UNIVERSIDADE Đ COIMBRA

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ASSESSING ENERGY-EFFICIENCY MARKET TRANSFORMATION: THE CASE STUDY OF A DEVELOPING ASIAN COUNTRY

Doctoral Thesis in Sustainable Energy Systems,
supervised by Professor Carla Margarida Saraiva de Oliveira Henriques
and Professor António Manuel Oliveira Gomes Martins,
and submitted to the Department of Mechanical Engineering,
Faculty of Sciences and Technology of the University of Coimbra

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Energy for Sustainability (EfS/MIT Portugal Program)

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Vivek Kumar Singh

Abstract

Traditionally, energy planning in developing Asian countries has neglected the structure of energy demand and how it is likely to evolve as development takes its path. Furthermore, the lack of concern with the conservation of energy and the limited availability of energy consumption data have made it very difficult to assess in a reasonable manner the potential for energy savings in the major energy end-use sectors. Energy planning is thus a challenging task, in particular with the continuous growth of agricultural and industrial activities. Henceforth, an up-to-date review of the main issues at stake regarding the choice of energy efficient technologies in India's residential sector, bringing to light the main challenges that have to be faced in the design of energy efficiency policies and programs in this country, has been first conducted based on extensive literature research.

Since energy efficiency and energy security have a prominent role in the economic and social development of all countries, the formulation of a proper modelling framework that supports decision-makers with the definition of energy policies without compromising future energy needs becomes timely and relevant.

From the different approaches available, Input – Output (IO) models are especially useful, since they allow considering different impacts that can be consistent with different energy policy options. In order to assist energy decision-makers of India on the appraisal of the future effects of the replacement of the current business as usual technologies (BAU) with energy efficient best available technologies (BAT), a novel IO modelling framework has been designed by introducing a bottom-up approach into an IO model which is combined with technical data for the holistic assessment of nine energy efficient technologies. A large size platform of real data has also been gathered considering different data sources, namely the household building stock characterization, the average number of operating days across the climatic regions of India, the lifetime and the investment cost of each equipment.

The trade-offs involved in the multi perspective assessment of the technologies under analysis were then evaluated by both considering the economic IO modelling framework developed and an economic analysis specifically addressing the net present value, the savings to investment ratio and the cost of conserved energy (also incorporating the private investor's concerns).

Finally, two modelling formulations were suggested which combine the use of the Economic IO Lifecycle (EIO-LCA) assessment with multiobjective interval portfolio theory to support public decision-makers on the design of programs to foster the investment on energy efficient technologies. Each model considers two objective functions: the maximization of the savings to investment ratio as a surrogate measure of return and the maximization of the minimum deviation of GHG avoided emissions/energy savings of the portfolio during its lifetime from the expected GHG emitted/energy embodied in its manufacture, as a proxy of risk minimization. In order to ensure a certain diversification level of the technologies to be subsidized, constraints were imposed on the maximal amount assigned to the energy efficient technologies under consideration, also assuring a given energy payback time (EPBT)/GHG payback time (GPBT). In this last case, the originality of this work is twofold: on one hand, the energy embodied in each energy efficient technology (EET) under scrutiny has been obtained through national I-O data avoiding the truncation problems usually found in traditional lifecycle inventories; on the other hand, besides the traditional EPBT/GPBT which only accounts for direct energy saving/GHG avoided emission effects, new EPBT/GPBT concepts are introduced which consider indirect and induced energy saving/GHG avoided emission effects.

The first and second formulations might be more suitable for countries with higher and lower emission factors regarding their electricity mix, respectively. In addition, a proposal for obtaining the efficient portfolio solutions was also suggested, which allows considering three types of investment strategies, i.e., a conservative strategy (leading to a lower number of subsidized devices), an aggressive strategy (leading to a higher number of subsidized devices) and a combined strategy. Finally, the anticipated economic, energy, environmental and social impacts (E3S) obtained in each solution previously computed are projected.

Keyword: Energy efficient technologies in India’s households, Economic Input-Output Lifecycle Assessment, Energy payback time, Greenhouse gas payback time, Multiojective interval portfolio models

Resumo

Tradicionalmente, o planeamento energético em países em vias desenvolvimento, em particular nos países asiáticos, tem negligenciado a estrutura da procura de energia e a sua evolução, num contexto de desenvolvimento económico crescente. Por outro lado, a falta de preocupação com a conservação de energia e a falta de disponibilidade de informação atualizada e detalhada, respeitante ao consumo de energia nestes países, têm dificultado a análise fundamentada do potencial efetivo de poupança energética nos sectores mais intensivos em energia. Neste âmbito, o planeamento energético apresenta diversos desafios, em particular com o crescimento contínuo dos setores de atividade agrícola e industrial. Por conseguinte, foi efetuada uma revisão crítica da literatura atualizada, respeitante às principais tecnologias eficientes de energia utilizadas no sector residencial da Índia, ressaltando os principais aspetos críticos que devem ser contemplados na elaboração de políticas e programas de eficiência energética neste país.

Como a eficiência e a segurança energéticas desempenham um papel proeminente no desenvolvimento económico e social de todos os países, a formulação de modelos adequados, que permitam apoiar os decisores, de forma consistente, na definição de políticas energéticas, sem comprometer as necessidades energéticas futuras, torna-se oportuna e relevante.

No que diz respeito às diferentes abordagens disponíveis na literatura científica, os modelos de Input – Output (IO) são especialmente úteis, pois permitem avaliar diferentes impactes que podem ser consentâneos com diferentes opções de política energética.

Neste âmbito, de modo a apoiar os decisores de política energética da Índia na avaliação dos efeitos potenciais resultantes da adoção de medidas de política que incentivem a adoção de tecnologias energeticamente eficientes, foi proposta uma nova ferramenta metodológica assente em análise IO. O modelo IO foi então ajustado para efetuar a avaliação holística de nove tecnologias energeticamente eficientes, através de uma abordagem *bottom-up* que combina dados técnicos com dados económicos. Neste contexto, foi construída uma plataforma de dados reais de dimensão considerável, tendo sido reunida informação proveniente de diferentes fontes de dados, tendo em conta, nomeadamente, a caracterização do parque habitacional, o número de dias em que as tecnologias operam, em média, de acordo com as regiões climáticas da Índia, a vida útil e o custo de investimento de cada equipamento.

De modo a ser possível avaliar os *trade-offs* envolvidos na avaliação multidimensional de cada tecnologia analisada, foi utilizada a ferramenta metodológica anteriormente desenvolvida e foi encetada uma análise económica, contemplando especificamente o valor atualizado líquido, o rácio entre poupança e investimento e o custo da energia conservada de cada equipamento (incorporando também as preocupações do investidor privado).

Finalmente, foram sugeridas duas formulações matemáticas que combinam o uso da Análise do Ciclo de Vida IO (ACV-IO) com modelos do *portfolio* multiobjectivo intervalares para apoiar os decisores públicos na proposta de programas para fomentar o investimento em tecnologias energeticamente eficientes. Cada modelo considera duas funções objetivo: a maximização da relação entre poupança e investimento, como medida de retorno, e a maximização do desvio mínimo entre as emissões de GEE evitadas/energia poupada durante a vida útil do equipamento e os GEE emitidos/energia incorporada nas fases de fabrico e instalação, como *proxy* de minimização do risco. Com o objetivo de garantir um certo nível de diversificação das tecnologias a serem subsidiadas, impuseram-se restrições ao montante máximo a afetar às tecnologias energeticamente eficientes, assegurando, simultaneamente, um determinado tempo de retorno energético (EPBT)/tempo de retorno carbónico (GPBT). Neste último caso, a originalidade deste trabalho é dupla: por um lado, a energia incorporada em cada tecnologia energeticamente eficiente sob escrutínio foi obtida através de dados IO, evitando os problemas de truncagem normalmente encontrados nos inventários de análise do ciclo de vida; por outro lado, além do tradicional EPBT/ GPBT, que apenas contabiliza os efeitos diretos da energia poupada/emissões evitadas de GEE, são introduzidos novos conceitos de EPBT/GPBT que consideram os efeitos indiretos e induzidos pela poupança energética/emissões evitadas de GEE. A primeira e a segunda formulações podem ser mais adequadas para países com maiores e menores fatores de emissão em relação ao seu *mix* de fontes energéticas utilizadas na produção de eletricidade, respetivamente. Adicionalmente, foi ainda sugerida uma proposta para obter soluções eficientes, considerando três tipos de estratégias de investimento, isto é, uma estratégia conservadora (conduzindo à subsidiação de um menor número de equipamentos), uma estratégia agressiva (conduzindo à subsidiação de um maior número de equipamentos) e uma estratégia combinada.

Palavras-chave: Tecnologias energeticamente eficientes no setor residencial da Índia, Análise do ciclo de vida input-output, Tempo de retorno energético, Tempo de retorno carbónico, Modelos de *portfolio* multiobjectivo intervalares

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List of acronyms

ACEEE - American Council for an Energy-Efficient Economy

AEC - Avoided energy cost

AS/NZS - Australian standards/ Standards New Zealand

BAT - Best Available Technology

BAU - Business-As-Usual

BEE - Bureau of Energy Efficiency

BIS - Bureau of Indian Standards

BLY - Bachat Lamp Yojana

CCE - Cost of conserved energy

CCF - Cold-cathode fluorescent lamp

CDM - Clean Development Mechanism

CEA - Central Electricity Authority

CEMEP - European Committee of Manufacturers of Electrical Machines and Power Electronics

CF - Ceiling fan

CH4 - Methane

CLASP - Collaborative Labelling and Appliance Standards Program

CO - Carbon monoxide

CO_2 - Carbon dioxide

COM - Computer

COPANT - Pan American Standards Commission

CRT - Cathode Ray Tube

CSA - Canadian Standards Association

DELP - Domestic efficient lighting program

DSM - Demand Side Management

E3 - Economic, Energy and Environmental

E3S - Economic, Energy, Environmental and Social

ECM - Energy conservation measures

EE - Energy Efficiency

EE-IO - Environmentally Extended I-O Analysis

EEM - Energy efficiency measures

EET - Energy efficient technology

EG – Electric water heater/ geyser

EIO - Economic Input-Output

EMP - Employment

EPA - Environmental Protection Agency

EPAcT - Except Fire Pump Motors

EPBT - Energy payback time

ERC - Electricity regulatory commissions

ESCO’s - Energy Service Companies

FL - Fluorescent Lamp

FR - Freezer

GDP - Gross Domestic Product

GEF - Global Environment Facility

GHG - Greenhouse Gas

GVA - Gross Value Added

GWP - Global Warming Potential

IBE - Institute of Building Efficiency

IEA - International energy agency

IEC - International Electrotechnical Commission

IIASA - International Institute for Applied Systems Analysis

IL - Incandescent Lamp

IND – India

I-O - Input-Output

IPCC - The Intergovernmental Panel on Climate Change

LBNL - Lawrence Berkeley National Laboratory

LCA – Lifecycle Assessment

LCD - Liquid Crystal Display

LED - Light-Emitting Diode

LPG - Liquefied Petroleum Gas Cooking Stove

MESSAGE - Model for Energy Supply Strategy Alternatives and their General Environmental Impact

MOLP – Multiobjective Linear Programming

MP - Motor pump

MT - Market Transformation

N2O - Nitrous oxide

NAPCC - National Action Plan on Climate Change

NEMA - National Electrical Manufacturers Association

NH3 - Ammonia

NMVOCs - Non-Methane Volatile Organic Compounds

NOx - Nitrogen oxide

NPV – Net present value

NSSO - National Sample Survey Office

O&M - Operation and maintenance

RAC - Room air conditioners

RAMA - Refrigeration and Air-Conditioning Manufacturers Association of India

S&L - Standard and labelling

SCCE - Supply curve of conserved energy

SDA - Structural decomposition analysis

SEEP - Supper efficient equipment program

SIR - Savings to investment ratio

SOx - Sulphur oxide

TESP - Technical energy savings potential

TFL - Tubular Fluorescent Lamp

TOFP - Tropospheric ozone formation potential

TPS – Technical potential saving

TV – Television

UEC - Unit energy consumption

UJALA - Unant Jyoti by affordable LEDs for all

UNDP - United Nations Development Programme

UNFCCC - United Nations Framework Convention on Climate Change

USEPA - United States Environmental Protection Agency

VIP - Vacuum insulation pumps

WEP - Water electric pumps

WM - Washing machine

Key terminology

Activity sectors	The economic sectors within the I-O table, including manufacturing, services and agriculture.
Aggressive strategy	An investment strategy which is aimed at maximizing returns by taking a relatively higher degree of risk.
Appliances/end-uses	Typical domestic appliances and other electrical equipment used in households.
Appliance projections	The penetration rate of appliances across the time horizon based on current sales and households' appliance ownership.
Avoided acidifying potential	The avoided acidification potential is measured in SO2 equivalents of major acidifying substances (NH3, SO2, NOx).
Avoided emissions	Reduction in emissions due to energy efficient appliances/end-uses replacing less efficient ones (BAU).
Avoided energy costs	Avoided costs due to the energy saved during the operation phase of energy efficient appliances/end-uses.
Avoided GHG emission potential	Avoided GHG emission potential measured in CO2 equivalents of major acidifying substances (CO2, CH4, N20).
Avoided tropospheric ozone formation potential	The avoided tropospheric ozone formation potential is measured in NMVOC equivalent of major acidifying substances (NMVOC, CO, CH4, NOx).
Base year	Reference year for which most recent data are available.
Basics prices	Cost of goods and services used in the production process + Remuneration of production factors + Other taxes on production – other production subsidies.
Best available technology (BAT)	Best available energy efficient technology existing in the market.
Business as usual technology (BAU)	Current available energy efficient technology existing in households.
Combined strategy	The strategy of investment which combines aggressive and conservative strategy features.
Conservative strategy	An investment strategy which is aimed at maximizing returns by taking a relatively minimum degree of risk.
Cumulative value	A sequence of yearly sums for a certain time horizon.

Direct coefficients	Direct relation between an indicator and the output of an activity sector of the I-O table (it is obtained, for example, by dividing the input of fuels/labor utilized by the domestic output of each activity sector).
Direct impacts	The impacts on domestic production levels of the activity sectors which are directly engaged in the manufacture of the appliances/end-uses under assessment due to the the investment on these technologies (e.g. domestic production of metal required in the manufacture of washing machines).
Disposal income	Amount of income available in households after deducting taxes and social security charges.
Economic impacts	Estimated changes in economic activity due to the investment on each technology.
Electricity mix	Electricity generation mix.
Employment generation	Employment generation due to the investment on each technology.
Energy demand	Energy consumed in households during the operational stage of technologies.
Energy efficiency	The ratio between energy output and energy input. A certain energy service level provided by an efficient device requires less energy input than the same energy service level provided by a less efficient device.
Energy efficiency investment	Investment on energy efficient technologies.
Electricity generation cost	The cost of producing electricity according to a certain electricity generation mix.
Energy payback time	The time to recover the embodied energy in the manufacturing of appliances, based on annual energy saved during operation.
Electricity price	The purchase cost of electricity by households.
Final demand	Household Final Consumption + General Government Final Consumption + Non-Profit Institutions Serving Households (NPISH) in monetized energy consumption value + Gross Fixed Capital Formation (GFCF) + Valuables, Changes in Inventories + Exports (monetized energy consumption value)
Global warming potential	Measures how much heat a GHG traps in the atmosphere considering a similar mass of CO2.

Greenhouse payback time	The time to recover GHG embodied emissions in the manufacturing of appliances, based on annual avoided GHG emissions during operation.
Gross value added	Measures the value of goods produced in a country and it is obtained by deducting intermediate consumption to the output value.
Indirect impacts	The impacts on domestic production levels of the activity sectors which are in the supply chain of the industries directly engaged in the manufacture of the appliances/end-uses under assessment due to the the investment on these technologies (e.g. domestic production of the activity sectors supplying the industry that produces the metal required in the manufacture of washing machines).
Induced impacts	Flows of money coming in and out of households and the corresponding effects on industries. In order to arrive at the induced effects, it is required to include the household's sector within the I-O matrix. The model becomes closed and the household sector is handled as an additional industry, implying the introduction of an additional row and column into the I-O table for 'compensation of employees' and 'household expenditures', respectively.
Lifecycle phases	Manufacturing and operational phases associated with traditional as well as energy efficient technologies.
Market transformation	According to (ACEEE), the term market transformation refers to the strategic process of intervening in a market to create lasting change in market behaviour by removing identified barriers or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice.
Net emissions	The emissions associated with the adoption of energy efficient technology when contrasted with BAU technology.
Savings to investment ratio	The SIR considers the total present value of energy savings (in USD) over the lifetime of the equipment divided by the cost of the investment (in USD).
Technical energy savings potential	The energy saved due to replacement of BAU by BAT

Type I Multipliers	Measure the impacts of investment and O&M expenditures, including impacts on upstream industries (i.e. direct and indirect effects). Type I multipliers are obtained by considering (direct effect + indirect effect)/direct effect).
Type II Multipliers	Measure the impulse from household income due to changes in the investment on BAT/BAU appliances. Type II multipliers are obtained by considering (direct effects + indirect effects + induced effects)/direct effect).

Units of measure and conversion factors

Area	m^2	square meter
	sq. ft.	square foot
Emissions	tCO_2	tonnes of carbon dioxide
	$MtCO_2$	million tonnes of carbon dioxide
	$MtCO_2eq$	million tonnes of carbon dioxide equivalent
	tSO_2	tonnes of sulphur dioxide
	$MtSO_2$	million tonnes of sulphur dioxide
	$MtSO_2eq$	million tonnes of sulphur dioxide equivalent
	tNMVOC	tonnes of NMVOC
	MtNMVOC	million tonnes of NMVOC
	MtNMVOCeq	million tonnes of NMVOC equivalent
Energy	kWh	kilowatt-hour
	GWh	gigawatt-hour
	W	kilowatt-hour
Power	kW	kilowatt (1 watt * 10^3)
	MW	megawatt (1 watt * 10^6)
	GW	gigawatt (1 watt * 10^9)
	TW	terawatt (1 watt * 10^{12})
Volume	m^3	cubic meter
	l	liter
	kg	kilogram
	toe	tonnes of oil equivalent
	1 toe	11,630 kWh.
Time	T	year(s)
Temperature	°C	degree Celsius
Monetary	USD	US dollars ($)
	$ Million	1 US dollar * 10^6
	₹ INR	Indian rupees

CHAPTER 1

Introduction, research motivation and objectives

1. Background and motivation

The Intergovernmental Panel on Climate Change (IPCC) has stated that anthropogenic effects on the natural environment have led to irreversible climate change due to greenhouse gas (GHG) emissions [1]. Climate change effects should be assessed using an integrated evaluation tool which combines economic, energy and environmental concerns, allowing a cost benefit analysis of emission reduction policies and reduction in energy consumption [2]. GHG can be reduced with the lowering of the performance of economic activity or by enhanced energy efficiency with technological improvements) [3]. Improving energy efficiency can be more effective in preventing climate change than the development of renewable energy supply technologies. In fact, improving end-use energy efficiency might be considered as the most effective way to mitigate climate change [4]. Reducing energy use is seen as a key solution to the problem of reducing GHG emissions. According to the International Energy Agency (IEA), improved energy efficiency in buildings, industrial processes, and transportation could reduce the world's energy needs in 2050 by one-third, and help control global emissions of GHG [1], [5].

Besides the advocated positive effects on energy security and the environment, energy efficiency also plays a key role on the achievement of economic and health benefits, namely on job generation, since a strong energy efficiency sector helps fostering a job – rich economy; improved indoor air quality, because better building equipment can improve air quality and comfort and reduce illness, thus improving workers' productivity; and induce local businesses and cluster development [6].

The development of energy efficiency measures entails an array of barriers to market transformation, including the requirement of greater innovation, the filling of workers skill gaps, consumer misinformation and difficulty of access to capital.

2. Research significance

Consumers should be provided with information about the complete lifecycle cost of energy efficient appliances and the corresponding performances in various climatic regions. Better data about energy consumption can empower consumers and policy makers to more efficiently facilitate reductions in energy consumption [7]. Many consumers desire to reduce energy consumption and consequent GHG emissions but lack the knowledge, resources, and capital to do so. On the other hand, it is essential to have access to baseline statistical data on energy consumption in different sectors of the economy to gauge the effectiveness of energy efficiency programs.

The market for energy savings remains untapped for a variety of reasons such as the relatively poor understanding by both policy makers and consumers about how and why consumers use energy. Numerous studies have explored how better data and feedback for users may result in reduced energy consumption over various periods of time. Another way in which policy makers and researchers currently can gain further insights into energy use and GHG emissions is through I-O models and multiobjective decision-making models. These allow modelling all monetary transactions between the activity sectors of an economy across the supply chain to generate a given output consistent with the objectives considered.

3. Research objectives

This study is aimed at designing a multiobjective I-O modelling framework for assessing several measures to promote energy efficient end-use technologies in India's residential sector, which assists planners and energy decision-makers of India on the appraisal of the future impacts of public policies towards energy efficiency improvements and thus help to shape future energy plans in this country.

The research work developed will help to answer the following questions:

- What are the main challenges ahead regarding the design of energy efficiency policies in India?
- What are the major energy efficient technologies/end-use technologies in the residential sector that require particular attention regarding the design of energy efficiency policies in India?
- How can energy decision-makers in India assess the major Economic, Energy, Environmental and Social (E3s) impacts and trade-offs regarding the adoption of different energy efficient technologies/end-uses with particular focus on the residential sector?
- How should energy efficient technologies be subsidized in India's residential sector and what are the anticipated E3S impacts?

4. Research limitations

The methodological framework developed in this study only addresses India's residential sector, and its scope might be seen has reductive. However, with the suitable adjustments this type of modelling approach can be designed to accommodate other technologies typically used in other sectors and/or in other world regions. An additional limitation refers to the fact the methodology followed did not consider India's distinct climatic regions (i.e. hot and dry, warm and humid, moderate cold and cloudy, cold and sunny), only accounting for the household building stock characterization, the number of operating days according to the average climatic regions of India, the lifetime and the investment cost of each equipment. Finally, besides the limitations inherent to the use of the I-O approach that will be further discussed in the next chapters, the lack of recent data, has led to the consideration of 2011 as the base year of this study, since the latest Census published by the Government of India dates back to 2011.

5. Research structure

This thesis is organized as follows:

Chapter 1 presents the major motivations, significance, objectives and limitations of this work.

Chapter 2 describes the main concepts that can be found in the scientific literature which motivated this work; provides an up-to-date review of the main issues at stake regarding the choice of energy efficient technologies in India's residential sector bringing to light the main challenges that have to be faced in the design of energy efficiency policies and programs in this country.

Chapters 3 and 4 propose a novel I-O modelling framework by introducing a bottom-up approach into an I-O model which is combined with technical data for the holistic assessment of nine energy efficient technologies in the residential sector, which can assist energy decision-makers of India on the appraisal of the future impacts of the adoption of these energy saving technologies.

Chapter 5 suggests two modelling formulations which combine the use of the Economic Input-Output Lifecycle assessment with multiobjective interval portfolio theory to support public decision-makers on the design of programs to foster the investment on energy efficient technologies. Additionally, a proposal for obtaining the efficient portfolio solutions is also suggested, which allows considering three types of investment strategies, i.e., a conservative strategy (leading to a lower number of subsidized devices), an aggressive strategy (leading to a higher number of subsidized devices) and a combined strategy. Finally, an assessment of the E3S impacts (based on the modelling framework developed in Chapters 3 and 4) of the different energy efficient technology portfolios obtained in this Chapter is also conducted.

In Chapter 6, some conclusions are drawn and future research developments are indicated. Figure 1.1 depicts a schematic outline of the thesis.

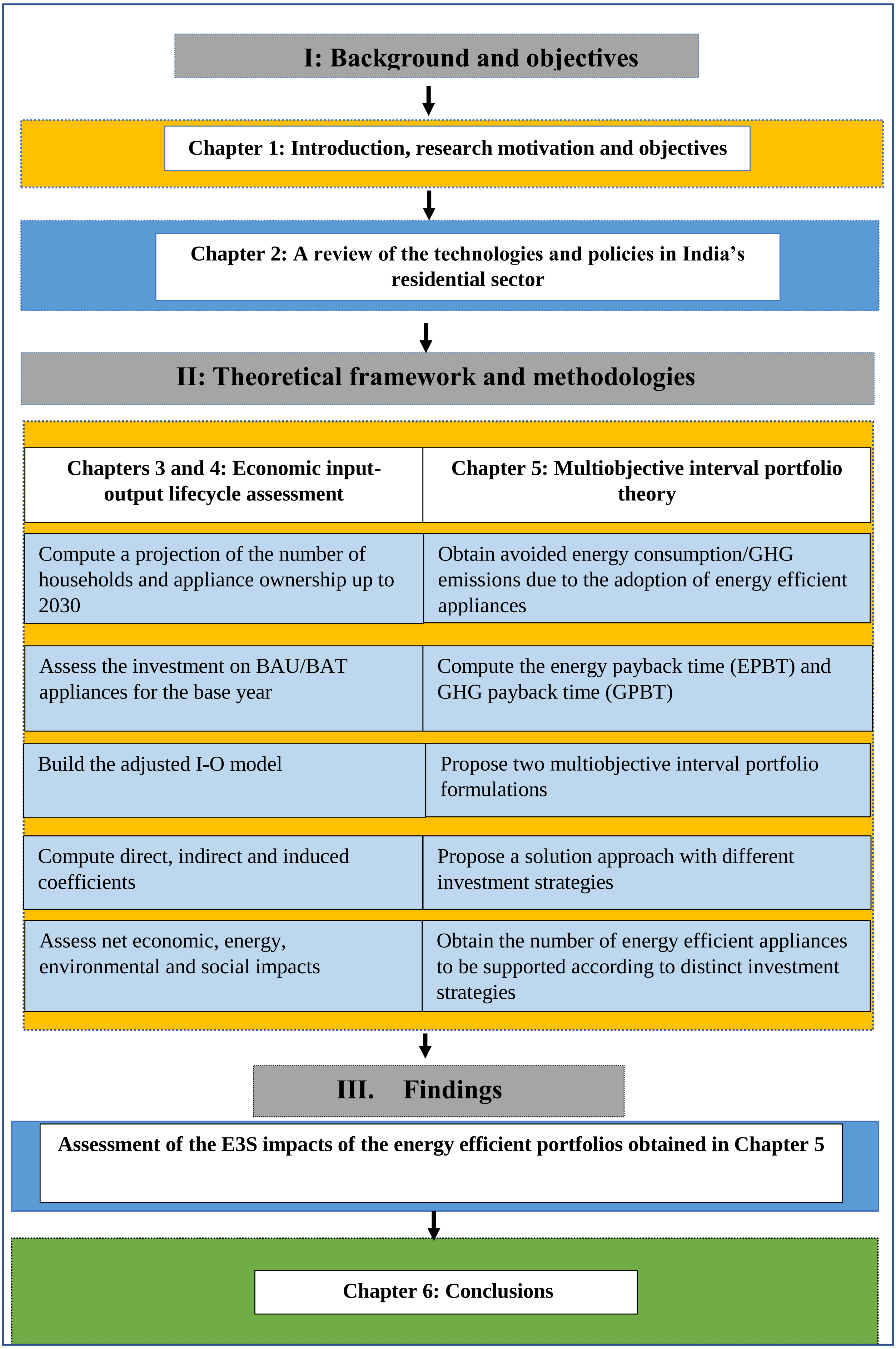

Figure 1.1. Schematic outline of the thesis

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CHAPTER 2

A review of the technologies and policies in India’s residential sector

Although the version presented here has been modified in such a way that notation follows the rest of the thesis, this chapter is based on:

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins “Assessment of energy efficient appliances: A review of the technologies and policies in India’s residential sector”, Wiley Interdisciplinary Reviews: Energy and Environment. https://DOI: 10.1002/wene.330).

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1. Introduction

Energy performance on a global scale depends on several factors such as energy supply, energy demand and market transformation [1]. Therefore, the implementation of energy efficiency measures in commercial and residential sectors plays a prominent role in the reduction of energy demand, further contributing to reduce global warming [2]. According to a IEA report, 71% of the world greenhouse gas (GHG) emission reduction would come from energy efficiency improvements by 2020 and 38% by 2050 [3]. Energy efficiency is recognized as a key strategy to tackle three energy-related challenges – climate change, energy security and economic development – at the least cost to society [4]. Additionally, the policies promoting energy efficiency in the household sector are significantly and positively related to energy efficient innovations introduced in the building sector and lighting technologies, particularly among the developing countries of the Asia-Pacific region [5]. Furthermore, developing countries face critical energy security issues due to their fast economic growth inherently supported by an increasing demand for energy [6]. In fact, in 2014, India's domestic sectors consumed about 45% of primary energy [7]. In the domestic sector, energy is primarily used for electrical equipment/appliances, lighting and cooking, [8].

The first studies aimed at estimating the potential energy savings obtainable with the use of more efficient refrigerators and air conditioning systems in India's households were published by [9]; [10]; [11]; [12]. The Lawrence Berkeley National Laboratory (LBNL) also published a report on the assessment of the potential energy efficiency improvements of India's residential sector. However, the type of analysis therein presented accounted for the energy savings potential in the residential sector as a whole rather than per appliance or end-use. In another study conducted by the LBNL, projections were issued regarding the required energy efficiency improvements in India's residential sector to cope with the residential electricity demand in the future [13]. The World Bank estimated the ownership rate of various electrical appliances in India's residential sector based on the projected income [14]. In a study prepared by the LBNL, several strategies were also discussed for attaining low carbon growth in India's industry and non-residential sectors. Since then, few publications arose in the scientific literature trying to estimate ownership rates for selected appliances, particularly addressing air conditioner systems [15], electric fans, television and refrigerators [16].

More recently, the India's Low Carbon Strategy for Inclusive Growth highlights the importance of the potential energy savings achievable with the use of energy efficient appliances [17]. According to the standards and labelling (S&L) scheme recognized by the Bureau of Energy Efficiency (BEE) of the Government of India there are ten out of twenty-one types of star-rated appliances used in households.

In an environment of rapid economic growth with high urbanization rates, the growing India's middle class pursues higher comfort levels through the purchase of a large number of appliances [18]. Therefore, the consequent rise in energy consumption and GHG emissions can be significantly mitigated if consumers are motivated and made aware of the different options that the market has to offer regarding the panoply of energy efficient technologies (EET) available [19].

In this context, this paper provides an updated and systematic review which aims at contributing to the discussion of the main challenges ahead regarding the design of energy efficiency policies in India. In Section 2 a brief overview of the current energy consumption patterns in India will be presented. Section 3 provides a brief overview of the technological characteristics of the appliances/end-uses typically used in India's residential sector. Section 4 describes the specific features of these appliances/end-uses. Section 5 reviews some dimensions of the energy efficiency governance framework in India. Section 6 discusses the most important co-benefits associated to the use of energy efficient appliances. Section 7 addresses the market transformation overarching framework regarding energy efficiency. Section 8 is foremost dedicated to the energy efficiency market barriers. Finally, some conclusions are drawn that can contribute to the discussion and design of energy efficiency policies and programs in India.

2. Electricity consumption patterns in India

Energy is the basic building block of economic development [20]. Energy consumption plays an important role in growth and development processes as it facilitates production and improves household welfare [21]. Final energy consumption is usually allocated to three main activity sectors: industry, transport and 'others' – including agriculture, services and the residential sector [22]. The share of the residential sector electricity consumption in India reached about 24 % in 2016-2017 [23]. Therefore, after industry, which accounts for 40.1 % of the total electricity consumed in India, the residential sector is the second biggest energy consumer. Figure 2.1 highlights the contrasting electricity consumption patterns in different sectors from 2011 to 2017 [23]. Electricity consumption in the residential sector has been increasing 2.20 % per year while in the industrial sector it has been decreasing about 2.24 % over the last five years.

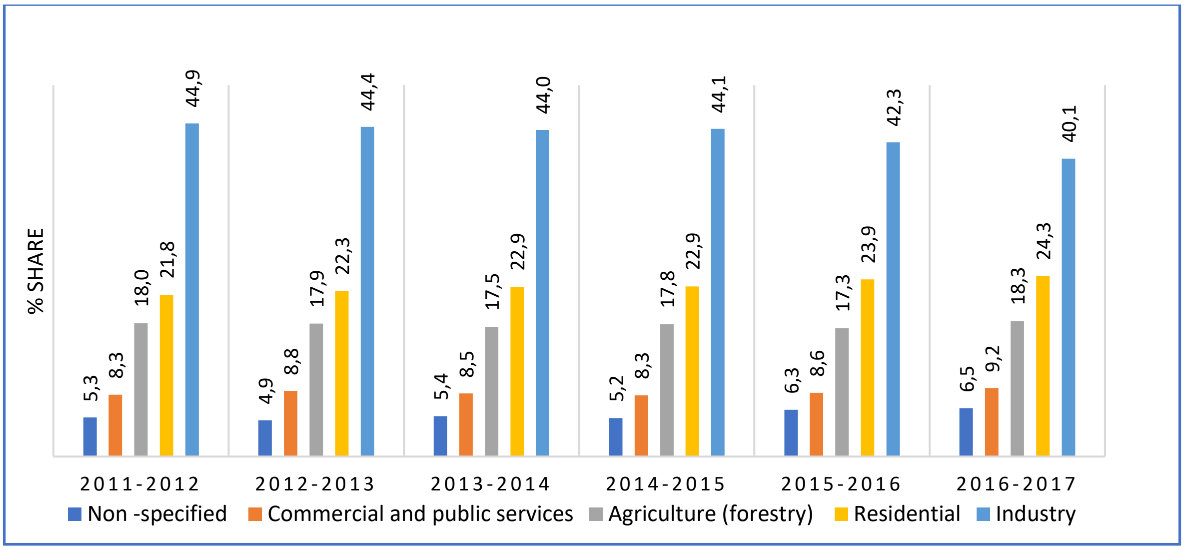

Figure 2.1. Share of electricity consumption by activity sectors from 2011 to 2017 in India

In 2014, the countries with the highest share of electricity consumption in the residential sector were the United States (36.88 %), France (36.46 %) and the United Kingdom (36.12%) – Table 2.1. In developed countries the energy consumption shares in the residential sector reach 20% to 37% of the total energy use while in BRICS (Brazil, Russia, India, China, South Africa) these values range between 15% to 25% of total electricity consumption in the residential sector [24].

Table 2.1. Electricity consumption per country in 2014

Country	Non - specified %	Agriculture (forestry) %	Commercial and public services%	Residential %	Transportation %	Industry %
Australia	0	1.11	29.11	29.64	1.95	38.20
Canada	0	1.82	29.49	30.49	0.84	37.36
France	0.36	1.84	32.11	36.46	2.86	26.34
Germany	0	0	28.62	26.05	2.30	43.02
Italy	0	1.96	30.42	23.41	3.63	40.55
Japan	0.75	0.10	36.10	31.14	2.02	29.90
Korea	0	1.99	31.69	13.27	0.47	52.06
United Kingdom	0	1.22	30.57	36.12	1.29	30.8
United States	3.89	0.83	35.52	36.88	0.18	22.7
South Africa	1.69	2.90	14.30	19.68	1.94	59.5
Brazil	0	4.92	25.29	24.88	0.59	44.32
Republic of China	7.63	2.45	5.92	15.06	1.26	67.68
Russian Federation	0	2.06	21.87	17.86	12.43	45.74
European Union -27	0.30	1.58	30.21	29.62	2.29	35.98
India (2014-2015)	5.20	17.81	8.26	22.92	1.71	44.11
World	**4.07**	**2.84**	**22.06**	**26.99**	**1.53**	**42.52**

3. Technological characteristics of appliances/end-uses

India is rapidly transforming into an urban country, but small towns and farming communities still make up the clear majority of its population. A government's survey shows that the spending patterns of India's population in cities and villages are fast converging, as rural households now pay for most goods and services usually associated with urban lifestyles [25].

The steady increase of technological innovation has had significant repercussions on the electrical appliances available on the market. In order to promote the reduction of energy consumption of appliances in the residential sector it is necessary to foster the investment on highly efficient appliances [26]. In the next sub-sections, we present a thorough description of the main end-use appliances that may be found in India's residential sector.

3.1 Room air conditioners

Room or window air conditioners cool limited areas rather than the complete building. If cooling is provided only where it is needed, room air conditioners are less expensive to operate than central units, despite the fact that their efficiency is generally lower than that of central air conditioners [27]. The businesses and residences of India use both window-mounted and split air conditioning units. Historically, window units have conquered the market, and most of air conditioners were sold to businesses. Since 2008, the BEE presented a plan for progressively improving the efficiency of room air conditioning and promoting the market transformation towards better energy efficiency standards. In 2016 the S&L program has had a positive impact on the market penetration of energy efficient air conditioners, with the sales of 5 star rated systems reaching a share of 34% [28]. Finally, it is worth mentioning that the BEE has also adjusted the standards for certifying the star-rating of these devices in such a way that the 5 star label rating obtained in 2010 became only 3 star label rating in 2015 and will become 1 star in 2018 according to the new India’s Seasonal Energy Efficiency Ratio (ISEER) methodology [29].

3.2 Ceiling fans

Ceiling Fans (CF) are the most common electrical appliances after electric lighting in India’s households and offices, and nevertheless, they have been rarely mentioned in the discussions of energy efficiency concerns [30]. In 2017, CF consumed about 20% of the electricity in India’s households, and their numbers are increasing rapidly [31]. The production of CF in India is about 40 million units per year, which, in 2010 (the most recent data known to the authors), corresponded to 28 million units in terms of annual sales just for India [30]. The Bureu of Indian Standards (BIS) is responsible for specifying the minimum performance requirements for CF. Most of the chief brands also have energy saving models which consume at around 35 W [31]. In 2016, the positive impacts of the S&L program can be seen in the sales of CF, which corresponded to nearly 100% of 5 star products [28].

3.3 Lighting

In 2015, lighting was also a major energy consumer, representing roughly 20% of electricity consumption in India [32]. There is a significant technical potential to reduce energy consumption from electric lighting with high efficient lamps, light control systems and improved building designs [33]. Much higher improvements are possible with gas discharge lamps, typically Fluorescent Lamps (FL), and with solid-state Light-Emitting Diode (LED). FL are low-pressure gas discharge light sources, producing light mainly by fluorescent powders which get activated by ultraviolet radiation created by discharges in mercury [34]. The lighting appliance stock data from Electric Lamp and Component Manufacturers Association of India (ELCOMA) estimated that, in 2014, there were about 780 million incandescent bulbs (IL), 234 million FL and 453 million Compact Fluorescent Lamps (CFL) [35].

In the building sector both Tubular Fluorescent Lamp (TFL) and CFL are the most commonly used lighting sources, with the latter gaining an increased popularity due to a sharp price drop in the past and to its similarity with IL [36]. Over the last decades, many governments have passed measures to replace conventional IL with CFL, as they only require around one-quarter to one-third of electricity to produce the same amount of visible light [33]. Additionally, although LED lighting technology only represented 1% of the market share in 2013 it represented 70% in 2017 [37]. In fact, LED lighting technology may lead to 75 % of energy savings [38] and longer life spans than IL [39]. Nevertheless, a major market barrier for CFL and LED is their higher initial costs in comparison to IL, although they are normally more economical on a life cycle basis, because of their lower energy consumption and longer lifetimes [40]. Other market barriers are lack of consumer awareness and distrust of consumers in the technology, as CFL had at the beginning of its commercialization some quality and suitability issues to overcome [41].

3.4 Refrigeration

Refrigeration appliances can be categorized into four groups: refrigerator/freezer combinations, refrigerators only, refrigerators with freezer compartments and freezers only [41]. The technologies across the different categories have very similar operation modes, which are typically based on an electrically driven vapour compression refrigeration cycle [42]. There are two main product groups for residential refrigerators in India: single-door direct cool (manual defrost) and two-door frost-free. Traditionally, direct cool units have taken over the market, but frost-free units are gaining importance. Several low-cost technologies for refrigeration appliances are available to improve their energy efficiency. The LBNL assessed a cost-effective approach for accomplishing the reduction of energy consumption in this type of electrical devices from 4-71% through the enhancement of its design just by including thicker insulation, increasing the surface area of evaporators and condensers and incorporating higher efficiency compressors, thermostatic controls, Vacuum Insulation Pumps (VIP) and optimized capillary tube characteristics[41], [43] . In 2016, the sales of 5 star refrigeration appliances in India had a share of 25%, while the 4 star represented 10%, the 1 and 2 star corresponded to 18% and the 3 star attained 29%, respectively [28].

3.5 Televisions (TV)

A rapid improvement of energy efficiency in TV's happened in the last decade (e.g., Cathode-Ray Tube (CRT) to Liquid Crystal Display (LCD) and cold-cathode fluorescent lamp backlit LCD (CCFL-LCD) to LED backlit LCD (LED-LCD)), although simultaneously with an expected increase of penetration in households, especially in emerging economies, as well as the anticipated increase of the average screen size of the TV sets purchased [44]. The market transition regards the replacement of cold CCFL backlit LCD TV with higher efficient LED backlit LCD TV. The well-known progressive shift from analogue to digital TV as well as the improvement of energy efficiency standards increased world-wide [44]. Plasma TV have a small portion of sales and are mainly present in the market for large screen sizes [45]. Screen sizes and time of use have considerable impacts on annual electricity consumption. For instance, a growth in the diagonal's screen size of 40% leads to a 60% increase in electricity consumption [46]. In 2016, the share of 2 star TV sales in India was 55%, while 4 star and 3 star corresponded to a share of 20 % and only 5% were attained for 1 star TV sales [28].

3.6 Water heaters

Water heaters are major energy consumers both in the residential and the commercial sectors. Conventional storage water heaters and instantaneous water heaters remain the most popular types of water heating systems for homes and buildings [47]. A storage water heater operates by releasing hot water from the top of the tank when a hot water tap is turned on. To replace that hot water, cold water enters the bottom of the tank, ensuring that the tank is always full [33]. On the other hand, instantaneous water heaters produce hot water on demand using a gas burner or electric heating coil. Thus, instantaneous water heaters tend to have higher energy efficiencies by eliminating standby heat losses associated with a tank and often substantially reducing pipe losses [48]. Gas water heaters have normally lower rated energy efficiencies than electric ones, due to the combustion efficiency of gas and higher tank losses. However, these can represent an overall higher energy efficiency considering the energy source used, since there are no intermediary energy conversions to electricity when gas is directly burned to obtain heat. Condensing water heaters improve the energy efficiency of storage and instantaneous gas water heaters by about 10-30% capturing the latent heat of the combustion gas before it exits [49].

In India, the BEE labelling scheme for this sort of equipment has been in place for several years and it was voluntary until July 2015 [50]. Currently, however, there are mandatory labels for storage electric water heaters which consider a star rating system based on the standing (heat/energy) losses (kWh/24hour/45°C difference) calculated according to IS 2082:1993. In this context, water heaters are categorized in 10 different rated capacities ranging from 6 to 200 litres [51].

3.7 Electric water pump motors

In India, pumps are used in the domestic, industrial and agriculture sectors. India's agriculture sector is the largest user of pumps, for several applications such as irrigation and water distribution; in the industrial and domestic sectors, pumps are used for water supply, sewage and chemical supply.

The BEE has included the electric water pump sets in the voluntary labelling scheme. Most of the national manufacturers consider the star labelling program is an appropriate approach to save electricity [52]. A study by Shakti Foundation has shown that the market shares of pumps by end-users, are 30% for domestic, 35% for industrial and 35% for the agriculture sector with an estimated total motor manufacturing growth of 22% between 2009 to 2014 [53]. India's household water pumps lie between a rated output of 0.37 to 2.2 kW [54]. The star labelling rating of electric motors by the BEE is categorized in accordance with the International Electrotechnical Commission (IEC) standards. The motors lie between the ranges of IE1 to IE3 standard with an operating efficiency of 69 to 90% for all 2 pole, 4 pole and 6 pole motors. Around one third of the energy savings potential for electric motors is observed in motors ranging from 0.75Kw to 4 kW [47]. IEC has concentrated on single-speed, three-phase, 50Hz and 60Hz AC squirrel-cage induction motors in the range 0.75kW to 375kW in its published standard IEC 60034-30:2008 and reviewed by IEC 60034-30-1:2014 [55].

3.8 Computers

The Environmental Protection Agency (EPA) started a system of energy star rating in July of 2009 to classify computers, laptops and tablets based on their yearly electricity consumption [56]. The standards were set so that only 25% of the most efficient computers made the cut. This made sure that the energy star classified computers were 30% more efficient than the non-classified ones. The Computer Specification, Version 5.0 (2009), classification suggested by EPA is given below: Category A: <= 148.0 kWh, Category B: <= 175.0 kWh, Category C: <= 209.0 kWh, Category D: <= 234.0 kWh. The BEE has extended the application of this energy star rating system to India for computers and laptops [57].

3.9 Washing machines

Although not mandatory, the BEE always recommends the purchase of 5 star rated washing machine devices. The BEE labelling system of energy efficient washing machines depends on the size and front load or top load and water efficiency [58]. Washing machines in India are broadly classified into two categories: semi-automatic and fully automatic. Washing machines with a lower capacity range from 5 kg to 9 kg. On the other hand, the capacity of fully automatic washing machines varies from 6 kg to 11 kg, going up to 17 kg in some brands [59].

4. Specific features of appliances/end-uses

Over the last two decades, the ownership rate of electrical appliances has increased substantially both in rural and urban households due to the rise of the income level [60], [61]. The market of electronic appliances in India has been growing consistently mainly due to affordable prices, constant technological innovations and intense competition.

In the next subsections the distinct features of each appliance under consideration will be presented.

4.1 Lifetime

The lifetime mainly depends on the operating hours (e.g. TFL usually are assumed to last 20,000 hours, under the assumption of daily use of 4 hours, which corresponds to an average lifetime of 14 years). In spite of longer lifetimes achieved by technological advancements, these are being overshadowed by fast consumption trends [62]. The lifetime also depends on the consumption behaviours and on the socioeconomic characteristics of households (e.g. a household with many members will have a more intensive use of a washing machine) [63]. Table 2.2 presents the average lifetime of several appliances typically used in India's households.

4.2 Operating time

India can be divided into five different climatic regions, i.e. hot and dry, warm and humid, composite, temperate and cold [64]. Hence, the operating time of appliances differs according to each climatic region. The operating time is usually calculated based on the power of the devices (W), on the frequency of use and on the average regional climatic conditions and average working days (e.g. on average, CF are used 8 hours per day and for about 200 days per year). Table 2.3 depicts the operating time of the main appliances typically used in India's households based on available literature [12], [65], [14]. The discrepancy of data presented in Table 2.3 regarding the appliances' operating time can be attributed to several differences among the targets of the reported studies, namely the family size, the geographical regions as well as differences between rural and urban households.

Table 2.2. Lifetime of the main appliances typically used in India's households

Appliance/ end-use	Lifetime in years	References
TFL	14*	[66]
EG	15	[67]
TV	10	[68]
CF	15	[66], [69]
FR	15	[66], [70]
RAC	10	[66], [71]
WM	15	[66], [72]
COM	5	[66]
WEP	15	[74]
*In the residential sector a use of 4 h/day is assumed		

Table 2.3. Operating time of the main appliances typically used in India's households

Appliance/ end-use	[12]		[75]		[9]		[10]		[65]		[14]		[76]	
	Hours/day	**Days**	**Hours/day**	**Days**	**Hours/day**	**Days**	**Hours/day**	**Days**	**Hours/day**	**Days**	**Hours/day**	**Days**	**Hours/day**	**Days**
TFL									6	365	2.5	365	4	365
FR	24	365	24	365	24	365	24	365			24	365	24	365
TV	3	365			3	350	3.6-3.9	365	6	365	4	365	6	365
RAC	8	120	4	180	4	120	1	365	6	120	2	365	6	180
CF	10	225			6	200	4.6-6.6	365	8	200	7	365	8	200
EG	1	150			2	250	1	365	1	200	0.4	365	0.5	200
WM	1	200			1	350	1	365	1	250	1	365	1	365
COM									3	250	3	365	4	350
WEP													1.5	365

5. An overview of energy efficiency governance in India

According to [77] “Energy efficiency governance is the combination of legislative frameworks and funding mechanisms, institutional arrangements, and co-ordination mechanisms, which work together to support implementation of energy efficiency strategies, policies, and programmes”. Therefore, energy efficiency governance should cover a broad set of aspects related to institutional, human, financial, and political dimensions [78]. In the next sections, a brief description will be provided regarding several dimensions of energy efficiency governance in India.

5.1 A brief overview of the energy efficiency governance structure in India

Figure 2.2 depicts India’s energy efficiency governance structure. In India, the Bureau of Energy Efficiency (BEE) is the major institutional body aimed at developing, implementing and monitoring energy efficiency policies. The National Institution for Transforming India (NITI) previously known as the Planning Commission, is also largely responsible for governing the energy policy landscape in the country. In 2010, the Government of India created the Energy Efficiency Services Limited (EESL), the world largest public energy saving company (ESCO) which also acts as the resource centre for capacity building for electricity distribution companies as well as financial institutions such as the India Infrastructure Finance Company Ltd (IIFCL), the Export-Import Bank of India (EXIM Bank), the Small Industries Development Bank of India (SIDBI) and the National Housing Bank (NHB) which, in one way or the other, provide funding to energy efficiency projects.

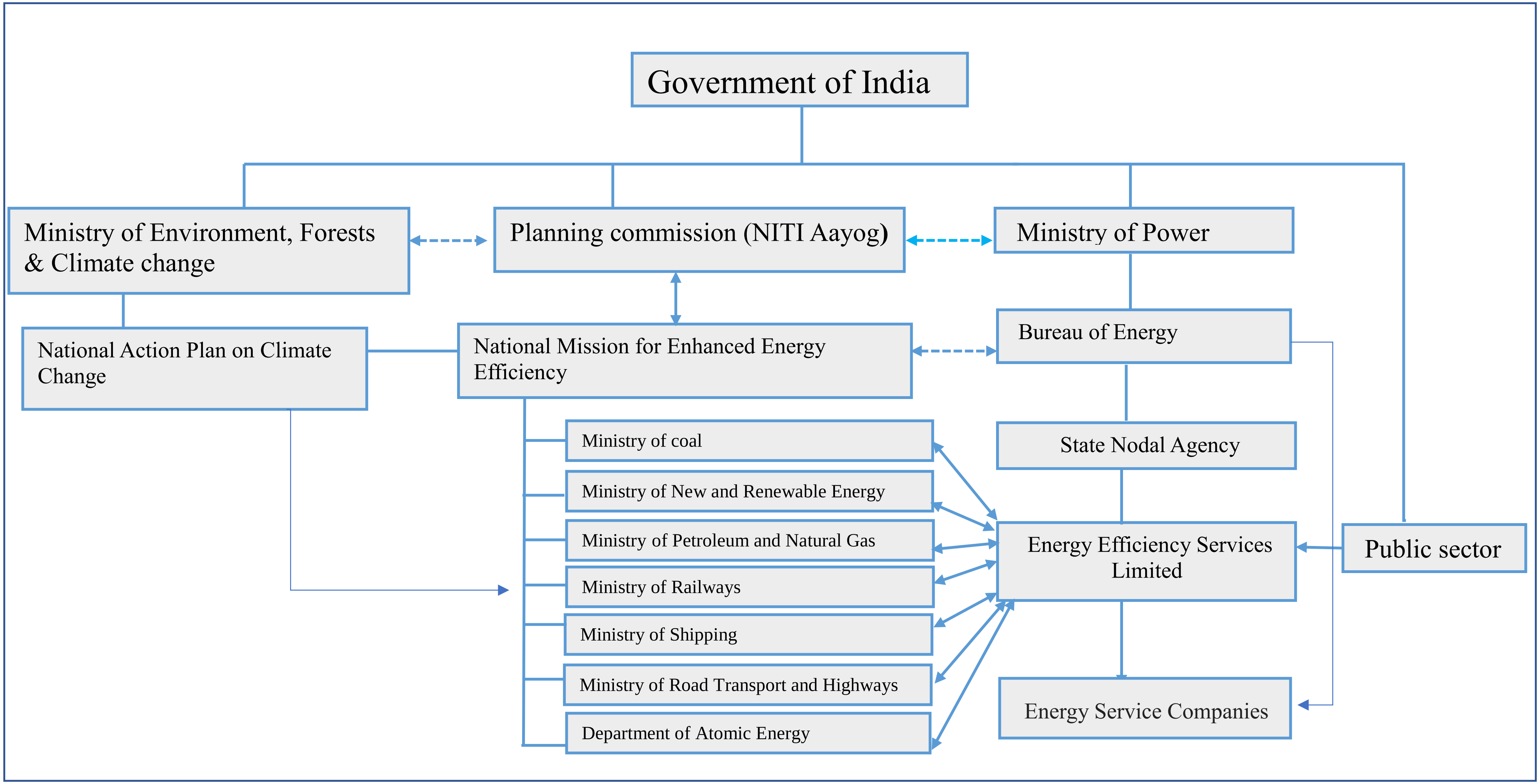

Figure 2.2. India's energy efficiency governance structure

5.2 Energy efficiency strategies and action plans

In 2008, the National Action Plan on Climate Change (NAPCC) in India was launched and it identified a number of measures that simultaneously advanced the country's development and climate change related objectives of adaptation and mitigation [79], [80].

The National Mission for Enhanced Energy Efficiency (NMEEE) is one of the eight missions under the NAPCC. The NMEEE aims to strengthen the energy efficiency market by creating regulatory and policy regimes and envisages to foster innovative and sustainable business models for the energy efficiency sector [81]. In this framework four initiatives were adopted to enhance energy efficiency in energy intensive industries as follows:

1) The **Perform Achieve and Trade Scheme (PAT)**, which is a market-based mechanism to enhance the cost effectiveness in improving the energy efficiency in energy intensive industries through certification of energy saving which can be traded.
2) **Market Transformation for Energy Efficiency (MTEE)**, for accelerating the shift to energy efficient appliances in designated sectors through innovative measures to make the products more affordable.
3) An **Energy Efficiency Financing Platform (EEFP)**, for the creation of mechanisms that would help finance demand side management programmes in all sectors by capturing future energy savings.
4) A **Framework for Energy Efficient Economic Development (FEEED)**, for the development of fiscal instruments to promote energy efficiency.

United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty adopted in 1992 committed to the reduction of greenhouse gas emissions towards the implementation of the Kyoto Protocol. About 192 countries participated in the UNFCCC framework and have defined national action plans. The first countries responsible for the formulation of national strategies aimed at reducing the energy consumption were the United States (1992), Australia (1998) and the United Kingdom (1999). Table 2.4 displays examples of some of the earliest national energy efficiency strategies and action plans adopted in various countries.

Table 2.4. Examples of some energy efficiency strategies and action plans

Country	Strategy	Year	Reference
Australia	Energy efficiency Best Practice programme	1998	[82]
Brazil	National Plan on Climate Change	2008	[82]
China	National Climate Change Programme	2007	[82]
Canada	Action Plan on Climate Change	2009	[77]
European Union	Efficiency Action Plan	2007	[77]
France	National Energy Efficiency Action Plan	2008	[77]
Hungary	National Energy Efficiency Action Plan	2008	[77]
Indonesia	Master Plan on National Energy Conservation	2010	[77]
India	National Plan on Climate Change	2008	[82]
Italy	Climate Change Action Plan	2007	[82]
Japan	New National Energy Policy	2006	[77]
Korea	Low Carbon Green Growth Strategy	2009	[77]
New Zealand	Energy Efficiency and Conservation Strategy	2007	[77]
Singapore	National Climate Change Strategy	2008	[77]
South Africa	Energy Efficiency Strategy	2004	[77]
Ukraine	Energy Strategy to 2030	2009	[77]
United Kingdom	Energy-Efficiency label (Energy Star)	1999	[82]
United States	ENERGY STAR-labeled Products	1992	[82]
Russia	Energy Efficiency Labelling Russia	2011	[82]

The effectiveness of the energy efficiency strategy and of the adopted action plans in India can be seen on several aspects:

- The government of India has put forward a set of intertwined legislative instruments to improve the EE of the country. One example is the 2001 Energy Conservation (EC) Act which includes instruments such as Designated Consumers, S&L of Appliances and the Energy Conservation Building Codes. It also created the Bureau for Energy Efficiency (BEE), in charge of implementing the EC Act, as well as the Energy Conservation Fund, as a complete set of instruments aiming at reducing the energy intensity of India's economy.

- There has been also a specialized action towards specific activity sectors, issuing standards and guidelines, of which the Energy Conservation Building Codes is an example, as well as the cases of Demand-Side Management (DSM) in agriculture, energy efficiency improvement in municipal water pumping and in domestic lighting.
- Following the EC Act, the 2003 Electricity Act aims at efficient use of energy and energy savings through Energy Efficient Technologies (EET) and DSM in various activity sectors.
- An example of an awareness raising program is the national scheme designated Bachat Lamp Yojana (BLY), also known as 'Save lamp schemes' for promoting energy efficient and high quality CFLs as a replacement for incandescent bulbs in households. The BLY scheme successfully registered under UNFCCC- Executive Board on 29th April, 2010 under the Clean Development Mechanism of the Kyoto Protocol to reduce greenhouse gases from power plants connected to the grid.
- In 2006 India adopted an integrated energy policy which became a comprehensive National policy in 2012. This integrated policy approach will explore alternative technologies and possible synergies to increase energy systems efficiency while meeting appropriate requirement for energy services.

5.3 Standard and labelling programs in India

Over the last decades, there has been an increasing recognition of the importance of energy efficiency in India's energy policy agenda which resulted in an Energy Conservation Act in 2001 and in an Electricity Act in 2003. One of the energy efficiency initiatives specifically targeting energy efficient appliances in India was launched by the Minister of Power on the 18th of May of 2006 consisting of the adoption of an S&L scheme. Later on, the BEE incorporated the USEPA's energy star rating system into India's S&L scheme, considering both mandatory and voluntary labelling. The scheme contemplated 21 types of technologies

([83], [84]) and raised awareness regarding the energy performance of the appliances available on the market, with the least and most energy efficient appliances being rated with 1 and 5 stars, respectively [19].

The star labelling scheme combines comparative star labels according to minimum energy performance standards (MEPS) [85]. There are two types of labels which are depicted in Figure 2.3, small labels which are assigned to small household appliances – i.e. tube lights, computers, laptops, ceiling fans, televisions; and big labels for the other types of appliances – i.e. washing machines, refrigerators, room air conditioners and electric geysers. The timeline for the implementation of the S&L program in India is illustrated in Figure 2.4. In Table 2.5 it is possible to see the appliances subject to mandatory/voluntary labelling schemes and without any labelling schemes. State and central electricity regulatory commissions (ERC) are also involved in energy efficiency improvement initiatives. In this framework, ERC are only targeting lighting, RAC and CF in Maharashtra and Delhi [86]. Table 2.6 presents the type of labelling schemes that are being adopted in other countries.

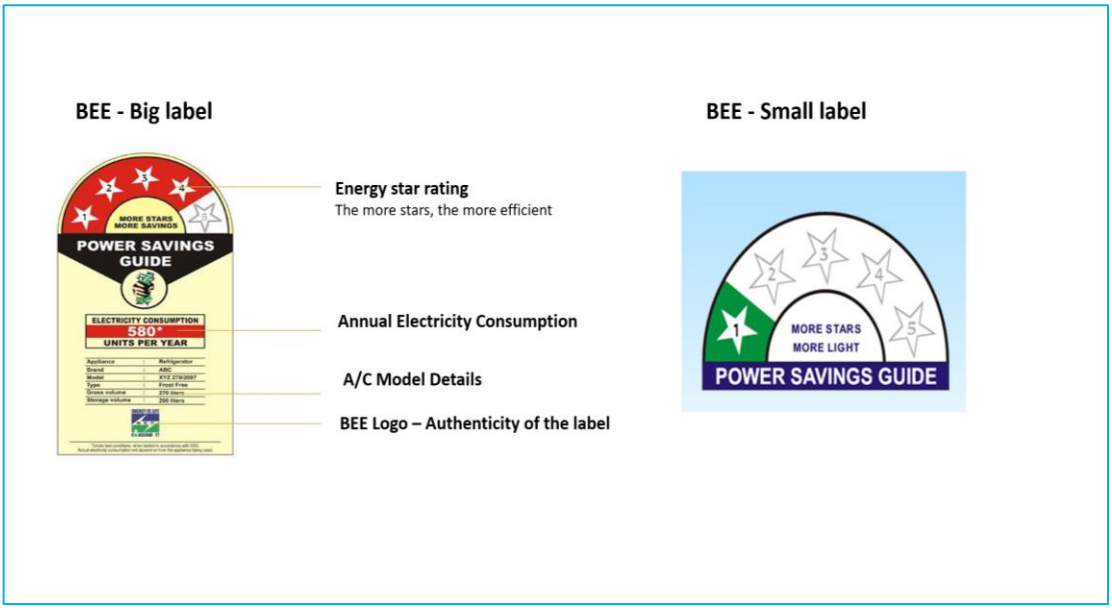

Figure 2.3. BEE label for appliances.

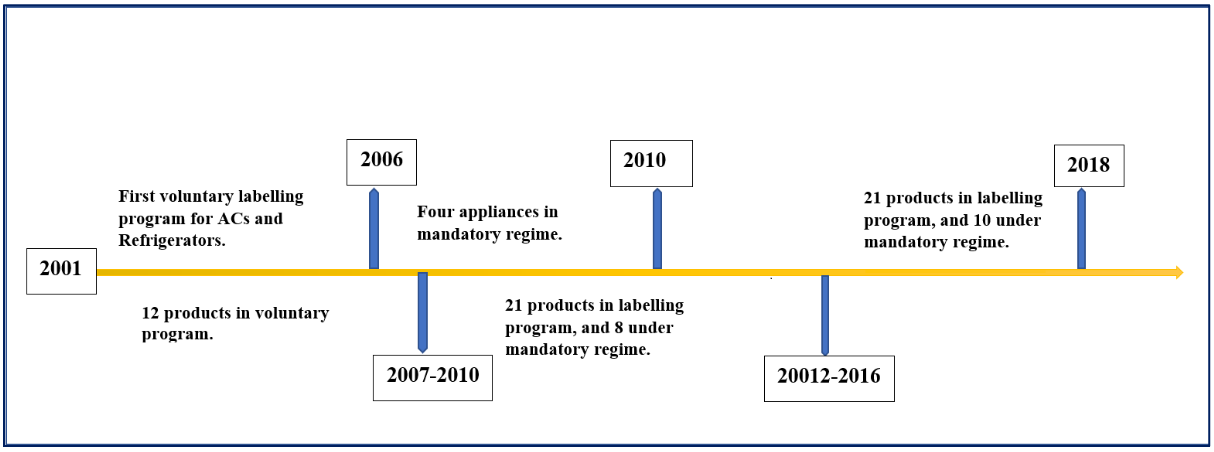

Figure 2.4. Timeline for the S&L program in India

The S&L program was introduced by the central Government to moderate energy demand growth in the residential sectors. The implementation of a S&L scheme is under the responsibility of the BEE, the Ministry of Power, the BIS, consumers associations, manufacturers associations, and the National Accreditation Board for Testing and Calibration Laboratories (NABL) [87]. The standard setting process is led by committees established by the BEE (Figure 2.5). Energy labelling usually starts with a voluntary stage requiring a minimum energy performance but in due time it is expected that these will become mandatory [83]. Although there is lack of additional information or explanation regarding the transition of energy labels from voluntary to mandatory, the process of labelling transition is generally reviewed every two years. Table 2.7 displays the chronogram with the major energy efficiency initiatives and policies specifically addressing the appliances typically used in India's households.

Table 2.5. Appliances / end-use technologies with and without labelling schemes in the residential sector (India)

With energy label scheme	Without energy label scheme
Tubular fluorescent lamps (TFL)	Tape recorder, CD player
Refrigerator (FR)	Radio
Television (TV)	Air cooler
Room Air conditioner (RAC)	Room heater
Ceiling Fan (CF)	Set-Top Box
Electric Water heating (EG)	DVD Players
Washing machine (WM)	Electric Oven
Computer (COM)	Incandescent bulb
Cooking stove LPG	Compact Fluorescent Lamp (CFL)
Water Electric pump (WEP)	Toaster

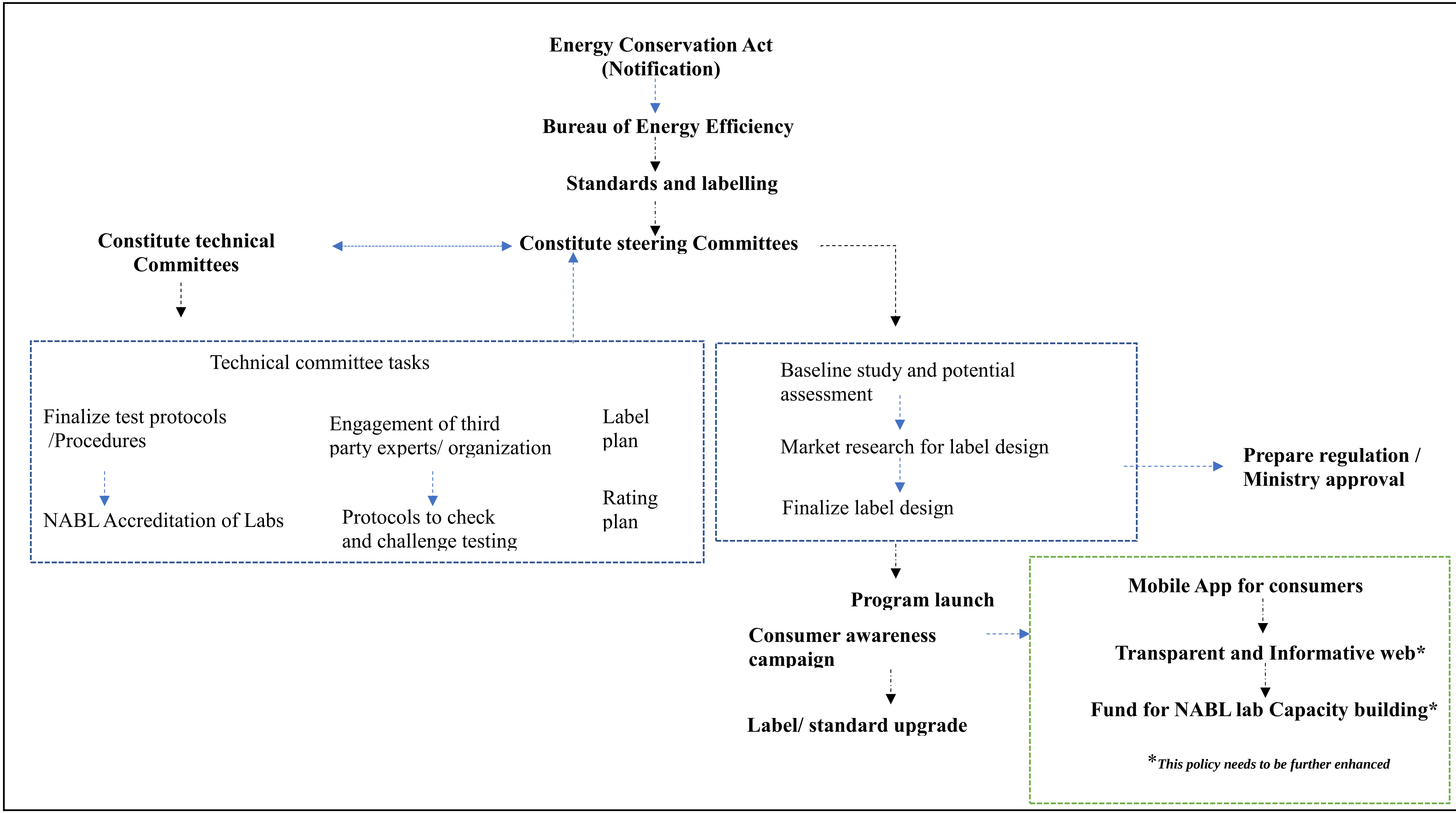

Figure 2.5. S&L program process adapted from [87] and [28]

Table 2.6. Appliances / end-use technologies with mandatory and voluntary labelling schemes in other countries (July 2016)

Appliance/end-use	Australia [88]	Canada [89]	Japan [90]	Korea [91]	United Kingdom [92]	United States of America [93]	South Africa [90]	Brazil [94]	Peoples Republic of China [90]	Russian Federation* [90]	EU -27 [95]	India [96]
TFL	M	V	M	M	M	M	U	M	M	U	M	M
EG	n.a.	V	n.a.	M	M	M	U	M	V	M	M	M
TV	M	V	U	M	M	M	U	M	M	M	M	M
CF	n.a.	V	n.a.	M	M	M	n.a.	M	V	U	M	V
FR	M	M	M	M	M	M	V	M	M	M	M	M
RAC	M	M	V	M	M	M	U	M	M	n.a.	M	M
WM	M	V	V	M	M	M	U	M	V	M	M	V
COM	U	V	V	M	M	M	n.a.	M	V	n.a.	M	V
WEP	V	V	U	M	M	M	U	M	V	n.a.	M	V

Legend: M-Mandatory Label, V-Voluntary Label and U-Under Development.
* Russian Federation adopted an energy label scheme in 2013-14.

Table 2.7. Energy efficiency initiatives and policies specifically addressing the appliances typically used in India's households

Program	Year	Scope	Observations
Energy Conservation Act	2001	National policy to promote energy efficiency	Launched by the government by the Ministry of Power and BEE. Information available at: https://www.beeindia.gov.in/
Electricity act	2003	National policy	Involves the participation of the private sector.
Standard and Labelling Scheme (S&L)	2006	Mandatory labelling / Voluntary labelling	Is aimed at reducing the energy consumption of appliances without diminishing the services it provides to consumers.
National Action Plan for Climate Change (NAPCC)	2008	Represents a long-term and integrated approach for achieving key goals in the context of climate change	National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge for Climate Change. Information available at: http://www.moef.nic.in/ccd-napcc.
Bachat Lamp Yojana (BLY)	2009	Part of the Clean Development Mechanism (CDM) program implementation	The BLY CDM Programme of Activities (PoA) registered under the auspices of the UNFCCC on the 29th of April of 2010. It involved 50 small scale BLY projects from various parts of India but only 44 projects have been implemented. As a result, about 29 million CFLs have been distributed during the XI plan period.
Supper Efficient Equipment Programme (SEEP)	2013	MTEE (Market Transformation for Energy Efficiency)	Ceiling fans have been considered under this program.
Energy Efficient Lighting Programme	2014	A Case study in Puducherry	Domestic efficient lighting program
Domestic Efficient Lighting Programme (DELP)	January-2015	Replacing the BLY	302 million lamps sold in the country (5 July 2018) Information available at: http://www.ujala.gov.in/
Unant Jyoti by affordable LEDs for all (UJALA)	May-15	National program which established at target for replacing 770 million incandescent bulbs in India with LEDs by 2019	

6. Market transformation and energy efficiency

Energy efficiency improvement is a rather complex phenomenon, which is affected by the decisions of different actors: manufacturers, retailers, consumers, professional consultants, etc. Although energy efficiency is economically sustainable in that investments are repaid in a few years, the measures actually taken to improve energy efficiency in general, and electricity end-use in particular, are far less than strict economic judgement would justify: this is partly because the relevant decision making is dispersed between different actors [97]. In the context of energy efficiency, market transformation (MT) is a process whereby energy-efficiency innovations are stimulated and over time penetrate a large portion of the eligible market.

According to ACEEE "the term market transformation refers to the strategic process of intervening in a market to create lasting change in market behaviour by removing identified barriers or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice" [98].

The technological diffusion of energy efficiency generally follows an S curve [99], [100]. With the foregoing in mind, a double S Curve is proposed in Figure 2.6 that illustrates the influence of the process of market transformation on the rate of penetration of energy efficient appliances. At the first early adoption stages, while innovation takes place and the maturity of the technology is not reached, the market penetration is less intense. Subsequently, the mass adoption stage of energy efficient appliances is achieved due to incentive designed programs. Finally, after establishing the effective implementation of the last stage, the adoption rates start increasing in a steadier manner. Overcoming the gap between the business as usual and the best available technology options requires a process of market transformation.

Market transformation (MT) depends on incentive designed programs which increase demand, and thus market penetration, of early stage highly efficient technologies. The mass increase of demand of such technologies leads to economies of scale for the manufacturers and positive learning effects, streamlining production processes and decreasing the costs of production [100]. Because of its inherent characteristics, in the case of India, attaining an effective MT mechanism is particularly important. Specifically, technology development can create a market demand and market demand also can accelerate the development of technology innovation processes. The first relationship is usually designated technology push and the second is usually designated demand-pull [101], [102], [103]. Technology-push favouring policies help decreasing the production cost (private cost) of innovative products – for instance, by means of targeted R&D funding support. Demand-pull policies increase the private payoff of successful innovation through several possible mechanisms: intellectual property protection, tax credits and rebates for consumers of new technologies, government procurement, technology mandates, regulatory standards, and taxes on competing technologies [104]. The UJALA program is one example of both demand-pull and technology-push policy. Under this program 295 million LED lights were sold, bringing the price down from around USD $5 to less than $1 per light bulb in 2016 [105].

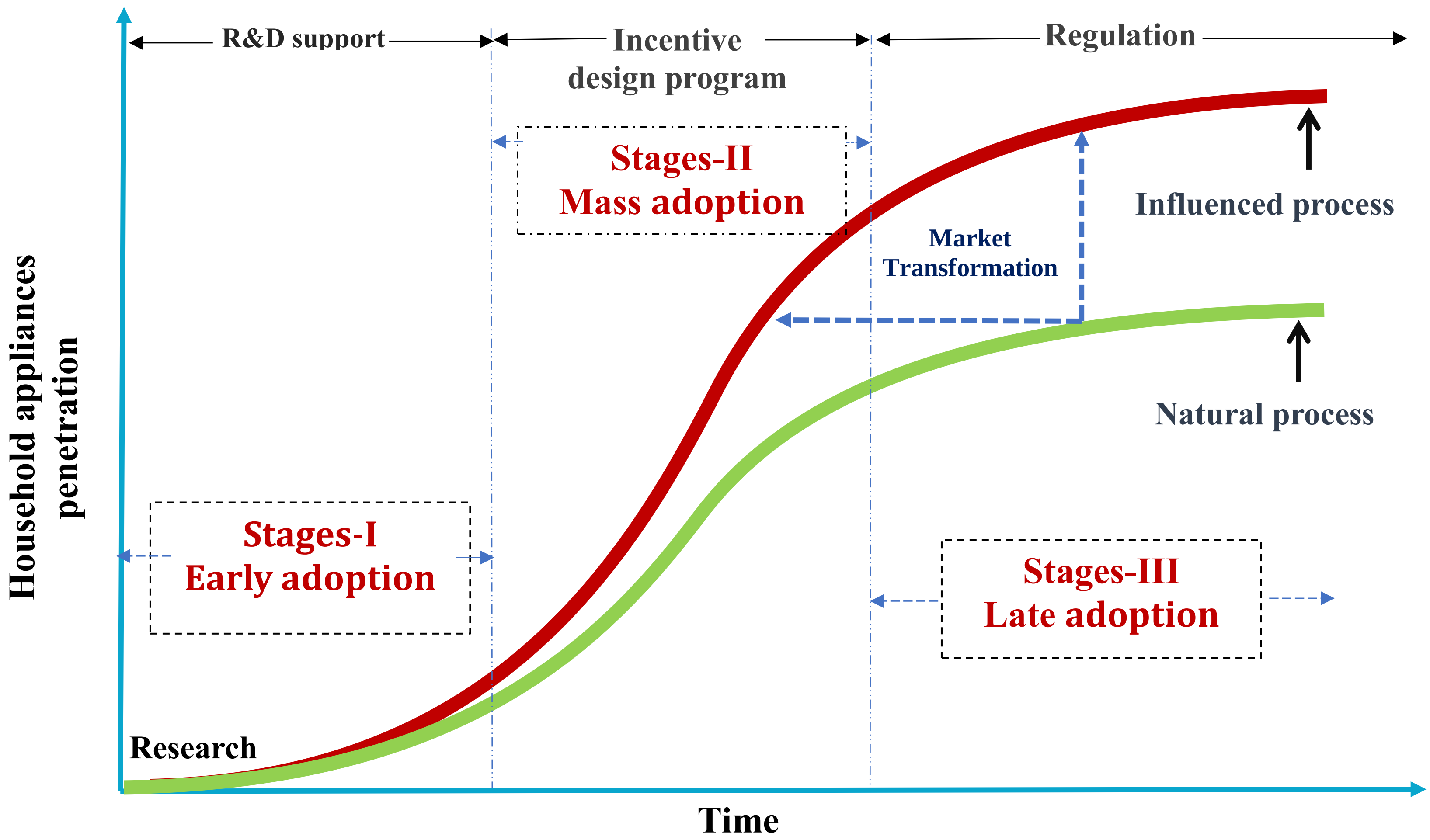

Figure 2.6. Double S curve illustrating the market transformation effect

7. Co-benefits obtained with the use of energy efficient appliances

Energy efficiency can bring multiple benefits, such as enhancing the sustainability of the energy system, supporting strategic objectives for economic and social development, promoting environmental goals and increasing prosperity [106], [107]. Besides being a cost-effective driver for attaining reduced energy consumption, the adoption of energy conservation measures also allows achieving additional 'co-benefits' [61]. The reduction of the energy bill for households might be regarded as the main investor's direct motivation for purchasing energy efficient appliances, but there are also other co-benefits. Figure 2.7 illustrates the major co-benefits obtained as a result of investing in energy efficient appliances. In what concerns society, poverty alleviation might be expected due to the increase of disposal income with the reduction of the energy bill. On the other hand, with the rise of disposable income, private household's consumption also increases leading to a positive impact on gross domestic product and thus on national economy. The reduction of energy demand increases energy security and reduces GHG emissions during manufacturing and energy production phases contributing to positive environmental outcomes. The expected improvement of air quality and of indoor comfort levels with energy efficient appliances reduces respiratory diseases, among others, having a positive impact on health.

Figure 2.7. Co-benefits of the adoption of energy efficient appliances adapted from [61].

8. Barriers to the adoption of energy efficient appliances

8.1 Global barriers

The term energy efficiency barrier refers to a mechanism that inhibits a decision or behaviour that appears to be efficient both economically and from an energy point of view [108]. Barriers can either complicate the adoption of cost-effective energy efficiency technologies or slow down their diffusion. Some examples of these barriers are high investment cost, lack of financing mechanisms in the field, lack of awareness, cost of production and risk of disruption – Table 2.8. There are many proposals to categorize these barriers, which can be divided in two groups [108]: structural (distortion in fuel prices, uncertainty about the future or government policies) and behavioural barriers (like the perceived risk of energy efficiency investments, lack of information or lack of life-cycle thinking on the costs and savings). Other possible classifications were proposed in [109], [110], [111], [112].

Table 2.8. Examples of barriers, adapted from IEA (2010)[113].

Barrier	Examples
Market	- Market organisation and price distortions prevent customers from appraising the true value of energy efficiency - Split incentive problems created when investors cannot capture the benefits of improved efficiency
Financial	- Up-front costs and dispersed benefits discourage investors - Perception of energy efficiency investments as complicated and risky - Lack of awareness of financial benefits on the part of financial institutions
Information and awareness	- Lack of information and understanding to make rational consumption and investment decisions on the part of consumers
Regulatory and institutional	- Energy tariffs that discourage energy efficiency investment - Incentive structures encourage energy providers to sell energy rather than invest in cost-effective energy efficiency - Institutional bias towards supply-side investments
Technical	- Lack of affordable energy efficient technologies suitable to local conditions - Insufficient capacity to identify, develop and implement and maintain EE investments

The possible categorization herein followed was proposed in [111] and identifies six market barriers [114].

Misplaced incentives

Misplaced incentives are those incentives that do not actually benefit the person who is trying to adopt improved energy efficiency measures, the majority being related to the residential sector ([115], [116], [117]). For example, if a renter decides about the energy use and pays the bills while the owner decides about the installed equipment (and chooses the cheapest alternative) the most cost-efficient combination will probably not be chosen.

Lack of access to financing

This type of barrier is related with up-front costs and the corresponding lack of liquidity, namely for low-income individuals or small business owners ([2], [118], [119], [120], [121]). Moreover, there is a lack of awareness of the financial benefits associated to this type of investments on the part of financial institutions, preventing the access to capital for small investors. Finally, the perception of energy efficient investments as complicated and risky might also subsist.

Flaws in the market structure

A typical market failure is related to the fact that the existence of powerful firms might impair the arrival of other competitors supplying other energy efficient technologies, eventually more cost-effective ([121], [120], [122]: [115], [123]).

Mispricing imposed by regulation

This market barrier refers to the fact that energy regulated prices might discourage the adoption of energy efficiency measures ([116]: [117]).

Lack of information or misinformation

Sometimes the consumers are not well informed and do not understand how to make rational consumption and investment decisions [117].

Lack of standard practice

The Global Environment Facility (GEF) and the Collaborative Labelling and Appliance Standards Program (CLASP) were the main drivers of market transformation of energy efficiency technologies in developing countries. In fact, several financed energy efficiency programs took place in India by means of the GEF through the United Nations Development Programme (UNDP) and the CLASP. However, developing countries have particular barriers for market transformation and energy efficiency [124], namely: few experiences on fostering energy efficiency, through the use of market-based schemes and informational issues as awareness raising; absence of standard practices regarding programs for the adoption of energy efficiency measures; lack of data; lack of regulation and organization with local governments and the private sector to foster energy efficiency; incipient energy efficiency markets for high energy efficient technologies; lack of government based policy instruments; lack of governance capacity aiming for energy efficiency markets.

8.2 India's national barriers

The adoption of energy efficient appliances has faced different barriers in India's residential sector. The main barriers are the high initial cost of efficient technology and the lack of awareness or lack of interest of consumers. Heterogeneity of consumers also plays a role, since middle class families live mainly in urban areas while low income families live mainly in rural areas. The 4P's major barriers identified in this paper are: Players, Price, Policy and Political will. They need to be addressed to create an effect of energy efficiency governance by policymakers (see Figure 2.8). The first of the four Ps stands for player. A player is any business-oriented enterprise committed to ensure the supply of some energy efficient product to the market to fulfil some consumers' need. The second P refers to the price barrier. Traditional, not efficient products are usually available on the market at much lower prices than efficient ones, since established manufacturers resist to make the investments needed to adapt their production lines. The third P stands for policy. India is still lacking an effective national policy plan to promote energy efficient appliances in the residential sector. Multiple ministries related to energy issues cause a high complexity of the state government involvement, often obstructing institutional coordination for coherent central policy making.

India is a democratic country where political leaders are capable of influencing the decision-making process. Political will is also important to government investment and implementation processes, which cannot occur without a strong commitment of political leaders.

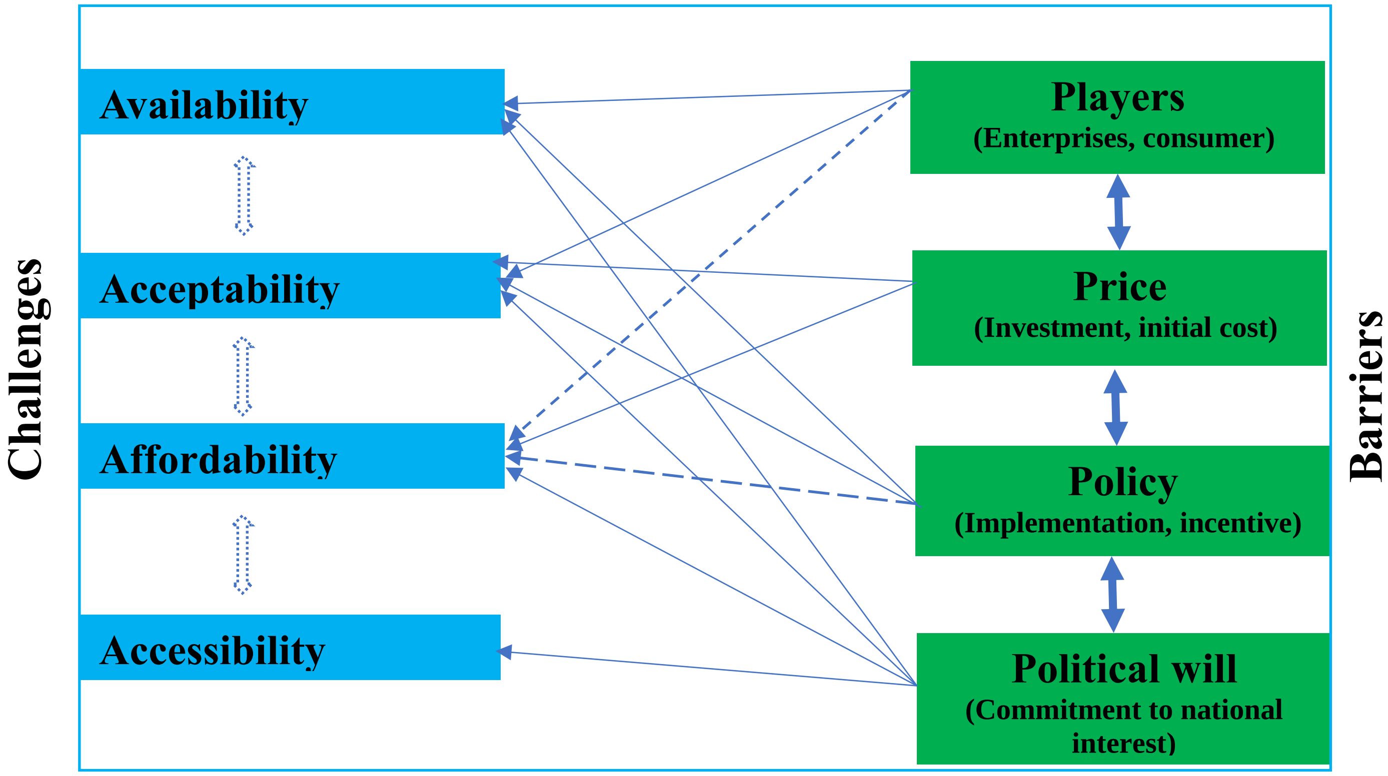

Figure 2.8. Energy efficient technology challenges and barriers

9. Conclusions

In this chapter, a review is presented of energy efficient end-use appliance technologies and energy efficiency policy initiatives across national level for India's residential sector, based on literature research. Some of the main conclusions are drawn:

- India's residential sector shows higher energy consumption than in other developing countries, almost reaching the share of some developed countries like Germany and Italy (23 to 26% approx.)

