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FOSSIL FUEL FISCAL POLICIES AND GREENHOUSE GAS EMISSIONS IN VIET NAM

*Subsidies and taxes in Viet Nam's energy sector, and their effects on
economic development and income distribution in the context of
responding to climate change*

Ha Noi, May 2012



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Foreword

It is with great pleasure that the UNDP in Viet Nam presents this policy discussion paper on fossil fuel fiscal policies in Viet Nam.

We produced this paper because of the urgency to act now on the causes of global climate change, rather than later. Direct or indirect subsidies on fossil fuels are a major factor in rapidly increasing global greenhouse gas emissions, and they are a drag on progress with renewable energy.

Viet Nam has no legal obligation to reduce emissions or even to limit its emissions growth in the near future, but it has declared its intention to join the international community and take responsibilities in this regard. Viet Nam is also putting its words into action as it is formulating its Green Growth Strategy, which is highly commendable and puts Viet Nam at the forefront of the international community.

The world is now gearing up for the UN Conference on Sustainable Development in Rio de Janeiro in June 2012, or “Rio+20”. This will be a very important event for renewed efforts by all countries to address the principal barriers to sustainable development and to a low carbon future so that we avoid dangerous climate change.

It is also important that Viet Nam and all other developing countries will identify and implement those climate change responses that serve social and economic development. Reform of fossil fuel fiscal policies offers the possibility for such win-win situations, as this paper shows. However, it also suggests that actually achieving win-win will not be straightforward and easy, and considerable discussion and consideration of advantages and disadvantages is critical.

The underlying research was done by national and international researchers. The analysis and recommendations in this paper have been discussed with national peer reviewers from different research and also international experts, and written up by UNDP’s Policy Advisory Team. All contributions are gratefully acknowledged.

I highly recommend this paper, hope it will support policy dialogues, and that it will be of use to Vietnamese policymakers, interested citizens, and the international community.



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Acknowledgements and Disclaimer

The United Nations Development Programme in Viet Nam and the EU in Viet Nam commissioned three research reports as well as a synthesis of those reports on different aspects of fossil fuel fiscal policies. The national and international consultants working on those reports are herewith gratefully acknowledged for their important contributions (please see endnotes for references to those studies).

The research and dialogue leading to this discussion paper were mainly financed by the Spanish Agency for International Development Cooperation (AECID) and by the EU-Vietnam MUTRAP III project (Multilateral Trade Assistance Project III, EuropeAid/126313/C/SER/VN).

In the process of finalizing the research reports many national and also international officials and experts were engaged in four different workshops, particularly through commissioned peer reviews. This helped shape the conclusions and recommendations considerably. The contributions from all workshop participants including peer reviewers are also very much appreciated.

The external inputs were managed by the UNDP-Viet Nam. The UNDP-Viet Nam Policy Advisory Team has written this policy discussion paper based on all written inputs, as well as additional comments and suggestions from staff of UNDP, the EU-Vietnam MUTRAP III project, and other development agencies.

This policy discussion paper is offered to help reinforce policy making processes in Viet Nam, in support of sustainable development. However, the opinions, analysis, conclusions and recommendations contained in this document do not constitute the official policy position of the UNDP, the European Union, the Government of Spain, or the Government of Viet Nam.

The policy paper is available for download at <http://www.undp.org.vn/publications/our-publications> and http://www.un.org.vn/en/publications/publications-by-agency/cat_view/126-un-publications-by-agency/90-undp-publications.html