- India’s S&L scheme has been implemented during the last decades, considering both mandatory and voluntary labelling schemes, contemplating 21 types of technologies, of which only nine (only five mandatory) electrical end-use appliances in the residential sector.
- S&L, BLY, SEEP, DELP and UJALA energy efficiency initiatives and policies specifically address the appliances typically used in India’s households. However, we found that utility program BLY and the second program DELP is expanding the Unant Jyoti program by affordable LEDs for all (UJALA). Both utility programs are based on lighting technologies. India is still lacking other large-scale policies beyond the S&L scheme.
- Energy efficient appliances can bring multiple co-benefits, such as enhancing investment, alleviating energy poverty due to the increase of disposal income from the reduction of energy bills, causing a positive impact on the national economy. Reduction in energy demand also improves environmental impacts by reducing GHG emissions, with a positive impact on health.
- A double S curve representation is used to illustrate the effect of market transformation programs on the acceleration of the diffusion of efficient appliances on the market.
- Barrier types are identified that prevent the adoption of energy efficient appliances, namely, financial, technical, related to information and awareness, or to regulatory and institutional incentives, or to market structure.
- International Agencies like UNDP, GEF and CLASP should focus on some pilot case-studies in real households.
- Since energy efficiency and energy security have a prominent role on the economic and social development of all countries, it is crucial to incorporate energy efficiency concerns in any economic program [125].

- Therefore, developing countries like India need to promote energy efficiency measures. In this context, energy self-sufficiency plays a critical role in the economic/social development and prosperity of these countries. Energy initiatives are directly associated with general political options related to tariff incentives, social cohesion, national alliances, and bilateral commercial agreements. At the same time, energy efficiency planning should include several aspects, such as energy saving targets, instruments to promote innovative technologies development and diffusion.

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CHAPTER 3

Fostering investment on energy efficient appliances in India – A multi-perspective Economic Input-Output Lifecycle Assessment

Although the version presented here has been modified in such a way that notation follows the rest of the thesis, this chapter is based on:

Singh, V. K., Henriques, C. O., & Martins, A. G. (2018). Fostering investment on energy efficient appliances in India–A multi-perspective economic input-output lifecycle assessment. *Energy*, 149, 1022-1035. doi.org/10.1016/j.energy.2018.01.140

Vivek Kumar Singh, António Gomes Martins, Carla Oliveira Henriques, "Energy savings technical potential of energy efficient appliances in India's residential sector", Conference proceedings of CYTEF 2016 − VIII Iberian Congress | VI Ibero-American Refrigeration Sciences and Technologies, At Coimbra-Portugal, 3-6 May 2016.

Vivek Kumar Singh, António Gomes Martins, Carla Oliveira Henriques, "Assessing E3s Impacts of Energy Efficient Appliances in India – An IO-LCA Approach", Conference proceeding of 3rd International Conference on Energy and Environment: bringing together Engineering and Economics Porto, Portugal 29-30 June 2017.

1. Introduction

In 2012 the residential sector was responsible for consuming nearly one fourth of total world electricity consumption [1].The growing penetration rate of electric appliances in developing countries, such as India, is one of the leading causes of the current energy demand and CO2 emissions increase. In fact, according to India's Central Electricity Authority, electricity consumption in all households was 203 TWh in 2013 [2]. In the past decade, population and energy consumption grew at a similar rate to GDP (i.e. about 7%) and it is anticipated that energy consumption growth rate will likely surpass GDP’s growth rate in about 10 to 30 years [3]. The level of comfort in the residential sector has been reported to steadily increase along with an increasing dependence on electricity. The residential sector is at the second rank after industry with about 24% of total electricity demand in 2013-2014 [4] and appliances account for 35 to 40% of that demand [5]. Energy consumption has traditionally been tied to economic development. However, its environmental implications have been a driving factor for the definition of the contemporary environmental policy around the world, highlighting the role of energy efficiency (EE) in the reduction of GHG emissions [6], [7]. Therefore, the consequent rise in energy consumption and GHG emissions can be significantly reduced if consumers are motivated to buy energy efficient appliances [8].

The International Energy Agency anticipates that by 2030 one of the lowest cost GHG emissions abatement option in Organisation for Economic Co-operation and Development countries will come from energy efficient end-use technologies (EET) [9]. The support of EE policies can thus be seen as a cost-effective driver of energy consumption and GHG emissions reduction, while providing economical energy services in different activity sectors [10]. The need for energy autonomy and EE plays a decisive role in the economic development and the societal prosperity worldwide [11]. EE is an important element that needs to be included in any program associated with the promotion of economic development in all the countries without increasing the level of use of energy sources for electricity generation.

Several studies have estimated the impacts of the adoption of EET in the residential sector in India. Most of these studies are focused on household electricity consumption [12]. For instance, the Lawrence Berkeley National Laboratory (LBNL) estimated the energy savings obtained for two particular appliances used in the residential sector: refrigerators and air conditioning [13]. A study conducted by the Energy Resources Institute assessed the energy savings in the residential sector as a whole and not per appliance/end-use [14]. Reddy and Balachandra [15] computed the implicit energy savings potential from the usage of more efficient appliances. A bottom–up analysis approach was also developed by the LBNL (see [16], [13]) for the residential sector in India by considering different use categories (e.g. lighting, water heaters, television, fan, washing machine, air coolers, air conditioners, refrigerators, etc.). A similar study was also published by the World Bank [17] that uses both an end-use and a bottom-up modelling approach. Most of the studies herein reviewed present big discrepancies between the projected and the real energy potential savings per appliance/end-use and are also lacking an integrated E3S assessment.

Energy models have been extensively used to address and assess the impact of different energy policy options [18]. These models became the focus of attention of researchers in the early seventies of the twentieth century with the first oil crises. In the framework of energy systems, I-O analysis has been applied in a multitude of contexts: to estimate China's energy disparities in energy consumption [19]; to provide primary energy forecasts in the Spanish economic system [20]; to analyse the employment impacts of EE retrofit investments [21] and renewable energy targets in Portugal [22]; to account for the economic impacts of EE and renewable energy in Germany [23]; to compute direct and indirect energy use and carbon emissions in the production phase of buildings in Sweden [24]. Over the last decades, several I-O models were also coupled with other mathematically based formulations in order to enhance the understanding and prediction of future impacts of energy use. For example, [25] identified strategies for mitigating the global warming impact of the European Union-25 economy by using a multi-objective I-O approach, [26] optimized sectoral production with energy and GHG emission constraints in Greece and [27] assessed the E3S trade-offs in the Brazilian economic system. A review of Input-output (I-O) analysis with Multi Objective Linear Programming models for the study of E3S interactions can be found in [28]. Suitable E3S models allow assessing the impacts of market transformation in the framework of EE. I-O analysis provides a modelling approach that can be particularly useful to compute the primary energy and GHG embodied in final demand [29].

In this context, this Chapter presents an I-O framework instantiated with real data which provides an integrated assessment of the E3S impacts of nine energy efficient appliances currently used in India's residential sector, i.e. lighting sources (TFL), refrigerators (FR), room air-conditioners (RAC), electric water heaters (EG), televisions (TV), computers (COM), ceiling fans (CF), water pumps (WEP) and washing machines (WM). The time horizon considered for the study herein conducted comprises 2011 to 2030 and it is assumed that the adoption of energy efficient appliances/end-uses will have started in 2011 (the reference year of the study for which the most recent data was available) and that all new appliances purchased will be energy efficient (i.e. will correspond to the BAT). Although this also means that it is not possible to benchmark the outputs of the model with real data even for the past years between 2011 and the present date, the I-O modelling framework herein suggested is designed to assist planners and energy decision-makers of India on the appraisal of the future impacts of the current national energy saving targets, providing a contribution that can help to shape future energy plans in the country.

In the next Section, a description of the I-O modelling framework developed is given. Section 3 provides the main assumptions considered in order to instantiate the model. Section 4 presents a discussion of the main illustrative results obtained. Finally, some conclusions are drawn and future work developments are suggested.

2. Methodology

The E3S impact assessment of energy use of an economy in a resource-constrained world requires an understanding of the relationships between its economic, social, and energy-use elements [22].

I-O is an approach that allows capturing all the economy-wide interdependencies. Generalized I-O analysis allows obtaining total factor multipliers, which describe embodiments of production factors (e.g. labour, energy, resources) and pollutants per unit of final consumption of commodities [18].

The traditional economic I-O model is based on an I-O matrix with the economic flows between industries that can be extended with information regarding the E3S impacts, creating additional columns and rows that represent the E3S impacts per each activity sector/industry [30]. This additional information is obtained just by combining national accounts with satellite national statistics for pollutant emissions, employment and energy. For further details on the I-O methodology please see Appendix 3.

Since official published I-O data do not provide the clear identification of the E3S impacts that are likely to be created by an increase in the investment of a typical BAT/BAU technology, in the next Section of this Chapter we provide a thorough explanation of the approach herein suggested, by combining data on expenditures for domestic appliances with I-O modelling techniques to arrive at the related direct, indirect and induced economic, energy, environmental and social impact effects.

2. 1. A new framework for assessing energy efficient appliances

In order to assess these E3S estimates, the economic impulses that originate these impacts must be identified (as in Table 3.1). Therefore, the lifecycle of a BAT/BAU appliance is divided into lifecycle phases (i.e. installation and operation and maintenance - O&M) and then these phases need to be further decomposed into their corresponding activities/components. Through collecting information on the total expenditure connected to each lifecycle phase, along with data on the cost share of each relevant activity/component as a percentage of the corresponding lifecycle phase, it is then possible to calculate the total output (in monetary units) of each of these relevant activities/components.

Table 3.1. Methodology application of the EIO-LCA framework

Divide into lifecycle phases	• Manufacturing and Installation.
Decompose lifecycle phases into their activities/components	• Example of components involved in the manufacturing phase of washing machines: glass, metal, rubber, plastics, insulation material and electronic components
Calculate total output of each relevant activity/ component	• Obtain appliance costs and material shares (as a %). • Connect total expenditure to each component and compute domestic output.
Match the domestic output of each relevant activity/ component of BAT/BAU appliance to the industry in the IO table	• Assign the domestic output of each activity/component previously calculated to the corresponding industries.
Calculate the multiplier effects of each activity/component	• Compute IO multipliers (for each emission type considered or for obtaining embodied energy), to arrive at indirect and induced effects.

The lifecycle phases can then be economic activities that provide impulses in the form of expenditures that can generate different E3S effects. Impulses (e.g. expenditures for O&M, manufacturing and installation of BAT/BAU appliances) are regarded as exogenously determined parameters that trigger an economic mechanism that leads to several effects. Effects (e.g. a direct positive effect could be an increase in BAT/BAU appliance production; a negative induced effect could be a decrease in the consumption of goods) relate to how impulses influence the economy – positively, negatively, directly, indirectly or induced. The most important impulses herein analysed are: investment and O&M expenditures, including impacts on upstream industries (direct and indirect effects – obtained through type I multipliers, i.e. (direct effect + indirect effect)/direct effect); the impulse from household income due to changes in the investment on BAT/BAU appliances (obtained through type II multipliers – i.e. (direct effects + indirect effects + induced effects)/direct effect). Figure 3.1 depicts the relationship between impulses, effects and impacts.

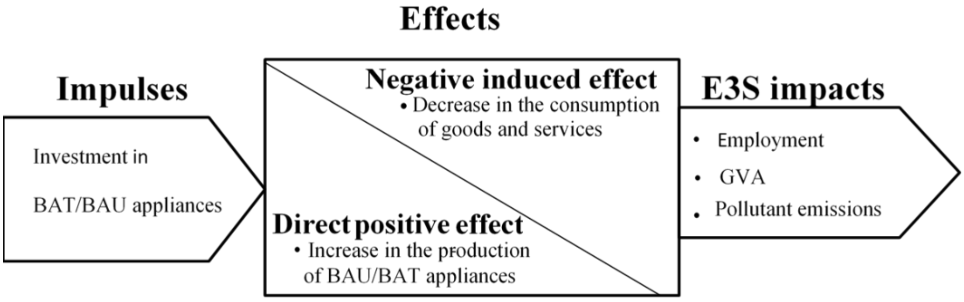

Figure 3.1. Impulses, effects and impacts relationship

The methodological approach followed has various implementation steps which are provided below, being also depicted in Figure 3.2.

Step 1 – Defining the system boundaries of BAU/BAT appliance industries:

- The BAU/BAT appliance industries include all economic activities that are related to and are characteristic for or specific to BAU/BAT appliance use.
- The term "BAU/BAT appliance use" comprises the complete lifecycle of the BAU/BAT appliance use, which can be roughly split into: manufacturing and operation.

- The life cycle consists of various activities such as manufacturing the various components needed for the BAU/BAT appliance use, O&M and replacement of parts after their defined lifetime is over (see Figure 3.3).

Step 2 - Determine expenditures for the BAU/BAT appliance use:

- Compute the number of households for the time horizon of the analysis and obtain the appliance ownership and sales up to 2030. Estimate the number of BAT appliances needed to calculate the investment on new energy efficient appliances.

- Determine energy consumption during operation based on the computation of total annual energy demand with expressions (5) and (6).

- Obtain the technical energy savings potential with expression (7).

1) Energy Demand

$$EBAU_k = \sum_i [\ NOH_k \times (RPA_i \times OTA_i) \times TNS_i\ ] \quad (5)$$

$$EBAT_k = \sum_i [\ NOH_k \times (RPA(BEE\eta)_i \times OTA_i) \times TNS_i\ ] \quad (6)$$

2) Energy Savings per year k

$$\Delta E(y)_k = EBAT_k - EBAU_k\ . \quad (7)$$

where $EBAU_k$ is the BAU energy demand at year k, $EBAT_k$ is the BAT energy demand at year k, NOH_k is the projected number of dwellings for year k, RPA_i is the rated power of appliance/end-use i, $RPA(BEE\eta)_i$ is the rated power of appliance/end-use i for the star labelling efficient appliances according to the BEE, OTA_i is the operational time per year of appliance/end-use i and TNS_i the average number of appliance/end-use of type i per household

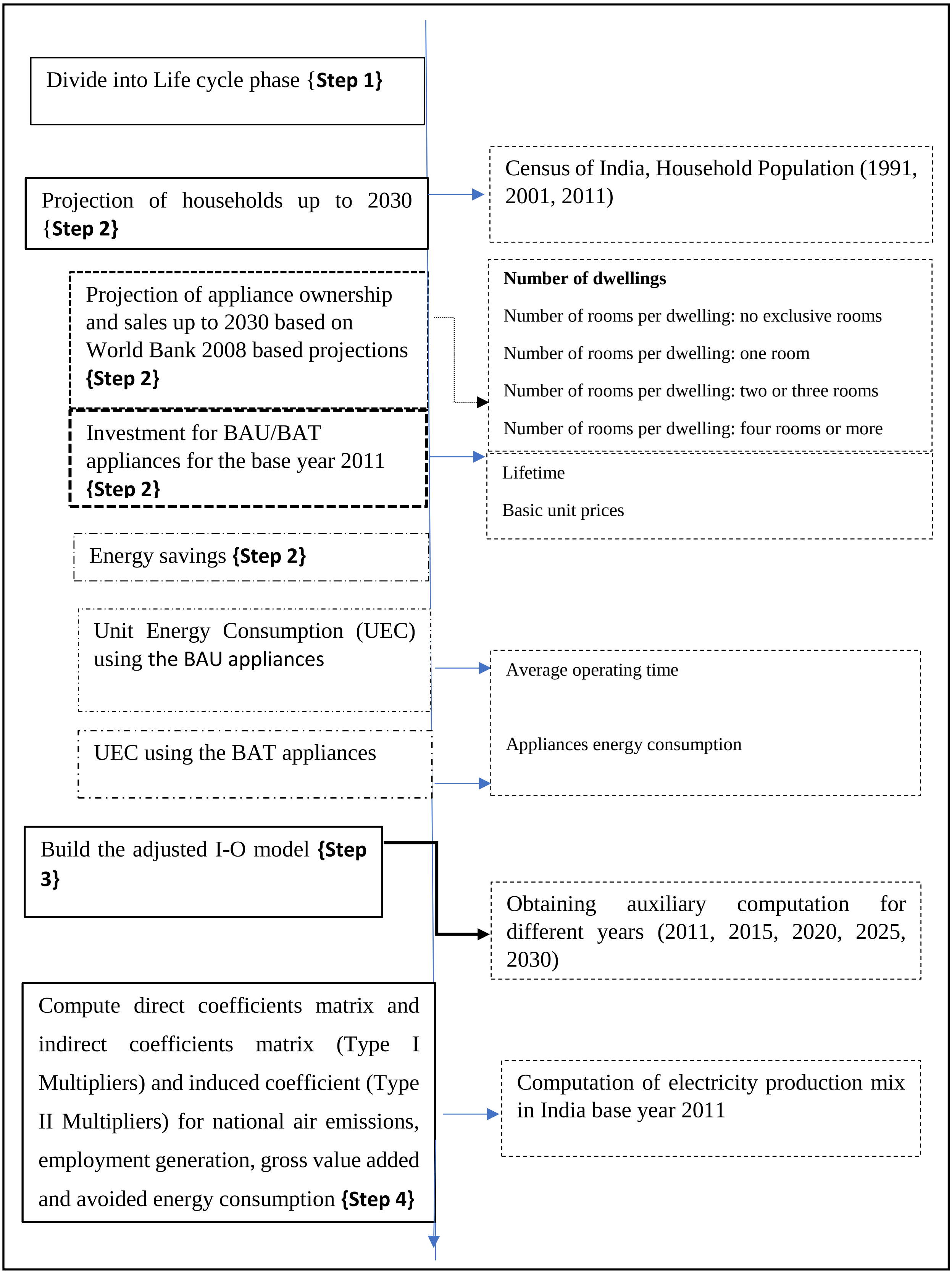

Figure 3.2. Schematic illustration of the implementation steps required for the application of the I-O modelling approach

Step 3 - Calculate domestic output by BAU/BAT appliance technology:

- Distribute the expenditures to cost components which can be related to certain economic activities (see Figure 3.3).
- Determine, at the cost component level, the import shares and subtract imports from expenditures to obtain domestic output.
- Allocate the domestic output for each economic activity to the appropriate industry as represented in the I-O model.
- Compile a vector of domestic output by industry for each lifecycle phase of each technology. Put all the vectors into a matrix of direct domestic output by industry.

Step 4 - Calculate direct, indirect and induced E3S net impacts:

1) Economic impacts

- The GVA is the value of output less the value of intermediate consumption and it can be seen as a measure of the contribution to GDP made by the industry sectors engaged with the BAU/BAT appliances.
- The computation of the net GVA has been done in two stages:
    - Computation of the direct, indirect and induced GVA generated during the production and installation of BAT and BAU appliances.
    - Computation of the direct, indirect and induced GVA throughout the lifetime of the equipment due to energy consumption.
- The computation of the net GVA is then obtained by considering:

- GVA from BAT (BAU) appliances = GVA during production and installation of BAT (BAU) appliances + GVA generated throughout the lifetime of the BAT (BAU) appliances due to energy consumption.
- Net GVA = GVA from BAT appliances – GVA from BAU appliances.

2) Environmental impacts

- The computation of the net pollutant emissions has been done in two steps:
    - Computation of the direct, indirect and induced emissions generated during the production and installation of BAT and BAU appliances.
    - Computation of the direct, indirect and induced emissions throughout the lifetime of the equipment.
- The computation of the avoided emissions is then obtained by considering:
    - Avoided emissions = BAU emissions - BAT emissions
    - Emissions from BAT (BAU) appliances = Emissions during production and installation of BAT (BAU) appliances + Emissions throughout the lifetime of the of BAT (BAU) appliances.
- The emissions associated with the decommissioning and dismantling of the appliances have not been considered due to the lack of data sources and the absence of electronic waste management facilities in India.

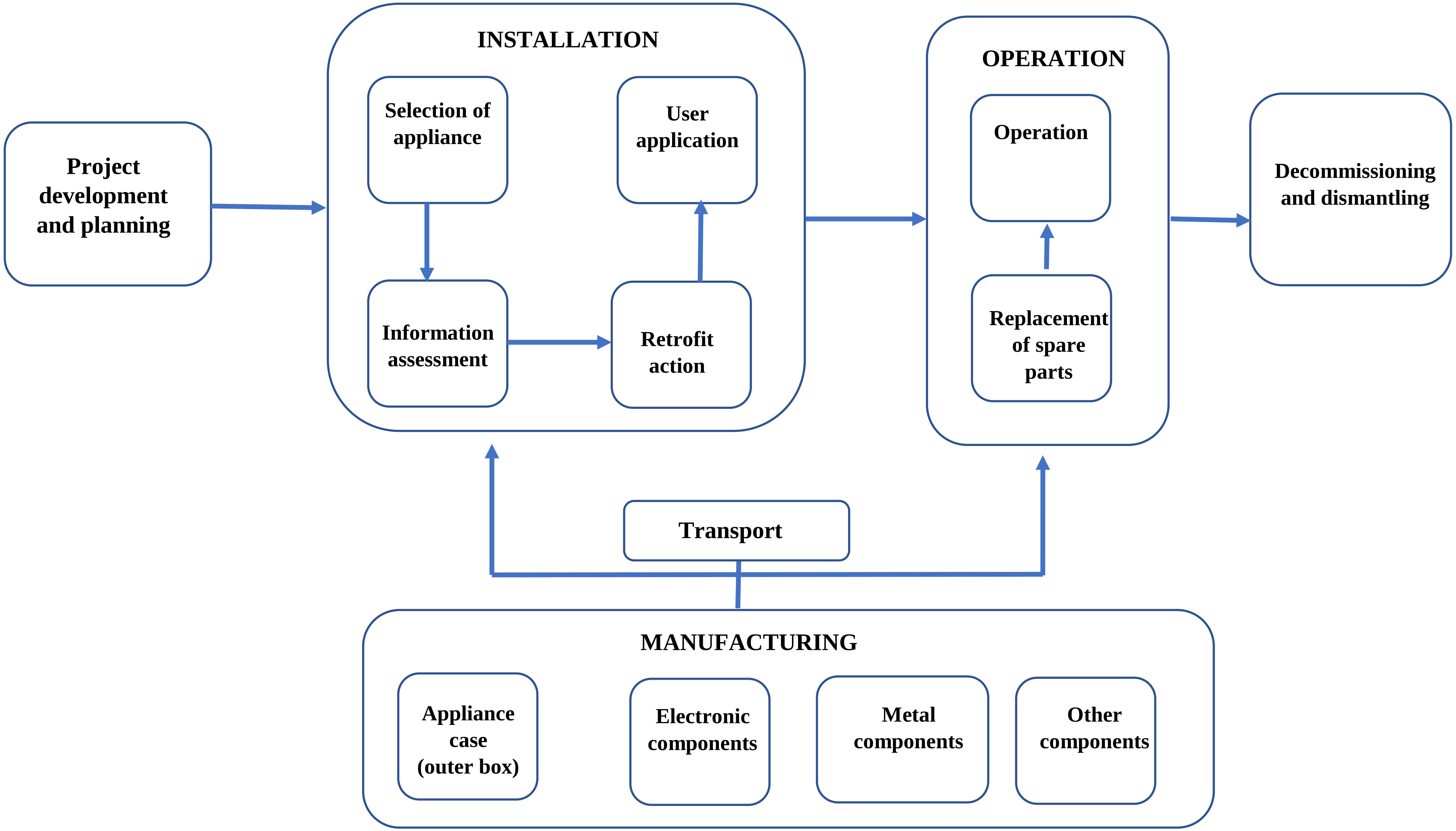

Figure 3.3. Lifecycle and supply chains of appliances

3) Social impacts

- The computation of net employment has been done in two steps:
    - Computation of the direct, indirect and induced employment generated during the production and installation of BAT and BAU appliances.
    - Computation of the direct, indirect and induced employment throughout the lifetime of the equipment.
- In this case, we consider that the employment generated during the manufacturing stage of BAU appliances will be kept with the replacement of old appliances with BAT appliances, assuming in this situation that an upgrade of the job skills is sufficient. Therefore, the computation of the net employment is then obtained by considering:
    - Net employment = Employment from BAU appliances + Net employment change – Employment loss.
    - Net employment change = Employment from BAT appliances – Employment from BAU appliances.
    - Employment from BAT (BAU) appliances = Employment during production and installation of BAT (BAU) appliances.
    - Employment loss = Employment due to electricity consumption with BAU appliances - Employment due to electricity consumption by BAT appliances.

3. Assumptions and estimates

For further details regarding the premises concerning data collection and assumptions please see Appendices 1, 2 and 3.

4. Discussion of results

The I-O framework herein developed allows estimating the net E3S impacts obtainable with the investment in BAT appliances within a consistent framework. Our approach combines data on expenditures for domestic appliances with I-O modelling to assess the related direct, indirect and induced E3S effects. The illustrative results regarding the E3S impact assessment of the nine electrical appliances under evaluation are presented below.

4.1. Energy Consumption

Some of the impacts of avoided electricity consumption during the operation stage of the nine energy efficient appliances (BAT), as compared to the corresponding conventional ones (BAU) herein considered were computed according to the methodology followed in Section 2 and to data and assumptions provided in Sections 3 and 4. The results obtained for the time horizon considered in this study are presented in Figure 3.4, where TESP stands for technical energy savings potential.

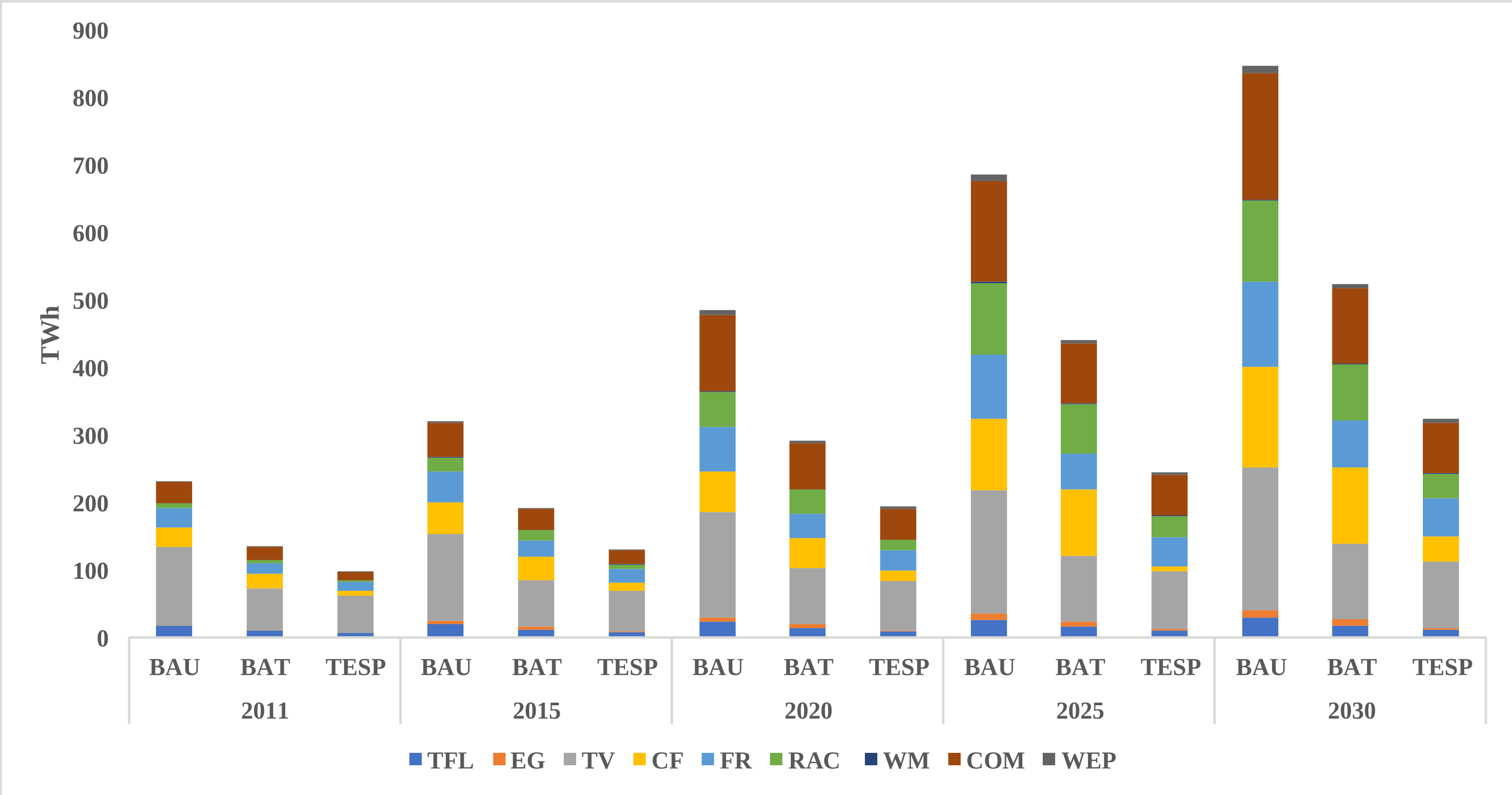

Figure 3.4. Energy consumption of BAT/BAU appliances and the corresponding technical energy savings potential

Out of the nine appliances under assessment three (TV, CF, FR) are responsible for more than 80 % of the energy consumption in 2011 (see Figure 3.4).

If the replacement of BAU with BAT appliances took place in the time of horizon of this study, the avoided electricity consumption would correspond to 97 TWh in 2011, 129 TWh in 2015, 194 TWh in 2020 and 326 TWh in 2030 (see Table 3.2).

Table 3.2. Technical energy savings potential

Energy consumption	Appliance/end-use	2011	2015	2020	2025	2030
		GWh/yr	**GWh/yr**	**GWh/yr**	**GWh/yr**	**GWh/yr**
BAT	TFL	10,197	11,695	13,681	15,664	17,642
	EG	300	4, 400	5,700	7,356	8,863
	TV	62,238	68,721	83,522	98,064	112,754
	CF	21,261	34,320	44,000	77,000	110,000
	FR	15,510	24,750	36,300	52,800	69,300
	RAC	5, 289	14, 852	35740	73895	84,038
	WM	36	448	559	672	784
	COM	19,168	30,760	68,217	90,089	112,078
	WEP	608	925	3,496	4,514	5,534
BAU	TFL	16,994	19,491	22,802	26,106	29,403
	EG	360	5,280	6,840	8,827	10,635
	TV	116,695	128,851	156,603	183,869	211,413
	CF	28,992	46,800	60,000	105,000	150,000
	FR	28,200	45,000	66,000	96,000	126,000
	RAC	7,569	21,254	51,149	105,754	120,269
	WM	89	671	1,398	1,679	1,960
	COM	31,947	51,267	113,695	150,149	186,797
	WEP	1,215	1,849	6,991	9,028	11,069
TESP	TFL	6,798	7,796	9,121	10,442	11,761
	EG	60	880	1,140	1,471	1,773
	TV	54,458	60,131	73,081	85,806	98,659
	CF	7,731	12,480	16,000	28,000	40,000
	FR	12,690	20,250	29,700	43,200	56,700
	RAC	2,280	6,403	15,409	31,858	36,231
	WM	53	224	839	1,007	1,176
	COM	12,779	20,507	45,478	60,059	74,719
	WEP	608	925	3,496	4,514	55,34
Overall TESP	**GWh/yr.**	**97,456**	**129,595**	**194,263**	**266,358**	**326,553**
	TWh/yr.	**97**	**129**	**194**	**266**	**326**

According to our projections and to the penetration rate of the electrical appliances evaluated in 2030 a reduction is anticipated of 98.6 TWh, 74.7 TWh and 56.7 TWh of electricity consumption with the replacement BAU with BAT for TV, COM and FR, respectively (see Table 3.2).

A study conducted to estimate the electricity savings obtained from the replacement of RAC, FR, TV and CF BAU with BAT suggests a reduction of electricity consumption in Indian households of 165 TWh in 2030 [8]. LBNL estimated a reduction of electricity consumption for Indian households of 78 TWh in 2030 just with the replacement of RAC and FR [32]. According to our assessment the overall amount of energy savings attainable in 2030 with the replacement of BAU RAC, FR, TV and CF with BAT would be 227 TWh.

These results illustrate the potentially very high impact on energy savings if measures to promote the investment in energy efficient appliances are adopted and become effective, namely avoiding the need of installing new thermal power plants in India.

4.2. Avoided electricity costs

We have computed the cumulative electricity savings and corresponding energy avoided costs at basic prices. by taking into account the energy savings obtainable with the energy efficient technologies (BAT) against conventional technologies (BAU). Figure 5 illustrates the avoided energy costs in different time frames indicating that the investment in more efficient TV, COM and RAC offers the highest potential for reducing energy costs. Out of the nine BAT appliances considered, TV, COM and RAC (Figure 3.5) are accountable for more than 80% of the expected avoided energy costs. Namely, the replacement of BAU appliances with BAT appliances corresponds to an overall avoided energy cost in million $ of about 6,109 in 2011, 70,519 in 2015, 281,837 in 2020, 566,242 in 2025 and 937,349 in 2030.

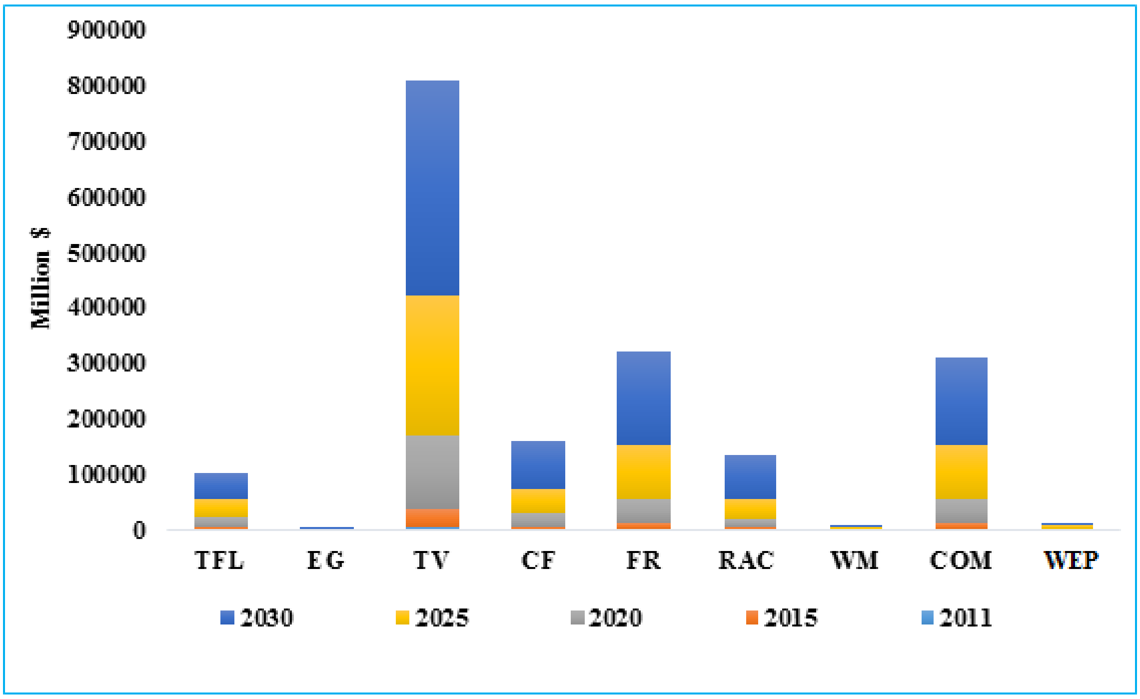

Figure 3.5. Avoided electricity costs

4.3. Economic impacts

The anticipated direct, indirect and induced impact on GVA resulting from the investment on energy efficient appliances for the different time horizons of this study is provided below (see Figure 3.6).

Out of the nine BAT appliances considered only COM, TV, CF and FR are responsible for more than 80 % of the expected net GVA in 2011 (see Figure 3.6). The replacement of BAU appliances with BAT appliances corresponds to a net positive direct, indirect and induced GVA of 5,460 million $, 4,406 million $, and 144 million $, in 2011, respectively (see Table 3.3). The positive impacts on GVA always occur in the manufacturing lifecycle stages while the negatives impacts are obtained in the operation stage. This explains the anticipated overall negative economic impact on direct, indirect and induced GVA in 2015, 2020, 2025 and 2030 (see Table 5A.1 of Appendix 5).

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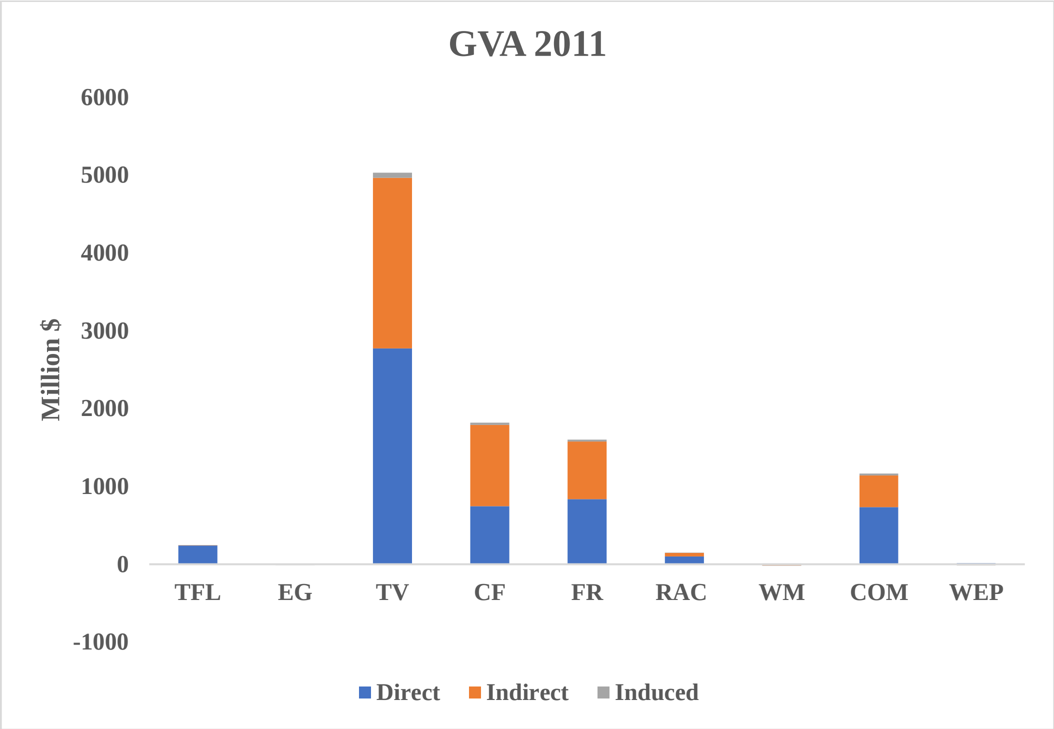


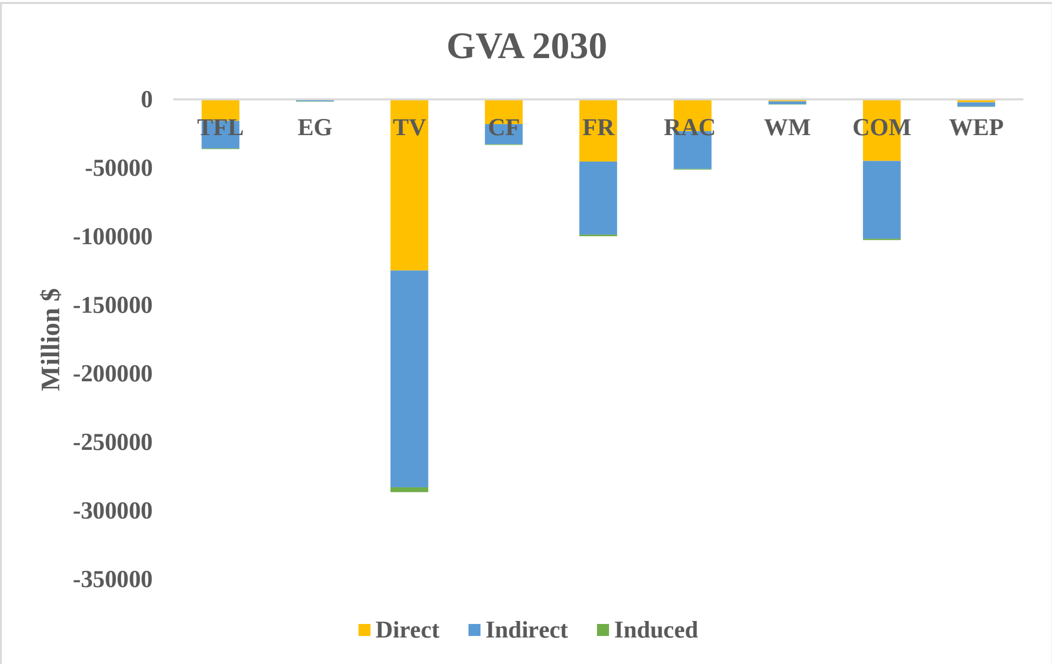


Figure 3.6. GVA direct, indirect and induced impacts in 2011 and 2030

Table 3.3. Net GVA in 2011 and 2030

2011		Manufacturing in Million $			Operation in Million $			Total in Million $		
	Appliances	**Direct**	**Indirect**	**Induced**	**Direct**	**Indirect**	**Induced**	**Direct**	**Indirect**	**Induced**
	TFL	96	192	5	144	-190	-4	239	2	1
	EG	0	0	0	4	-5	0	4	-5	0
	TV	1,623	3,717	100	1,151	-1524	-35	2,775	2,192	65
	CF	584	1,260	33	163	-216	-5	747	1,044	28
	FR	568	1,096	33	268	-355	-8	837	741	25
	RAC	50	112	3	48	-64	-1	99	48	1
	WM	0	-1	0	11	-15	0	11	-16	0
	COM	462	767	33	270	-358	-8	732	409	25
	WEP	3	7	0	13	-17	0	16	-10	0
	Sum	**3,387**	**7,151**	**207**	**2,073**	**-2,745**	**-63**	**5,460**	**4,406**	**144**
2030	TFL	789	1589	44	-16,416	-21,738	-499	-15,627	-20,150	-455
	EG	-19	-38	-1	-621	-822	-19	-640	-860	-20
	TV	7016	16,445	438	-131,844	-174,587	-4,007	-124,827	-158,141	-3,569
	CF	10,634	22,955	592	-28,595	-37,866	-869	-17,961	-14,911	-277
	FR	11,487	22,152	665	-56,936	-75,394	-1,730	-45,449	-53,242	-1,065
	RAC	3,460	7,693	197	-26,602	-35,227	-808	-23,143	-27,533	-611
	WM	0	-10	2	-1515	-2,006	-46	-1515	-2016	-44
	COM	8,299	13,775	593	-53,211	-70,461	-1,617	-44,911	-56,686	-1,024
	WEP	42	94	2	-2,322	-3,075	-71	-2,280	-2,981	-68
	Sum	**41,708**	**84,655**	**2,534**	**-318,061**	**-421,175**	**-9,666**	**-276,353**	**-336,520**	**-7,132**

4.4. Environmental impacts

The emissions accounted for in our study include both CO_2 emission and non-CO_2 emissions and involve energy-related and non-energy related combustion, covering their corresponding global warming potential (GWP) in tonnes of CO_2 equivalent (tCO_2eq) [33],[34]. SO_2, NO_x and NH_3 are the primary gases used to account for the acidification potential [35]. The tropospheric ozone potential involves emissions of the following gases: NO_x, NMVOC, CO and CH_4 [36].

The avoided GHG emissions were computed by considering that each GHG has a different GWP and persists for a different period of time in the atmosphere. The three main GHG and their 100-year GWP compared to carbon dioxide are [36]: 1 x CO_2; 25 x CH_4 (i.e. releasing 1 kg of CH_4 into the atmosphere is almost equivalent to releasing 25 kg of CO_2); 298 x N_2O (i.e. releasing 1 kg of N_2O into the atmosphere is almost equivalent to releasing 298 kg of CO_2).

The calculation of the acidification potential is analogous to the GWP and is stated in SO_2 equivalents (tSO_2eq). The chosen acidifying substances (i.e. SO_2, NO_x and NH_3) are aggregated into a single indicator, after assigning to each specific pollutant the corresponding acidification potential: 1 x SO_2; 0.7 x of N_2O and NO_X (i.e. releasing 1 kg of N_2O and NO_X into the atmosphere is almost equivalent to releasing 0.70 kg of SO_2); 1.88 x NH_3 (i.e. releasing 1 kg NH_3 into the atmosphere is almost equivalent to releasing 1.88 kg of SO_2) [36].

The calculation of the tropospheric ozone formation potential (TOFP) follows the same reasoning of GWP and acidification potential and it is provided in tonnes of Non-Methane Volatile Organic Compounds (NMVOC) equivalent (tNMVOCeq). The chosen set of ozone precursors (i.e. NO_x, NMVOC, CO and CH_4) is aggregated into a single indicator, after allocating to each specific pollutant the corresponding TOFP : 1 x NMVOC; 1.22 x NOx ; 0.11 x CO (i.e. releasing 1 kg of NMVOC, NO_X into the atmosphere is almost equivalent to releasing 1.22 kg of NMVOC and CO is equivalent to releasing 0.11 kg of NMVOC); 0.0144 x CH_4 (i.e. releasing 1 kg CH_4 into the atmosphere is almost equivalent to releasing 0.0144 kg of NMVOC) [36].

The appliances with the highest GHG reduction potential in 2011 and 2030 are COM, FR, TV, RAC, CF and TFL (see Figure 3.7 and Table 5A.2 of Appendix 5). If the replacement of BAU with BAT appliances took place in 2011, there would be no avoided GHG emissions in the starting year of the assessment with TV, CF, FR, corresponding to an overall increase of 2,874 Gg CO2eq in 2011. However, an overall reduction of GHG emissions of 337,Gg tCO_2eq in 2030 is anticipated.

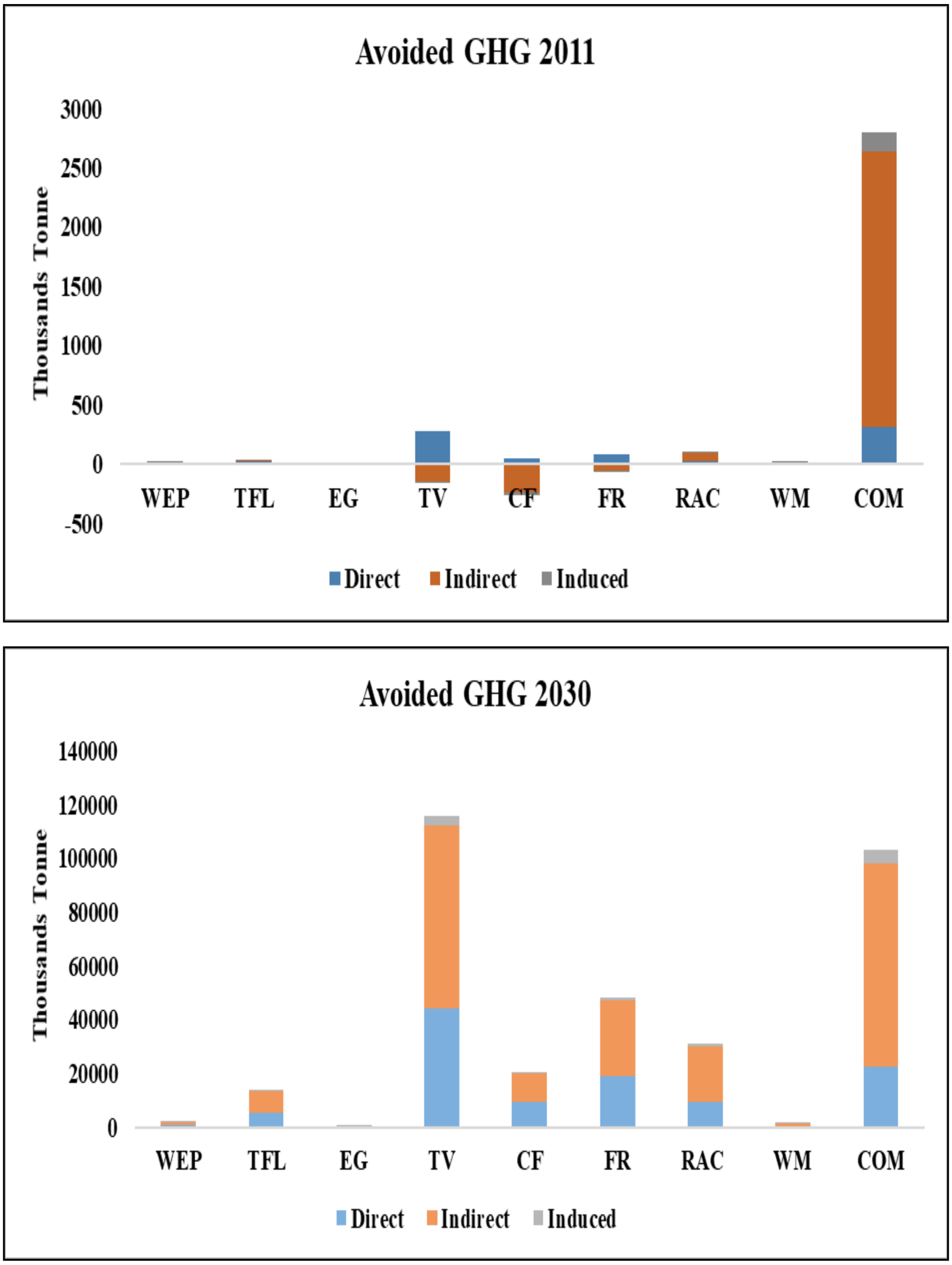
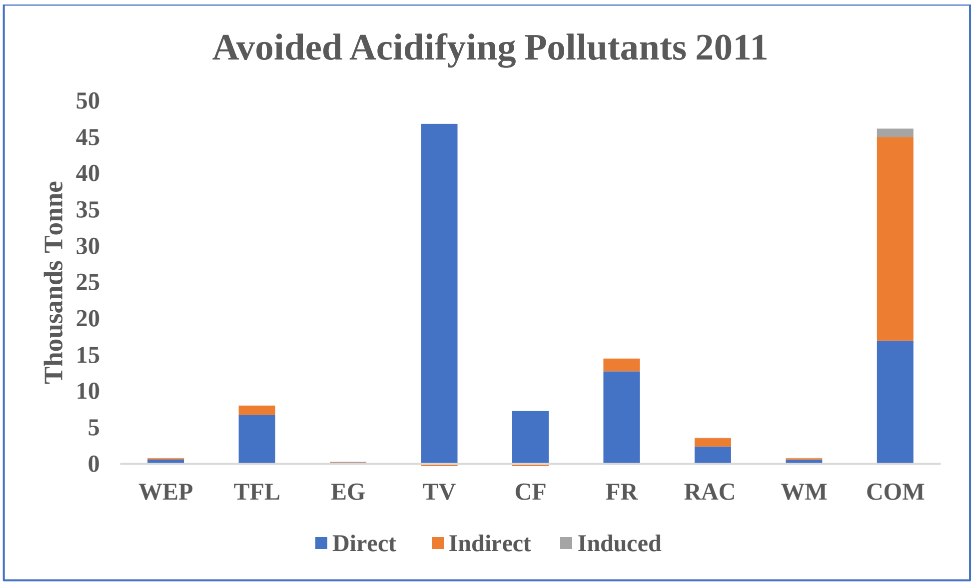


Figure 3.7. Avoided GHG emissions with BAT appliances

The appliances with the highest acidification reduction potential in both years are (once more) FR, TV, RAC, CF and TFL (see Figure 3.8 and Table 5A.3. of Appendix 5). If the replacement of BAU with BAT appliances was carried out in 2011, the avoided overall acidifying gas emissions would correspond to 11, Gg tSO_2eq Considering the same previous assumptions, our projections also indicate that in 2030 an overall reduction of acidifying gas emissions of 2,028, Gg tSO_2eq is foreseen.



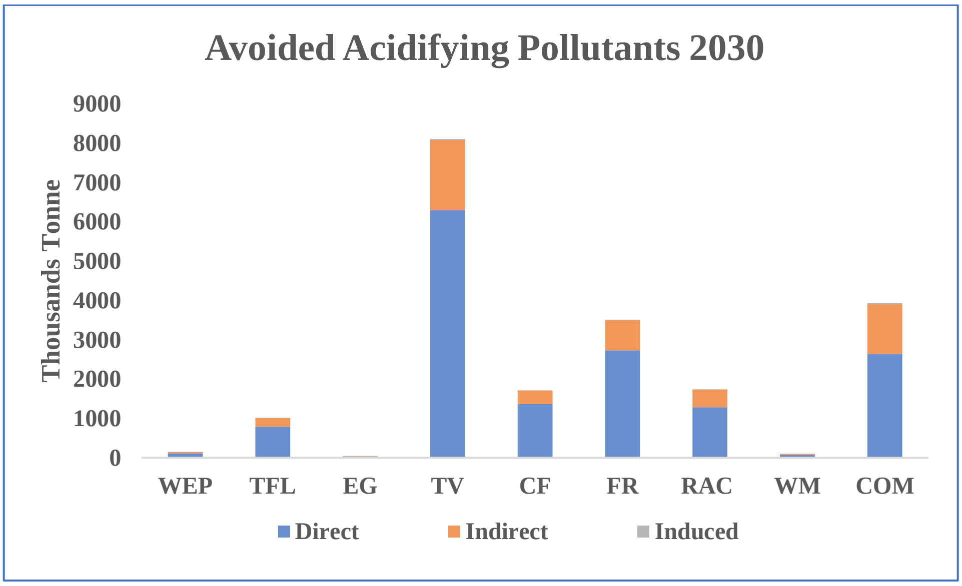


Figure 3.8. Avoided acidification potential emissions with BAT appliances

The appliances with the highest anticipated reduction projections for TOFP in 2011 and 2030 are TV, RAC, TFL and CF (see Figure 3.9 and Table 5A.4 of Appendix 5). With the replacement of BAU with BAT appliances in 2011, the avoided emissions of ozone precursors would correspond to 396 294 tNMVOCeq. Our projections also indicate that in 2030 an overall reduction of ozone precursors is predicted of 50 Gg tNMVOCeq

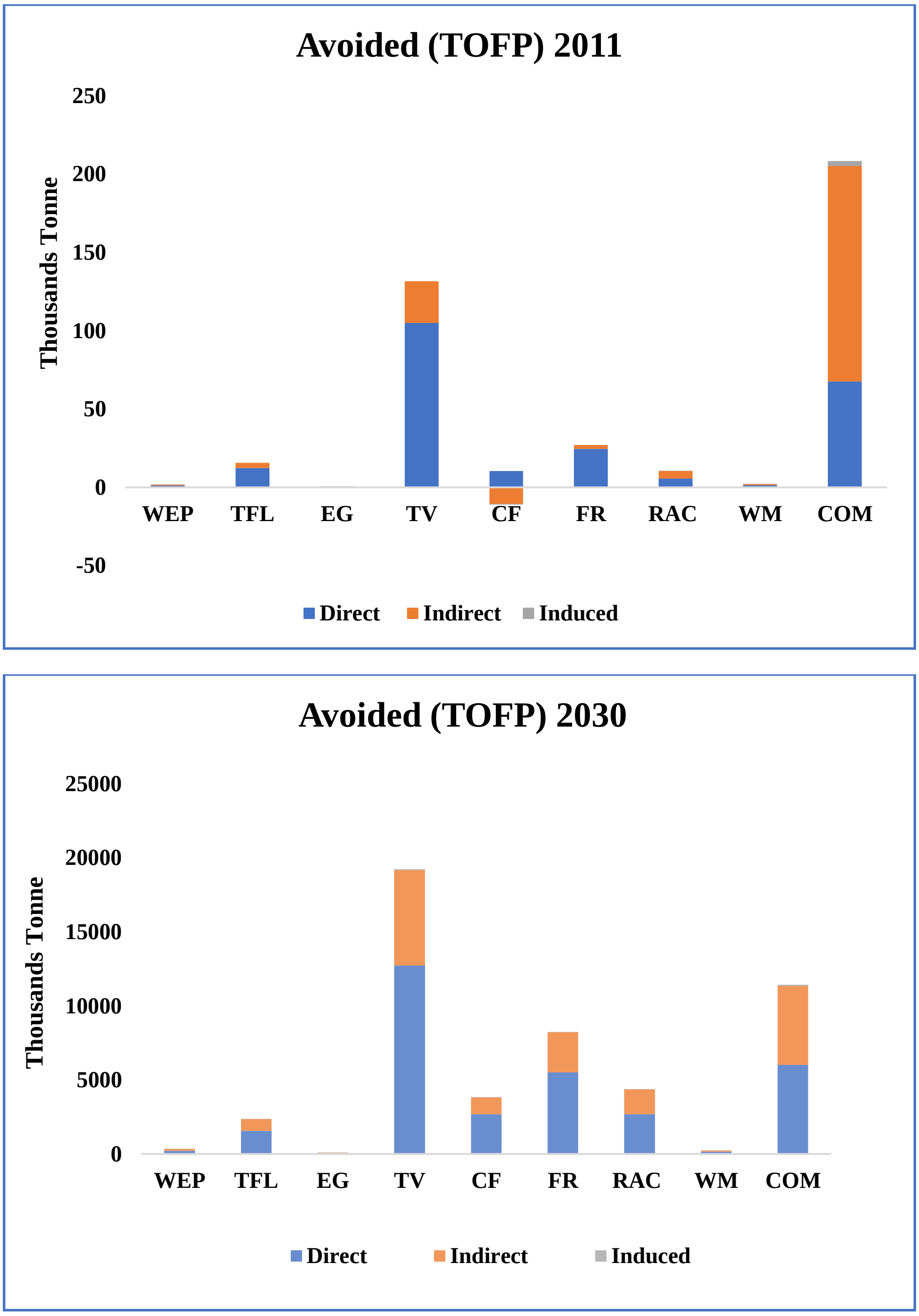


Figure 3.9. Avoided tropospheric ozone formation potential with BAT appliances

4.5. Social impacts

The foreseen overall net employment generation with BAT appliances is illustrated in Figure 3.10 indicating that promoting EE will promote net job generation until 2030. In 2011 the replacement of BAU with BAT appliances would have been responsible for 337 thousand direct jobs, 857 thousand indirect jobs and 37 thousand induced jobs. In 2030 a generation of 2,306 thousand direct jobs, 1,217 thousand indirect jobs and 12 thousand induced jobs is foreseen. However, a loss of 2,959 thousand indirect jobs and 176 thousand induced jobs is to be expected between 2025 and 2,030. These outcomes are aligned with the conclusions of ACEEE, suggesting that there will be a job loss due to energy efficient technology ([37], [38]).

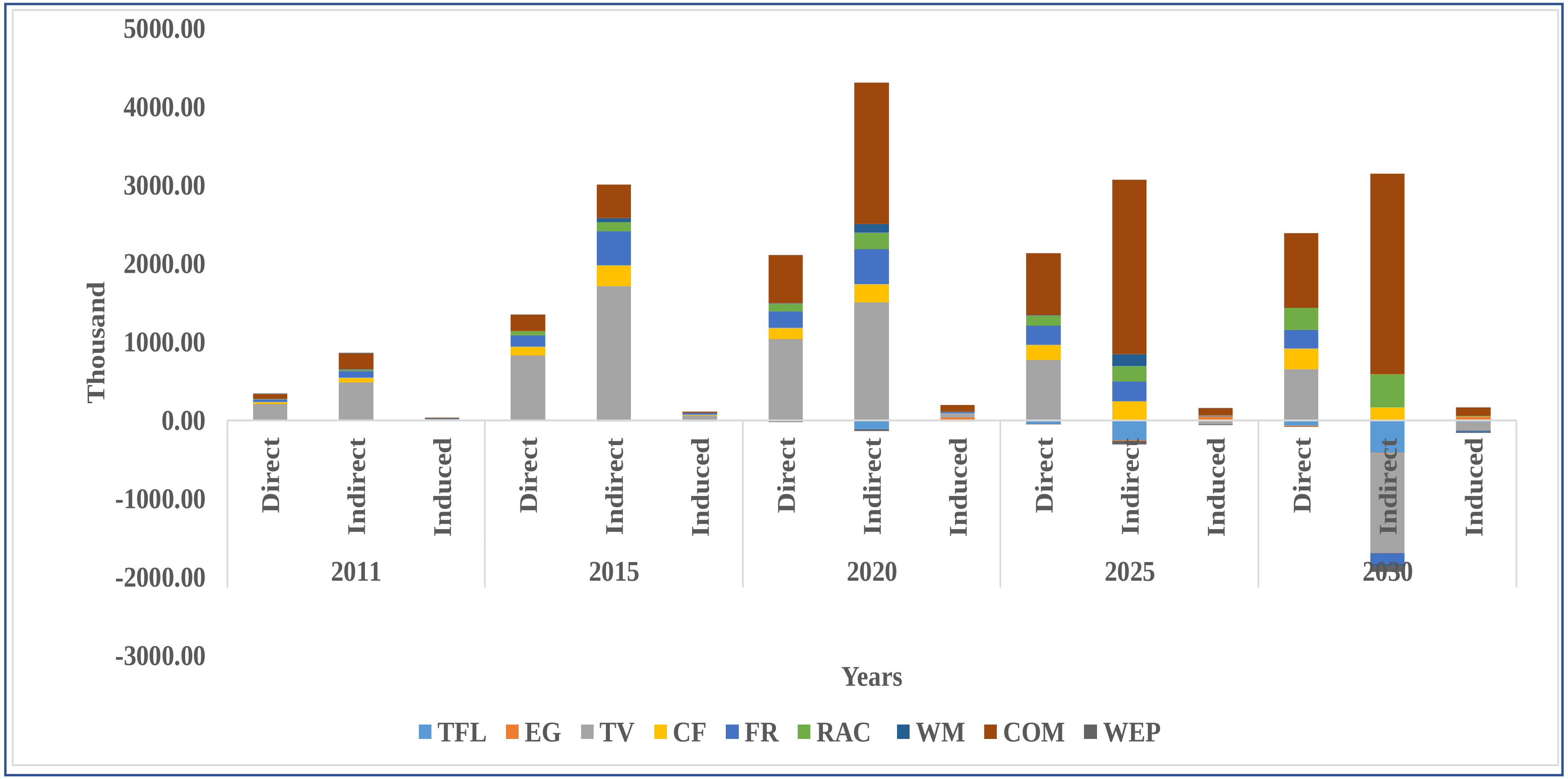


Figure 3.10. Overall net employment generated from 2011 to 2030

5. Conclusions and future work developments

An I-O lifecycle assessment modelling approach has been suggested which allows obtaining several projections regarding the assessment of the E3S impacts associated with the replacement of less efficient appliances (BAU) with BAT appliances from the year 2011 to 2030. Several environmental impacts have been covered, including GHG emissions, acidifying substance emissions and TOFP emissions. According to the scenarios considered in our analyses, we have concluded that there will be no avoided GHG emissions in the starting year of our assessment for TV, CF, FR. This outcome is obtained because the impact of the manufacturing lifecycle stage will be more significant than the operational phase in the initial stages of our analysis. However, the longer the lifetime of the equipment, the higher the expected overall reduction of the GHG emissions throughout the equipment's lifetime. According to our projections in 2030, an overall reduction of GHG emissions is anticipated of above 337 Gg CO_2eq. The avoided acidifying gas emissions would reach more than 11 Gg SO_2eq in 2011, whereas in 2030 an overall reduction of more than 2,028 Gg SO_2eq is estimated. Regarding the TOFP avoided emissions these would correspond to above 396 Gg NMVOCeq in 2011, while in 2030 an overall reduction of more than 50 Gg NMVOCeq is expected. Our study also indicates that TV, CF, FR and RAC BAU appliances will have been responsible for more than 85 % of the potential GHG emissions, in 2011. From the nine appliances herein considered, three (TV, CF, FR) alone are responsible for more than 80 % of the energy consumption. In particular, the replacement of current less efficient models with BAT can reduce the overall energy consumption to 326 TWh in 2030. The cumulative electricity savings obtained with the replacement of BAU with BAT appliances, may correspond to an overall avoided energy cost in million USD about 6,109 in 2011, 70,519 in 2015, 281,837 in 2020, 566,242 in 2025 and 937,349 million USD in 2030.

Regarding the economic impacts, an expected net positive direct, indirect and induced GAV impact of about 5,460 million $, 4,406 million $ and 144 million $ would be attained in 2011, respectively, while in 2030 net negative direct, indirect and induced GAV impacts are foreseen of 276,353 million $ 336,520 million $ and 7,132 million $, respectively. The overall economic effect becomes negative because of the anticipated reduction of energy consumption. Nevertheless, this conclusion is not straightforward since an expected increase of private consumption "may be anticipated due to the increase of disposable income caused by savings in electricity consumption".

The overall net employment generation caused by the adoption of BAT appliances suggests that promoting energy-efficient appliances will lead to positive direct net job generation of 337, 1,352, 2,089, 2,082 and 2,306 thousand jobs in 2011, 2015, 2020, 2025 and 2030 respectively. Although the overall employment effect is largely positive, a negative impact on indirect and induced employment in 2030 can be anticipated.

We can conclude that the adoption of more energy efficient technology will not necessarily lead to high economic impacts. However, it is expected that the avoided energy consumption costs can be used to further promote the investment in more efficient technologies (e.g. super-efficient appliances). Finally, this modelling framework has also been used in Chapter 4 to assess the impact of each technology on a per unit basis, only accounting for the manufacturing stages of the equipment under evaluation. Furthermore, an economic analysis was also conducted for each technology, specifically addressing the net present value (NPV), the savings to investment ratio (SIR) and the cost of conserved energy (CCE). Additionally, a correlation study of all the indicators obtained has been performed in order to study the trade-offs involved in our multi perspective assessment.

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CHAPTER 4

A multi perspective assessment of best available energy end-use technologies in India's households

Although the version presented here has been modified in such a way that notation follows the rest of the thesis, this chapter is based on:

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A multi perspective assessment of best available energy end-use technologies in India's households", Accepted for publication in the Journal of Process Integration and Optimization for Sustainability. https://doi.org/10.1007/s41660-018-0054-1

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A novel energy-economy-environment modelling framework for evaluating energy efficient appliances in India's residential sector", Submitted to Springer proceedings in energy. (under review).

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins, "Assessing the Impacts of Energy Efficient Appliances in India's Residential Sector- An EIO LCA Modelling Framework", Conference proceedings of the 6th International Conference on Advances in Energy Research IIT Mumbai, India 12-14 Dec 2017.

1. Introduction

India is a developing country which has reached a yearly average growth rate of approximately 7% over the last two decades [1], corresponding to the sixth largest world's economy according to its nominal Gross Domestic Product (GDP) [2]. Currently, India has 1.4 billion inhabitants, representing 17% of the world's population [3]. Economic growth has been linked and sustained by India's exports, high saving rates, favourable demographics, and a rising middle class [4], which seeks higher living standards, accompanied by a consistent increase of the purchase of electric appliances. In fact, India is rapidly shifting from a rural to an urban country, although small towns and farming communities still make up the clear majority of its population. On the other hand, the spending patterns of India's population in the cities and villages are rapidly converging, as rural households now pay for most goods and services usually associated with urban lifestyles - from electrical appliances and laundry services to air travel [5].

India is the fourth-largest energy consumer in the world, just after the United States, China and Russia [6]. The residential sector is the second to industry biggest consumer representing 24% of total electricity demand in 2016-2017 [7]. Buildings account for 35% of total final energy consumption and building's energy consumption is growing 7 to 8% per annum in the commercial and residential sectors [8]. The residential sector represented 24% of India's final energy consumption while it only corresponded to 27% of World's electricity consumption in 2013 [9] (Figure 4.1). India has about 247 million households with a growth rate of 28.04% between 2001 and 2011 [3].

The access to electricity services is an important factor for human [10], economic and social development [11], [12]. In this context, presently, in India, about 70% of rural households and 98.3% of urban households have access to electricity services [13]. In fact, India's households were responsible for a consumption of about 250 TWh of electricity in 2016-2017 [7].

India's Star labelling program is aimed at motivating the consumers to adopt energy efficient appliances and thus contributing to the reduction of energy consumption and greenhouse gas (GHG) emissions [14]. Policy options for reducing energy demand growth are equally important for India and energy efficiency adoption in end-use technologies in the residential sector is one of such important policies [15]. The support of energy efficiency policies can be seen as a cost-effective driver for reducing energy consumption and GHG emissions while providing economical energy services in different activity sector [16].

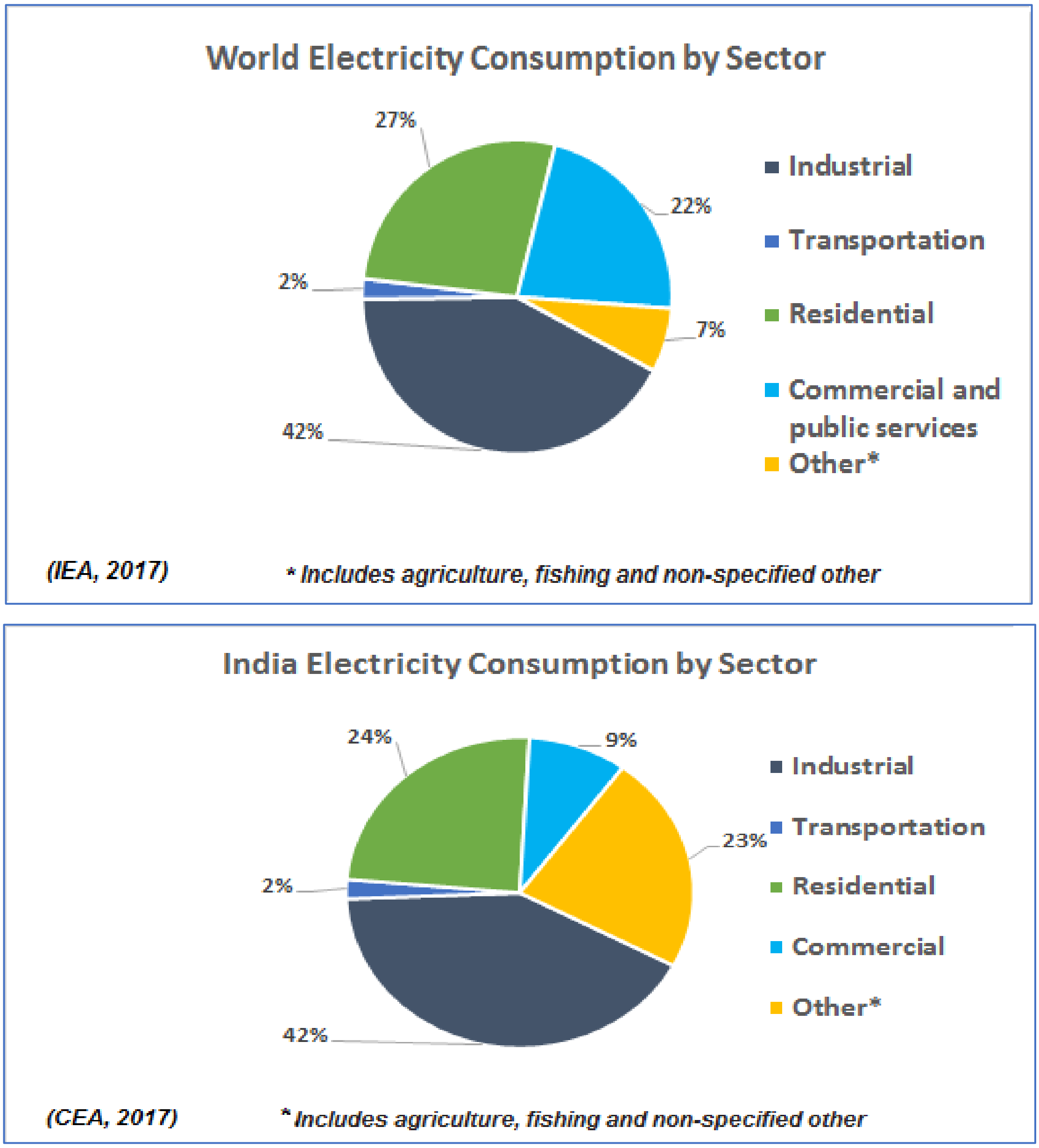

Figure 4.1. Final electricity consumption per activity sector

In this context, EIO LCA is an approach which allows obtaining a multidimensional assessment of the adoption of energy efficient technologies, encompassing environmental, economic and social impacts. The novelty of this work lies on the fact that the energy consumption for lighting sources (TFL), refrigerators (FR), air-conditioners (RAC), water heaters (EG), televisions (TV), computers (COM), washing machines (WM), ceiling fans (CF) and water pumps (WEP) has been computed by means of national average I-O sectoral data. An economic analysis was also conducted for the different technologies under assessment based on different discount rates ranging from 6.5% to10% (according to [17] and [18]. The main objective of this study is to provide a modelling framework which allows supporting public bodies in the assessment and selection of energy efficient technologies/end-uses that can be adopted in the residential sector, considering the evaluation of technical, economic, environmental and social impacts.

This Chapter is organised as follows. Section 2 presents a brief description of the methodological approach herein developed. Section 3 provides the main supporting premises regarding data collection. In Section 4 a discussion of the illustrative results obtained is presented. Finally, some conclusions are conveyed and future work developments are suggested.

2. Methodology

In the next Sections, we provide a brief description of the basic underpinning assumptions of the I-O approach as well as the necessary adjustments to enable its application to our case study. We also present the indicators specifically used to address the economic analysis of the best available technologies (BAT) under assessment and, finally, we explain the main phases followed to conduct our study.

2.1. The mathematical features of I-O analysis

The methodological EIO-LCA framework herein followed was developed on the previous Chapters and hence it will not be herein presented.

2.2. Economic analysis

2.2.1. Net present value

The net present value (NPV) is computed by considering the discounted cash flows obtained due the investment on BAT as:

$$NPV_i = -I_i + \sum_{t=1}^{T} \frac{ES_i}{(1+d)^t} \tag{4}$$

Where NPV_i is the NPV of technology i, I_i is the investment cost of BAT i, ES_i is the yearly energy savings (in USD), according to the average electricity tariffs; d represents the discount rate and t is the lifetime of the BAT considered.

2.2.2. Savings to investment ratio

The savings to investment ratio (SIR) considers the total present value of the energy saved (in USD) over the lifetime of the BAT divided by the cost of the investment (in USD) and it is obtainable as:

$$SIR_i = \frac{\sum_{t=1}^{T} \frac{ES_i}{(1+d)^t}}{I_i} \tag{5}$$

Where SIR_i is the SIR of technology i.

2.2.3. Cost of conserved energy

The cost of conserved energy (CCE) corresponds to the annualized additional cost (in USD /kWh) that the consumers have to face when they adopt a more efficient technology and it has to be compared with the cost of electricity. In this case, if the CCE of a given BAT is lower than the electricity price, then that BAT presents cost-effectiveness to the consumer. This indicator is obtained (when contrasting BAT with BAU) as:

$$CCE_i = CRF \ \frac{\Delta I_i}{ES_i} \tag{6}$$

$$CRF \ = \frac{d}{1-(1+d)^{-t}} \tag{7}$$

where ΔI_i is the incremental investment cost of BAT i and CRF is the capital recovery factor that establishes the linkage between the discount rate and the lifetime of the appliances [19].

2.3. Phases involved in the multi perspective assessment of BAT

The various phases involved in the multi perspective assessment of the BAT are illustrated in Figure 4.2 and explained below:

Phase I - Defining the boundaries of the analysis

- Select the electrical appliances/end uses to be assessed, according to India's star labelling program.
- Obtain the average rated power and operating time for the electrical technologies based on published literature.
- Compute the energy consumption based on the total annual operating days and further obtain the potential energy savings with the adoption of BAT.
- Estimate the total investment on BAT and BAU technologies based on basic prices.
- Obtain India's electricity production mix and energy consumption according to the energy balances published by the Ministry of Statistics of the Government of India.

Phase II- Adjust the I-O framework to conduct the EIO LCA analysis

- Distribute the investment cost of each technology/end use and allocate the domestic output thus obtained to the corresponding IO sector.
- Compute direct, indirect and induced multipliers for national air emissions, employment generation, gross value added and energy consumption.

Phase III- Economic analysis

- Calculate the NPV with the inputs obtained in phase 1 regarding annual energy savings and investment costs of each BAT.
- Obtain the savings to investment ratio (SIR) of each BAT based on a variable discount rate.
- Compute the cost of conserved energy (CCE) of each BAT and compare it with the electricity tariff prices faced by the consumers.

Phase IV Correlation analysis

- Consider the data obtained in the previous phases and perform the correlation analysis.

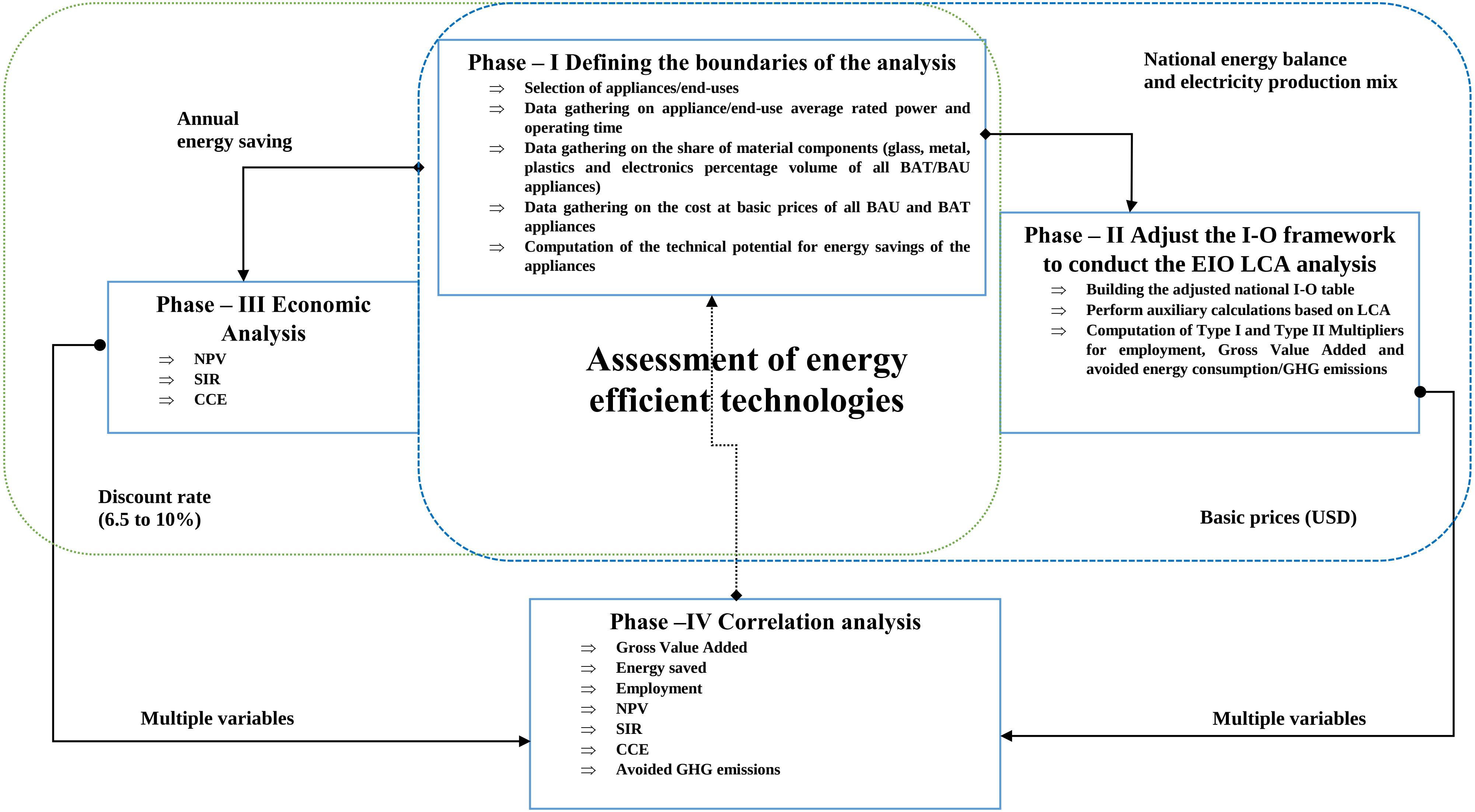

Figure 4.2. Methodological framework

3. Data sources and assumptions

Data and assumptions have been described in detail in Appendices 1, 2 and 3.

4. Illustrative results

The comparative results regarding the EIO-LCA impact assessment of the nine BAT technologies and obtained with the economic analysis herein considered are presented below.

4.1. Energy impacts

The avoided electricity consumption value (in USD) was analysed on a yearly basis during the operation stage of the nine energy efficient technologies. The annual avoided electricity consumption per BAT was obtained based on the BAT's operating hours (Table 4.1). From our results, RAC shows the highest annual avoided electricity consumption (about 760 USD over its lifetime), while the avoided electricity consumption of WEP, FR, WM, TV and EG ranges between 122 and 480 USD. In the case of TFL, COM and CF the avoided electricity consumption obtained is lower than 100 USD.

Table 4.1. Energy savings obtainable with the adoption of BAT

Appliances/ end-uses	*Energy savings per year (USD)*	*Energy savings over the lifetime (kWh)*	*Energy savings over the lifetime (USD)*
TFL	2.8	491	39.2
EG	9	1,779	142.4
TV	12	1,533	122.6
CF	4.7	876	70.1
FR	22	4,050	324.0
RAC	76	9,500	760.0
WM	17.5	3,285	262.8
COM	12	730	58.4
WEP	32	5,995	479.6

The annual energy savings values per BAT were also obtained based on BAT's operating hours (Table 4.1). The energy savings thus computed vary considerably among the different BAT. From our results, RAC shows the highest annual energy savings potential (about 7 and USD per annum), while the energy savings potential of WEP, FR, WM, TV and COM ranges between 12 and 32 USD per annum. In the case of TFL, EG and CF the annual energy savings potential obtained is lower than 10 USD. In the residential sector, the annual energy savings are mainly influenced by the number of operating days and hours.

4.2. Environmental impacts/avoided GHG emissions

The emissions accounted for in this study include both CO2 and non-CO2 emissions. The avoided GHG emissions were computed by considering that each GHG has a different global warming potential (GWP) and persists for a different length of time in the atmosphere. The three main GHG and their 100-year GWP compared to carbon dioxide are CO2, CH4 and N2O. The following emission conversion factors have been used [20]: 1 × CO2; 25 × CH4 (i.e. releasing 1 kg of CH4 into the atmosphere is almost equivalent to releasing 25 kg of CO2); 298 × N2O (i.e. releasing 1 kg of N2O into the atmosphere is almost equivalent to releasing 298 kg of CO2). The energy efficient appliances with the highest reduction potential of GHG emissions over their corresponding lifetime (85%) were RAC, WEP, FR and EG while lower GHG avoided emissions are anticipated with WM, CF, TV and TFL, due to the type of materials embodied in these technologies [21] (Figure 4.3).

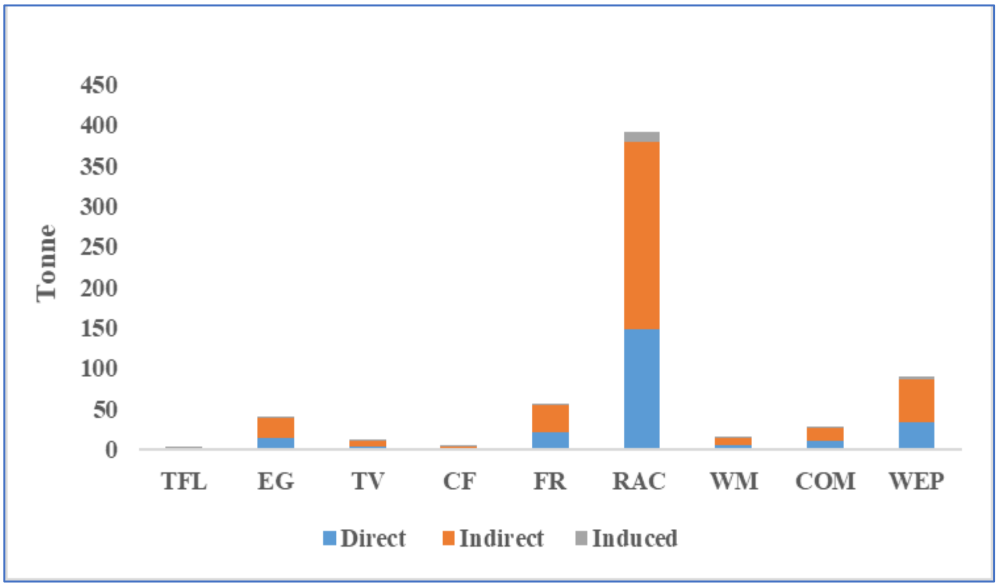

Figure 4.3. Avoided GHG emissions per BAT (t CO2 equivalent)

4.3. Economic impacts

The Gross Value Added (GVA) is the value of output less the value of intermediate consumption and it can be seen as a measure of the contribution to GDP made by the industrial sectors engaged with energy efficient appliances. The anticipated direct, indirect and induced net GVA impacts resulting from the investment in energy efficient appliances are depicted in Figure 4.4. The net GVA impacts were obtained by considering the GVA generated during the manufacturing phases of energy efficient appliances. FR, RAC, TV, COM, CF and WEP are the highest contributors to GVA while TFL, EG and WM provide a lower contribution.

In this context, it should be noted that the anticipated effects of energy consumption on economic growth can vary greatly due to the stages of development that a country has experienced and as a result of its economic structure [22]. Moreover, although not accounted for in this study, the adoption of BAT reduces domestic energy bills thus allowing to obtain higher disposable incomes, which can be spent in other activity sectors or even in other super-efficient technologies.

The foreseen net direct, indirect and induced employment impacts obtained with the investment on energy efficient appliances are always positive during the manufacturing phases of energy efficient appliances (Figure 4.5). The highest impacts on employment generation are also mainly related to the investment on FR, RAC, TV, COM, CF and WEP.

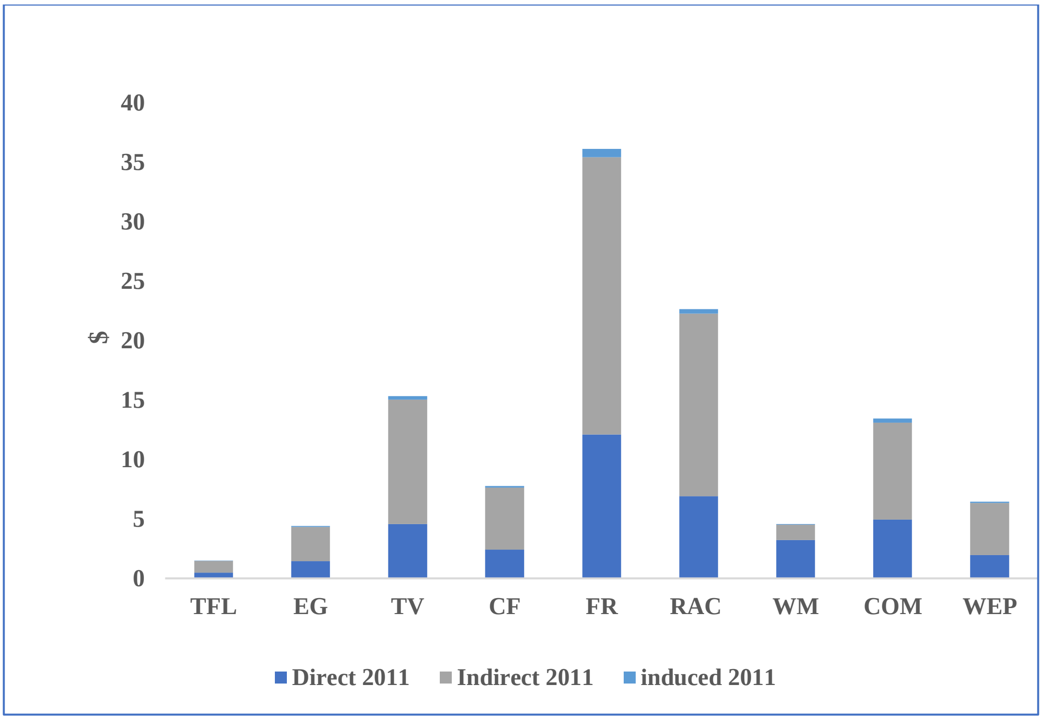

Figure 4.4. GVA per BAT (USD)

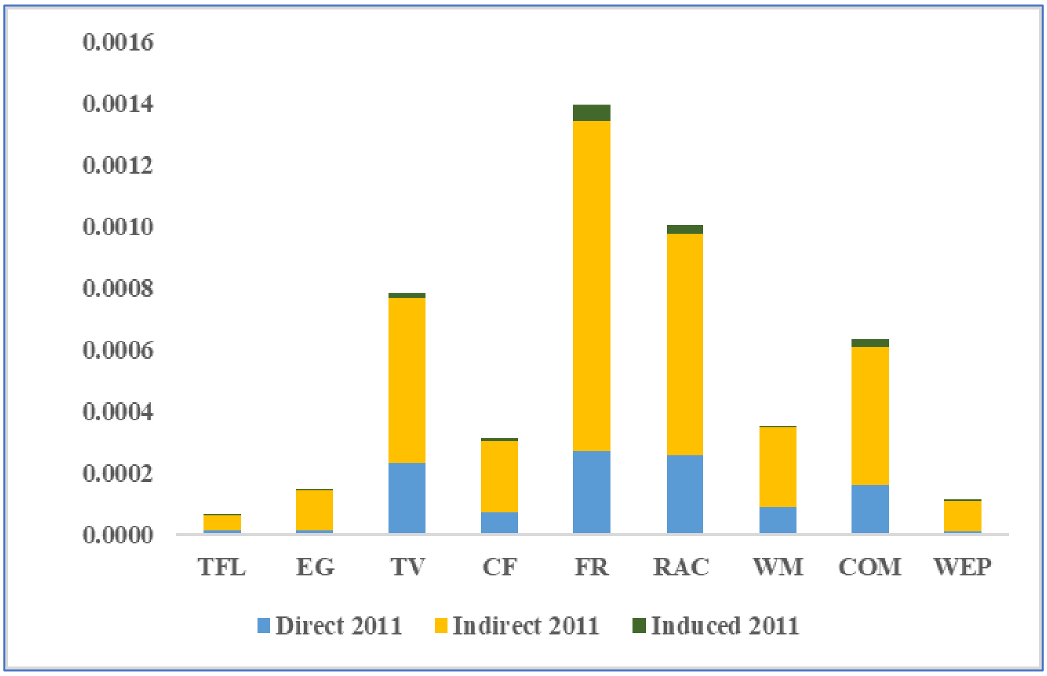

Figure 4.5. Employment per BAT (number of employees)

Table 4.2. The CCE per BAT

Appliances/ end -use	Additional Investment (USD)	CRF	CCE (USD /kWh)	CRF	CCE (USD/kWh)
		Discount rate 6.5%		Discount rate 10%	
TFL	2.10	0.111	0.007	0.136	0.008
EG	6.10	0.106	0.005	0.131	0.007
TV	52.50	0.139	0.048	0.163	0.056
CF	10.80	0.106	0.020	0.131	0.024
FR	49.80	0.106	0.020	0.131	0.024
RAC	31.40	0.139	0.005	0.163	0.005
WM	17.00	0.106	0.008	0.131	0.010
COM	18.00	0.241	0.030	0.264	0.033
WEP	9.00	0.106	0.002	0.131	0.003

Table 4.3. NPV and SIR per BAT

Appliances/ end -use	NPV	SIR	NPV	SIR
	Discount rate 6.5%		Discount rate 10%	
TFL	22.2	8.2	17.6	6.7
EG	55.1	2.6	38.1	2.1
TV	-16.8	0.8	-29.6	0.7
CF	28.9	2.9	20.5	2.4
FR	88.5	1.8	49.7	1.4
RAC	380.0	3.3	300.6	2.8
WM	72.7	1.8	41.3	1.4
COM	-155.5	0.2	-159.7	0.2
WEP	281.6	15.8	224.2	12.8

The CCE, the NPV and the SIR are important metrics that provide information regarding the attractiveness of the investment on distinct energy efficient technologies from the investor's point of view. The higher the CCE and the lower the NPV and SIR values, the less attractive the investment becomes on the technology under scrutiny. In Table 4.2 the CCE values for each BAT are presented. The highest CCE values are obtained for TV, COM, CF, FR and the lowest CCE values are obtained for TFL, EG, RAC and WEP. It is worth noting that CCE value is always lower than the average electricity tariff paid by the residential sector, suggesting that from this point of view the investment on BAT is always attractive. In Table 4.3, both the values of NPV and SIR are provided per technology. The NPV values obtained become only negative for COM and TV. Finally, from the point of the SIR, TV and COM are also the less attractive BAT investments.

5. Correlation analysis

In order to explore the trade-offs among the distinct indicators herein computed per BAT, we have conducted a correlation analysis. These results are depicted in Table 4.4.

In this case, the values of NPV and SIR are positively correlated. As it would be expected, CCE is negatively correlated with NPV and SIR, respectively. Both the net GVA and Employment present a slightly negative correlation with NPV and SIR. This result can be explained by the fact that the investment on BAT has a negative effect on the NPV, while it has a positive impact on GVA and Employment. The values of Employment and GVA are positively correlated. The GHG avoided emissions obtained also present a positive correlation with the GVA and Employment generation. Similar results were obtained in the assessment of lighting technologies in Portugal (see [23]). The avoided GHG emissions and the AEC are both strongly positively correlated with NPV, whereas they are negatively correlated with the CCE. These results are also consistent with the ones obtained in [24] in the assessment of transport cost-benefit analysis and in [25].

Table 4.4. Correlation analysis of distinct metrics used to assess BAT technologies

	NPV (10%)	NPV (6.5%)	SIR (10%)	SIR (6.5%)	CCE (6.5%)	CCE (10%)	EMP	GHG	GVA	AEC
NPV (10%)	1.000									
NPV (6.5%)	0.998	1.000								
SIR (10%)	0.541	0.516	1.000							
SIR (6.5%)	0.537	0.512	1.000	1.000						
CCE (6.5%)	**-0.634**	**-0.618**	**-0.549**	**-0.551**	1.000					
CCE (10%)	**-0.621**	**-0.606**	**-0.550**	**-0.551**	0.998	1.000				
EMP	**-0.101**	**-0.042**	**-0.518**	**-0.522**	0.318	0.286	1.000			
GHG	0.770	0.792	0.078	0.070	**-0.358**	**-0.368**	0.489	1.000		
GVA	**-0.115**	**-0.160**	**-0.356**	**-0.355**	0.291	0.302	0.608	0.398	1.000	
AEC	0.895	0.923	0.295	0.292	**-0.453**	**-0.453**	0.331	0.895	0.422	1.000

The trade-offs among the various metrics herein used to assess distinct BAT highlight the nexus between energy efficiency and the economic and environmental impacts anticipated with the adoption of these types of technologies.

6. Conclusions

The EIO LCA modelling framework herein proposed is aimed at supporting public bodies, such as government agencies, in the selection of the BAT appliances that should be promoted under the auspices of a public programme aimed at fostering energy efficiency in India. A new approach for assessing E3 impacts regarding the investment on BAT technologies is provided. In this framework, the EIO LCA has been used for the assessment of the lifecycle phases of nine energy efficient appliances (manufacturing, installation and operation) typically used in India's households. The dismantling of the equipment has not been accounted for due to the lack of data sources concerning electronic waste management in India.

From the results obtained, only avoided GHG emissions clearly show overall positive impacts for all the BAT under analysis. Furthermore, increasing the equipment's efficiency guarantees a positive impact on employment generation as well as a positive increase in GVA during the manufacturing phases of the energy efficient appliances. However, it should be acknowledged that the adoption of BAT contributes to reduce the domestic energy bill on electricity thus allowing to obtain higher disposable incomes, which can be spent elsewhere or even in other super-efficient technologies. On the other hand, it should not be forgotten that the extent of the beneficial effects of energy efficiency on economic growth is mainly influenced by the cost-effectiveness of BAT. Hence, countries already placed on the frontline of energy efficiency will have less opportunities for enhancement than countries with less efficient economic systems. Finally, this energy efficiency frontline also depends on the characteristics of the countries considered, namely if such countries have prevailing energy intensive industries and lower local energy prices.

After conducting the correlation analysis, it was also possible to conclude that NPV and SIR are positively correlated. On the other hand, it was possible to observe the negative correlation of CCE with NPV and SIR, respectively. As ascertained by other authors [23] the net GVA and employment have a negative correlation with NPV and the SIR, since the investment on BAT has a negative impact on the NPV and SIR, whereas it has a positive effect on GVA and on Employment generation. Additionally, as suggested in [24] in the assessment of transport cost-benefit analysis and in [25] the avoided GHG emissions and the AEC are both positively correlated with NPV, while they are negatively correlated with the CCE. Finally, as it would be expected the values of Employment and GVA are also positively correlated and, in their turn, they both present a positive correlation with GHG avoided emissions, suggesting that fostering the investment on more energy efficient technologies does not necessarily lead to conflicting economic/social results.

In this study, it was necessary to follow several premises in order to assess the BAT under scrutiny, since there were insufficient data available. Hence, future work should address the reduction of the uncertainty underlying the assessment of BAT. In Chapter 5, we specifically address some of these aspects by means of interval programming techniques, allowing to explore the main potentialities offered by different approaches.

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CHAPTER 5

A multiobjective optimization approach to support end-use energy efficiency policy design – the case-study of India

Although the version presented here has been modified in such a way that notation follows the rest of the thesis, this chapter is based on:

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A multiobjective optimization approach to support end-use energy efficiency policy design – the case-study of India", submitted to International Journal of Sustainable Energy Planning and Management (under review).

Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins. "Energy payback time and CO2 mitigation potential of energy efficient appliances in India: an EIO-LCA based approach" Conference proceedings of Planning for Climate Change: Political Climate and Policy Changes, Volume: CITTA 10th Annual Conference on Planning Research, held at Porto, Portugal, on the 12th of May 2017.

1. Introduction

Energy efficiency (EE) is becoming an important policy tool in India to deal with the substantial growth in energy demand [1]. A report by the International Energy Agency points out that 35% of the cumulative CO_2 savings would come from end-use energy efficiency [2]. Worldwide Building and construction together accounted for 36% of final energy use in 2017 [3]. Like many developing countries, in India there has been a rapid growth of its building stock, where it accounted for 41% of its total final energy use in 2013 [4]. Therefore, the need of policy options for minimizing the energy demand is equally important for India, namely promoting the adoption of EE of end-use technologies in the residential sector [5].

The National Action Plan on Climate Change (NAPCC) in India was launched in 2008 and it identified a set of measures that simultaneously account for the GDP's growth and climate change objectives of adaptation and mitigation [6]. The NAPCC was an initiative framed under the country's specific circumstances, especially incorporating EE concerns [7]. EE penetration in India's industries and other sectors varies widely and has an acknowledged role as an effective catalyser for reducing energy consumption and greenhouse gas (GHG) emissions, without impairing the access to energy services. Several studies focusing on EE highlight the absence of awareness/information, financial reasons, and split incentives as some important barriers to EE improvement in buildings (see e.g. [8],[9],[10] [7-9]). The policies endorsing EE in the residential sector are significantly associated with energy efficient advances in buildings and lighting end-use [11].

Since EE programmes usually make use of subsidizing programs sought to elect highly efficient actions, energy policy decision-makers should have at their disposal sound optimization tools to make better informed decisions.

To our knowledge the first attempt to obtain a global overview of the impacts of some energy efficient retrofit investments through the integration of a bottom-up approach into a top-down model was made by [12]. In their work some results are reported regarding the implementation of a methodological framework for assessing the impacts of energy saving measures in the building sector based on a multiobjective linear programming (MOLP) model and on input-output (IO) analysis. Consistent estimates for depicting important impacts, namely on environment, energy security of supply and other relevant economic indicators were provided through this type of methodology. Furthermore, [13] implemented an IO methodological framework which provides estimates regarding the contribution of some energy saving measures in the Portuguese building sector (residential, private services and public services) in net employment generation.

More recently [14] also quantified the economic, environmental and social benefits of large-scale energy efficiency programs in Qatar by means of detailed parametric and optimization analyses using lifecycle cost analysis for both new and existing buildings.

Consequently, the use of traditional optimization models which rely on the single concern of cost minimization become less reasonable, thus requiring the development of more suitable optimization tools.

In this context, modern portfolio theory has been broadly employed in finance in the evaluation of electricity power assets (see [15] for a review on this topic). From the investor's stance, portfolio theory aims at selecting the portfolios of electricity power technologies with the lowest risk and highest return, taking into consideration the economic, technical and social concerns at stake, in addition to resources scarcity [16]. In this case, [17] proposed two possible mean-variance approaches for the design of optimal renewable electricity production portfolios. The first one is aimed at maximizing the portfolio output and the second one is aimed at minimizing the portfolio cost. A set of renewable energy sources (RES) portfolios was computed, integrating three RES technologies, namely hydro power, wind power and photovoltaic (PV).

Furthermore, modern portfolio theory has also been adjusted to address other types of environmental investment problems, including in conservation investment decision cases, in agroecosystems planning, land allocation and forest management, among other fields of application. With this regard, [18] considered conservation investments which are assigned to distinct sub regions of a planning area. The percentage of the total portfolio investment in a particular sub region is viewed as that sub region's weight. The portfolio model thus considered computes the portfolio weights that minimize the variance of the total ecological value of the chosen investments for a given expected value of the portfolio. This optimization problem is then solved for multiple levels of expected ecological value (or return) in order to compute a set of efficient portfolios. [19] suggested a portfolio optimization model which covers three sustainability dimensions: the economic sphere, given as the maximization of the average annual income over the considered time horizon, defined as the average net present value of the yearly revenue from the agricultural production; the maximization of biodiversity referring to the portions of available area occupied by each species; and the social dimension of sustainability, given by the stability of annual economic income, as a proxy for the economic risk considered as the minimization of the monthly income variance within a year. [20] dealt with scarce land to various land-use options by means of portfolio theory, which proposes a variant of robust portfolio optimization as an alternative to the classical stochastic mean-variance optimization model that requires less pre-information. In their model, the maximization of the economic return of the land-use portfolio is subject to a set of constraints that impose that a pre-defined return threshold is reached by the robust solution for each uncertainty scenario considered. [21] also used modern portfolio theory in the appraisal of the risks and returns related with payments for ecosystem services (PES) for private forestland. In this study, PES schemes for biodiversity conservation and climate change mitigation were explicitly addressed.

Additionally, portfolio optimization theory has also been used to support public bodies in investment planning for EE programs (see e.g.[22],[23]), although less abundant publications still exist on this topic.

It becomes clear from the literature review that comprehensive approaches which encompass environmental and socioeconomic concerns are viewed as fundamental pillars in the design of more sustainable energy efficiency programmes.

In this context, IO analysis can be regarded as a suitable methodological technique for the assessment of the inter-relations among distinct industrial sectors, which has been applied to assess economic, energy, environmental and social (E3S) interactions [24]. Therefore, despite the limiting hypotheses inherent to the application of the IO approach, specifically the assumption of the constancy of the model's coefficients, the level of data aggregation and the fact that it does not include any mechanism for price adjustments, an essential interest of IO analysis is associated with the possibilities of its practical application. In fact, on the one hand, the importance of the IO Leontief approach comes from its ability of depicting the technology and its changes with sufficient precision to allow presenting a real empirical analysis [25]. On the other hand, IO analysis entails structural information and satisfies a number of laws and identities of conservation, namely general interdependency. Furthermore, IO analysis is an adaptable tool for theoretical or empirical studies of a broad range of problems, which enables assessing any type of environmental burden caused by changes in the output of industrial sectors once reliable economic data is used.

Therefore, taking India's residential sector as a case study, this work is aimed at suggesting a new modelling tool to support public investors in the appraisal and selection of distinct energy efficient technologies (EET) based on portfolio theory combined with IO analysis.

This work provides new fertile grounds for this field of application, in particular: 1) we have adapted the energy payback time (EPBT) and the greenhouse gas payback time (GPBT) indicators typically used in lifecycle assessment (LCA) to quantify the energy consumption and GHG emission patterns of each EET, respectively, based on national IO data different from the approach normally found in traditional lifecycle inventories; 2) then, besides the traditional EPBT and GPBT which only account for direct energy saving effects, new EPBT and GPBT concepts are introduced which consider both indirect and induced energy savings and GHG emission effects; 3) we suggest a new multiobjective interval optimization portfolio (MIOP) framework which encompasses new surrogate measures of return and risk minimization based on the EPBT and GPBT concepts previously developed; 4) finally, a comprehensive assessment of the anticipated E3S impacts regarding the adoption of the different portfolios selected according to distinct model formulations is also provided.

The remaining of this paper is structured as follows. Section 2 presents the approach herein followed to arrive at EPBT and GPBT, the underpinning assumptions to the MIOP model formulation and the methods to obtain the possibly efficient portfolios according to the investor's strategies. Section 3 delivers the main assumptions concerning data collection. In Section 4 the main outcomes of this study are conveyed. Finally, in Section 5 the main conclusions are drawn, and possible future research opportunities are also indicated.

2. Methodology

In this Section, a brief description of the necessary adjustments required to obtain the EPBT and GPBT in the framework of the IO approach is provided (see Appendix 3 for further explanations regarding the IO methodology). The underpinning assumptions and notations considered in the model formulations herein developed are also described (for further details on the interval programming approach see Appendices 4). Moreover, a comprehensive presentation of the objective functions and constraints used in the MIOP models is also given. Finally, three surrogate mathematical models are proposed according to distinct investor's standpoints. Figure 5.1 portrays a schematic representation of the main steps followed in the application of the methodological framework herein proposed.

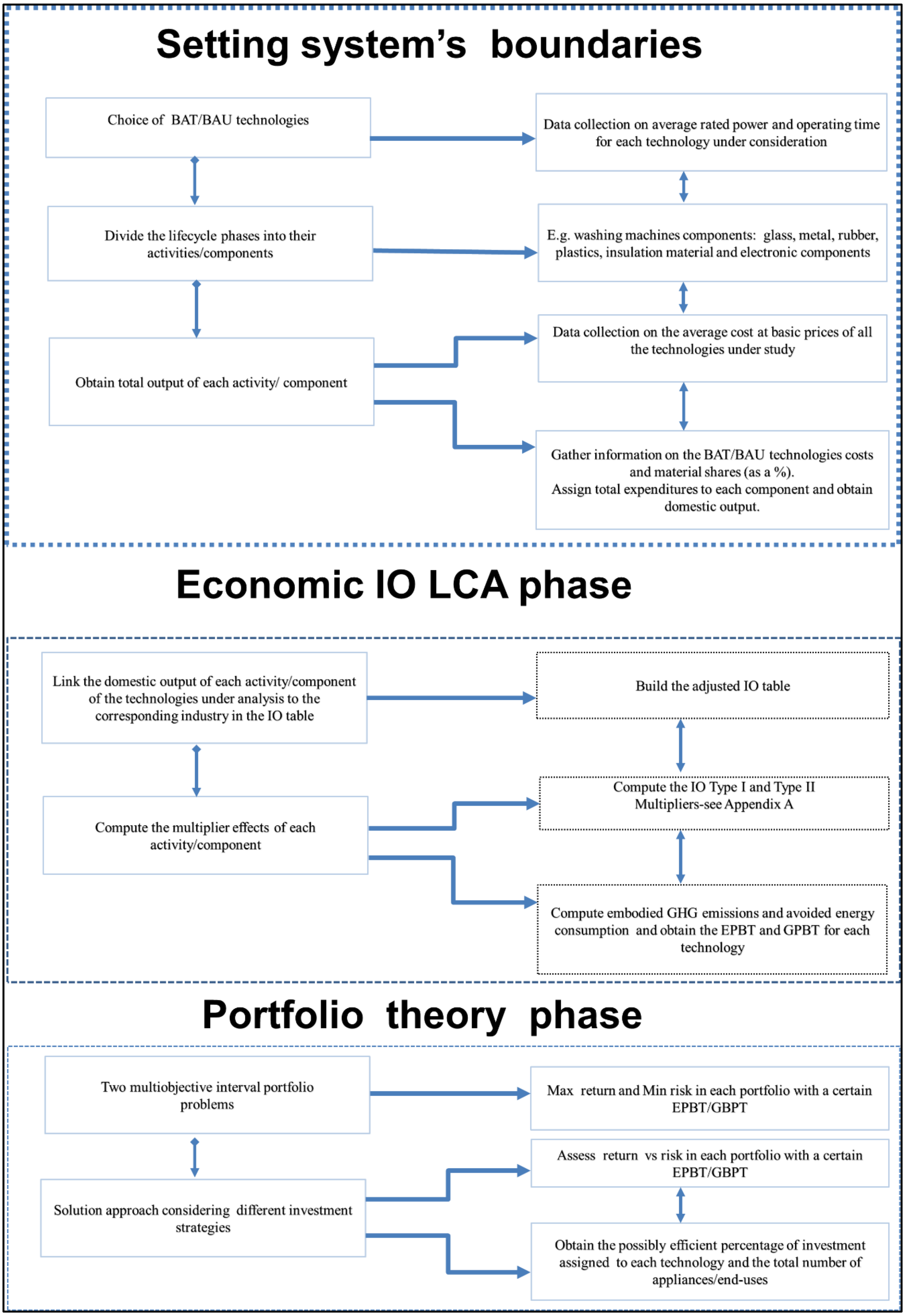


Figure 5.1. Steps followed in the application of the methodological framework proposed

2.1. Energy Payback Time and Greenhouse Gas Payback Time

The EPBT is an indicator used in LCA which has been applied in several studies in the evaluation of the energy obtained through renewable energy systems (RES), such as photovoltaic systems [26],[27],[28],[29],[30],[31], wind power [32], fuel cell stacks [33] and biofuel [34].

This type of metric can be adjusted to encompass the evaluation of energy efficient retrofit actions (EERA) [35],[36],[37]. In this framework, the GPBT can also be helpful since it allows expressing the GHG mitigation potential of EERA [38]. When considered in the context of RES, the EPBT is mainly dependent on the energy incorporated in the manufacture of its components [39]. In fact, the EPBT is the time (in years or months) required to regain the total energy invested in the manufacture of the materials incorporated into RES (i.e. embodied energy) and it is given by the ratio of embodied energy to annual energy output from the system [40]. Embodied energy inputs usually include the energy requirements in different stages that go from manufacturing, to installation, energy use during operation and maintenance (O&M), eventually considering the energy demanded for decommissioning, while the energy output corresponds to the annual energy avoided from other sources due to electricity generated from RES [26].

The application of the EPBT in the particular case of EERA is the time (in years or months) needed for the retrofit action to recuperate the total energy spent in the manufacturing of the materials used in it and it is the ratio of the embodied energy to the annual energy savings obtained [31]. When applied to the assessment of EERA, the EPBT should also consider the energy used in the deployment and installation of the device, additionally to its embodied energy. The EPBT will, thus, allow to assess to what extent energy savings compensate all the upstream energy used, up to the moment when the device is ready to provide the energy service for which it was designed.

In our analysis we have followed the Economic IO LCA approach which is a methodological framework sought to simplify LCA based on an IO matrix with the economic flows between industries that can be extended with information regarding the environmental discharges to the environment, creating additional columns and rows that represent the environmental impacts per each activity sector/industry [41]. The Economic IO LCA framework eliminates the two major issues raised by process-based LCA, since the transactions and emissions of all activity sectors/ industries are taken into account, and the boundary of the analysis becomes very broad and inclusive; and since the self-sector flows are also considered, the circularity effects are included as well [41].

Because the Economic IO LCA approach does not require any cut-offs to be made, it does not have the same problem of truncation as process-based LCA. However, given that Economic IO LCA works with a higher aggregation level, the sector resolution in Economic IO LCA might become too diffuse for obtaining the LCA of specific products [41].

Therefore, the use of the Economic IO LCA approach in the framework of EERA also involves a challenging exertion, since the IO tables officially published do not possess the required detail to identify the prospective economic impacts that can be attained because of the demand for a typical best available (BAT) or business as usual (BAU) technology. In this context, the disaggregation of the EERA's components is not straightforward, requiring the explicit use of supplementary data, exogenous to the information provided in currently available IO tables. Hence, following the methodology given in [42] – see Figure 1 – the lifecycle of each BAT/BAU technology has been divided into distinct lifecycle phases (i.e. manufacturing, installation and O&M) and then we have further decomposed them into their related activities/components. Additionally, extending the idea presented in [16] and considering the IO approach besides direct energy saving impacts, we now address indirect, induced and overall energy/GHG emissions embodied and energy saving/GHG avoided emission impacts, leading to the following novel EPBT/GPBT concepts for each BAT technology in years:

1) **Direct energy payback time** of BAT i ($DEPBT_i$) – ratio of the energy required in the activities directly engaged in the manufacturing and installation of BAT i ($DE_{input}i$) and the energy saved per year by BAT i ($DE_{saved}i$) when contrasted with the tipical BAU technology.

$$DEPBT_i = DE_{input}i/DE_{saved}i \quad (1)$$

2) **Indirect energy payback time** ($IEPBT_i$) - ratio of the energy demanded in the activities involved in the supply chain of the activities directly related to the manufacturing and installation of BAT i ($IE_{input}i$) and the energy saved per year in the supply chain of electricity production due to the yearly energy saved by BAT i ($IE_{saved}i$) when compared to the commonly used BAU technology.

$$IEPBT_i = IE_{input}i/IE_{saved}i \quad (2)$$

3) **Induced energy payback time** ($INDEPBT_i$) - ratio of the energy consumed in other activities because of the increase in the flows of money coming in and out of households due to the activities linked to the manufacturing and installation of BAT i ($INDE_{input}i$) and the energy saved per year in other activities due to the decrease of money coming in and out of households in the activity sectors related to electricity production which is saved by BAT i ($INDE_{saved}i$) when compared to the corresponding BAU technology:

$$INDEPBT_i = INDE_{input}i/INDE_{saved}i \quad (3)$$

4) **Overall energy payback time** (OEPBT) – ratio of the overall energy embodied in manufacturing and installation of the BAT technology i ($OE_{input}i$) and the yearly overall energy savings of BAT i ($OE_{saved}i$) as compared to the BAU related technology.

$$OEPBT_i = OE_{input}i/OE_{saved}i \quad (4)$$

The Direct (DGPBT), indirect (IDGPBT), induced (INDGPBT) and overall GPBT (OGPBT) of each BAT technology in years can be obtained analogously.

2.2. The portfolio optimization problem with interval coefficients

Consider that the public decision-makers are interested in subsidizing n EET and that energy savings per unit funding invested is a proxy of return [23].

Portfolio selection problems are usually specified as biobjective optimization problems that seek to attain an acceptable compromise between the expected rate of return and risk [43].

In here, we consider that the risk of adopting an EET is gauged by the risk of the energy savings (GHG avoided) obtainable during the lifetime of the technology not compensating the energy use (GHG emitted), i.e. the embedded energy (embedded GHG) in the manufacturing and deployment of that technology[23].

Young [44] proposed as an alternative measure for risk the maximization of the minimum return (or minimization of the maximum loss) demanded by the investor. This risk measure is relatively simple, but some authors argue that it might lead to an infeasible solution if all assets yield a negative return. However, only occasionally, an ill-conceived EERA intervention could cause a higher lifetime energy consumption, making the overall energy saved negative. Hence, the risk measure herein tackled is the maximization of the minimum deviation of energy savings (GHG emissions avoided) of the portfolio from the corresponding energy (GHG emissions) embodied in it.

Therefore, the following problem is obtained:

max min $\sum_{i=1}^{n}[r_{iT}^{L}, r_{iT}^{U}]x_i - \sum_{i=1}^{n}[r_i^{L}, r_i^{U}]x_i$,

max $\sum_{i=1}^{n}[SIR_i^{L}, SIR_i^{U}]x_i$,

$s.t{:}\sum_{i=1}^{n} x_i = 1$,

$\sum_{i=1}^{n} y_i \leq [h^{L}, h^{U}]$,

$y_i GPBT_i \leq [GPBT_i^{L}$ (or $EPBT_i^{L}$), $GPBT_i^{U}$ (or $EPBT_i^{U}$)], i =1, …, n,

$x_i \leq [u_i^{L}, u_i^{U}]y_i$, i =1, …, n,

$x_i \geq 0$, i =1, …, n,

$y_i \in \{0,1\}$, $i = 1, \ldots, n$, (5)

where x_i is the percentage of funds allocated to the i^{th} EET; y_i is a binary variable discriminating the i^{th} EET belonging to the portfolio; $[r_{iT}^L, r_{iT}^U]$ refers to the projected energy savings or GHG emissions avoided across the lifetime of the EET i per unit funding invested (an interval value), respectively (depending on the mathematical formulation considered); $[r_i^L, r_i^U]$ are the energy or GHG emissions embodied in the i^{th} EET per unit budget input, respectively (depending on the mathematical formulation selected); *SIR* is the savings to investment ratio which is also given as an interval value, where $SIR_i^L = \frac{\sum_{t=1}^{T} \frac{ES_{it}}{(1+d^U)^t}}{I_i^U}$ and $SIR_i^U = \frac{\sum_{t=1}^{T} \frac{ES_{it}}{(1+d^L)^t}}{I_i^L}$ are the lower and upper bounds of the savings to investment ratio, d^L and d^U are the lower and upper bounds of the discount rates (reflecting lower and higher opportunity costs, respectively) and I_i^L and I_i^U are the lower and upper values of the level of public support regarding the investment in energy efficient projects; $[h^L, h^U]$ is an interval range of the number of EET the public investor wants to consider in the portfolio; the upper acceptable limits to the EPBT and GPBT are considered within the intervals $[EPBT_i^L, EPBT_i^U]$ and $[GPBT_i^L, GPBT_i^U]$, respectively (according to the mathematical model used); the upper bounds on the investment in each EET are also given within a range of values, $[u_i^L, u_i^U]$ and y_i is a binary variable that allows identifying if the BAT *i* either belongs to the portfolio (i.e. assuming the value "1" if it belongs or "0" if it does not belong to the portfolio) .

Let ν be the minimum difference between the energy savings across the lifespan of a portfolio of lighting projects and the corresponding energy incorporated in it, such that $\nu = \min \sum_{i=1}^{n} [r_{iT}^L, r_{iT}^U] x_i - \sum_{i=1}^{n} [r_i^L, r_i^U] x_i$. The risk function maximizes the minimum gain (i.e. minimizes de maximum loss) or alternatively it maximizes ν, where $\sum_{i=1}^{n} [r_{iT}^L, r_{iT}^U] x_i - \sum_{i=1}^{n} [r_i^L, r_i^U] x_i \geq \nu$. This last equation guarantees that ν will be upper bounded by the minimum portfolio gain; because this is the only constraint on ν and since ν is being maximized, it will take on the value of the maximum minimum gain, or the minimum maximum loss. Then, problem (5) has the following surrogate multiobjective interval integer linear programming problem:

$\max \nu,$

$\max \sum_{i=1}^{n}[SIR_i^L, SIR_i^U]x_i,$

$s.t{:}\sum_{i=1}^{n} x_i = 1,$

$\sum_{i=1}^{n} y_i \leq \left[h^L, h^U\right],$

$y_i GPBT_i$ (or $EPBT_i$)$\leq[GPBT_i^L, GPBT_i^U]$(or $[EPBT_i^L, EPBT_i^U]$), i =1, …, n,

$\sum_{i=1}^{n}[r_{iT}^L, r_{iT}^U]x_i - \sum_{i=1}^{n}[r_i^L, r_i^U]x_i \geq \nu,$

$x_i \leq [u_i^L, u_i^U]y_i$, i =1, …, n,

$x_i \geq 0$, i =1, …, n,

$y_i \in \{0,1\}$, i =1, …, n. (6)

2.3. The solution approaches

Problem (6) can be straightforwardly replaced with a surrogate linear interval objective optimization problem through the weighted-sum method [42]. Distinct optimization models for portfolio selection can thus be considered following three kinds of investment standpoints, namely, a conservative strategy (leading to a lower number of subsidized devices), an aggressive strategy (leading to a higher number of subsidized devices) and a combined strategy.

2.3.1. Conservative strategy

The public decision-maker aiming for a conservative strategy is more risk averse, being more driven by risk than return. Therefore, the problem is formulated considering the tightest version of the feasible region and the worst coefficient settings for the objective function:

$\max \beta\sum_{i=1}^{n} SIR_i^L\, x_i + \alpha\nu$,

$s.t{:}\sum_{i=1}^{n} x_i = 1,$

$\sum_{i=1}^{n} y_i \leq h^L$,

$y_i GPBT_i$(or $EPBT_i$)≤$GPBT_i^L$(or $EPBT_i^L$), i =1, …, n,

$\sum_{i=1}^{n} r_{iT}^L x_i - \sum_{i=1}^{n} r_i^U x_i \geq \nu,$

$x_i \leq u_i^L y_i$i =1, …, n,i =1, …, n,

$x_i \geq 0$, i = 1, …, n,

$y_i \in \{0,1\}$, i = 1, …, n, (7)

where 0 < β, τ, α < 1, are weights which indicate the decision-maker's preferences regarding each objective function.

2.3.2. Aggressive Strategy

The public decision-maker aiming for an aggressive strategy is more prone to risk, preferring return over risk. Hence, the problem is formulated considering the widest version of the feasible region and the best coefficient setting for the objective function:

max $\beta\sum_{i=1}^{n} SIR_i^U x_i + \alpha\nu$,

$s.t{:}\sum_{i=1}^{n} x_i = 1,$

$\sum_{i=1}^{n} y_i \leq h^U$,

$y_i GPBT_i$ (or $EPBT_i$)≤$GPBT_i^U$(or $EPBT_i^U$), i =1, …, n,

$\sum_{i=1}^{n} r_{iT}^U x_i - \sum_{i=1}^{n} r_i^L x_i \geq \nu,$

$x_i \leq u_i^U y_i$i =1, …, n,i =1, …, n,

$x_i \geq 0$, i = 1, …, n,

$y_i \in \{0,1\}$, i = 1, …, n, (8)

2.3.3. Combined Strategy

A combined strategy allows for the public decision-maker to choose a more balanced approach regarding risk and return.

max $\rho(\beta\sum_{i=1}^{n} SIR_i^L\, x_i + \alpha\, \nu) + (1-\rho)(\beta\sum_{i=1}^{n} SIR_i^U\, x_i + \alpha\, \nu)$

$s.t: \sum_{i=1}^{n} x_i = 1,$

$\sum_{i=1}^{n} y_i \le h^U - \delta(h^U - h^L),$

$y_i GPBT_i$ (or $EPBT_i$)$\le GPBT_i^U$(or $EPBT_i^U$) $- \mu_i(GPBT_i^U$(or $EPBT_i^U$) $-$

$GPBT_i^L$(or $EPBT_i^L$)),

i =1, …, n,

$\sum_{i=1}^{n}((r_{iT}^U - r_i^L) + \varpi((r_{iT}^L - r_i^U) - (r_{iT}^U - r_i^L)))x_i \ge \nu,$

$x_i \le (u_i^U - \delta_i(-u_i^L + u_i^U))y_i$i =1, …, n,i =1, …, n,

$x_i \ge 0$, i = 1, …, n,

$y_i \in \{0,1\}$, i = 1, …, n, (9)

where ρ, δ, μ_i, ϖ and δ_i a are indexes of pessimism varying on a scale from 0 to 1.

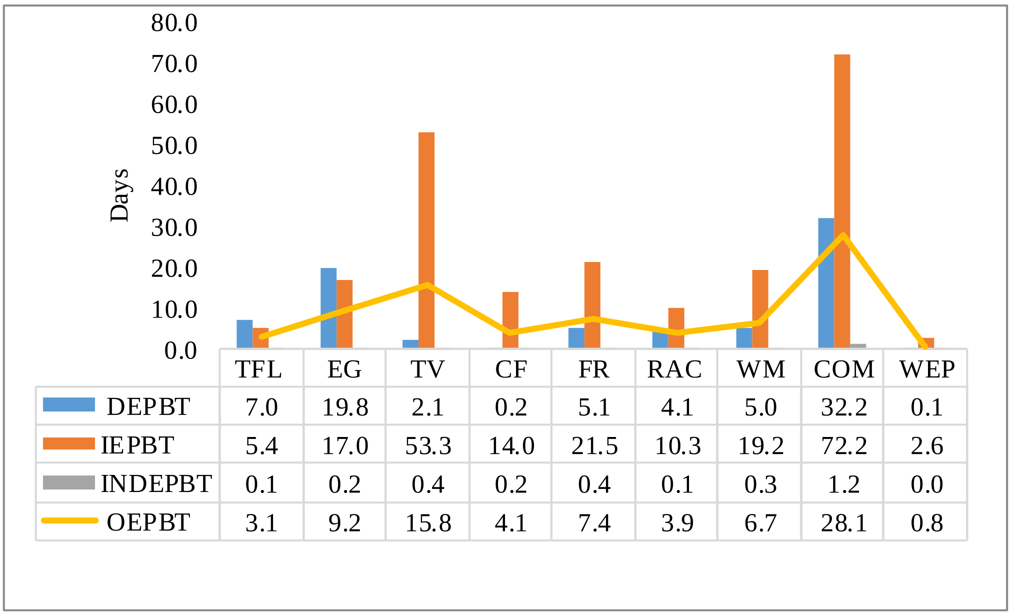
3. Data and Assumptions

We have used the national IO tables for India available from the World IO Database to appraise the energy and environmental impacts of several EET in India's residential sector (see [45] and [46]). The year 2011 was selected to be the base year of our study since the methodology herein developed is based on the classification of households considered in the latest Census published by the Government of India which dates back to 2011. Distinct data sources have also been used in order to set up a large size structured repository of real data for India's residential sector (see, e.g. [47-57]). Tables 5.1 and 5.2 provide specific information regarding the features of each technology under evaluation and the average annual operating hours according to the average operation data available for India, the lifetime and the investment cost of each EET under analysis. Table 5.3 provides the average shares of materials and the costs considered for each BAT, which were based in [42]. Finally, the energy balances of India have also been used to account for the energy consumption and then they were coupled with the World IO Database.

3.1. Energy impacts (EPBT)

The energy savings obtained when contrasting the BAU with BAT appliances are given in Table 5.1. The embodied energy computed considering the manufacturing to installation stages, according to the Economic IO LCA approach, is provided in Table 5.2. The conversion factors used are 1 toe = 11,630 kWh. From our assessment, it was possible to ascertain that although TV sets present an IEPBT higher than a month, the DEPBT and INDEPBT are lower than a month, leading to an OEPBT lower than one (the second highest OEPBT). In fact, the results obtained consistently lead to higher values of the IEPBT when contrasted to those obtained for the DEPBT. These results suggest that the appraisal of both direct and indirect effects on the EPBT should be contemplated in EE policies and EET choices, since positive direct effects can be counterbalanced by indirect impacts on other activity sectors, mainly from the upper supply chain.

Contrarily, COM both attains a DEPBT and an IEPBT higher than a month reaching the highest OEPBT. Finally, TFL, EG, TV, CF, and the other BAT technologies have an IEPBT lower than a month (Figure 5.2)). It can be also concluded that the number of operating days and operating hours have a significant impact on the EPBT computed for each EET.



	TFL	EG	TV	CF	FR	RAC	WM	COM	WEP
DEPBT	7.0	19.8	2.1	0.2	5.1	4.1	5.0	32.2	0.1
IEPBT	5.4	17.0	53.3	14.0	21.5	10.3	19.2	72.2	2.6
INDEPBT	0.1	0.2	0.4	0.2	0.4	0.1	0.3	1.2	0.0
OEPBT	3.1	9.2	15.8	4.1	7.4	3.9	6.7	28.1	0.8

Figure 5.2. EPBT for BAT

Table 5.1. Specific features, energy saved and embodied energy of BAT/BAU appliances

End-use	BAU (W)	BAT (W)	Use (hours/day)	Operating days	Lifetime (years)	BAU Annual operational (kWh)	BAT Annual operational (kWh)	Total Energy Saved (kWh)
TFL	60	36	4	365	14	88	53	35
EG	2,400	1,750	0.5	365	15	438	319	119
TV	150	80	6	365	10	329	175	153
CF	75	55	8	200	15	219	161	58
FR	68.5	37.7	24	365	15	600	330	270
RAC	2,400	1,677	6	120	10	3,154	2,204	950
WM	1,000	400	1	365	15	365	146	219
COM	250	150	4	350	5	365	219	146
WEP	1,460	730	1.5	365	15	799	400	400

Table 5.2. Embodied energy of BAT/BAU appliances

End-use	(Wh)						Electricity consumption (manufacturing stage)	Gram of oil equivalent to electricity	Total electricity
	Coal	lignite	LPG	Naphtha	Diesel	Heavy fuel oil	(Wh)		
TFL	12.21	0.93	0.00	0.23	0.12	0.16	458	14	472
EG	178.64	11.28	0.12	2.56	1.28	1.59	4,589	195	4,785
TV	305.64	21.86	0.12	5.93	0.00	3.50	10,294	337	10,631
CF	75.83	4.42	0.00	0.23	0.47	0.29	976	81	1,057
FR	514.74	31.28	0.35	2.79	3.49	2.69	8,200	555	8,755
RAC	841.31	51.06	0.35	6.28	5.70	4.88	15,283	910	16,192
WM	334.60	20.93	0.12	2.21	2.33	1.92	6,041	362	6,404
COM	862.83	53.15	0.58	7.21	6.28	5.78	17,054	936	17,989
WEP	105.60	5.82	0.00	0.23	0.70	0.34	1,211	113	1,324

Table 5.3. Shares of materials and costs (based on [42])

End-use	Share of material %						Share of cost %					
	Glass	Metal	Rubber	Plastics	Insulation material	Electronic	Glass	Metal	Rubber	Plastics	Insulation material	Electronic
TFL	90	4	0	4	0	2	40	5	0	25	0	30
EG	0	70	0	0	25	5	0	40	0	0	30	30
TV	10	10	0	60	0	20	15	20	0	15	0	50
CF	80	15	0	0	0	5	35	15	0	0	0	50
FR	0	60	5	10	10	15	0	25	5	5	5	60
RAC	0	60	5	20	10	5	0	35	5	10	10	40
WM	0	60	5	5	20	10	0	20	5	5	10	40
COM	55	10	10	5	0	20	20	20	20	5	0	35
WEP	0	75	0	10	0	15	0	40	0	10	0	50

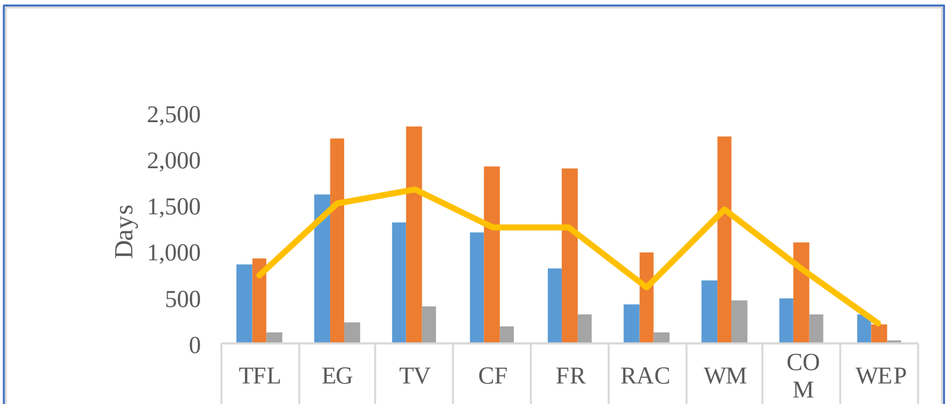
Table 5.4. Avoided and Embodied GHG emissions per BAT appliance during the lifetime

Appliance/end- use	mg of CO_2 equivalent	Avoided GHG emissions			Embodied GHG emissions		
		Direct	Indirect	Induced	Direct	Indirect	Induced
TFL	CO2	27.27	7.88	0.02	0.07	0.02	0.00
	CH4	71.49	363.03	14.59	159.54	907.06	39.72
	N2O	185.39	71.42	166.76	515.58	231.37	24.47
EG	CO2	92.32	26.67	0.07	0.36	0.14	0.00
	CH4	242.02	1,229.00	49.40	886.18	7,350.67	345.18
	N2O	627.63	241.79	821.11	3,447.39	1,950.00	212.60
TV	CO2	119.31	34.47	0.09	0.27	0.13	0.00
	CH4	312.76	1,588.25	63.84	742.67	9,124.77	478.94
	N2O	811.09	312.47	630.27	3,822.79	3,588.10	294.99
CF	CO2	24.91	7.20	0.02	0.10	0.03	0.00
	CH4	65.29	331.53	13.33	221.67	1,693.46	74.85
	N2O	169.31	65.23	224.85	643.07	474.04	46.10
FR	CO2	210.14	60.71	0.16	0.49	0.22	0.00
	CH4	550.85	2,797.31	112.43	1,215.08	14,120.49	670.27
	N2O	1,428.53	550.34	1,148.93	3,720.71	3,929.16	412.83
RAC	CO2	405.15	117.05	0.30	1.39	0.57	0.00
	CH4	1,062.04	5,393.22	216.77	3,399.28	33,375.70	1,591.59
	N2O	2,754.20	1,061.06	3,251.23	11,119.86	9,471.61	980.28
WM	CO2	170.45	49.24	0.13	0.31	0.19	0.00
	CH4	446.80	2,268.93	91.20	818.24	13,356.63	655.74
	N2O	1,158.70	446.39	711.22	2,563.34	3,876.13	403.88
COM	CO2	926.16	267.57	0.69	1.15	0.55	0.00
	CH4	2,427.82	12,328.89	495.53	2,889.33	35,795.81	1,852.61
	N2O	6,296.10	2,425.59	2,806.51	10,088.61	10,147.90	1,141.05
WEP	CO2	311.06	89.87	0.23	0.31	0.08	0.00
	CH4	815.41	4,140.80	166.43	694.68	2,430.96	85.04
	N2O	2,114.62	814.66	1,539.63	2,095.06	504.36	52.38

3.2. Environmental impacts (GPBT)

The embodied GHG emissions were calculated by considering the manufacturing to installation Economic IO LCA stages (see Table 5.4) and using distinct global warming potentials for each GHG[47],. The avoided GHG emissions are provided in Table 5.4.

The outcomes of our analysis indicate that the electric appliances with the highest GPBT are TV, EG, WM (see Figure 5.3)). Once more as in [48], the indirect effects are higher than the direct effects, highlighting the importance of the IGPBT.



	TFL	EG	TV	CF	FR	RAC	WM	CO M	WEP
DGPBT	855	1,622	1,322	1,200	812	421	686	484	310
IGPBT	927	2,236	2,365	1,932	1,906	989	2,244	1,101	209
INDGPBT	127	231	401	183	309	112	475	326	29
OGPBT	745	1,534	1,678	1,259	1,263	608	1,460	797	211

Figure 5.3. GPBT for BAT

3.3. Economic impacts (SIR)

The SIR is the ratio between the discounted value of energy savings (in USD) across the lifetime of the EET and the investment cost expressed in basic prices (in USD). Figure 5.4 provides the different variation ranges of the SIR attainable per technology by considering a discount rate from 6.5% to 10% (according to [49] and [50]), whereas the maximum public support of EET is assumed to be within the range of 65% to 85% of its basic price.

The results obtained point out that the BAT with the highest SIR is WEP followed by TFL, WM, RAC and CF.

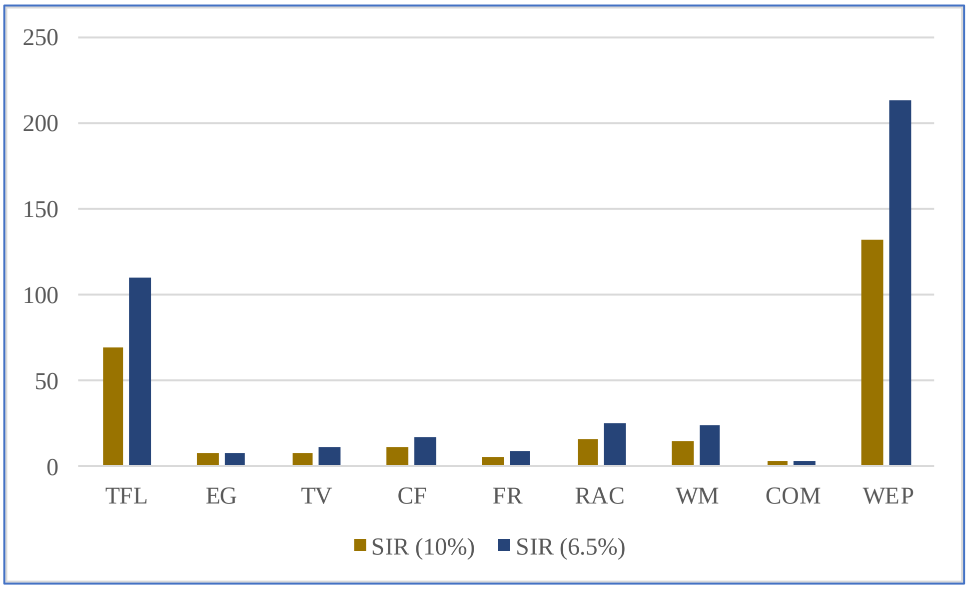


Figure 5.4. SIR for BAT appliances

4. Illustrative Results

Since the EPBT is linked to the yearly useful energy saved by the EET under analysis, while the GBPT depends on the emission factors of the electricity mix within the country, two distinct formulations were herein considered. These modelling formulations either account, respectively, for the embodied GHG emissions or the embodied energy during the manufacturing phase, which are mainly dependent on the manufacturing processes and on the availability of the raw materials [51], [52].

Therefore, the modelling framework suggested is consistent with the EE policies which usually address the residential sector in developing countries, where the promotion of the investment in appliances with low embodied energy [53] and low embodied CO2 emission [54] is particularly relevant.

While the formulation relying on the maximization of the minimum deviation of the GHG avoided emissions from the GHG embodied emissions might be more helpful for countries with higher emission factors regarding the electricity mix within the country, the second formulation which accounts for the maximization of the minimum deviation of the energy savings from the embodied energy might be more useful for countries with lower emission factors regarding their electricity mix.While the formulation relying on the maximization of the minimum deviation of the GHG avoided emissions from the GHG embodied emissions might be more helpful for countries with higher emission factors regarding the electricity mix within the country, the second formulation which accounts for the maximization of the minimum deviation of the energy savings from the embodied energy might be more useful for countries with lower emission factors regarding their electricity mix.

4.1. Max min deviation of avoided emissions from embodied emissions

The solutions herein presented were obtained by considering $[EPBT_i^L, EPBT_i^U]$ = [0.46, 1.48], i.e. the EPBT should be below the average EPBT of the technologies under assessment in a conservative strategy and below the greatest EPBT if an aggressive strategy is assumed.

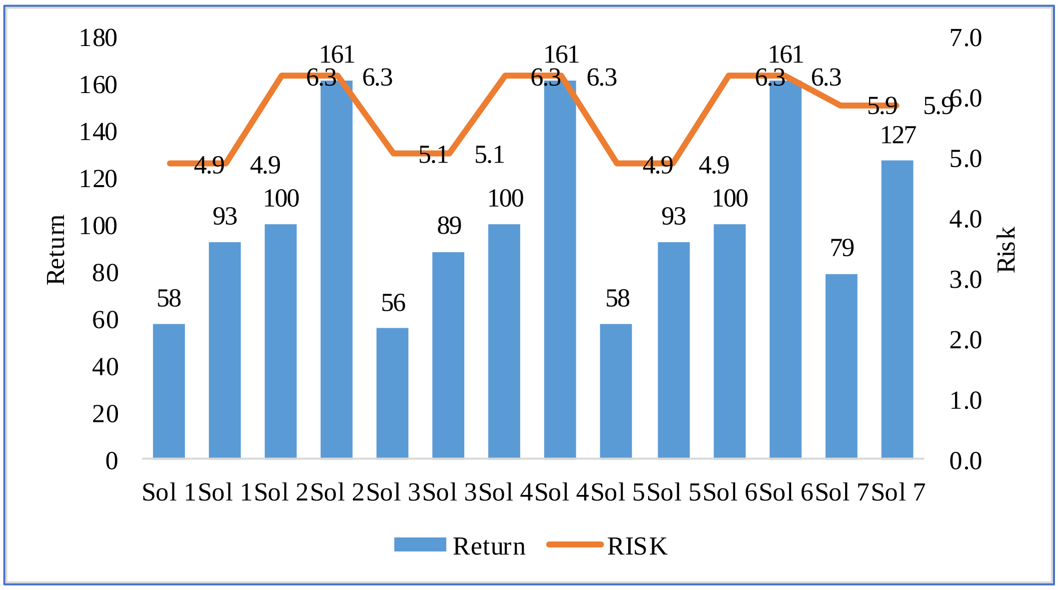
The maximum number of technologies being held in the portfolio is assumed to be $[h^L, h^U]$ = [4, 5], while the maximum funding allocated to each technology is $[u_i^L, u_i^U]$ = [25%, 50%], in order to ensure a certain level of diversification.

The number of devices targeted for funding in India (Table 5.5 b), d)) can be computed both considering as a reference World EE investment as a percentage of GDP which was about 0.3% in 2016, according to the IEA EE Market Report published in 2016 [55] and World Energy Investment 2017 [56] and to the STATISTA - The Statistics Portal [57] and the share of energy consumption by the residential sector in India, which was about 25% in 2015 [56]. This allowed us to estimate that a reasonable investment value on EET would be 1,466 million dollars at constant prices of 2011.

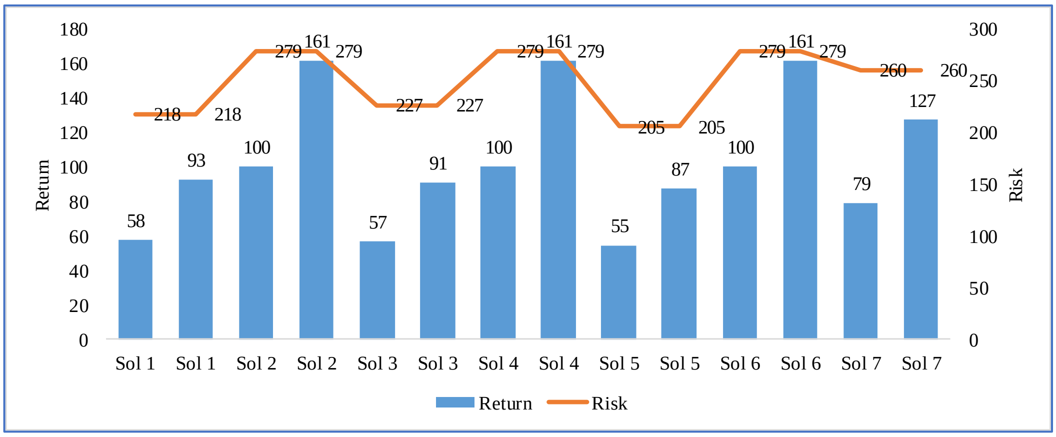
The results depicted in Figure 5.5 illustrate the consistency of the strategy type considered with the level of risk assumed by a certain decision maker (higher return corresponding to a higher risk solution, i.e. a solution with a higher number of subsidized devices and vice-versa).

Table 5.5 a) and b) provides information regarding the EET chosen in each solution (although other search strategies could be considered).

Figure 5.5 a) presents the values obtained for return (SIR) and risk in each portfolio. Under this formulation the trade-off between risk and return is reduced.



a) Return vs. risk with a certain EPBT



b) Return vs. risk with a certain GPBT

Figure 5.5. Return vs. risk obtained in each portfolio with a certain EPBT/GPBT

Several conclusions can be gathered based on a certain EPBT:

1) Aggressive strategies always lead to less diversified portfolios with similar solutions both for the individual optimization of return and risk, respectively. In this situation (solutions 2, 4 and 6), the funding is evenly distributed between TFL (suggesting the replacement of 363.8 million of lamps) and WEP (proposing the substitution of 59.4 million of water pumps). The highest performance of TFL and WEP both regarding the SIR (Figure 5.4) and the highest difference between embodied emissions regarding avoided emissions justifies these results (Table 5.4).
2) Conservative strategies always lead to the most diversified portfolios, but with distinct technology choices for return and risk. In the maximization of return (solution 1) the portfolio contains TFL (139.1 million lamps), RAC (2.6 million devices), WM (4.7 million machines) and WEP (22.7 million water pumps), while in risk optimization (solution 3) the portfolio incorporates EG (12.6 million devices), TFL (139.1 million lamps), RAC (2.6 million devices) and WEP (22.7 million water pumps). Under this conservative scenario it is interesting to see that TFL, RAC and WEP are considered as a good investment option in both cases.
3) Under a conservative strategy, if both risk and return have the same weight, solution 5 presents the same portfolio of solution 1; in contrast, a balanced approach towards risk and return under an aggressive strategy (solution 6) allows obtaining the same portfolio of solution 2.
4) A combined approach with average pessimistic coefficients leads to the even investment in TFL (239.6 million lamps) and WEP (39.1 million pumps)

(37.5% of investment allocated to each technology), while RAC (2.9 million devices) takes 25% of the investment.

5) According to this modelling formulation, TV and COM are never selected for a public program for supporting EET (Table 5.5a)).

4.2. Max min deviation of energy savings from the energy embodied

The solutions herein computed were obtained by considering $[GPBT_i^L, GPBT_i^U]$=[0.61, 0.95], i.e. the GPBT is considered to be below the average GPBT of the technologies under assessment in a conservative strategy and below the greatest GPBT if an aggressive strategy is considered. The maximum number of technologies being held in the portfolio and the maximum funding allocated to each technology are identical to the previous formulation.

Figure 5.5 b) presents the values computed for return (SIR) and risk in each portfolio. Under this formulation the trade-off between risk and return is reduced.

Table 5.5 c) and d) provides information regarding the EET selected according to distinct strategies (other search strategies could also be investigated). Based on a certain GPBT several conclusions can be drawn:

1) Once more, aggressive strategies always lead to the less diversified strategies with similar technology portfolios for return and risk (solutions 2, 4 and 6), equally suggesting TFL and WEP for funding (the same results were also attained with the previous formulation).
2) Conservative strategies always lead to the most diversified strategies, but once more with distinct technology portfolios for return and risk. In solution 1 (maximization of return) the portfolio contains TFL, RAC, WM and WEP (the same results were also obtained with the previous formulation). In solution 3 (maximization of the minimum deviation of the energy saved regarding the energy embodied during the manufacturing

stage) the selected appliances differ from the previous ones because the portfolio now includes CF (28.7 million of fans) instead of EG. When compared to solution 3, if both risk and return have the same weight, solution 5 leads to include COM (2.1 million computers) and RAC (2.6 million devices) in the portfolio, instead of CF and RF. It is curious to see that when considering the previous set of coefficients (Section 5.1), COM was never elected for funding.

3) Under a conservative strategy, if both risk and return have the same weight, solution 5 presents the same portfolio of solution 1; in contrast, a balanced approach towards risk and return under an aggressive strategy (solution 6) allows obtaining the same portfolio of solution 2.

4) According to this modelling formulation, EG, TV, and FR appliances are never selected under the auspices of a public program for supporting EET (Table 5.5c)).

5) Overall, it can be concluded that it is always worth endorsing the investment in TFL and WEP with both modelling formulations. Finally, the promotion of more efficient TV is never considered in both modelling formulations.

Table 5.5. Percentage of investment and number of devices assigned to each technology under different strategies

Strategy	Conserv.	Aggress.	Conserv.	Aggress.	Conserv.	Aggress.	Comb.
Pessim. indexes	$\beta=1,\alpha=0$	$\beta=1,\alpha=0$	$\beta=0,\alpha=1$	$\beta=0,\alpha=1$	$\beta=\alpha=1/2$	$\beta=\alpha=1/2$	$\beta = \alpha = \rho = \delta = \varphi_i = \vartheta = \delta_i = 1/2$
	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7
TFL	0.25	0.50	0.25	0.50	0.25	0.50	0.38
EG	0.00	0.00	0.25	0.00	0.00	0.00	0.00
TV	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CF	0.00	0.00	0.00	0.00	0.25	0.00	0.00
FR	0.00	0.00	0.00	0.00	0.25	0.00	0.00
RAC	0.25	0.00	0.25	0.00	0.00	0.00	0.25
WM	0.25	0.00	0.00	0.00	0.00	0.00	0.00
COM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEP	0.25	0.50	0.25	0.50	0.25	0.50	0.38

a) Percentage of investment assigned to each technology – EPBT

Strategy	Conserv.	Aggress.	Conserv.	Aggress.	Conserv.	Aggress.	Comb.
Pessim. indexes	$\beta=1,\alpha=0$	$\beta=1,\alpha=0$	$\beta=0,\alpha=1$	$\beta=0,\alpha=1$	$\beta=\alpha=1/2$	$\beta=\alpha=1/2$	$\beta = \alpha = \rho = \delta = \varphi_i = \vartheta = \delta_i = 1/2$
	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7
TFL	139.1	363.8	139.1	363.8	139.1	363.8	239.6
EG	0.0	0.0	12.6	0.0	0.0	0.0	0.0
TV	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF	0.0	0.0	0.0	0.0	28.7	0.0	0.0
FR	0.0	0.0	0.0	0.0	3.8	0.0	0.0
RAC	2.6	0.0	2.6	0.0	0.0	0.0	2.9
WM	4.7	0.0	0.0	0.0		0.0	0.0
COM	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WEP	22.7	59.4	22.7	59.4	22.7	59.4	39.1

b) Number of devices in millions recommended for funding – EPBT

Strategy	Conserv.	Aggress.	Conserv.	Aggress.	Conserv.	Aggress.	Comb.
Pessim. indexes	$\beta=1, \tau=0$	$\beta=1, \tau=0$	$\beta=0, \tau=1$	$\beta=0, \tau=1$	$\beta, \tau=1/2$	$\beta, \tau=1/2$	$\rho = \delta = \varphi i = \mu_i = \varpi = \delta i = 1/2$
	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7
TFL	0.25	0.50	0.25	0.50	0.25	0.50	0.38
EG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TV	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CF	0.00	0.00	0.25	0.00	0.00	0.00	0.00
FR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAC	0.25	0.00	0.25	0.00	0.25	0.00	0.25
WM	0.25	0.00	0.00	0.00	0.00	0.00	0.00
COM	0.00	0.00	0.00	0.00	0.25	0.00	0.00
WEP	0.25	0.50	0.25	0.50	0.25	0.50	0.38

c) Percentage of investment assigned to each technology – GPBT

Strategy	Conserv.	Aggress.	Conserv.	Aggress.	Conserv.	Aggress.	Comb.
Pessim. indexes	$\beta=1, \tau=0$	$\beta=1, \tau=0$	$\beta=0, \tau=1$	$\beta=0, \tau=1$	$\beta, \tau=1/2$	$\beta, \tau=1/2$	$\rho = \delta = \varphi i = \mu_i = \varpi = \delta i = 1/2$
	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7
TFL	139.1	363.8	139.1	363.8	139.1	363.8	239.6
EG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TV	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF	0.0	0.0	28.7	0.0	0.0	0.0	0.0
FR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAC	2.6	0.0	2.6	0.0	2.6	0.0	2.9
WM	4.7	0.0	0.0	0.0		0.0	0.0
COM	0.0	0.0	0.0	0.0	2.1	0.0	0.0
WEP	22.7	59.4	22.7	59.4	22.7	59.4	39.1

d) Number of devices in millions recommended for funding – GPBT

Indices of robustness have also been computed, which allow assessing the technologies which are more often selected irrespective of the investment strategy followed – see Tables 5.6 and 5.7. According to the values obtained, TFL and WEP should have the highest support in terms of funding no matter the DM's stance or the modelling formulation considered. The investment in RAC and WM should also be contemplated in terms of support with both modelling formulations. The investment in EG should be considered when a certain EPBT is imposed, while the investment in COM and CF is only selected if a certain upper bound on GPBT is introduced (following the most conservative strategies). Finally, TVs and FR should never be considered in terms of support for funding with either formulation.

Table 5.6. Technologies which are more often selected assuming a certain EPBT

Technology	Irrespective of the strategy followed	More conservative	More aggressive	Intermediate
TFL	38%	25%	50%	38%
EG	4%	8%	0%	0%
TV	0%	0%	0%	0%
CF	0%	0%	0%	0%
FR	0%	0%	0%	0%
RAC	14%	25%	0%	25%
WM	7%	17%	0%	0%
COM	0%	0%	0%	0%
WEP	38%	25%	50%	38%

Table 5.7. Technologies which are more often selected assuming a certain GPBT

Technology	Irrespective of the strategy followed	More conservative	More aggressive	Intermediate
TFL	38%	25%	50%	38%
EG	0%	0%	0%	0%
TV	0%	0%	0%	0%
CF	4%	8%	0%	0%
FR	0%	0%	0%	0%
RAC	14%	25%	0%	25%
WM	4%	8%	0%	0%
COM	4%	8%	0%	0%
WEP	38%	25%	50%	38%

5. Assessment of E3(S) impacts for each BAT efficient portfolio solution

In the next Sections of this Chapter we evaluate the anticipated E3S impacts regarding the adoption of the different BAT efficient portfolio solutions previously selected.

5.1. Energy impacts

The Technical Energy Savings Potential (TESP) obtained in each solution has been analysed for both formulations. As it would be expected, the most aggressive investment options always lead to higher TESP (see Tables 5.8 and 5.9). Additionally, the formulation considering a given EPBT generally leads to higher TESP under the conservative investment options (see solutions S3 and S5) when compared to the formulation that considers a certain GPBT.

Table 5.8. TESP assuming a certain EPBT

Appliance/end-use	S1	S2	S3	S4	S5	S6	S7
	kWh	kWh	kWh	kWh	kWh	kWh	kWh
TFL	272,962	713,900	272,962	713,900	272,962	713,900	470,222
EG	0	0	90,009	0	0	0	0
TV	0	0	0	0	0	0	0
CF	0	0	0	0	55,198	0	0
FR	0	0	0	0	60,960	0	0
RAC	53,962	0	53,962	0	0	0	61,157
WM	61,591	0	0	0	0	0	0
COM	0	0	0	0	0	0	0
WEP	544,272	1,423,480	544,272	1,423,480	544,272	1,423,480	937,599
Total saving (kWh)	932,787	2,137,380	961,204	2,137,380	933,391	2,137,380	1,468,978
Total saving (GWh)	**933**	**2,137**	**961**	**2,137**	**933**	**2,137**	**1,469**

Table 5.9. TESP assuming a certain GPBT

Appliance/end-use	S1	S2	S3	S4	S5	S6	S7
	kWh	kWh	kWh	kWh	kWh	kWh	kWh
TFL	272,962	713,900	272,962	713,900	272,962	713,900	470,222
EG	0	0	0	0	0	0	0
TV	0	0	0	0	0	0	0
CF	0	0	55,198	0	0	0	0
FR	0	0	0	0	0	0	0
RAC	53,962	0	53,962	0	53,962	0	61,157
WM	61,591	0	0	0	0	0	0
COM	0	0	0	0	5,919	0	0
WEP	544,272	1,423,480	544,272	1,423,480	544,272	1,423,480	937,599
Total saving (kWh)	932,787	2,137,380	926,393	2,137,380	877,115	2,137,380	1,468,978
Total saving (GWh)	**933**	**2,137**	**926**	**2,137**	**877**	**2,137**	**1,469**

5.2. Socioeconomics impacts

Regarding the economic impacts obtained with both formulations (Figures 5.6 and 5.7) several conclusions can be drawn as follows. The investment in BAT allows reaching a higher Gross Value Added (GVA) when compared to the investment in BAU technologies. As it would be expected, under different investment options (i.e. with a subsidy of 85%, 65% and 75% of the value of investment), Solutions 2, 4 and 6 (following an aggressive strategy) and Solution 7 (with a combined strategy) allow reaching the highest GVA, while lower GVA levels are anticipated with the choice of Solutions 1, 3 and 5 (considering a conservative strategy).

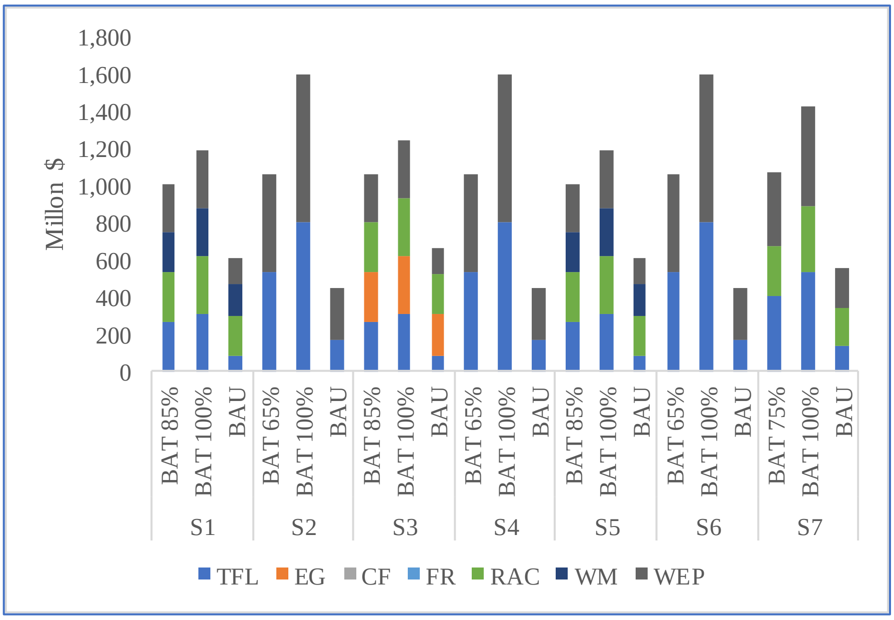


Figure 5.6. Overall GVA assuming a given EPBT

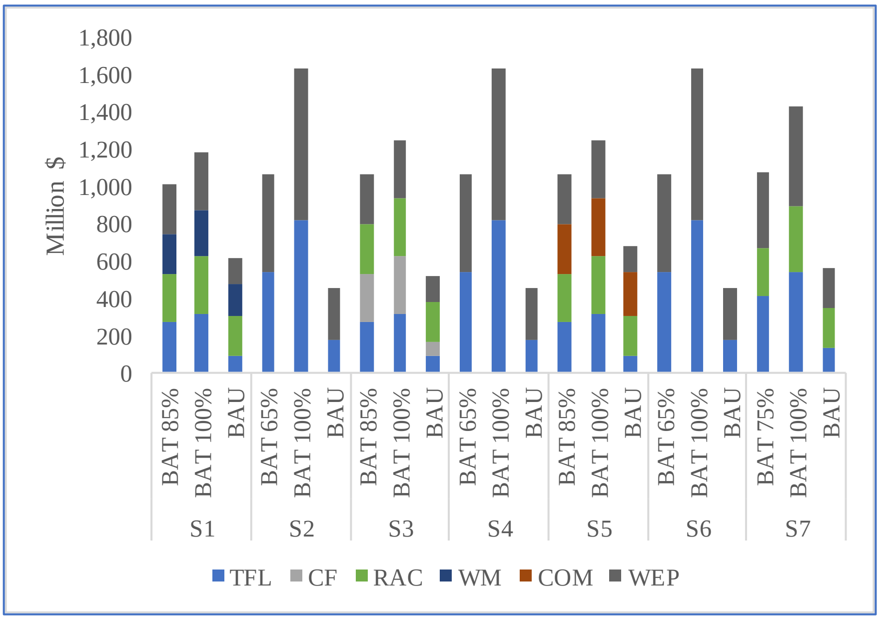


Figure 5.7. Overall GVA assuming a given GPBT

The social impacts were analysed in terms of employment generation with both formulations. According to the formulation assuming a given EPBT, 17 thousand jobs will be generated with Solution 1, 26 thousand jobs in Solutions 2, 4 and 6, 22 thousand jobs in Solution 7, 27 thousand jobs in Solution 3 and 26 thousand jobs in Solution 5 (Figure 5.8). On the other hand, with the alternative formulation the results only differ in Solution 3, with the generation of 23 thousand jobs and with the generation of 16 thousand jobs in Solution 5 (Figure 5.9). Analogously to what was found previously for the case of the economic impacts, the number of jobs generated is higher with aggressive strategies and with combined strategies while conservative strategies lead to lower job creation.

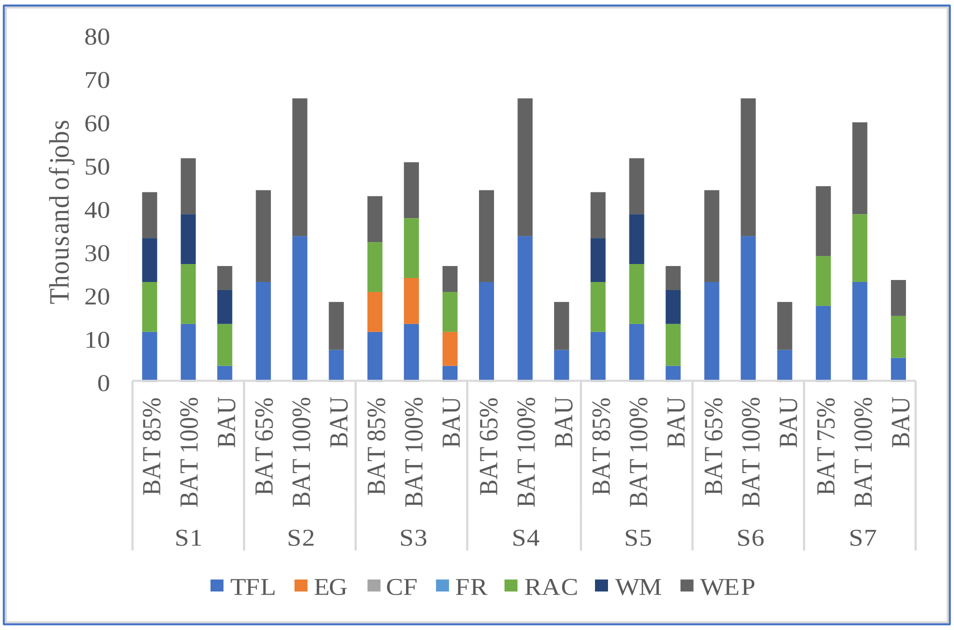


Figure 5.8. Employment generation assuming a certain EPBT

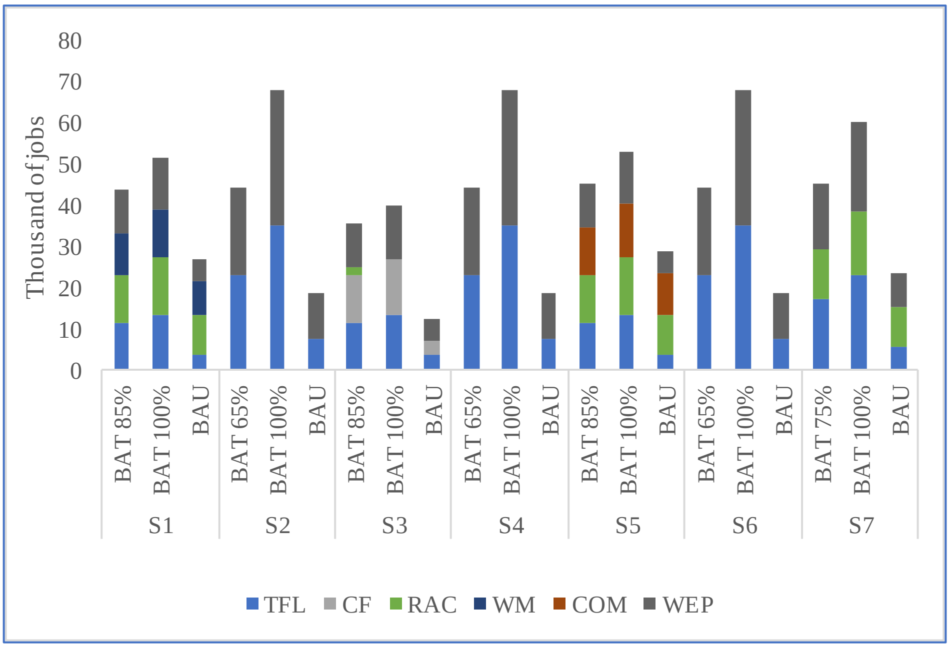


Figure 5.9. Employment generation assuming a certain GPBT

5.3. Environmental Impacts

According to our analysis, under the formulation which considers a given EPBT, an overall reduction of GHG emissions of 53% is projected in Solutions 1 and 5, 65% in Solutions 2, 4 and 6, 50% in Solution 3 and 58% in Solution 7 (Figure 5.10). Following the alternative formulation, with GBPT, similar results are obtained in Solutions 1, 2, 4, 6 and 7, while a 51% and 52% reduction of GHG emissions is obtained in Solutions 3 and 5, respectively (Figure 5.11).

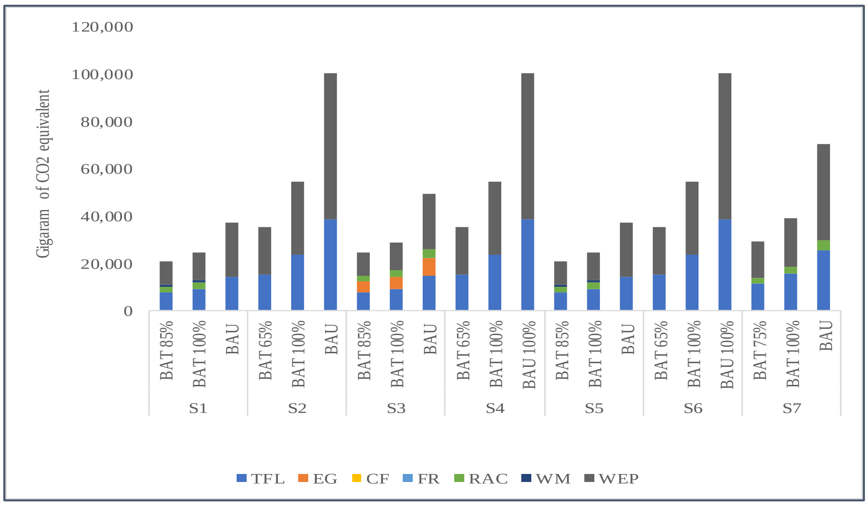


Figure 5.10. Avoided GHG emissions assuming a certain EPBT

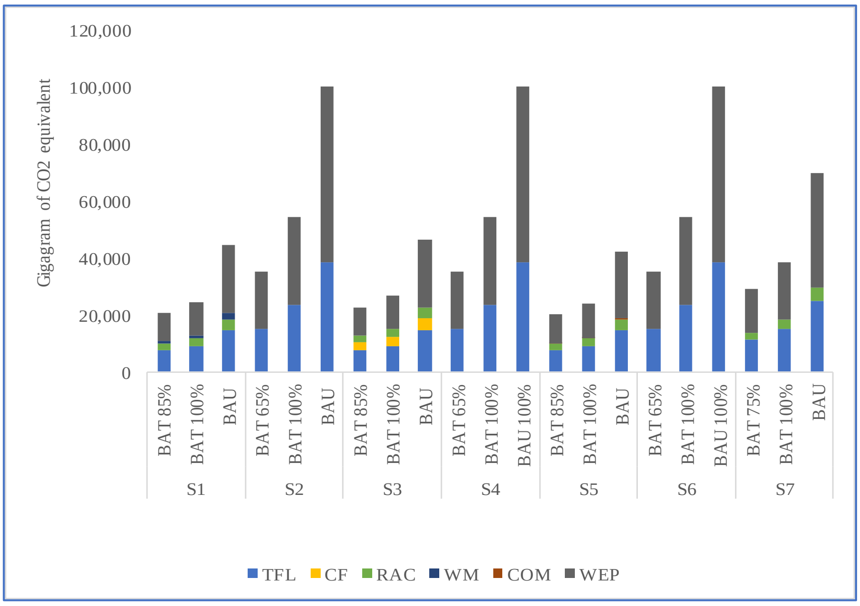


Figure 5.11. Avoided GHG emissions assuming a certain GPBT

Once more, the results obtained with both modelling formulations are quite similar, with an anticipated overall reduction of acidifying pollutant emissions of 54% in Solutions 1, 65% in Solutions 2, 4 and 6, 51% in Solution 3 and 59% in Solution 7 (Figures 5.12 and 5.13). Minor differences are only found in Solution 5 (54% and 53%, respectively).