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Abbreviations

AAGR	Average annual growth rate
BAU	Business as usual
bbl	Barrel
BP	British Petroleum
CCGT	Combined cycle gas turbine
CGE	Computable General Equilibrium
EU	European Union
EVN	Electricity Viet Nam
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoV	Government of Vietnam
GSO	General Statistical Office
IE	Institute of Energy
IEA	International Energy Agency
IMF	International Monetary fund
KgOE	Kilogramme of oil equivalent
KWh	Kilo-Watt hour (=one thousand or 10^3 Watt hours)
LEAP	Long-range energy alternatives planning
LPG	Liquid petroleum gas
MIC	Middle Income Country
MoF	Ministry of Finance
MtCO ₂ e	Mega-tons of carbon dioxide equivalent
MtOE	Million tons of oil equivalent
MUTRAP III	Viet Nam Multilateral Trade Assistance Project III
MW	Mega-Watt (=one million or 10^6 Watt)
NAMAs	Nationally Appropriate Mitigation Actions
NGL	Natural Gas Liquids
OCGT	Open cycle gas turbine
OECD	Organisation for Economic Co-operation and Development

OOG	Office of the Government
PDP	Power Development Plan
PPP	Purchasing Power Parity
R&D	Research and Development
RD&D	Research, development and dissemination
SOE	State owned enterprise
TFEC	Total final energy consumption
TWh	Tera-Watt hour (=one million million or 10^{12} Watt hours)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USc	United States Cents
USD	United States Dollars
VAT	Value added tax
VND	Vietnamese Dong

Executive Summary

1. Potential benefits from fossil fuel fiscal reform

Viet Nam is facing many macro-economic uncertainties, including high inflation, a trade deficit, and sovereign debt. It will also need to generate additional public and private finance for investments in climate change adaptation and greenhouse gas (GHG) emissions mitigation. Under the UN Framework Convention on Climate Change (UNFCCC) Viet Nam is not obliged to reduce GHG emissions but the economy is energy in-efficient and carbon intensive by comparison with other Middle Income Countries (MICs), and Viet Nam is becoming more dependent on imported refined petroleum products and coal.

Viet Nam is capping electricity and fossil fuel prices, which amounts to very substantial indirect government subsidies to energy prices. These policies are not sustainable, are benefiting the better off more than the poor, and are counter-productive for future growth and modernisation, whilst also contributing to climate change. Fossil fuel fiscal reform may have economic, social and environmental benefits, as has been shown in many other countries. The G-20 and APEC leaders, including the Vietnamese president, agreed in 2009 to phase out 'inefficient fossil fuel subsidies', and this may also be addressed at the Rio+20 conference in June 2012. Such reform is also in line with the objectives of the forthcoming national Green Growth Strategy, and requires strengthening of the ongoing energy markets reform and of state owned energy enterprise reform.

Under a broad definition, fossil fuel subsidies are any government intervention that can reduce the cost of fossil fuel below what it would be without that intervention. Globally, fossil fuel subsidies and support measures are estimated to have fluctuated between USD 300 billion and USD 554 billion annually in the period 2007-2010, using a 'price-gap' approach.

2. Fossil fuel prices and fiscal policies in Viet Nam

Viet Nam's dependence on fossil fuel imports, and rising international fossil fuel prices

Biomass is still the most important primary energy source, but this is changing rapidly. Hydro-electric power accounted for most electricity production in 1995, but by 2010 gas turbine generation covered 47% and coal fired thermal plants 17% of production capacity. By 2030 coal is projected to cover over 56% of all electricity production capacities, and Viet Nam would import about 80 million tons of coal per year, which is equivalent to roughly 60,000 average sized loads of coal by river barge. Consumption of refined petroleum products has grown rapidly, and Viet Nam is likely to become a net oil importer by volume within the next five years.

Rising demand for oil-based products has been driven especially by rapid growth in transportation. LPG (for cooking, to replace biomass), and diesel (for transport) are expected to grow particularly fast over the coming years. Domestic refining capacity is increasing and Viet Nam may be able to meet about two thirds of expected domestic demand for refined petroleum products in 2025. Global market prices of oil and coal are volatile and have started to rise again since late 2008, and are expected to rise further whilst remaining volatile.

Overall energy sector subsidies in Viet Nam

Electricity prices are capped and differentiated for different users. Domestic coal prices are set below world market prices in order to enable cheap electricity production and manufacturing. There are also price ceilings in the refined petroleum markets, and there are various taxes and tax waivers. Direct subsidies are exceptions but have happened.