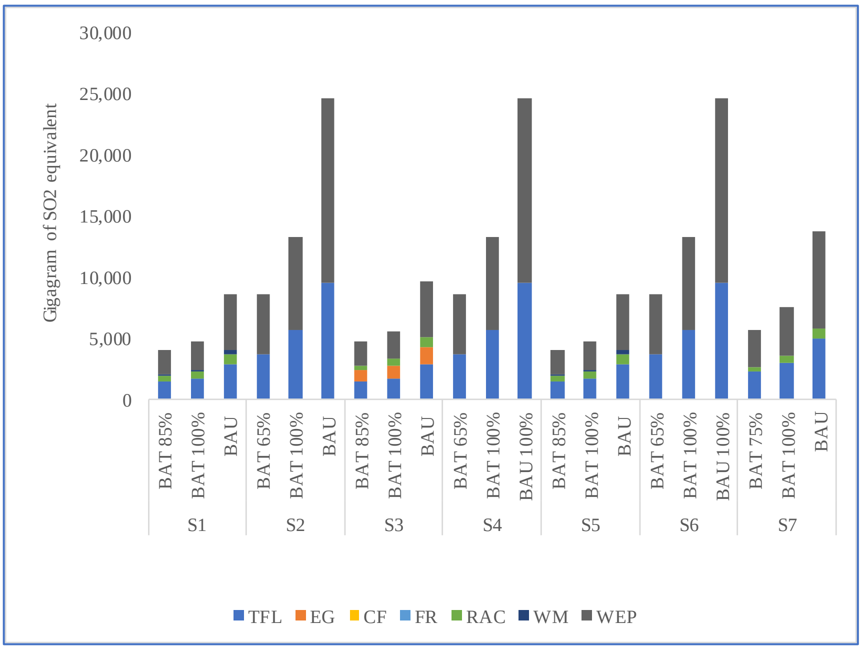


Figure 5.12. Avoided acidifying pollutant emissions assuming a certain EPBT

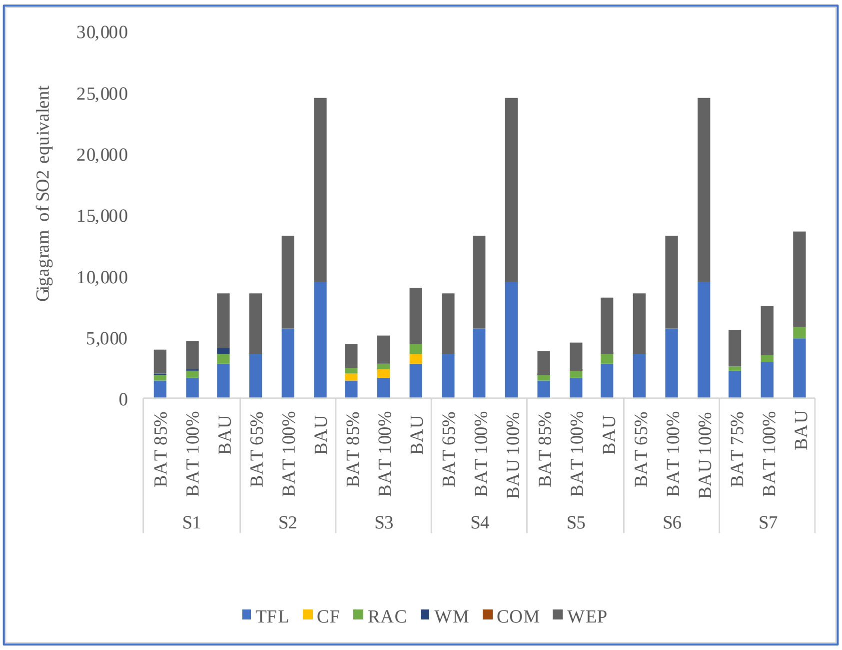


Figure 5.13. Avoided acidifying pollutant emissions assuming a certain GPBT

Regarding the reduction of tropospheric ozone potential emissions both formulations lead once more to identical results with an anticipated reduction of 53% in Solution 1, 65% in Solutions 2, 4 and 6, 51% in Solution 3, 53% in Solution 5 and 58% in Solution 7 (Figures 5.14 and 5.15).

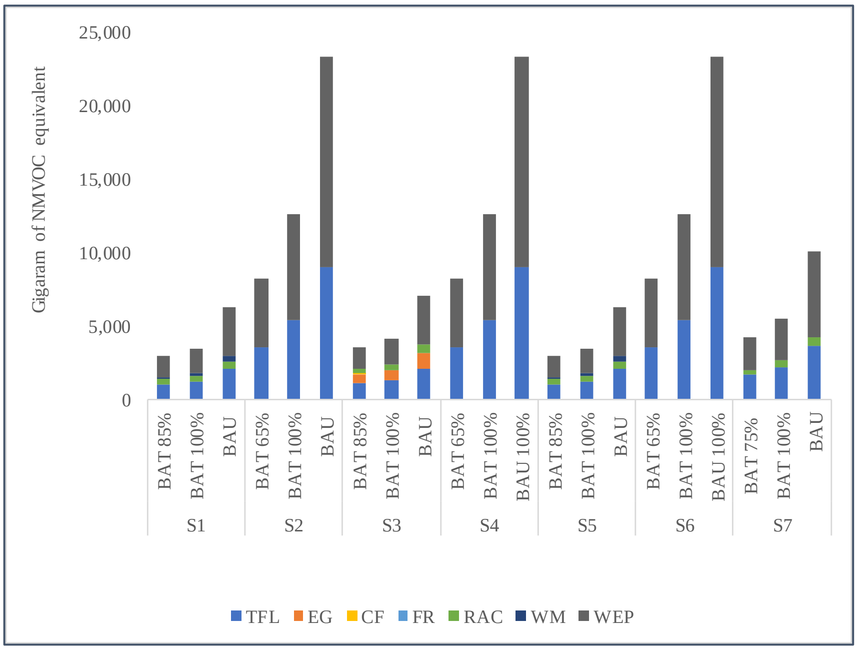


Figure 5.14. Avoided tropospheric ozone potential emissions assuming a certain EPBT

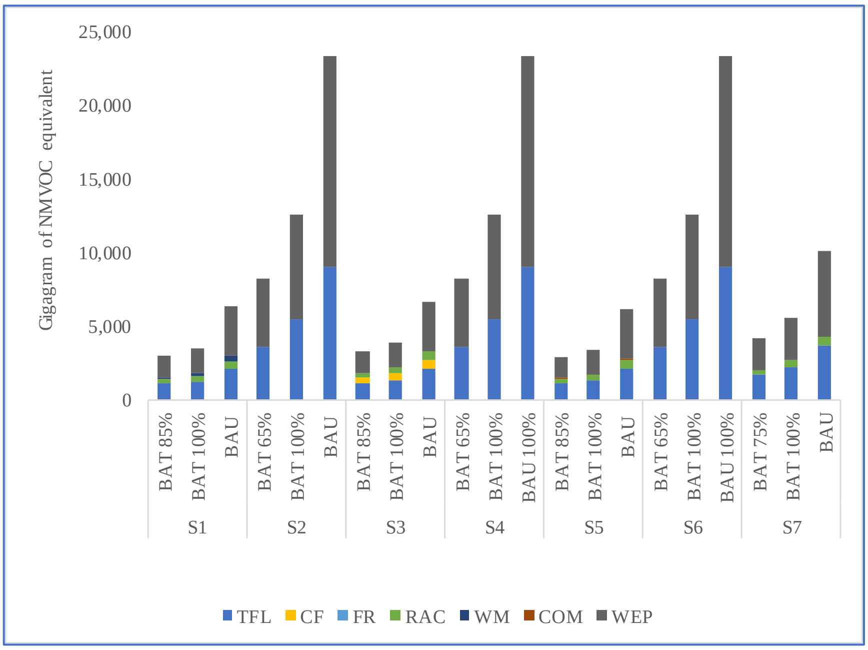


Figure 5.15. Avoided tropospheric ozone potential emissions assuming a certain GPBT

6. Conclusions

In this chapter, a methodological tool which can help public decision-makers in the choice of several EET to be subsidized in India's residential sector is presented, which can help with the design of EE programs in this country. A new overarching framework was also suggested for obtaining the EPBT/GPBT for EET based on the Economic IO LCA approach, which allows assessing the direct, indirect and induced EPBT/GPBT of BAT technologies. The importance of this new EPBT/GPBT modelling structure might be ascertained by the fact that positive direct effects regarding the adoption of EET can be overcompensated by indirect impacts on other activity sectors, in particular in the upper industrial supply chain.

The fact that the energy/GHG incorporated in each EET under consideration has been obtained through the use of India's national IO data, enabling to overcome one of the major drawbacks regarding truncation problems typically encountered when an approach based on the traditional lifecycle inventories is followed, is one of the main advantages of this new modelling proposal. Based on the data obtained, it was possible to establish that the EPBT for domestic BAT appliances in India is always lower than the corresponding expected lifetime. Although opposed conclusions were drawn regarding several renewable electricity systems, namely for PV [26-31],wind power [32] and fuel cell stacks [33], our results are consistent with the ones obtained for low concentrating solar PV-thermal (CPVT) systems [59] and for several EERA [36]. Overall, the EPBT relies on the yearly ratio energy produced/yearly energy saved by the system under analysis, while the GBPT is mainly explained by the emission factors of the electricity mix within the country.

Two modelling formulations based on interval portfolio theory were also proposed, where the objective functions used are accustomed to the appraisal of distinct EET generally held in India's residential sector. The objective functions which allow evaluating the trade-off between the return and risk of the portfolio of EET are: the SIR and the maximization of the minimum deviation of the energy savings (GHG avoided emissions) of the portfolio from the expected energy embodied (GHG emissions) in its manufacture, respectively. The diversification of the portfolio is ensured by the consideration of upper bounds on the maximal funding that can be assigned to the various EET also imposing a given EPBT/GPBT.

The selected portfolios of EET were then obtained by developing three surrogate problems reflecting distinct investment standpoints, i.e., a conservative strategy (leading to a lower number of subsidized devices), an aggressive strategy (leading to a higher number of subsidized devices) and a combined strategy.

Based on the results obtained, some guidelines can be drawn to help and support energy decision planning and energy decision-makers, in particular in a context where BAT technologies are designed to reduce energy consumption, bringing to light the need to consider a lifecycle approach in their performance assessment. In general, it can be concluded that it is always worth promoting the investment in TFL and WEP, while the incentive of more efficient TV and FR should never be considered, according to both modelling formulations.

Additionally, the assessment of the anticipated E3S impacts regarding the adoption of the different BAT selected in each portfolio was also conducted. With this regard, the most aggressive investment options always attain a higher TESP. Furthermore, the formulation which uses a given EPBT usually results in a higher TESP under the conservative investment options when contrasted with the formulation which uses a certain GPBT. In what concerns the economic impacts, the investment in BAT has a higher impact on GVA vis-a-vis the investment in BAU technologies. Then again, the most aggressive investment options are those which allow reaching the highest GVA. In terms of environmental impacts, both model formulations lead to quiet similar results. Lastly, concerning the analysis of the social impacts, the number of jobs generated are, as it would be expected, higher with aggressive strategies whereas conservative strategies lead to lower job creation.

It should be stressed that future work should be developed in order to encompass the assembly and disposal phases of the equipment as well. Furthermore, while the study behind this paper particularly addresses energy efficient technologies in India's residential sector, this work may be used to inspire similar approaches in commercial and industrial sectors. In addition, because of the scarcity of data available, in particular addressing the material cost shares of each technology, future work is needed to reduce the uncertainty raised by this type of shortcomings, namely by considering other possible hybrid IO LCA frameworks.

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CHAPTER 6

Conclusions, contributions and future work

1. Introduction

This thesis explores novel approaches that allow supporting public decision-makers on the estimation of the E3S impacts intertwined with the investment on BAT, bringing to light the trade-offs between a multitude of axes of evaluation that should be explicitly considered in the appraisal of these technologies. This Chapter is aimed at answering the research questions presented in Chapter 1, additionally conveying the main value added and contributions of this thesis

2. Findings with regard to the research questions

2.1. Research question 1(a)

What are the main challenges ahead regarding the design of energy efficiency policies in India?

India has been facing a consistent economic growth over the last two decades and the country has witnessed a reduction in poverty and an improvement of the standards of living, especially in middle class families [1], leading to the pervasive investment on electric appliances in the residential sector. On the other hand, the economic growth in India has largely been associated with increasing energy consumption [2]. Therefore, the support of energy efficiency policies can be seen as a cost-effective means for decreasing the growth rate of energy consumption and GHG emissions while supplying economical energy services in different activity sectors [3]. The design of energy efficiency policies in India depends on several important aspects, in particular awareness, motivation and improved information that can help fostering the adoption of energy efficient technologies in India’s household sector. Chapter 2 presents the major challenges which need to be resolved to create a functioning market transformation for energy efficiency programs with strong relation with players, pricing, policy, political will and investment implementation. Overall, it can be concluded that India's public decision-makers need to foster energy efficiency measures, without forgetting the important contribution of energy self-sufficiency on the economic/social development and prosperity of this country. On the other hand, it is important to highlight that energy initiatives are mainly dependent on general political options related to tariff incentives, social cohesion, national alliances and bilateral commercial agreements. Finally, energy efficiency planning should encompass several aspects of evaluation, besides energy savings, such as instruments to promote the development of innovative technologies, and diffusion of know-how.

2.2. Research question 1(b)

What are the major energy efficient technologies/end-use technologies in the residential sector that require particular attention regarding the design of energy efficiency policies in India?

The government star labelling program is aimed at encouraging the consumers to purchase energy efficient appliances and thus contributing to the mitigation of energy consumption and GHG emissions. In Chapter 2, we analysed several energy efficient technologies based on the standards and labelling schemes recognized by the Bureau of Energy Efficiency (BEE) of the Government of India [4], [5]. In this framework, we have identified nine types of star-rated electrical appliances in India's residential that require particular attention: lighting sources, refrigerators, air-conditioners, water heaters, televisions, computers, washing machines, ceiling fans and water pumps.

2.3. Research question 1(c)

How can energy decision-makers in India assess the major Economic, Energy, Environmental and Social (E3S) impacts and trade-offs regarding the adoption of different energy efficient technologies/end-uses with particular focus on the residential sector?

I-O analysis is a valuable tool for the assessment of the inter-relations between different economic activities. Additionally, it can be combined with bottom-up data, i.e. energy efficient technology-specific data, costs and cost structures, allowing to project the E3S impacts intertwined with the investment on this type of technologies within a comprehensive and consistent framework. In this context, in Chapters 3 and 4 an I-O lifecycle assessment modelling approach has been suggested which allows obtaining several estimations regarding the assessment of the E3S impacts associated with the replacement of less efficient appliances (BAU) with BAT appliances from the year 2011 to 2030. A large size platform of real data has also been built combining different data sources, in particular the household building stock characterization, the number of operating days according to the climatic regions of India, the lifetime and the investment cost of each equipment.

Several environmental impacts have been covered, including GHG emissions, acidifying substance emissions and TOFP emissions. According to the scenarios considered in our analyses, we have concluded that there will be no avoided GHG emissions in the starting year of our assessment for TV, CF, FR. This outcome is obtained because the impact of the manufacturing stage of the lifecycle will be more significant than the operational phase in the initial stages of our analysis. However, the longer the lifetime of the equipment, the higher the expected overall reduction of the GHG emissions throughout the equipment's lifetime.

Finally, this modelling framework has also been used in Chapter 4 to assess the impact of each technology on a per unit basis, only accounting for the manufacturing stages of the equipment under evaluation. Furthermore, an economic analysis was also conducted for each technology, specifically addressing the NPV, the SIR and the CCE. Additionally, a correlation study of all the indicators obtained has been performed in order to study the trade-offs involved in our multi perspective assessment.

In summary, it can be concluded that the adoption of BAT always leads to positive avoided GHG emissions. Moreover, the investment on this type of technologies ensures both a positive impact on employment and GVA during the manufacturing phases of the energy efficient appliances under consideration. With the correlation analysis, it was also possible to ascertain that NPV and SIR are positively correlated. On the other hand, it was possible to notice the negative correlation of CCE with NPV and SIR, respectively. The net GVA and employment have a negative correlation with NPV and the SIR, since the investment on BAT has a negative impact on the NPV and SIR, while it has a positive effect on GVA and on Employment generation. Furthermore, the avoided GHG emissions and the AEC are both positively correlated with NPV, while they are negatively correlated with the CCE. Finally, the values of Employment and GVA are also positively correlated and, in their turn, they both present a positive correlation with GHG avoided emissions, suggesting that fostering the investment on more energy efficient technologies does not necessarily lead to conflicting economic/social results.

2.4. Research question 1(d)

How should energy efficient technologies be subsidized in India's residential sector and what are the anticipated E3S impacts?

A methodological tool which can help public decision-makers in the choice of several EET to be subsidized in India's residential sector is presented in Chapter 5, which can help with the design of EE programs in this country. A new overarching framework was also suggested for obtaining the EPBT/GPBT for EET based on the EIO-LCA approach, which allows assessing the direct, indirect and induced EPBT/GPBT of BAT technologies. The importance of this new EPBT/GPBT modelling structure might be established by the fact that positive direct effects regarding the adoption of EET can be overcompensated by indirect impacts on other activity sectors, in particular in the upper industrial supply chain.

The EPBT relies on the ratio yearly energy produced/yearly energy saved by the system under analysis, while the GBPT is mainly explained by the emission factors of the electricity mix within the country.

Two modelling formulations based on interval portfolio theory have additionally been developed, where the objective functions used are adapted to the evaluation of distinct EET typically used in India's residential sector. The objective functions which allow evaluating the trade-off between the return and risk of the portfolio of EET are: the maximization of SIR and the maximization of the minimum deviation of the energy savings (GHG avoided emissions) of the portfolio from the expected energy embodied (GHG emissions) in its manufacture, respectively. The diversification of the portfolio is ensured by the consideration of upper bounds on the maximal funding that can be assigned to the various EET also imposing a given EPBT/GPBT.

The selected portfolios of EET were then obtained by taking into account three surrogate problems reflecting distinct investment standpoints, i.e., a conservative strategy (leading to a lower number of subsidized devices), an aggressive strategy (leading to a higher number of subsidized devices) and a combined strategy.

3. Contributions and future work

The main methodological contribution of the research work herein conducted mainly lies on the combination of the EIO-LCA analysis with other mathematical programming tools, leading to the suggestion of two new concepts for EPBT and GPBT, to the design of a methodological framework that allows performing a multidimensional assessment of distinct energy efficient technologies and the suggestion of two novel modelling formulations which allow supporting public decision makers of India in the selection of the energy efficient portfolios that should be funded by public bodies. Nevertheless, it should be stressed that future work should be developed in order to encompass the decommissioning and dismantling phases of the equipment. Finally, while in this thesis this study particularly addresses the energy efficient appliances in India’s residential sector, this work may be used to inspire similar approaches in the commercial and industrial sectors.

Appendix 1 – Equipment labelling in India

Table 1A.1. Appliance energy labelling status

Code	Component	Technology	Energy label scheme (Govt.of India)
E01	Lighting	**TFL**	**Yes**
		I|L	Absent
		LED	Absent
		Floor Lamp FL	Absent
		CFL)	Absent
E02	Doors and Window	Energy efficient windows	Absent
		Automatic door closing mechanisms	Absent
		Curtains, drapes, blinds	Absent
E03	Building Envelope	Professional infiltration Reduction	Absent
		Insulation in walls between conditioned and unconditioned spaces	Absent
		Insulation in floor (Urban area)	Absent
		Insulation in ceiling (Urban area)	Absent
E04	Kitchens	Cooking stove (Induction plate)	Absent
		Cooking stove (LPG)	**Yes**
		Microwave	Absent
		Electric Oven	Absent
		EG	**Yes**
		Toaster	Absent
		Dishwasher	Absent
		Kitchens ventilation (Fan, Hood)	Absent
E05	Electric appliances	**TV**	**Yes**
		Set-Top Box	Absent
		DVD Players	Absent
		Tape recorder, CD player	Absent
		Radio	Absent
		CF	**Yes**
		FR	**Yes**
		Air cooler	Absent
		RAC	**Yes**
		WM	**Yes**
E06	Miscellaneous	**COM**	**Yes**
		WEP	**Yes**
		Room heater	Absent
		Room Air cleaner	Absent
		Shading or planting trees	Absent

Appendix 2 – Data and assumptions

1. Data Sources

An I-O modelling framework has been built with real data (to obtain further details on the data collected please see Annexes I to VI) based on the World Input-Output Database (National I-O tables for India, http://www.wiod.org/) to assess the energy and environmental impacts of several energy efficient technologies/end-uses in India's residential sector. A large size platform of real data for the residential sector in India has also been gathered considering different data sources (see, e.g. [1], [2], [3] ,[4], [5], [6]; [7], [8], [9]). The average share of materials and the corresponding costs were obtained from ([10], [11], [12]) (Tables 2A.1). Data regarding energy consumption have been obtained from the energy balance of India and then combined with the World Input-Output Database.

Table 2A.1. Prices of BAU/BAT appliances

Appliance/end-use	BAU					BAT				
	Wholesale price $ (cost) without tax	VAT %	Tax $	Consumer price $	Basic Price $	Wholesale Price $ (cost) without tax	VAT %	P Tax$	Consumer price $	Basic price $
TFL	4	4.5	0.18	4.18	1.2	12.27	4.5	1.5	13.77	3.07
EG	114	12.5	14.2	128.2	39.9	136.4	12.5	17	153.4	34.09
TV	150	12.5	18.7	168.7	52.5	300	12.5	37.5	337.5	105
CF	28	12.5	3.5	31.5	4.2	100	12.5	12.5	112.5	15
FR	216	12.5	27	243	64	381.8	12.5	47.7	429.5	114.55
RAC	450	12.5	56.2	506.2	135	554.6	12.5	69.3	623.9	166.3
WM	250	12.5	11.2	261.2	62.5	309.1	12.5	102	411.1	92.7
COM	620	12.5	77.5	697.5	186	818.2	12.5	38.6	856.8	204.5
WEP	40	12.5	5	45	10	76.36	12.5	9.5	85.86	85.91

The base year of our study is 2011 because this is the year for which validated census data is available. The time frame considered in our analysis goes from 2011 to 2030. The reason for this choice lies on the fact that it is expected that major technological changes will take place within the next 16 to 20 years (see for example the replacement of cathode ray tube television by plasma display or liquid crystal display television) [13]. In our study, we have assumed that the adoption of energy efficient appliances/end-uses will have started in 2011 and that all new appliances purchased will be energy efficient (i.e. BAT appliances), meaning that it is not possible to benchmark the outputs of the model with real data even for past years between 2011 and the present date.

2. Households' projections

The household size is usually considered in this sort of studies and projection [14], [15]. Nevertheless, our methodology is slightly different and based on the classification of households, according to the Census of India [16], [17] . According to the Census of India, the total number of households will reach 344,978,775 by 2030.The annual percentage of growth rate is projected to be 2.2 % by 2030 (see Table 2A.2).

Table 2A.2. Households' projections up to 2030

Sources	Years	Number of dwelling rooms: No exclusive - Households, Total	Number of dwelling rooms: one - Households, Total	Number of dwelling rooms: Two or three - Households, Total	Number of dwelling rooms: Four and above - Households, Total	TOTAL
Census data India	1991	45,300	61,139,900	67,089,300	22,725,500	151,000,000
	2001	5,972,416	73,856,117	8,51,13,213	27,022,189	191,963,935
	2011	9,638,369	91,491,894	113,928,405	31,633,999	246,692,667
Projections	*2012*	*10,494,883*	*92,189,567*	*114,471,814*	*3,2026,904*	*2491,83,168*
	2013	*10,667,276*	*94,375,666*	*118,280,152*	*32,515,149*	*255,838,243*
	2014	*11,295,750*	*95,569,480*	*119,911,870*	*32,939,834*	*259,716,935*
	2015	***11,620,170***	***97,424,818***	***122,994,668***	***33,406,893***	***265,446,548***
	2016	*12,147,293*	*98,839,140*	*125,110,080*	*33,845,702*	*269,942,214*
	2017	*12,539,280*	*100,547,472*	*127,870,415*	*34,303,345*	*275,260,512*
	2018	*13,021,358*	*102,059,798*	*130,200,802*	*34,748,432*	*280,030,389*
	2019	*13,443,375*	*103,702,795*	*132,817,821*	*35,201,889*	*285,165,880*
	2020	***13,905,433***	***105,258,677***	***135,243,752***	***35,649,766***	***290057628***
	2021	*14,340,797*	*106,872,636*	*137,797,075*	*36,101,363*	*295,111,871*
	2022	*14,793,957*	*108,447,877*	*140,265,470*	*36,550,481*	*300,057,785*
	2023	*15,235,253*	*110,048,930*	*142,790,483*	*37,001,251*	*305,075,918*
	2024	*15,684,458*	*111,632,775*	*145,277,751*	*37,450,919*	*310,045,904*
	2025	***16,128,391***	***113,228,092***	***147,790,183***	***37,901,322***	***315,047,989***
	2026	*16,575,838*	*114,815,762*	*150,285,839*	*38,351,236*	*320,028,674*
	2027	*17,020,943*	*116,408,529*	*152,792,678*	*38,801,476*	*325,023,626*
	2028	*17,467,609*	*1179,97,898*	*155,292,062*	*39,251,498*	*330,009,067*
	2029	*17,913,234*	*119,589,533*	*157,796,417*	*39,701,665*	*335,000,848*
	2030	***18,359,553***	***121,179,657***	***160,297,457***	***40,151,735***	***339,988,403***
Bold values signify the base/projected year of time -horizon.						

3. Appliance ownership and sales

In order to estimate future sales, we have used a linear regression model based on data of the sales within the period of 2007 to 2011.The results obtained were validated and contrasted with the data published in [13], [15], [18], [19] and [7]. Data regarding the rate of appliance ownership were based on several data sources. The total share of sales to the residential sector are given in Table 2A.3. Data regarding the rate of appliance ownership were based on several data sources (see Table 2A.4 and 2A.5).

Table 2A.3. Share of sales per each appliance in the residential sector

Appliance/end-use	TFL	EG	TV	CF	FR	RAC	WM	COM	WEP
% of sales	66	85	85	85	85	60	85	50	50

Table 2A.4. Appliance ownership projections

Appliance/end-use	Stock in million					Data Sources
	2011	2015	2020	2025	2030	
TFL	194	222	260	298	335	[13],[15],[18],[19],[7]
FR	47	75	110	160	210	[13],[15],[7]
TV	336	345	392	477	560	[13],[15],[7],[20]
RAC	7	21	37	77	116	[13],[15],[7],[21]
CF	242	312	400	700	1,000	[13],[15],[7],[22],[23]
EG	2	2	3	4	4	[13],[15],[7]
WM	2	3	4	5	5	[13],[15],[7],[24]
COM	91	146	217	286	356	[13],[15],[7]
WEP	2	2	3	4	5	[25]

Table 2A.5. Stock Quantity (Million Pieces)

Appliance/end-use	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TFL	194	200	208	215	223	230	238	245	253	260	268	275	283	290	298	306	313	321	328	336
LPG	120	128	150	152	161	171	182	192	199	210	220	230	239	249	259	268	277	287	297	306
EG	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4
TV	336	338	338	338	345	355	358	360	375	392	410	427	447	457	477	494	510	527	543	560
CF	242	259	277	294	312	330	347	365	382	400	460	520	580	640	700	760	820	880	940	1000
FR	47	54	61	68	75	82	89	96	103	110	120	130	140	150	160	170	180	190	200	210
RAC	7	11	14	17	21	24	27	30	34	37	45	53	61	69	77	84	92	100	108	116
WM	2	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5
COM	91	109	115	131	146	161	174	188	201	217	230	244	258	272	286	300	314	328	342	356
WEP	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5

4. Selection of appliances

We have identified twenty typical appliances/end-uses in the residential sector. However, only nine appliances are accounted for in the energy efficient star labelling appliance/end-use categories of the BEE by Government of India (see [3],[26]). Therefore, our study will only focus on those nine electrical appliances/end-uses (see Table 2A.6).

Table 2A.6. Energy Labelling scheme up to 2016

With energy label scheme		Without energy label scheme
TFL	M	Tape recorder, CD player
FR	M	Radio
TV	M	Air cooler
RAC	M	Room heater
CF	V	Set-Top Box
EG	M	DVD Players
WM	V	Electric Oven,
COM	V	Incandescent bulb
WEP	V	Compact Fluorescent Lamp
Legend: M-Mandatory Label		V-Voluntary Label

The energy intensities considered in our analysis for BAT/BAU appliances are provided in Table 2A.7.

Table 2A.7. Energy intensity for BAT/BAU appliances

Appliance/end-use	BAT kWh/year	BAU kWh/year	References
LFL	53	88	[27], [28], [29]
FR	2891	7008	[30], [31]
TV	175	329	[32], [33]
COM	329	548	[33], [34]
WEP	1066	2132	[35], [36], [37]
CF	161	219	[38], [39]
RAC	4897	7008	[40], [41], [42]
EG	730	876	[43], [44], [45]
WM	146	365	[46], [47]

5. Operating hours per year

Table 2A.8 show the operating hours per year considered for each BAT/BAU appliance, which were based on [6], [4], [1], [15], [7] and [9].

Table 2A.8. Appliance operating hours per year

Appliance/ end-use		2011	2015	2020	2025	2030	References
TFL	Hrs/Year	1,460	1,460	1,460	1,460	1,460	[12], [13], [14], [17], [39] and [47].
EG	Hrs/Year	100	100	100	100	100	
TV	Hrs/Year	2,190	2,190	2,190	2,190	2,190	
CF	Hrs/Year	1,600	1,600	1,600	1,600	1,600	
FR	Hrs/Year	8,760	8,760	8,760	8,760	8,760	
RAC	Hrs/Year	1,080	1,080	1,080	1,080	1,080	
WM	Hrs/Year	365	365	365	365	365	
COM	load/Year	1,400	1,400	1,400	1,400	1,400	
WEP	Hrs/Year	548	548	548	548	548	[13]

6. Energy mix in India

The electricity is producing with blending of a group of different primary energy sources from which secondary energy for direct use in power generation. Energy production in India 2011[48]. And cost of energy generation (see- Table 2A.9).

Table 2A.9. Electricity Production Mix and Generation Cost.

Technology	*Coal*	*Gas*	*Nuclear*	*Hydro*	*Renewable (Wind/Solar)*	*Oil*
Share of each primary energy form for electricity production %	69%	10%	3%	12%	5%	1%
Cost of energy production $/kWh	0.06	0.07	0.04	0.03	0.17	0.06
Electricity tariff $/kWh	National average residential tariff 0.08$/kWh					

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Appendix 3 – I-O methodology and coefficients' matrices

1. I-O Methodology

Direct effects evaluate the impacts on a given industry as a result of the variation in the final demand of that same industry. Indirect effects assess the reaction of the supply chain of that industry from an increase (decrease) in its final demand. Induced effects correspond the overall impacts caused in all industries because of the increase (decrease) of purchases of new household's income and inter-industrial flows created (lost) from the direct and indirect effects related to the variation of final demand of a given industrial sector. The overall effect is the adds together the direct, indirect, and induced effects. The main I-O multipliers are provided in Table 3A1.

Table 3A.1. Output and income multipliers in the framework of the IO model

	Output Multiplier
Direct and indirect effects Type I Multipliers	$M_j^x = \sum_{i=1}^{n} \alpha_{ij}$
Direct, indirect and induced effects Type II Multipliers	$M'^x_j = \sum_{i=1}^{n} \alpha'_{ij}$

Note: M = Multiplier; α_{ij} = direct and indirect production coefficients of sector i as a result of changes in final demand of sector j; α'_{ij} = direct, indirect and induced (by household spending) production coefficients of sector i as a result of changes in final demand of sector j; i = supply sector; j = purchasing sector; Type I Multiplier = (direct effect + indirect effect) / direct effect; Type II multiplier = (direct effects + indirect effects + induced effects) / direct effect.

Thus, the energy supplies associated with the intermediate consumption in industrial activities can be evaluated through the use of a matrix of direct impact coefficients, where each generic element, e_{kj}, is the quantity of energy type (GHG type) k consumed (emitted) per monetary unit of industry j's output [1]. Therefore, the amount of energy consumption (of GHG emitted) linked to a given vector of total outputs is:

$$\mathbf{e} = E\mathbf{x}, \tag{A1}$$

where **e** is the vector of energy consumption (GHG emitted) and **x** is the vector of outputs.E is a matrix of technological coefficients

Consider the basic system of equations of the I-O system [2]:

$$\mathbf{x} = A\mathbf{x} + \mathbf{y}, \tag{A2}$$

where A is the matrix of technological coefficients and **y** is the vector of final demand (households, government, firms and foreign countries consumption).

Vector **e** can be given as a function of final demand, i.e., the total direct and indirect energy of each type consumed (GHG emitted) by the economy supporting that final demand:

$$\mathbf{e} = E\,(I - A)^{-1}\mathbf{y}, \tag{A3}$$

Finally, from (A3) matrix $E\,(I - A)^{-1}$ can be seen as the matrix of total energy consumption (GHG emitted) coefficients; thus, each element of this matrix is the total direct and indirect energy consumption (GHG emitted) per monetary unit of final demand.

Since type II multipliers (see Table 3A.1) are aimed at assessing the flows of money coming in and out of households and the corresponding effects on industries, it is then required to consider the households sector within the I-O matrix to arrive at the induced effects. In this case, the model becomes closed and the household sector is handled as an additional industry, implying the introduction of an additional row and column into the I-O table for 'compensation of employees' and 'household expenditures', respectively. The direct indirect and induced coefficient matrixt for value added, employment, air emissions account and energy mix (see Table 3A-2 to Table 3A.41 of appendix)

Table 3A.2. Country India sector code

S.N	Sector	code
1	Agriculture, Hunting, Forestry and Fishing	c1
2	Mining and Quarrying	c2
3	Food, Beverages and Tobacco	c3
4	Textiles and Textile Products	c4
5	Leather, Leather and Footwear	c5
6	Wood and Products of Wood and Cork	c6
7	Pulp, Paper, Paper , Printing and Publishing	c7
8	Coke, Refined Petroleum and Nuclear Fuel	c8
9	Chemicals and Chemical Products	c9
10	Rubber and Plastics	c10
11	Other Non-Metallic Mineral	c11
12	Basic Metals and Fabricated Metal	c12
13	Machinery, Nec	c13
14	Electrical and Optical Equipment	c14
15	Transport Equipment	c15
16	Manufacturing, Nec; Recycling	c16
17	Electricity, Gas and Water Supply	c17
18	Construction	c18
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	c19
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	c20
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	c21
22	Hotels and Restaurants	c22
23	Inland Transport	c23
24	Water Transport	c24
25	Air Transport	c25
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	c26
27	Post and Telecommunications	c27
28	Financial Intermediation	c28
29	Real Estate Activities	c29
30	Renting of M&Eq and Other Business Activities	c30
31	Public Admin and Defence; Compulsory Social Security	c31
32	Education	c32
33	Health and Social Work	c33
34	Other Community, Social and Personal Services	c34
35	Private Households with Employed Persons	c35
35	Final consumption expenditure by households	c37
35	Final consumption expenditure by non-profit organisations serving households (NPISH)	c38
35	Final consumption expenditure by government	c39
35	Gross fixed capital formation	c41
35	Changes in inventories and valuables	c42
35	Exports	c44

Table 3A.3. BAT/BAU connected to each relevant activity/component as % of LCA (Part-I)

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
TFL																		
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG																		
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TV																		
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COM																		
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Glass	0.00		0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEP																		
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.70	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 3A.3. BAT/BAU connected to each relevant activity/component as % of LCA (Part -II)

	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
TFL																	
Glass																	
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
EG																	
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
Labour costs																	
TV																	
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
CF																	
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
FR																	
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
RAC																	
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
WM																	
Insulation material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
COM																	
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic																	
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
WEP																	
Metal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintenace (incl. Spare parts)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70

Table 3A.4. Direct and Indirect Value-Added Coefficients (Part-I)

Value Added			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.77821	IND	c1	0.86054	0.00307	0.33424	0.08934	0.17592	0.15421	0.04160	0.00501	0.02349	0.06582	0.00887	0.00524	0.00641	0.00697	0.00671	0.00713	0.00460	0.02158
0.77689	IND	c2	0.00348	0.78351	0.00819	0.01084	0.00745	0.01000	0.01736	0.10992	0.01805	0.01406	0.04109	0.07507	0.02251	0.01878	0.01837	0.00478	0.06953	0.02036
0.14715	IND	c3	0.00086	0.00038	0.16358	0.00113	0.00095	0.00072	0.00158	0.00049	0.00445	0.00379	0.00063	0.00054	0.00048	0.00064	0.00058	0.00039	0.00045	0.00043
0.25363	IND	c4	0.00101	0.00041	0.00255	0.32264	0.00593	0.00114	0.00307	0.00072	0.00369	0.00693	0.00216	0.00087	0.00151	0.00188	0.00136	0.00159	0.00060	0.00117
0.25224	IND	c5	0.00005	0.00008	0.00033	0.00127	0.32029	0.00045	0.00038	0.00014	0.00063	0.00232	0.00047	0.00020	0.00031	0.00068	0.00140	0.00050	0.00010	0.00015
0.38924	IND	c6	0.00026	0.00134	0.00337	0.00248	0.00146	0.39823	0.01017	0.00081	0.00418	0.00347	0.00432	0.00126	0.00308	0.00190	0.00176	0.00207	0.00067	0.00533
0.24283	IND	c7	0.00042	0.00066	0.00517	0.00310	0.00186	0.00691	0.31518	0.00146	0.00371	0.00410	0.00394	0.00176	0.00225	0.00251	0.00184	0.00172	0.00232	0.00176
0.11643	IND	c8	0.00272	0.00300	0.00613	0.00659	0.00536	0.00441	0.00759	0.12582	0.01111	0.00870	0.01264	0.00806	0.00510	0.00505	0.00469	0.00228	0.01482	0.00837
0.27179	IND	c9	0.00633	0.00620	0.00968	0.01782	0.01238	0.00932	0.02137	0.00660	0.33951	0.07183	0.00842	0.00617	0.00557	0.00920	0.00783	0.00607	0.00320	0.00535
0.14459	IND	c10	0.00035	0.00060	0.00271	0.00289	0.00252	0.00249	0.00381	0.00107	0.00386	0.16462	0.00403	0.00158	0.00235	0.00333	0.00363	0.00287	0.00073	0.00119
0.33225	IND	c11	0.00054	0.00252	0.00128	0.00165	0.00138	0.00078	0.00203	0.00137	0.00197	0.00193	0.35999	0.00259	0.00378	0.00364	0.00214	0.00143	0.00207	0.03178
0.20633	IND	c12	0.00135	0.00808	0.00409	0.00642	0.00430	0.00434	0.00653	0.00384	0.00578	0.01001	0.01056	0.29129	0.07034	0.05441	0.04996	0.00916	0.00754	0.04083
0.24931	IND	c13	0.00075	0.00565	0.00281	0.00565	0.00272	0.00141	0.00222	0.00201	0.00304	0.00377	0.00253	0.00502	0.26812	0.01069	0.01424	0.00394	0.00507	0.00325
0.24771	IND	c14	0.00028	0.00077	0.00088	0.00123	0.00094	0.00073	0.00134	0.00085	0.00130	0.00166	0.00140	0.00244	0.00532	0.26434	0.00474	0.00305	0.00541	0.00338
0.24087	IND	c15	0.00096	0.00207	0.00279	0.00278	0.00291	0.00246	0.00286	0.00242	0.00274	0.00626	0.00281	0.00442	0.00541	0.00479	0.27153	0.00234	0.00254	0.00310
0.12979	IND	c16	0.00019	0.00050	0.00064	0.00078	0.00287	0.00068	0.00130	0.00046	0.00119	0.00158	0.00065	0.00090	0.00151	0.00138	0.00242	0.13051	0.00052	0.00078
0.33932	IND	c17	0.00561	0.01020	0.00974	0.02056	0.01056	0.01328	0.02309	0.01365	0.01829	0.02186	0.03883	0.03344	0.01609	0.01530	0.02033	0.00450	0.42689	0.01663
0.34534	IND	c18	0.00468	0.01332	0.01012	0.01294	0.00583	0.00440	0.01160	0.00993	0.00877	0.00705	0.03020	0.01015	0.01404	0.01268	0.00896	0.00502	0.01814	0.36830
0.88629	IND	c19	0.00186	0.00150	0.00708	0.00545	0.00619	0.00487	0.00638	0.00846	0.00696	0.00801	0.00541	0.00569	0.00485	0.00587	0.00442	0.00227	0.00407	0.00504
0.88629	IND	c20	0.01448	0.01165	0.05499	0.04235	0.04806	0.03784	0.04958	0.06580	0.05411	0.06229	0.04201	0.04422	0.03770	0.04563	0.03438	0.01761	0.03165	0.03915
0.88629	IND	c21	0.02364	0.01903	0.08980	0.06917	0.07850	0.06179	0.08095	0.10741	0.08835	0.10169	0.06860	0.07220	0.06156	0.07450	0.05614	0.02875	0.05168	0.06393
0.38115	IND	c22	0.00033	0.00049	0.00119	0.00125	0.00117	0.00097	0.00126	0.00118	0.00116	0.00131	0.00102	0.00107	0.00118	0.00115	0.00115	0.00078	0.00132	0.00096
0.35831	IND	c23	0.01355	0.01217	0.04762	0.04502	0.04386	0.03631	0.05062	0.04856	0.04581	0.05254	0.04118	0.04084	0.03211	0.03774	0.03010	0.01948	0.03086	0.03786
0.58639	IND	c24	0.00040	0.00029	0.00165	0.00091	0.00100	0.00148	0.00124	0.00140	0.00127	0.00132	0.00133	0.00127	0.00086	0.00099	0.00077	0.00053	0.00117	0.00102
0.43220	IND	c25	0.00034	0.00025	0.00112	0.00100	0.00266	0.00072	0.00191	0.00116	0.00127	0.00120	0.00078	0.00080	0.00082	0.00097	0.00085	0.00063	0.00065	0.00075
0.52976	IND	c26	0.00124	0.00100	0.00467	0.00366	0.00409	0.00325	0.00431	0.00567	0.00466	0.00537	0.00361	0.00377	0.00323	0.00392	0.00294	0.00153	0.00270	0.00336
0.68476	IND	c27	0.00159	0.00321	0.00676	0.00917	0.00686	0.00787	0.00824	0.00780	0.00784	0.00895	0.00956	0.01099	0.01139	0.03843	0.01344	0.01569	0.01118	0.00704
0.76751	IND	c28	0.01101	0.02360	0.04773	0.05579	0.04983	0.05347	0.05454	0.04871	0.04923	0.05238	0.04443	0.05068	0.07401	0.04984	0.08880	0.06705	0.07790	0.05286
0.92229	IND	c29	0.00000	0.00001	0.00002	0.00003	0.00003	0.00001	0.00002	0.00001	0.00002	0.00002	0.00001	0.00001	0.00004	0.00003	0.00003	0.00002	0.00001	0.00001
0.67873	IND	c30	0.00194	0.00368	0.01353	0.01834	0.01745	0.00762	0.01262	0.00523	0.01150	0.01301	0.00684	0.00826	0.02489	0.01840	0.01616	0.01008	0.00502	0.00460
1.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.89791	IND	c32	0.00003	0.00004	0.00016	0.00020	0.00019	0.00010	0.00015	0.00008	0.00014	0.00016	0.00009	0.00010	0.00025	0.00020	0.00017	0.00011	0.00007	0.00007
0.64753	IND	c33	0.00005	0.00005	0.00019	0.00021	0.00020	0.00014	0.00020	0.00016	0.00018	0.00021	0.00015	0.00015	0.00021	0.00022	0.00017	0.00011	0.00011	0.00013
0.81624	IND	c34	0.00159	0.00832	0.00626	0.02093	0.01214	0.01103	0.00865	0.00443	0.00625	0.01152	0.00745	0.00495	0.01896	0.01386	0.03368	0.00287	0.00465	0.00325
0.81624	IND	c35	0.00013	0.00070	0.00052	0.00175	0.00102	0.00092	0.00072	0.00037	0.00052	0.00096	0.00062	0.00041	0.00159	0.00116	0.00282	0.00024	0.00039	0.00027
		Total indirect coefficients	**0.96255**	**0.92835**	**0.85160**	**0.78533**	**0.83890**	**0.84434**	**0.75447**	**0.59297**	**0.73503**	**0.72071**	**0.76663**	**0.69641**	**0.70785**	**0.71108**	**0.70851**	**0.35708**	**0.78865**	**0.75403**

Table 3A.4. Direct and Indirect Value-Added Coefficients (Part -II)

Value Added			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.77821	IND	c1	0.00155	0.00155	0.00155	0.22949	0.02106	0.00896	0.00918	0.00965	0.00368	0.00434	0.00164	0.00564	0.00000	0.00534	0.01419	0.00094	0.00094
0.77689	IND	c2	0.00157	0.00157	0.00157	0.00600	0.02576	0.00883	0.01131	0.00983	0.00591	0.00277	0.00142	0.00206	0.00000	0.00138	0.00456	0.00064	0.00064
0.14715	IND	c3	0.00008	0.00008	0.00008	0.01520	0.00062	0.00143	0.00080	0.00056	0.00021	0.00027	0.00004	0.00034	0.00000	0.00019	0.00205	0.00006	0.00006
0.25363	IND	c4	0.00036	0.00036	0.00036	0.00095	0.00132	0.00128	0.00109	0.00090	0.00040	0.00035	0.00009	0.00058	0.00000	0.00051	0.00161	0.00016	0.00016
0.25224	IND	c5	0.00003	0.00003	0.00003	0.00011	0.00060	0.00034	0.00096	0.00028	0.00008	0.00005	0.00001	0.00003	0.00000	0.00002	0.00012	0.00001	0.00001
0.38924	IND	c6	0.00021	0.00021	0.00021	0.00069	0.00090	0.00080	0.00102	0.00163	0.00049	0.00034	0.00037	0.00028	0.00000	0.00016	0.00073	0.00009	0.00009
0.24283	IND	c7	0.00252	0.00252	0.00252	0.00163	0.00276	0.00125	0.00146	0.01713	0.00286	0.00456	0.00014	0.00114	0.00000	0.00061	0.00237	0.00034	0.00034
0.11643	IND	c8	0.00130	0.00130	0.00130	0.00444	0.02591	0.00650	0.01096	0.00579	0.00318	0.00194	0.00058	0.00089	0.00000	0.00103	0.00325	0.00032	0.00032
0.27179	IND	c9	0.00048	0.00048	0.00048	0.00365	0.00551	0.02368	0.01292	0.00451	0.00127	0.00085	0.00038	0.00087	0.00000	0.00059	0.03282	0.00064	0.00064
0.14459	IND	c10	0.00024	0.00024	0.00024	0.00076	0.00492	0.00263	0.00902	0.00250	0.00055	0.00037	0.00008	0.00018	0.00000	0.00014	0.00096	0.00007	0.00007
0.33225	IND	c11	0.00030	0.00030	0.00030	0.00155	0.00218	0.00189	0.00163	0.00188	0.00176	0.00085	0.00218	0.00126	0.00000	0.00071	0.00136	0.00039	0.00039
0.20633	IND	c12	0.00082	0.00082	0.00082	0.00298	0.00778	0.00605	0.00401	0.00455	0.00508	0.00206	0.00282	0.00258	0.00000	0.00130	0.00286	0.00075	0.00075
0.24931	IND	c13	0.00025	0.00025	0.00025	0.00149	0.00337	0.00200	0.00154	0.00147	0.00127	0.00053	0.00023	0.00048	0.00000	0.00028	0.00112	0.00018	0.00018
0.24771	IND	c14	0.00018	0.00018	0.00018	0.00074	0.00196	0.00172	0.00088	0.00153	0.00643	0.00108	0.00024	0.00115	0.00000	0.00017	0.00087	0.00025	0.00025
0.24087	IND	c15	0.00044	0.00044	0.00044	0.00164	0.01226	0.01428	0.00307	0.00361	0.00196	0.00194	0.00023	0.00197	0.00000	0.00052	0.00133	0.00036	0.00036
0.12979	IND	c16	0.00008	0.00008	0.00008	0.00032	0.00095	0.00088	0.00050	0.00056	0.00034	0.00022	0.00006	0.00016	0.00000	0.00007	0.00053	0.00004	0.00004
0.33932	IND	c17	0.00158	0.00158	0.00158	0.00954	0.01280	0.01122	0.00580	0.02616	0.01469	0.00394	0.00119	0.00475	0.00000	0.00116	0.00434	0.00118	0.00118
0.34534	IND	c18	0.00302	0.00302	0.00302	0.01324	0.01538	0.01246	0.01491	0.01864	0.01854	0.00866	0.02521	0.01338	0.00000	0.00786	0.01053	0.00397	0.00397
0.88629	IND	c19	0.88667	0.00039	0.00039	0.00491	0.00498	0.00334	0.00316	0.00237	0.00246	0.00089	0.00035	0.00074	0.00000	0.00039	0.00302	0.00023	0.00023
0.88629	IND	c20	0.00301	0.88929	0.00301	0.03810	0.03872	0.02593	0.02452	0.01839	0.01913	0.00693	0.00275	0.00578	0.00000	0.00301	0.02351	0.00179	0.00179
0.88629	IND	c21	0.00491	0.00491	0.89120	0.06222	0.06323	0.04235	0.04004	0.03002	0.03122	0.01131	0.00449	0.00943	0.00000	0.00492	0.03839	0.00293	0.00293
0.38115	IND	c22	0.00103	0.00103	0.00103	0.38474	0.00573	0.00355	0.00336	0.00592	0.00206	0.00451	0.00031	0.00699	0.00000	0.00379	0.00998	0.00053	0.00053
0.35831	IND	c23	0.00671	0.00671	0.00671	0.03250	0.38948	0.02624	0.02567	0.03605	0.01693	0.00900	0.00266	0.00575	0.00000	0.00678	0.02031	0.00233	0.00233
0.58639	IND	c24	0.00008	0.00008	0.00008	0.00116	0.00118	0.58698	0.00066	0.00047	0.00042	0.00018	0.00007	0.00014	0.00000	0.00008	0.00051	0.00005	0.00005
0.43220	IND	c25	0.00014	0.00014	0.00014	0.00093	0.00086	0.00051	0.43272	0.00085	0.00048	0.00035	0.00005	0.00044	0.00000	0.00008	0.00131	0.00008	0.00008
0.52976	IND	c26	0.01031	0.01031	0.01031	0.00352	0.00331	0.00247	0.00210	0.53850	0.00164	0.00060	0.00024	0.00050	0.00000	0.00026	0.00205	0.00015	0.00015
0.68476	IND	c27	0.00503	0.00503	0.00503	0.00568	0.01683	0.01300	0.01429	0.04404	0.71539	0.02246	0.00123	0.01067	0.00000	0.00328	0.00908	0.00303	0.00303
0.76751	IND	c28	0.03294	0.03294	0.03294	0.03051	0.03713	0.03080	0.02796	0.06119	0.01494	0.85072	0.00388	0.04129	0.00000	0.02103	0.01282	0.00422	0.00422
0.92229	IND	c29	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00002	0.00005	0.00001	0.00001	0.92711	0.00127	0.00000	0.00000	0.00001	0.00005	0.00005
0.67873	IND	c30	0.00518	0.00518	0.00518	0.00603	0.01889	0.00877	0.01184	0.03182	0.00831	0.00594	0.00044	0.76378	0.00000	0.00123	0.00488	0.02790	0.02790
1.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000
0.89791	IND	c32	0.00005	0.00005	0.00005	0.00008	0.00044	0.00010	0.00013	0.00032	0.00009	0.00006	0.00001	0.00709	0.00000	0.89795	0.00013	0.00026	0.00026
0.64753	IND	c33	0.00005	0.00005	0.00005	0.00012	0.00111	0.00012	0.00013	0.00028	0.00062	0.00007	0.00001	0.00374	0.00000	0.00003	0.64761	0.00014	0.00014
0.81624	IND	c34	0.00113	0.00113	0.00113	0.00239	0.01533	0.00356	0.00253	0.00474	0.00171	0.00113	0.00060	0.00961	0.00000	0.00072	0.00334	0.83392	0.01767
0.81624	IND	c35	0.00009	0.00009	0.00009	0.00020	0.00128	0.00030	0.00021	0.00040	0.00014	0.00009	0.00005	0.00080	0.00000	0.00006	0.00028	0.00148	0.81772
		Total indirect coefficients	**0.97235**	**0.97235**	**0.97235**	**0.86753**	**0.74458**	**0.85423**	**0.68040**	**0.88659**	**0.88428**	**0.94937**	**0.98116**	**0.90577**	**1.00000**	**0.96568**	**0.86283**	**0.88949**	**0.88949**

Table 3A.5. Induced Value-Added Coefficients (Part-I)

Value Added	(industry-by-industry)		IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
0.77821	IND	c1	0.86353	0.01157	0.33984	0.09272	0.18156	0.16261	0.04754	0.00850	0.02728	0.07059	0.01229	0.00750	0.00883	0.01094	0.01159	0.00856	0.00745	0.02562	0.00187
0.77689	IND	c2	0.00361	0.78389	0.00844	0.01099	0.00770	0.01038	0.01762	0.11007	0.01822	0.01427	0.04124	0.07517	0.02262	0.01895	0.01859	0.00484	0.06966	0.02054	0.00158
0.14715	IND	c3	0.00109	0.00105	0.16402	0.00140	0.00140	0.00138	0.00204	0.00076	0.00474	0.00417	0.00090	0.00072	0.00067	0.00096	0.00096	0.00050	0.00068	0.00075	0.00010
0.25363	IND	c4	0.00126	0.00110	0.00301	0.32291	0.00639	0.00182	0.00355	0.00100	0.00400	0.00732	0.00243	0.00106	0.00170	0.00220	0.00176	0.00171	0.00084	0.00150	0.00038
0.25224	IND	c5	0.00007	0.00013	0.00037	0.00129	0.32033	0.00051	0.00042	0.00016	0.00065	0.00235	0.00050	0.00021	0.00033	0.00071	0.00144	0.00051	0.00012	0.00018	0.00003
0.38924	IND	c6	0.00028	0.00138	0.00340	0.00249	0.00149	0.39828	0.01020	0.00083	0.00420	0.00350	0.00434	0.00127	0.00309	0.00192	0.00179	0.00208	0.00069	0.00535	0.00021
0.24283	IND	c7	0.00046	0.00077	0.00524	0.00315	0.00194	0.00702	0.31527	0.00151	0.00377	0.00417	0.00399	0.00179	0.00228	0.00256	0.00190	0.00174	0.00236	0.00181	0.00253
0.11643	IND	c8	0.00283	0.00330	0.00632	0.00671	0.00555	0.00471	0.00780	0.12594	0.01124	0.00887	0.01276	0.00814	0.00519	0.00519	0.00486	0.00233	0.01492	0.00851	0.00131
0.27179	IND	c9	0.00646	0.00659	0.00993	0.01797	0.01264	0.00969	0.02164	0.00676	0.33968	0.07204	0.00858	0.00627	0.00568	0.00938	0.00805	0.00614	0.00332	0.00553	0.00050
0.14459	IND	c10	0.00038	0.00067	0.00276	0.00292	0.00257	0.00256	0.00386	0.00110	0.00389	0.16466	0.00406	0.00160	0.00237	0.00336	0.00367	0.00288	0.00076	0.00122	0.00024
0.33225	IND	c11	0.00056	0.00258	0.00132	0.00168	0.00143	0.00084	0.00207	0.00140	0.00200	0.00197	0.36001	0.00260	0.00379	0.00367	0.00218	0.00144	0.00209	0.03181	0.00030
0.20633	IND	c12	0.00143	0.00830	0.00424	0.00651	0.00445	0.00456	0.00669	0.00393	0.00588	0.01013	0.01065	0.29135	0.07041	0.05451	0.05009	0.00920	0.00762	0.04093	0.00082
0.24931	IND	c13	0.00080	0.00578	0.00290	0.00570	0.00281	0.00154	0.00232	0.00206	0.00310	0.00385	0.00259	0.00506	0.26816	0.01075	0.01432	0.00396	0.00512	0.00331	0.00025
0.24771	IND	c14	0.00031	0.00083	0.00092	0.00125	0.00098	0.00079	0.00139	0.00087	0.00133	0.00170	0.00142	0.00246	0.00534	0.26437	0.00478	0.00306	0.00543	0.00341	0.00018
0.24087	IND	c15	0.00102	0.00226	0.00291	0.00286	0.00303	0.00264	0.00299	0.00250	0.00282	0.00636	0.00289	0.00447	0.00546	0.00487	0.27163	0.00237	0.00260	0.00319	0.00045
0.12979	IND	c16	0.00020	0.00053	0.00065	0.00079	0.00289	0.00071	0.00132	0.00048	0.00120	0.00160	0.00066	0.00091	0.00152	0.00139	0.00244	0.13052	0.00053	0.00080	0.00008
0.33932	IND	c17	0.00575	0.01062	0.01002	0.02072	0.01084	0.01369	0.02338	0.01382	0.01848	0.02209	0.03900	0.03355	0.01621	0.01549	0.02057	0.00457	0.42703	0.01682	0.00159
0.34534	IND	c18	0.00486	0.01383	0.01045	0.01314	0.00617	0.00491	0.01196	0.01014	0.00899	0.00733	0.03041	0.01029	0.01419	0.01292	0.00925	0.00510	0.01831	0.36855	0.00304
0.88629	IND	c19	0.00195	0.00174	0.00724	0.00555	0.00635	0.00511	0.00655	0.00856	0.00707	0.00815	0.00550	0.00576	0.00492	0.00598	0.00456	0.00231	0.00415	0.00515	0.88668
0.88629	IND	c20	0.01513	0.01352	0.05622	0.04310	0.04931	0.03969	0.05089	0.06657	0.05495	0.06334	0.04276	0.04471	0.03824	0.04651	0.03545	0.01792	0.03228	0.04004	0.00308
0.88629	IND	c21	0.02472	0.02208	0.09182	0.07038	0.08052	0.06481	0.08308	0.10866	0.08971	0.10341	0.06982	0.07302	0.06243	0.07592	0.05789	0.02926	0.05271	0.06538	0.00503
0.38115	IND	c22	0.00055	0.00110	0.00160	0.00149	0.00158	0.00158	0.00168	0.00143	0.00143	0.00165	0.00126	0.00123	0.00135	0.00144	0.00150	0.00088	0.00152	0.00125	0.00106
0.35831	IND	c23	0.01425	0.01414	0.04892	0.04581	0.04517	0.03827	0.05200	0.04937	0.04669	0.05364	0.04198	0.04136	0.03267	0.03867	0.03123	0.01981	0.03152	0.03880	0.00679
0.58639	IND	c24	0.00042	0.00035	0.00168	0.00093	0.00104	0.00153	0.00128	0.00142	0.00129	0.00135	0.00135	0.00129	0.00088	0.00101	0.00081	0.00054	0.00119	0.00105	0.00008
0.43220	IND	c25	0.00035	0.00029	0.00115	0.00101	0.00269	0.00077	0.00194	0.00118	0.00129	0.00123	0.00080	0.00081	0.00083	0.00099	0.00088	0.00063	0.00067	0.00077	0.00015
0.52976	IND	c26	0.00130	0.00116	0.00478	0.00373	0.00420	0.00340	0.00442	0.00573	0.00473	0.00546	0.00367	0.00381	0.00328	0.00400	0.00303	0.00155	0.00276	0.00343	0.01031
0.68476	IND	c27	0.00174	0.00363	0.00704	0.00933	0.00714	0.00828	0.00853	0.00797	0.00802	0.00919	0.00972	0.01110	0.01151	0.03863	0.01367	0.01576	0.01132	0.00724	0.00505
0.76751	IND	c28	0.01161	0.02532	0.04886	0.05647	0.05097	0.05517	0.05574	0.04942	0.04999	0.05334	0.04512	0.05114	0.07450	0.05064	0.08979	0.06733	0.07847	0.05368	0.03300
0.92229	IND	c29	0.00127	0.00359	0.00238	0.00146	0.00241	0.00356	0.00253	0.00148	0.00161	0.00203	0.00145	0.00097	0.00106	0.00170	0.00208	0.00062	0.00121	0.00171	0.00014
0.67873	IND	c30	0.00237	0.00490	0.01434	0.01882	0.01826	0.00882	0.01347	0.00573	0.01204	0.01370	0.00733	0.00858	0.02524	0.01897	0.01686	0.01028	0.00543	0.00518	0.00523
1.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.89791	IND	c32	0.00059	0.00163	0.00121	0.00083	0.00125	0.00167	0.00126	0.00073	0.00085	0.00105	0.00073	0.00053	0.00071	0.00094	0.00108	0.00037	0.00060	0.00082	0.00011
0.64753	IND	c33	0.00032	0.00082	0.00070	0.00052	0.00071	0.00090	0.00074	0.00047	0.00052	0.00064	0.00046	0.00036	0.00043	0.00057	0.00061	0.00024	0.00037	0.00049	0.00008
0.81624	IND	c34	0.00178	0.00888	0.00663	0.02115	0.01251	0.01158	0.00904	0.00466	0.00650	0.01183	0.00767	0.00510	0.01912	0.01412	0.03400	0.00296	0.00483	0.00352	0.00115
0.81624	IND	c35	0.00015	0.00074	0.00055	0.00177	0.00104	0.00097	0.00075	0.00039	0.00054	0.00099	0.00064	0.00043	0.00160	0.00118	0.00284	0.00025	0.00040	0.00029	0.00010
	Employees compensation		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Total Induced Effect		**0.97339**	**0.95910**	**0.87184**	**0.79756**	**0.85932**	**0.87475**	**0.77596**	**0.60560**	**0.74871**	**0.73797**	**0.77899**	**0.70460**	**0.71659**	**0.72542**	**0.72615**	**0.36223**	**0.79896**	**0.76862**	**0.97352**

Table 3A.5. Induced Value-Added Coefficients (Part -II)

Value Added	(industry-by-industry)		IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	c37
0.77821	IND	c1	0.00666	0.00384	0.23517	0.02387	0.02040	0.01977	0.01325	0.01050	0.00595	0.00444	0.00923	0.00701	0.00915	0.01728	0.01463	0.00146	0.15965
0.77689	IND	c2	0.00179	0.00167	0.00625	0.02588	0.00934	0.01178	0.00999	0.00621	0.00285	0.00154	0.00222	0.00031	0.00155	0.00470	0.00125	0.00067	0.00710
0.14715	IND	c3	0.00048	0.00026	0.01564	0.00084	0.00233	0.00163	0.00084	0.00074	0.00040	0.00026	0.00062	0.00055	0.00049	0.00230	0.00113	0.00010	0.01255
0.25363	IND	c4	0.00077	0.00054	0.00141	0.00155	0.00221	0.00195	0.00119	0.00095	0.00048	0.00032	0.00087	0.00057	0.00082	0.00186	0.00127	0.00020	0.01297
0.25224	IND	c5	0.00006	0.00004	0.00015	0.00062	0.00042	0.00103	0.00030	0.00013	0.00006	0.00003	0.00006	0.00005	0.00005	0.00014	0.00010	0.00001	0.00110
0.38924	IND	c6	0.00024	0.00022	0.00072	0.00092	0.00086	0.00108	0.00165	0.00052	0.00035	0.00038	0.00030	0.00004	0.00018	0.00075	0.00016	0.00009	0.00085
0.24283	IND	c7	0.00259	0.00256	0.00171	0.00280	0.00141	0.00161	0.01718	0.00296	0.00459	0.00018	0.00119	0.00010	0.00066	0.00241	0.00054	0.00035	0.00223
0.11643	IND	c8	0.00148	0.00138	0.00463	0.02600	0.00690	0.01133	0.00591	0.00342	0.00200	0.00068	0.00101	0.00024	0.00116	0.00336	0.00079	0.00034	0.00555
0.27179	IND	c9	0.00071	0.00058	0.00390	0.00563	0.02419	0.01339	0.00468	0.00158	0.00092	0.00051	0.00103	0.00031	0.00076	0.03296	0.00125	0.00066	0.00716
0.14459	IND	c10	0.00028	0.00026	0.00081	0.00495	0.00272	0.00911	0.00253	0.00061	0.00038	0.00011	0.00022	0.00006	0.00018	0.00099	0.00018	0.00007	0.00138
0.33225	IND	c11	0.00034	0.00032	0.00160	0.00220	0.00197	0.00171	0.00191	0.00181	0.00086	0.00220	0.00129	0.00005	0.00074	0.00138	0.00049	0.00040	0.00116
0.20633	IND	c12	0.00095	0.00088	0.00313	0.00786	0.00635	0.00429	0.00464	0.00526	0.00210	0.00290	0.00267	0.00018	0.00140	0.00294	0.00111	0.00077	0.00420
0.24931	IND	c13	0.00033	0.00029	0.00158	0.00342	0.00218	0.00171	0.00153	0.00138	0.00056	0.00028	0.00054	0.00011	0.00034	0.00117	0.00040	0.00019	0.00255
0.24771	IND	c14	0.00022	0.00019	0.00079	0.00198	0.00181	0.00096	0.00156	0.00648	0.00109	0.00026	0.00117	0.00005	0.00020	0.00089	0.00035	0.00025	0.00120
0.24087	IND	c15	0.00055	0.00049	0.00177	0.01232	0.01453	0.00330	0.00368	0.00211	0.00197	0.00029	0.00205	0.00015	0.00060	0.00140	0.00066	0.00037	0.00348
0.12979	IND	c16	0.00010	0.00009	0.00034	0.00096	0.00092	0.00054	0.00057	0.00036	0.00023	0.00006	0.00017	0.00002	0.00008	0.00054	0.00009	0.00005	0.00052
0.33932	IND	c17	0.00183	0.00169	0.00982	0.01294	0.01179	0.00632	0.02634	0.01502	0.00402	0.00133	0.00492	0.00034	0.00135	0.00449	0.00185	0.00121	0.00784
0.34534	IND	c18	0.00333	0.00316	0.01358	0.01555	0.01314	0.01555	0.01886	0.01895	0.00876	0.02538	0.01360	0.00042	0.00809	0.01071	0.00479	0.00400	0.00959
0.88629	IND	c19	0.00053	0.00045	0.00507	0.00506	0.00366	0.00346	0.00247	0.00265	0.00094	0.00043	0.00084	0.00020	0.00050	0.00311	0.00062	0.00025	0.00452
0.88629	IND	c20	0.89042	0.00351	0.03935	0.03934	0.02845	0.02685	0.01918	0.02063	0.00728	0.00337	0.00657	0.00154	0.00385	0.02420	0.00480	0.00191	0.03513
0.88629	IND	c21	0.00675	0.89202	0.06426	0.06424	0.04646	0.04385	0.03131	0.03367	0.01189	0.00550	0.01072	0.00252	0.00629	0.03950	0.00785	0.00311	0.05736
0.38115	IND	c22	0.00140	0.00120	0.38515	0.00593	0.00437	0.00412	0.00618	0.00255	0.00463	0.00051	0.00725	0.00050	0.00406	0.01020	0.00151	0.00056	0.01148
0.35831	IND	c23	0.00790	0.00724	0.03382	0.39013	0.02889	0.02813	0.03689	0.01852	0.00938	0.00331	0.00658	0.00163	0.00766	0.02103	0.00550	0.00245	0.03707
0.58639	IND	c24	0.00012	0.00010	0.00120	0.00120	0.58706	0.00073	0.00049	0.00047	0.00019	0.00009	0.00016	0.00005	0.00011	0.00053	0.00014	0.00005	0.00110
0.43220	IND	c25	0.00017	0.00016	0.00097	0.00088	0.00057	0.43278	0.00087	0.00052	0.00036	0.00007	0.00045	0.00004	0.00010	0.00133	0.00015	0.00008	0.00085
0.52976	IND	c26	0.01040	0.01035	0.00363	0.00337	0.00268	0.00230	0.53857	0.00177	0.00063	0.00029	0.00057	0.00013	0.00033	0.00210	0.00041	0.00016	0.00300
0.68476	IND	c27	0.00528	0.00515	0.00596	0.01697	0.01356	0.01481	0.04422	0.71572	0.02254	0.00136	0.01085	0.00034	0.00347	0.00923	0.00371	0.00306	0.00785
0.76751	IND	c28	0.03397	0.03340	0.03166	0.03769	0.03312	0.03010	0.06192	0.01632	0.85105	0.00445	0.04202	0.00142	0.02180	0.01344	0.00699	0.00433	0.03225
0.92229	IND	c29	0.00217	0.00098	0.00241	0.00122	0.00484	0.00449	0.00157	0.00289	0.00069	0.92829	0.00278	0.00296	0.00161	0.00131	0.00582	0.00026	0.06735
0.67873	IND	c30	0.00591	0.00551	0.00685	0.01929	0.01041	0.01336	0.03233	0.00929	0.00617	0.00085	0.76430	0.00101	0.00178	0.00532	0.02986	0.02797	0.02288
1.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.89791	IND	c32	0.00101	0.00048	0.00114	0.00097	0.00224	0.00211	0.00099	0.00137	0.00036	0.00053	0.00776	0.00131	0.89866	0.00071	0.00282	0.00036	0.02989
0.64753	IND	c33	0.00051	0.00025	0.00063	0.00136	0.00116	0.00109	0.00061	0.00124	0.00022	0.00026	0.00406	0.00064	0.00037	0.64789	0.00138	0.00019	0.01447
0.81624	IND	c34	0.00147	0.00128	0.00277	0.01552	0.00431	0.00322	0.00498	0.00215	0.00124	0.00078	0.00985	0.00046	0.00097	0.00354	0.83481	0.01771	0.01041
0.81624	IND	c35	0.00012	0.00011	0.00023	0.00130	0.00036	0.00027	0.00042	0.00018	0.00010	0.00006	0.00082	0.00004	0.00008	0.00030	0.00155	0.81772	0.00083
	Employees compensation		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Total Induced Effect		**0.99085**	**0.98064**	**0.88807**	**0.75474**	**0.89562**	**0.71871**	**0.89961**	**0.90895**	**0.95522**	**0.99130**	**0.91874**	**1.02537**	**0.97946**	**0.87402**	**0.93898**	**0.89135**	**0.57754**

Table 3A.6. CO2 Direct and Indirect Coefficients (Part-I)

C02			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.18448	IND	c1	0.20399	0.00073	0.07923	0.02118	0.04170	0.03656	0.00986	0.00119	0.00557	0.01560	0.00210	0.00124	0.00152	0.00165	0.00159	0.00169	0.00109	0.00512
2.63253	IND	c2	0.01178	2.65495	0.02775	0.03675	0.02523	0.03389	0.05882	0.37246	0.06118	0.04765	0.13922	0.25436	0.07627	0.06362	0.06226	0.01620	0.23561	0.06899
0.53314	IND	c3	0.00311	0.00138	0.59266	0.00410	0.00346	0.00260	0.00571	0.00177	0.01611	0.01374	0.00228	0.00195	0.00173	0.00233	0.00210	0.00141	0.00164	0.00156
0.11755	IND	c4	0.00047	0.00019	0.00118	0.14953	0.00275	0.00053	0.00142	0.00033	0.00171	0.00321	0.00100	0.00040	0.00070	0.00087	0.00063	0.00074	0.00028	0.00054
0.03617	IND	c5	0.00001	0.00001	0.00005	0.00018	0.04593	0.00006	0.00005	0.00002	0.00009	0.00033	0.00007	0.00003	0.00004	0.00010	0.00020	0.00007	0.00001	0.00002
1.07096	IND	c6	0.00071	0.00368	0.00927	0.00681	0.00403	1.09572	0.02799	0.00224	0.01150	0.00956	0.01190	0.00347	0.00847	0.00523	0.00484	0.00570	0.00185	0.01466
0.43444	IND	c7	0.00075	0.00117	0.00924	0.00554	0.00333	0.01236	0.56390	0.00261	0.00664	0.00734	0.00706	0.00315	0.00402	0.00448	0.00329	0.00308	0.00415	0.00314
0.42960	IND	c8	0.01005	0.01108	0.02262	0.02433	0.01977	0.01629	0.02801	0.46425	0.04101	0.03211	0.04663	0.02973	0.01883	0.01865	0.01730	0.00843	0.05467	0.03088
0.54171	IND	c9	0.01261	0.01237	0.01930	0.03551	0.02468	0.01857	0.04260	0.01316	0.67667	0.14317	0.01679	0.01230	0.01111	0.01834	0.01561	0.01210	0.00637	0.01066
0.10853	IND	c10	0.00026	0.00045	0.00203	0.00217	0.00189	0.00187	0.00286	0.00080	0.00289	0.12356	0.00303	0.00118	0.00176	0.00250	0.00273	0.00215	0.00055	0.00089
2.46207	IND	c11	0.00402	0.01866	0.00946	0.01225	0.01026	0.00581	0.01505	0.01016	0.01460	0.01434	2.66762	0.01917	0.02798	0.02701	0.01589	0.01058	0.01532	0.23550
0.76302	IND	c12	0.00499	0.02987	0.01514	0.02373	0.01591	0.01605	0.02415	0.01420	0.02136	0.03701	0.03906	1.07721	0.26013	0.20121	0.18477	0.03388	0.02789	0.15098
0.10803	IND	c13	0.00033	0.00245	0.00122	0.00245	0.00118	0.00061	0.00096	0.00087	0.00132	0.00163	0.00110	0.00218	0.11618	0.00463	0.00617	0.00171	0.00220	0.00141
0.06598	IND	c14	0.00008	0.00020	0.00023	0.00033	0.00025	0.00019	0.00036	0.00023	0.00035	0.00044	0.00037	0.00065	0.00142	0.07041	0.00126	0.00081	0.00144	0.00090
0.15278	IND	c15	0.00061	0.00131	0.00177	0.00176	0.00185	0.00156	0.00182	0.00154	0.00174	0.00397	0.00178	0.00280	0.00343	0.00304	0.17223	0.00148	0.00161	0.00197
0.01272	IND	c16	0.00002	0.00005	0.00006	0.00008	0.00028	0.00007	0.00013	0.00005	0.00012	0.00015	0.00006	0.00009	0.00015	0.00013	0.00024	0.01279	0.00005	0.00008
12.49258	IND	c17	0.20639	0.37565	0.35863	0.75686	0.38890	0.48890	0.85020	0.50248	0.67352	0.80471	1.42971	1.23116	0.59246	0.56311	0.74845	0.16560	15.71675	0.61208
0.04019	IND	c18	0.00054	0.00155	0.00118	0.00151	0.00068	0.00051	0.00135	0.00116	0.00102	0.00082	0.00351	0.00118	0.00163	0.00148	0.00104	0.00058	0.00211	0.04286
0.04118	IND	c19	0.00009	0.00007	0.00033	0.00025	0.00029	0.00023	0.00030	0.00039	0.00032	0.00037	0.00025	0.00026	0.00023	0.00027	0.00021	0.00011	0.00019	0.00023
0.01256	IND	c20	0.00021	0.00017	0.00078	0.00060	0.00068	0.00054	0.00070	0.00093	0.00077	0.00088	0.00060	0.00063	0.00053	0.00065	0.00049	0.00025	0.00045	0.00055
0.03385	IND	c21	0.00090	0.00073	0.00343	0.00264	0.00300	0.00236	0.00309	0.00410	0.00337	0.00388	0.00262	0.00276	0.00235	0.00285	0.00214	0.00110	0.00197	0.00244
0.43357	IND	c22	0.00038	0.00056	0.00136	0.00142	0.00133	0.00110	0.00143	0.00134	0.00132	0.00149	0.00116	0.00121	0.00134	0.00131	0.00131	0.00089	0.00150	0.00110
0.17051	IND	c23	0.00645	0.00579	0.02266	0.02143	0.02087	0.01728	0.02409	0.02311	0.02180	0.02500	0.01960	0.01943	0.01528	0.01796	0.01432	0.00927	0.01468	0.01802
1.75151	IND	c24	0.00121	0.00087	0.00492	0.00271	0.00299	0.00441	0.00371	0.00418	0.00379	0.00394	0.00396	0.00380	0.00258	0.00295	0.00231	0.00158	0.00349	0.00304
0.82529	IND	c25	0.00065	0.00047	0.00213	0.00190	0.00508	0.00138	0.00364	0.00222	0.00242	0.00230	0.00150	0.00152	0.00156	0.00185	0.00163	0.00119	0.00124	0.00143
0.28842	IND	c26	0.00068	0.00055	0.00254	0.00199	0.00223	0.00177	0.00235	0.00308	0.00254	0.00292	0.00196	0.00205	0.00176	0.00214	0.00160	0.00083	0.00147	0.00183
0.08115	IND	c27	0.00019	0.00038	0.00080	0.00109	0.00081	0.00093	0.00098	0.00092	0.00093	0.00106	0.00113	0.00130	0.00135	0.00455	0.00159	0.00186	0.00133	0.00083
0.00706	IND	c28	0.00010	0.00022	0.00044	0.00051	0.00046	0.00049	0.00050	0.00045	0.00045	0.00048	0.00041	0.00047	0.00068	0.00046	0.00082	0.00062	0.00072	0.00049
0.00410	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04683	IND	c30	0.00013	0.00025	0.00093	0.00127	0.00120	0.00053	0.00087	0.00036	0.00079	0.00090	0.00047	0.00057	0.00172	0.00127	0.00112	0.00070	0.00035	0.00032
0.00990	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02523	IND	c32	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000
0.02487	IND	c33	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000
0.11831	IND	c34	0.00023	0.00121	0.00091	0.00303	0.00176	0.00160	0.00125	0.00064	0.00091	0.00167	0.00108	0.00072	0.00275	0.00201	0.00488	0.00042	0.00067	0.00047
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
		coefficients	**0.471919**	**3.127002**	**1.192285**	**1.123922**	**0.632796**	**1.76475**	**1.678145**	**1.431249**	**1.576824**	**1.304261**	**4.408042**	**2.676996**	**1.159981**	**1.027069**	**1.273019**	**0.297838**	**16.10167**	**1.212995**

Table 3A.6. CO2 Direct and Indirect Coefficients (Part-II)

C02			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.18448	IND	c1	0.000367	0.000367	0.000367	0.054403	0.004993	0.002125	0.002175	0.002288	0.000873	0.001028	0.000389	0.001337	0.000000	0.001266	0.003364	0.000223	0.000223
2.63253	IND	c2	0.005304	0.005304	0.005304	0.020319	0.087276	0.029910	0.038330	0.033322	0.020028	0.009396	0.004801	0.006991	0.000000	0.004690	0.015460	0.002177	0.002177
0.53314	IND	c3	0.000276	0.000276	0.000276	0.055065	0.002240	0.005191	0.002895	0.002030	0.000750	0.000978	0.000146	0.001221	0.000000	0.000683	0.007437	0.000212	0.000212
0.11755	IND	c4	0.000166	0.000166	0.000166	0.000440	0.000613	0.000595	0.000504	0.000416	0.000185	0.000161	0.000041	0.000270	0.000000	0.000237	0.000744	0.000073	0.000073
0.03617	IND	c5	0.000004	0.000004	0.000004	0.000015	0.000086	0.000048	0.000138	0.000040	0.000011	0.000007	0.000002	0.000005	0.000000	0.000003	0.000017	0.000001	0.000001
1.07096	IND	c6	0.000584	0.000584	0.000584	0.001889	0.002482	0.002194	0.002810	0.004476	0.001342	0.000931	0.001009	0.000766	0.000000	0.000441	0.002020	0.000239	0.000239
0.43444	IND	c7	0.004514	0.004514	0.004514	0.002920	0.004935	0.002238	0.002620	0.030642	0.005125	0.008166	0.000254	0.002046	0.000000	0.001083	0.004237	0.000617	0.000617
0.42960	IND	c8	0.004789	0.004789	0.004789	0.016366	0.095585	0.023991	0.040457	0.021353	0.011732	0.007163	0.002151	0.003266	0.000000	0.003810	0.011995	0.001176	0.001176
0.54171	IND	c9	0.000960	0.000960	0.000960	0.007268	0.010975	0.047192	0.025741	0.008997	0.002529	0.001698	0.000759	0.001733	0.000000	0.001181	0.065419	0.001268	0.001268
0.10853	IND	c10	0.000179	0.000179	0.000179	0.000568	0.003694	0.001971	0.006767	0.001875	0.000416	0.000277	0.000063	0.000138	0.000000	0.000108	0.000724	0.000050	0.000050
2.46207	IND	c11	0.002224	0.002224	0.002224	0.011520	0.016150	0.013984	0.012086	0.013943	0.013033	0.006280	0.016141	0.009364	0.000000	0.005275	0.010060	0.002910	0.002910
0.76302	IND	c12	0.003019	0.003019	0.003019	0.011007	0.028788	0.022375	0.014839	0.016827	0.018803	0.007610	0.010443	0.009527	0.000000	0.004825	0.010584	0.002785	0.002785
0.10803	IND	c13	0.000108	0.000108	0.000108	0.000644	0.001462	0.000866	0.000668	0.000638	0.000551	0.000229	0.000100	0.000209	0.000000	0.000122	0.000486	0.000080	0.000080
0.06598	IND	c14	0.000047	0.000047	0.000047	0.000198	0.000522	0.000459	0.000234	0.000407	0.001713	0.000287	0.000064	0.000306	0.000000	0.000046	0.000231	0.000065	0.000065
0.15278	IND	c15	0.000281	0.000281	0.000281	0.001043	0.007774	0.009057	0.001945	0.002287	0.001246	0.001228	0.000143	0.001251	0.000000	0.000329	0.000843	0.000231	0.000231
0.01272	IND	c16	0.000008	0.000008	0.000008	0.000032	0.000093	0.000086	0.000049	0.000055	0.000033	0.000022	0.000005	0.000016	0.000000	0.000007	0.000052	0.000004	0.000004
12.49258	IND	c17	0.058121	0.058121	0.058121	0.351340	0.471382	0.413263	0.213468	0.963146	0.540710	0.145014	0.043793	0.174803	0.000000	0.042689	0.159646	0.043479	0.043479
0.04019	IND	c18	0.000352	0.000352	0.000352	0.001541	0.001790	0.001450	0.001735	0.002170	0.002158	0.001008	0.002934	0.001557	0.000000	0.000915	0.001225	0.000462	0.000462
0.04118	IND	c19	0.041202	0.000018	0.000018	0.000228	0.000232	0.000155	0.000147	0.000110	0.000114	0.000041	0.000016	0.000035	0.000000	0.000018	0.000141	0.000011	0.000011
0.01256	IND	c20	0.000043	0.012601	0.000043	0.000540	0.000549	0.000367	0.000348	0.000261	0.000271	0.000098	0.000039	0.000082	0.000000	0.000043	0.000333	0.000025	0.000025
0.03385	IND	c21	0.000188	0.000188	0.034039	0.002377	0.002415	0.001618	0.001529	0.001147	0.001193	0.000432	0.000172	0.000360	0.000000	0.000188	0.001466	0.000112	0.000112
0.43357	IND	c22	0.001176	0.001176	0.001176	0.437657	0.006517	0.004040	0.003825	0.006738	0.002346	0.005130	0.000352	0.007949	0.000000	0.004311	0.011354	0.000598	0.000598
0.17051	IND	c23	0.003194	0.003194	0.003194	0.015466	0.185349	0.012486	0.012215	0.017157	0.008058	0.004285	0.001265	0.002736	0.000000	0.003226	0.009666	0.001108	0.001108
1.75151	IND	c24	0.000243	0.000243	0.000243	0.003463	0.003539	1.753270	0.001972	0.001398	0.001269	0.000529	0.000214	0.000413	0.000000	0.000238	0.001512	0.000141	0.000141
0.82529	IND	c25	0.000275	0.000275	0.000275	0.001785	0.001643	0.000976	0.826284	0.001624	0.000922	0.000662	0.000103	0.000832	0.000000	0.000151	0.002501	0.000147	0.000147
0.28842	IND	c26	0.005610	0.005610	0.005610	0.001918	0.001805	0.001343	0.001142	0.293172	0.000895	0.000328	0.000129	0.000273	0.000000	0.000142	0.001114	0.000084	0.000084
0.08115	IND	c27	0.000596	0.000596	0.000596	0.000674	0.001994	0.001540	0.001693	0.005219	0.084777	0.002661	0.000145	0.001265	0.000000	0.000389	0.001076	0.000360	0.000360
0.00706	IND	c28	0.000303	0.000303	0.000303	0.000281	0.000342	0.000283	0.000257	0.000563	0.000138	0.007829	0.000036	0.000380	0.000000	0.000194	0.000118	0.000039	0.000039
0.00410	IND	c29	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004118	0.000006	0.000000	0.000000	0.000000	0.000000	0.000000
0.04683	IND	c30	0.000357	0.000357	0.000357	0.000416	0.001303	0.000605	0.000817	0.002195	0.000573	0.000410	0.000031	0.052698	0.000000	0.000085	0.000337	0.001925	0.001925
0.00990	IND	c31	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009899	0.000000	0.000000	0.000000	0.000000
0.02523	IND	c32	0.000001	0.000001	0.000001	0.000002	0.000012	0.000003	0.000004	0.000009	0.000002	0.000002	0.000000	0.000199	0.000000	0.025235	0.000004	0.000007	0.000007
0.02487	IND	c33	0.000002	0.000002	0.000002	0.000005	0.000043	0.000005	0.000005	0.000011	0.000024	0.000003	0.000000	0.000144	0.000000	0.000001	0.024870	0.000006	0.000006
0.11831	IND	c34	0.000164	0.000164	0.000164	0.000347	0.002223	0.000517	0.000366	0.000688	0.000247	0.000164	0.000086	0.001393	0.000000	0.000105	0.000484	0.120877	0.002562
0.00000	IND	c35	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
		coefficients	**0.134659**	**0.106033**	**0.127326**	**1.001737**	**0.948803**	**2.354203**	**1.218065**	**1.435202**	**0.722070**	**0.214056**	**0.089942**	**0.283572**	**0.009899**	**0.102034**	**0.349521**	**0.181490**	**0.063175**

Table 3A.7. CO2 Induced Coefficients (Part-I)

C02			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.18448	IND	c1	0.20471	0.00274	0.08056	0.02198	0.04304	0.03855	0.01127	0.00201	0.00647	0.01673	0.00291	0.00178	0.00209	0.00259	0.00275	0.00203	0.00177	0.00607
2.63253	IND	c2	0.01223	2.65623	0.02860	0.03726	0.02608	0.03516	0.05971	0.37298	0.06175	0.04837	0.13973	0.25471	0.07664	0.06422	0.06300	0.01641	0.23604	0.06960
0.53314	IND	c3	0.00396	0.00380	0.59426	0.00506	0.00506	0.00499	0.00740	0.00276	0.01719	0.01510	0.00325	0.00260	0.00241	0.00346	0.00349	0.00182	0.00245	0.00270
0.11755	IND	c4	0.00058	0.00051	0.00139	0.14965	0.00296	0.00084	0.00164	0.00046	0.00185	0.00339	0.00113	0.00049	0.00079	0.00102	0.00081	0.00079	0.00039	0.00070
0.03617	IND	c5	0.00001	0.00002	0.00005	0.00019	0.04594	0.00007	0.00006	0.00002	0.00009	0.00034	0.00007	0.00003	0.00005	0.00010	0.00021	0.00007	0.00002	0.00003
1.07096	IND	c6	0.00076	0.00380	0.00936	0.00686	0.00411	1.09584	0.02808	0.00229	0.01156	0.00963	0.01195	0.00350	0.00850	0.00529	0.00491	0.00572	0.00189	0.01472
0.43444	IND	c7	0.00082	0.00138	0.00938	0.00563	0.00347	0.01257	0.56404	0.00270	0.00674	0.00746	0.00714	0.00321	0.00408	0.00458	0.00341	0.00312	0.00422	0.00324
0.42960	IND	c8	0.01043	0.01217	0.02334	0.02476	0.02049	0.01736	0.02878	0.46470	0.04149	0.03273	0.04707	0.03003	0.01914	0.01915	0.01792	0.00861	0.05504	0.03140
0.54171	IND	c9	0.01288	0.01313	0.01980	0.03581	0.02519	0.01932	0.04313	0.01347	0.67701	0.14359	0.01710	0.01250	0.01132	0.01869	0.01604	0.01223	0.00663	0.01102
0.10853	IND	c10	0.00028	0.00050	0.00207	0.00219	0.00193	0.00192	0.00290	0.00082	0.00292	0.12359	0.00305	0.00120	0.00178	0.00252	0.00276	0.00216	0.00057	0.00092
2.46207	IND	c11	0.00418	0.01912	0.00976	0.01243	0.01057	0.00626	0.01537	0.01035	0.01481	0.01459	2.66780	0.01929	0.02811	0.02722	0.01615	0.01066	0.01548	0.23572
0.76302	IND	c12	0.00528	0.03070	0.01569	0.02406	0.01646	0.01687	0.02473	0.01454	0.02173	0.03747	0.03940	1.07743	0.26036	0.20159	0.18524	0.03402	0.02817	0.15137
0.10803	IND	c13	0.00035	0.00251	0.00125	0.00247	0.00122	0.00067	0.00100	0.00089	0.00135	0.00167	0.00112	0.00219	0.11620	0.00466	0.00620	0.00172	0.00222	0.00144
0.06598	IND	c14	0.00008	0.00022	0.00025	0.00033	0.00026	0.00021	0.00037	0.00023	0.00035	0.00045	0.00038	0.00065	0.00142	0.07042	0.00127	0.00082	0.00145	0.00091
0.15278	IND	c15	0.00065	0.00143	0.00184	0.00181	0.00192	0.00167	0.00190	0.00158	0.00179	0.00403	0.00183	0.00284	0.00347	0.00309	0.17229	0.00150	0.00165	0.00202
0.01272	IND	c16	0.00002	0.00005	0.00006	0.00008	0.00028	0.00007	0.00013	0.00005	0.00012	0.00016	0.00006	0.00009	0.00015	0.00014	0.00024	0.01279	0.00005	0.00008
12.49258	IND	c17	0.21181	0.39102	0.36874	0.76297	0.39910	0.50409	0.86094	0.50879	0.68036	0.81333	1.43588	1.23525	0.59683	0.57028	0.75726	0.16817	15.72190	0.61937
0.04019	IND	c18	0.00057	0.00161	0.00122	0.00153	0.00072	0.00057	0.00139	0.00118	0.00105	0.00085	0.00354	0.00120	0.00165	0.00150	0.00108	0.00059	0.00213	0.04289
0.04118	IND	c19	0.00009	0.00008	0.00034	0.00026	0.00029	0.00024	0.00030	0.00040	0.00033	0.00038	0.00026	0.00027	0.00023	0.00028	0.00021	0.00011	0.00019	0.00024
0.01256	IND	c20	0.00021	0.00019	0.00080	0.00061	0.00070	0.00056	0.00072	0.00094	0.00078	0.00090	0.00061	0.00063	0.00054	0.00066	0.00050	0.00025	0.00046	0.00057
0.03385	IND	c21	0.00094	0.00084	0.00351	0.00269	0.00308	0.00248	0.00317	0.00415	0.00343	0.00395	0.00267	0.00279	0.00238	0.00290	0.00221	0.00112	0.00201	0.00250
0.43357	IND	c22	0.00062	0.00125	0.00181	0.00170	0.00180	0.00179	0.00191	0.00162	0.00163	0.00188	0.00144	0.00140	0.00153	0.00164	0.00171	0.00100	0.00173	0.00143
0.17051	IND	c23	0.00678	0.00673	0.02328	0.02180	0.02150	0.01821	0.02475	0.02349	0.02222	0.02553	0.01998	0.01968	0.01555	0.01840	0.01486	0.00943	0.01500	0.01846
1.75151	IND	c24	0.00127	0.00104	0.00503	0.00278	0.00311	0.00458	0.00383	0.00425	0.00386	0.00404	0.00403	0.00384	0.00263	0.00303	0.00241	0.00161	0.00355	0.00312
0.82529	IND	c25	0.00068	0.00056	0.00219	0.00194	0.00514	0.00147	0.00370	0.00226	0.00246	0.00235	0.00153	0.00155	0.00159	0.00189	0.00167	0.00121	0.00127	0.00147
0.28842	IND	c26	0.00071	0.00063	0.00260	0.00203	0.00229	0.00185	0.00241	0.00312	0.00257	0.00297	0.00200	0.00207	0.00179	0.00218	0.00165	0.00085	0.00150	0.00187
0.08115	IND	c27	0.00021	0.00043	0.00083	0.00111	0.00085	0.00098	0.00101	0.00094	0.00095	0.00109	0.00115	0.00132	0.00136	0.00458	0.00162	0.00187	0.00134	0.00086
0.00706	IND	c28	0.00011	0.00023	0.00045	0.00052	0.00047	0.00051	0.00051	0.00045	0.00046	0.00049	0.00042	0.00047	0.00069	0.00047	0.00083	0.00062	0.00072	0.00049
0.00410	IND	c29	0.00001	0.00002	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00001	0.00001	0.00000	0.00001	0.00001
0.04683	IND	c30	0.00016	0.00034	0.00099	0.00130	0.00126	0.00061	0.00093	0.00040	0.00083	0.00094	0.00051	0.00059	0.00174	0.00131	0.00116	0.00071	0.00037	0.00036
0.00990	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02523	IND	c32	0.00002	0.00005	0.00003	0.00002	0.00004	0.00005	0.00004	0.00002	0.00002	0.00003	0.00002	0.00001	0.00002	0.00003	0.00003	0.00001	0.00002	0.00002
0.02487	IND	c33	0.00001	0.00003	0.00003	0.00002	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002
0.11831	IND	c34	0.00026	0.00129	0.00096	0.00307	0.00181	0.00168	0.00131	0.00067	0.00094	0.00172	0.00111	0.00074	0.00277	0.00205	0.00493	0.00043	0.00070	0.00051
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.48167**	**3.15466**	**1.21049**	**1.13491**	**0.65115**	**1.79209**	**1.69747**	**1.44260**	**1.58913**	**1.31978**	**4.41916**	**2.68436**	**1.16784**	**1.03997**	**1.28888**	**0.30247**	**16.11094**	**1.22611**

Table 3A.7. CO2 Induced Coefficients (Part-II)

C02			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.18448	IND	c1	0.00044	0.001580	0.000911	0.055749	0.005659	0.004837	0.004686	0.003142	0.002490	0.001411	0.001053	0.002187	0.001663	0.002169	0.004097	0.003467	0.000346	0.037847
2.63253	IND	c2	0.00535	0.006075	0.005650	0.021175	0.087700	0.031635	0.039927	0.033865	0.021056	0.009641	0.005224	0.007532	0.001058	0.005264	0.015927	0.004240	0.002254	0.024075
0.53314	IND	c3	0.00037	0.001733	0.000929	0.056683	0.003040	0.008450	0.005912	0.003056	0.002693	0.001439	0.000944	0.002243	0.001998	0.001768	0.008319	0.004110	0.000359	0.045488
0.11755	IND	c4	0.00018	0.000358	0.000252	0.000654	0.000718	0.001026	0.000902	0.000552	0.000442	0.000222	0.000146	0.000405	0.000264	0.000380	0.000861	0.000588	0.000092	0.006012
0.03617	IND	c5	0.00000	0.000009	0.000006	0.000021	0.000089	0.000060	0.000148	0.000043	0.000018	0.000009	0.000004	0.000008	0.000007	0.000007	0.000020	0.000015	0.000002	0.000157
1.07096	IND	c6	0.00059	0.000659	0.000617	0.001972	0.002523	0.002361	0.002965	0.004529	0.001442	0.000955	0.001050	0.000818	0.000102	0.000496	0.002066	0.000439	0.000247	0.002332
0.43444	IND	c7	0.00452	0.004642	0.004571	0.003062	0.005005	0.002524	0.002885	0.030732	0.005295	0.008206	0.000324	0.002136	0.000175	0.001178	0.004315	0.000959	0.000630	0.003995
0.42960	IND	c8	0.00483	0.005446	0.005084	0.017095	0.095946	0.025459	0.041816	0.021815	0.012608	0.007370	0.002511	0.003726	0.000900	0.004298	0.012392	0.002932	0.001242	0.020493
0.54171	IND	c9	0.00099	0.001417	0.001164	0.007776	0.011227	0.048215	0.026688	0.009319	0.003139	0.001842	0.001009	0.002054	0.000627	0.001521	0.065695	0.002491	0.001314	0.014276
0.10853	IND	c10	0.00018	0.000212	0.000194	0.000604	0.003712	0.002045	0.006836	0.001898	0.000461	0.000288	0.000081	0.000161	0.000045	0.000133	0.000744	0.000139	0.000053	0.001034
2.46207	IND	c11	0.00224	0.002499	0.002348	0.011825	0.016301	0.014599	0.012655	0.014136	0.013399	0.006366	0.016291	0.009557	0.000377	0.005480	0.010226	0.003645	0.002938	0.008580
0.76302	IND	c12	0.00305	0.003516	0.003242	0.011559	0.029061	0.023487	0.015869	0.017177	0.019466	0.007767	0.010715	0.009876	0.000682	0.005195	0.010885	0.004116	0.002835	0.015529
0.10803	IND	c13	0.00011	0.000143	0.000124	0.000684	0.001482	0.000945	0.000742	0.000662	0.000598	0.000241	0.000119	0.000234	0.000048	0.000148	0.000508	0.000175	0.000083	0.001104
0.06598	IND	c14	0.00005	0.000057	0.000052	0.000209	0.000528	0.000482	0.000255	0.000414	0.001727	0.000291	0.000070	0.000313	0.000014	0.000054	0.000237	0.000093	0.000066	0.000321
0.15278	IND	c15	0.00029	0.000352	0.000313	0.001122	0.007813	0.009215	0.002092	0.002337	0.001340	0.001251	0.000182	0.001301	0.000097	0.000381	0.000886	0.000420	0.000238	0.002207
0.01272	IND	c16	0.00001	0.000009	0.000009	0.000034	0.000094	0.000090	0.000053	0.000056	0.000036	0.000022	0.000006	0.000017	0.000002	0.000008	0.000053	0.000009	0.000004	0.000051
12.49258	IND	c17	0.05870	0.067364	0.062264	0.361603	0.476461	0.433939	0.232611	0.969655	0.553034	0.147939	0.048860	0.181283	0.012676	0.049574	0.165237	0.068208	0.044410	0.288552
0.04019	IND	c18	0.00035	0.000388	0.000368	0.001581	0.001809	0.001530	0.001809	0.002195	0.002206	0.001019	0.002953	0.001582	0.000049	0.000942	0.001247	0.000558	0.000466	0.001116
0.04118	IND	c19	0.04120	0.000025	0.000021	0.000235	0.000235	0.000170	0.000161	0.000115	0.000123	0.000044	0.000020	0.000039	0.000009	0.000023	0.000145	0.000029	0.000011	0.000210
0.01256	IND	c20	0.00004	0.012617	0.000050	0.000558	0.000557	0.000403	0.000381	0.000272	0.000292	0.000103	0.000048	0.000093	0.000022	0.000055	0.000343	0.000068	0.000027	0.000498
0.03385	IND	c21	0.00019	0.000258	0.034070	0.002454	0.002454	0.001775	0.001675	0.001196	0.001286	0.000454	0.000210	0.000409	0.000096	0.000240	0.001509	0.000300	0.000119	0.002191
0.43357	IND	c22	0.00120	0.001595	0.001364	0.438121	0.006746	0.004976	0.004691	0.007033	0.002904	0.005262	0.000581	0.008242	0.000574	0.004623	0.011607	0.001717	0.000640	0.013056
0.17051	IND	c23	0.00323	0.003759	0.003448	0.016093	0.185660	0.013751	0.013386	0.017555	0.008811	0.004463	0.001575	0.003133	0.000775	0.003647	0.010008	0.002620	0.001164	0.017643
1.75151	IND	c24	0.00025	0.000348	0.000290	0.003579	0.003597	1.753504	0.002189	0.001472	0.001408	0.000563	0.000271	0.000487	0.000144	0.000316	0.001575	0.000421	0.000151	0.003271
0.82529	IND	c25	0.00028	0.000327	0.000298	0.001843	0.001671	0.001092	0.826392	0.001660	0.000992	0.000678	0.000131	0.000869	0.000071	0.000190	0.002533	0.000286	0.000152	0.001623
0.28842	IND	c26	0.00561	0.005663	0.005634	0.001976	0.001834	0.001460	0.001251	0.293209	0.000965	0.000344	0.000157	0.000309	0.000072	0.000181	0.001146	0.000224	0.000089	0.001635
0.08115	IND	c27	0.00060	0.000626	0.000610	0.000707	0.002010	0.001607	0.001755	0.005240	0.084817	0.002671	0.000162	0.001286	0.000041	0.000411	0.001094	0.000439	0.000363	0.000930
0.00706	IND	c28	0.00030	0.000313	0.000307	0.000291	0.000347	0.000305	0.000277	0.000570	0.000150	0.007832	0.000041	0.000387	0.000013	0.000201	0.000124	0.000064	0.000040	0.000297
0.00410	IND	c29	0.00000	0.000010	0.000004	0.000011	0.000005	0.000022	0.000020	0.000007	0.000013	0.000003	0.004124	0.000012	0.000013	0.000007	0.000006	0.000026	0.000001	0.000299
0.04683	IND	c30	0.00036	0.000408	0.000380	0.000472	0.001331	0.000718	0.000922	0.002231	0.000641	0.000426	0.000058	0.052734	0.000069	0.000123	0.000367	0.002060	0.001930	0.001579
0.00990	IND	c31	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009899	0.000000	0.000000	0.000000	0.000000	0.000000
0.02523	IND	c32	0.00000	0.000028	0.000014	0.000032	0.000027	0.000063	0.000059	0.000028	0.000038	0.000010	0.000015	0.000218	0.000037	0.025255	0.000020	0.000079	0.000010	0.000840
0.02487	IND	c33	0.00000	0.000020	0.000010	0.000024	0.000052	0.000044	0.000042	0.000023	0.000047	0.000008	0.000010	0.000156	0.000024	0.000014	0.024880	0.000053	0.000007	0.000556
0.11831	IND	c34	0.00017	0.000213	0.000186	0.000401	0.002249	0.000625	0.000466	0.000722	0.000312	0.000180	0.000113	0.001427	0.000066	0.000141	0.000514	0.121006	0.002567	0.001509
0.00000	IND	c35	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Employees compensation			0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Table 3A.8. CH4 Direct and Indirect Coefficients (Part-I)

CH4			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
63.40978	IND	c1	70.11831	0.25031	27.23463	7.27961	14.33398	12.56512	3.38967	0.40820	1.91426	5.36293	0.72268	0.42677	0.52258	0.56818	0.54666	0.58131	0.37481	1.75855
58.98309	IND	c2	0.26392	59.48558	0.62181	0.82333	0.56532	0.75930	1.31780	8.34505	1.37072	1.06761	3.11927	5.69915	1.70895	1.42544	1.39497	0.36295	5.27899	1.54574
0.31083	IND	c3	0.00181	0.00081	0.34553	0.00239	0.00202	0.00152	0.00333	0.00103	0.00939	0.00801	0.00133	0.00114	0.00101	0.00136	0.00123	0.00082	0.00096	0.00091
0.05211	IND	c4	0.00021	0.00008	0.00052	0.06628	0.00122	0.00023	0.00063	0.00015	0.00076	0.00142	0.00044	0.00018	0.00031	0.00039	0.00028	0.00033	0.00012	0.00024
0.05045	IND	c5	0.00001	0.00002	0.00007	0.00025	0.06407	0.00009	0.00008	0.00003	0.00013	0.00046	0.00009	0.00004	0.00006	0.00014	0.00028	0.00010	0.00002	0.00003
0.39997	IND	c6	0.00027	0.00137	0.00346	0.00254	0.00150	0.40922	0.01045	0.00083	0.00430	0.00357	0.00444	0.00130	0.00316	0.00195	0.00181	0.00213	0.00069	0.00548
0.18719	IND	c7	0.00032	0.00051	0.00398	0.00239	0.00143	0.00532	0.24296	0.00113	0.00286	0.00316	0.00304	0.00136	0.00173	0.00193	0.00142	0.00133	0.00179	0.00135
0.20235	IND	c8	0.00473	0.00522	0.01065	0.01146	0.00931	0.00767	0.01319	0.21867	0.01931	0.01513	0.02196	0.01401	0.00887	0.00878	0.00815	0.00397	0.02575	0.01454
0.30850	IND	c9	0.00718	0.00704	0.01099	0.02022	0.01406	0.01057	0.02426	0.00750	0.38537	0.08153	0.00956	0.00700	0.00633	0.01044	0.00889	0.00689	0.00363	0.00607
0.03183	IND	c10	0.00008	0.00013	0.00060	0.00064	0.00055	0.00055	0.00084	0.00023	0.00085	0.03624	0.00089	0.00035	0.00052	0.00073	0.00080	0.00063	0.00016	0.00026
0.27723	IND	c11	0.00045	0.00210	0.00106	0.00138	0.00116	0.00065	0.00169	0.00114	0.00164	0.00161	0.30038	0.00216	0.00315	0.00304	0.00179	0.00119	0.00173	0.02652
0.20587	IND	c12	0.00135	0.00806	0.00409	0.00640	0.00429	0.00433	0.00652	0.00383	0.00576	0.00999	0.01054	0.29065	0.07019	0.05429	0.04985	0.00914	0.00753	0.04074
0.01224	IND	c13	0.00004	0.00028	0.00014	0.00028	0.00013	0.00007	0.00011	0.00010	0.00015	0.00019	0.00012	0.00025	0.01316	0.00052	0.00070	0.00019	0.00025	0.00016
0.00815	IND	c14	0.00001	0.00003	0.00003	0.00004	0.00003	0.00002	0.00004	0.00003	0.00004	0.00005	0.00005	0.00008	0.00018	0.00870	0.00016	0.00010	0.00018	0.00011
0.02410	IND	c15	0.00010	0.00021	0.00028	0.00028	0.00029	0.00025	0.00029	0.00024	0.00027	0.00063	0.00028	0.00044	0.00054	0.00048	0.02716	0.00023	0.00025	0.00031
0.01153	IND	c16	0.00002	0.00004	0.00006	0.00007	0.00026	0.00006	0.00012	0.00004	0.00011	0.00014	0.00006	0.00008	0.00013	0.00012	0.00022	0.01160	0.00005	0.00007
1.36449	IND	c17	0.02254	0.04103	0.03917	0.08267	0.04248	0.05340	0.09286	0.05488	0.07356	0.08789	0.15616	0.13447	0.06471	0.06151	0.08175	0.01809	1.71665	0.06685
0.01460	IND	c18	0.00020	0.00056	0.00043	0.00055	0.00025	0.00019	0.00049	0.00042	0.00037	0.00030	0.00128	0.00043	0.00059	0.00054	0.00038	0.00021	0.00077	0.01557
0.07768	IND	c19	0.00016	0.00013	0.00062	0.00048	0.00054	0.00043	0.00056	0.00074	0.00061	0.00070	0.00047	0.00050	0.00043	0.00051	0.00039	0.00020	0.00036	0.00044
0.00448	IND	c20	0.00007	0.00006	0.00028	0.00021	0.00024	0.00019	0.00025	0.00033	0.00027	0.00031	0.00021	0.00022	0.00019	0.00023	0.00017	0.00009	0.00016	0.00020
0.00649	IND	c21	0.00017	0.00014	0.00066	0.00051	0.00058	0.00045	0.00059	0.00079	0.00065	0.00075	0.00050	0.00053	0.00045	0.00055	0.00041	0.00021	0.00038	0.00047
0.10317	IND	c22	0.00009	0.00013	0.00032	0.00034	0.00032	0.00026	0.00034	0.00032	0.00031	0.00035	0.00028	0.00029	0.00032	0.00031	0.00031	0.00021	0.00036	0.00026
0.06982	IND	c23	0.00264	0.00237	0.00928	0.00877	0.00855	0.00708	0.00986	0.00946	0.00893	0.01024	0.00803	0.00796	0.00626	0.00735	0.00586	0.00380	0.00601	0.00738
0.27637	IND	c24	0.00019	0.00014	0.00078	0.00043	0.00047	0.00070	0.00059	0.00066	0.00060	0.00062	0.00063	0.00060	0.00041	0.00047	0.00037	0.00025	0.00055	0.00048
0.00388	IND	c25	0.00000	0.00000	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.36068	IND	c26	0.00085	0.00068	0.00318	0.00249	0.00279	0.00221	0.00293	0.00386	0.00317	0.00365	0.00246	0.00257	0.00220	0.00267	0.00200	0.00104	0.00184	0.00229
0.02465	IND	c27	0.00006	0.00012	0.00024	0.00033	0.00025	0.00028	0.00030	0.00028	0.00028	0.00032	0.00034	0.00040	0.00041	0.00138	0.00048	0.00056	0.00040	0.00025
0.00620	IND	c28	0.00009	0.00019	0.00039	0.00045	0.00040	0.00043	0.00044	0.00039	0.00040	0.00042	0.00036	0.00041	0.00060	0.00040	0.00072	0.00054	0.00063	0.00043
0.00108	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01195	IND	c30	0.00003	0.00006	0.00024	0.00032	0.00031	0.00013	0.00022	0.00009	0.00020	0.00023	0.00012	0.00015	0.00044	0.00032	0.00028	0.00018	0.00009	0.00008
0.01284	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00933	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01121	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
152.56871	IND	c34	0.29648	1.55580	1.17018	3.91208	2.26982	2.06148	1.61732	0.82785	1.16881	2.15349	1.39169	0.92509	3.54391	2.59079	6.29506	0.53555	0.86851	0.60808
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**70.722376**	**61.363191**	**29.46367**	**12.2272033**	**17.326635**	**15.892216**	**6.7387585**	**9.8882863**	**4.9740998**	**8.8519792**	**5.7576722**	**7.5185574**	**5.9617848**	**4.7535559**	**8.4325537**	**1.543859278**	**8.2936025**	**4.103865**

Table 3A.8. CH4 Direct and Indirect Coefficients (Part-II)

CH4			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
63.40978	IND	c1	0.12630	0.12630	0.12630	18.69955	1.71613	0.73048	0.74771	0.78655	0.30016	0.35326	0.13355	0.45970	0.00000	0.43525	1.15617	0.07682	0.07682
58.98309	IND	c2	0.11884	0.11884	0.11884	0.45525	1.95547	0.67015	0.85879	0.74660	0.44874	0.21053	0.10757	0.15665	0.00000	0.10508	0.34640	0.04877	0.04877
0.31083	IND	c3	0.00016	0.00016	0.00016	0.03210	0.00131	0.00303	0.00169	0.00118	0.00044	0.00057	0.00008	0.00071	0.00000	0.00040	0.00434	0.00012	0.00012
0.05211	IND	c4	0.00007	0.00007	0.00007	0.00020	0.00027	0.00026	0.00022	0.00018	0.00008	0.00007	0.00002	0.00012	0.00000	0.00011	0.00033	0.00003	0.00003
0.05045	IND	c5	0.00001	0.00001	0.00001	0.00002	0.00012	0.00007	0.00019	0.00006	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00002	0.00000	0.00000
0.39997	IND	c6	0.00022	0.00022	0.00022	0.00071	0.00093	0.00082	0.00105	0.00167	0.00050	0.00035	0.00038	0.00029	0.00000	0.00016	0.00075	0.00009	0.00009
0.18719	IND	c7	0.00194	0.00194	0.00194	0.00126	0.00213	0.00096	0.00113	0.01320	0.00221	0.00352	0.00011	0.00088	0.00000	0.00047	0.00183	0.00027	0.00027
0.20235	IND	c8	0.00226	0.00226	0.00226	0.00771	0.04502	0.01130	0.01906	0.01006	0.00553	0.00337	0.00101	0.00154	0.00000	0.00179	0.00565	0.00055	0.00055
0.30850	IND	c9	0.00055	0.00055	0.00055	0.00414	0.00625	0.02688	0.01466	0.00512	0.00144	0.00097	0.00043	0.00099	0.00000	0.00067	0.03726	0.00072	0.00072
0.03183	IND	c10	0.00005	0.00005	0.00005	0.00017	0.00108	0.00058	0.00198	0.00055	0.00012	0.00008	0.00002	0.00004	0.00000	0.00003	0.00021	0.00001	0.00001
0.27723	IND	c11	0.00025	0.00025	0.00025	0.00130	0.00182	0.00157	0.00136	0.00157	0.00147	0.00071	0.00182	0.00105	0.00000	0.00059	0.00113	0.00033	0.00033
0.20587	IND	c12	0.00081	0.00081	0.00081	0.00297	0.00777	0.00604	0.00400	0.00454	0.00507	0.00205	0.00282	0.00257	0.00000	0.00130	0.00286	0.00075	0.00075
0.01224	IND	c13	0.00001	0.00001	0.00001	0.00007	0.00017	0.00010	0.00008	0.00007	0.00006	0.00003	0.00001	0.00002	0.00000	0.00001	0.00006	0.00001	0.00001
0.00815	IND	c14	0.00001	0.00001	0.00001	0.00002	0.00006	0.00006	0.00003	0.00005	0.00021	0.00004	0.00001	0.00004	0.00000	0.00001	0.00003	0.00001	0.00001
0.02410	IND	c15	0.00004	0.00004	0.00004	0.00016	0.00123	0.00143	0.00031	0.00036	0.00020	0.00019	0.00002	0.00020	0.00000	0.00005	0.00013	0.00004	0.00004
0.01153	IND	c16	0.00001	0.00001	0.00001	0.00003	0.00008	0.00008	0.00004	0.00005	0.00003	0.00002	0.00000	0.00001	0.00000	0.00001	0.00005	0.00000	0.00000
1.36449	IND	c17	0.00635	0.00635	0.00635	0.03837	0.05149	0.04514	0.02332	0.10520	0.05906	0.01584	0.00478	0.01909	0.00000	0.00466	0.01744	0.00475	0.00475
0.01460	IND	c18	0.00013	0.00013	0.00013	0.00056	0.00065	0.00053	0.00063	0.00079	0.00078	0.00037	0.00107	0.00057	0.00000	0.00033	0.00045	0.00017	0.00017
0.07768	IND	c19	0.07772	0.00003	0.00003	0.00043	0.00044	0.00029	0.00028	0.00021	0.00022	0.00008	0.00003	0.00007	0.00000	0.00003	0.00027	0.00002	0.00002
0.00448	IND	c20	0.00002	0.00449	0.00002	0.00019	0.00020	0.00013	0.00012	0.00009	0.00010	0.00003	0.00001	0.00003	0.00000	0.00002	0.00012	0.00001	0.00001
0.00649	IND	c21	0.00004	0.00004	0.00653	0.00046	0.00046	0.00031	0.00029	0.00022	0.00023	0.00008	0.00003	0.00007	0.00000	0.00004	0.00028	0.00002	0.00002
0.10317	IND	c22	0.00028	0.00028	0.00028	0.10414	0.00155	0.00096	0.00091	0.00160	0.00056	0.00122	0.00008	0.00189	0.00000	0.00103	0.00270	0.00014	0.00014
0.06982	IND	c23	0.00131	0.00131	0.00131	0.00633	0.07590	0.00511	0.00500	0.00703	0.00330	0.00175	0.00052	0.00112	0.00000	0.00132	0.00396	0.00045	0.00045
0.27637	IND	c24	0.00004	0.00004	0.00004	0.00055	0.00056	0.27665	0.00031	0.00022	0.00020	0.00008	0.00003	0.00007	0.00000	0.00004	0.00024	0.00002	0.00002
0.00388	IND	c25	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00389	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.36068	IND	c26	0.00702	0.00702	0.00702	0.00240	0.00226	0.00168	0.00143	0.36663	0.00112	0.00041	0.00016	0.00034	0.00000	0.00018	0.00139	0.00011	0.00011
0.02465	IND	c27	0.00018	0.00018	0.00018	0.00020	0.00061	0.00047	0.00051	0.00159	0.02575	0.00081	0.00004	0.00038	0.00000	0.00012	0.00033	0.00011	0.00011
0.00620	IND	c28	0.00027	0.00027	0.00027	0.00025	0.00030	0.00025	0.00023	0.00049	0.00012	0.00687	0.00003	0.00033	0.00000	0.00017	0.00010	0.00003	0.00003
0.00108	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00109	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01195	IND	c30	0.00009	0.00009	0.00009	0.00011	0.00033	0.00015	0.00021	0.00056	0.00015	0.00010	0.00001	0.01345	0.00000	0.00002	0.00009	0.00049	0.00049
0.01284	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.01284	0.00000	0.00000	0.00000	0.00000
0.00933	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00007	0.00000	0.00933	0.00000	0.00000	0.00000
0.01121	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00006	0.00000	0.00000	0.01121	0.00000	0.00000
152.56871	IND	c34	0.21174	0.21174	0.21174	0.44762	2.86617	0.66607	0.47213	0.88675	0.31898	0.21185	0.11123	1.79678	0.00000	0.13502	0.62457	155.87234	3.30363
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.55670**	**0.48349**	**0.48551**	**19.80728**	**6.74076**	**2.45156**	**2.16157**	**2.94322**	**1.17685**	**0.81528**	**0.36697**	**2.45916**	**0.01284**	**0.69825**	**2.22036**	**156.00720**	**3.43849**

Table 3A.9. CH4 Induced Coefficients (Part-I)

CH4			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
63.40978	IND	c1	70.36247	0.94307	27.69056	7.55495	14.79387	13.25006	3.87369	0.69259	2.22249	5.75170	1.00109	0.61129	0.71953	0.89139	0.94397	0.69736	0.60710	2.08720
58.98309	IND	c2	0.27405	59.51430	0.64071	0.83475	0.58439	0.78770	1.33787	8.35684	1.38350	1.08373	3.13082	5.70680	1.71712	1.43884	1.41144	0.36776	5.28862	1.55936
0.31083	IND	c3	0.00231	0.00222	0.34646	0.00295	0.00295	0.00291	0.00431	0.00161	0.01002	0.00880	0.00190	0.00152	0.00141	0.00202	0.00204	0.00106	0.00143	0.00158
0.05211	IND	c4	0.00026	0.00023	0.00062	0.06634	0.00131	0.00037	0.00073	0.00021	0.00082	0.00150	0.00050	0.00022	0.00035	0.00045	0.00036	0.00035	0.00017	0.00031
0.05045	IND	c5	0.00001	0.00003	0.00007	0.00026	0.06407	0.00010	0.00008	0.00003	0.00013	0.00047	0.00010	0.00004	0.00007	0.00014	0.00029	0.00010	0.00002	0.00004
0.39997	IND	c6	0.00028	0.00142	0.00349	0.00256	0.00154	0.40926	0.01049	0.00085	0.00432	0.00360	0.00446	0.00131	0.00318	0.00198	0.00183	0.00214	0.00071	0.00550
0.18719	IND	c7	0.00036	0.00060	0.00404	0.00242	0.00149	0.00541	0.24303	0.00116	0.00290	0.00321	0.00308	0.00138	0.00176	0.00198	0.00147	0.00134	0.00182	0.00140
0.20235	IND	c8	0.00491	0.00573	0.01099	0.01166	0.00965	0.00818	0.01355	0.21888	0.01954	0.01541	0.02217	0.01414	0.00902	0.00902	0.00844	0.00406	0.02592	0.01479
0.30850	IND	c9	0.00733	0.00748	0.01128	0.02040	0.01434	0.01100	0.02456	0.00767	0.38556	0.08178	0.00974	0.00712	0.00645	0.01064	0.00914	0.00697	0.00377	0.00628
0.03183	IND	c10	0.00008	0.00015	0.00061	0.00064	0.00057	0.00056	0.00085	0.00024	0.00086	0.03625	0.00089	0.00035	0.00052	0.00074	0.00081	0.00063	0.00017	0.00027
0.27723	IND	c11	0.00047	0.00215	0.00110	0.00140	0.00119	0.00070	0.00173	0.00117	0.00167	0.00164	0.30040	0.00217	0.00317	0.00306	0.00182	0.00120	0.00174	0.02654
0.20587	IND	c12	0.00142	0.00828	0.00423	0.00649	0.00444	0.00455	0.00667	0.00392	0.00586	0.01011	0.01063	0.29071	0.07025	0.05439	0.04998	0.00918	0.00760	0.04084
0.01224	IND	c13	0.00004	0.00028	0.00014	0.00028	0.00014	0.00008	0.00011	0.00010	0.00015	0.00019	0.00013	0.00025	0.01316	0.00053	0.00070	0.00019	0.00025	0.00016
0.00815	IND	c14	0.00001	0.00003	0.00003	0.00004	0.00003	0.00003	0.00005	0.00003	0.00004	0.00006	0.00005	0.00008	0.00018	0.00870	0.00016	0.00010	0.00018	0.00011
0.02410	IND	c15	0.00010	0.00023	0.00029	0.00029	0.00030	0.00026	0.00030	0.00025	0.00028	0.00064	0.00029	0.00045	0.00055	0.00049	0.02718	0.00024	0.00026	0.00032
0.01153	IND	c16	0.00002	0.00005	0.00006	0.00007	0.00026	0.00006	0.00012	0.00004	0.00011	0.00014	0.00006	0.00008	0.00014	0.00012	0.00022	0.01160	0.00005	0.00007
1.36449	IND	c17	0.02313	0.04271	0.04028	0.08333	0.04359	0.05506	0.09403	0.05557	0.07431	0.08883	0.15683	0.13492	0.06519	0.06229	0.08271	0.01837	1.71721	0.06765
0.01460	IND	c18	0.00021	0.00058	0.00044	0.00056	0.00026	0.00021	0.00051	0.00043	0.00038	0.00031	0.00129	0.00044	0.00060	0.00055	0.00039	0.00022	0.00077	0.01558
0.07768	IND	c19	0.00017	0.00015	0.00063	0.00049	0.00056	0.00045	0.00057	0.00075	0.00062	0.00071	0.00048	0.00050	0.00043	0.00052	0.00040	0.00020	0.00036	0.00045
0.00448	IND	c20	0.00008	0.00007	0.00028	0.00022	0.00025	0.00020	0.00026	0.00034	0.00028	0.00032	0.00022	0.00023	0.00019	0.00023	0.00018	0.00009	0.00016	0.00020
0.00649	IND	c21	0.00018	0.00016	0.00067	0.00052	0.00059	0.00047	0.00061	0.00080	0.00066	0.00076	0.00051	0.00053	0.00046	0.00056	0.00042	0.00021	0.00039	0.00048
0.10317	IND	c22	0.00015	0.00030	0.00043	0.00040	0.00043	0.00043	0.00046	0.00039	0.00039	0.00045	0.00034	0.00033	0.00037	0.00039	0.00041	0.00024	0.00041	0.00034
0.06982	IND	c23	0.00278	0.00276	0.00953	0.00893	0.00880	0.00746	0.01013	0.00962	0.00910	0.01045	0.00818	0.00806	0.00637	0.00753	0.00609	0.00386	0.00614	0.00756
0.27637	IND	c24	0.00020	0.00016	0.00079	0.00044	0.00049	0.00072	0.00060	0.00067	0.00061	0.00064	0.00064	0.00061	0.00042	0.00048	0.00038	0.00025	0.00056	0.00049
0.00388	IND	c25	0.00000	0.00000	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.36068	IND	c26	0.00088	0.00079	0.00325	0.00254	0.00286	0.00232	0.00301	0.00390	0.00322	0.00372	0.00250	0.00259	0.00223	0.00272	0.00207	0.00106	0.00188	0.00234
0.02465	IND	c27	0.00006	0.00013	0.00025	0.00034	0.00026	0.00030	0.00031	0.00029	0.00029	0.00033	0.00035	0.00040	0.00041	0.00139	0.00049	0.00057	0.00041	0.00026
0.00620	IND	c28	0.00009	0.00020	0.00039	0.00046	0.00041	0.00045	0.00045	0.00040	0.00040	0.00043	0.00036	0.00041	0.00060	0.00041	0.00073	0.00054	0.00063	0.00043
0.00108	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01195	IND	c30	0.00004	0.00009	0.00025	0.00033	0.00032	0.00016	0.00024	0.00010	0.00021	0.00024	0.00013	0.00015	0.00044	0.00033	0.00030	0.00018	0.00010	0.00009
0.01284	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00933	IND	c32	0.00001	0.00002	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
0.01121	IND	c33	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
152.56871	IND	c34	0.33300	1.65941	1.23837	3.95326	2.33860	2.16392	1.68971	0.87038	1.21491	2.21164	1.43333	0.95269	3.57337	2.63913	6.35448	0.55290	0.90325	0.65724
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**71.01512**	**62.19379**	**30.01031**	**12.55733**	**17.87803**	**16.71343**	**7.319081**	**10.22926**	**5.343664**	**9.318106**	**6.091473**	**7.739799**	**6.197925**	**5.141077**	**8.908913**	**1.682988**	**8.572103**	**4.497905**

Table 3A.9. CH4 Induced Coefficients (Part-II)

CH4			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
63.40978	IND	c1	70.36247	0.94307	27.69056	7.55495	14.79387	13.25006	3.87369	0.69259	2.22249	5.75170	1.00109	0.61129	0.71953	0.89139	0.94397	0.69736	0.60710	2.08720
58.98309	IND	c2	0.27405	59.51430	0.64071	0.83475	0.58439	0.78770	1.33787	8.35684	1.38350	1.08373	3.13082	5.70680	1.71712	1.43884	1.41144	0.36776	5.28862	1.55936
0.31083	IND	c3	0.00231	0.00222	0.34646	0.00295	0.00295	0.00291	0.00431	0.00161	0.01002	0.00880	0.00190	0.00152	0.00141	0.00202	0.00204	0.00106	0.00143	0.00158
0.05211	IND	c4	0.00026	0.00023	0.00062	0.06634	0.00131	0.00037	0.00073	0.00021	0.00082	0.00150	0.00050	0.00022	0.00035	0.00045	0.00036	0.00035	0.00017	0.00031
0.05045	IND	c5	0.00001	0.00003	0.00007	0.00026	0.06407	0.00010	0.00008	0.00003	0.00013	0.00047	0.00010	0.00004	0.00007	0.00014	0.00029	0.00010	0.00002	0.00004
0.39997	IND	c6	0.00028	0.00142	0.00349	0.00256	0.00154	0.40926	0.01049	0.00085	0.00432	0.00360	0.00446	0.00131	0.00318	0.00198	0.00183	0.00214	0.00071	0.00550
0.18719	IND	c7	0.00036	0.00060	0.00404	0.00242	0.00149	0.00541	0.24303	0.00116	0.00290	0.00321	0.00308	0.00138	0.00176	0.00198	0.00147	0.00134	0.00182	0.00140
0.20235	IND	c8	0.00491	0.00573	0.01099	0.01166	0.00965	0.00818	0.01355	0.21888	0.01954	0.01541	0.02217	0.01414	0.00902	0.00902	0.00844	0.00406	0.02592	0.01479
0.30850	IND	c9	0.00733	0.00748	0.01128	0.02040	0.01434	0.01100	0.02456	0.00767	0.38556	0.08178	0.00974	0.00712	0.00645	0.01064	0.00914	0.00697	0.00377	0.00628
0.03183	IND	c10	0.00008	0.00015	0.00061	0.00064	0.00057	0.00056	0.00085	0.00024	0.00086	0.03625	0.00089	0.00035	0.00052	0.00074	0.00081	0.00063	0.00017	0.00027
0.27723	IND	c11	0.00047	0.00215	0.00110	0.00140	0.00119	0.00070	0.00173	0.00117	0.00167	0.00164	0.30040	0.00217	0.00317	0.00306	0.00182	0.00120	0.00174	0.02654
0.20587	IND	c12	0.00142	0.00828	0.00423	0.00649	0.00444	0.00455	0.00667	0.00392	0.00586	0.01011	0.01063	0.29071	0.07025	0.05439	0.04998	0.00918	0.00760	0.04084
0.01224	IND	c13	0.00004	0.00028	0.00014	0.00028	0.00014	0.00008	0.00011	0.00010	0.00015	0.00019	0.00013	0.00025	0.01316	0.00053	0.00070	0.00019	0.00025	0.00016
0.00815	IND	c14	0.00001	0.00003	0.00003	0.00004	0.00003	0.00003	0.00005	0.00003	0.00004	0.00006	0.00005	0.00008	0.00018	0.00870	0.00016	0.00010	0.00018	0.00011
0.02410	IND	c15	0.00010	0.00023	0.00029	0.00029	0.00030	0.00026	0.00030	0.00025	0.00028	0.00064	0.00029	0.00045	0.00055	0.00049	0.02718	0.00024	0.00026	0.00032
0.01153	IND	c16	0.00002	0.00005	0.00006	0.00007	0.00026	0.00006	0.00012	0.00004	0.00011	0.00014	0.00006	0.00008	0.00014	0.00012	0.00022	0.01160	0.00005	0.00007
1.36449	IND	c17	0.02313	0.04271	0.04028	0.08333	0.04359	0.05506	0.09403	0.05557	0.07431	0.08883	0.15683	0.13492	0.06519	0.06229	0.08271	0.01837	1.71721	0.06765
0.01460	IND	c18	0.00021	0.00058	0.00044	0.00056	0.00026	0.00021	0.00051	0.00043	0.00038	0.00031	0.00129	0.00044	0.00060	0.00055	0.00039	0.00022	0.00077	0.01558
0.07768	IND	c19	0.00017	0.00015	0.00063	0.00049	0.00056	0.00045	0.00057	0.00075	0.00062	0.00071	0.00048	0.00050	0.00043	0.00052	0.00040	0.00020	0.00036	0.00045
0.00448	IND	c20	0.00008	0.00007	0.00028	0.00022	0.00025	0.00020	0.00026	0.00034	0.00028	0.00032	0.00022	0.00023	0.00019	0.00023	0.00018	0.00009	0.00016	0.00020
0.00649	IND	c21	0.00018	0.00016	0.00067	0.00052	0.00059	0.00047	0.00061	0.00080	0.00066	0.00076	0.00051	0.00053	0.00046	0.00056	0.00042	0.00021	0.00039	0.00048
0.10317	IND	c22	0.00015	0.00030	0.00043	0.00040	0.00043	0.00043	0.00046	0.00039	0.00039	0.00045	0.00034	0.00033	0.00037	0.00039	0.00041	0.00024	0.00041	0.00034
0.06982	IND	c23	0.00278	0.00276	0.00953	0.00893	0.00880	0.00746	0.01013	0.00962	0.00910	0.01045	0.00818	0.00806	0.00637	0.00753	0.00609	0.00386	0.00614	0.00756
0.27637	IND	c24	0.00020	0.00016	0.00079	0.00044	0.00049	0.00072	0.00060	0.00067	0.00061	0.00064	0.00064	0.00061	0.00042	0.00048	0.00038	0.00025	0.00056	0.00049
0.00388	IND	c25	0.00000	0.00000	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.36068	IND	c26	0.00088	0.00079	0.00325	0.00254	0.00286	0.00232	0.00301	0.00390	0.00322	0.00372	0.00250	0.00259	0.00223	0.00272	0.00207	0.00106	0.00188	0.00234
0.02465	IND	c27	0.00006	0.00013	0.00025	0.00034	0.00026	0.00030	0.00031	0.00029	0.00029	0.00033	0.00035	0.00040	0.00041	0.00139	0.00049	0.00057	0.00041	0.00026
0.00620	IND	c28	0.00009	0.00020	0.00039	0.00046	0.00041	0.00045	0.00045	0.00040	0.00040	0.00043	0.00036	0.00041	0.00060	0.00041	0.00073	0.00054	0.00063	0.00043
0.00108	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01195	IND	c30	0.00004	0.00009	0.00025	0.00033	0.00032	0.00016	0.00024	0.00010	0.00021	0.00024	0.00013	0.00015	0.00044	0.00033	0.00030	0.00018	0.00010	0.00009
0.01284	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00933	IND	c32	0.00001	0.00002	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
0.01121	IND	c33	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
152.56871	IND	c34	0.33300	1.65941	1.23837	3.95326	2.33860	2.16392	1.68971	0.87038	1.21491	2.21164	1.43333	0.95269	3.57337	2.63913	6.35448	0.55290	0.90325	0.65724
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**71.01512**	**62.19379**	**30.01031**	**12.55733**	**17.87803**	**16.71343**	**7.319081**	**10.22926**	**5.343664**	**9.318106**	**6.091473**	**7.739799**	**6.197925**	**5.141077**	**8.908913**	**1.682988**	**8.572103**	**4.497905**

Table 3A.10. NO2 Direct and Indirect Coefficients (Part-I)

NO2			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
2.97564	IND	c1	3.29045	0.01175	1.27804	0.34161	0.67265	0.58964	0.15907	0.01916	0.08983	0.25167	0.03391	0.02003	0.02452	0.02666	0.02565	0.02728	0.01759	0.08252
0.01306	IND	c2	0.00006	0.01317	0.00014	0.00018	0.00013	0.00017	0.00029	0.00185	0.00030	0.00024	0.00069	0.00126	0.00038	0.00032	0.00031	0.00008	0.00117	0.00034
0.02824	IND	c3	0.00016	0.00007	0.03139	0.00022	0.00018	0.00014	0.00030	0.00009	0.00085	0.00073	0.00012	0.00010	0.00009	0.00012	0.00011	0.00007	0.00009	0.00008
0.00291	IND	c4	0.00001	0.00000	0.00003	0.00370	0.00007	0.00001	0.00004	0.00001	0.00004	0.00008	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001
0.00271	IND	c5	0.00000	0.00000	0.00000	0.00001	0.00344	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000
0.03708	IND	c6	0.00002	0.00013	0.00032	0.00024	0.00014	0.03794	0.00097	0.00008	0.00040	0.00033	0.00041	0.00012	0.00029	0.00018	0.00017	0.00020	0.00006	0.00051
0.01269	IND	c7	0.00002	0.00003	0.00027	0.00016	0.00010	0.00036	0.01648	0.00008	0.00019	0.00021	0.00021	0.00009	0.00012	0.00013	0.00010	0.00009	0.00012	0.00009
0.00529	IND	c8	0.00012	0.00014	0.00028	0.00030	0.00024	0.00020	0.00035	0.00572	0.00051	0.00040	0.00057	0.00037	0.00023	0.00023	0.00021	0.00010	0.00067	0.00038
0.41468	IND	c9	0.00965	0.00947	0.01477	0.02719	0.01889	0.01421	0.03261	0.01007	0.51800	0.10959	0.01285	0.00941	0.00850	0.01404	0.01195	0.00927	0.00488	0.00816
0.00371	IND	c10	0.00001	0.00002	0.00007	0.00007	0.00006	0.00006	0.00010	0.00003	0.00010	0.00422	0.00010	0.00004	0.00006	0.00009	0.00009	0.00007	0.00002	0.00003
0.03596	IND	c11	0.00006	0.00027	0.00014	0.00018	0.00015	0.00008	0.00022	0.00015	0.00021	0.00021	0.03896	0.00028	0.00041	0.00039	0.00023	0.00015	0.00022	0.00344
0.01355	IND	c12	0.00009	0.00053	0.00027	0.00042	0.00028	0.00028	0.00043	0.00025	0.00038	0.00066	0.00069	0.01913	0.00462	0.00357	0.00328	0.00060	0.00050	0.00268
0.00205	IND	c13	0.00001	0.00005	0.00002	0.00005	0.00002	0.00001	0.00002	0.00002	0.00002	0.00003	0.00002	0.00004	0.00220	0.00009	0.00012	0.00003	0.00004	0.00003
0.00120	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00003	0.00128	0.00002	0.00001	0.00003	0.00002
0.00490	IND	c15	0.00002	0.00004	0.00006	0.00006	0.00006	0.00005	0.00006	0.00005	0.00006	0.00013	0.00006	0.00009	0.00011	0.00010	0.00553	0.00005	0.00005	0.00006
0.00134	IND	c16	0.00000	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00000	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00002	0.00134	0.00001	0.00001
0.27395	IND	c17	0.00453	0.00824	0.00786	0.01660	0.00853	0.01072	0.01864	0.01102	0.01477	0.01765	0.03135	0.02700	0.01299	0.01235	0.01641	0.00363	0.34466	0.01342
0.00342	IND	c18	0.00005	0.00013	0.00010	0.00013	0.00006	0.00004	0.00011	0.00010	0.00009	0.00007	0.00030	0.00010	0.00014	0.00013	0.00009	0.00005	0.00018	0.00365
0.00337	IND	c19	0.00001	0.00001	0.00003	0.00002	0.00002	0.00002	0.00002	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
0.00038	IND	c20	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00002
0.00088	IND	c21	0.00002	0.00002	0.00009	0.00007	0.00008	0.00006	0.00008	0.00011	0.00009	0.00010	0.00007	0.00007	0.00006	0.00007	0.00006	0.00003	0.00005	0.00006
0.00878	IND	c22	0.00001	0.00001	0.00003	0.00003	0.00003	0.00002	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00003	0.00003	0.00003	0.00002	0.00003	0.00002
0.01685	IND	c23	0.00064	0.00057	0.00224	0.00212	0.00206	0.00171	0.00238	0.00228	0.00215	0.00247	0.00194	0.00192	0.00151	0.00178	0.00142	0.00092	0.00145	0.00178
0.07372	IND	c24	0.00005	0.00004	0.00021	0.00011	0.00013	0.00019	0.00016	0.00018	0.00016	0.00017	0.00017	0.00016	0.00011	0.00012	0.00010	0.00007	0.00015	0.00013
0.01787	IND	c25	0.00001	0.00001	0.00005	0.00004	0.00011	0.00003	0.00008	0.00005	0.00005	0.00005	0.00003	0.00003	0.00003	0.00004	0.00004	0.00003	0.00003	0.00003
0.01252	IND	c26	0.00003	0.00002	0.00011	0.00009	0.00010	0.00008	0.00010	0.00013	0.00011	0.00013	0.00009	0.00009	0.00008	0.00009	0.00007	0.00004	0.00006	0.00008
0.00337	IND	c27	0.00001	0.00002	0.00003	0.00005	0.00003	0.00004	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00006	0.00019	0.00007	0.00008	0.00006	0.00003
0.00053	IND	c28	0.00001	0.00002	0.00003	0.00004	0.00003	0.00004	0.00004	0.00003	0.00003	0.00004	0.00003	0.00003	0.00005	0.00003	0.00006	0.00005	0.00005	0.00004
0.00005	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00087	IND	c30	0.00000	0.00000	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001
0.00050	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00055	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02178	IND	c33	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000
1.28016	IND	c34	0.00249	0.01305	0.00982	0.03283	0.01905	0.01730	0.01357	0.00695	0.00981	0.01807	0.01168	0.00776	0.02974	0.02174	0.05282	0.00449	0.00729	0.00510
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**3.30854**	**0.05782**	**1.34646**	**0.42656**	**0.72673**	**0.67346**	**0.24624**	**0.05854**	**0.63832**	**0.40743**	**0.13442**	**0.08830**	**0.08647**	**0.08389**	**0.11903**	**0.04881**	**0.37949**	**0.12276**

Table 3A.10. NO2 Direct and Indirect Coefficients (Part-II)

NO2			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
2.97564	IND	c1	0.00593	0.00593	0.00593	0.87752	0.08053	0.03428	0.03509	0.03691	0.01409	0.01658	0.00627	0.02157	0.00000	0.02042	0.05426	0.00360	0.00360
0.01306	IND	c2	0.00003	0.00003	0.00003	0.00010	0.00043	0.00015	0.00019	0.00017	0.00010	0.00005	0.00002	0.00003	0.00000	0.00002	0.00008	0.00001	0.00001
0.02824	IND	c3	0.00001	0.00001	0.00001	0.00292	0.00012	0.00027	0.00015	0.00011	0.00004	0.00005	0.00001	0.00006	0.00000	0.00004	0.00039	0.00001	0.00001
0.00291	IND	c4	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00001	0.00000	0.00001	0.00002	0.00000	0.00000
0.00271	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.03708	IND	c6	0.00002	0.00002	0.00002	0.00007	0.00009	0.00008	0.00010	0.00015	0.00005	0.00003	0.00003	0.00003	0.00000	0.00002	0.00007	0.00001	0.00001
0.01269	IND	c7	0.00013	0.00013	0.00013	0.00009	0.00014	0.00007	0.00008	0.00090	0.00015	0.00024	0.00001	0.00006	0.00000	0.00003	0.00012	0.00002	0.00002
0.00529	IND	c8	0.00006	0.00006	0.00006	0.00020	0.00118	0.00030	0.00050	0.00026	0.00014	0.00009	0.00003	0.00004	0.00000	0.00005	0.00015	0.00001	0.00001
0.41468	IND	c9	0.00073	0.00073	0.00073	0.00556	0.00840	0.03613	0.01970	0.00689	0.00194	0.00130	0.00058	0.00133	0.00000	0.00090	0.05008	0.00097	0.00097
0.00371	IND	c10	0.00001	0.00001	0.00001	0.00002	0.00013	0.00007	0.00023	0.00006	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000
0.03596	IND	c11	0.00003	0.00003	0.00003	0.00017	0.00024	0.00020	0.00018	0.00020	0.00019	0.00009	0.00024	0.00014	0.00000	0.00008	0.00015	0.00004	0.00004
0.01355	IND	c12	0.00005	0.00005	0.00005	0.00020	0.00051	0.00040	0.00026	0.00030	0.00033	0.00014	0.00019	0.00017	0.00000	0.00009	0.00019	0.00005	0.00005
0.00205	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00003	0.00002	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00120	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00001	0.00003	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
0.00490	IND	c15	0.00001	0.00001	0.00001	0.00003	0.00025	0.00029	0.00006	0.00007	0.00004	0.00004	0.00000	0.00004	0.00000	0.00001	0.00003	0.00001	0.00001
0.00134	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.27395	IND	c17	0.00127	0.00127	0.00127	0.00770	0.01034	0.00906	0.00468	0.02112	0.01186	0.00318	0.00096	0.00383	0.00000	0.00094	0.00350	0.00095	0.00095
0.00342	IND	c18	0.00003	0.00003	0.00003	0.00013	0.00015	0.00012	0.00015	0.00018	0.00018	0.00009	0.00025	0.00013	0.00000	0.00008	0.00010	0.00004	0.00004
0.00337	IND	c19	0.00338	0.00000	0.00000	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00038	IND	c20	0.00000	0.00038	0.00000	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00088	IND	c21	0.00000	0.00000	0.00088	0.00006	0.00006	0.00004	0.00004	0.00003	0.00003	0.00001	0.00000	0.00001	0.00000	0.00000	0.00004	0.00000	0.00000
0.00878	IND	c22	0.00002	0.00002	0.00002	0.00886	0.00013	0.00008	0.00008	0.00014	0.00005	0.00010	0.00001	0.00016	0.00000	0.00009	0.00023	0.00001	0.00001
0.01685	IND	c23	0.00032	0.00032	0.00032	0.00153	0.01832	0.00123	0.00121	0.00170	0.00080	0.00042	0.00013	0.00027	0.00000	0.00032	0.00096	0.00011	0.00011
0.07372	IND	c24	0.00001	0.00001	0.00001	0.00015	0.00015	0.07380	0.00008	0.00006	0.00005	0.00002	0.00001	0.00002	0.00000	0.00001	0.00006	0.00001	0.00001
0.01787	IND	c25	0.00001	0.00001	0.00001	0.00004	0.00004	0.00002	0.01790	0.00004	0.00002	0.00001	0.00000	0.00002	0.00000	0.00000	0.00005	0.00000	0.00000
0.01252	IND	c26	0.00024	0.00024	0.00024	0.00008	0.00008	0.00006	0.00005	0.01272	0.00004	0.00001	0.00001	0.00001	0.00000	0.00001	0.00005	0.00000	0.00000
0.00337	IND	c27	0.00002	0.00002	0.00002	0.00003	0.00008	0.00006	0.00007	0.00022	0.00352	0.00011	0.00001	0.00005	0.00000	0.00002	0.00004	0.00001	0.00001
0.00053	IND	c28	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00002	0.00004	0.00001	0.00059	0.00000	0.00003	0.00000	0.00001	0.00001	0.00000	0.00000
0.00005	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00087	IND	c30	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00004	0.00001	0.00001	0.00000	0.00098	0.00000	0.00000	0.00001	0.00004	0.00004
0.00050	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00050	0.00000	0.00000	0.00000	0.00000
0.00055	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00055	0.00000	0.00000	0.00000
0.02178	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00004	0.00000	0.00000	0.00001	0.00002	0.00000	0.00000	0.00013	0.00000	0.00000	0.02178	0.00000	0.00000
1.28016	IND	c34	0.00178	0.00178	0.00178	0.00376	0.02405	0.00559	0.00396	0.00744	0.00268	0.00178	0.00093	0.01508	0.00000	0.00113	0.00524	1.30788	0.02772
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.01414**	**0.01115**	**0.01164**	**0.90930**	**0.14561**	**0.16241**	**0.08486**	**0.08982**	**0.03642**	**0.02497**	**0.00974**	**0.04422**	**0.00050**	**0.02483**	**0.13767**	**1.31381**	**0.03365**

Table 3A.11. NO2 Induced Coefficients (Part-I)

NO2			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
2.97564	IND	c1	3.30191	0.04426	1.29944	0.35453	0.69423	0.62179	0.18178	0.03250	0.10430	0.26991	0.04698	0.02869	0.03377	0.04183	0.04430	0.03272	0.02849	0.09795
0.01306	IND	c2	0.00006	0.01317	0.00014	0.00018	0.00013	0.00017	0.00030	0.00185	0.00031	0.00024	0.00069	0.00126	0.00038	0.00032	0.00031	0.00008	0.00117	0.00035
0.02824	IND	c3	0.00021	0.00020	0.03148	0.00027	0.00027	0.00026	0.00039	0.00015	0.00091	0.00080	0.00017	0.00014	0.00013	0.00018	0.00019	0.00010	0.00013	0.00014
0.00291	IND	c4	0.00001	0.00001	0.00003	0.00370	0.00007	0.00002	0.00004	0.00001	0.00005	0.00008	0.00003	0.00001	0.00002	0.00003	0.00002	0.00002	0.00001	0.00002
0.00271	IND	c5	0.00000	0.00000	0.00000	0.00001	0.00344	0.00001	0.00000	0.00000	0.00001	0.00003	0.00001	0.00000	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000
0.03708	IND	c6	0.00003	0.00013	0.00032	0.00024	0.00014	0.03794	0.00097	0.00008	0.00040	0.00033	0.00041	0.00012	0.00029	0.00018	0.00017	0.00020	0.00007	0.00051
0.01269	IND	c7	0.00002	0.00004	0.00027	0.00016	0.00010	0.00037	0.01648	0.00008	0.00020	0.00022	0.00021	0.00009	0.00012	0.00013	0.00010	0.00009	0.00012	0.00009
0.00529	IND	c8	0.00013	0.00015	0.00029	0.00031	0.00025	0.00021	0.00035	0.00573	0.00051	0.00040	0.00058	0.00037	0.00024	0.00024	0.00022	0.00011	0.00068	0.00039
0.41468	IND	c9	0.00986	0.01005	0.01516	0.02742	0.01928	0.01479	0.03302	0.01031	0.51826	0.10992	0.01309	0.00957	0.00867	0.01431	0.01228	0.00936	0.00507	0.00844
0.00371	IND	c10	0.00001	0.00002	0.00007	0.00007	0.00007	0.00007	0.00010	0.00003	0.00010	0.00422	0.00010	0.00004	0.00006	0.00009	0.00009	0.00007	0.00002	0.00003
0.03596	IND	c11	0.00006	0.00028	0.00014	0.00018	0.00015	0.00009	0.00022	0.00015	0.00022	0.00021	0.03897	0.00028	0.00041	0.00040	0.00024	0.00016	0.00023	0.00344
0.01355	IND	c12	0.00009	0.00055	0.00028	0.00043	0.00029	0.00030	0.00044	0.00026	0.00039	0.00067	0.00070	0.01913	0.00462	0.00358	0.00329	0.00060	0.00050	0.00269
0.00205	IND	c13	0.00001	0.00005	0.00002	0.00005	0.00002	0.00001	0.00002	0.00002	0.00003	0.00003	0.00002	0.00004	0.00220	0.00009	0.00012	0.00003	0.00004	0.00003
0.00120	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00003	0.00128	0.00002	0.00001	0.00003	0.00002
0.00490	IND	c15	0.00002	0.00005	0.00006	0.00006	0.00006	0.00005	0.00006	0.00005	0.00006	0.00013	0.00006	0.00009	0.00011	0.00010	0.00553	0.00005	0.00005	0.00006
0.00134	IND	c16	0.00000	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00000	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00003	0.00134	0.00001	0.00001
0.27395	IND	c17	0.00464	0.00857	0.00809	0.01673	0.00875	0.01105	0.01888	0.01116	0.01492	0.01784	0.03149	0.02709	0.01309	0.01251	0.01661	0.00369	0.34477	0.01358
0.00342	IND	c18	0.00005	0.00014	0.00010	0.00013	0.00006	0.00005	0.00012	0.00010	0.00009	0.00007	0.00030	0.00010	0.00014	0.00013	0.00009	0.00005	0.00018	0.00365
0.00337	IND	c19	0.00001	0.00001	0.00003	0.00002	0.00002	0.00002	0.00002	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
0.00038	IND	c20	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002
0.00088	IND	c21	0.00002	0.00002	0.00009	0.00007	0.00008	0.00006	0.00008	0.00011	0.00009	0.00010	0.00007	0.00007	0.00006	0.00008	0.00006	0.00003	0.00005	0.00006
0.00878	IND	c22	0.00001	0.00003	0.00004	0.00003	0.00004	0.00004	0.00004	0.00003	0.00003	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00002	0.00004	0.00003
0.01685	IND	c23	0.00067	0.00067	0.00230	0.00215	0.00212	0.00180	0.00245	0.00232	0.00220	0.00252	0.00197	0.00195	0.00154	0.00182	0.00147	0.00093	0.00148	0.00182
0.07372	IND	c24	0.00005	0.00004	0.00021	0.00012	0.00013	0.00019	0.00016	0.00018	0.00016	0.00017	0.00017	0.00016	0.00011	0.00013	0.00010	0.00007	0.00015	0.00013
0.01787	IND	c25	0.00001	0.00001	0.00005	0.00004	0.00011	0.00003	0.00008	0.00005	0.00005	0.00005	0.00003	0.00003	0.00003	0.00004	0.00004	0.00003	0.00003	0.00003
0.01252	IND	c26	0.00003	0.00003	0.00011	0.00009	0.00010	0.00008	0.00010	0.00014	0.00011	0.00013	0.00009	0.00009	0.00008	0.00009	0.00007	0.00004	0.00007	0.00008
0.00337	IND	c27	0.00001	0.00002	0.00003	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00006	0.00019	0.00007	0.00008	0.00006	0.00004
0.00053	IND	c28	0.00001	0.00002	0.00003	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003	0.00004	0.00003	0.00004	0.00005	0.00003	0.00006	0.00005	0.00005	0.00004
0.00005	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00087	IND	c30	0.00000	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00002	0.00002	0.00001	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001
0.00050	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00055	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02178	IND	c33	0.00001	0.00003	0.00002	0.00002	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00002
1.28016	IND	c34	0.00279	0.01392	0.01039	0.03317	0.01962	0.01816	0.01418	0.00730	0.01019	0.01856	0.01203	0.00799	0.02998	0.02214	0.05332	0.00464	0.00758	0.00551
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**3.32076**	**0.09247**	**1.36927**	**0.44033**	**0.74974**	**0.70772**	**0.27046**	**0.07277**	**0.65374**	**0.42688**	**0.14835**	**0.09753**	**0.09632**	**0.10005**	**0.13891**	**0.05461**	**0.39111**	**0.13920**

Table 3A.11. NO2 Induced Coefficients (Part-II)

NO2			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
2.97564	IND	c1	0.00716	0.02548	0.01469	0.89923	0.09128	0.07802	0.07559	0.05068	0.04016	0.02277	0.01699	0.03528	0.02682	0.03499	0.06608	0.05592	0.00558	0.61047
0.01306	IND	c2	0.00003	0.00003	0.00003	0.00011	0.00043	0.00016	0.00020	0.00017	0.00010	0.00005	0.00003	0.00004	0.00001	0.00003	0.00008	0.00002	0.00001	0.00012
0.02824	IND	c3	0.00002	0.00009	0.00005	0.00300	0.00016	0.00045	0.00031	0.00016	0.00014	0.00008	0.00005	0.00012	0.00011	0.00009	0.00044	0.00022	0.00002	0.00241
0.00291	IND	c4	0.00000	0.00001	0.00001	0.00002	0.00002	0.00003	0.00002	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001	0.00001	0.00002	0.00001	0.00000	0.00015
0.00271	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
0.03708	IND	c6	0.00002	0.00002	0.00002	0.00007	0.00009	0.00008	0.00010	0.00016	0.00005	0.00003	0.00004	0.00003	0.00000	0.00002	0.00007	0.00002	0.00001	0.00008
0.01269	IND	c7	0.00013	0.00014	0.00013	0.00009	0.00015	0.00007	0.00008	0.00090	0.00015	0.00024	0.00001	0.00006	0.00001	0.00003	0.00013	0.00003	0.00002	0.00012
0.00529	IND	c8	0.00006	0.00007	0.00006	0.00021	0.00118	0.00031	0.00052	0.00027	0.00016	0.00009	0.00003	0.00005	0.00001	0.00005	0.00015	0.00004	0.00002	0.00025
0.41468	IND	c9	0.00076	0.00108	0.00089	0.00595	0.00859	0.03691	0.02043	0.00713	0.00240	0.00141	0.00077	0.00157	0.00048	0.00116	0.05029	0.00191	0.00101	0.01093
0.00371	IND	c10	0.00001	0.00001	0.00001	0.00002	0.00013	0.00007	0.00023	0.00006	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00003	0.00000	0.00000	0.00004
0.03596	IND	c11	0.00003	0.00004	0.00003	0.00017	0.00024	0.00021	0.00018	0.00021	0.00020	0.00009	0.00024	0.00014	0.00001	0.00008	0.00015	0.00005	0.00004	0.00013
0.01355	IND	c12	0.00005	0.00006	0.00006	0.00021	0.00052	0.00042	0.00028	0.00031	0.00035	0.00014	0.00019	0.00018	0.00001	0.00009	0.00019	0.00007	0.00005	0.00028
0.00205	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00003	0.00002	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00002
0.00120	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00001	0.00003	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
0.00490	IND	c15	0.00001	0.00001	0.00001	0.00004	0.00025	0.00030	0.00007	0.00007	0.00004	0.00004	0.00001	0.00004	0.00000	0.00001	0.00003	0.00001	0.00001	0.00007
0.00134	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001
0.27395	IND	c17	0.00129	0.00148	0.00137	0.00793	0.01045	0.00952	0.00510	0.02126	0.01213	0.00324	0.00107	0.00398	0.00028	0.00109	0.00362	0.00150	0.00097	0.00633
0.00342	IND	c18	0.00003	0.00003	0.00003	0.00013	0.00015	0.00013	0.00015	0.00019	0.00019	0.00009	0.00025	0.00013	0.00000	0.00008	0.00011	0.00005	0.00004	0.00009
0.00337	IND	c19	0.00338	0.00000	0.00000	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00002
0.00038	IND	c20	0.00000	0.00038	0.00000	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00002
0.00088	IND	c21	0.00000	0.00001	0.00088	0.00006	0.00006	0.00005	0.00004	0.00003	0.00003	0.00001	0.00001	0.00001	0.00000	0.00001	0.00004	0.00001	0.00000	0.00006
0.00878	IND	c22	0.00002	0.00003	0.00003	0.00887	0.00014	0.00010	0.00009	0.00014	0.00006	0.00011	0.00001	0.00017	0.00001	0.00009	0.00024	0.00003	0.00001	0.00026
0.01685	IND	c23	0.00032	0.00037	0.00034	0.00159	0.01835	0.00136	0.00132	0.00173	0.00087	0.00044	0.00016	0.00031	0.00008	0.00036	0.00099	0.00026	0.00012	0.00174
0.07372	IND	c24	0.00001	0.00001	0.00001	0.00015	0.00015	0.07381	0.00009	0.00006	0.00006	0.00002	0.00001	0.00002	0.00001	0.00001	0.00007	0.00002	0.00001	0.00014
0.01787	IND	c25	0.00001	0.00001	0.00001	0.00004	0.00004	0.00002	0.01790	0.00004	0.00002	0.00001	0.00000	0.00002	0.00000	0.00000	0.00005	0.00001	0.00000	0.00004
0.01252	IND	c26	0.00024	0.00025	0.00024	0.00009	0.00008	0.00006	0.00005	0.01273	0.00004	0.00001	0.00001	0.00001	0.00000	0.00001	0.00005	0.00001	0.00000	0.00007
0.00337	IND	c27	0.00002	0.00003	0.00003	0.00003	0.00008	0.00007	0.00007	0.00022	0.00353	0.00011	0.00001	0.00005	0.00000	0.00002	0.00005	0.00002	0.00002	0.00004
0.00053	IND	c28	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00002	0.00004	0.00001	0.00059	0.00000	0.00003	0.00000	0.00002	0.00001	0.00000	0.00000	0.00002
0.00005	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00087	IND	c30	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00004	0.00001	0.00001	0.00000	0.00098	0.00000	0.00000	0.00001	0.00004	0.00004	0.00003
0.00050	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00050	0.00000	0.00000	0.00000	0.00000	0.00000
0.00055	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00055	0.00000	0.00000	0.00000	0.00002
0.02178	IND	c33	0.00000	0.00002	0.00001	0.00002	0.00005	0.00004	0.00004	0.00002	0.00004	0.00001	0.00001	0.00014	0.00002	0.00001	0.02179	0.00005	0.00001	0.00049
1.28016	IND	c34	0.00181	0.00230	0.00201	0.00434	0.02434	0.00676	0.00504	0.00781	0.00337	0.00194	0.00122	0.01544	0.00072	0.00152	0.00556	1.30928	0.02777	0.01633
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.01545**	**0.03199**	**0.02099**	**0.93245**	**0.15706**	**0.20904**	**0.12803**	**0.10450**	**0.06421**	**0.03157**	**0.02116**	**0.05883**	**0.02909**	**0.04035**	**0.15028**	**1.36959**	**0.03575**	**0.65076**

Table 3A.12. NOX Direct and Indirect Coefficients (Part-I)

NOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
12.20725	IND	c1	13.49873	0.04819	5.24304	1.40142	2.75949	2.41896	0.65256	0.07858	0.36852	1.03244	0.13913	0.08216	0.10060	0.10938	0.10524	0.11191	0.07216	0.33854	0.02431
5.16084	IND	c2	0.02309	5.20480	0.05441	0.07204	0.04946	0.06644	0.11530	0.73017	0.11993	0.09341	0.27293	0.49866	0.14953	0.12472	0.12206	0.03176	0.46189	0.13525	0.01040
2.36724	IND	c3	0.01380	0.00613	2.63151	0.01821	0.01535	0.01154	0.02535	0.00784	0.07155	0.06099	0.01012	0.00868	0.00766	0.01036	0.00934	0.00628	0.00728	0.00690	0.00122
0.64014	IND	c4	0.00255	0.00104	0.00645	0.81431	0.01497	0.00287	0.00774	0.00181	0.00932	0.01749	0.00544	0.00220	0.00380	0.00475	0.00343	0.00402	0.00152	0.00296	0.00090
0.60608	IND	c5	0.00012	0.00018	0.00079	0.00305	0.76959	0.00108	0.00092	0.00034	0.00150	0.00557	0.00114	0.00048	0.00075	0.00164	0.00337	0.00121	0.00025	0.00037	0.00007
3.06785	IND	c6	0.00204	0.01053	0.02657	0.01951	0.01154	3.13878	0.08018	0.00640	0.03295	0.02739	0.03408	0.00994	0.02426	0.01499	0.01387	0.01633	0.00531	0.04201	0.00167
1.21737	IND	c7	0.00210	0.00328	0.02590	0.01553	0.00932	0.03463	1.58011	0.00733	0.01861	0.02057	0.01978	0.00883	0.01127	0.01257	0.00921	0.00864	0.01162	0.00880	0.01265
0.43840	IND	c8	0.01025	0.01130	0.02308	0.02483	0.02017	0.01662	0.02859	0.47376	0.04185	0.03277	0.04759	0.03034	0.01922	0.01903	0.01765	0.00860	0.05579	0.03151	0.00489
0.81819	IND	c9	0.01904	0.01868	0.02915	0.05364	0.03728	0.02804	0.06434	0.01988	1.02205	0.21624	0.02536	0.01857	0.01678	0.02770	0.02357	0.01828	0.00962	0.01610	0.00145
0.43332	IND	c10	0.00105	0.00179	0.00812	0.00867	0.00755	0.00746	0.01141	0.00319	0.01156	0.49336	0.01208	0.00473	0.00705	0.00997	0.01088	0.00859	0.00219	0.00356	0.00071
6.29663	IND	c11	0.01028	0.04772	0.02419	0.03132	0.02625	0.01485	0.03849	0.02599	0.03735	0.03667	6.82232	0.04902	0.07155	0.06907	0.04064	0.02707	0.03919	0.60229	0.00569
1.05340	IND	c12	0.00689	0.04124	0.02090	0.03277	0.02197	0.02216	0.03334	0.01960	0.02949	0.05109	0.05393	1.48716	0.35912	0.27778	0.25509	0.04678	0.03851	0.20844	0.00417
0.27538	IND	c13	0.00083	0.00624	0.00310	0.00624	0.00300	0.00155	0.00245	0.00222	0.00336	0.00417	0.00280	0.00555	0.29616	0.01180	0.01573	0.00435	0.00560	0.00359	0.00028
0.18769	IND	c14	0.00021	0.00058	0.00067	0.00093	0.00071	0.00055	0.00102	0.00064	0.00099	0.00126	0.00106	0.00185	0.00403	0.20028	0.00359	0.00231	0.00410	0.00256	0.00013
0.38274	IND	c15	0.00152	0.00329	0.00443	0.00442	0.00462	0.00390	0.00455	0.00385	0.00435	0.00994	0.00447	0.00702	0.00860	0.00761	0.43147	0.00371	0.00404	0.00493	0.00070
0.04427	IND	c16	0.00006	0.00017	0.00022	0.00026	0.00098	0.00023	0.00044	0.00016	0.00040	0.00054	0.00022	0.00031	0.00052	0.00047	0.00083	0.04451	0.00018	0.00027	0.00003
18.54854	IND	c17	0.30645	0.55775	0.53248	1.12376	0.57742	0.72590	1.26235	0.74607	1.00002	1.19480	2.12278	1.82798	0.87966	0.83609	1.11127	0.24588	23.33567	0.90879	0.08630
0.49713	IND	c18	0.00674	0.01917	0.01456	0.01862	0.00839	0.00634	0.01670	0.01429	0.01262	0.01015	0.04348	0.01461	0.02022	0.01825	0.01290	0.00722	0.02611	0.53019	0.00435
0.09204	IND	c19	0.00019	0.00016	0.00074	0.00057	0.00064	0.00051	0.00066	0.00088	0.00072	0.00083	0.00056	0.00059	0.00050	0.00061	0.00046	0.00024	0.00042	0.00052	0.09208
0.03178	IND	c20	0.00052	0.00042	0.00197	0.00152	0.00172	0.00136	0.00178	0.00236	0.00194	0.00223	0.00151	0.00159	0.00135	0.00164	0.00123	0.00063	0.00113	0.00140	0.00011
0.08271	IND	c21	0.00221	0.00178	0.00838	0.00645	0.00733	0.00577	0.00755	0.01002	0.00824	0.00949	0.00640	0.00674	0.00574	0.00695	0.00524	0.00268	0.00482	0.00597	0.00046
1.83129	IND	c22	0.00160	0.00235	0.00573	0.00601	0.00564	0.00467	0.00603	0.00566	0.00556	0.00627	0.00489	0.00512	0.00565	0.00555	0.00552	0.00374	0.00632	0.00463	0.00497
2.62226	IND	c23	0.09916	0.08904	0.34854	0.32951	0.32099	0.26577	0.37050	0.35535	0.33526	0.38449	0.30140	0.29888	0.23496	0.27623	0.22026	0.14255	0.22583	0.27709	0.04912
9.35465	IND	c24	0.00645	0.00462	0.02627	0.01447	0.01597	0.02355	0.01981	0.02234	0.02023	0.02106	0.02116	0.02027	0.01380	0.01576	0.01236	0.00846	0.01865	0.01624	0.00130
3.10541	IND	c25	0.00243	0.00178	0.00803	0.00715	0.01913	0.00519	0.01369	0.00835	0.00911	0.00864	0.00564	0.00573	0.00588	0.00697	0.00612	0.00449	0.00468	0.00538	0.00103
1.01320	IND	c26	0.00238	0.00192	0.00894	0.00700	0.00783	0.00621	0.00824	0.01084	0.00891	0.01026	0.00690	0.00721	0.00618	0.00750	0.00563	0.00292	0.00517	0.00642	0.01971
0.37923	IND	c27	0.00088	0.00178	0.00375	0.00508	0.00380	0.00436	0.00456	0.00432	0.00434	0.00496	0.00529	0.00609	0.00631	0.02128	0.00744	0.00869	0.00619	0.00390	0.00279
0.04539	IND	c28	0.00065	0.00140	0.00282	0.00330	0.00295	0.00316	0.00323	0.00288	0.00291	0.00310	0.00263	0.00300	0.00438	0.00295	0.00525	0.00397	0.00461	0.00313	0.00195
0.00775	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.11335	IND	c30	0.00032	0.00061	0.00226	0.00306	0.00291	0.00127	0.00211	0.00087	0.00192	0.00217	0.00114	0.00138	0.00416	0.00307	0.00270	0.00168	0.00084	0.00077	0.00087
0.02091	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.07203	IND	c32	0.00000	0.00000	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000
0.05346	IND	c33	0.00000	0.00000	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000
0.16763	IND	c34	0.00033	0.00171	0.00129	0.00430	0.00249	0.00226	0.00178	0.00091	0.00128	0.00237	0.00153	0.00102	0.00389	0.00285	0.00692	0.00059	0.00095	0.00067	0.00023
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**14.02290**	**6.08966**	**9.06829**	**4.03799**	**4.72950**	**6.82599**	**4.36579**	**2.56692**	**3.18688**	**3.76475**	**9.97775**	**4.41572**	**2.27362**	**2.10784**	**2.46928**	**0.77810**	**24.36067**	**3.17318**	**0.33455**

Table 3A.12. NOX Direct and Indirect Coefficients (Part-II)

NOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
12.20725	IND	c1	0.02431	0.02431	0.02431	3.59992	0.33038	0.14063	0.14394	0.15142	0.05778	0.06801	0.02571	0.08850	0.00000	0.08379	0.22258	0.01479	0.01479
5.16084	IND	c2	0.01040	0.01040	0.01040	0.03983	0.17110	0.05864	0.07514	0.06533	0.03926	0.01842	0.00941	0.01371	0.00000	0.00919	0.03031	0.00427	0.00427
2.36724	IND	c3	0.00122	0.00122	0.00122	0.24450	0.00994	0.02305	0.01285	0.00901	0.00333	0.00434	0.00065	0.00542	0.00000	0.00303	0.03302	0.00094	0.00094
0.64014	IND	c4	0.00090	0.00090	0.00090	0.00240	0.00334	0.00324	0.00274	0.00227	0.00101	0.00087	0.00022	0.00147	0.00000	0.00129	0.00405	0.00039	0.00039
0.60608	IND	c5	0.00007	0.00007	0.00007	0.00026	0.00145	0.00081	0.00231	0.00067	0.00019	0.00012	0.00003	0.00008	0.00000	0.00005	0.00028	0.00002	0.00002
3.06785	IND	c6	0.00167	0.00167	0.00167	0.00541	0.00711	0.00629	0.00805	0.01282	0.00384	0.00267	0.00289	0.00219	0.00000	0.00126	0.00579	0.00068	0.00068
1.21737	IND	c7	0.01265	0.01265	0.01265	0.00818	0.01383	0.00627	0.00734	0.08586	0.01436	0.02288	0.00071	0.00573	0.00000	0.00303	0.01187	0.00173	0.00173
0.43840	IND	c8	0.00489	0.00489	0.00489	0.01670	0.09754	0.02448	0.04129	0.02179	0.01197	0.00731	0.00220	0.00333	0.00000	0.00389	0.01224	0.00120	0.00120
0.81819	IND	c9	0.00145	0.00145	0.00145	0.01098	0.01658	0.07128	0.03888	0.01359	0.00382	0.00256	0.00115	0.00262	0.00000	0.00178	0.09881	0.00191	0.00191
0.43332	IND	c10	0.00071	0.00071	0.00071	0.00227	0.01475	0.00787	0.02702	0.00749	0.00166	0.00111	0.00025	0.00055	0.00000	0.00043	0.00289	0.00020	0.00020
6.29663	IND	c11	0.00569	0.00569	0.00569	0.02946	0.04130	0.03576	0.03091	0.03566	0.03333	0.01606	0.04128	0.02395	0.00000	0.01349	0.02573	0.00744	0.00744
1.05340	IND	c12	0.00417	0.00417	0.00417	0.01520	0.03974	0.03089	0.02049	0.02323	0.02596	0.01051	0.01442	0.01315	0.00000	0.00666	0.01461	0.00385	0.00385
0.27538	IND	c13	0.00028	0.00028	0.00028	0.00164	0.00373	0.00221	0.00170	0.00163	0.00140	0.00058	0.00025	0.00053	0.00000	0.00031	0.00124	0.00020	0.00020
0.18769	IND	c14	0.00013	0.00013	0.00013	0.00056	0.00149	0.00130	0.00067	0.00116	0.00487	0.00082	0.00018	0.00087	0.00000	0.00013	0.00066	0.00019	0.00019
0.38274	IND	c15	0.00070	0.00070	0.00070	0.00261	0.01948	0.02269	0.00487	0.00573	0.00312	0.00308	0.00036	0.00314	0.00000	0.00082	0.00211	0.00058	0.00058
0.04427	IND	c16	0.00003	0.00003	0.00003	0.00011	0.00032	0.00030	0.00017	0.00019	0.00012	0.00008	0.00002	0.00005	0.00000	0.00002	0.00018	0.00001	0.00001
18.54854	IND	c17	0.08630	0.08630	0.08630	0.52166	0.69989	0.61360	0.31695	1.43004	0.80283	0.21531	0.06502	0.25954	0.00000	0.06338	0.23704	0.06456	0.06456
0.49713	IND	c18	0.00435	0.00435	0.00435	0.01906	0.02214	0.01793	0.02146	0.02684	0.02669	0.01247	0.03629	0.01926	0.00000	0.01132	0.01516	0.00572	0.00572
0.09204	IND	c19	0.09208	0.00004	0.00004	0.00051	0.00052	0.00035	0.00033	0.00025	0.00026	0.00009	0.00004	0.00008	0.00000	0.00004	0.00031	0.00002	0.00002
0.03178	IND	c20	0.00011	0.03189	0.00011	0.00137	0.00139	0.00093	0.00088	0.00066	0.00069	0.00025	0.00010	0.00021	0.00000	0.00011	0.00084	0.00006	0.00006
0.08271	IND	c21	0.00046	0.00046	0.08317	0.00581	0.00590	0.00395	0.00374	0.00280	0.00291	0.00106	0.00042	0.00088	0.00000	0.00046	0.00358	0.00027	0.00027
1.83129	IND	c22	0.00497	0.00497	0.00497	1.84856	0.02752	0.01707	0.01615	0.02846	0.00991	0.02167	0.00149	0.03357	0.00000	0.01821	0.04796	0.00253	0.00253
2.62226	IND	c23	0.04912	0.04912	0.04912	0.23784	2.85041	0.19202	0.18785	0.26385	0.12392	0.06589	0.01946	0.04208	0.00000	0.04961	0.14865	0.01703	0.01703
9.35465	IND	c24	0.00130	0.00130	0.00130	0.01849	0.01890	9.36405	0.01053	0.00747	0.00678	0.00283	0.00114	0.00221	0.00000	0.00127	0.00807	0.00075	0.00075
3.10541	IND	c25	0.00103	0.00103	0.00103	0.00672	0.00618	0.00367	3.10914	0.00611	0.00347	0.00249	0.00039	0.00313	0.00000	0.00057	0.00941	0.00055	0.00055
1.01320	IND	c26	0.01971	0.01971	0.01971	0.00674	0.00634	0.00472	0.00401	1.02991	0.00314	0.00115	0.00045	0.00096	0.00000	0.00050	0.00391	0.00030	0.00030
0.37923	IND	c27	0.00279	0.00279	0.00279	0.00315	0.00932	0.00720	0.00791	0.02439	0.39620	0.01244	0.00068	0.00591	0.00000	0.00182	0.00503	0.00168	0.00168
0.04539	IND	c28	0.00195	0.00195	0.00195	0.00180	0.00220	0.00182	0.00165	0.00362	0.00088	0.05031	0.00023	0.00244	0.00000	0.00124	0.00076	0.00025	0.00025
0.00775	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00779	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
0.11335	IND	c30	0.00087	0.00087	0.00087	0.00101	0.00315	0.00146	0.00198	0.00531	0.00139	0.00099	0.00007	0.12756	0.00000	0.00021	0.00082	0.00466	0.00466
0.02091	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.02091	0.00000	0.00000	0.00000	0.00000
0.07203	IND	c32	0.00000	0.00000	0.00000	0.00001	0.00004	0.00001	0.00001	0.00003	0.00001	0.00000	0.00000	0.00057	0.00000	0.07203	0.00001	0.00002	0.00002
0.05346	IND	c33	0.00000	0.00000	0.00000	0.00001	0.00009	0.00001	0.00001	0.00002	0.00005	0.00001	0.00000	0.00031	0.00000	0.00000	0.05347	0.00001	0.00001
0.16763	IND	c34	0.00023	0.00023	0.00023	0.00049	0.00315	0.00073	0.00052	0.00097	0.00035	0.00023	0.00012	0.00197	0.00000	0.00015	0.00069	0.17126	0.00363
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.33455**	**0.274288**	**0.325215**	**6.653255**	**4.429201**	**10.66522**	**4.101502**	**3.268571**	**1.585513**	**0.546606**	**0.233408**	**0.665995**	**0.020913**	**0.350118**	**1.002077**	**0.308081**	**0.140456**