IEA estimates with the 'price-gap approach' that (indirect) fossil fuel consumption subsidies in Viet Nam in 2007, 2008, 2009 and 2010 were USD 2.1, 3.56, 1.2 and 2.93 billion respectively, and were allocated especially to electricity, i.e. fluctuating between about 1 and 4 percent of GDP in current USD. The Government revenue from refined petroleum were VND24,922 billion in 2009 compared to VND4,839 billion from electricity or in total about USD1.5 billion, which is above the subsidy in 2009, but lower than the subsidies in 2007, 2008 and 2010.

Power sector price controls, indirect subsidies and reform policies

Power sector losses at energy SOEs must ultimately be borne by the central Government and are therefore essentially indirect subsidies. Block-tariff pricing schemes are in place for residential users (a low rate for the first units of electricity, benefiting low-users in particular) and for commercial and industrial users. In 2011 the Government granted EVN greater authority to set prices, but over the period including 2011 it raised them by rates below inflation.

The average electricity tariff was estimated to be 7 US¢ /kWh in 2010 which is below the ASEAN region average of 10 US¢/kWh. To become financially sustainable an estimated increase of power tariffs above inflation by 15-30% of the current price will be needed. Low power tariffs act as a disincentive for users to invest in more efficient energy technology. Electricity consumption in industry has increased relative to coal in response to a 40% increase in coal prices compared to lower increases in electricity prices.

The Electricity Law of 2004 and subsequent policy are aiming for reform of the power markets, with wholesale market and retail market competition. EVN aims to cut costs, reduce power losses and improve efficiency of electricity use, whilst moving towards market prices. But the reform process is too slow as debts and losses are very substantial and expected to increase with rising global fossil fuel prices, and increasing demand and imports. And the losses cause a drag on investment for increasing power supply from e.g. renewable sources and improved electricity distribution.

Refined petroleum products' price controls, indirect subsidies, and taxes

Petrolimex dominates import and retail of refined petroleum products such as petrol and diesel. The Dung Quat refinery currently supplies about 30% of the market.

A price stability fund was set up with fees for every litre of petroleum products sold, in order to deal with rising prices after early 2009. But in early 2011 funds were exhausted and initial price liberalisation was halted to cope with inflation. Through 2011 retail losses became severe and the Government temporarily suspended import tariffs and allowed the retail price of petroleum a 15% increase, but retailers still make losses.

Subsidy estimates from the IEA suggest that subsidies for refined products declined to zero in 2009 and 2010 with the decline in global prices. But resurgent global prices, a weakening VND and remaining price caps caused subsidies to rise again in 2011 and they may surge in 2012.

In February 2012 MOF reduced petroleum and jet fuel import taxes, but prices at the pump were between VND1,300 and VND2,400 per litre lower than the import prices for different products. This is up to 12% of the price per litre of petrol and other products, which is unsustainable considering the large and rising volume of the market.

Refined petroleum sector subsidies are concentrated on the demand side, and are largely composed of the losses of state owned enterprises, which are eventually borne by the Government through for example preferential loans, preferential tax treatment and investment in infrastructure and R&D.

3. Potential effects of fossil fuel fiscal reform

A CGE model of the economy and an emissions accounting model with a range of parameters were used to assess future economic and emissions trends by comparing two scenarios with 'business as usual' (BAU): one where estimated subsidies are removed, and one where fossil fuel taxes are introduced, in addition to subsidy cuts. Analysis was also done of different options for re-investing additional Government revenue into economically the most productive investments, low carbon investments, or returning it to customers as 'rebate' or a reduction of taxes.

The model results are not predictions, but demonstrate trends under sets of reasonable assumptions. The modelling results confirm international experience and found that cutting subsidies and imposing a carbon tax could have several positive effects.