Table 3A.13. NOX Induced Coefficients (Part-I)

NOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
12.20725	IND	c1	13.54574	0.18155	5.33081	1.45443	2.84802	2.55082	0.74574	0.13333	0.42786	1.10728	0.19272	0.11768	0.13852	0.17161	0.18173	0.13425	0.11687	0.40181
5.16084	IND	c2	0.02398	5.20731	0.05606	0.07304	0.05113	0.06892	0.11706	0.73120	0.12105	0.09482	0.27394	0.49933	0.15024	0.12589	0.12350	0.03218	0.46274	0.13644
2.36724	IND	c3	0.01759	0.01689	2.63859	0.02249	0.02249	0.02218	0.03286	0.01225	0.07633	0.06703	0.01444	0.01154	0.01072	0.01537	0.01551	0.00808	0.01088	0.01201
0.64014	IND	c4	0.00317	0.00278	0.00759	0.81500	0.01612	0.00459	0.00896	0.00253	0.01009	0.01847	0.00614	0.00267	0.00430	0.00556	0.00443	0.00431	0.00211	0.00379
0.60608	IND	c5	0.00017	0.00032	0.00088	0.00311	0.76968	0.00122	0.00102	0.00039	0.00157	0.00565	0.00120	0.00051	0.00079	0.00171	0.00345	0.00123	0.00030	0.00044
3.06785	IND	c6	0.00217	0.01089	0.02680	0.01965	0.01178	3.13913	0.08042	0.00655	0.03311	0.02759	0.03422	0.01004	0.02436	0.01516	0.01407	0.01639	0.00543	0.04218
1.21737	IND	c7	0.00231	0.00388	0.02629	0.01577	0.00972	0.03522	1.58052	0.00757	0.01888	0.02091	0.02002	0.00899	0.01144	0.01284	0.00955	0.00874	0.01182	0.00908
0.43840	IND	c8	0.01064	0.01242	0.02381	0.02527	0.02091	0.01772	0.02936	0.47422	0.04234	0.03340	0.04803	0.03064	0.01954	0.01955	0.01829	0.00879	0.05616	0.03204
0.81819	IND	c9	0.01945	0.01983	0.02991	0.05409	0.03804	0.02918	0.06514	0.02035	1.02256	0.21688	0.02582	0.01888	0.01710	0.02823	0.02423	0.01847	0.01001	0.01665
0.43332	IND	c10	0.00113	0.00201	0.00827	0.00876	0.00770	0.00768	0.01156	0.00329	0.01165	0.49348	0.01217	0.00479	0.00711	0.01007	0.01101	0.00863	0.00227	0.00366
6.29663	IND	c11	0.01069	0.04889	0.02496	0.03179	0.02702	0.01600	0.03931	0.02647	0.03787	0.03732	6.82279	0.04933	0.07188	0.06961	0.04131	0.02727	0.03958	0.60284
1.05340	IND	c12	0.00729	0.04238	0.02165	0.03322	0.02273	0.02328	0.03414	0.02007	0.03000	0.05173	0.05439	1.48747	0.35945	0.27832	0.25574	0.04697	0.03889	0.20898
0.27538	IND	c13	0.00089	0.00639	0.00320	0.00630	0.00310	0.00170	0.00256	0.00228	0.00343	0.00425	0.00286	0.00559	0.29621	0.01187	0.01581	0.00437	0.00565	0.00366
0.18769	IND	c14	0.00023	0.00063	0.00070	0.00095	0.00074	0.00060	0.00105	0.00066	0.00101	0.00129	0.00108	0.00186	0.00404	0.20030	0.00362	0.00232	0.00411	0.00258
0.38274	IND	c15	0.00163	0.00359	0.00462	0.00454	0.00482	0.00419	0.00476	0.00397	0.00448	0.01011	0.00459	0.00710	0.00868	0.00774	0.43163	0.00376	0.00414	0.00507
0.04427	IND	c16	0.00007	0.00018	0.00022	0.00027	0.00099	0.00024	0.00045	0.00016	0.00041	0.00054	0.00023	0.00031	0.00052	0.00047	0.00083	0.04452	0.00018	0.00027
18.54854	IND	c17	0.31449	0.58057	0.54750	1.13283	0.59257	0.74846	1.27829	0.75544	1.01017	1.20760	2.13195	1.83406	0.88615	0.84673	1.12435	0.24970	23.34332	0.91962
0.49713	IND	c18	0.00700	0.01991	0.01505	0.01892	0.00888	0.00707	0.01721	0.01459	0.01294	0.01056	0.04377	0.01481	0.02043	0.01859	0.01332	0.00734	0.02636	0.53053
0.09204	IND	c19	0.00020	0.00018	0.00075	0.00058	0.00066	0.00053	0.00068	0.00089	0.00073	0.00085	0.00057	0.00060	0.00051	0.00062	0.00047	0.00024	0.00043	0.00054
0.03178	IND	c20	0.00054	0.00048	0.00202	0.00155	0.00177	0.00142	0.00182	0.00239	0.00197	0.00227	0.00153	0.00160	0.00137	0.00167	0.00127	0.00064	0.00116	0.00144
0.08271	IND	c21	0.00231	0.00206	0.00857	0.00657	0.00751	0.00605	0.00775	0.01014	0.00837	0.00965	0.00652	0.00681	0.00583	0.00709	0.00540	0.00273	0.00492	0.00610
1.83129	IND	c22	0.00263	0.00529	0.00766	0.00717	0.00759	0.00757	0.00808	0.00686	0.00686	0.00792	0.00607	0.00591	0.00648	0.00692	0.00720	0.00423	0.00731	0.00602
2.62226	IND	c23	0.10425	0.10349	0.35804	0.33525	0.33059	0.28005	0.38059	0.36128	0.34169	0.39259	0.30721	0.30272	0.23907	0.28297	0.22855	0.14497	0.23067	0.28395
9.35465	IND	c24	0.00678	0.00555	0.02688	0.01484	0.01659	0.02447	0.02046	0.02272	0.02064	0.02158	0.02153	0.02052	0.01406	0.01619	0.01289	0.00861	0.01896	0.01668
3.10541	IND	c25	0.00255	0.00210	0.00824	0.00728	0.01934	0.00551	0.01392	0.00849	0.00925	0.00883	0.00577	0.00582	0.00597	0.00712	0.00630	0.00455	0.00479	0.00554
1.01320	IND	c26	0.00249	0.00223	0.00914	0.00713	0.00803	0.00651	0.00845	0.01096	0.00904	0.01044	0.00702	0.00729	0.00627	0.00764	0.00580	0.00297	0.00527	0.00657
0.37923	IND	c27	0.00096	0.00201	0.00390	0.00517	0.00395	0.00459	0.00472	0.00441	0.00444	0.00509	0.00539	0.00615	0.00637	0.02139	0.00757	0.00873	0.00627	0.00401
0.04539	IND	c28	0.00069	0.00150	0.00289	0.00334	0.00301	0.00326	0.00330	0.00292	0.00296	0.00315	0.00267	0.00302	0.00441	0.00300	0.00531	0.00398	0.00464	0.00317
0.00775	IND	c29	0.00001	0.00003	0.00002	0.00001	0.00002	0.00003	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001
0.11335	IND	c30	0.00040	0.00082	0.00239	0.00314	0.00305	0.00147	0.00225	0.00096	0.00201	0.00229	0.00122	0.00143	0.00422	0.00317	0.00282	0.00172	0.00091	0.00086
0.02091	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.07203	IND	c32	0.00005	0.00013	0.00010	0.00007	0.00010	0.00013	0.00010	0.00006	0.00007	0.00008	0.00006	0.00004	0.00006	0.00008	0.00009	0.00003	0.00005	0.00007
0.05346	IND	c33	0.00003	0.00007	0.00006	0.00004	0.00006	0.00007	0.00006	0.00004	0.00004	0.00005	0.00004	0.00003	0.00004	0.00005	0.00005	0.00002	0.00003	0.00004
0.16763	IND	c34	0.00037	0.00182	0.00136	0.00434	0.00257	0.00238	0.00186	0.00096	0.00133	0.00243	0.00157	0.00105	0.00393	0.00290	0.00698	0.00061	0.00099	0.00072
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**14.09286**	**6.28817**	**9.19893**	**4.11689**	**4.86128**	**7.02226**	**4.50448**	**2.64841**	**3.27520**	**3.87615**	**10.05753**	**4.46860**	**2.33006**	**2.20046**	**2.58313**	**0.81135**	**24.42724**	**3.26736**

Table 3A.13. NOX Induced Coefficients (Part-II)

NOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
12.20725	IND	c1	0.02937	0.10453	0.06026	3.68899	0.37447	0.32008	0.31009	0.20792	0.16475	0.09340	0.06968	0.14474	0.11001	0.14354	0.27110	0.22942	0.02287	2.50439
5.16084	IND	c2	0.01049	0.01191	0.01108	0.04151	0.17193	0.06202	0.07827	0.06639	0.04128	0.01890	0.01024	0.01477	0.00207	0.01032	0.03122	0.00831	0.00442	0.04720
2.36724	IND	c3	0.00163	0.00769	0.00412	0.25168	0.01350	0.03752	0.02625	0.01357	0.01196	0.00639	0.00419	0.00996	0.00887	0.00785	0.03694	0.01825	0.00159	0.20197
0.64014	IND	c4	0.00097	0.00195	0.00137	0.00356	0.00391	0.00559	0.00491	0.00300	0.00241	0.00121	0.00080	0.00221	0.00144	0.00207	0.00469	0.00320	0.00050	0.03274
0.60608	IND	c5	0.00007	0.00015	0.00011	0.00035	0.00149	0.00100	0.00248	0.00073	0.00030	0.00014	0.00007	0.00014	0.00012	0.00012	0.00033	0.00025	0.00003	0.00264
3.06785	IND	c6	0.00169	0.00189	0.00177	0.00565	0.00723	0.00676	0.00849	0.01297	0.00413	0.00274	0.00301	0.00234	0.00029	0.00142	0.00592	0.00126	0.00071	0.00668
1.21737	IND	c7	0.01267	0.01301	0.01281	0.00858	0.01403	0.00707	0.00808	0.08612	0.01484	0.02300	0.00091	0.00599	0.00049	0.00330	0.01209	0.00269	0.00176	0.01119
0.43840	IND	c8	0.00493	0.00556	0.00519	0.01745	0.09791	0.02598	0.04267	0.02226	0.01287	0.00752	0.00256	0.00380	0.00092	0.00439	0.01265	0.00299	0.00127	0.02091
0.81819	IND	c9	0.00149	0.00214	0.00176	0.01175	0.01696	0.07282	0.04031	0.01408	0.00474	0.00278	0.00152	0.00310	0.00095	0.00230	0.09923	0.00376	0.00198	0.02156
0.43332	IND	c10	0.00072	0.00085	0.00077	0.00241	0.01482	0.00817	0.02729	0.00758	0.00184	0.00115	0.00032	0.00064	0.00018	0.00053	0.00297	0.00055	0.00021	0.00413
6.29663	IND	c11	0.00573	0.00639	0.00600	0.03024	0.04169	0.03733	0.03237	0.03615	0.03427	0.01628	0.04166	0.02444	0.00096	0.01401	0.02615	0.00932	0.00751	0.02194
1.05340	IND	c12	0.00421	0.00485	0.00448	0.01596	0.04012	0.03243	0.02191	0.02371	0.02687	0.01072	0.01479	0.01363	0.00094	0.00717	0.01503	0.00568	0.00391	0.02144
0.27538	IND	c13	0.00028	0.00037	0.00032	0.00174	0.00378	0.00241	0.00189	0.00169	0.00152	0.00061	0.00030	0.00060	0.00012	0.00038	0.00129	0.00044	0.00021	0.00281
0.18769	IND	c14	0.00014	0.00016	0.00015	0.00060	0.00150	0.00137	0.00073	0.00118	0.00491	0.00083	0.00020	0.00089	0.00004	0.00015	0.00067	0.00026	0.00019	0.00091
0.38274	IND	c15	0.00072	0.00088	0.00078	0.00281	0.01957	0.02309	0.00524	0.00585	0.00336	0.00313	0.00046	0.00326	0.00024	0.00096	0.00222	0.00105	0.00060	0.00553
0.04427	IND	c16	0.00003	0.00003	0.00003	0.00012	0.00033	0.00031	0.00018	0.00019	0.00012	0.00008	0.00002	0.00006	0.00001	0.00003	0.00018	0.00003	0.00002	0.00018
18.54854	IND	c17	0.08716	0.10002	0.09245	0.53689	0.70743	0.64430	0.34537	1.43971	0.82113	0.21965	0.07254	0.26916	0.01882	0.07361	0.24534	0.10127	0.06594	0.42843
0.49713	IND	c18	0.00438	0.00480	0.00455	0.01955	0.02238	0.01892	0.02238	0.02715	0.02728	0.01261	0.03653	0.01957	0.00061	0.01165	0.01542	0.00690	0.00576	0.01380
0.09204	IND	c19	0.09209	0.00006	0.00005	0.00053	0.00053	0.00038	0.00036	0.00026	0.00028	0.00010	0.00005	0.00009	0.00002	0.00005	0.00032	0.00006	0.00003	0.00047
0.03178	IND	c20	0.00011	0.03193	0.00013	0.00141	0.00141	0.00102	0.00096	0.00069	0.00074	0.00026	0.00012	0.00024	0.00006	0.00014	0.00087	0.00017	0.00007	0.00126
0.08271	IND	c21	0.00047	0.00063	0.08324	0.00600	0.00599	0.00434	0.00409	0.00292	0.00314	0.00111	0.00051	0.00100	0.00024	0.00059	0.00369	0.00073	0.00029	0.00535
1.83129	IND	c22	0.00508	0.00674	0.00576	1.85052	0.02850	0.02102	0.01981	0.02970	0.01227	0.02223	0.00246	0.03481	0.00242	0.01953	0.04903	0.00725	0.00270	0.05515
2.62226	IND	c23	0.04967	0.05781	0.05302	0.24749	2.85518	0.21146	0.20586	0.26997	0.13550	0.06864	0.02422	0.04818	0.01192	0.05608	0.15390	0.04029	0.01791	0.27133
9.35465	IND	c24	0.00133	0.00186	0.00155	0.01912	0.01921	9.36530	0.01169	0.00786	0.00752	0.00300	0.00145	0.00260	0.00077	0.00169	0.00841	0.00225	0.00081	0.01747
3.10541	IND	c25	0.00105	0.00123	0.00112	0.00693	0.00629	0.00411	3.10954	0.00625	0.00373	0.00255	0.00049	0.00327	0.00027	0.00071	0.00953	0.00108	0.00057	0.00611
1.01320	IND	c26	0.01972	0.01989	0.01979	0.00694	0.00644	0.00513	0.00439	1.03004	0.00339	0.00121	0.00055	0.00109	0.00025	0.00064	0.00403	0.00079	0.00031	0.00575
0.37923	IND	c27	0.00280	0.00293	0.00285	0.00330	0.00940	0.00751	0.00820	0.02449	0.39638	0.01248	0.00076	0.00601	0.00019	0.00192	0.00511	0.00205	0.00169	0.00435
0.04539	IND	c28	0.00195	0.00201	0.00198	0.00187	0.00223	0.00196	0.00178	0.00366	0.00097	0.05033	0.00026	0.00249	0.00008	0.00129	0.00080	0.00041	0.00026	0.00191
0.00775	IND	c29	0.00000	0.00002	0.00001	0.00002	0.00001	0.00004	0.00004	0.00001	0.00002	0.00001	0.00780	0.00002	0.00002	0.00001	0.00001	0.00005	0.00000	0.00057
0.11335	IND	c30	0.00087	0.00099	0.00092	0.00114	0.00322	0.00174	0.00223	0.00540	0.00155	0.00103	0.00014	0.12764	0.00017	0.00030	0.00089	0.00499	0.00467	0.00382
0.02091	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.02091	0.00000	0.00000	0.00000	0.00000	0.00000
0.07203	IND	c32	0.00001	0.00008	0.00004	0.00009	0.00008	0.00018	0.00017	0.00008	0.00011	0.00003	0.00004	0.00062	0.00011	0.07209	0.00006	0.00023	0.00003	0.00240
0.05346	IND	c33	0.00001	0.00004	0.00002	0.00005	0.00011	0.00010	0.00009	0.00005	0.00010	0.00002	0.00002	0.00034	0.00005	0.00003	0.05349	0.00011	0.00002	0.00119
0.16763	IND	c34	0.00024	0.00030	0.00026	0.00057	0.00319	0.00088	0.00066	0.00102	0.00044	0.00025	0.00016	0.00202	0.00009	0.00020	0.00073	0.17144	0.00364	0.00214
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.34207**	**0.39369**	**0.37873**	**6.78584**	**4.49483**	**10.93233**	**4.34880**	**3.35266**	**1.74472**	**0.58440**	**0.29886**	**0.74971**	**0.18467**	**0.43905**	**1.07430**	**0.62755**	**0.15249**	**3.72771**

Table 3A.14. SOX Direct and Indirect Coefficients (Part-I)

SOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
19.49341	IND	c1	21.55575	0.07695	8.37246	2.23789	4.40655	3.86277	1.04205	0.12549	0.58848	1.64867	0.22217	0.13120	0.16065	0.17467	0.16806	0.17871	0.11523	0.54061
2.76345	IND	c2	0.01237	2.78699	0.02913	0.03857	0.02649	0.03557	0.06174	0.39098	0.06422	0.05002	0.14614	0.26701	0.08007	0.06678	0.06536	0.01700	0.24733	0.07242
1.09082	IND	c3	0.00636	0.00283	1.21260	0.00839	0.00707	0.00532	0.01168	0.00361	0.03297	0.02811	0.00466	0.00400	0.00353	0.00477	0.00430	0.00289	0.00335	0.00318
0.34277	IND	c4	0.00137	0.00056	0.00345	0.43603	0.00801	0.00153	0.00414	0.00097	0.00499	0.00937	0.00291	0.00118	0.00204	0.00254	0.00184	0.00215	0.00082	0.00159
0.32453	IND	c5	0.00007	0.00010	0.00042	0.00163	0.41209	0.00058	0.00049	0.00018	0.00081	0.00298	0.00061	0.00025	0.00040	0.00088	0.00180	0.00065	0.00013	0.00020
1.64273	IND	c6	0.00109	0.00564	0.01423	0.01045	0.00618	1.68071	0.04293	0.00343	0.01764	0.01466	0.01825	0.00532	0.01299	0.00803	0.00743	0.00874	0.00284	0.02249
0.60667	IND	c7	0.00105	0.00164	0.01291	0.00774	0.00465	0.01726	0.78744	0.00365	0.00928	0.01025	0.00986	0.00440	0.00562	0.00626	0.00459	0.00430	0.00579	0.00439
0.99605	IND	c8	0.02329	0.02568	0.05244	0.05640	0.04584	0.03776	0.06495	1.07640	0.09507	0.07446	0.10812	0.06894	0.04367	0.04323	0.04011	0.01955	0.12675	0.07159
1.21649	IND	c9	0.02831	0.02777	0.04334	0.07975	0.05543	0.04169	0.09566	0.02955	1.51958	0.32150	0.03771	0.02761	0.02495	0.04118	0.03505	0.02718	0.01431	0.02394
0.23203	IND	c10	0.00056	0.00096	0.00435	0.00464	0.00404	0.00400	0.00611	0.00171	0.00619	0.26418	0.00647	0.00253	0.00377	0.00534	0.00583	0.00460	0.00117	0.00191
4.17768	IND	c11	0.00682	0.03166	0.01605	0.02078	0.01741	0.00985	0.02554	0.01724	0.02478	0.02433	4.52646	0.03252	0.04747	0.04582	0.02697	0.01796	0.02600	0.39960
1.07411	IND	c12	0.00702	0.04205	0.02131	0.03341	0.02240	0.02259	0.03399	0.01999	0.03007	0.05210	0.05499	1.51640	0.36618	0.28324	0.26010	0.04770	0.03926	0.21254
0.14746	IND	c13	0.00045	0.00334	0.00166	0.00334	0.00161	0.00083	0.00131	0.00119	0.00180	0.00223	0.00150	0.00297	0.15859	0.00632	0.00842	0.00233	0.00300	0.00192
0.10050	IND	c14	0.00012	0.00031	0.00036	0.00050	0.00038	0.00029	0.00054	0.00034	0.00053	0.00067	0.00057	0.00099	0.00216	0.10724	0.00192	0.00124	0.00219	0.00137
0.20495	IND	c15	0.00081	0.00176	0.00237	0.00237	0.00248	0.00209	0.00244	0.00206	0.00233	0.00532	0.00239	0.00376	0.00460	0.00407	0.23103	0.00199	0.00216	0.00264
0.02370	IND	c16	0.00003	0.00009	0.00012	0.00014	0.00052	0.00012	0.00024	0.00008	0.00022	0.00029	0.00012	0.00017	0.00028	0.00025	0.00044	0.02384	0.00010	0.00014
39.11767	IND	c17	0.64627	1.17626	1.12297	2.36993	1.21774	1.53088	2.66221	1.57341	2.10898	2.51975	4.47681	3.85509	1.85515	1.76326	2.34360	0.51854	49.21342	1.91659
0.19397	IND	c18	0.00263	0.00748	0.00568	0.00727	0.00327	0.00247	0.00652	0.00558	0.00492	0.00396	0.01696	0.00570	0.00789	0.00712	0.00503	0.00282	0.01019	0.20686
0.04929	IND	c19	0.00010	0.00008	0.00039	0.00030	0.00034	0.00027	0.00035	0.00047	0.00039	0.00045	0.00030	0.00032	0.00027	0.00033	0.00025	0.00013	0.00023	0.00028
0.01702	IND	c20	0.00028	0.00022	0.00106	0.00081	0.00092	0.00073	0.00095	0.00126	0.00104	0.00120	0.00081	0.00085	0.00072	0.00088	0.00066	0.00034	0.00061	0.00075
0.04429	IND	c21	0.00118	0.00095	0.00449	0.00346	0.00392	0.00309	0.00404	0.00537	0.00441	0.00508	0.00343	0.00361	0.00308	0.00372	0.00281	0.00144	0.00258	0.00319
0.98059	IND	c22	0.00086	0.00126	0.00307	0.00322	0.00302	0.00250	0.00323	0.00303	0.00298	0.00336	0.00262	0.00274	0.00302	0.00297	0.00296	0.00200	0.00339	0.00248
0.07791	IND	c23	0.00295	0.00265	0.01036	0.00979	0.00954	0.00790	0.01101	0.01056	0.00996	0.01142	0.00896	0.00888	0.00698	0.00821	0.00654	0.00424	0.00671	0.00823
0.68690	IND	c24	0.00047	0.00034	0.00193	0.00106	0.00117	0.00173	0.00145	0.00164	0.00149	0.00155	0.00155	0.00149	0.00101	0.00116	0.00091	0.00062	0.00137	0.00119
0.11253	IND	c25	0.00009	0.00006	0.00029	0.00026	0.00069	0.00019	0.00050	0.00030	0.00033	0.00031	0.00020	0.00021	0.00021	0.00025	0.00022	0.00016	0.00017	0.00019
0.54253	IND	c26	0.00127	0.00103	0.00479	0.00375	0.00419	0.00332	0.00441	0.00580	0.00477	0.00550	0.00369	0.00386	0.00331	0.00402	0.00301	0.00156	0.00277	0.00344
0.20307	IND	c27	0.00047	0.00095	0.00201	0.00272	0.00203	0.00233	0.00244	0.00231	0.00232	0.00266	0.00283	0.00326	0.00338	0.01140	0.00398	0.00465	0.00332	0.00209
0.02431	IND	c28	0.00035	0.00075	0.00151	0.00177	0.00158	0.00169	0.00173	0.00154	0.00156	0.00166	0.00141	0.00160	0.00234	0.00158	0.00281	0.00212	0.00247	0.00167
0.00415	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.06070	IND	c30	0.00017	0.00033	0.00121	0.00164	0.00156	0.00068	0.00113	0.00047	0.00103	0.00116	0.00061	0.00074	0.00223	0.00165	0.00145	0.00090	0.00045	0.00041
0.01120	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.03857	IND	c32	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000
0.02863	IND	c33	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00001
0.08976	IND	c34	0.00017	0.00092	0.00069	0.00230	0.00134	0.00121	0.00095	0.00049	0.00069	0.00127	0.00082	0.00054	0.00208	0.00152	0.00370	0.00032	0.00051	0.00036
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**22.30274**	**4.20161**	**10.94764**	**5.35035**	**6.27249**	**7.28197**	**4.88220**	**3.28912**	**4.54383**	**5.06847**	**9.66393**	**5.95817**	**2.80866**	**2.60871**	**3.24119**	**0.90067**	**49.83862**	**3.50828**

Table 3A.14. SOX Direct and Indirect Coefficients (Part-II)

SOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
19.49341	IND	c1	0.03883	0.03883	0.03883	5.74861	0.52757	0.22456	0.22986	0.24180	0.09227	0.10860	0.04106	0.14132	0.00000	0.13380	0.35543	0.02361	0.02361
2.76345	IND	c2	0.00557	0.00557	0.00557	0.02133	0.09162	0.03140	0.04024	0.03498	0.02102	0.00986	0.00504	0.00734	0.00000	0.00492	0.01623	0.00228	0.00228
1.09082	IND	c3	0.00056	0.00056	0.00056	0.11266	0.00458	0.01062	0.00592	0.00415	0.00153	0.00200	0.00030	0.00250	0.00000	0.00140	0.01522	0.00043	0.00043
0.34277	IND	c4	0.00048	0.00048	0.00048	0.00128	0.00179	0.00174	0.00147	0.00121	0.00054	0.00047	0.00012	0.00079	0.00000	0.00069	0.00217	0.00021	0.00021
0.32453	IND	c5	0.00004	0.00004	0.00004	0.00014	0.00078	0.00044	0.00124	0.00036	0.00010	0.00006	0.00001	0.00004	0.00000	0.00003	0.00015	0.00001	0.00001
1.64273	IND	c6	0.00090	0.00090	0.00090	0.00290	0.00381	0.00337	0.00431	0.00687	0.00206	0.00143	0.00155	0.00117	0.00000	0.00068	0.00310	0.00037	0.00037
0.60667	IND	c7	0.00630	0.00630	0.00630	0.00408	0.00689	0.00312	0.00366	0.04279	0.00716	0.01140	0.00035	0.00286	0.00000	0.00151	0.00592	0.00086	0.00086
0.99605	IND	c8	0.01110	0.01110	0.01110	0.03795	0.22162	0.05562	0.09380	0.04951	0.02720	0.01661	0.00499	0.00757	0.00000	0.00883	0.02781	0.00273	0.00273
1.21649	IND	c9	0.00215	0.00215	0.00215	0.01632	0.02465	0.10598	0.05781	0.02021	0.00568	0.00381	0.00170	0.00389	0.00000	0.00265	0.14691	0.00285	0.00285
0.23203	IND	c10	0.00038	0.00038	0.00038	0.00121	0.00790	0.00421	0.01447	0.00401	0.00089	0.00059	0.00013	0.00030	0.00000	0.00023	0.00155	0.00011	0.00011
4.17768	IND	c11	0.00377	0.00377	0.00377	0.01955	0.02740	0.02373	0.02051	0.02366	0.02211	0.01066	0.02739	0.01589	0.00000	0.00895	0.01707	0.00494	0.00494
1.07411	IND	c12	0.00425	0.00425	0.00425	0.01549	0.04052	0.03150	0.02089	0.02369	0.02647	0.01071	0.01470	0.01341	0.00000	0.00679	0.01490	0.00392	0.00392
0.14746	IND	c13	0.00015	0.00015	0.00015	0.00088	0.00200	0.00118	0.00091	0.00087	0.00075	0.00031	0.00014	0.00029	0.00000	0.00017	0.00066	0.00011	0.00011
0.10050	IND	c14	0.00007	0.00007	0.00007	0.00030	0.00080	0.00070	0.00036	0.00062	0.00261	0.00044	0.00010	0.00047	0.00000	0.00007	0.00035	0.00010	0.00010
0.20495	IND	c15	0.00038	0.00038	0.00038	0.00140	0.01043	0.01215	0.00261	0.00307	0.00167	0.00165	0.00019	0.00168	0.00000	0.00044	0.00113	0.00031	0.00031
0.02370	IND	c16	0.00001	0.00001	0.00001	0.00006	0.00017	0.00016	0.00009	0.00010	0.00006	0.00004	0.00001	0.00003	0.00000	0.00001	0.00010	0.00001	0.00001
39.11767	IND	c17	0.18199	0.18199	0.18199	1.10014	1.47602	1.29404	0.66843	3.01587	1.69311	0.45408	0.13713	0.54736	0.00000	0.13367	0.49989	0.13614	0.13614
0.19397	IND	c18	0.00170	0.00170	0.00170	0.00744	0.00864	0.00700	0.00837	0.01047	0.01042	0.00487	0.01416	0.00752	0.00000	0.00442	0.00591	0.00223	0.00223
0.04929	IND	c19	0.04931	0.00002	0.00002	0.00027	0.00028	0.00019	0.00018	0.00013	0.00014	0.00005	0.00002	0.00004	0.00000	0.00002	0.00017	0.00001	0.00001
0.01702	IND	c20	0.00006	0.01708	0.00006	0.00073	0.00074	0.00050	0.00047	0.00035	0.00037	0.00013	0.00005	0.00011	0.00000	0.00006	0.00045	0.00003	0.00003
0.04429	IND	c21	0.00025	0.00025	0.04453	0.00311	0.00316	0.00212	0.00200	0.00150	0.00156	0.00057	0.00022	0.00047	0.00000	0.00025	0.00192	0.00015	0.00015
0.98059	IND	c22	0.00266	0.00266	0.00266	0.98984	0.01474	0.00914	0.00865	0.01524	0.00531	0.01160	0.00080	0.01798	0.00000	0.00975	0.02568	0.00135	0.00135
0.07791	IND	c23	0.00146	0.00146	0.00146	0.00707	0.08469	0.00571	0.00558	0.00784	0.00368	0.00196	0.00058	0.00125	0.00000	0.00147	0.00442	0.00051	0.00051
0.68690	IND	c24	0.00010	0.00010	0.00010	0.00136	0.00139	0.68759	0.00077	0.00055	0.00050	0.00021	0.00008	0.00016	0.00000	0.00009	0.00059	0.00006	0.00006
0.11253	IND	c25	0.00004	0.00004	0.00004	0.00024	0.00022	0.00013	0.11267	0.00022	0.00013	0.00009	0.00001	0.00011	0.00000	0.00002	0.00034	0.00002	0.00002
0.54253	IND	c26	0.01055	0.01055	0.01055	0.00361	0.00339	0.00253	0.00215	0.55148	0.00168	0.00062	0.00024	0.00051	0.00000	0.00027	0.00210	0.00016	0.00016
0.20307	IND	c27	0.00149	0.00149	0.00149	0.00169	0.00499	0.00385	0.00424	0.01306	0.21215	0.00666	0.00036	0.00316	0.00000	0.00097	0.00269	0.00090	0.00090
0.02431	IND	c28	0.00104	0.00104	0.00104	0.00097	0.00118	0.00098	0.00089	0.00194	0.00047	0.02694	0.00012	0.00131	0.00000	0.00067	0.00041	0.00013	0.00013
0.00415	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00417	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
0.06070	IND	c30	0.00046	0.00046	0.00046	0.00054	0.00169	0.00078	0.00106	0.00285	0.00074	0.00053	0.00004	0.06830	0.00000	0.00011	0.00044	0.00250	0.00250
0.01120	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.01120	0.00000	0.00000	0.00000	0.00000
0.03857	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00030	0.00000	0.03857	0.00001	0.00001	0.00001
0.02863	IND	c33	0.00000	0.00000	0.00000	0.00001	0.00005	0.00001	0.00001	0.00001	0.00003	0.00000	0.00000	0.00017	0.00000	0.00000	0.02863	0.00001	0.00001
0.08976	IND	c34	0.00012	0.00012	0.00012	0.00026	0.00169	0.00039	0.00028	0.00052	0.00019	0.00012	0.00007	0.00106	0.00000	0.00008	0.00037	0.09170	0.00194
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.32619**	**0.29392**	**0.32119**	**8.10144**	**2.57540**	**2.52541**	**1.31387**	**4.07994**	**2.14261**	**0.68707**	**0.25584**	**0.84936**	**0.01120**	**0.36160**	**1.18270**	**0.27876**	**0.18900**

Table 3A.15. SOX Induced Coefficients (Part-I)

SOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
19.49341	IND	c1	21.63081	0.28992	8.51262	2.32254	4.54793	4.07333	1.19085	0.21291	0.68324	1.76819	0.30775	0.18792	0.22120	0.27403	0.29020	0.21438	0.18663	0.64165
2.76345	IND	c2	0.01284	2.78834	0.03002	0.03911	0.02738	0.03691	0.06268	0.39153	0.06482	0.05077	0.14668	0.26737	0.08045	0.06741	0.06613	0.01723	0.24778	0.07306
1.09082	IND	c3	0.00811	0.00778	1.21586	0.01036	0.01036	0.01022	0.01514	0.00565	0.03517	0.03089	0.00665	0.00532	0.00494	0.00708	0.00715	0.00372	0.00501	0.00553
0.34277	IND	c4	0.00170	0.00149	0.00407	0.43641	0.00863	0.00246	0.00480	0.00135	0.00540	0.00989	0.00329	0.00143	0.00230	0.00298	0.00237	0.00231	0.00113	0.00203
0.32453	IND	c5	0.00009	0.00017	0.00047	0.00166	0.41214	0.00065	0.00054	0.00021	0.00084	0.00303	0.00064	0.00027	0.00042	0.00092	0.00185	0.00066	0.00016	0.00023
1.64273	IND	c6	0.00116	0.00583	0.01435	0.01052	0.00631	1.68090	0.04306	0.00351	0.01773	0.01477	0.01832	0.00537	0.01305	0.00812	0.00754	0.00877	0.00291	0.02258
0.60667	IND	c7	0.00115	0.00193	0.01310	0.00786	0.00484	0.01755	0.78765	0.00377	0.00941	0.01042	0.00997	0.00448	0.00570	0.00640	0.00476	0.00435	0.00589	0.00453
0.99605	IND	c8	0.02418	0.02821	0.05410	0.05741	0.04752	0.04026	0.06672	1.07744	0.09620	0.07588	0.10914	0.06962	0.04439	0.04441	0.04156	0.01997	0.12760	0.07279
1.21649	IND	c9	0.02891	0.02948	0.04447	0.08043	0.05656	0.04338	0.09685	0.03026	1.52034	0.32246	0.03839	0.02807	0.02543	0.04197	0.03602	0.02747	0.01488	0.02475
0.23203	IND	c10	0.00061	0.00108	0.00443	0.00469	0.00412	0.00411	0.00619	0.00176	0.00624	0.26424	0.00651	0.00256	0.00381	0.00539	0.00590	0.00462	0.00121	0.00196
4.17768	IND	c11	0.00709	0.03243	0.01656	0.02109	0.01793	0.01062	0.02608	0.01756	0.02513	0.02476	4.52677	0.03273	0.04769	0.04619	0.02741	0.01809	0.02626	0.39997
1.07411	IND	c12	0.00743	0.04321	0.02208	0.03387	0.02317	0.02374	0.03481	0.02047	0.03059	0.05275	0.05546	1.51671	0.36651	0.28379	0.26077	0.04789	0.03965	0.21309
0.14746	IND	c13	0.00047	0.00342	0.00171	0.00337	0.00166	0.00091	0.00137	0.00122	0.00184	0.00228	0.00153	0.00299	0.15861	0.00636	0.00847	0.00234	0.00303	0.00196
0.10050	IND	c14	0.00012	0.00034	0.00037	0.00051	0.00040	0.00032	0.00056	0.00035	0.00054	0.00069	0.00058	0.00100	0.00216	0.10726	0.00194	0.00124	0.00220	0.00138
0.20495	IND	c15	0.00087	0.00192	0.00247	0.00243	0.00258	0.00225	0.00255	0.00213	0.00240	0.00541	0.00246	0.00380	0.00465	0.00415	0.23113	0.00202	0.00221	0.00271
0.02370	IND	c16	0.00004	0.00010	0.00012	0.00014	0.00053	0.00013	0.00024	0.00009	0.00022	0.00029	0.00012	0.00017	0.00028	0.00025	0.00044	0.02384	0.00010	0.00015
39.11767	IND	c17	0.66323	1.22438	1.15464	2.38906	1.24968	1.57845	2.69583	1.59317	2.13039	2.54675	4.49614	3.86791	1.86883	1.78571	2.37119	0.52660	49.22955	1.93941
0.19397	IND	c18	0.00273	0.00777	0.00587	0.00738	0.00346	0.00276	0.00672	0.00569	0.00505	0.00412	0.01708	0.00578	0.00797	0.00726	0.00520	0.00287	0.01029	0.20700
0.04929	IND	c19	0.00011	0.00010	0.00040	0.00031	0.00035	0.00028	0.00036	0.00048	0.00039	0.00045	0.00031	0.00032	0.00027	0.00033	0.00025	0.00013	0.00023	0.00029
0.01702	IND	c20	0.00029	0.00026	0.00108	0.00083	0.00095	0.00076	0.00098	0.00128	0.00106	0.00122	0.00082	0.00086	0.00073	0.00089	0.00068	0.00034	0.00062	0.00077
0.04429	IND	c21	0.00123	0.00110	0.00459	0.00352	0.00402	0.00324	0.00415	0.00543	0.00448	0.00517	0.00349	0.00365	0.00312	0.00379	0.00289	0.00146	0.00263	0.00327
0.98059	IND	c22	0.00141	0.00283	0.00410	0.00384	0.00406	0.00405	0.00433	0.00367	0.00368	0.00424	0.00325	0.00316	0.00347	0.00370	0.00386	0.00227	0.00391	0.00322
0.07791	IND	c23	0.00310	0.00307	0.01064	0.00996	0.00982	0.00832	0.01131	0.01073	0.01015	0.01166	0.00913	0.00899	0.00710	0.00841	0.00679	0.00431	0.00685	0.00844
0.68690	IND	c24	0.00050	0.00041	0.00197	0.00109	0.00122	0.00180	0.00150	0.00167	0.00152	0.00158	0.00158	0.00151	0.00103	0.00119	0.00095	0.00063	0.00139	0.00122
0.11253	IND	c25	0.00009	0.00008	0.00030	0.00026	0.00070	0.00020	0.00050	0.00031	0.00034	0.00032	0.00021	0.00021	0.00022	0.00026	0.00023	0.00016	0.00017	0.00020
0.54253	IND	c26	0.00133	0.00119	0.00489	0.00382	0.00430	0.00349	0.00453	0.00587	0.00484	0.00559	0.00376	0.00390	0.00336	0.00409	0.00311	0.00159	0.00282	0.00352
0.20307	IND	c27	0.00052	0.00108	0.00209	0.00277	0.00212	0.00246	0.00253	0.00236	0.00238	0.00272	0.00288	0.00329	0.00341	0.01145	0.00406	0.00467	0.00336	0.00215
0.02431	IND	c28	0.00037	0.00080	0.00155	0.00179	0.00161	0.00175	0.00177	0.00157	0.00158	0.00169	0.00143	0.00162	0.00236	0.00160	0.00284	0.00213	0.00249	0.00170
0.00415	IND	c29	0.00001	0.00002	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00001	0.00001	0.00000	0.00001	0.00001
0.06070	IND	c30	0.00021	0.00044	0.00128	0.00168	0.00163	0.00079	0.00120	0.00051	0.00108	0.00122	0.00066	0.00077	0.00226	0.00170	0.00151	0.00092	0.00049	0.00046
0.01120	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.03857	IND	c32	0.00003	0.00007	0.00005	0.00004	0.00005	0.00007	0.00005	0.00003	0.00004	0.00005	0.00003	0.00002	0.00003	0.00004	0.00005	0.00002	0.00003	0.00004
0.02863	IND	c33	0.00001	0.00004	0.00003	0.00002	0.00003	0.00004	0.00003	0.00002	0.00002	0.00003	0.00002	0.00002	0.00002	0.00003	0.00003	0.00001	0.00002	0.00002
0.08976	IND	c34	0.00020	0.00098	0.00073	0.00233	0.00138	0.00127	0.00099	0.00051	0.00071	0.00130	0.00084	0.00056	0.00210	0.00155	0.00374	0.00033	0.00053	0.00039
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**22.40095**	**4.48026**	**11.13103**	**5.46110**	**6.45747**	**7.55747**	**5.07688**	**3.40351**	**4.66781**	**5.22485**	**9.77592**	**6.03239**	**2.88788**	**2.73872**	**3.40100**	**0.94735**	**49.93205**	**3.64048**

Table 3A.15. SOX Induced Coefficients (Part-II)

SOX			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
19.49341	IND	c1	0.04689	0.16692	0.09624	5.89084	0.59798	0.51112	0.49517	0.33202	0.26308	0.14914	0.11128	0.23113	0.17568	0.22922	0.43292	0.36635	0.03653	3.99919
2.76345	IND	c2	0.00562	0.00638	0.00593	0.02223	0.09206	0.03321	0.04191	0.03555	0.02210	0.01012	0.00548	0.00791	0.00111	0.00553	0.01672	0.00445	0.00237	0.02527
1.09082	IND	c3	0.00075	0.00355	0.00190	0.11597	0.00622	0.01729	0.01210	0.00625	0.00551	0.00294	0.00193	0.00459	0.00409	0.00362	0.01702	0.00841	0.00073	0.09307
0.34277	IND	c4	0.00052	0.00104	0.00073	0.00191	0.00210	0.00299	0.00263	0.00161	0.00129	0.00065	0.00043	0.00118	0.00077	0.00111	0.00251	0.00171	0.00027	0.01753
0.32453	IND	c5	0.00004	0.00008	0.00006	0.00019	0.00080	0.00054	0.00133	0.00039	0.00016	0.00008	0.00004	0.00007	0.00006	0.00006	0.00018	0.00013	0.00002	0.00141
1.64273	IND	c6	0.00090	0.00101	0.00095	0.00303	0.00387	0.00362	0.00455	0.00695	0.00221	0.00146	0.00161	0.00126	0.00016	0.00076	0.00317	0.00067	0.00038	0.00358
0.60667	IND	c7	0.00631	0.00648	0.00638	0.00428	0.00699	0.00352	0.00403	0.04291	0.00739	0.01146	0.00045	0.00298	0.00025	0.00165	0.00603	0.00134	0.00088	0.00558
0.99605	IND	c8	0.01120	0.01263	0.01179	0.03964	0.22246	0.05903	0.09695	0.05058	0.02923	0.01709	0.00582	0.00864	0.00209	0.00997	0.02873	0.00680	0.00288	0.04751
1.21649	IND	c9	0.00222	0.00318	0.00261	0.01746	0.02521	0.10828	0.05993	0.02093	0.00705	0.00414	0.00227	0.00461	0.00141	0.00342	0.14753	0.00559	0.00295	0.03206
0.23203	IND	c10	0.00039	0.00045	0.00041	0.00129	0.00794	0.00437	0.01461	0.00406	0.00098	0.00062	0.00017	0.00035	0.00010	0.00028	0.00159	0.00030	0.00011	0.00221
4.17768	IND	c11	0.00380	0.00424	0.00398	0.02007	0.02766	0.02477	0.02147	0.02399	0.02274	0.01080	0.02764	0.01622	0.00064	0.00930	0.01735	0.00619	0.00498	0.01456
1.07411	IND	c12	0.00429	0.00495	0.00456	0.01627	0.04091	0.03306	0.02234	0.02418	0.02740	0.01093	0.01508	0.01390	0.00096	0.00731	0.01532	0.00579	0.00399	0.02186
0.14746	IND	c13	0.00015	0.00020	0.00017	0.00093	0.00202	0.00129	0.00101	0.00090	0.00082	0.00033	0.00016	0.00032	0.00007	0.00020	0.00069	0.00024	0.00011	0.00151
0.10050	IND	c14	0.00007	0.00009	0.00008	0.00032	0.00080	0.00073	0.00039	0.00063	0.00263	0.00044	0.00011	0.00048	0.00002	0.00008	0.00036	0.00014	0.00010	0.00049
0.20495	IND	c15	0.00038	0.00047	0.00042	0.00150	0.01048	0.01236	0.00281	0.00313	0.00180	0.00168	0.00024	0.00175	0.00013	0.00051	0.00119	0.00056	0.00032	0.00296
0.02370	IND	c16	0.00001	0.00002	0.00002	0.00006	0.00017	0.00017	0.00010	0.00010	0.00007	0.00004	0.00001	0.00003	0.00000	0.00001	0.00010	0.00002	0.00001	0.00010
39.11767	IND	c17	0.18382	0.21093	0.19496	1.13228	1.49193	1.35878	0.72837	3.03625	1.73170	0.46324	0.15299	0.56765	0.03969	0.15523	0.51740	0.21358	0.13906	0.90354
0.19397	IND	c18	0.00171	0.00187	0.00178	0.00763	0.00873	0.00738	0.00873	0.01059	0.01065	0.00492	0.01425	0.00764	0.00024	0.00454	0.00602	0.00269	0.00225	0.00538
0.04929	IND	c19	0.04931	0.00003	0.00003	0.00028	0.00028	0.00020	0.00019	0.00014	0.00015	0.00005	0.00002	0.00005	0.00001	0.00003	0.00017	0.00003	0.00001	0.00025
0.01702	IND	c20	0.00006	0.01710	0.00007	0.00076	0.00076	0.00055	0.00052	0.00037	0.00040	0.00014	0.00006	0.00013	0.00003	0.00007	0.00046	0.00009	0.00004	0.00067
0.04429	IND	c21	0.00025	0.00034	0.04457	0.00321	0.00321	0.00232	0.00219	0.00156	0.00168	0.00059	0.00027	0.00054	0.00013	0.00031	0.00197	0.00039	0.00016	0.00287
0.98059	IND	c22	0.00272	0.00361	0.00308	0.99089	0.01526	0.01125	0.01061	0.01591	0.00657	0.01190	0.00131	0.01864	0.00130	0.01046	0.02625	0.00388	0.00145	0.02953
0.07791	IND	c23	0.00148	0.00172	0.00158	0.00735	0.08483	0.00628	0.00612	0.00802	0.00403	0.00204	0.00072	0.00143	0.00035	0.00167	0.00457	0.00120	0.00053	0.00806
0.68690	IND	c24	0.00010	0.00014	0.00011	0.00140	0.00141	0.68768	0.00086	0.00058	0.00055	0.00022	0.00011	0.00019	0.00006	0.00012	0.00062	0.00017	0.00006	0.00128
0.11253	IND	c25	0.00004	0.00004	0.00004	0.00025	0.00023	0.00015	0.11268	0.00023	0.00014	0.00009	0.00002	0.00012	0.00001	0.00003	0.00035	0.00004	0.00002	0.00022
0.54253	IND	c26	0.01056	0.01065	0.01060	0.00372	0.00345	0.00275	0.00235	0.55155	0.00182	0.00065	0.00030	0.00058	0.00014	0.00034	0.00216	0.00042	0.00017	0.00308
0.20307	IND	c27	0.00150	0.00157	0.00153	0.00177	0.00503	0.00402	0.00439	0.01311	0.21225	0.00668	0.00040	0.00322	0.00010	0.00103	0.00274	0.00110	0.00091	0.00233
0.02431	IND	c28	0.00105	0.00108	0.00106	0.00100	0.00119	0.00105	0.00095	0.00196	0.00052	0.02695	0.00014	0.00133	0.00004	0.00069	0.00043	0.00022	0.00014	0.00102
0.00415	IND	c29	0.00000	0.00001	0.00000	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00000	0.00418	0.00001	0.00001	0.00001	0.00001	0.00003	0.00000	0.00030
0.06070	IND	c30	0.00047	0.00053	0.00049	0.00061	0.00172	0.00093	0.00119	0.00289	0.00083	0.00055	0.00008	0.06835	0.00009	0.00016	0.00048	0.00267	0.00250	0.00205
0.01120	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.01120	0.00000	0.00000	0.00000	0.00000	0.00000
0.03857	IND	c32	0.00000	0.00004	0.00002	0.00005	0.00004	0.00010	0.00009	0.00004	0.00006	0.00002	0.00002	0.00033	0.00006	0.03860	0.00003	0.00012	0.00002	0.00128
0.02863	IND	c33	0.00000	0.00002	0.00001	0.00003	0.00006	0.00005	0.00005	0.00003	0.00005	0.00001	0.00001	0.00018	0.00003	0.00002	0.02864	0.00006	0.00001	0.00064
0.08976	IND	c34	0.00013	0.00016	0.00014	0.00030	0.00171	0.00047	0.00035	0.00055	0.00024	0.00014	0.00009	0.00108	0.00005	0.00011	0.00039	0.09180	0.00195	0.00114
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.33675**	**0.46152**	**0.39631**	**8.28754**	**2.66752**	**2.90034**	**1.66100**	**4.19798**	**2.36609**	**0.74012**	**0.34772**	**0.96687**	**0.24105**	**0.48644**	**1.28409**	**0.72719**	**0.20589**	**5.23253**

Table 3A.16. CO Direct and Indirect Coefficients (Part-I)

CO			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
5.98290	IND	c1	6.61587	0.02362	2.56967	0.68685	1.35245	1.18556	0.31983	0.03851	0.18062	0.50601	0.06819	0.04027	0.04931	0.05361	0.05158	0.05485	0.03536	0.16592
36.15374	IND	c2	0.16177	36.46174	0.38114	0.50466	0.34652	0.46541	0.80775	5.11510	0.84018	0.65439	1.91196	3.49330	1.04750	0.87372	0.85505	0.22247	3.23576	0.94746
7.17750	IND	c3	0.04184	0.01860	7.97878	0.05522	0.04654	0.03500	0.07686	0.02377	0.21694	0.18494	0.03068	0.02631	0.02323	0.03140	0.02832	0.01903	0.02206	0.02094
4.48446	IND	c4	0.01790	0.00729	0.04516	5.70456	0.10485	0.02008	0.05422	0.01270	0.06527	0.12253	0.03812	0.01543	0.02663	0.03325	0.02404	0.02813	0.01068	0.02077
4.24580	IND	c5	0.00086	0.00127	0.00552	0.02139	5.39130	0.00759	0.00644	0.00235	0.01054	0.03904	0.00799	0.00334	0.00524	0.01151	0.02360	0.00847	0.00176	0.00260
21.49157	IND	c6	0.01431	0.07376	0.18612	0.13666	0.08084	21.98842	0.56166	0.04486	0.23084	0.19185	0.23873	0.06965	0.16996	0.10503	0.09716	0.11438	0.03718	0.29428
3.91148	IND	c7	0.00675	0.01055	0.08321	0.04990	0.02995	0.11126	5.07697	0.02354	0.05981	0.06610	0.06354	0.02837	0.03620	0.04038	0.02958	0.02775	0.03735	0.02827
91.33109	IND	c8	2.13567	2.35495	4.80827	5.17192	4.20293	3.46223	5.95538	98.69806	8.71753	6.82704	9.91384	6.32148	4.00395	3.96383	3.67766	1.79231	11.62247	6.56469
3.75364	IND	c9	0.08736	0.08569	0.13374	0.24608	0.17103	0.12865	0.29517	0.09119	4.68888	0.99204	0.11635	0.08520	0.07697	0.12706	0.10814	0.08387	0.04415	0.07387
3.03557	IND	c10	0.00738	0.01253	0.05692	0.06073	0.05291	0.05229	0.07994	0.02238	0.08095	3.45618	0.08461	0.03313	0.04936	0.06985	0.07625	0.06020	0.01535	0.02493
21.17699	IND	c11	0.03456	0.16048	0.08135	0.10535	0.08828	0.04993	0.12946	0.08741	0.12562	0.12332	22.94500	0.16486	0.24065	0.23228	0.13669	0.09104	0.13180	2.02563
17.02931	IND	c12	0.11133	0.66664	0.33793	0.52970	0.35515	0.35816	0.53894	0.31689	0.47673	0.82599	0.87183	24.04160	5.80558	4.49067	4.12374	0.75624	0.62248	3.36966
1.92918	IND	c13	0.00584	0.04369	0.02171	0.04369	0.02102	0.01088	0.01718	0.01553	0.02356	0.02919	0.01958	0.03885	2.07475	0.08269	0.11018	0.03047	0.03924	0.02513
1.31482	IND	c14	0.00151	0.00408	0.00468	0.00653	0.00498	0.00386	0.00712	0.00449	0.00692	0.00882	0.00741	0.01296	0.02822	1.40305	0.02518	0.01619	0.02870	0.01792
2.68126	IND	c15	0.01066	0.02307	0.03100	0.03097	0.03238	0.02734	0.03187	0.02696	0.03047	0.06965	0.03131	0.04921	0.06023	0.05329	3.02259	0.02602	0.02828	0.03451
0.31011	IND	c16	0.00044	0.00120	0.00152	0.00186	0.00687	0.00162	0.00310	0.00111	0.00283	0.00378	0.00155	0.00216	0.00362	0.00329	0.00578	0.31183	0.00125	0.00187
37.66859	IND	c17	0.62233	1.13269	1.08137	2.28214	1.17263	1.47417	2.56359	1.51513	2.03085	2.42641	4.31097	3.71229	1.78643	1.69794	2.25678	0.49933	47.39035	1.84559
2.13299	IND	c18	0.02891	0.08226	0.06249	0.07991	0.03600	0.02721	0.07165	0.06131	0.05414	0.04353	0.18653	0.06270	0.08674	0.07831	0.05535	0.03098	0.11205	2.27479
0.64481	IND	c19	0.00136	0.00109	0.00515	0.00397	0.00450	0.00354	0.00464	0.00616	0.00507	0.00583	0.00393	0.00414	0.00353	0.00427	0.00322	0.00165	0.00296	0.00367
0.22264	IND	c20	0.00364	0.00293	0.01381	0.01064	0.01207	0.00951	0.01245	0.01653	0.01359	0.01565	0.01055	0.01111	0.00947	0.01146	0.00864	0.00442	0.00795	0.00983
0.57940	IND	c21	0.01545	0.01244	0.05871	0.04522	0.05132	0.04040	0.05292	0.07022	0.05776	0.06648	0.04484	0.04720	0.04024	0.04870	0.03670	0.01879	0.03379	0.04179
12.82890	IND	c22	0.01119	0.01647	0.04016	0.04207	0.03948	0.03268	0.04225	0.03962	0.03894	0.04394	0.03428	0.03589	0.03956	0.03886	0.03866	0.02622	0.04429	0.03241
8.44221	IND	c23	0.31925	0.28666	1.12209	1.06084	1.03342	0.85563	1.19279	1.14403	1.07935	1.23783	0.97035	0.96221	0.75646	0.88931	0.70911	0.45892	0.72705	0.89208
6.82420	IND	c24	0.00470	0.00337	0.01916	0.01055	0.01165	0.01718	0.01445	0.01630	0.01476	0.01536	0.01543	0.01479	0.01007	0.01149	0.00902	0.00617	0.01361	0.01184
27.93064	IND	c25	0.02188	0.01600	0.07221	0.06435	0.17203	0.04669	0.12315	0.07514	0.08190	0.07774	0.05070	0.05156	0.05290	0.06267	0.05500	0.04043	0.04211	0.04840
7.09787	IND	c26	0.01666	0.01345	0.06262	0.04906	0.05483	0.04350	0.05771	0.07591	0.06240	0.07191	0.04832	0.05049	0.04333	0.05255	0.03943	0.02046	0.03623	0.04498
2.65669	IND	c27	0.00617	0.01246	0.02624	0.03556	0.02661	0.03054	0.03196	0.03025	0.03040	0.03474	0.03708	0.04264	0.04418	0.14910	0.05213	0.06089	0.04338	0.02732
0.31800	IND	c28	0.00456	0.00978	0.01977	0.02312	0.02065	0.02215	0.02260	0.02018	0.02040	0.02170	0.01841	0.02100	0.03067	0.02065	0.03679	0.02778	0.03227	0.02190
0.05432	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.79409	IND	c30	0.00227	0.00431	0.01583	0.02145	0.02042	0.00891	0.01476	0.00612	0.01346	0.01522	0.00800	0.00966	0.02913	0.02153	0.01891	0.01179	0.00587	0.00538
0.14650	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.50461	IND	c32	0.00002	0.00002	0.00009	0.00011	0.00011	0.00005	0.00009	0.00005	0.00008	0.00009	0.00005	0.00006	0.00014	0.00011	0.00010	0.00006	0.00004	0.00004
0.37453	IND	c33	0.00003	0.00003	0.00011	0.00012	0.00012	0.00008	0.00011	0.00009	0.00010	0.00012	0.00008	0.00009	0.00012	0.00012	0.00010	0.00006	0.00006	0.00007
1.17428	IND	c34	0.00228	0.01197	0.00901	0.03011	0.01747	0.01587	0.01245	0.00637	0.00900	0.01657	0.01071	0.00712	0.02728	0.01994	0.04845	0.00412	0.00668	0.00468
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**10.31477**	**41.55511**	**19.33554**	**17.11531**	**14.96130**	**30.53639**	**18.17945**	**107.60826**	**19.26989**	**18.19399**	**42.10096**	**39.45905**	**16.66163**	**14.68194**	**15.76391**	**4.85533**	**64.41258**	**18.88324**

Table 3A.16. CO Direct and Indirect Coefficients (Part-II)

CO			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
5.98290	IND	c1	0.01192	0.01192	0.01192	1.76436	0.16192	0.06892	0.07055	0.07421	0.02832	0.03333	0.01260	0.04337	0.00000	0.04107	0.10909	0.00725	0.00725
36.15374	IND	c2	0.07284	0.07284	0.07284	0.27905	1.19860	0.41077	0.52640	0.45763	0.27505	0.12905	0.06593	0.09602	0.00000	0.06441	0.21232	0.02989	0.02989
7.17750	IND	c3	0.00371	0.00371	0.00371	0.74132	0.03015	0.06988	0.03897	0.02733	0.01010	0.01317	0.00196	0.01644	0.00000	0.00919	0.10012	0.00285	0.00285
4.48446	IND	c4	0.00632	0.00632	0.00632	0.01679	0.02337	0.02270	0.01921	0.01587	0.00706	0.00613	0.00155	0.01032	0.00000	0.00904	0.02840	0.00277	0.00277
4.24580	IND	c5	0.00047	0.00047	0.00047	0.00181	0.01015	0.00569	0.01616	0.00468	0.00132	0.00081	0.00018	0.00054	0.00000	0.00037	0.00195	0.00016	0.00016
21.49157	IND	c6	0.01172	0.01172	0.01172	0.03791	0.04980	0.04403	0.05639	0.08983	0.02694	0.01869	0.02025	0.01537	0.00000	0.00885	0.04054	0.00480	0.00480
3.91148	IND	c7	0.04064	0.04064	0.04064	0.02629	0.04443	0.02015	0.02359	0.27588	0.04614	0.07352	0.00228	0.01842	0.00000	0.00975	0.03815	0.00555	0.00555
91.33109	IND	c8	1.01821	1.01821	1.01821	3.47941	20.32086	5.10033	8.60086	4.53944	2.49422	1.52274	0.45738	0.69430	0.00000	0.80989	2.55007	0.25001	0.25001
3.75364	IND	c9	0.00665	0.00665	0.00665	0.05036	0.07605	0.32701	0.17837	0.06235	0.01753	0.01176	0.00526	0.01201	0.00000	0.00818	0.45331	0.00878	0.00878
3.03557	IND	c10	0.00500	0.00500	0.00500	0.01587	0.10332	0.05514	0.18928	0.05244	0.01165	0.00775	0.00175	0.00386	0.00000	0.00302	0.02025	0.00140	0.00140
21.17699	IND	c11	0.01913	0.01913	0.01913	0.09909	0.13891	0.12028	0.10395	0.11993	0.11210	0.05401	0.13883	0.08055	0.00000	0.04537	0.08653	0.02503	0.02503
17.02931	IND	c12	0.06737	0.06737	0.06737	0.24566	0.64249	0.49937	0.33118	0.37555	0.41965	0.16984	0.23306	0.21263	0.00000	0.10768	0.23622	0.06216	0.06216
1.92918	IND	c13	0.00193	0.00193	0.00193	0.01151	0.02611	0.01547	0.01193	0.01139	0.00984	0.00410	0.00179	0.00373	0.00000	0.00217	0.00869	0.00143	0.00143
1.31482	IND	c14	0.00094	0.00094	0.00094	0.00394	0.01041	0.00914	0.00466	0.00811	0.03414	0.00573	0.00128	0.00609	0.00000	0.00092	0.00460	0.00130	0.00130
2.68126	IND	c15	0.00493	0.00493	0.00493	0.01831	0.13644	0.15894	0.03414	0.04013	0.02187	0.02155	0.00251	0.02196	0.00000	0.00577	0.01480	0.00405	0.00405
0.31011	IND	c16	0.00019	0.00019	0.00019	0.00078	0.00226	0.00210	0.00120	0.00133	0.00081	0.00054	0.00013	0.00038	0.00000	0.00016	0.00126	0.00010	0.00010
37.66859	IND	c17	0.17525	0.17525	0.17525	1.05939	1.42135	1.24610	0.64367	2.90415	1.63039	0.43726	0.13205	0.52708	0.00000	0.12872	0.48138	0.13110	0.13110
2.13299	IND	c18	0.01868	0.01868	0.01868	0.08178	0.09498	0.07694	0.09208	0.11515	0.11453	0.05351	0.15569	0.08265	0.00000	0.04856	0.06503	0.02453	0.02453
0.64481	IND	c19	0.64509	0.00028	0.00028	0.00357	0.00363	0.00243	0.00230	0.00172	0.00179	0.00065	0.00026	0.00054	0.00000	0.00028	0.00220	0.00017	0.00017
0.22264	IND	c20	0.00076	0.22339	0.00076	0.00957	0.00973	0.00651	0.00616	0.00462	0.00480	0.00174	0.00069	0.00145	0.00000	0.00076	0.00591	0.00045	0.00045
0.57940	IND	c21	0.00321	0.00321	0.58261	0.04068	0.04133	0.02769	0.02618	0.01963	0.02041	0.00739	0.00294	0.00617	0.00000	0.00322	0.02510	0.00191	0.00191
12.82890	IND	c22	0.03481	0.03481	0.03481	12.94993	0.19282	0.11955	0.11316	0.19937	0.06943	0.15178	0.01042	0.23520	0.00000	0.12757	0.33596	0.01770	0.01770
8.44221	IND	c23	0.15815	0.15815	0.15815	0.76573	9.17673	0.61821	0.60479	0.84945	0.39894	0.21213	0.06264	0.13548	0.00000	0.15971	0.47856	0.05483	0.05483
6.82420	IND	c24	0.00095	0.00095	0.00095	0.01349	0.01379	6.83105	0.00768	0.00545	0.00494	0.00206	0.00083	0.00161	0.00000	0.00093	0.00589	0.00055	0.00055
27.93064	IND	c25	0.00930	0.00930	0.00930	0.06041	0.05560	0.03303	27.96418	0.05495	0.03121	0.02240	0.00348	0.02816	0.00000	0.00511	0.08465	0.00497	0.00497
7.09787	IND	c26	0.13807	0.13807	0.13807	0.04720	0.04441	0.03305	0.02811	7.21494	0.02203	0.00806	0.00317	0.00671	0.00000	0.00350	0.02742	0.00207	0.00207
2.65669	IND	c27	0.01953	0.01953	0.01953	0.02205	0.06529	0.05043	0.05544	0.17087	2.77553	0.08713	0.00476	0.04140	0.00000	0.01274	0.03522	0.01177	0.01177
0.31800	IND	c28	0.01365	0.01365	0.01365	0.01264	0.01538	0.01276	0.01158	0.02535	0.00619	0.35247	0.00161	0.01711	0.00000	0.00871	0.00531	0.00175	0.00175
0.05432	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.05460	0.00007	0.00000	0.00000	0.00000	0.00000	0.00000
0.79409	IND	c30	0.00606	0.00606	0.00606	0.00706	0.02209	0.01026	0.01386	0.03722	0.00972	0.00695	0.00052	0.89360	0.00000	0.00144	0.00571	0.03264	0.03264
0.14650	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.14650	0.00000	0.00000	0.00000	0.00000
0.50461	IND	c32	0.00003	0.00003	0.00003	0.00004	0.00025	0.00006	0.00007	0.00018	0.00005	0.00003	0.00000	0.00398	0.00000	0.50463	0.00008	0.00015	0.00015
0.37453	IND	c33	0.00003	0.00003	0.00003	0.00007	0.00064	0.00007	0.00008	0.00016	0.00036	0.00004	0.00001	0.00216	0.00000	0.00001	0.37458	0.00008	0.00008
1.17428	IND	c34	0.00163	0.00163	0.00163	0.00345	0.02206	0.00513	0.00363	0.00683	0.00246	0.00163	0.00086	0.01383	0.00000	0.00104	0.00481	1.19971	0.02543
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**2.4971658**	**2.0749977**	**2.4317582**	**21.869525**	**34.15537**	**16.003176**	**39.779824**	**17.7661494**	**8.6095255**	**3.4179616**	**1.3812663**	**3.2332134**	**0.1465043**	**2.1327708**	**5.8440963**	**1.891925**	**0.7176416**

Table 3A.17. CO Induced Coefficients (Part-I)

CO			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
5.98290	IND	c1	6.63891	0.08898	2.61269	0.71283	1.39585	1.25018	0.36549	0.06535	0.20970	0.54269	0.09446	0.05768	0.06789	0.08411	0.08907	0.06580	0.05728	0.19693
36.15374	IND	c2	0.16798	36.47935	0.39273	0.51166	0.35820	0.48282	0.82005	5.12233	0.84802	0.66428	1.91904	3.49799	1.05251	0.88194	0.86514	0.22542	3.24166	0.95581
7.17750	IND	c3	0.05334	0.05121	8.00024	0.06818	0.06819	0.06724	0.09964	0.03715	0.23145	0.20324	0.04379	0.03500	0.03250	0.04662	0.04702	0.02449	0.03300	0.03641
4.48446	IND	c4	0.02220	0.01950	0.05319	5.70942	0.11296	0.03216	0.06275	0.01771	0.07071	0.12938	0.04303	0.01868	0.03010	0.03895	0.03105	0.03018	0.01477	0.02656
4.24580	IND	c5	0.00121	0.00225	0.00617	0.02178	5.39195	0.00856	0.00713	0.00275	0.01098	0.03959	0.00839	0.00360	0.00552	0.01197	0.02417	0.00864	0.00209	0.00306
21.49157	IND	c6	0.01519	0.07625	0.18776	0.13765	0.08250	21.99089	0.56341	0.04588	0.23195	0.19325	0.23974	0.07031	0.17067	0.10619	0.09859	0.11479	0.03801	0.29546
3.91148	IND	c7	0.00743	0.01247	0.08447	0.05066	0.03122	0.11315	5.07830	0.02433	0.06066	0.06718	0.06431	0.02888	0.03675	0.04127	0.03068	0.02807	0.03799	0.02918
91.33109	IND	c8	2.21745	2.58695	4.96096	5.26413	4.35695	3.69162	6.11747	98.79330	8.82076	6.95724	10.00708	6.38327	4.06991	4.07207	3.81072	1.83117	11.70026	6.67475
3.75364	IND	c9	0.08922	0.09096	0.13720	0.24817	0.17453	0.13386	0.29885	0.09336	4.69122	0.99500	0.11847	0.08661	0.07847	0.12952	0.11116	0.08475	0.04592	0.07637
3.03557	IND	c10	0.00793	0.01407	0.05793	0.06134	0.05393	0.05381	0.08101	0.02301	0.08164	3.45705	0.08523	0.03354	0.04980	0.07057	0.07713	0.06045	0.01587	0.02566
21.17699	IND	c11	0.03595	0.16441	0.08394	0.10691	0.09089	0.05382	0.13220	0.08902	0.12737	0.12553	22.94658	0.16591	0.24177	0.23412	0.13895	0.09170	0.13312	2.02749
17.02931	IND	c12	0.11783	0.68510	0.35008	0.53704	0.36740	0.37641	0.55184	0.32447	0.48495	0.83635	0.87924	24.04651	5.81083	4.49928	4.13433	0.75933	0.62867	3.37842
1.92918	IND	c13	0.00621	0.04474	0.02241	0.04410	0.02171	0.01192	0.01792	0.01596	0.02403	0.02978	0.02001	0.03913	2.07505	0.08318	0.11078	0.03065	0.03959	0.02563
1.31482	IND	c14	0.00163	0.00443	0.00491	0.00666	0.00521	0.00419	0.00736	0.00463	0.00707	0.00901	0.00754	0.01305	0.02832	1.40321	0.02538	0.01625	0.02881	0.01808
2.68126	IND	c15	0.01139	0.02514	0.03236	0.03179	0.03375	0.02938	0.03331	0.02780	0.03139	0.07081	0.03214	0.04976	0.06082	0.05426	3.02377	0.02637	0.02897	0.03548
0.31011	IND	c16	0.00047	0.00127	0.00156	0.00188	0.00691	0.00169	0.00315	0.00114	0.00286	0.00381	0.00158	0.00218	0.00363	0.00332	0.00582	0.31185	0.00127	0.00190
37.66859	IND	c17	0.63866	1.17902	1.11186	2.30056	1.20339	1.51998	2.59596	1.53415	2.05147	2.45241	4.32959	3.72463	1.79960	1.71956	2.28335	0.50709	47.40589	1.86757
2.13299	IND	c18	0.03002	0.08542	0.06456	0.08116	0.03809	0.03032	0.07385	0.06261	0.05554	0.04530	0.18780	0.06354	0.08764	0.07978	0.05716	0.03151	0.11310	2.27629
0.64481	IND	c19	0.00142	0.00127	0.00527	0.00404	0.00462	0.00372	0.00476	0.00623	0.00514	0.00593	0.00400	0.00419	0.00358	0.00435	0.00332	0.00168	0.00302	0.00375
0.22264	IND	c20	0.00380	0.00340	0.01412	0.01083	0.01239	0.00997	0.01278	0.01672	0.01380	0.01591	0.01074	0.01123	0.00960	0.01168	0.00891	0.00450	0.00811	0.01006
0.57940	IND	c21	0.01616	0.01444	0.06002	0.04601	0.05264	0.04237	0.05431	0.07104	0.05865	0.06760	0.04565	0.04773	0.04081	0.04963	0.03784	0.01913	0.03446	0.04274
12.82890	IND	c22	0.01844	0.03705	0.05370	0.05025	0.05314	0.05302	0.05662	0.04807	0.04809	0.05549	0.04255	0.04137	0.04541	0.04846	0.05046	0.02966	0.05119	0.04217
8.44221	IND	c23	0.33564	0.33318	1.15271	1.07933	1.06431	0.90162	1.22529	1.16313	1.10005	1.26394	0.98904	0.97461	0.76968	0.91101	0.73579	0.46671	0.74264	0.91415
6.82420	IND	c24	0.00494	0.00405	0.01961	0.01082	0.01210	0.01785	0.01493	0.01658	0.01506	0.01574	0.01571	0.01497	0.01026	0.01181	0.00941	0.00628	0.01383	0.01217
27.93064	IND	c25	0.02292	0.01892	0.07413	0.06551	0.17397	0.04959	0.12519	0.07634	0.08320	0.07938	0.05187	0.05234	0.05373	0.06403	0.05668	0.04092	0.04309	0.04978
7.09787	IND	c26	0.01742	0.01559	0.06403	0.04992	0.05625	0.04562	0.05921	0.07679	0.06336	0.07311	0.04918	0.05106	0.04393	0.05355	0.04066	0.02082	0.03695	0.04600
2.65669	IND	c27	0.00674	0.01408	0.02730	0.03620	0.02769	0.03214	0.03309	0.03091	0.03112	0.03565	0.03773	0.04307	0.04464	0.14986	0.05306	0.06116	0.04393	0.02809
0.31800	IND	c28	0.00481	0.01049	0.02024	0.02340	0.02112	0.02286	0.02309	0.02047	0.02071	0.02210	0.01870	0.02119	0.03087	0.02098	0.03720	0.02790	0.03251	0.02224
0.05432	IND	c29	0.00007	0.00021	0.00014	0.00009	0.00014	0.00021	0.00015	0.00009	0.00010	0.00012	0.00009	0.00006	0.00006	0.00010	0.00012	0.00004	0.00007	0.00010
0.79409	IND	c30	0.00277	0.00573	0.01677	0.02202	0.02136	0.01032	0.01576	0.00670	0.01409	0.01602	0.00857	0.01004	0.02953	0.02219	0.01973	0.01203	0.00635	0.00605
0.14650	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.50461	IND	c32	0.00033	0.00092	0.00068	0.00047	0.00070	0.00094	0.00071	0.00041	0.00048	0.00059	0.00041	0.00030	0.00040	0.00053	0.00061	0.00021	0.00034	0.00046
0.37453	IND	c33	0.00018	0.00048	0.00041	0.00030	0.00041	0.00052	0.00043	0.00027	0.00030	0.00037	0.00026	0.00021	0.00025	0.00033	0.00035	0.00014	0.00021	0.00028
1.17428	IND	c34	0.00256	0.01277	0.00953	0.03043	0.01800	0.01666	0.01301	0.00670	0.00935	0.01702	0.01103	0.00733	0.02750	0.02031	0.04891	0.00426	0.00695	0.00506
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**10.50121**	**42.08409**	**19.68368**	**17.32556**	**15.31246**	**31.05940**	**18.54904**	**107.82542**	**19.50526**	**18.49085**	**42.31355**	**39.59996**	**16.81202**	**14.92874**	**16.06729**	**4.94393**	**64.58995**	**19.13419**

Table 3A.17. CO Induced Coefficients (Part-II)

CO			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
5.98290	IND	c1	0.01439	0.05123	0.02954	1.80801	0.18353	0.15687	0.15198	0.10190	0.08074	0.04578	0.03415	0.07094	0.05392	0.07035	0.13287	0.11244	0.01121	1.22743
36.15374	IND	c2	0.07351	0.08343	0.07759	0.29081	1.20443	0.43446	0.54833	0.46509	0.28918	0.13240	0.07174	0.10344	0.01452	0.07230	0.21873	0.05823	0.03096	0.33064
7.17750	IND	c3	0.00495	0.02333	0.01250	0.76310	0.04093	0.11376	0.07960	0.04115	0.03625	0.01937	0.01271	0.03019	0.02690	0.02380	0.11199	0.05534	0.00483	0.61238
4.48446	IND	c4	0.00678	0.01367	0.00961	0.02495	0.02741	0.03913	0.03443	0.02105	0.01685	0.00845	0.00557	0.01547	0.01008	0.01451	0.03284	0.02242	0.00351	0.22936
4.24580	IND	c5	0.00051	0.00106	0.00074	0.00247	0.01047	0.00702	0.01738	0.00510	0.00211	0.00100	0.00051	0.00095	0.00081	0.00081	0.00231	0.00175	0.00022	0.01848
21.49157	IND	c6	0.01181	0.01322	0.01239	0.03958	0.05062	0.04739	0.05949	0.09089	0.02893	0.01916	0.02107	0.01642	0.00206	0.00996	0.04145	0.00881	0.00495	0.04680
3.91148	IND	c7	0.04071	0.04179	0.04116	0.02757	0.04507	0.02272	0.02598	0.27669	0.04767	0.07389	0.00292	0.01923	0.00158	0.01061	0.03885	0.00863	0.00567	0.03596
91.33109	IND	c8	1.02700	1.15775	1.08075	3.63436	20.39756	5.41250	8.88989	4.63772	2.68029	1.56690	0.53387	0.79214	0.19138	0.91383	2.63448	0.62338	0.26407	4.35663
3.75364	IND	c9	0.00685	0.00982	0.00807	0.05388	0.07779	0.33410	0.18493	0.06458	0.02175	0.01277	0.00699	0.01423	0.00435	0.01054	0.45522	0.01726	0.00910	0.09893
3.03557	IND	c10	0.00506	0.00593	0.00541	0.01690	0.10383	0.05721	0.19120	0.05309	0.01288	0.00805	0.00226	0.00451	0.00127	0.00371	0.02081	0.00387	0.00149	0.02891
21.17699	IND	c11	0.01928	0.02150	0.02019	0.10171	0.14021	0.12557	0.10885	0.12159	0.11525	0.05476	0.14013	0.08220	0.00324	0.04713	0.08796	0.03135	0.02527	0.07380
17.02931	IND	c12	0.06807	0.07847	0.07235	0.25799	0.64859	0.52420	0.35417	0.38336	0.43445	0.17336	0.23915	0.22042	0.01522	0.11595	0.24293	0.09186	0.06328	0.34658
1.92918	IND	c13	0.00197	0.00256	0.00221	0.01221	0.02646	0.01688	0.01324	0.01183	0.01068	0.00430	0.00213	0.00417	0.00087	0.00264	0.00907	0.00312	0.00149	0.01972
1.31482	IND	c14	0.00095	0.00114	0.00103	0.00417	0.01052	0.00960	0.00508	0.00826	0.03442	0.00579	0.00140	0.00623	0.00028	0.00107	0.00473	0.00185	0.00133	0.00639
2.68126	IND	c15	0.00501	0.00617	0.00549	0.01969	0.13712	0.16172	0.03671	0.04101	0.02352	0.02195	0.00319	0.02283	0.00170	0.00669	0.01555	0.00737	0.00417	0.03874
0.31011	IND	c16	0.00019	0.00023	0.00021	0.00082	0.00229	0.00219	0.00128	0.00136	0.00087	0.00055	0.00015	0.00041	0.00005	0.00019	0.00129	0.00021	0.00011	0.00125
37.66859	IND	c17	0.17701	0.20312	0.18774	1.09033	1.43666	1.30845	0.70139	2.92378	1.66755	0.44608	0.14733	0.54662	0.03822	0.14948	0.49823	0.20567	0.13391	0.87006
2.13299	IND	c18	0.01880	0.02058	0.01953	0.08389	0.09602	0.08118	0.09601	0.11648	0.11706	0.05411	0.15673	0.08398	0.00260	0.04997	0.06618	0.02960	0.02472	0.05921
0.64481	IND	c19	0.64509	0.00039	0.00033	0.00369	0.00368	0.00266	0.00251	0.00180	0.00193	0.00068	0.00032	0.00061	0.00014	0.00036	0.00226	0.00045	0.00018	0.00329
0.22264	IND	c20	0.00077	0.22367	0.00088	0.00988	0.00988	0.00715	0.00675	0.00482	0.00518	0.00183	0.00085	0.00165	0.00039	0.00097	0.00608	0.00121	0.00048	0.00882
0.57940	IND	c21	0.00329	0.00441	0.58315	0.04201	0.04199	0.03037	0.02867	0.02047	0.02201	0.00777	0.00360	0.00701	0.00165	0.00411	0.02582	0.00513	0.00204	0.03750
12.82890	IND	c22	0.03559	0.04719	0.04036	12.96367	0.19962	0.14723	0.13879	0.20809	0.08593	0.15570	0.01720	0.24387	0.01697	0.13678	0.34345	0.05081	0.01894	0.38633
8.44221	IND	c23	0.15991	0.18613	0.17069	0.79680	9.19211	0.68080	0.66274	0.86915	0.43625	0.22099	0.07798	0.15510	0.03837	0.18055	0.49548	0.12970	0.05765	0.87353
6.82420	IND	c24	0.00097	0.00136	0.00113	0.01394	0.01401	6.83196	0.00853	0.00574	0.00549	0.00219	0.00106	0.00190	0.00056	0.00123	0.00614	0.00164	0.00059	0.01275
27.93064	IND	c25	0.00941	0.01106	0.01009	0.06236	0.05657	0.03696	27.96783	0.05618	0.03356	0.02296	0.00444	0.02940	0.00241	0.00642	0.08571	0.00968	0.00515	0.05494
7.09787	IND	c26	0.13816	0.13936	0.13865	0.04863	0.04512	0.03593	0.03078	7.21585	0.02375	0.00847	0.00387	0.00762	0.00177	0.00446	0.02820	0.00552	0.00220	0.04025
2.65669	IND	c27	0.01959	0.02050	0.01996	0.02314	0.06582	0.05261	0.05746	0.17156	2.77683	0.08744	0.00529	0.04209	0.00134	0.01347	0.03581	0.01438	0.01187	0.03044
0.31800	IND	c28	0.01367	0.01407	0.01384	0.01312	0.01562	0.01372	0.01247	0.02565	0.00676	0.35261	0.00184	0.01741	0.00059	0.00903	0.00557	0.00290	0.00179	0.01336
0.05432	IND	c29	0.00001	0.00013	0.00006	0.00014	0.00007	0.00029	0.00026	0.00009	0.00017	0.00004	0.05467	0.00016	0.00017	0.00009	0.00008	0.00034	0.00002	0.00397
0.79409	IND	c30	0.00611	0.00692	0.00645	0.00801	0.02257	0.01218	0.01563	0.03783	0.01087	0.00722	0.00099	0.89420	0.00118	0.00208	0.00623	0.03494	0.03273	0.02677
0.14650	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.14650	0.00000	0.00000	0.00000	0.00000	0.00000
0.50461	IND	c32	0.00006	0.00057	0.00027	0.00064	0.00054	0.00126	0.00119	0.00056	0.00077	0.00020	0.00030	0.00436	0.00074	0.50503	0.00040	0.00159	0.00020	0.01680
0.37453	IND	c33	0.00004	0.00029	0.00015	0.00037	0.00079	0.00067	0.00063	0.00035	0.00071	0.00012	0.00015	0.00235	0.00037	0.00021	0.37474	0.00080	0.00011	0.00837
1.17428	IND	c34	0.00166	0.00211	0.00184	0.00398	0.02232	0.00620	0.00463	0.00716	0.00309	0.00178	0.00112	0.01417	0.00066	0.00140	0.00510	1.20099	0.02548	0.01498
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**2.51720**	**2.39316**	**2.57435**	**22.22282**	**34.33024**	**16.71493**	**40.43881**	**17.99023**	**9.03378**	**3.51867**	**1.55569**	**3.45628**	**0.58286**	**2.36976**	**6.03656**	**2.74323**	**0.74971**	**9.93335**

Table 3A.18. Direct and Indirect Coefficients (Part-I)

NMVOC			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
4.00816	IND	c1	4.43220	0.01582	1.72151	0.46015	0.90606	0.79425	0.21426	0.02580	0.12100	0.33899	0.04568	0.02698	0.03303	0.03591	0.03455	0.03675	0.02369	0.11116
10.76290	IND	c2	0.04816	10.85459	0.11346	0.15024	0.10316	0.13855	0.24047	1.52276	0.25012	0.19481	0.56919	1.03995	0.31184	0.26011	0.25455	0.06623	0.96328	0.28206
10.67381	IND	c3	0.06223	0.02766	11.86541	0.08212	0.06921	0.05205	0.11429	0.03534	0.32261	0.27502	0.04563	0.03913	0.03454	0.04670	0.04212	0.02830	0.03281	0.03113
1.33501	IND	c4	0.00533	0.00217	0.01344	1.69824	0.03121	0.00598	0.01614	0.00378	0.01943	0.03648	0.01135	0.00459	0.00793	0.00990	0.00716	0.00837	0.00318	0.00618
1.26397	IND	c5	0.00026	0.00038	0.00164	0.00637	1.60498	0.00226	0.00192	0.00070	0.00314	0.01162	0.00238	0.00099	0.00156	0.00343	0.00703	0.00252	0.00052	0.00077
6.39800	IND	c6	0.00426	0.02196	0.05541	0.04068	0.02407	6.54591	0.16721	0.01335	0.06872	0.05711	0.07107	0.02073	0.05060	0.03127	0.02892	0.03405	0.01107	0.08761
1.70539	IND	c7	0.00294	0.00460	0.03628	0.02176	0.01306	0.04851	2.21354	0.01026	0.02607	0.02882	0.02770	0.01237	0.01578	0.01760	0.01290	0.01210	0.01628	0.01233
27.97318	IND	c8	0.65412	0.72128	1.47269	1.58407	1.28729	1.06042	1.82403	30.22956	2.67003	2.09101	3.03644	1.93616	1.22634	1.21405	1.12641	0.54896	3.55977	2.01065
5.58602	IND	c9	0.13000	0.12752	0.19902	0.36620	0.25452	0.19146	0.43927	0.13571	6.97781	1.47631	0.17314	0.12680	0.11455	0.18908	0.16093	0.12481	0.06570	0.10993
0.90369	IND	c10	0.00220	0.00373	0.01694	0.01808	0.01575	0.01557	0.02380	0.00666	0.02410	1.02890	0.02519	0.00986	0.01469	0.02080	0.02270	0.01792	0.00457	0.00742
6.35896	IND	c11	0.01038	0.04819	0.02443	0.03163	0.02651	0.01499	0.03887	0.02625	0.03772	0.03703	6.88985	0.04950	0.07226	0.06975	0.04105	0.02734	0.03958	0.60825
2.61131	IND	c12	0.01707	0.10222	0.05182	0.08123	0.05446	0.05492	0.08264	0.04859	0.07310	0.12666	0.13369	3.68659	0.89024	0.68861	0.63234	0.11596	0.09545	0.51671
0.57431	IND	c13	0.00174	0.01301	0.00646	0.01301	0.00626	0.00324	0.00512	0.00462	0.00701	0.00869	0.00583	0.01157	0.61765	0.02462	0.03280	0.00907	0.01168	0.00748
0.39142	IND	c14	0.00045	0.00122	0.00139	0.00194	0.00148	0.00115	0.00212	0.00134	0.00206	0.00262	0.00220	0.00386	0.00840	0.41769	0.00750	0.00482	0.00854	0.00533
0.79821	IND	c15	0.00317	0.00687	0.00923	0.00922	0.00964	0.00814	0.00949	0.00803	0.00907	0.02074	0.00932	0.01465	0.01793	0.01587	0.89982	0.00775	0.00842	0.01027
0.09232	IND	c16	0.00013	0.00036	0.00045	0.00055	0.00204	0.00048	0.00092	0.00033	0.00084	0.00112	0.00046	0.00064	0.00108	0.00098	0.00172	0.09283	0.00037	0.00056
5.93526	IND	c17	0.09806	0.17847	0.17039	0.35959	0.18477	0.23228	0.40393	0.23873	0.31999	0.38232	0.67926	0.58493	0.28148	0.26754	0.35559	0.07868	7.46708	0.29080
2.49214	IND	c18	0.03377	0.09612	0.07301	0.09337	0.04206	0.03179	0.08371	0.07164	0.06325	0.05086	0.21794	0.07326	0.10135	0.09150	0.06467	0.03620	0.13091	2.65783
0.19196	IND	c19	0.00040	0.00032	0.00153	0.00118	0.00134	0.00106	0.00138	0.00183	0.00151	0.00174	0.00117	0.00123	0.00105	0.00127	0.00096	0.00049	0.00088	0.00109
0.06628	IND	c20	0.00108	0.00087	0.00411	0.00317	0.00359	0.00283	0.00371	0.00492	0.00405	0.00466	0.00314	0.00331	0.00282	0.00341	0.00257	0.00132	0.00237	0.00293
0.17249	IND	c21	0.00460	0.00370	0.01748	0.01346	0.01528	0.01203	0.01575	0.02090	0.01719	0.01979	0.01335	0.01405	0.01198	0.01450	0.01093	0.00559	0.01006	0.01244
3.81914	IND	c22	0.00333	0.00490	0.01195	0.01252	0.01175	0.00973	0.01258	0.01180	0.01159	0.01308	0.01021	0.01069	0.01178	0.01157	0.01151	0.00781	0.01319	0.00965
0.73035	IND	c23	0.02762	0.02480	0.09707	0.09178	0.08940	0.07402	0.10319	0.09897	0.09338	0.10709	0.08395	0.08324	0.06544	0.07694	0.06135	0.03970	0.06290	0.07718
1.24174	IND	c24	0.00086	0.00061	0.00349	0.00192	0.00212	0.00313	0.00263	0.00297	0.00268	0.00280	0.00281	0.00269	0.00183	0.00209	0.00164	0.00112	0.00248	0.00216
1.70113	IND	c25	0.00133	0.00097	0.00440	0.00392	0.01048	0.00284	0.00750	0.00458	0.00499	0.00473	0.00309	0.00314	0.00322	0.00382	0.00335	0.00246	0.00256	0.00295
2.11302	IND	c26	0.00496	0.00400	0.01864	0.01461	0.01632	0.01295	0.01718	0.02260	0.01858	0.02141	0.01439	0.01503	0.01290	0.01564	0.01174	0.00609	0.01079	0.01339
0.79089	IND	c27	0.00184	0.00371	0.00781	0.01059	0.00792	0.00909	0.00951	0.00900	0.00905	0.01034	0.01104	0.01269	0.01315	0.04439	0.01552	0.01813	0.01291	0.00813
0.09467	IND	c28	0.00136	0.00291	0.00589	0.00688	0.00615	0.00660	0.00673	0.00601	0.00607	0.00646	0.00548	0.00625	0.00913	0.00615	0.01095	0.00827	0.00961	0.00652
0.01617	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.23640	IND	c30	0.00067	0.00128	0.00471	0.00639	0.00608	0.00265	0.00440	0.00182	0.00401	0.00453	0.00238	0.00288	0.00867	0.00641	0.00563	0.00351	0.00175	0.00160
0.04361	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.15022	IND	c32	0.00000	0.00001	0.00003	0.00003	0.00003	0.00002	0.00003	0.00001	0.00002	0.00003	0.00002	0.00002	0.00004	0.00003	0.00003	0.00002	0.00001	0.00001
0.11150	IND	c33	0.00001	0.00001	0.00003	0.00004	0.00003	0.00002	0.00003	0.00003	0.00003	0.00004	0.00003	0.00003	0.00004	0.00004	0.00003	0.00002	0.00002	0.00002
0.34958	IND	c34	0.00068	0.00356	0.00268	0.00896	0.00520	0.00472	0.00371	0.00190	0.00268	0.00493	0.00319	0.00212	0.00812	0.00594	0.01442	0.00123	0.00199	0.00139
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**5.55523**	**12.27784**	**16.01283**	**5.19388**	**4.81222**	**9.34363**	**6.07005**	**32.57080**	**11.17193**	**6.37074**	**12.10056**	**7.79993**	**3.95143**	**3.59758**	**3.88336**	**1.34841**	**12.57442**	**6.89594**

Table 3A.18. Direct and Indirect Coefficients (Part-II)

NMVOC			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
4.008156	IND	c1	0.00798	0.00798	0.00798	1.18201	0.10848	0.04617	0.04726	0.04972	0.01897	0.02233	0.00844	0.02906	0.00000	0.02751	0.07308	0.00486	0.00486
10.7629	IND	c2	0.02169	0.02169	0.02169	0.08307	0.35682	0.12229	0.15671	0.13624	0.08188	0.03842	0.01963	0.02858	0.00000	0.01917	0.06321	0.00890	0.00890
10.67381	IND	c3	0.00552	0.00552	0.00552	1.10243	0.04484	0.10392	0.05795	0.04064	0.01502	0.01958	0.00291	0.02445	0.00000	0.01367	0.14890	0.00424	0.00424
1.335015	IND	c4	0.00188	0.00188	0.00188	0.00500	0.00696	0.00676	0.00572	0.00473	0.00210	0.00182	0.00046	0.00307	0.00000	0.00269	0.00845	0.00082	0.00082
1.263968	IND	c5	0.00014	0.00014	0.00014	0.00054	0.00302	0.00169	0.00481	0.00139	0.00039	0.00024	0.00006	0.00016	0.00000	0.00011	0.00058	0.00005	0.00005
6.398001	IND	c6	0.00349	0.00349	0.00349	0.01129	0.01483	0.01311	0.01679	0.02674	0.00802	0.00556	0.00603	0.00458	0.00000	0.00263	0.01207	0.00143	0.00143
1.705389	IND	c7	0.01772	0.01772	0.01772	0.01146	0.01937	0.00878	0.01029	0.12028	0.02012	0.03206	0.00100	0.00803	0.00000	0.00425	0.01663	0.00242	0.00242
27.97318	IND	c8	0.31186	0.31186	0.31186	1.06569	6.22394	1.56215	2.63430	1.39036	0.76394	0.46639	0.14009	0.21265	0.00000	0.24806	0.78104	0.07657	0.07657
5.586023	IND	c9	0.00989	0.00989	0.00989	0.07495	0.11318	0.48664	0.26544	0.09278	0.02608	0.01751	0.00782	0.01787	0.00000	0.01218	0.67459	0.01307	0.01307
0.903685	IND	c10	0.00149	0.00149	0.00149	0.00473	0.03076	0.01641	0.05635	0.01561	0.00347	0.00231	0.00052	0.00115	0.00000	0.00090	0.00603	0.00042	0.00042
6.358956	IND	c11	0.00575	0.00575	0.00575	0.02975	0.04171	0.03612	0.03122	0.03601	0.03366	0.01622	0.04169	0.02419	0.00000	0.01362	0.02598	0.00752	0.00752
2.611311	IND	c12	0.01033	0.01033	0.01033	0.03767	0.09852	0.07657	0.05078	0.05759	0.06435	0.02604	0.03574	0.03261	0.00000	0.01651	0.03622	0.00953	0.00953
0.574314	IND	c13	0.00057	0.00057	0.00057	0.00343	0.00777	0.00460	0.00355	0.00339	0.00293	0.00122	0.00053	0.00111	0.00000	0.00065	0.00259	0.00042	0.00042
0.391419	IND	c14	0.00028	0.00028	0.00028	0.00117	0.00310	0.00272	0.00139	0.00242	0.01016	0.00170	0.00038	0.00181	0.00000	0.00027	0.00137	0.00039	0.00039
0.798207	IND	c15	0.00147	0.00147	0.00147	0.00545	0.04062	0.04732	0.01016	0.01195	0.00651	0.00642	0.00075	0.00654	0.00000	0.00172	0.00441	0.00121	0.00121
0.092318	IND	c16	0.00006	0.00006	0.00006	0.00023	0.00067	0.00062	0.00036	0.00040	0.00024	0.00016	0.00004	0.00011	0.00000	0.00005	0.00038	0.00003	0.00003
5.935263	IND	c17	0.02761	0.02761	0.02761	0.16692	0.22395	0.19634	0.10142	0.45759	0.25689	0.06890	0.02081	0.08305	0.00000	0.02028	0.07585	0.02066	0.02066
2.492145	IND	c18	0.02182	0.02182	0.02182	0.09556	0.11097	0.08989	0.10759	0.13454	0.13382	0.06251	0.18191	0.09657	0.00000	0.05674	0.07598	0.02866	0.02866
0.191957	IND	c19	0.19204	0.00008	0.00008	0.00106	0.00108	0.00072	0.00068	0.00051	0.00053	0.00019	0.00008	0.00016	0.00000	0.00008	0.00066	0.00005	0.00005
0.066279	IND	c20	0.00022	0.06650	0.00022	0.00285	0.00290	0.00194	0.00183	0.00138	0.00143	0.00052	0.00021	0.00043	0.00000	0.00023	0.00176	0.00013	0.00013
0.172486	IND	c21	0.00096	0.00096	0.17344	0.01211	0.01231	0.00824	0.00779	0.00584	0.00608	0.00220	0.00087	0.00184	0.00000	0.00096	0.00747	0.00057	0.00057
3.819142	IND	c22	0.01036	0.01036	0.01036	3.85517	0.05740	0.03559	0.03369	0.05935	0.02067	0.04519	0.00310	0.07002	0.00000	0.03798	0.10002	0.00527	0.00527
0.730349	IND	c23	0.01368	0.01368	0.01368	0.06624	0.79389	0.05348	0.05232	0.07349	0.03451	0.01835	0.00542	0.01172	0.00000	0.01382	0.04140	0.00474	0.00474
1.241736	IND	c24	0.00017	0.00017	0.00017	0.00245	0.00251	1.24298	0.00140	0.00099	0.00090	0.00038	0.00015	0.00029	0.00000	0.00017	0.00107	0.00010	0.00010
1.701127	IND	c25	0.00057	0.00057	0.00057	0.00368	0.00339	0.00201	1.70317	0.00335	0.00190	0.00136	0.00021	0.00172	0.00000	0.00031	0.00516	0.00030	0.00030
2.113024	IND	c26	0.04110	0.04110	0.04110	0.01405	0.01322	0.00984	0.00837	2.14788	0.00656	0.00240	0.00094	0.00200	0.00000	0.00104	0.00816	0.00062	0.00062
0.790891	IND	c27	0.00581	0.00581	0.00581	0.00656	0.01944	0.01501	0.01650	0.05087	0.82627	0.02594	0.00142	0.01233	0.00000	0.00379	0.01049	0.00350	0.00350
0.094667	IND	c28	0.00406	0.00406	0.00406	0.00376	0.00458	0.00380	0.00345	0.00755	0.00184	0.10493	0.00048	0.00509	0.00000	0.00259	0.00158	0.00052	0.00052
0.01617	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.01625	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000
0.236399	IND	c30	0.00180	0.00180	0.00180	0.00210	0.00658	0.00305	0.00412	0.01108	0.00289	0.00207	0.00015	0.26602	0.00000	0.00043	0.00170	0.00972	0.00972
0.043614	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.04361	0.00000	0.00000	0.00000	0.00000
0.15022	IND	c32	0.00001	0.00001	0.00001	0.00001	0.00007	0.00002	0.00002	0.00005	0.00001	0.00001	0.00000	0.00119	0.00000	0.15023	0.00002	0.00004	0.00004
0.111497	IND	c33	0.00001	0.00001	0.00001	0.00002	0.00019	0.00002	0.00002	0.00005	0.00011	0.00001	0.00000	0.00064	0.00000	0.00000	0.11151	0.00002	0.00002
0.349582	IND	c34	0.00049	0.00049	0.00049	0.00103	0.00657	0.00153	0.00108	0.00203	0.00073	0.00049	0.00025	0.00412	0.00000	0.00031	0.00143	0.35715	0.00757
0	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.72085**	**0.59517**	**0.70138**	**7.85245**	**8.37363**	**4.20036**	**5.39654**	**4.94678**	**2.35300**	**0.99342**	**0.49834**	**0.95317**	**0.04361**	**0.65295**	**2.29978**	**0.56394**	**0.21436**

Table 3A.19. NMVOC Induced Coefficients (Part-I)

NMVOC			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
4.00816	IND	c1	4.44764	0.05961	1.75033	0.47755	0.93513	0.83754	0.24486	0.04378	0.14048	0.36357	0.06328	0.03864	0.04548	0.05635	0.05967	0.04408	0.03837	0.13193
10.76290	IND	c2	0.05001	10.85984	0.11691	0.15232	0.10664	0.14374	0.24413	1.52491	0.25245	0.19775	0.57129	1.04134	0.31333	0.26255	0.25755	0.06711	0.96504	0.28454
10.67381	IND	c3	0.07932	0.07615	11.89733	0.10140	0.10140	0.09999	0.14818	0.05525	0.34419	0.30224	0.06512	0.05205	0.04833	0.06932	0.06993	0.03643	0.04907	0.05414
1.33501	IND	c4	0.00661	0.00581	0.01584	1.69968	0.03363	0.00957	0.01868	0.00527	0.02105	0.03852	0.01281	0.00556	0.00896	0.01160	0.00924	0.00898	0.00440	0.00791
1.26397	IND	c5	0.00036	0.00067	0.00184	0.00648	1.60517	0.00255	0.00212	0.00082	0.00327	0.01179	0.00250	0.00107	0.00164	0.00356	0.00719	0.00257	0.00062	0.00091
6.39800	IND	c6	0.00452	0.02270	0.05589	0.04098	0.02456	6.54665	0.16772	0.01366	0.06905	0.05753	0.07137	0.02093	0.05081	0.03161	0.02935	0.03417	0.01132	0.08796
1.70539	IND	c7	0.00324	0.00544	0.03683	0.02209	0.01361	0.04933	2.21412	0.01061	0.02645	0.02929	0.02804	0.01259	0.01602	0.01799	0.01338	0.01224	0.01656	0.01272
27.97318	IND	c8	0.67917	0.79234	1.51946	1.61232	1.33446	1.13068	1.87368	30.25873	2.70165	2.13088	3.06500	1.95509	1.24654	1.24721	1.16716	0.56086	3.58359	2.04437
5.58602	IND	c9	0.13277	0.13536	0.20418	0.36932	0.25973	0.19921	0.44474	0.13893	6.98130	1.48071	0.17630	0.12888	0.11678	0.19274	0.16542	0.12612	0.06833	0.11365
0.90369	IND	c10	0.00236	0.00419	0.01725	0.01826	0.01606	0.01602	0.02412	0.00685	0.02430	1.02916	0.02537	0.00999	0.01482	0.02101	0.02296	0.01800	0.00472	0.00764
6.35896	IND	c11	0.01079	0.04937	0.02520	0.03210	0.02729	0.01616	0.03970	0.02673	0.03825	0.03769	6.89032	0.04982	0.07260	0.07030	0.04172	0.02754	0.03997	0.60881
2.61131	IND	c12	0.01807	0.10505	0.05368	0.08235	0.05634	0.05772	0.08462	0.04975	0.07436	0.12825	0.13483	3.68734	0.89105	0.68993	0.63397	0.11644	0.09640	0.51805
0.57431	IND	c13	0.00185	0.01332	0.00667	0.01313	0.00646	0.00355	0.00533	0.00475	0.00715	0.00886	0.00596	0.01165	0.61774	0.02476	0.03298	0.00912	0.01179	0.00763
0.39142	IND	c14	0.00048	0.00132	0.00146	0.00198	0.00155	0.00125	0.00219	0.00138	0.00211	0.00268	0.00225	0.00388	0.00843	0.41773	0.00755	0.00484	0.00858	0.00538
0.79821	IND	c15	0.00339	0.00748	0.00963	0.00946	0.01005	0.00875	0.00992	0.00828	0.00935	0.02108	0.00957	0.01481	0.01811	0.01615	0.90017	0.00785	0.00862	0.01056
0.09232	IND	c16	0.00014	0.00038	0.00047	0.00056	0.00206	0.00050	0.00094	0.00034	0.00085	0.00114	0.00047	0.00065	0.00108	0.00099	0.00173	0.09284	0.00038	0.00057
5.93526	IND	c17	0.10063	0.18577	0.17519	0.36249	0.18961	0.23950	0.40903	0.24173	0.32324	0.38642	0.68219	0.58687	0.28355	0.27094	0.35978	0.07990	7.46952	0.29426
2.49214	IND	c18	0.03507	0.09980	0.07543	0.09483	0.04450	0.03543	0.08629	0.07315	0.06489	0.05293	0.21942	0.07424	0.10240	0.09322	0.06678	0.03682	0.13215	2.65958
0.19196	IND	c19	0.00042	0.00038	0.00157	0.00120	0.00137	0.00111	0.00142	0.00185	0.00153	0.00176	0.00119	0.00125	0.00107	0.00130	0.00099	0.00050	0.00090	0.00112
0.06628	IND	c20	0.00113	0.00101	0.00420	0.00322	0.00369	0.00297	0.00381	0.00498	0.00411	0.00474	0.00320	0.00334	0.00286	0.00348	0.00265	0.00134	0.00241	0.00299
0.17249	IND	c21	0.00481	0.00430	0.01787	0.01370	0.01567	0.01261	0.01617	0.02115	0.01746	0.02013	0.01359	0.01421	0.01215	0.01478	0.01127	0.00569	0.01026	0.01272
3.81914	IND	c22	0.00549	0.01103	0.01599	0.01496	0.01582	0.01579	0.01686	0.01431	0.01432	0.01652	0.01267	0.01232	0.01352	0.01443	0.01502	0.00883	0.01524	0.01255
0.73035	IND	c23	0.02904	0.02882	0.09972	0.09337	0.09207	0.07800	0.10600	0.10062	0.09517	0.10935	0.08556	0.08431	0.06659	0.07881	0.06365	0.04038	0.06425	0.07908
1.24174	IND	c24	0.00090	0.00074	0.00357	0.00197	0.00220	0.00325	0.00272	0.00302	0.00274	0.00286	0.00286	0.00272	0.00187	0.00215	0.00171	0.00114	0.00252	0.00221
1.70113	IND	c25	0.00140	0.00115	0.00452	0.00399	0.01060	0.00302	0.00762	0.00465	0.00507	0.00483	0.00316	0.00319	0.00327	0.00390	0.00345	0.00249	0.00262	0.00303
2.11302	IND	c26	0.00518	0.00464	0.01906	0.01486	0.01675	0.01358	0.01763	0.02286	0.01886	0.02176	0.01464	0.01520	0.01308	0.01594	0.01210	0.00620	0.01100	0.01369
0.79089	IND	c27	0.00201	0.00419	0.00813	0.01078	0.00824	0.00957	0.00985	0.00920	0.00927	0.01061	0.01123	0.01282	0.01329	0.04461	0.01579	0.01821	0.01308	0.00836
0.09467	IND	c28	0.00143	0.00312	0.00603	0.00697	0.00629	0.00680	0.00688	0.00610	0.00617	0.00658	0.00557	0.00631	0.00919	0.00625	0.01107	0.00831	0.00968	0.00662
0.01617	IND	c29	0.00002	0.00006	0.00004	0.00003	0.00004	0.00006	0.00004	0.00003	0.00003	0.00004	0.00003	0.00002	0.00002	0.00003	0.00004	0.00001	0.00002	0.00003
0.23640	IND	c30	0.00082	0.00171	0.00499	0.00656	0.00636	0.00307	0.00469	0.00200	0.00420	0.00477	0.00255	0.00299	0.00879	0.00661	0.00587	0.00358	0.00189	0.00180
0.04361	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.15022	IND	c32	0.00010	0.00027	0.00020	0.00014	0.00021	0.00028	0.00021	0.00012	0.00014	0.00018	0.00012	0.00009	0.00012	0.00016	0.00018	0.00006	0.00010	0.00014
0.11150	IND	c33	0.00005	0.00014	0.00012	0.00009	0.00012	0.00015	0.00013	0.00008	0.00009	0.00011	0.00008	0.00006	0.00007	0.00010	0.00010	0.00004	0.00006	0.00008
0.34958	IND	c34	0.00076	0.00380	0.00284	0.00906	0.00536	0.00496	0.00387	0.00199	0.00278	0.00507	0.00328	0.00218	0.00819	0.00605	0.01456	0.00127	0.00207	0.00151
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			5.62999	12.48997	16.15244	5.27820	4.95304	9.55336	6.21826	32.65788	11.26631	6.48979	12.18581	7.85643	4.01173	3.69654	4.00501	1.38394	12.64555	6.99658

Table 3A.19. NMVOC Induced Coefficients (Part-II)

NMVOC			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
4.00816	IND	c1	0.00964	0.03432	0.01979	1.21125	0.12295	0.10509	0.10181	0.06827	0.05409	0.03067	0.02288	0.04752	0.03612	0.04713	0.08901	0.07533	0.00751	0.82230
10.76290	IND	c2	0.02188	0.02484	0.02310	0.08657	0.35856	0.12934	0.16324	0.13846	0.08609	0.03941	0.02136	0.03079	0.00432	0.02152	0.06512	0.01733	0.00922	0.09843
10.67381	IND	c3	0.00736	0.03469	0.01859	1.13482	0.06087	0.16917	0.11837	0.06119	0.05391	0.02881	0.01891	0.04490	0.04001	0.03540	0.16654	0.08229	0.00718	0.91069
1.33501	IND	c4	0.00202	0.00407	0.00286	0.00743	0.00816	0.01165	0.01025	0.00627	0.00502	0.00252	0.00166	0.00460	0.00300	0.00432	0.00978	0.00668	0.00104	0.06828
1.26397	IND	c5	0.00015	0.00032	0.00022	0.00073	0.00312	0.00209	0.00518	0.00152	0.00063	0.00030	0.00015	0.00028	0.00024	0.00024	0.00069	0.00052	0.00007	0.00550
6.39800	IND	c6	0.00352	0.00393	0.00369	0.01178	0.01507	0.01411	0.01771	0.02706	0.00861	0.00571	0.00627	0.00489	0.00061	0.00297	0.01234	0.00262	0.00147	0.01393
1.70539	IND	c7	0.01775	0.01822	0.01794	0.01202	0.01965	0.00991	0.01133	0.12064	0.02079	0.03221	0.00127	0.00838	0.00069	0.00462	0.01694	0.00376	0.00247	0.01568
27.97318	IND	c8	0.31455	0.35460	0.33102	1.11314	6.24743	1.65776	2.72282	1.42046	0.82093	0.47992	0.16352	0.24262	0.05862	0.27989	0.80690	0.19093	0.08088	1.33436
5.58602	IND	c9	0.01019	0.01461	0.01201	0.08019	0.11577	0.49719	0.27521	0.09610	0.03237	0.01900	0.01041	0.02118	0.00647	0.01569	0.67745	0.02569	0.01355	0.14722
0.90369	IND	c10	0.00151	0.00176	0.00161	0.00503	0.03091	0.01703	0.05692	0.01581	0.00383	0.00240	0.00067	0.00134	0.00038	0.00110	0.00620	0.00115	0.00044	0.00861
6.35896	IND	c11	0.00579	0.00645	0.00606	0.03054	0.04210	0.03770	0.03269	0.03651	0.03461	0.01644	0.04208	0.02468	0.00097	0.01415	0.02641	0.00941	0.00759	0.02216
2.61131	IND	c12	0.01044	0.01203	0.01109	0.03956	0.09946	0.08038	0.05431	0.05879	0.06662	0.02658	0.03667	0.03380	0.00233	0.01778	0.03725	0.01409	0.00970	0.05315
0.57431	IND	c13	0.00059	0.00076	0.00066	0.00363	0.00788	0.00503	0.00394	0.00352	0.00318	0.00128	0.00063	0.00124	0.00026	0.00079	0.00270	0.00093	0.00044	0.00587
0.39142	IND	c14	0.00028	0.00034	0.00031	0.00124	0.00313	0.00286	0.00151	0.00246	0.01025	0.00172	0.00042	0.00186	0.00008	0.00032	0.00141	0.00055	0.00039	0.00190
0.79821	IND	c15	0.00149	0.00184	0.00163	0.00586	0.04082	0.04814	0.01093	0.01221	0.00700	0.00653	0.00095	0.00680	0.00051	0.00199	0.00463	0.00219	0.00124	0.01153
0.09232	IND	c16	0.00006	0.00007	0.00006	0.00024	0.00068	0.00065	0.00038	0.00041	0.00026	0.00016	0.00005	0.00012	0.00002	0.00006	0.00038	0.00006	0.00003	0.00037
5.93526	IND	c17	0.02789	0.03200	0.02958	0.17180	0.22637	0.20617	0.11051	0.46069	0.26275	0.07029	0.02321	0.08613	0.00602	0.02355	0.07850	0.03241	0.02110	0.13709
2.49214	IND	c18	0.02196	0.02404	0.02282	0.09802	0.11219	0.09485	0.11218	0.13610	0.13677	0.06322	0.18313	0.09812	0.00304	0.05839	0.07732	0.03459	0.02888	0.06918
0.19196	IND	c19	0.19204	0.00012	0.00010	0.00110	0.00110	0.00079	0.00075	0.00053	0.00057	0.00020	0.00009	0.00018	0.00004	0.00011	0.00067	0.00013	0.00005	0.00098
0.06628	IND	c20	0.00023	0.06659	0.00026	0.00294	0.00294	0.00213	0.00201	0.00143	0.00154	0.00054	0.00025	0.00049	0.00012	0.00029	0.00181	0.00036	0.00014	0.00263
0.17249	IND	c21	0.00098	0.00131	0.17360	0.01251	0.01250	0.00904	0.00853	0.00609	0.00655	0.00231	0.00107	0.00209	0.00049	0.00122	0.00769	0.00153	0.00061	0.01116
3.81914	IND	c22	0.01060	0.01405	0.01201	3.85926	0.05943	0.04383	0.04132	0.06195	0.02558	0.04635	0.00512	0.07260	0.00505	0.04072	0.10224	0.01512	0.00564	0.11501
0.73035	IND	c23	0.01383	0.01610	0.01477	0.06893	0.79522	0.05890	0.05733	0.07519	0.03774	0.01912	0.00675	0.01342	0.00332	0.01562	0.04287	0.01122	0.00499	0.07557
1.24174	IND	c24	0.00018	0.00025	0.00021	0.00254	0.00255	1.24315	0.00155	0.00104	0.00100	0.00040	0.00019	0.00035	0.00010	0.00022	0.00112	0.00030	0.00011	0.00232
1.70113	IND	c25	0.00057	0.00067	0.00061	0.00380	0.00345	0.00225	1.70339	0.00342	0.00204	0.00140	0.00027	0.00179	0.00015	0.00039	0.00522	0.00059	0.00031	0.00335
2.11302	IND	c26	0.04113	0.04149	0.04128	0.01448	0.01343	0.01070	0.00916	2.14815	0.00707	0.00252	0.00115	0.00227	0.00053	0.00133	0.00840	0.00164	0.00066	0.01198
0.79089	IND	c27	0.00583	0.00610	0.00594	0.00689	0.01960	0.01566	0.01711	0.05107	0.82666	0.02603	0.00158	0.01253	0.00040	0.00401	0.01066	0.00428	0.00353	0.00906
0.09467	IND	c28	0.00407	0.00419	0.00412	0.00390	0.00465	0.00408	0.00371	0.00764	0.00201	0.10497	0.00055	0.00518	0.00017	0.00269	0.00166	0.00086	0.00053	0.00398
0.01617	IND	c29	0.00000	0.00004	0.00002	0.00004	0.00002	0.00008	0.00008	0.00003	0.00005	0.00001	0.01627	0.00005	0.00005	0.00003	0.00002	0.00010	0.00000	0.00118
0.23640	IND	c30	0.00182	0.00206	0.00192	0.00238	0.00672	0.00363	0.00465	0.01126	0.00323	0.00215	0.00029	0.26620	0.00035	0.00062	0.00185	0.01040	0.00974	0.00797
0.04361	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.04361	0.00000	0.00000	0.00000	0.00000	0.00000
0.15022	IND	c32	0.00002	0.00017	0.00008	0.00019	0.00016	0.00037	0.00035	0.00017	0.00023	0.00006	0.00009	0.00130	0.00022	0.15035	0.00012	0.00047	0.00006	0.00500
0.11150	IND	c33	0.00001	0.00009	0.00004	0.00011	0.00023	0.00020	0.00019	0.00010	0.00021	0.00004	0.00005	0.00070	0.00011	0.00006	0.11156	0.00024	0.00003	0.00249
0.34958	IND	c34	0.00049	0.00063	0.00055	0.00118	0.00665	0.00185	0.00138	0.00213	0.00092	0.00053	0.00033	0.00422	0.00020	0.00042	0.00152	0.35753	0.00758	0.00446
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			0.72888	0.72275	0.75856	7.99412	8.44375	4.48578	5.66081	5.03664	2.52313	1.03381	0.56829	1.04263	0.21860	0.74799	2.37696	0.90532	0.22722	3.98338

Table 3A.20. NH3 Direct and Indirect Coefficients (Part-I)

NH3			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
10.90523	IND	c1	12.05896	0.04305	4.68382	1.25195	2.46516	2.16095	0.58296	0.07020	0.32921	0.92232	0.12429	0.07340	0.08987	0.09772	0.09402	0.09997	0.06446	0.30244
0.78559	IND	c2	0.00352	0.79228	0.00828	0.01097	0.00753	0.01011	0.01755	0.11115	0.01826	0.01422	0.04155	0.07591	0.02276	0.01899	0.01858	0.00483	0.07031	0.02059
0.01884	IND	c3	0.00011	0.00005	0.02094	0.00014	0.00012	0.00009	0.00020	0.00006	0.00057	0.00049	0.00008	0.00007	0.00006	0.00008	0.00007	0.00005	0.00006	0.00005
0.00244	IND	c4	0.00001	0.00000	0.00002	0.00311	0.00006	0.00001	0.00003	0.00001	0.00004	0.00007	0.00002	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001
0.00146	IND	c5	0.00000	0.00000	0.00000	0.00001	0.00185	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000
0.01705	IND	c6	0.00001	0.00006	0.00015	0.00011	0.00006	0.01744	0.00045	0.00004	0.00018	0.00015	0.00019	0.00006	0.00013	0.00008	0.00008	0.00009	0.00003	0.00023
0.00724	IND	c7	0.00001	0.00002	0.00015	0.00009	0.00006	0.00021	0.00939	0.00004	0.00011	0.00012	0.00012	0.00005	0.00007	0.00007	0.00005	0.00005	0.00007	0.00005
0.00030	IND	c8	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00002	0.00032	0.00003	0.00002	0.00003	0.00002	0.00001	0.00001	0.00001	0.00001	0.00004	0.00002
0.18308	IND	c9	0.00426	0.00418	0.00652	0.01200	0.00834	0.00627	0.01440	0.00445	0.22869	0.04838	0.00567	0.00416	0.00375	0.00620	0.00527	0.00409	0.00215	0.00360
0.00350	IND	c10	0.00001	0.00001	0.00007	0.00007	0.00006	0.00006	0.00009	0.00003	0.00009	0.00399	0.00010	0.00004	0.00006	0.00008	0.00009	0.00007	0.00002	0.00003
0.04563	IND	c11	0.00007	0.00035	0.00018	0.00023	0.00019	0.00011	0.00028	0.00019	0.00027	0.00027	0.04944	0.00036	0.00052	0.00050	0.00029	0.00020	0.00028	0.00436
0.00950	IND	c12	0.00006	0.00037	0.00019	0.00030	0.00020	0.00020	0.00030	0.00018	0.00027	0.00046	0.00049	0.01342	0.00324	0.00251	0.00230	0.00042	0.00035	0.00188
0.00202	IND	c13	0.00001	0.00005	0.00002	0.00005	0.00002	0.00001	0.00002	0.00002	0.00002	0.00003	0.00002	0.00004	0.00217	0.00009	0.00012	0.00003	0.00004	0.00003
0.00105	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00002	0.00112	0.00002	0.00001	0.00002	0.00001
0.00219	IND	c15	0.00001	0.00002	0.00003	0.00003	0.00003	0.00002	0.00003	0.00002	0.00002	0.00006	0.00003	0.00004	0.00005	0.00004	0.00246	0.00002	0.00002	0.00003
0.00041	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00041	0.00000	0.00000
0.00079	IND	c17	0.00001	0.00002	0.00002	0.00005	0.00002	0.00003	0.00005	0.00003	0.00004	0.00005	0.00009	0.00008	0.00004	0.00004	0.00005	0.00001	0.00100	0.00004
0.00162	IND	c18	0.00002	0.00006	0.00005	0.00006	0.00003	0.00002	0.00005	0.00005	0.00004	0.00003	0.00014	0.00005	0.00007	0.00006	0.00004	0.00002	0.00009	0.00173
0.00188	IND	c19	0.00000	0.00000	0.00002	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
0.00026	IND	c20	0.00000	0.00000	0.00002	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.00028	IND	c21	0.00001	0.00001	0.00003	0.00002	0.00003	0.00002	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
0.00118	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00027	IND	c23	0.00001	0.00001	0.00004	0.00003	0.00003	0.00003	0.00004	0.00004	0.00003	0.00004	0.00003	0.00003	0.00002	0.00003	0.00002	0.00001	0.00002	0.00003
0.00263	IND	c24	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00272	IND	c26	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002
0.00126	IND	c27	0.00000	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00007	0.00002	0.00003	0.00002	0.00001
0.00010	IND	c28	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.00003	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00032	IND	c30	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000
0.00016	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00018	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.24430	IND	c34	0.00047	0.00249	0.00187	0.00626	0.00363	0.00330	0.00259	0.00133	0.00187	0.00345	0.00223	0.00148	0.00567	0.00415	0.01008	0.00086	0.00139	0.00097
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**12.06760**	**0.84307**	**4.72249**	**1.28558**	**2.48754**	**2.19898**	**0.62857**	**0.18828**	**0.57989**	**0.99431**	**0.22462**	**0.16932**	**0.12865**	**0.13195**	**0.13370**	**0.11126**	**0.14045**	**0.33621**

Table 3A.20. NH3 Direct and Indirect Coefficients (Part-II)

NH3			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
10.90523	IND	c1	0.02172	0.02172	0.02172	3.21595	0.29514	0.12563	0.12859	0.13527	0.05162	0.06075	0.02297	0.07906	0.00000	0.07485	0.19884	0.01321	0.01321
0.78559	IND	c2	0.00158	0.00158	0.00158	0.00606	0.02604	0.00893	0.01144	0.00994	0.00598	0.00280	0.00143	0.00209	0.00000	0.00140	0.00461	0.00065	0.00065
0.01884	IND	c3	0.00001	0.00001	0.00001	0.00195	0.00008	0.00018	0.00010	0.00007	0.00003	0.00003	0.00001	0.00004	0.00000	0.00002	0.00026	0.00001	0.00001
0.00244	IND	c4	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00002	0.00000	0.00000
0.00146	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01705	IND	c6	0.00001	0.00001	0.00001	0.00003	0.00004	0.00003	0.00004	0.00007	0.00002	0.00001	0.00002	0.00001	0.00000	0.00001	0.00003	0.00000	0.00000
0.00724	IND	c7	0.00008	0.00008	0.00008	0.00005	0.00008	0.00004	0.00004	0.00051	0.00009	0.00014	0.00000	0.00003	0.00000	0.00002	0.00007	0.00001	0.00001
0.00030	IND	c8	0.00000	0.00000	0.00000	0.00001	0.00007	0.00002	0.00003	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.18308	IND	c9	0.00032	0.00032	0.00032	0.00246	0.00371	0.01595	0.00870	0.00304	0.00085	0.00057	0.00026	0.00059	0.00000	0.00040	0.02211	0.00043	0.00043
0.00350	IND	c10	0.00001	0.00001	0.00001	0.00002	0.00012	0.00006	0.00022	0.00006	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000
0.04563	IND	c11	0.00004	0.00004	0.00004	0.00021	0.00030	0.00026	0.00022	0.00026	0.00024	0.00012	0.00030	0.00017	0.00000	0.00010	0.00019	0.00005	0.00005
0.00950	IND	c12	0.00004	0.00004	0.00004	0.00014	0.00036	0.00028	0.00018	0.00021	0.00023	0.00009	0.00013	0.00012	0.00000	0.00006	0.00013	0.00003	0.00003
0.00202	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00003	0.00002	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00105	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00001	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00219	IND	c15	0.00000	0.00000	0.00000	0.00001	0.00011	0.00013	0.00003	0.00003	0.00002	0.00002	0.00000	0.00002	0.00000	0.00000	0.00001	0.00000	0.00000
0.00041	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00079	IND	c17	0.00000	0.00000	0.00000	0.00002	0.00003	0.00003	0.00001	0.00006	0.00003	0.00001	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000
0.00162	IND	c18	0.00001	0.00001	0.00001	0.00006	0.00007	0.00006	0.00007	0.00009	0.00009	0.00004	0.00012	0.00006	0.00000	0.00004	0.00005	0.00002	0.00002
0.00188	IND	c19	0.00188	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00026	IND	c20	0.00000	0.00026	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00028	IND	c21	0.00000	0.00000	0.00029	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00118	IND	c22	0.00000	0.00000	0.00000	0.00119	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00000	0.00002	0.00000	0.00001	0.00003	0.00000	0.00000
0.00027	IND	c23	0.00001	0.00001	0.00001	0.00002	0.00029	0.00002	0.00002	0.00003	0.00001	0.00001	0.00000	0.00000	0.00000	0.00001	0.00002	0.00000	0.00000
0.00263	IND	c24	0.00000	0.00000	0.00000	0.00001	0.00001	0.00263	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00272	IND	c26	0.00005	0.00005	0.00005	0.00002	0.00002	0.00001	0.00001	0.00276	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00126	IND	c27	0.00001	0.00001	0.00001	0.00001	0.00003	0.00002	0.00003	0.00008	0.00132	0.00004	0.00000	0.00002	0.00000	0.00001	0.00002	0.00001	0.00001
0.00010	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00011	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
0.00003	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00032	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00035	0.00000	0.00000	0.00000	0.00001	0.00001
0.00016	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00016	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000
0.00018	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00018	0.00000	0.00000
0.24430	IND	c34	0.00034	0.00034	0.00034	0.00072	0.00459	0.00107	0.00076	0.00142	0.00051	0.00034	0.00018	0.00288	0.00000	0.00022	0.00100	0.24959	0.00529
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.02614**	**0.02452**	**0.02454**	**3.22901**	**0.33122**	**0.15543**	**0.15058**	**0.15402**	**0.06115**	**0.06515**	**0.02546**	**0.08552**	**0.00016**	**0.07727**	**0.22766**	**0.26405**	**0.01975**

Table 3A.21. NH3 Induced Coefficients (Part-I)

NH3			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
10.90523	IND	c1	12.10095	0.16219	4.76223	1.29930	2.54425	2.27875	0.66620	0.11911	0.38222	0.98918	0.17217	0.10513	0.12374	0.15330	0.16234	0.11993	0.10441	0.35896
0.78559	IND	c2	0.00365	0.79267	0.00853	0.01112	0.00778	0.01049	0.01782	0.11130	0.01843	0.01443	0.04170	0.07601	0.02287	0.01916	0.01880	0.00490	0.07044	0.02077
0.01884	IND	c3	0.00014	0.00013	0.02100	0.00018	0.00018	0.00018	0.00026	0.00010	0.00061	0.00053	0.00011	0.00009	0.00009	0.00012	0.00012	0.00006	0.00009	0.00010
0.00244	IND	c4	0.00001	0.00001	0.00003	0.00311	0.00006	0.00002	0.00003	0.00001	0.00004	0.00007	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001
0.00146	IND	c5	0.00000	0.00000	0.00000	0.00001	0.00185	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000
0.01705	IND	c6	0.00001	0.00006	0.00015	0.00011	0.00007	0.01744	0.00045	0.00004	0.00018	0.00015	0.00019	0.00006	0.00014	0.00008	0.00008	0.00009	0.00003	0.00023
0.00724	IND	c7	0.00001	0.00002	0.00016	0.00009	0.00006	0.00021	0.00940	0.00005	0.00011	0.00012	0.00012	0.00005	0.00007	0.00008	0.00006	0.00005	0.00007	0.00005
0.00030	IND	c8	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00002	0.00032	0.00003	0.00002	0.00003	0.00002	0.00001	0.00001	0.00001	0.00001	0.00004	0.00002
0.18308	IND	c9	0.00435	0.00444	0.00669	0.01210	0.00851	0.00653	0.01458	0.00455	0.22881	0.04853	0.00578	0.00422	0.00383	0.00632	0.00542	0.00413	0.00224	0.00372
0.00350	IND	c10	0.00001	0.00002	0.00007	0.00007	0.00006	0.00006	0.00009	0.00003	0.00009	0.00399	0.00010	0.00004	0.00006	0.00008	0.00009	0.00007	0.00002	0.00003
0.04563	IND	c11	0.00008	0.00035	0.00018	0.00023	0.00020	0.00012	0.00028	0.00019	0.00027	0.00027	0.04944	0.00036	0.00052	0.00050	0.00030	0.00020	0.00029	0.00437
0.00950	IND	c12	0.00007	0.00038	0.00020	0.00030	0.00021	0.00021	0.00031	0.00018	0.00027	0.00047	0.00049	0.01342	0.00324	0.00251	0.00231	0.00042	0.00035	0.00189
0.00202	IND	c13	0.00001	0.00005	0.00002	0.00005	0.00002	0.00001	0.00002	0.00002	0.00003	0.00003	0.00002	0.00004	0.00217	0.00009	0.00012	0.00003	0.00004	0.00003
0.00105	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00002	0.00112	0.00002	0.00001	0.00002	0.00001
0.00219	IND	c15	0.00001	0.00002	0.00003	0.00003	0.00003	0.00002	0.00003	0.00002	0.00003	0.00006	0.00003	0.00004	0.00005	0.00004	0.00246	0.00002	0.00002	0.00003
0.00041	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00041	0.00000	0.00000
0.00079	IND	c17	0.00001	0.00002	0.00002	0.00005	0.00003	0.00003	0.00005	0.00003	0.00004	0.00005	0.00009	0.00008	0.00004	0.00004	0.00005	0.00001	0.00100	0.00004
0.00162	IND	c18	0.00002	0.00006	0.00005	0.00006	0.00003	0.00002	0.00006	0.00005	0.00004	0.00003	0.00014	0.00005	0.00007	0.00006	0.00004	0.00002	0.00009	0.00173
0.00188	IND	c19	0.00000	0.00000	0.00002	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
0.00026	IND	c20	0.00000	0.00000	0.00002	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.00028	IND	c21	0.00001	0.00001	0.00003	0.00002	0.00003	0.00002	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
0.00118	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00027	IND	c23	0.00001	0.00001	0.00004	0.00003	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003	0.00002	0.00003	0.00002	0.00001	0.00002	0.00003
0.00263	IND	c24	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00272	IND	c26	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00002	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002
0.00126	IND	c27	0.00000	0.00001	0.00001	0.00002	0.00001	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00007	0.00003	0.00003	0.00002	0.00001
0.00010	IND	c28	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.00003	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00032	IND	c30	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000
0.00016	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00018	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.24430	IND	c34	0.00053	0.00266	0.00198	0.00633	0.00374	0.00346	0.00271	0.00139	0.00195	0.00354	0.00230	0.00153	0.00572	0.00423	0.01018	0.00089	0.00145	0.00105
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**12.10992**	**0.96315**	**4.80152**	**1.33331**	**2.56725**	**2.31771**	**0.71247**	**0.23757**	**0.63332**	**1.06169**	**0.27288**	**0.20130**	**0.16279**	**0.18797**	**0.20256**	**0.13138**	**0.18071**	**0.39317**

Table 3A.21. NH3 Induced Coefficients (Part-II)

NH3			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
10.90523	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.78559	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01884	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00244	IND	c4	0.00003	0.00005	0.00001	0.00003	0.00002	0.00005	0.00006	0.00008	0.00007	0.00004	0.00003	0.00002	0.00001	0.00003	0.00002	0.00003	0.00007	0.00005
0.00146	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01705	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00724	IND	c7	0.00063	0.00049	0.00068	0.00070	0.00069	0.00046	0.00075	0.00038	0.00043	0.00462	0.00080	0.00123	0.00005	0.00032	0.00003	0.00018	0.00065	0.00014
0.00030	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.18308	IND	c9	0.00009	0.00015	0.00001	0.00002	0.00002	0.00011	0.00015	0.00066	0.00037	0.00013	0.00004	0.00003	0.00001	0.00003	0.00001	0.00002	0.00090	0.00003
0.00350	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04563	IND	c11	0.00005	0.00078	0.00001	0.00001	0.00001	0.00004	0.00005	0.00005	0.00004	0.00005	0.00004	0.00002	0.00005	0.00003	0.00000	0.00002	0.00003	0.00001
0.00950	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00202	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00105	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00219	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00041	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00079	IND	c17	0.44473	0.01752	0.00166	0.00191	0.00176	0.01023	0.01348	0.01227	0.00658	0.02743	0.01564	0.00418	0.00138	0.00513	0.00036	0.00140	0.00467	0.00193
0.00162	IND	c18	0.00007	0.00140	0.00001	0.00001	0.00001	0.00005	0.00006	0.00005	0.00006	0.00007	0.00007	0.00003	0.00010	0.00005	0.00000	0.00003	0.00004	0.00002
0.00188	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00026	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00028	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00118	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00027	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00263	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00272	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00126	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00003	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00032	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00016	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00018	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.24430	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.44561**	**0.02039**	**0.00239**	**0.00267**	**0.00250**	**0.01094**	**0.01456**	**0.01350**	**0.00756**	**0.03234**	**0.01664**	**0.00552**	**0.00161**	**0.00559**	**0.00042**	**0.00168**	**0.00637**	**0.00219**

Table 3A.22. Employment Direct and Indirect Coefficients (Part-I)

Employment			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.10759	IND	c1	0.11897	0.00042	0.04621	0.01235	0.02432	0.02132	0.00575	0.00069	0.00325	0.00910	0.00123	0.00072	0.00089	0.00096	0.00093	0.00099	0.00064	0.00298
0.02323	IND	c2	0.00010	0.02343	0.00024	0.00032	0.00022	0.00030	0.00052	0.00329	0.00054	0.00042	0.00123	0.00224	0.00067	0.00056	0.00055	0.00014	0.00208	0.00061
0.01345	IND	c3	0.00008	0.00003	0.01495	0.00010	0.00009	0.00007	0.00014	0.00004	0.00041	0.00035	0.00006	0.00005	0.00004	0.00006	0.00005	0.00004	0.00004	0.00004
0.02211	IND	c4	0.00009	0.00004	0.00022	0.02812	0.00052	0.00010	0.00027	0.00006	0.00032	0.00060	0.00019	0.00008	0.00013	0.00016	0.00012	0.00014	0.00005	0.00010
0.05367	IND	c5	0.00001	0.00002	0.00007	0.00027	0.06815	0.00010	0.00008	0.00003	0.00013	0.00049	0.00010	0.00004	0.00007	0.00015	0.00030	0.00011	0.00002	0.00003
0.21929	IND	c6	0.00015	0.00075	0.00190	0.00139	0.00082	0.22436	0.00573	0.00046	0.00236	0.00196	0.00244	0.00071	0.00173	0.00107	0.00099	0.00117	0.00038	0.00300
0.02448	IND	c7	0.00004	0.00007	0.00052	0.00031	0.00019	0.00070	0.03178	0.00015	0.00037	0.00041	0.00040	0.00018	0.00023	0.00025	0.00019	0.00017	0.00023	0.00018
0.00071	IND	c8	0.00002	0.00002	0.00004	0.00004	0.00003	0.00003	0.00005	0.00077	0.00007	0.00005	0.00008	0.00005	0.00003	0.00003	0.00003	0.00001	0.00009	0.00005
0.00338	IND	c9	0.00008	0.00008	0.00012	0.00022	0.00015	0.00012	0.00027	0.00008	0.00422	0.00089	0.00010	0.00008	0.00007	0.00011	0.00010	0.00008	0.00004	0.00007
0.03411	IND	c10	0.00008	0.00014	0.00064	0.00068	0.00059	0.00059	0.00090	0.00025	0.00091	0.03883	0.00095	0.00037	0.00055	0.00078	0.00086	0.00068	0.00017	0.00028
0.02462	IND	c11	0.00004	0.00019	0.00009	0.00012	0.00010	0.00006	0.00015	0.00010	0.00015	0.00014	0.02667	0.00019	0.00028	0.00027	0.00016	0.00011	0.00015	0.00235
0.00254	IND	c12	0.00002	0.00010	0.00005	0.00008	0.00005	0.00005	0.00008	0.00005	0.00007	0.00012	0.00013	0.00358	0.00087	0.00067	0.00061	0.00011	0.00009	0.00050
0.00129	IND	c13	0.00000	0.00003	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00003	0.00139	0.00006	0.00007	0.00002	0.00003	0.00002
0.00455	IND	c14	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00003	0.00003	0.00004	0.00010	0.00486	0.00009	0.00006	0.00010	0.00006
0.00531	IND	c15	0.00002	0.00005	0.00006	0.00006	0.00006	0.00005	0.00006	0.00005	0.00006	0.00014	0.00006	0.00010	0.00012	0.00011	0.00598	0.00005	0.00006	0.00007
0.00834	IND	c16	0.00001	0.00003	0.00004	0.00005	0.00018	0.00004	0.00008	0.00003	0.00008	0.00010	0.00004	0.00006	0.00010	0.00009	0.00016	0.00838	0.00003	0.00005
0.00282	IND	c17	0.00005	0.00008	0.00008	0.00017	0.00009	0.00011	0.00019	0.00011	0.00015	0.00018	0.00032	0.00028	0.00013	0.00013	0.00017	0.00004	0.00355	0.00014
0.01526	IND	c18	0.00021	0.00059	0.00045	0.00057	0.00026	0.00019	0.00051	0.00044	0.00039	0.00031	0.00133	0.00045	0.00062	0.00056	0.00040	0.00022	0.00080	0.01628
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.09561	IND	c20	0.00156	0.00126	0.00593	0.00457	0.00518	0.00408	0.00535	0.00710	0.00584	0.00672	0.00453	0.00477	0.00407	0.00492	0.00371	0.00190	0.00341	0.00422
0.03930	IND	c21	0.00105	0.00084	0.00398	0.00307	0.00348	0.00274	0.00359	0.00476	0.00392	0.00451	0.00304	0.00320	0.00273	0.00330	0.00249	0.00127	0.00229	0.00284
0.09572	IND	c22	0.00008	0.00012	0.00030	0.00031	0.00029	0.00024	0.00032	0.00030	0.00029	0.00033	0.00026	0.00027	0.00030	0.00029	0.00029	0.00020	0.00033	0.00024
0.01140	IND	c23	0.00043	0.00039	0.00152	0.00143	0.00140	0.00116	0.00161	0.00154	0.00146	0.00167	0.00131	0.00130	0.00102	0.00120	0.00096	0.00062	0.00098	0.00120
0.15250	IND	c24	0.00011	0.00008	0.00043	0.00024	0.00026	0.00038	0.00032	0.00036	0.00033	0.00034	0.00034	0.00033	0.00022	0.00026	0.00020	0.00014	0.00030	0.00026
0.02454	IND	c25	0.00002	0.00001	0.00006	0.00006	0.00015	0.00004	0.00011	0.00007	0.00007	0.00007	0.00004	0.00005	0.00005	0.00006	0.00005	0.00004	0.00004	0.00004
0.03130	IND	c26	0.00007	0.00006	0.00028	0.00022	0.00024	0.00019	0.00025	0.00033	0.00028	0.00032	0.00021	0.00022	0.00019	0.00023	0.00017	0.00009	0.00016	0.00020
0.02005	IND	c27	0.00005	0.00009	0.00020	0.00027	0.00020	0.00023	0.00024	0.00023	0.00023	0.00026	0.00028	0.00032	0.00033	0.00113	0.00039	0.00046	0.00033	0.00021
0.00840	IND	c28	0.00012	0.00026	0.00052	0.00061	0.00055	0.00059	0.00060	0.00053	0.00054	0.00057	0.00049	0.00055	0.00081	0.00055	0.00097	0.00073	0.00085	0.00058
0.00659	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00689	IND	c30	0.00002	0.00004	0.00014	0.00019	0.00018	0.00008	0.00013	0.00005	0.00012	0.00013	0.00007	0.00008	0.00025	0.00019	0.00016	0.00010	0.00005	0.00005
0.03730	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.07289	IND	c32	0.00000	0.00000	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001
0.03156	IND	c33	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
0.14452	IND	c34	0.00028	0.00147	0.00111	0.00371	0.00215	0.00195	0.00153	0.00078	0.00111	0.00204	0.00132	0.00088	0.00336	0.00245	0.00596	0.00051	0.00082	0.00058
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.12376**	**0.03071**	**0.08020**	**0.05962**	**0.10998**	**0.25990**	**0.06067**	**0.02272**	**0.02771**	**0.07115**	**0.04728**	**0.02124**	**0.02138**	**0.02548**	**0.02712**	**0.01858**	**0.01814**	**0.03725**

Table 3A.22. Employment Direct and Indirect Coefficients (Part-II)

Employment			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.10759	IND	c1	0.00021	0.00021	0.00021	0.03173	0.00291	0.00124	0.00127	0.00133	0.00051	0.00060	0.00023	0.00078	0.00000	0.00074	0.00196	0.00013	0.00013
0.02323	IND	c2	0.00005	0.00005	0.00005	0.00018	0.00077	0.00026	0.00034	0.00029	0.00018	0.00008	0.00004	0.00006	0.00000	0.00004	0.00014	0.00002	0.00002
0.01345	IND	c3	0.00001	0.00001	0.00001	0.00139	0.00006	0.00013	0.00007	0.00005	0.00002	0.00002	0.00000	0.00003	0.00000	0.00002	0.00019	0.00001	0.00001
0.02211	IND	c4	0.00003	0.00003	0.00003	0.00008	0.00012	0.00011	0.00009	0.00008	0.00003	0.00003	0.00001	0.00005	0.00000	0.00004	0.00014	0.00001	0.00001
0.05367	IND	c5	0.00001	0.00001	0.00001	0.00002	0.00013	0.00007	0.00020	0.00006	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00002	0.00000	0.00000
0.21929	IND	c6	0.00012	0.00012	0.00012	0.00039	0.00051	0.00045	0.00058	0.00092	0.00027	0.00019	0.00021	0.00016	0.00000	0.00009	0.00041	0.00005	0.00005
0.02448	IND	c7	0.00025	0.00025	0.00025	0.00016	0.00028	0.00013	0.00015	0.00173	0.00029	0.00046	0.00001	0.00012	0.00000	0.00006	0.00024	0.00003	0.00003
0.00071	IND	c8	0.00001	0.00001	0.00001	0.00003	0.00016	0.00004	0.00007	0.00004	0.00002	0.00001	0.00000	0.00001	0.00000	0.00001	0.00002	0.00000	0.00000
0.00338	IND	c9	0.00001	0.00001	0.00001	0.00005	0.00007	0.00029	0.00016	0.00006	0.00002	0.00001	0.00000	0.00001	0.00000	0.00001	0.00041	0.00001	0.00001
0.03411	IND	c10	0.00006	0.00006	0.00006	0.00018	0.00116	0.00062	0.00213	0.00059	0.00013	0.00009	0.00002	0.00004	0.00000	0.00003	0.00023	0.00002	0.00002
0.02462	IND	c11	0.00002	0.00002	0.00002	0.00012	0.00016	0.00014	0.00012	0.00014	0.00013	0.00006	0.00016	0.00009	0.00000	0.00005	0.00010	0.00003	0.00003
0.00254	IND	c12	0.00001	0.00001	0.00001	0.00004	0.00010	0.00007	0.00005	0.00006	0.00006	0.00003	0.00003	0.00003	0.00000	0.00002	0.00004	0.00001	0.00001
0.00129	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00455	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00004	0.00003	0.00002	0.00003	0.00012	0.00002	0.00000	0.00002	0.00000	0.00000	0.00002	0.00000	0.00000
0.00531	IND	c15	0.00001	0.00001	0.00001	0.00004	0.00027	0.00031	0.00007	0.00008	0.00004	0.00004	0.00000	0.00004	0.00000	0.00001	0.00003	0.00001	0.00001
0.00834	IND	c16	0.00001	0.00001	0.00001	0.00002	0.00006	0.00006	0.00003	0.00004	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00003	0.00000	0.00000
0.00282	IND	c17	0.00001	0.00001	0.00001	0.00008	0.00011	0.00009	0.00005	0.00022	0.00012	0.00003	0.00001	0.00004	0.00000	0.00001	0.00004	0.00001	0.00001
0.01526	IND	c18	0.00013	0.00013	0.00013	0.00059	0.00068	0.00055	0.00066	0.00082	0.00082	0.00038	0.00111	0.00059	0.00000	0.00035	0.00047	0.00018	0.00018
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.09561	IND	c20	0.00032	0.09593	0.00032	0.00411	0.00418	0.00280	0.00265	0.00198	0.00206	0.00075	0.00030	0.00062	0.00000	0.00033	0.00254	0.00019	0.00019
0.03930	IND	c21	0.00022	0.00022	0.03952	0.00276	0.00280	0.00188	0.00178	0.00133	0.00138	0.00050	0.00020	0.00042	0.00000	0.00022	0.00170	0.00013	0.00013
0.09572	IND	c22	0.00026	0.00026	0.00026	0.09662	0.00144	0.00089	0.00084	0.00149	0.00052	0.00113	0.00008	0.00175	0.00000	0.00095	0.00251	0.00013	0.00013
0.01140	IND	c23	0.00021	0.00021	0.00021	0.00103	0.01239	0.00083	0.00082	0.00115	0.00054	0.00029	0.00008	0.00018	0.00000	0.00022	0.00065	0.00007	0.00007
0.15250	IND	c24	0.00002	0.00002	0.00002	0.00030	0.00031	0.15265	0.00017	0.00012	0.00011	0.00005	0.00002	0.00004	0.00000	0.00002	0.00013	0.00001	0.00001
0.02454	IND	c25	0.00001	0.00001	0.00001	0.00005	0.00005	0.00003	0.02457	0.00005	0.00003	0.00002	0.00000	0.00002	0.00000	0.00000	0.00007	0.00000	0.00000
0.03130	IND	c26	0.00061	0.00061	0.00061	0.00021	0.00020	0.00015	0.00012	0.03182	0.00010	0.00004	0.00001	0.00003	0.00000	0.00002	0.00012	0.00001	0.00001
0.02005	IND	c27	0.00015	0.00015	0.00015	0.00017	0.00049	0.00038	0.00042	0.00129	0.02095	0.00066	0.00004	0.00031	0.00000	0.00010	0.00027	0.00009	0.00009
0.00840	IND	c28	0.00036	0.00036	0.00036	0.00033	0.00041	0.00034	0.00031	0.00067	0.00016	0.00931	0.00004	0.00045	0.00000	0.00023	0.00014	0.00005	0.00005
0.00659	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00662	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
0.00689	IND	c30	0.00005	0.00005	0.00005	0.00006	0.00019	0.00009	0.00012	0.00032	0.00008	0.00006	0.00000	0.00775	0.00000	0.00001	0.00005	0.00028	0.00028
0.03730	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.03730	0.00000	0.00000	0.00000	0.00000
0.07289	IND	c32	0.00000	0.00000	0.00000	0.00001	0.00004	0.00001	0.00001	0.00003	0.00001	0.00000	0.00000	0.00058	0.00000	0.07289	0.00001	0.00002	0.00002
0.03156	IND	c33	0.00000	0.00000	0.00000	0.00001	0.00005	0.00001	0.00001	0.00001	0.00003	0.00000	0.00000	0.00018	0.00000	0.00000	0.03156	0.00001	0.00001
0.14452	IND	c34	0.00020	0.00020	0.00020	0.00042	0.00271	0.00063	0.00045	0.00084	0.00030	0.00020	0.00011	0.00170	0.00000	0.00013	0.00059	0.14765	0.00313
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00337**	**0.09897**	**0.04267**	**0.14118**	**0.03285**	**0.16530**	**0.03831**	**0.04763**	**0.02908**	**0.01510**	**0.00937**	**0.01615**	**0.03730**	**0.07660**	**0.04482**	**0.14917**	**0.00465**

Table 3A.23. Employment Induced Coefficients (Part-I)

Employment			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.10759	IND	c1	0.11938	0.00160	0.04698	0.01282	0.02510	0.02248	0.00657	0.00118	0.00377	0.00976	0.00170	0.00104	0.00122	0.00151	0.00160	0.00118	0.00103	0.00354
0.02323	IND	c2	0.00011	0.02344	0.00025	0.00033	0.00023	0.00031	0.00053	0.00329	0.00054	0.00043	0.00123	0.00225	0.00068	0.00057	0.00056	0.00014	0.00208	0.00061
0.01345	IND	c3	0.00010	0.00010	0.01499	0.00013	0.00013	0.00013	0.00019	0.00007	0.00043	0.00038	0.00008	0.00007	0.00006	0.00009	0.00009	0.00005	0.00006	0.00007
0.02211	IND	c4	0.00011	0.00010	0.00026	0.02814	0.00056	0.00016	0.00031	0.00009	0.00035	0.00064	0.00021	0.00009	0.00015	0.00019	0.00015	0.00015	0.00007	0.00013
0.05367	IND	c5	0.00002	0.00003	0.00008	0.00028	0.06816	0.00011	0.00009	0.00003	0.00014	0.00050	0.00011	0.00005	0.00007	0.00015	0.00031	0.00011	0.00003	0.00004
0.21929	IND	c6	0.00015	0.00078	0.00192	0.00140	0.00084	0.22438	0.00575	0.00047	0.00237	0.00197	0.00245	0.00072	0.00174	0.00108	0.00101	0.00117	0.00039	0.00301
0.02448	IND	c7	0.00005	0.00008	0.00053	0.00032	0.00020	0.00071	0.03179	0.00015	0.00038	0.00042	0.00040	0.00018	0.00023	0.00026	0.00019	0.00018	0.00024	0.00018
0.00071	IND	c8	0.00002	0.00002	0.00004	0.00004	0.00003	0.00003	0.00005	0.00077	0.00007	0.00005	0.00008	0.00005	0.00003	0.00003	0.00003	0.00001	0.00009	0.00005
0.00338	IND	c9	0.00008	0.00008	0.00012	0.00022	0.00016	0.00012	0.00027	0.00008	0.00423	0.00090	0.00011	0.00008	0.00007	0.00012	0.00010	0.00008	0.00004	0.00007
0.03411	IND	c10	0.00009	0.00016	0.00065	0.00069	0.00061	0.00060	0.00091	0.00026	0.00092	0.03884	0.00096	0.00038	0.00056	0.00079	0.00087	0.00068	0.00018	0.00029
0.02462	IND	c11	0.00004	0.00019	0.00010	0.00012	0.00011	0.00006	0.00015	0.00010	0.00015	0.00015	0.02668	0.00019	0.00028	0.00027	0.00016	0.00011	0.00015	0.00236
0.00254	IND	c12	0.00002	0.00010	0.00005	0.00008	0.00005	0.00006	0.00008	0.00005	0.00007	0.00012	0.00013	0.00358	0.00087	0.00067	0.00062	0.00011	0.00009	0.00050
0.00129	IND	c13	0.00000	0.00003	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00003	0.00139	0.00006	0.00007	0.00002	0.00003	0.00002
0.00455	IND	c14	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002	0.00002	0.00003	0.00003	0.00005	0.00010	0.00486	0.00009	0.00006	0.00010	0.00006
0.00531	IND	c15	0.00002	0.00005	0.00006	0.00006	0.00007	0.00006	0.00007	0.00006	0.00006	0.00014	0.00006	0.00010	0.00012	0.00011	0.00598	0.00005	0.00006	0.00007
0.00834	IND	c16	0.00001	0.00003	0.00004	0.00005	0.00019	0.00005	0.00008	0.00003	0.00008	0.00010	0.00004	0.00006	0.00010	0.00009	0.00016	0.00838	0.00003	0.00005
0.00282	IND	c17	0.00005	0.00009	0.00008	0.00017	0.00009	0.00011	0.00019	0.00011	0.00015	0.00018	0.00032	0.00028	0.00013	0.00013	0.00017	0.00004	0.00355	0.00014
0.01526	IND	c18	0.00021	0.00061	0.00046	0.00058	0.00027	0.00022	0.00053	0.00045	0.00040	0.00032	0.00134	0.00045	0.00063	0.00057	0.00041	0.00023	0.00081	0.01629
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.09561	IND	c20	0.00163	0.00146	0.00606	0.00465	0.00532	0.00428	0.00549	0.00718	0.00593	0.00683	0.00461	0.00482	0.00412	0.00502	0.00382	0.00193	0.00348	0.00432
0.03930	IND	c21	0.00110	0.00098	0.00407	0.00312	0.00357	0.00287	0.00368	0.00482	0.00398	0.00459	0.00310	0.00324	0.00277	0.00337	0.00257	0.00130	0.00234	0.00290
0.09572	IND	c22	0.00014	0.00028	0.00040	0.00037	0.00040	0.00040	0.00042	0.00036	0.00036	0.00041	0.00032	0.00031	0.00034	0.00036	0.00038	0.00022	0.00038	0.00031
0.01140	IND	c23	0.00045	0.00045	0.00156	0.00146	0.00144	0.00122	0.00165	0.00157	0.00149	0.00171	0.00134	0.00132	0.00104	0.00123	0.00099	0.00063	0.00100	0.00123
0.15250	IND	c24	0.00011	0.00009	0.00044	0.00024	0.00027	0.00040	0.00033	0.00037	0.00034	0.00035	0.00035	0.00033	0.00023	0.00026	0.00021	0.00014	0.00031	0.00027
0.02454	IND	c25	0.00002	0.00002	0.00007	0.00006	0.00015	0.00004	0.00011	0.00007	0.00007	0.00007	0.00005	0.00005	0.00005	0.00006	0.00005	0.00004	0.00004	0.00004
0.03130	IND	c26	0.00008	0.00007	0.00028	0.00022	0.00025	0.00020	0.00026	0.00034	0.00028	0.00032	0.00022	0.00023	0.00019	0.00024	0.00018	0.00009	0.00016	0.00020
0.02005	IND	c27	0.00005	0.00011	0.00021	0.00027	0.00021	0.00024	0.00025	0.00023	0.00023	0.00027	0.00028	0.00033	0.00034	0.00113	0.00040	0.00046	0.00033	0.00021
0.00840	IND	c28	0.00013	0.00028	0.00053	0.00062	0.00056	0.00060	0.00061	0.00054	0.00055	0.00058	0.00049	0.00056	0.00082	0.00055	0.00098	0.00074	0.00086	0.00059
0.00659	IND	c29	0.00001	0.00003	0.00002	0.00001	0.00002	0.00003	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001
0.00689	IND	c30	0.00002	0.00005	0.00015	0.00019	0.00019	0.00009	0.00014	0.00006	0.00012	0.00014	0.00007	0.00009	0.00026	0.00019	0.00017	0.00010	0.00006	0.00005
0.03730	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.07289	IND	c32	0.00005	0.00013	0.00010	0.00007	0.00010	0.00014	0.00010	0.00006	0.00007	0.00009	0.00006	0.00004	0.00006	0.00008	0.00009	0.00003	0.00005	0.00007
0.03156	IND	c33	0.00002	0.00004	0.00003	0.00003	0.00003	0.00004	0.00004	0.00002	0.00003	0.00003	0.00002	0.00002	0.00002	0.00003	0.00003	0.00001	0.00002	0.00002
0.14452	IND	c34	0.00032	0.00157	0.00117	0.00374	0.00222	0.00205	0.00160	0.00082	0.00115	0.00209	0.00136	0.00090	0.00338	0.00250	0.00602	0.00052	0.00086	0.00062
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			0.12459	0.03305	0.08174	0.06055	0.11153	0.26221	0.06230	0.02368	0.02875	0.07246	0.04822	0.02186	0.02204	0.02657	0.02847	0.01897	0.01892	0.03835

Table 3A.23. Employment Induced Coefficients (Part-II)

Employment			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.10759	IND	c1	0.00026	0.00092	0.00053	0.03251	0.00330	0.00282	0.00273	0.00183	0.00145	0.00082	0.00061	0.00128	0.00097	0.00127	0.00239	0.00202	0.00020	0.02207
0.02323	IND	c2	0.00005	0.00005	0.00005	0.00019	0.00077	0.00028	0.00035	0.00030	0.00019	0.00009	0.00005	0.00007	0.00001	0.00005	0.00014	0.00004	0.00002	0.00021
0.01345	IND	c3	0.00001	0.00004	0.00002	0.00143	0.00008	0.00021	0.00015	0.00008	0.00007	0.00004	0.00002	0.00006	0.00005	0.00004	0.00021	0.00010	0.00001	0.00115
0.02211	IND	c4	0.00003	0.00007	0.00005	0.00012	0.00014	0.00019	0.00017	0.00010	0.00008	0.00004	0.00003	0.00008	0.00005	0.00007	0.00016	0.00011	0.00002	0.00113
0.05367	IND	c5	0.00001	0.00001	0.00001	0.00003	0.00013	0.00009	0.00022	0.00006	0.00003	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003	0.00002	0.00000	0.00023
0.21929	IND	c6	0.00012	0.00013	0.00013	0.00040	0.00052	0.00048	0.00061	0.00093	0.00030	0.00020	0.00021	0.00017	0.00002	0.00010	0.00042	0.00009	0.00005	0.00048
0.02448	IND	c7	0.00025	0.00026	0.00026	0.00017	0.00028	0.00014	0.00016	0.00173	0.00030	0.00046	0.00002	0.00012	0.00001	0.00007	0.00024	0.00005	0.00004	0.00023
0.00071	IND	c8	0.00001	0.00001	0.00001	0.00003	0.00016	0.00004	0.00007	0.00004	0.00002	0.00001	0.00000	0.00001	0.00000	0.00001	0.00002	0.00000	0.00000	0.00003
0.00338	IND	c9	0.00001	0.00001	0.00001	0.00005	0.00007	0.00030	0.00017	0.00006	0.00002	0.00001	0.00001	0.00001	0.00000	0.00001	0.00041	0.00002	0.00001	0.00009
0.03411	IND	c10	0.00006	0.00007	0.00006	0.00019	0.00117	0.00064	0.00215	0.00060	0.00014	0.00009	0.00003	0.00005	0.00001	0.00004	0.00023	0.00004	0.00002	0.00032
0.02462	IND	c11	0.00002	0.00002	0.00002	0.00012	0.00016	0.00015	0.00013	0.00014	0.00013	0.00006	0.00016	0.00010	0.00000	0.00005	0.00010	0.00004	0.00003	0.00009
0.00254	IND	c12	0.00001	0.00001	0.00001	0.00004	0.00010	0.00008	0.00005	0.00006	0.00006	0.00003	0.00004	0.00003	0.00000	0.00002	0.00004	0.00001	0.00001	0.00005
0.00129	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001
0.00455	IND	c14	0.00000	0.00000	0.00000	0.00001	0.00004	0.00003	0.00002	0.00003	0.00012	0.00002	0.00000	0.00002	0.00000	0.00000	0.00002	0.00001	0.00000	0.00002
0.00531	IND	c15	0.00001	0.00001	0.00001	0.00004	0.00027	0.00032	0.00007	0.00008	0.00005	0.00004	0.00001	0.00005	0.00000	0.00001	0.00003	0.00001	0.00001	0.00008
0.00834	IND	c16	0.00001	0.00001	0.00001	0.00002	0.00006	0.00006	0.00003	0.00004	0.00002	0.00001	0.00000	0.00001	0.00000	0.00001	0.00003	0.00001	0.00000	0.00003
0.00282	IND	c17	0.00001	0.00002	0.00001	0.00008	0.00011	0.00010	0.00005	0.00022	0.00012	0.00003	0.00001	0.00004	0.00000	0.00001	0.00004	0.00002	0.00001	0.00007
0.01526	IND	c18	0.00013	0.00015	0.00014	0.00060	0.00069	0.00058	0.00069	0.00083	0.00084	0.00039	0.00112	0.00060	0.00002	0.00036	0.00047	0.00021	0.00018	0.00042
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.09561	IND	c20	0.00033	0.09605	0.00038	0.00424	0.00424	0.00307	0.00290	0.00207	0.00222	0.00079	0.00036	0.00071	0.00017	0.00042	0.00261	0.00052	0.00021	0.00379
0.03930	IND	c21	0.00022	0.00030	0.03956	0.00285	0.00285	0.00206	0.00194	0.00139	0.00149	0.00053	0.00024	0.00048	0.00011	0.00028	0.00175	0.00035	0.00014	0.00254
0.09572	IND	c22	0.00027	0.00035	0.00030	0.09672	0.00149	0.00110	0.00104	0.00155	0.00064	0.00116	0.00013	0.00182	0.00013	0.00102	0.00256	0.00038	0.00014	0.00288
0.01140	IND	c23	0.00022	0.00025	0.00023	0.00108	0.01241	0.00092	0.00089	0.00117	0.00059	0.00030	0.00011	0.00021	0.00005	0.00024	0.00067	0.00018	0.00008	0.00118
0.15250	IND	c24	0.00002	0.00003	0.00003	0.00031	0.00031	0.15267	0.00019	0.00013	0.00012	0.00005	0.00002	0.00004	0.00001	0.00003	0.00014	0.00004	0.00001	0.00028
0.02454	IND	c25	0.00001	0.00001	0.00001	0.00005	0.00005	0.00003	0.02457	0.00005	0.00003	0.00002	0.00000	0.00003	0.00000	0.00001	0.00008	0.00001	0.00000	0.00005
0.03130	IND	c26	0.00061	0.00061	0.00061	0.00021	0.00020	0.00016	0.00014	0.03182	0.00010	0.00004	0.00002	0.00003	0.00001	0.00002	0.00012	0.00002	0.00001	0.00018
0.02005	IND	c27	0.00015	0.00015	0.00015	0.00017	0.00050	0.00040	0.00043	0.00129	0.02096	0.00066	0.00004	0.00032	0.00001	0.00010	0.00027	0.00011	0.00009	0.00023
0.00840	IND	c28	0.00036	0.00037	0.00037	0.00035	0.00041	0.00036	0.00033	0.00068	0.00018	0.00932	0.00005	0.00046	0.00002	0.00024	0.00015	0.00008	0.00005	0.00035
0.00659	IND	c29	0.00000	0.00002	0.00001	0.00002	0.00001	0.00003	0.00003	0.00001	0.00002	0.00000	0.00663	0.00002	0.00002	0.00001	0.00001	0.00004	0.00000	0.00048
0.00689	IND	c30	0.00005	0.00006	0.00006	0.00007	0.00020	0.00011	0.00014	0.00033	0.00009	0.00006	0.00001	0.00776	0.00001	0.00002	0.00005	0.00030	0.00028	0.00023
0.03730	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.03730	0.00000	0.00000	0.00000	0.00000	0.00000
0.07289	IND	c32	0.00001	0.00008	0.00004	0.00009	0.00008	0.00018	0.00017	0.00008	0.00011	0.00003	0.00004	0.00063	0.00011	0.07295	0.00006	0.00023	0.00003	0.00243
0.03156	IND	c33	0.00000	0.00002	0.00001	0.00003	0.00007	0.00006	0.00005	0.00003	0.00006	0.00001	0.00001	0.00020	0.00003	0.00002	0.03157	0.00007	0.00001	0.00071
0.14452	IND	c34	0.00020	0.00026	0.00023	0.00049	0.00275	0.00076	0.00057	0.00088	0.00038	0.00022	0.00014	0.00174	0.00008	0.00017	0.00063	0.14781	0.00314	0.00184
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00346**	**0.10038**	**0.04330**	**0.14274**	**0.03362**	**0.16844**	**0.04122**	**0.04862**	**0.03096**	**0.01554**	**0.01014**	**0.01713**	**0.03922**	**0.07765**	**0.04567**	**0.15293**	**0.00479**	**0.04389**

Table 3A.24. Coal Direct and Indirect Coefficients (Part-I)

Coal			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00217	IND	c4	0.00001	0.00000	0.00002	0.00275	0.00005	0.00001	0.00003	0.00001	0.00003	0.00006	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001
0.00076	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00097	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.08996	IND	c7	0.00016	0.00024	0.00191	0.00115	0.00069	0.00256	0.11677	0.00054	0.00138	0.00152	0.00146	0.00065	0.00083	0.00093	0.00068	0.00064	0.00086	0.00065
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00476	IND	c9	0.00011	0.00011	0.00017	0.00031	0.00022	0.00016	0.00037	0.00012	0.00595	0.00126	0.00015	0.00011	0.00010	0.00016	0.00014	0.00011	0.00006	0.00009
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.33814	IND	c11	0.00055	0.00256	0.00130	0.00168	0.00141	0.00080	0.00207	0.00140	0.00201	0.00197	0.36637	0.00263	0.00384	0.00371	0.00218	0.00145	0.00210	0.03234
0.18273	IND	c12	0.00119	0.00715	0.00363	0.00568	0.00381	0.00384	0.00578	0.00340	0.00512	0.00886	0.00936	0.25798	0.06230	0.04819	0.04425	0.00811	0.00668	0.03616
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4.67846	IND	c17	0.07729	0.14068	0.13431	0.28344	0.14564	0.18309	0.31840	0.18818	0.25223	0.30136	0.53542	0.46107	0.22187	0.21088	0.28029	0.06202	5.88590	0.22922
0.00066	IND	c18	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00006	0.00002	0.00003	0.00002	0.00002	0.00001	0.00003	0.00070
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.07932**	**0.15078**	**0.14136**	**0.29505**	**0.15280**	**0.19047**	**0.44344**	**0.19366**	**0.26673**	**0.31505**	**0.91284**	**0.72247**	**0.28899**	**0.26391**	**0.32758**	**0.07235**	**5.89564**	**0.29918**

Table 3A.24. Coal Direct and Indirect Coefficients (Part-II)

Coal			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00217	IND	c4	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00076	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.08996	IND	c7	0.00093	0.00093	0.00093	0.00060	0.00102	0.00046	0.00054	0.00635	0.00106	0.00169	0.00005	0.00042	0.00000	0.00022	0.00088	0.00013	0.00013
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00476	IND	c9	0.00001	0.00001	0.00001	0.00006	0.00010	0.00041	0.00023	0.00008	0.00002	0.00001	0.00001	0.00002	0.00000	0.00001	0.00057	0.00001	0.00001
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.33814	IND	c11	0.00031	0.00031	0.00031	0.00158	0.00222	0.00192	0.00166	0.00191	0.00179	0.00086	0.00222	0.00129	0.00000	0.00072	0.00138	0.00040	0.00040
0.18273	IND	c12	0.00072	0.00072	0.00072	0.00264	0.00689	0.00536	0.00355	0.00403	0.00450	0.00182	0.00250	0.00228	0.00000	0.00116	0.00253	0.00067	0.00067
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4.67846	IND	c17	0.02177	0.02177	0.02177	0.13158	0.17653	0.15477	0.07994	0.36070	0.20250	0.05431	0.01640	0.06546	0.00000	0.01599	0.05979	0.01628	0.01628
0.00066	IND	c18	0.00001	0.00001	0.00001	0.00003	0.00003	0.00002	0.00003	0.00004	0.00004	0.00002	0.00005	0.00003	0.00000	0.00001	0.00002	0.00001	0.00001
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.02375**	**0.02375**	**0.02375**	**0.13650**	**0.18680**	**0.16296**	**0.08597**	**0.37311**	**0.20991**	**0.05872**	**0.02123**	**0.06950**	**0.00000**	**0.01812**	**0.06519**	**0.01750**	**0.01750**

Table 3A.25. Coal Induced Coefficients (Part-I)

Coal			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00217	IND	c4	0.00001	0.00001	0.00003	0.00276	0.00005	0.00002	0.00003	0.00001	0.00003	0.00006	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001
0.00076	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00097	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.08996	IND	c7	0.00017	0.00029	0.00194	0.00117	0.00072	0.00260	0.11680	0.00056	0.00140	0.00155	0.00148	0.00066	0.00085	0.00095	0.00071	0.00065	0.00087	0.00067
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00476	IND	c9	0.00011	0.00012	0.00017	0.00031	0.00022	0.00017	0.00038	0.00012	0.00595	0.00126	0.00015	0.00011	0.00010	0.00016	0.00014	0.00011	0.00006	0.00010
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.33814	IND	c11	0.00057	0.00263	0.00134	0.00171	0.00145	0.00086	0.00211	0.00142	0.00203	0.00200	0.36640	0.00265	0.00386	0.00374	0.00222	0.00146	0.00213	0.03237
0.18273	IND	c12	0.00126	0.00735	0.00376	0.00576	0.00394	0.00404	0.00592	0.00348	0.00520	0.00897	0.00943	0.25803	0.06235	0.04828	0.04436	0.00815	0.00675	0.03625
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4.67846	IND	c17	0.07932	0.14644	0.13809	0.28573	0.14946	0.18878	0.32242	0.19054	0.25479	0.30459	0.53774	0.46260	0.22351	0.21357	0.28359	0.06298	5.88783	0.23195
0.00066	IND	c18	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00006	0.00002	0.00003	0.00002	0.00002	0.00001	0.00003	0.00070
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.08146**	**0.15685**	**0.14535**	**0.29747**	**0.15683**	**0.19648**	**0.44769**	**0.19615**	**0.26943**	**0.31846**	**0.91528**	**0.72408**	**0.29071**	**0.26675**	**0.33106**	**0.07337**	**5.89768**	**0.30206**

Table 3A.25. Coal Induced Coefficients (Part-II)

Coal			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00217	IND	c4	0.00001	0.00001	0.00000	0.00001	0.00000	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00000	0.00000	0.00001	0.00000	0.00001	0.00002	0.00001
0.00076	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.08996	IND	c7	0.00087	0.00067	0.00094	0.00096	0.00095	0.00063	0.00104	0.00052	0.00060	0.00636	0.00110	0.00170	0.00007	0.00044	0.00004	0.00024	0.00089	0.00020
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00476	IND	c9	0.00006	0.00010	0.00001	0.00001	0.00001	0.00007	0.00010	0.00042	0.00023	0.00008	0.00003	0.00002	0.00001	0.00002	0.00001	0.00001	0.00058	0.00002
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.33814	IND	c11	0.00213	0.03237	0.00031	0.00034	0.00032	0.00162	0.00224	0.00200	0.00174	0.00194	0.00184	0.00087	0.00224	0.00131	0.00005	0.00075	0.00140	0.00050
0.18273	IND	c12	0.00675	0.03625	0.00073	0.00084	0.00078	0.00277	0.00696	0.00562	0.00380	0.00411	0.00466	0.00186	0.00257	0.00237	0.00016	0.00124	0.00261	0.00099
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4.67846	IND	c17	5.88783	0.23195	0.02198	0.02523	0.02332	0.13542	0.17843	0.16251	0.08711	0.36313	0.20711	0.05540	0.01830	0.06789	0.00475	0.01857	0.06188	0.02554
0.00066	IND	c18	0.00003	0.00070	0.00001	0.00001	0.00001	0.00003	0.00003	0.00002	0.00003	0.00004	0.00004	0.00002	0.00005	0.00003	0.00000	0.00002	0.00002	0.00001
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**5.89768**	**0.30206**	**0.02398**	**0.02740**	**0.02538**	**0.14055**	**0.18881**	**0.17113**	**0.09353**	**0.37568**	**0.21478**	**0.05987**	**0.02323**	**0.07206**	**0.00501**	**0.02084**	**0.06740**	**0.02727**