The CGE modelling of both scenarios indicated real GDP could be about 1% higher in the subsidy cut scenario than in the BAU scenario and about 1.5% higher in the subsidy cut & carbon tax scenario, compared to the BAU scenario over the period to 2020, and gross investment rates would be considerably higher. GDP growth is initially lower due to lower consumption and higher production costs, but growth rebounds strongly after the economy has adjusted to the change in energy prices.

The model runs assume that revenue savings and increases are invested in the currently most productive sectors, or into low carbon activities including R&D.

The increase in fossil fuel prices would lead to lower household consumption growth relative to the BAU scenario, although overall consumption growth would remain robust. Imports and exports would be slightly lower, and if additional revenue is mainly used for low carbon investment, there will be a particular decline in imports due to less reliance on energy imports. The exchange rate appreciates slightly compared to the BAU scenario, suggesting that a deterioration in the current account balance due to the new policy would be unlikely.

Rural households see lower impacts on consumption growth than urban people. The poorest rural households lose least consumption growth under both scenarios, as a proportion of consumption growth. However, the low income households may feel small changes more than the better-off, whilst the modelling does not allow for analysis of effects on specific social groups.

If the additional Government revenue is used for household transfers or tax cuts instead, there is still a small improvement in investment but average annual GDP would be slightly below BAU. And despite the 'rebates' to consumers in this model run, the consumption is lower than in the 'low carbon investment' case.

The economic structure will change, with reduced growth in energy intensive sectors and increased growth in light manufacturing, when compared to BAU. The high energy intensity sectors that will see slower growth employ mainly men (e.g. metal, fisheries) and low energy sectors that will see accelerated growth employ mainly women (e.g. light manufacturing, textile, footwear).

The emissions modelling for the energy sector shows that both the cuts in fuel subsidies and the imposition of tax on fossil fuels could result in significant reduction in emissions because demand is moderated in response to higher fossil fuel prices – in particular the combination of the two.

The power sector is the largest consumer of fossil fuels and the largest emitter of GHGs. It also accounts for the largest decline in emissions due to the price changes under both scenarios.

Coal emissions decline with the significant increase in coal price in both scenarios, even though model assumptions are conservative in this regard. There would be a switch of power generators towards gas in response to an assumed strong price increase of coal.

Elasticities are relatively low for products such as petrol and diesel, so price increases do not reduce demand by much. Reducing consumption and emissions from refined petroleum fuels will require investment in development and transfer of new technologies.

4. Recommendations for fiscal reform of fossil fuels in Viet Nam

Remove indirect subsidies and selectively introduce differentiated fossil fuel taxes

Electricity prices in Viet Nam are capped and differentiated for different users, domestic coal prices are set below world market prices, and there are price ceilings in the refined petroleum markets. There are also various taxes and tax waivers as well as other support measures such as infrastructure investment and Government support to R&D. Direct subsidies are exceptions but have happened.

The losses of energy SOE are compensated by the Government through a variety of subsidies, including preferential access to financial resources as well as land, water and other natural resources, and a monopoly position in energy markets.

Viet Nam should reinforce the market reforms in the energy sector that were started in the last decade with for example the Electricity Law of 2004. This should include the removal of subsidies in the energy sector, which will have multiple benefits. But several actions are needed to optimise the benefits and mitigate potential negative effects of the reform of fossil fuel fiscal policies.

Prudent macro-economic management

Phase-out of subsidies and introduction of additional fossil fuel taxes should serve multiple macro-economic aims, including a gradual reduction of annual budget deficits and public debt; improved efficiency of energy utilities and other SOEs; improved international competitiveness; increased foreign and private sector investment in the (low carbon) energy sector; and maintenance of a reasonably strong VND. The reform process must also consider impact on inflation.

Importantly, reform must happen gradually and in a phased manner in order to avoid shocks to the economy and inflationary pressure, i.e. a gradual removal of price caps, followed by step wise introduction of selected taxes. Gradual phasing out of subsidies and introduction of taxes must be accompanied by further restructuring of SOEs and the introduction of competitive energy markets.