Table 3A.26. Lignite Direct and Indirect Coefficients (Part-I)

Lignite			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00925	IND	c4	0.00004	0.00002	0.00009	0.01177	0.00022	0.00004	0.00011	0.00003	0.00013	0.00025	0.00008	0.00003	0.00005	0.00007	0.00005	0.00006	0.00002	0.00004
0.00326	IND	c5	0.00000	0.00000	0.00000	0.00002	0.00413	0.00001	0.00000	0.00000	0.00001	0.00003	0.00001	0.00000	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.06533	IND	c7	0.00011	0.00018	0.00139	0.00083	0.00050	0.00186	0.08479	0.00039	0.00100	0.00110	0.00106	0.00047	0.00060	0.00067	0.00049	0.00046	0.00062	0.00047
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00742	IND	c9	0.00017	0.00017	0.00026	0.00049	0.00034	0.00025	0.00058	0.00018	0.00926	0.00196	0.00023	0.00017	0.00015	0.00025	0.00021	0.00017	0.00009	0.00015
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00810	IND	c11	0.00001	0.00006	0.00003	0.00004	0.00003	0.00002	0.00005	0.00003	0.00005	0.00005	0.00877	0.00006	0.00009	0.00009	0.00005	0.00003	0.00005	0.00077
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.35338	IND	c17	0.00584	0.01063	0.01014	0.02141	0.01100	0.01383	0.02405	0.01421	0.01905	0.02276	0.04044	0.03483	0.01676	0.01593	0.02117	0.00468	0.44458	0.01731
0.00131	IND	c18	0.00002	0.00005	0.00004	0.00005	0.00002	0.00002	0.00004	0.00004	0.00003	0.00003	0.00011	0.00004	0.00005	0.00005	0.00003	0.00002	0.00007	0.00140
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00619**	**0.01110**	**0.01197**	**0.03461**	**0.01624**	**0.01603**	**0.10964**	**0.01489**	**0.02954**	**0.02618**	**0.05070**	**0.03560**	**0.01772**	**0.01707**	**0.02203**	**0.00543**	**0.44544**	**0.02015**

Table 3A.26. Lignite Direct and Indirect Coefficients (Part-II)

Lignite			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00925	IND	c4	0.00001	0.00001	0.00001	0.00003	0.00005	0.00005	0.00004	0.00003	0.00001	0.00001	0.00000	0.00002	0.00000	0.00002	0.00006	0.00001	0.00001
0.00326	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.06533	IND	c7	0.00068	0.00068	0.00068	0.00044	0.00074	0.00034	0.00039	0.00461	0.00077	0.00123	0.00004	0.00031	0.00000	0.00016	0.00064	0.00009	0.00009
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00742	IND	c9	0.00001	0.00001	0.00001	0.00010	0.00015	0.00065	0.00035	0.00012	0.00003	0.00002	0.00001	0.00002	0.00000	0.00002	0.00090	0.00002	0.00002
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00810	IND	c11	0.00001	0.00001	0.00001	0.00004	0.00005	0.00005	0.00004	0.00005	0.00004	0.00002	0.00005	0.00003	0.00000	0.00002	0.00003	0.00001	0.00001
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.35338	IND	c17	0.00164	0.00164	0.00164	0.00994	0.01333	0.01169	0.00604	0.02724	0.01530	0.00410	0.00124	0.00494	0.00000	0.00121	0.00452	0.00123	0.00123
0.00131	IND	c18	0.00001	0.00001	0.00001	0.00005	0.00006	0.00005	0.00006	0.00007	0.00007	0.00003	0.00010	0.00005	0.00000	0.00003	0.00004	0.00002	0.00002
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00237**	**0.00237**	**0.00237**	**0.01060**	**0.01439**	**0.01282**	**0.00693**	**0.03213**	**0.01623**	**0.00542**	**0.00144**	**0.00538**	**0.00000**	**0.00145**	**0.00618**	**0.00137**	**0.00137**

Table 3A.27. Lignite Induced Coefficients (Part-I)

lignite			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00925	IND	c4	IND	c4	0.00005	0.00004	0.00011	0.01178	0.00023	0.00007	0.00013	0.00004	0.00015	0.00027	0.00009	0.00004	0.00006	0.00008	0.00006	0.00006
0.00326	IND	c5	IND	c5	0.00000	0.00000	0.00000	0.00002	0.00413	0.00001	0.00001	0.00000	0.00001	0.00003	0.00001	0.00000	0.00000	0.00001	0.00002	0.00001
0.00000	IND	c6	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.06533	IND	c7	IND	c7	0.00012	0.00021	0.00141	0.00085	0.00052	0.00189	0.08482	0.00041	0.00101	0.00112	0.00107	0.00048	0.00061	0.00069	0.00051	0.00047
0.00000	IND	c8	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00742	IND	c9	IND	c9	0.00018	0.00018	0.00027	0.00049	0.00034	0.00026	0.00059	0.00018	0.00927	0.00197	0.00023	0.00017	0.00016	0.00026	0.00022	0.00017
0.00000	IND	c10	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00810	IND	c11	IND	c11	0.00001	0.00006	0.00003	0.00004	0.00003	0.00002	0.00005	0.00003	0.00005	0.00005	0.00877	0.00006	0.00009	0.00009	0.00005	0.00004
0.00000	IND	c12	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c13	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.35338	IND	c17	IND	c17	0.00599	0.01106	0.01043	0.02158	0.01129	0.01426	0.02435	0.01439	0.01925	0.02301	0.04062	0.03494	0.01688	0.01613	0.02142	0.00476
0.00131	IND	c18	IND	c18	0.00002	0.00005	0.00004	0.00005	0.00002	0.00002	0.00005	0.00004	0.00003	0.00003	0.00012	0.00004	0.00005	0.00005	0.00004	0.00002
0.00000	IND	c19	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	Employees	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00000**	**Total indi**	**0.00637**	**0.01161**	**0.01230**	**0.03481**	**0.01658**	**0.01653**	**0.10999**	**0.01509**	**0.02976**	**0.02647**	**0.05091**	**0.03574**	**0.01786**	**0.01730**	**0.02232**	**0.00552**

Table 3A.27. Lignite Induced Coefficients (Part-II)

lignite			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00925	IND	c4	0.00003	0.00005	0.00001	0.00003	0.00002	0.00005	0.00006	0.00008	0.00007	0.00004	0.00003	0.00002	0.00001	0.00003	0.00002	0.00003	0.00007	0.00005
0.00326	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.06533	IND	c7	0.00063	0.00049	0.00068	0.00070	0.00069	0.00046	0.00075	0.00038	0.00043	0.00462	0.00080	0.00123	0.00005	0.00032	0.00003	0.00018	0.00065	0.00014
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00742	IND	c9	0.00009	0.00015	0.00001	0.00002	0.00002	0.00011	0.00015	0.00066	0.00037	0.00013	0.00004	0.00003	0.00001	0.00003	0.00001	0.00002	0.00090	0.00003
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00810	IND	c11	0.00005	0.00078	0.00001	0.00001	0.00001	0.00004	0.00005	0.00005	0.00004	0.00005	0.00004	0.00002	0.00005	0.00003	0.00000	0.00002	0.00003	0.00001
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.35338	IND	c17	0.44473	0.01752	0.00166	0.00191	0.00176	0.01023	0.01348	0.01227	0.00658	0.02743	0.01564	0.00418	0.00138	0.00513	0.00036	0.00140	0.00467	0.00193
0.00131	IND	c18	0.00007	0.00140	0.00001	0.00001	0.00001	0.00005	0.00006	0.00005	0.00006	0.00007	0.00007	0.00003	0.00010	0.00005	0.00000	0.00003	0.00004	0.00002
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.44561**	**0.02039**	**0.00239**	**0.00267**	**0.00250**	**0.01094**	**0.01456**	**0.01350**	**0.00756**	**0.03234**	**0.01664**	**0.00552**	**0.00161**	**0.00559**	**0.00042**	**0.00168**	**0.00637**	**0.00219**

Table 3A.28. LPG Direct and Indirect Coefficients (Part-I)

LPG			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00001	IND	c1	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00002	IND	c4	0.00000	0.00000	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00001	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00007	IND	c9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00009	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00011	0.00000	0.00001	0.00000	0.00000	0.00000
0.00029	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00031	0.00001	0.00000	0.00001	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01405	IND	c24	0.00001	0.00001	0.00004	0.00002	0.00002	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00002**	**0.00001**	**0.00005**	**0.00006**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00013**	**0.00006**	**0.00004**	**0.00004**	**0.00014**	**0.00034**	**0.00003**	**0.00002**	**0.00004**	**0.00003**

Table 3A.28. LPG Direct and Indirect Coefficients (Part-II)

LPG			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00001	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00002	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00001	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00007	IND	c9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00010	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00029	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01405	IND	c24	0.00000	0.00000	0.00000	0.00003	0.00003	0.01406	0.00002	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00000**	**0.00000**	**0.00000**	**0.00003**	**0.00003**	**0.01407**	**0.00002**	**0.00002**	**0.00002**	**0.00001**	**0.00000**	**0.00001**	**0.00000**	**0.00000**	**0.00002**	**0.00000**	**0.00000**

Table 3A.29. LPG Induced Coefficients (Part-I)

LPG			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00001	IND	c1	0.000006	0.000000	0.000002	0.000001	0.000001	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c2	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c3	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00002	IND	c4	0.000000	0.000000	0.000000	0.000030	0.000001	0.000000	0.000000	0.000000	0.000000	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00001	IND	c5	0.000000	0.000000	0.000000	0.000000	0.000011	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c6	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c7	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c8	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00007	IND	c9	0.000002	0.000002	0.000003	0.000005	0.000003	0.000003	0.000006	0.000002	0.000094	0.000020	0.000002	0.000002	0.000002	0.000003	0.000002	0.000002	0.000001	0.000002
0.00000	IND	c10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00010	IND	c13	0.000000	0.000002	0.000001	0.000002	0.000001	0.000001	0.000001	0.000001	0.000001	0.000002	0.000001	0.000002	0.000111	0.000004	0.000006	0.000002	0.000002	0.000001
0.00029	IND	c14	0.000000	0.000001	0.000001	0.000001	0.000001	0.000001	0.000002	0.000001	0.000002	0.000002	0.000002	0.000003	0.000006	0.000314	0.000006	0.000004	0.000006	0.000004
0.00000	IND	c15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c16	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c17	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c18	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c19	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c20	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c21	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c22	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c23	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.01405	IND	c24	0.000010	0.000008	0.000040	0.000022	0.000025	0.000037	0.000031	0.000034	0.000031	0.000032	0.000032	0.000031	0.000021	0.000024	0.000019	0.000013	0.000028	0.000025
0.00000	IND	c25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c26	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c27	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c28	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c29	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c30	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c31	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c32	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c33	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c34	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c35	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Employees compensation			0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Total Induced coefficients			**0.000019**	**0.000014**	**0.000048**	**0.000062**	**0.000043**	**0.000042**	**0.000040**	**0.000038**	**0.000128**	**0.000057**	**0.000038**	**0.000038**	**0.000141**	**0.000346**	**0.000033**	**0.000020**	**0.000038**	**0.000032**

Table 3A.29. LPG Induced Coefficients (Part-II)

LPG			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00001	IND	c1	0.000000	0.000000	0.000000	0.000000	0.000000	0.000002	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c2	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c3	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00002	IND	c4	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00001	IND	c5	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c6	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c7	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c8	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00007	IND	c9	0.000001	0.000002	0.000000	0.000000	0.000000	0.000001	0.000002	0.000007	0.000004	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000009	0.000000
0.00000	IND	c10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00010	IND	c13	0.000002	0.000001	0.000000	0.000000	0.000000	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00029	IND	c14	0.000006	0.000004	0.000000	0.000000	0.000000	0.000001	0.000002	0.000002	0.000001	0.000002	0.000008	0.000001	0.000000	0.000001	0.000000	0.000000	0.000001	0.000000
0.00000	IND	c15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c16	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c17	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c18	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c19	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c20	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c21	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c22	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c23	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.01405	IND	c24	0.000028	0.000025	0.000002	0.000003	0.000002	0.000029	0.000029	0.014063	0.000018	0.000012	0.000011	0.000005	0.000002	0.000004	0.000001	0.000003	0.000013	0.000003
0.00000	IND	c25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c26	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c27	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c28	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c29	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c30	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c31	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c32	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c33	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c34	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.00000	IND	c35	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Employees compensation			0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Total Induced coefficients			**0.000038**	**0.000032**	**0.000003**	**0.000003**	**0.000003**	**0.000033**	**0.000034**	**0.014074**	**0.000023**	**0.000016**	**0.000020**	**0.000006**	**0.000003**	**0.000006**	**0.000001**	**0.000003**	**0.000024**	**0.000005**

Table 3A.30. Naphtha Direct and Indirect Coefficients (Part-I)

Naphtha			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01572	IND	c9	0.00037	0.00036	0.00056	0.00103	0.00072	0.00054	0.00124	0.00038	0.01964	0.00415	0.00049	0.00036	0.00032	0.00053	0.00045	0.00035	0.00018	0.00031
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00054	IND	c12	0.00000	0.00002	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00002	0.00003	0.00003	0.00076	0.00018	0.00014	0.00013	0.00002	0.00002	0.00011
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00037**	**0.00038**	**0.00057**	**0.00105**	**0.00073**	**0.00055**	**0.00125**	**0.00039**	**0.01965**	**0.00418**	**0.00051**	**0.00111**	**0.00051**	**0.00067**	**0.00058**	**0.00038**	**0.00020**	**0.00042**

Table 3A.30. Naphtha Direct and Indirect Coefficients (Part-II)

Naphtha			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01572	IND	c9	0.00003	0.00003	0.00003	0.00021	0.00032	0.00137	0.00075	0.00026	0.00007	0.00005	0.00002	0.00005	0.00000	0.00003	0.00190	0.00004	0.00004
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00054	IND	c12	0.00000	0.00000	0.00000	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			0.00003	0.00003	0.00003	0.00022	0.00034	0.00139	0.00076	0.00027	0.00009	0.00005	0.00003	0.00006	0.00000	0.00004	0.00191	0.00004	0.00004

Table 3A.31. Naphtha Induced Coefficients (Part-I)

Nephta			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01572	IND	c9	0.00037	0.00038	0.00057	0.00104	0.00073	0.00056	0.00125	0.00039	0.01965	0.00417	0.00050	0.00036	0.00033	0.00054	0.00047	0.00035	0.00019	0.00032
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00054	IND	c12	0.00000	0.00002	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00002	0.00003	0.00003	0.00076	0.00018	0.00014	0.00013	0.00002	0.00002	0.00011
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.000377**	**0.000403**	**0.000586**	**0.001056**	**0.000743**	**0.000573**	**0.001269**	**0.000401**	**0.019664**	**0.004194**	**0.000524**	**0.00112**	**0.000512**	**0.000684**	**0.000596**	**0.000379**	**0.000212**	**0.000426**

Table 3A.31. Naphtha Induced Coefficients (Part-II)

Nephta			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01572	IND	c9	0.00003	0.00004	0.00003	0.00023	0.00033	0.00140	0.00077	0.00027	0.00009	0.00005	0.00003	0.00006	0.00002	0.00004	0.00191	0.00007	0.00004	0.00041
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00054	IND	c12	0.00000	0.00000	0.00000	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001
0.00000	IND	c13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00003**	**0.00004**	**0.00004**	**0.00023**	**0.00035**	**0.00142**	**0.00079**	**0.00028**	**0.00010**	**0.00006**	**0.00004**	**0.00007**	**0.00002**	**0.00005**	**0.00191**	**0.00008**	**0.00004**	**0.00043**

Table 3A.32. Diesel Direct and Indirect Coefficients (Part-I)

Diesel			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00162	IND	c1	0.00180	0.00001	0.00070	0.00019	0.00037	0.00032	0.00009	0.00001	0.00005	0.00014	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00005
0.02344	IND	c2	0.00010	0.02364	0.00025	0.00033	0.00022	0.00030	0.00052	0.00332	0.00054	0.00042	0.00124	0.00226	0.00068	0.00057	0.00055	0.00014	0.00210	0.00061
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00144	IND	c4	0.00001	0.00000	0.00001	0.00183	0.00003	0.00001	0.00002	0.00000	0.00002	0.00004	0.00001	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001
0.00051	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00064	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c9	0.00003	0.00003	0.00005	0.00009	0.00006	0.00005	0.00011	0.00003	0.00167	0.00035	0.00004	0.00003	0.00003	0.00005	0.00004	0.00003	0.00002	0.00003
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c13	0.00000	0.00003	0.00002	0.00003	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00003	0.00144	0.00006	0.00008	0.00002	0.00003	0.00002
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00196	IND	c17	0.00003	0.00006	0.00006	0.00012	0.00006	0.00008	0.00013	0.00008	0.00011	0.00013	0.00022	0.00019	0.00009	0.00009	0.00012	0.00003	0.00247	0.00010
0.00137	IND	c18	0.00002	0.00005	0.00004	0.00005	0.00002	0.00002	0.00005	0.00004	0.00003	0.00003	0.00012	0.00004	0.00006	0.00005	0.00004	0.00002	0.00007	0.00146
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00880	IND	c23	0.00033	0.00030	0.00117	0.00111	0.00108	0.00089	0.00124	0.00119	0.00113	0.00129	0.00101	0.00100	0.00079	0.00093	0.00074	0.00048	0.00076	0.00093
0.11589	IND	c24	0.00008	0.00006	0.00033	0.00018	0.00020	0.00029	0.00025	0.00028	0.00025	0.00026	0.00026	0.00025	0.00017	0.00020	0.00015	0.00010	0.00023	0.00020
0.00017	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00241**	**0.02417**	**0.00262**	**0.00392**	**0.00271**	**0.00196**	**0.00242**	**0.00496**	**0.00382**	**0.00269**	**0.00294**	**0.00383**	**0.00327**	**0.00196**	**0.00174**	**0.00085**	**0.00568**	**0.00339**

Table 3A.32. Diesel Direct and Indirect Coefficients (Part-II)

Diesel			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00162	IND	c1	0.00000	0.00000	0.00000	0.00048	0.00004	0.00002	0.00002	0.00002	0.00001	0.00001	0.00000	0.00001	0.00000	0.00001	0.00003	0.00000	0.00000
0.02344	IND	c2	0.00005	0.00005	0.00005	0.00018	0.00078	0.00027	0.00034	0.00030	0.00018	0.00008	0.00004	0.00006	0.00000	0.00004	0.00014	0.00002	0.00002
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00144	IND	c4	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00051	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c9	0.00000	0.00000	0.00000	0.00002	0.00003	0.00012	0.00006	0.00002	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00016	0.00000	0.00000
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00196	IND	c17	0.00001	0.00001	0.00001	0.00006	0.00007	0.00006	0.00003	0.00015	0.00008	0.00002	0.00001	0.00003	0.00000	0.00001	0.00003	0.00001	0.00001
0.00137	IND	c18	0.00001	0.00001	0.00001	0.00005	0.00006	0.00005	0.00006	0.00007	0.00007	0.00003	0.00010	0.00005	0.00000	0.00003	0.00004	0.00002	0.00002
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00880	IND	c23	0.00016	0.00016	0.00016	0.00080	0.00957	0.00064	0.00063	0.00089	0.00042	0.00022	0.00007	0.00014	0.00000	0.00017	0.00050	0.00006	0.00006
0.11589	IND	c24	0.00002	0.00002	0.00002	0.00023	0.00023	0.11601	0.00013	0.00009	0.00008	0.00004	0.00001	0.00003	0.00000	0.00002	0.00010	0.00001	0.00001
0.00017	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00017	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00026**	**0.00026**	**0.00026**	**0.00183**	**0.01081**	**0.11719**	**0.00147**	**0.00156**	**0.00086**	**0.00042**	**0.00024**	**0.00033**	**0.00000**	**0.00028**	**0.00101**	**0.00012**	**0.00012**

Table 3A.33. Diesel Induced Coefficients (Part-I)

Diesel			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00162	IND	c1	0.00180	0.00002	0.00071	0.00019	0.00038	0.00034	0.00010	0.00002	0.00006	0.00015	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00005
0.02344	IND	c2	0.00011	0.02365	0.00025	0.00033	0.00023	0.00031	0.00053	0.00332	0.00055	0.00043	0.00124	0.00227	0.00068	0.00057	0.00056	0.00015	0.00210	0.00062
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00144	IND	c4	0.00001	0.00001	0.00002	0.00183	0.00004	0.00001	0.00002	0.00001	0.00002	0.00004	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00001
0.00051	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00064	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c9	0.00003	0.00003	0.00005	0.00009	0.00006	0.00005	0.00011	0.00003	0.00167	0.00035	0.00004	0.00003	0.00003	0.00005	0.00004	0.00003	0.00002	0.00003
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c13	0.00000	0.00003	0.00002	0.00003	0.00002	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00003	0.00144	0.00006	0.00008	0.00002	0.00003	0.00002
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00196	IND	c17	0.00003	0.00006	0.00006	0.00012	0.00006	0.00008	0.00014	0.00008	0.00011	0.00013	0.00023	0.00019	0.00009	0.00009	0.00012	0.00003	0.00247	0.00010
0.00137	IND	c18	0.00002	0.00005	0.00004	0.00005	0.00002	0.00002	0.00005	0.00004	0.00004	0.00003	0.00012	0.00004	0.00006	0.00005	0.00004	0.00002	0.00007	0.00146
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00880	IND	c23	0.00035	0.00035	0.00120	0.00113	0.00111	0.00094	0.00128	0.00121	0.00115	0.00132	0.00103	0.00102	0.00080	0.00095	0.00077	0.00049	0.00077	0.00095
0.11589	IND	c24	0.00008	0.00007	0.00033	0.00018	0.00021	0.00030	0.00025	0.00028	0.00026	0.00027	0.00027	0.00025	0.00017	0.00020	0.00016	0.00011	0.00023	0.00021
0.00017	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00244**	**0.02427**	**0.00268**	**0.00396**	**0.00277**	**0.00206**	**0.00249**	**0.00500**	**0.00386**	**0.00274**	**0.00298**	**0.00385**	**0.00330**	**0.00200**	**0.00180**	**0.00087**	**0.00572**	**0.00344**

Table 3A.33. Diesel Induced Coefficients (Part-II)

Diesel			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00162	IND	c1	0.00000	0.00001	0.00001	0.00049	0.00005	0.00004	0.00004	0.00003	0.00002	0.00001	0.00001	0.00002	0.00001	0.00002	0.00004	0.00003	0.00000	0.00033
0.02344	IND	c2	0.00005	0.00005	0.00005	0.00019	0.00078	0.00028	0.00036	0.00030	0.00019	0.00009	0.00005	0.00007	0.00001	0.00005	0.00014	0.00004	0.00002	0.00021
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00144	IND	c4	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00007
0.00051	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c9	0.00000	0.00000	0.00000	0.00002	0.00003	0.00012	0.00007	0.00002	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00016	0.00001	0.00000	0.00004
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00134	IND	c13	0.00000	0.00000	0.00000	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00196	IND	c17	0.00001	0.00001	0.00001	0.00006	0.00007	0.00007	0.00004	0.00015	0.00009	0.00002	0.00001	0.00003	0.00000	0.00001	0.00003	0.00001	0.00001	0.00005
0.00137	IND	c18	0.00001	0.00001	0.00001	0.00005	0.00006	0.00005	0.00006	0.00007	0.00007	0.00003	0.00010	0.00005	0.00000	0.00003	0.00004	0.00002	0.00002	0.00004
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00880	IND	c23	0.00017	0.00019	0.00018	0.00083	0.00959	0.00071	0.00069	0.00091	0.00045	0.00023	0.00008	0.00016	0.00004	0.00019	0.00052	0.00014	0.00006	0.00091
0.11589	IND	c24	0.00002	0.00002	0.00002	0.00024	0.00024	0.11602	0.00014	0.00010	0.00009	0.00004	0.00002	0.00003	0.00001	0.00002	0.00010	0.00003	0.00001	0.00022
0.00017	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00017	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00026**	**0.00032**	**0.00029**	**0.00189**	**0.01085**	**0.11732**	**0.00159**	**0.00160**	**0.00094**	**0.00043**	**0.00027**	**0.00038**	**0.00008**	**0.00033**	**0.00105**	**0.00028**	**0.00012**	**0.00188**

Table 3A.34. Heavy Fuel Oil Direct and Indirect Coefficients (Part-I)

Heavy Fuel Oil			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00012	IND	c2	0.00000	0.00012	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00067	IND	c4	0.00000	0.00000	0.00001	0.00085	0.00002	0.00000	0.00001	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00024	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00030	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00739	IND	c9	0.00017	0.00017	0.00026	0.00048	0.00034	0.00025	0.00058	0.00018	0.00923	0.00195	0.00023	0.00017	0.00015	0.00025	0.00021	0.00017	0.00009	0.00015
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01558	IND	c13	0.00005	0.00035	0.00018	0.00035	0.00017	0.00009	0.00014	0.00013	0.00019	0.00024	0.00016	0.00031	0.01676	0.00067	0.00089	0.00025	0.00032	0.00020
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00973	IND	c17	0.00016	0.00029	0.00028	0.00059	0.00030	0.00038	0.00066	0.00039	0.00052	0.00063	0.00111	0.00096	0.00046	0.00044	0.00058	0.00013	0.01224	0.00048
0.00106	IND	c18	0.00001	0.00004	0.00003	0.00004	0.00002	0.00001	0.00004	0.00003	0.00003	0.00002	0.00009	0.00003	0.00004	0.00004	0.00003	0.00002	0.00006	0.00113
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00040**	**0.00098**	**0.00076**	**0.00232**	**0.00114**	**0.00074**	**0.00143**	**0.00075**	**0.00998**	**0.00286**	**0.00161**	**0.00149**	**0.01742**	**0.00140**	**0.00172**	**0.00056**	**0.01271**	**0.00196**

Table 3A.34. Heavy Fuel Oil Direct and Indirect Coefficients (Part-II)

Heavy Fuel Oil			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00012	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00067	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00024	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00739	IND	c9	0.00001	0.00001	0.00001	0.00010	0.00015	0.00064	0.00035	0.00012	0.00003	0.00002	0.00001	0.00002	0.00000	0.00002	0.00089	0.00002	0.00002
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01558	IND	c13	0.00002	0.00002	0.00002	0.00009	0.00021	0.00012	0.00010	0.00009	0.00008	0.00003	0.00001	0.00003	0.00000	0.00002	0.00007	0.00001	0.00001
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00973	IND	c17	0.00005	0.00005	0.00005	0.00027	0.00037	0.00032	0.00017	0.00075	0.00042	0.00011	0.00003	0.00014	0.00000	0.00003	0.00012	0.00003	0.00003
0.00106	IND	c18	0.00001	0.00001	0.00001	0.00004	0.00005	0.00004	0.00005	0.00006	0.00006	0.00003	0.00008	0.00004	0.00000	0.00002	0.00003	0.00001	0.00001
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00008**	**0.00008**	**0.00008**	**0.00051**	**0.00078**	**0.00113**	**0.00066**	**0.00103**	**0.00059**	**0.00020**	**0.00014**	**0.00023**	**0.00000**	**0.00009**	**0.00112**	**0.00008**	**0.00008**

Table 3A.35. Heavy Fuel Oil Induced Coefficients (Part-I)

HFO			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00012	IND	c2	0.00000	0.00012	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00067	IND	c4	0.00000	0.00000	0.00001	0.00085	0.00002	0.00000	0.00001	0.00000	0.00001	0.00002	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000
0.00024	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00030	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00739	IND	c9	0.00018	0.00018	0.00027	0.00049	0.00034	0.00026	0.00059	0.00018	0.00923	0.00196	0.00023	0.00017	0.00015	0.00025	0.00022	0.00017	0.00009	0.00015
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01558	IND	c13	0.00005	0.00036	0.00018	0.00036	0.00018	0.00010	0.00014	0.00013	0.00019	0.00024	0.00016	0.00032	0.01676	0.00067	0.00089	0.00025	0.00032	0.00021
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00973	IND	c17	0.00016	0.00030	0.00029	0.00059	0.00031	0.00039	0.00067	0.00040	0.00053	0.00063	0.00112	0.00096	0.00046	0.00044	0.00059	0.00013	0.01224	0.00048
0.00106	IND	c18	0.00001	0.00004	0.00003	0.00004	0.00002	0.00002	0.00004	0.00003	0.00003	0.00002	0.00009	0.00003	0.00004	0.00004	0.00003	0.00002	0.00006	0.00113
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00041**	**0.00101**	**0.00078**	**0.00233**	**0.00117**	**0.00077**	**0.00145**	**0.00076**	**0.01000**	**0.00288**	**0.00162**	**0.00149**	**0.01743**	**0.00142**	**0.00174**	**0.00057**	**0.01272**	**0.00198**

Table 3A.35. Heavy Fuel Oil Induced Coefficients (Part-II)

HF O			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.00000	IND	c1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00012	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00067	IND	c4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00003
0.00024	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00739	IND	c9	0.00001	0.00002	0.00002	0.00011	0.00015	0.00066	0.00036	0.00013	0.00004	0.00003	0.00001	0.00003	0.00001	0.00002	0.00090	0.00003	0.00002	0.00019
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01558	IND	c13	0.00002	0.00002	0.00002	0.00010	0.00021	0.00014	0.00011	0.00010	0.00009	0.00003	0.00002	0.00003	0.00001	0.00002	0.00007	0.00003	0.00001	0.00016
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00973	IND	c17	0.00005	0.00005	0.00005	0.00028	0.00037	0.00034	0.00018	0.00076	0.00043	0.00012	0.00004	0.00014	0.00001	0.00004	0.00013	0.00005	0.00003	0.00022
0.00106	IND	c18	0.00001	0.00001	0.00001	0.00004	0.00005	0.00004	0.00005	0.00006	0.00006	0.00003	0.00008	0.00004	0.00000	0.00002	0.00003	0.00001	0.00001	0.00003
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00009**	**0.00011**	**0.00009**	**0.00053**	**0.00079**	**0.00118**	**0.00071**	**0.00104**	**0.00062**	**0.00020**	**0.00015**	**0.00025**	**0.00003**	**0.00011**	**0.00114**	**0.00013**	**0.00008**	**0.00064**

Table 3A.36. Electricity Direct and Indirect Coefficients (Part-I)

Electricity			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.28361	IND	c1	0.31362	0.00112	0.12181	0.03256	0.06411	0.05620	0.01516	0.00183	0.00856	0.02399	0.00323	0.00191	0.00234	0.00254	0.00245	0.00260	0.00168	0.00787
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02241	IND	c4	0.00009	0.00004	0.00023	0.02850	0.00052	0.00010	0.00027	0.00006	0.00033	0.00061	0.00019	0.00008	0.00013	0.00017	0.00012	0.00014	0.00005	0.00010
0.00788	IND	c5	0.00000	0.00000	0.00001	0.00004	0.01001	0.00001	0.00001	0.00000	0.00002	0.00007	0.00001	0.00001	0.00001	0.00002	0.00004	0.00002	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.21258	IND	c9	0.00495	0.00485	0.00757	0.01394	0.00969	0.00729	0.01672	0.00516	0.26555	0.05618	0.00659	0.00483	0.00436	0.00720	0.00612	0.00475	0.00250	0.00418
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04495	IND	c13	0.00014	0.00102	0.00051	0.00102	0.00049	0.00025	0.00040	0.00036	0.00055	0.00068	0.00046	0.00091	0.04834	0.00193	0.00257	0.00071	0.00091	0.00059
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01319	IND	c15	0.00005	0.00011	0.00015	0.00015	0.00016	0.00013	0.00016	0.00013	0.00015	0.00034	0.00015	0.00024	0.00030	0.00026	0.01487	0.00013	0.00014	0.00017
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.61909	IND	c17	0.01023	0.01862	0.01777	0.03751	0.01927	0.02423	0.04213	0.02490	0.03338	0.03988	0.07085	0.06101	0.02936	0.02791	0.03709	0.00821	0.77887	0.03033
0.02762	IND	c18	0.00037	0.00107	0.00081	0.00103	0.00047	0.00035	0.00093	0.00079	0.00070	0.00056	0.00242	0.00081	0.00112	0.00101	0.00072	0.00040	0.00145	0.02946
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			0.32944	0.02682	0.14886	0.11475	0.10472	0.08857	0.07578	0.03325	0.30923	0.12232	0.08390	0.06979	0.08596	0.04103	0.06398	0.01695	0.78560	0.07270

Table 3A.36. Electricity Direct and Indirect Coefficients (Part-II)

Electricity			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35
0.28361	IND	c1	0.00056	0.00056	0.00056	0.08364	0.00768	0.00327	0.00334	0.00352	0.00134	0.00158	0.00060	0.00206	0.00000	0.00195	0.00517	0.00034	0.00034
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02241	IND	c4	0.00003	0.00003	0.00003	0.00008	0.00012	0.00011	0.00010	0.00008	0.00004	0.00003	0.00001	0.00005	0.00000	0.00005	0.00014	0.00001	0.00001
0.00788	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00002	0.00001	0.00003	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.21258	IND	c9	0.00038	0.00038	0.00038	0.00285	0.00431	0.01852	0.01010	0.00353	0.00099	0.00067	0.00030	0.00068	0.00000	0.00046	0.02567	0.00050	0.00050
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04495	IND	c13	0.00004	0.00004	0.00004	0.00027	0.00061	0.00036	0.00028	0.00027	0.00023	0.00010	0.00004	0.00009	0.00000	0.00005	0.00020	0.00003	0.00003
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01319	IND	c15	0.00002	0.00002	0.00002	0.00009	0.00067	0.00078	0.00017	0.00020	0.00011	0.00011	0.00001	0.00011	0.00000	0.00003	0.00007	0.00002	0.00002
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.61909	IND	c17	0.00288	0.00288	0.00288	0.01741	0.02336	0.02048	0.01058	0.04773	0.02680	0.00719	0.00217	0.00866	0.00000	0.00212	0.00791	0.00215	0.00215
0.02762	IND	c18	0.00024	0.00024	0.00024	0.00106	0.00123	0.00100	0.00119	0.00149	0.00148	0.00069	0.00202	0.00107	0.00000	0.00063	0.00084	0.00032	0.00032
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total indirect coefficients			**0.00417**	**0.00417**	**0.00417**	**0.10540**	**0.03799**	**0.04453**	**0.02579**	**0.05682**	**0.03099**	**0.01036**	**0.00514**	**0.01272**	**0.00000**	**0.00528**	**0.04002**	**0.00338**	**0.00338**

Table 3A.37. Electricity Induced Coefficients (Part-I)

Electricity			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Direct coefficients			c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
0.28361	IND	c1	0.31471	0.00422	0.12385	0.03379	0.06617	0.05926	0.01733	0.00310	0.00994	0.02573	0.00448	0.00273	0.00322	0.00399	0.00422	0.00312	0.00272	0.00934
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02241	IND	c4	0.00011	0.00010	0.00027	0.02853	0.00056	0.00016	0.00031	0.00009	0.00035	0.00065	0.00022	0.00009	0.00015	0.00019	0.00016	0.00015	0.00007	0.00013
0.00788	IND	c5	0.00000	0.00000	0.00001	0.00004	0.01001	0.00002	0.00001	0.00001	0.00002	0.00007	0.00002	0.00001	0.00001	0.00002	0.00004	0.00002	0.00000	0.00001
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.21258	IND	c9	0.00505	0.00515	0.00777	0.01405	0.00988	0.00758	0.01693	0.00529	0.26568	0.05635	0.00671	0.00490	0.00444	0.00734	0.00630	0.00480	0.00260	0.00433
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04495	IND	c13	0.00014	0.00104	0.00052	0.00103	0.00051	0.00028	0.00042	0.00037	0.00056	0.00069	0.00047	0.00091	0.04835	0.00194	0.00258	0.00071	0.00092	0.00060
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01319	IND	c15	0.00006	0.00012	0.00016	0.00016	0.00017	0.00014	0.00016	0.00014	0.00015	0.00035	0.00016	0.00024	0.00030	0.00027	0.01488	0.00013	0.00014	0.00017
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.61909	IND	c17	0.01050	0.01938	0.01827	0.03781	0.01978	0.02498	0.04266	0.02521	0.03372	0.04031	0.07116	0.06121	0.02958	0.02826	0.03753	0.00833	0.77912	0.03069
0.02762	IND	c18	0.00039	0.00111	0.00084	0.00105	0.00049	0.00039	0.00096	0.00081	0.00072	0.00059	0.00243	0.00082	0.00113	0.00103	0.00074	0.00041	0.00146	0.02947
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.33096**	**0.03112**	**0.15169**	**0.11646**	**0.10757**	**0.09282**	**0.07878**	**0.03501**	**0.31114**	**0.12473**	**0.08563**	**0.07093**	**0.08718**	**0.04304**	**0.06644**	**0.01767**	**0.78705**	**0.07474**

Table 3A.37. Electricity Induced Coefficients (Part-II)

Electricity			IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	
Direct coefficients			c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	
0.28361	IND	c1	0.00068	0.00243	0.00140	0.08571	0.00870	0.00744	0.00720	0.00483	0.00383	0.00217	0.00162	0.00336	0.00256	0.00333	0.00630	0.00533	0.00053	0.05818
0.00000	IND	c2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.02241	IND	c4	0.00003	0.00007	0.00005	0.00012	0.00014	0.00020	0.00017	0.00011	0.00008	0.00004	0.00003	0.00008	0.00005	0.00007	0.00016	0.00011	0.00002	0.00115
0.00788	IND	c5	0.00000	0.00000	0.00000	0.00000	0.00002	0.00001	0.00003	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00003
0.00000	IND	c6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.21258	IND	c9	0.00039	0.00056	0.00046	0.00305	0.00441	0.01892	0.01047	0.00366	0.00123	0.00072	0.00040	0.00081	0.00025	0.00060	0.02578	0.00098	0.00052	0.00560
0.00000	IND	c10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.04495	IND	c13	0.00005	0.00006	0.00005	0.00028	0.00062	0.00039	0.00031	0.00028	0.00025	0.00010	0.00005	0.00010	0.00002	0.00006	0.00021	0.00007	0.00003	0.00046
0.00000	IND	c14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.01319	IND	c15	0.00002	0.00003	0.00003	0.00010	0.00067	0.00080	0.00018	0.00020	0.00012	0.00011	0.00002	0.00011	0.00001	0.00003	0.00008	0.00004	0.00002	0.00019
0.00000	IND	c16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.61909	IND	c17	0.00291	0.00334	0.00309	0.01792	0.02361	0.02150	0.01153	0.04805	0.02741	0.00733	0.00242	0.00898	0.00063	0.00246	0.00819	0.00338	0.00220	0.01430
0.02762	IND	c18	0.00024	0.00027	0.00025	0.00109	0.00124	0.00105	0.00124	0.00151	0.00152	0.00070	0.00203	0.00109	0.00003	0.00065	0.00086	0.00038	0.00032	0.00077
0.00000	IND	c19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c20	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c24	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c25	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c27	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c28	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c30	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c31	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c32	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c33	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c34	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	IND	c35	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Employees compensation			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Induced coefficients			**0.00433**	**0.00675**	**0.00532**	**0.10827**	**0.03941**	**0.05031**	**0.03114**	**0.05864**	**0.03443**	**0.01118**	**0.00656**	**0.01453**	**0.00354**	**0.00720**	**0.04158**	**0.01030**	**0.00364**	**0.08068**

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Appendix 4 – Underpinning assumptions of multiobjective interval linear programming

1. Interval numbers and interval operations

Let the value x (a real number) be uncertain, knowing that x lies within the range of two real numbers a^L and a^U forming an interval, where $a^L < a^U$. Additionally, consider that all the numbers belonging to this interval have the same importance [1]

An interval number A is the set of real numbers x such that $a^L \leq x \leq a^U$, i.e. $x \in [a^L, a^U]$, a^L, $a^U \in \Re$ or,

$A = [a^L, a^U] = \{x \colon a^L \leq x \leq a^U, x \in \Re\}$. (B1)

The width and midpoint of the interval number $A = [a^L, a^U]$ are $w[A] = (a^U - a^L)$ and $m[A] = \frac{1}{2}(a^U + a^L)$, respectively.

In the set of real numbers, an operator ♦ can be expanded to be considered in the set of interval numbers.

Hence, for the interval numbers $A = [a^L, a^U]$ and $B = [b^L, b^U]$, with $0 \notin B$, it is possible to define the operator (♦) as follows:

$A\,(\blacklozenge)\,B = \{ z : z = x \blacklozenge y, x \in A, y \in B\} =$

$\{ z : z = x \blacklozenge y, x \in [a^L, a^U], y \in [b^L, b^U]\}$, (B2)

where $A\,(\blacklozenge)\,B$ allows estimating the possible region of $x \blacklozenge y$, such that $x \in A$ and $y \in B$.

The operator (♦) is called the *possible expanded operator* of ♦ [2].

The *possible expanded addition* (or *possible addition*) of the interval numbers A and B is given by:

$A\ (+)\ B = [a^L, a^U]\ (+)\ [b^L, b^U] = [a^L + b^L, a^U + b^U].$ (B3)

The *possible expanded subtraction* (or *possible subtraction*) of the interval numbers A and B is given by:

$A\ (–)\ B = [a^L, a^U]\ (–)\ [b^L, b^U] = [a^L – b^U, a^U – b^L].$ (B4)

The possible addition and subtraction allow concluding that:

$\mathrm{m}[A\ (+)\ B] = \mathrm{m}[A] + \mathrm{m}[B],$ (B5)

$\mathrm{m}[A\ (–)\ B] = \mathrm{m}[A] – \mathrm{m}[\mathrm{B}],$ (B6)

$\mathrm{w}[A\ (+)\ B] = \mathrm{w}[A\ (–)\ B] = \mathrm{w}[A] + \mathrm{w}[B],$ (B7)

The width of the intervals A (+) B and A (–) B are always greater than or equal to the intervals A or B.

The *possible expanded maximum* (or *possible maximum*) of interval numbers is given by:

$A\ (\vee)\ B = [a^L \vee b^L, a^U \vee b^U].$ (B8)

The multiplication of interval numbers is defined as:

$A\ (.)\ B = [a^L, a^U]\ (.)\ [b^L, b^U] =$

$= [\min(a^L b^L, a^L b^U, a^U b^L, a^U b^U), \max(a^L b^L, a^L b^U, a^U b^L, a^U b^U)].$ (B9)

The division of interval numbers is defined by:

$A\ (\div)\ B = [a^L, a^U]\ (\div)\ [b^L, b^U] = [a^L, a^U]\ (.)\ [\frac{1}{b^U}, \frac{1}{b^L}].$ (B10)

If $0 \in B$, then the operation $A(\div)B$ *is not defined.*

The multiplication of a scalar by an interval number is:

$$\lambda A = \begin{cases} \left[\lambda a^{\mathrm{L}}, \quad \lambda a^{\mathrm{U}}\right], \lambda \geq 0, \\ \left[\lambda a^{\mathrm{U}}, \quad \lambda a^{\mathrm{L}}\right], \lambda \leq 0. \end{cases} \tag{B11}$$

The module of an interval number is obtained as follows:

$$|A| = \begin{cases} \left[a^{\mathrm{L}}, \quad a^{\mathrm{U}}\right], a^{\mathrm{L}} \geq 0, \\ \left[0, \quad (-a^{\mathrm{L}}) \vee a^{\mathrm{U}}\right], a^{\mathrm{L}} < 0 < a^{\mathrm{U}}, \\ \left[-a^{\mathrm{U}}, \quad -a^{\mathrm{L}}\right], a^{\mathrm{U}} \leq 0. \end{cases} \tag{B12}$$

The distance between the intervals A and B corresponds to $d(A, B) = \text{Max}\ (|a^{\mathrm{L}} - b^{\mathrm{L}}|, | a^{\mathrm{U}} - b^{\mathrm{U}}|)$.

If A and B are interval points, that is, $A = [a, a]$ and $B = [b, b]$, then the distance between A and B corresponds to the distance between two real numbers, that is, $d(A, B) = \text{Max}\ (|a - b|, |a - b|) = |a - b|$. Thus, $d(A, B) = d(B, A)$ and $d(A, B) = 0$ if and only if $A = B$.

2. Multiobjective linear programming models with interval coefficients

Consider, without loss of generality, the following multiobjective linear programming (MOLP) model with interval coefficients and parameters and the interval arithmetic operations previously defined:

$\max Z_k(\mathbf{x}) = \sum_{j=1}^{n} [c_{kj}^L, c_{kj}^U]\, x_j, k = 1, \dots, p,$

$s.t.: \sum_{j=1}^{n} a_{ij} x_j \leq b_i, i = 1, \dots, m,$

$x_j \geq 0, j = 1, \dots, n.$ (C1)

where $\mathbf{x} = (x_1, \dots, x_n)^T$ is the vector of variables and $X = \{\mathbf{x} = (x_1, \dots, x_n)^T \in \mathbb{R}^n \mid \sum_{j=1}^{n} a_{ij} x_j \leq b_i \; i = 1, \dots, m, \; x_j \geq 0, \; j = 1, \dots, n\}$ is the feasible region.

If each of the coefficients $[c_{kj}^L, c_{kj}^U]$ is a real value, then problem (C1) is also a MOLP problem:

$\max \bar{Z}_k(\mathbf{x}) = \sum_{j=1}^{n} \bar{c}_{kj}\, x_j, k = 1, \dots, p,$

$s.t.: \sum_{j=1}^{n} a_{ij} x_j \leq b_i, i = 1, \dots, m,$

$x_j \geq 0, j = 1, \dots, n.$ (C2)

where $\bar{c}_{kj} \in [c_{kj}^L, c_{kj}^U]$ for all $k = 1, \dots, p, j = 1, \dots, n.$

Analogously to the concept of ideal solution values in MOLP programming, the optimal values with the upper bounds of each objective function (best case scenario in a maximization problem) and with the lower bounds of every objective function (pessimistic case scenario in a maximization problem) are computed.

For each objective function $Z_k(\mathbf{x})$, $k = 1, \dots, p$, the following linear programming (LP) problems are solved [3]:

$\max Z_k^U(\mathbf{x}) = \sum_{j=1}^{n} c_{kj}^U\, x_j,$

$s.t.: \sum_{j=1}^{n} a_{ij} x_j \leq b_i, i = 1, \dots, m,$

$x_j \geq 0, j = 1, \dots, n.$ (C3)

and

$\max Z_k^L(\mathbf{x}) = \sum_{j=1}^{n} c_{kj}^L x_j,$

$s.t.: \sum_{j=1}^{n} a_{ij} x_j \leq b_i, i = 1, \dots, m,$

$x_j \geq 0, j = 1, \dots, n.$ (C4)

Let model (C3) and model (C4) be identified, respectively, with $\beta = 0$ and $\beta = 1$ and the optimal solution to each model be identified with $\mathbf{x}_k^{\beta}$, $k = 1, \dots, p$. The optimal values are denoted by:

$Z_k^{U^*} = Z_k^U(\mathbf{x}_k^0), k = 1, \dots, p,$ (C5)

$Z_k^{L^*} = Z_k^L(\mathbf{x}_k^1), k = 1, \dots, p.$ (C6)

The intervals $\left[Z_k^{L^*}, Z_k^{U^*}\right]$ with $k = 1, \dots, p$ are considered to be the bounds of the interval ideal solution [4].

[5] and [6] suggested two different approaches to handle with an interval objective function: the satisficing approach and the optimizing approach.

In the satisficing approach each interval objective function is replaced by one or several objective functions (the lower bound, the upper bound and the central value of the intervals are usually considered) in order to generate a solution. On the other hand, the optimizing approach translates the concept of optimality of MOLP problems into the interval objective function case [7].

Definition 1

A solution $\mathbf{x}' \in X$ is efficient to problem (C2) if and only if there is no other $\mathbf{x} \in X$ such that $\bar{Z}_k(\mathbf{x}') \leq \bar{Z}_k(\mathbf{x})$ for all $k = 1, \dots, p$ with at least one strict inequality.

Definition 2

A solution $\mathbf{x}' \in X$ is "necessarily efficient" to problem (C1) if and only if it is efficient to problem (C2) for any $\bar{c}_{kj} \in [c_{kj}^L, c_{kj}^U]$ for all $k = 1, \dots, p,\ j = 1, \dots, n$. The "necessarily efficient" solution set is given by N_E.

Definition 3

A solution $\mathbf{x}' \in X$ is "possibly efficient" to problem (C1) if it is efficient to problem (C2) for at least one $\bar{c}_{kj} \in [c_{kj}^L, c_{kj}^U]$ for all $k = 1, \dots, p, j = 1, \dots, n$. The "possibly efficient" solution set is given by P_E.

Definition 4

A solution $\mathbf{x}' \in X$ is weekly efficient to problem (C2) if and only if there is no other $\mathbf{x} \in X$ such that $\overline{Z}_k(\mathbf{x}') < \overline{Z}_k(\mathbf{x})$ for all $k = 1, \dots, p$, i.e. if and only if there is no other solution which strictly improves the values of all the objective functions.

An appropriate solution to an interval MOLP should be obtained from the elements of N_E or P_E.

The "necessarily efficient" solutions are the most robust ones [8]; however, in most situations they may not exist. The "possibly efficient" solutions are considered to be the optimistic ones [8].

The basic properties and theoretical foundations for necessarily and possibly efficiency were discussed in [7], [6],[9] and [10].

More recently, [13] also introduced two new solution concepts: a solution is "possibly weak efficient" if "it is weakly efficient" for at least one of the given objective function coefficient vectors and "it is weakly efficient" if it is necessarily weak efficient for any given objective function coefficient vectors within their admissible range of variation.

Additionally, [11] and [12] also investigated the relation and properties of the "it is weakly efficient" solutions with possibly and necessarily optimal solutions to the related single objective problems with uncertain coefficients of the objective function.

The computation of an efficient solution to problem (C3) can be done by solving an LP problem with a surrogate scalarising function which incorporates parameters for representing the decision maker's preferences, whose optimal solution is efficient to the MOLP problem (C3). The surrogate objective function used to build the surrogate scalar problem is generally called a scalarising function.

The weighted-sum method is one of the most used scalarising approaches (for further exploring other approaches see e.g. [13]), where each objective function is assigned with a parameter (weight) λ_k, in order to build a surrogate scalarising objective function which corresponds to the weighted-sum of the p objective functions:

$\max \sum_{j=1}^{n} \lambda_k \overline{Z}_k(\mathbf{x}),\ k = 1, \dots, p,$

$s.t.: \sum_{j=1}^{n} a_{ij} x_j \leq b_i, i = 1, \dots, m,$

$x_j \geq 0, j = 1, \dots, n,$

$\lambda \in \Lambda,$ (C7)

where Λ is the weight set $\Lambda = \{\lambda: \lambda \in \Re p,\ \lambda_k \geq 0,\ \sum_{k=1}^{p} \lambda_k = 1\}$.

The optimization of the weighted-sum problem (C7) leads to an efficient solution to problem (C2) when the solution to the scalar problem is unique even for some $\lambda_k = 0$. However, if there is some $\lambda_k = 0$ the optimization of problem (C2) might lead to weakly efficient solutions to problem (C2) if the scalar problem (C7) has alternative optimal solutions. In this case, the strict efficiency of the obtained solutions is only guaranteed if all the weights, λ_k ($k=1, \dots, p$) are strictly positive.

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Appendix 5 – Results

Table 5A.1. GVA during manufacturing and operation LCA stages in Million $ (Part-I)

		Manufacturing in Million $			**Operation in Million $**			**Total in Million $**		
2011	**Appliance/ end-use**	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
	TFL	96	192	5	144	-190	-4	239	2	1
	EG	0	0	0	4	-5	0	4	-5	0
	TV	1,623	3,717	100	1,151	-1,524	-35	2,775	2,192	65
	CF	584	1,260	33	163	-216	-5	747	1,044	28
	FR	568	1,096	33	268	-355	-8	837	741	25
	RAC	50	112	3	48	-64	-1	99	48	1
	WM	0	-1	0	11	-15	0	11	-16	0
	COM	462	767	33	270	-358	-8	732	409	25
	WEP	3	7	0	13	-17	0	16	-10	0
	Sum	**3,387**	**7,151**	**207**	**2,073**	**-2,745**	**-63**	**5,460**	**4,406**	**144**
2015	**Appliance/ end-use**	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
	TFL	383	772	21	-1,538	-2,036	-47	-1,154	-1,264	-25
	EG	-7	-14	0	-47	-62	-1	-54	-76	-2
	TV	6,798	15,563	418	-11,877	-15,727	-361	-5,079	-164	57
	CF	2,803	6,052	156	-1,921	-2,543	-58	883	3,508	98
	FR	3,204	6,179	186	-3,643	-4,823	-111	-438	1,356	75
	RAC	452	1,006	26	-1,005	-1,331	-31	-553	-325	-5
	WM	0	-4	1	-130	-173	-4	-130	-177	-3
	COM	-1,169	-2,728	-33	-3,598	-4,764	-109	-4,766	-7,492	-142
	WEP	17	37	1	-171	-227	-5	-155	-190	-4
	Sum	**12,482**	**26,862**	**775**	**-23,929**	**-31,686**	**-727**	**-11,447**	**-4,824**	**48**
2020	**Appliance/ end-use**	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
	TFL	604	1,215	34	-5,799	-7,679	-176	-5,196	-6,464	-142
	EG	-12	-24	-1	-192	-254	-6	-204	-278	-6
	TV	10,131	23,194	623	-45,128	-59,758	-1,372	-34,997	-36,564	-749
	CF	4,408	9,516	245	-7,507	-9,941	-228	-3,099	-425	17
	FR	5,804	11,193	336	-15,384	-20,371	-468	-9,580	-9,178	-131
	RAC	1,050	2,334	60	-4,956	-6,562	-151	-3,906	-4,228	-91
	WM	0	-7	1	-503	-667	-15	-503	-673	-14
	COM	4,763	7,905	340	-15,460	-20,473	-470	-10,698	-12,567	-129
	WEP	29	64	2	-704	-932	-21	-675	-868	-20
	Sum	**26,776**	**55,391**	**1,641**	**-95,633**	**-126,637**	**-2,906**	**-68,857**	**-71,246**	**-1,266**

Table 5A.1. GVA during manufacturing and operation LCA stages in Million $

(Part-II)

		Manufacturing in Million $			Operation in Million $			Total in Million $		
2025	**Appliance/end-use**	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
	TFL	1,402	39	789	-10,759	-14,247	-327	-9,357	-14,208	462
	EG	-31	-1	-19	-381	-504	-12	-411	-505	-31
	TV	14,197	378	7,016	-85,108	-112,700	-2,587	-70,911	-112,321	4,430
	CF	15,129	390	10,634	-15,573	-20,622	-473	-444	-20,232	10,161
	FR	16,323	490	11,487	-32,678	-43,272	-993	-16,355	-42,782	10,494
	RAC	3,627	93	3,460	-12,671	-16,779	-385	-9,044	-16,685	3,074
	WM	-8	1	0	-965	-1,277	-29	-973	-1,276	-29
	COM	10,838	467	8,299	-32,474	-43,002	-987	-21,636	-42,535	7,313
	WEP	85	2	42	-1,437	-1,902	-44	-1,351	-1,900	-2
	Sum	**61,562**	**1,861**	**41,708**	**-192,045**	**-254,305**	**-5,837**	**-130,483**	**-252,444**	**35,872**
2030	**Appliance/end-use**	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
	TFL	789	1,589	44	-16,416	-21,738	-499	-15,627	-20,150	-455
	EG	-19	-38	-1	-621	-822	-19	-640	-860	-20
	TV	7,016	16,445	438	-131,844	-174,587	-4,007	-124,827	-158,141	-3,569
	CF	10,634	22,955	592	-28,595	-37,866	-869	-17,961	-14,911	-277
	FR	11,487	22,152	665	-56,936	-75,394	-1,730	-45,449	-53,242	-1,065
	RAC	3,460	7,693	197	-26,602	-35,227	-808	-23,143	-27,533	-611
	WM	0	-10	2	-1,515	-2,006	-46	-1,515	-2,016	-44
	COM	8,299	13,775	593	-53,211	-70,461	-1,617	-44,911	-56,686	-1,024
	WEP	42	94	2	-2,322	-3,075	-71	-2,280	-2,981	-68
	Sum	**41,708**	**84,655**	**2,534**	**-318,061**	**-421,175**	**-9,666**	**-276,353**	**-336,520**	**-7,132**

Table 5A.2. GHG reduction potential during manufacturing and operation LCA stages in tonnes of CO2 equivalent

		Manufacturing			Operation			Total			Manufacturing			Operation			Total		
		2011									2030								
Appliance/end-use	Gases /Tonne	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
WEP	CO_2	0.00	-0.01	0.00	0.47	0.14	0.00	0.47	0.12	0.00	-0.03	-0.11	0.00	85.49	24.70	0.06	85.46	24.58	0.06
	CH4	-19.78	-1,253.90	-63.72	1,084.50	5,507.26	221.35	1,064.72	4,253.36	157.63	-167.56	-10,623.41	-539.84	196,090.46	995,781.90	40,023.27	195,922.90	985,158.49	39,483.43
	N20	-20.57	-326.35	-39.24	3,214.22	1,238.29	136.33	3,193.65	911.94	97.09	-174.24	-2,764.93	-332.49	581,171.17	223,897.57	24,650.88	580,996.93	221,132.63	24,318.39
TFL	CO2	-0.14	-0.47	0.00	5.29	1.53	0.00	5.15	1.06	0.00	-1.15	-3.89	-0.04	604.39	174.61	0.45	603.24	170.71	0.41
	CH4	-1,203.37	-46,965.54	-3,038.07	12,135.09	61,624.14	2,476.85	10,931.72	14,658.60	-561.22	-9,942.37	-388,034.42	-25,100.88	1,386,291.96	7,039,834.73	282,950.72	1,376,349.60	6,651,800.31	257,849.85
	N20	-17,204.72	-19,818.08	-1,871.19	35,965.88	13,855.94	1,525.52	18,761.16	-5,962.14	-345.67	-142,147.30	-163,739.12	-15,459.98	4,108,679.81	1,582,878.62	174,273.23	3,966,532.51	1,419,139.50	158,813.26
EG	CO2	0.00	0.00	0.00	0.14	0.04	0.00	0.14	0.04	0.00	0.04	0.11	0.00	22.85	6.60	0.02	22.89	6.71	0.02
	CH4	-2.67	-86.42	-4.75	317.65	1,613.07	64.83	314.98	1,526.65	60.09	297.96	9,658.01	530.29	52,415.48	266,175.04	10,698.32	52,713.44	275,833.05	11,228.61
	N20	-28.89	-27.03	-2.92	941.44	362.69	39.93	912.55	335.66	37.01	3,228.81	3,020.85	326.61	155,348.54	59,848.39	6,589.24	158,577.35	62,869.24	6,915.85
TV	CO2	-1.37	-4.95	-0.05	42.38	12.24	0.03	41.02	7.30	-0.01	-1.56	-9.10	-0.07	4,854.02	1,402.32	3.60	4,852.46	1,393.22	3.53
	CH4	-10,128.94	-522,823.12	-28,943.46	97,216.09	493,680.44	19,842.40	87,087.15	-29,142.68	-9,101.06	-2,437.80	-1,003,828.51	-46,893.70	11,133,679.02	56,538,782.83	2,272,452.44	11,131,241.22	55,534,954.32	2,225,558.73
	N20	-101,767.60	-230,158.65	-17,826.67	288,128.19	111,002.07	12,221.21	186,360.59	-119,156.59	-5,605.47	211,174.81	-344,620.89	-28,882.48	32,997,899.04	12,712,518.65	1,399,634.64	33,209,073.84	12,367,897.76	1,370,752.16
CF	CO2	-0.65	-2.71	-0.02	6.02	1.74	0.00	5.37	-0.97	-0.02	-9.12	-38.19	-0.32	1,052.77	304.14	0.78	1,043.65	265.96	0.46
	CH4	-3,434.04	-258,320.05	-14,546.02	13,801.43	70,086.11	2,816.96	10,367.40	-188,233.94	-11,729.07	-48,242.79	-3,599,123.18	-204,631.09	2,414,748.55	12,262,518.40	492,865.05	2,366,505.76	8,663,395.22	288,233.96
	N20	-3,659.34	-66,859.44	-8,959.10	40,904.56	15,758.58	1,735.00	37,245.23	-51,100.85	-7,224.09	-51,254.86	-883,563.12	-126,035.10	7,156,810.31	2,757,178.10	303,562.34	7,105,555.45	1,873,614.98	177,527.25
FR	CO2	-0.09	-1.41	-0.02	9.88	2.85	0.01	9.79	1.45	-0.01	1.99	-11.40	-0.24	2,096.17	605.58	1.56	2,098.16	594.18	1.31
	CH4	-436.98	-148,454.96	-12,686.61	22,653.69	115,039.41	4,623.76	22,216.71	-33,415.55	-8,062.85	13,010.53	-1,313,501.15	-153,606.26	4,807,996.87	24,415,854.86	981,341.76	4,821,007.41	23,102,353.71	827,735.50
	N20	-10,094.99	-42,832.74	-7,813.86	67,140.80	25,866.15	2,847.84	57,045.80	-16,966.59	-4,966.02	-95,606.79	-350,273.36	-94,608.20	14,249,898.45	5,489,807.08	604,421.86	14,154,291.65	5,139,533.72	509,813.65
RAC	CO2	0.09	0.34	0.00	1.77	0.51	0.00	1.87	0.86	0.00	13.69	50.32	0.43	979.41	282.95	0.73	993.10	333.27	1.15
	CH4	598.35	33,693.38	1,830.07	4,070.26	20,669.50	830.77	4,668.61	54,362.88	2,660.84	87,669.08	4,936,665.40	268,137.05	2,246,469.48	11,407,967.64	458,518.25	2,334,138.55	16,344,633.04	726,655.30
	N20	3,761.63	11,318.30	1,127.17	12,063.40	4,647.45	511.68	15,825.03	15,965.75	1,638.84	551,143.60	1,658,327.04	165,149.29	6,658,066.30	2,565,035.79	282,407.68	7,209,209.90	4,223,362.83	447,556.97
WM	CO2	0.03	0.06	0.00	0.41	0.12	0.00	0.44	0.18	0.00	0.33	0.93	0.00	55.78	16.11	0.04	56.11	17.04	0.05
	CH4	145.14	4,644.29	113.42	951.00	4,829.34	194.10	1,096.14	9,473.64	307.53	1,916.49	79,226.62	2,987.92	127,934.98	649,676.38	26,112.32	129,851.47	728,903.01	29,100.24
	N20	82.79	500.72	69.86	2,818.56	1,085.86	119.55	2,901.35	1,586.58	189.41	3,132.49	16,320.82	1,840.30	379,172.57	146,077.13	16,082.93	382,305.06	162,397.95	17,923.24
COM	CO2	4.59	17.28	0.15	9.95	2.87	0.01	14.54	20.15	0.16	96.22	373.70	3.33	1,959.03	565.96	1.45	2,055.24	939.66	4.78
	CH4	29,325.99	1,665,177.57	94,283.27	22,812.00	115,843.33	4,656.07	52,137.98	1,781,020.90	98,939.34	616,838.60	36,275,612.67	2,098,948.77	4,493,425.23	22,818,404.66	917,135.75	5,110,263.83	59,094,017.33	3,016,084.53
	N20	192,349.33	518,440.20	58,070.36	67,609.99	26,046.91	2,867.74	259,959.32	544,487.10	60,938.10	4,206,796.34	11,426,466.07	1,292,771.35	13,317,573.80	5,130,626.81	564,876.50	17,524,370.14	16,557,092.88	1,857,647.85
	Sum	78,263.81	895,856.33	59,698.59	693,905.07	1,088,778.58	57,731.95	772,168.88	1,984,634.91	117,430.54	5,345,335.40	46,345,587.78	3,134,604.63	106,475,381.94	167,066,247.54	8,858,605.89	111,820,717.34	213,411,835.32	11,993,210.52
Cumulative									2,874,234.32									337,225,763.18	

Table 5A.3. Reduction of acidifying potential during manufacturing and operation LCA stages in tonnes of SO2 equivalent

		Manufacturing			Operation			Total			Manufacturing			Operation			Total		
		2011									2030								
Appliance/end-use	Gases /Tonne	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
WEP	NOX	-123.84	-557.71	-15.77	15,261.87	4,782.27	54.77	15,138.03	4,224.56	39.00	-1,049.23	-4,725.12	-133.57	2,759,538.22	864,694.53	9,902.60	2,758,489.00	859,969.41	9,769.03
	SOX	-163.21	-1,127.03	-31.81	46,265.96	12,680.08	110.50	46,102.75	11,553.05	78.69	-1,382.79	-9,548.53	-269.50	8,365,467.51	2,292,718.36	19,980.63	8,364,084.73	2,283,169.82	19,711.13
	NH3	-2.84	-128.00	-25.80	1.76	310.91	89.63	-1.08	182.91	63.83	-33.06	-1,084.45	-218.60	318.85	56,215.56	16,207.04	285.79	55,131.11	15,988.44
TFL	NOX	-4,958.59	-21,445.71	-751.68	170,774.51	53,511.77	612.82	165,815.92	32,066.06	-138.86	-40,968.38	-177,186.82	-6,210.49	19,508,983.89	6,113,092.23	70,007.97	19,468,015.50	5,935,905.41	63,797.49
	SOX	-8,110.39	-42,903.05	-1,516.68	517,698.43	141,885.28	1,236.50	509,588.04	98,982.23	-280.18	-67,008.94	-354,469.67	-12,530.99	59,140,971.31	16,208,728.36	141,256.15	59,073,962.37	15,854,258.69	128,725.16
	NH3	-1,464.98	-7,282.25	-1,230.24	19.73	3,478.91	1,002.98	-1,445.25	-3,803.34	-227.26	-26,971.30	-60,166.77	-10,164.36	2,254.16	397,424.62	114,578.20	-24,717.14	337,257.86	104,413.84
EG	NOX	-11.25	-40.96	-1.17	4,470.18	1,400.72	16.04	4,458.92	1,359.76	14.87	1,257.75	4,577.20	131.20	737,631.60	231,135.05	2,646.99	738,889.36	235,712.25	2,778.19
	SOX	-18.45	-82.87	-2.37	13,551.22	3,713.98	32.37	13,532.77	3,631.10	30.00	2,062.00	9,261.45	264.73	2,236,110.80	612,849.46	5,340.87	2,238,172.81	622,110.91	5,605.60
	NH3	-2.49	-9.36	-1.92	0.52	91.06	26.25	-1.97	81.71	24.33	612.64	1,045.85	214.73	85.23	15,026.56	4,332.18	697.87	16,072.41	4,546.92
TV	NOX	-50,608.30	-230,503.50	-7,161.22	1,368,100.84	428,691.04	4,909.43	1,317,492.54	198,187.54	-2,251.79	-66,332.14	-411,752.00	-11,602.49	156,681,832.08	49,095,867.62	562,252.64	156,615,499.93	48,684,115.62	550,650.15
	SOX	-772,825.03	-1,995,074.52	-27,430.32	4,147,361.68	1,136,664.78	9,905.83	3,374,536.66	-858,409.75	-17,524.49	-1,586,062.51	-3,418,340.42	-44,442.14	474,976,851.19	130,176,603.26	1,134,465.65	473,390,788.68	126,758,262.83	1,090,023.51
	NH3	-8,881.27	-94,731.63	-11,720.38	158.08	27,870.08	8,034.99	-8,723.19	-66,861.55	-3,685.39	-622,935.36	-161,134.97	-18,989.16	18,103.78	3,191,822.73	920,207.93	-604,831.58	3,030,687.76	901,218.78
CF	NOX	-22,877.48	-113,734.45	-3,598.99	194,224.55	60,859.79	696.97	171,347.07	-52,874.66	-2,902.02	-320,135.35	-1,588,976.65	-50,630.05	33,982,228.70	10,648,247.98	121,945.20	33,662,093.35	9,059,271.33	71,315.16
	SOX	-29,132.53	-227,059.62	-7,261.74	588,786.62	161,368.37	1,406.30	559,654.09	-65,691.24	-5,855.45	-409,333.05	-3,165,101.30	-102,157.01	103,016,232.14	28,233,593.17	246,050.68	102,606,899.08	25,068,491.87	143,893.67
	NH3	-509.59	-25,107.92	-5,890.27	22.44	3,956.62	1,140.70	-487.15	-21,151.30	-4,749.57	-9,725.20	-323,618.93	-82,863.41	3,926.47	692,264.37	199,581.00	-5,798.72	368,645.44	116,717.59
FR	NOX	-5,901.10	-62,331.91	-3,138.93	318,800.39	99,895.32	1,144.01	312,899.29	37,563.41	-1,994.92	19,532.50	-522,646.62	-38,005.43	67,661,889.41	21,201,687.02	242,804.64	67,681,421.90	20,679,040.39	204,799.21
	SOX	-5,220.52	-116,466.91	-6,333.48	966,434.99	264,870.22	2,308.30	961,214.47	148,403.32	-4,025.18	73,480.76	-890,397.26	-76,684.13	205,115,237.35	56,215,802.53	489,910.59	205,188,718.11	55,325,405.27	413,226.47
	NH3	-876.69	-12,893.82	-5,137.32	36.84	6,494.40	1,872.35	-839.86	-6,399.42	-3,264.98	-18,140.62	-66,868.70	-62,201.39	7,817.98	1,378,365.02	397,384.99	-10,322.63	1,311,496.32	335,183.59
RAC	NOX	3,297.47	14,971.72	452.80	57,279.88	17,948.51	205.55	60,577.35	32,920.23	658.35	483,136.12	2,193,617.15	66,342.76	31,614,074.10	9,906,192.55	113,447.08	32,097,210.23	12,099,809.70	179,789.84
	SOX	4,595.52	30,264.76	913.62	173,642.46	47,590.08	414.74	178,237.98	77,854.83	1,328.36	673,323.88	4,434,312.11	133,860.78	95,837,233.79	26,266,049.66	228,903.89	96,510,557.67	30,700,361.77	362,764.68
	NH3	341.08	4,480.56	741.07	6.62	1,166.87	336.41	347.70	5,647.42	1,077.48	104,575.05	656,479.14	108,579.54	3,652.84	644,021.83	185,672.59	108,227.90	1,300,500.97	294,252.13
WM	NOX	756.52	2,251.48	28.06	13,383.21	4,193.59	48.03	14,139.73	6,445.07	76.09	10,420.13	36,821.21	739.27	1,800,401.08	564,151.26	6,460.74	1,810,821.21	600,972.47	7,200.01
	SOX	1,122.98	4,735.49	56.62	40,570.83	11,119.22	96.90	41,693.81	15,854.71	153.52	14,964.37	76,132.88	1,491.65	5,457,868.50	1,495,834.55	13,035.93	5,472,832.87	1,571,967.43	14,527.57
	NH3	13.84	204.89	45.93	1.55	272.63	78.60	15.39	477.53	124.53	594.36	6,581.56	1,209.93	208.03	36,676.63	10,573.93	802.39	43,258.19	11,783.86
COM	NOX	161,063.92	742,650.70	23,327.67	321,028.23	100,593.41	1,152.01	482,092.14	843,244.11	24,479.68	3,415,187.87	16,128,264.57	519,324.18	63,234,991.41	19,814,529.39	226,918.72	66,650,179.28	35,942,793.97	746,242.90
	SOX	225,461.81	1,490,992.31	47,068.59	973,188.62	266,721.19	2,324.43	1,198,650.44	1,757,713.49	49,393.02	4,752,622.22	32,302,416.71	1,047,848.24	191,695,212.57	52,537,784.88	457,857.33	196,447,834.79	84,840,201.59	1,505,705.57
	NH3	17,348.46	197,057.82	38,179.11	37.09	6,539.78	1,885.43	17,385.56	203,597.60	40,064.54	798,205.68	4,325,051.20	849,949.28	7,306.48	1,288,183.07	371,385.37	805,512.16	5,613,234.27	1,221,334.66
	Sum	-497,686.95	-463,871.51	29,563.36	9,931,109.11	2,868,670.89	41,142.84	9,433,422.16	2,404,799.38	70,706.21	7,179,897.41	49,018,542.83	2,212,853.59	1,523,866,429.48	440,179,562.26	6,313,111.55	1,531,046,326.89	489,198,105.09	8,525,965.15

Table 5A.4. TOFP reduction potential during manufacturing and operation LCA stages in tonnes of NMVOC equivalent

		Manufacturing			Operation			Total			Manufacturing			Operation			Total		
		2011									2030								
Appliance/end-use	Gases /Tonne	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced	Direct	Indirect	Induced
WEP	NOX	-6.95	-31.30	-0.88	856.46	268.37	3.07	849.51	237.07	2.19	-58.88	-265.16	-7.50	154,859.09	48,524.72	555.71	154,800.21	48,259.55	548.22
	CH4	-0.01	-0.84	-0.04	0.72	3.67	0.15	0.71	2.84	0.11	-0.11	-7.08	-0.36	130.73	663.85	26.68	130.62	656.77	26.32
	CO	-8.91	-18.35	-0.21	156.82	111.34	0.74	147.91	92.99	0.53	-75.50	-155.47	-1.80	28,355.63	20,131.96	133.52	28,280.13	19,976.49	131.72
	NMVOC	-13.65	-40.93	-0.77	224.64	251.28	2.69	210.99	210.34	1.92	-115.61	-346.79	-6.57	40,616.94	45,433.90	486.74	40,501.34	45,087.12	480.18
TFL	NOX	-278.26	-1,203.49	-42.18	9,583.48	3,002.96	34.39	9,305.22	1,799.48	-7.79	-2,299.05	-9,943.33	-348.52	1,094,800.38	343,053.01	3,928.69	1,092,501.33	333,109.69	3,580.17
	CH4	-0.80	-31.31	-2.03	8.09	41.08	1.65	7.29	9.77	-0.37	-6.63	-258.69	-16.73	924.19	4,693.22	188.63	917.57	4,434.53	171.90
	CO	-221.50	-698.44	-10.13	1,754.79	1,245.87	8.26	1,533.30	547.43	-1.87	-1,830.03	-5,770.55	-83.74	200,464.51	142,326.04	943.92	198,634.49	136,555.49	860.18
	NMVOC	-1,011.82	-1,826.76	-36.95	2,513.59	2,811.69	30.12	1,501.76	984.93	-6.83	-8,359.81	-15,092.87	-305.26	287,147.79	321,202.03	3,441.10	278,787.98	306,109.16	3,135.84
EG	NOX	-0.63	-2.30	-0.07	250.86	78.61	0.90	250.22	76.31	0.83	70.58	256.86	7.36	41,394.23	12,970.78	148.54	41,464.81	13,227.64	155.91
	CH4	0.00	-0.06	0.00	0.21	1.08	0.04	0.21	1.02	0.04	0.20	6.44	0.35	34.94	177.45	7.13	35.14	183.89	7.49
	CO	-0.66	-1.39	-0.02	45.93	32.61	0.22	45.28	31.22	0.20	73.33	155.22	1.77	7,579.53	5,381.33	35.69	7,652.86	5,536.54	37.46
	NMVOC	-2.03	-3.37	-0.06	65.80	73.60	0.79	63.76	70.22	0.73	227.04	377.07	6.45	10,857.01	12,144.60	130.11	11,084.05	12,521.67	136.56
TV	NOX	-2,840.02	-12,935.34	-401.87	76,774.75	24,057.18	275.51	73,934.72	11,121.84	-126.37	-3,722.41	-23,106.60	-651.11	8,792,632.71	2,755,149.88	31,552.36	8,788,910.30	2,732,043.29	30,901.25
	CH4	-6.75	-348.55	-19.30	64.81	329.12	13.23	58.06	-19.43	-6.07	-1.63	-669.22	-31.26	7,422.45	37,692.52	1,514.97	7,420.83	37,023.30	1,483.71
	CO	-899.16	-2,022.44	-38.72	14,057.92	9,980.86	66.19	13,158.76	7,958.42	27.47	-70.24	-3,008.76	-62.73	1,609,983.76	1,143,058.24	7,580.85	1,609,913.52	1,140,049.48	7,518.12
	NMVOC	-2,350.35	-15,025.78	-462.38	20,136.73	22,524.84	241.31	17,786.38	7,499.06	-221.06	-1,630.78	-26,950.19	-749.14	2,306,160.17	2,579,658.82	27,636.43	2,304,529.39	2,552,708.63	26,887.29
CF	NOX	-1,283.83	-6,382.52	-201.97	10,899.45	3,415.31	39.11	9,615.61	-2,967.21	-162.85	-17,965.28	-89,169.80	-2,841.24	1,907,006.39	597,555.77	6,843.29	1,889,041.12	508,385.97	4,002.05
	CH4	-2.29	-172.21	-9.70	9.20	46.72	1.88	6.91	-125.49	-7.82	-32.16	-2,399.42	-136.42	1,609.83	8,175.01	328.58	1,577.67	5,775.60	192.16
	CO	-1,578.35	-3,789.14	-48.53	1,995.75	1,416.95	9.40	417.40	-2,372.19	-39.13	-22,197.69	-53,449.48	-682.64	349,184.30	247,914.30	1,644.19	326,986.62	194,464.82	961.54
	NMVOC	-2,494.26	-8,412.61	-176.90	2,858.74	3,197.77	34.26	364.48	-5,214.83	-142.64	-34,946.68	-117,537.24	-2,488.62	500,175.81	559,494.07	5,993.98	465,229.13	441,956.84	3,505.36
FR	NOX	-331.16	-3,497.93	-176.15	17,890.36	5,605.90	64.20	17,559.21	2,107.97	-111.95	1,096.12	-29,329.76	-2,132.78	3,797,033.35	1,189,791.08	13,625.65	3,798,129.47	1,160,461.33	11,492.87
	CH4	-0.29	-98.97	-8.46	15.10	76.69	3.08	14.81	-22.28	-5.38	8.67	-875.67	-102.40	3,205.33	16,277.24	654.23	3,214.00	15,401.57	551.82
	CO	-113.74	-2,194.66	-42.32	3,275.83	2,325.78	15.42	3,162.09	131.12	-26.90	6,152.17	-20,064.50	-512.43	695,259.57	493,621.24	3,273.73	701,411.73	473,556.74	2,761.31
	NMVOC	-832.22	-4,943.71	-154.29	4,692.34	5,248.83	56.23	3,860.12	305.12	-98.06	623.43	-43,778.75	-1,868.08	995,898.20	1,114,006.57	11,934.59	996,521.64	1,070,227.81	10,066.50
RAC	NOX	185.05	840.18	25.41	3,214.42	1,007.23	11.53	3,399.46	1,847.41	36.94	27,112.51	123,100.87	3,723.01	1,774,110.87	555,913.29	6,366.40	1,801,223.39	679,014.16	10,089.40
	CH4	0.40	22.46	1.22	2.71	13.78	0.55	3.11	36.24	1.77	58.45	3,291.11	178.76	1,497.65	7,605.31	305.68	1,556.09	10,896.42	484.44
	CO	206.71	480.91	6.11	588.58	417.88	2.77	795.29	898.79	8.88	30,286.51	70,461.19	894.50	324,850.34	230,637.64	1,529.61	355,136.85	301,098.83	2,424.11
	NMVOC	453.22	1,149.85	22.26	843.09	943.07	10.10	1,296.31	2,092.92	32.36	66,404.36	168,472.77	3,260.95	465,319.54	520,504.03	5,576.27	531,723.90	688,976.80	8,837.22
WM	NOX	42.45	126.35	1.57	751.04	235.34	2.70	793.49	361.68	4.27	584.75	2,066.32	41.49	101,034.47	31,658.90	362.56	101,619.22	33,725.23	404.05
	CH4	0.10	3.10	0.08	0.63	3.22	0.13	0.73	6.32	0.21	1.28	52.82	1.99	85.29	433.12	17.41	86.57	485.94	19.40
	CO	63.68	76.86	0.38	137.52	97.64	0.65	201.20	174.50	1.03	813.18	1,223.88	9.97	18,500.02	13,134.66	87.11	19,313.20	14,358.54	97.08
	NMVOC	85.12	157.56	1.38	196.98	220.35	2.36	282.11	377.91	3.74	1,213.05	2,662.84	36.34	26,499.65	29,642.37	317.56	27,712.70	32,305.20	353.90
COM	NOX	9,038.55	41,675.89	1,309.10	18,015.38	5,645.08	64.65	27,053.93	47,320.97	1,373.74	191,652.68	905,082.00	29,143.31	3,548,605.77	1,111,946.91	12,734.17	3,740,258.45	2,017,028.92	41,877.48
	CH4	19.55	1,110.12	62.86	15.21	77.23	3.10	34.76	1,187.35	65.96	411.23	24,183.74	1,399.30	2,995.62	15,212.27	611.42	3,406.84	39,396.01	2,010.72
	CO	10,034.52	24,379.73	314.53	3,298.72	2,342.03	15.53	13,333.25	26,721.76	330.06	208,947.61	529,681.07	7,002.04	649,770.99	461,325.20	3,059.54	858,718.60	991,006.27	10,061.59
	NMVOC	22,390.08	57,222.65	1,146.63	4,725.13	5,285.51	56.62	27,115.21	62,508.16	1,203.25	477,483.71	1,245,693.35	25,526.36	930,739.81	1,041,120.73	11,153.74	1,408,223.52	2,286,814.08	36,680.11
	Sum	28,241.77	63,563.27	1,057.58	199,921.80	102,436.46	1,073.56	228,163.57	165,999.73	2,131.14	919,908.37	2,634,588.24	58,204.61	30,676,746.89	15,718,232.08	164,730.78	31,596,655.26	18,352,820.33	222,935.39
Cumulative								396,294.44									50,172,410.98		

Appendix 6 - Publications

Published papers

1. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "Fostering investment on energy efficient appliances in India – A multi-perspective Economic Input-Output Lifecycle Assessment", ***Energy*** https://doi.org/10.1016/j.energy.2018.01.140
2. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A multi perspective assessment of best available energy end-use technologies in India's households", ***Process Integration and Optimization for Sustainability*** (2018): 1-11. https://doi.org/10.1007/s41660-018-0054-1
3. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "Assessment of energy efficient appliances: A review of the technologies and policies in India's residential sector", ***Wiley Interdisciplinary Reviews: Energy and Environment.*** https://doi: 10.1002/wene.330).
4. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A novel energy-economy-environment modelling framework for evaluating energy efficient appliances in India's residential sector", Submitted to ***Springer proceedings in energy.*** (Accepted).

Manuscripts under review

5. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins "A novel modelling approach to support end-use energy efficiency policy design – the case-study of India", Submitted to ***International Journal of Sustainable Energy Planning and Management***. (Under revision).

International Conferences with peer-review

6. 6th International Conference on Advances in Energy Research IIT Mumbai, India 12-14 Dec 2017. "Assessing the Impacts of Energy Efficient Appliances in India's Residential Sector- An EIO LCA Modelling Framework"- Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.

7. 3rd International Conference on Energy and Environment: bringing together Engineering and Economics Porto, Portugal 29-30 June 2017. “Assessing E3s Impacts of Energy Efficient Appliances in India – An IO-LCA Approach”- Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
8. Planning for Climate Change: Political Climate and Policy Changes, Volume: CITTA 10th Annual Conference on Planning Research, At Porto Portugal 12 May, 2017. “Energy payback time and CO2 mitigation potential of energy efficient appliances in India: an EIO-LCA based approach”- Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
9. CYTEF 2016 − VIII Iberian Congress | VI Ibero-American Refrigeration Sciences and Technologies, At Coimbra-Portugal, 3-6 May 2016. “Energy savings technical potential of energy efficient appliances in India’s residential sector”- Vivek Kumar Singh, António Gomes Martins, Carla Oliveira Henriques.

Conference/ Meeting (Poster)

10. A poster presented in ECONTRO EFS 14 at University of Coimbra. “Assessing energy efficiency market transformation: the case study of developing Asian country”. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
11. A poster presented in 06/2016, Conference: MIT Portugal Annual Conference - 10 years engineering a better future, “Assessing net GHG emissions with the adoption of efficient appliances in India’s residential sector”. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
12. A poster presented in ECONTRO EFS 17 at University of Coimbra. “An -IO LCA modelling framework to access E4 impacts of energy efficient appliances in India”. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
13. A poster presented in ECONTRO EFS 18 at University of Coimbra. “A multiobjective interval portfolio approach to select energy efficient technologies in India”. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.
14. A poster accepted and publish online at the 8th International Symposium on Energy (Energy8 2018), 6-9 August 2018, United Kingdom. “Assessing the overall E3S impacts of end-use energy efficiency -A hybrid EIO-LCA approach”. Vivek Kumar Singh, Carla Oliveira Henriques, Antonio Gomes Martins.