Improve financial sustainability and attract more investment into the energy sector

With the current price levels EVN is unable to accumulate sufficient investment capital from retained earnings and to pay energy generated by independent power providers. Petroleum product traders also make losses. EVN, Vinacomin and Petrolimex should be able to charge higher prices and also should operate more efficiently, particularly by increasing competition in energy markets.

Private sector investors in electricity production or petrol trade need prices that allow an adequate return on investment from fossil fuel fiscal reform. Regulatory restrictions on domestic and foreign private businesses will also need to be relaxed in order to increase investments.

Energy SOEs need to be restructured to make sure that they focus on their core functions. Their

current debts may also need to be restructured before they can operate adequately even with higher energy prices.

Make sure that GHG emissions mitigation is optimised and that energy security increases

As a result of higher prices, energy efficiencies will improve, domestic production of renewable energy will increase and dependency on imports of coal would be reduced, when compared to BAU.

But expansion of renewable energy production through (domestic, foreign) private investment cannot be expected from removal of subsidies and introduction of taxes alone. Until the production costs of e.g. wind and solar energy come down further there is a need for appropriate feed-in tariffs that would be paid to potential investors, and increased targets for total renewable energy production – which amounts to introduction of targeted and temporary subsidies.

Fiscal policy reform should occur in the context of development, registration and implementation of Nationally Appropriate Mitigation Actions (NAMAs). NAMAs involve (international and national, public and private) finance and technology development and transfer with international support. NAMAs represent an opportunity to limit the costs to Vietnamese consumers and businesses of fossil fuel fiscal policy reform, and they could speed up the adoption of modern, clean technology.

Protect poor households, workers and other potential losers from fossil fuel fiscal reform

Energy subsidies tend to be regressive, as more affluent households with higher levels of energy consumption are able to capture most of the benefits of subsidies. However, low income groups will see reduction in consumption growth and certain workers may be affected more than others.

Some sectors are likely to experience slower growth (e.g. metal and fisheries) and others faster growth (e.g. textile and footwear), accompanied by male or female job losses and job creation. Transitions caused by fiscal reform will be gradual but require for example targeted re-training programs in order to compensate workers whose employment opportunities will reduce.

Viet Nam has a block-tariff electricity pricing scheme in place for residential electricity users (a lower rate for the first units of electricity) which must be maintained and possibly enhanced to compensate low income groups for increased prices. In 2011 Viet Nam compensated low income electricity users for price hikes in electricity through direct transfers of small subsidies. There is also a system in place for subsidised installation of solar water heaters. There may be administrative inefficiencies in these approaches but they merit further assessment and possible expansion for compensating low income households and workers.

The current price stabilisation fund may become costly with further international price rises. In-depth assessment is required of the actual effects on prices of this mechanism.

Conduct additional research and analysis of the barriers to fossil fuel fiscal reform

Additional research is needed on the indirect subsidies at different steps in the fossil fuel value chains, and the barriers to cutting the indirect subsidies and improving the operating efficiencies of the SOEs. It is important that the impacts of recent changes in regulation of the electricity and petrol markets are assessed, and that expectations from competitive energy markets are assessed.

The transparency of data on financing and operating of energy SOEs should increase, including incentive structures for personnel and contractors. The means by which the losses of SOEs are funded and how losses occur is not fully clear, and better understanding would enable the formulation of reform actions. There is also a need for further research on the ‘winners and losers’ of fossil fuel fiscal reform

This should include male and female workers and low income households. Social-economic research, including clear gender analysis is essential for effective targeting of mitigation measures.

Some industries are benefiting from the current low electricity and coal prices, or cheap diesel. The role of low energy costs in the competitiveness of specific industries needs to be examined, and how higher prices for coal and electricity will impact on them.

Such additional research and analysis will inform how to implement the suggested fossil fuel fiscal reforms in Viet Nam, and enable a transition to a more competitive and greener economy. It would critically inform the implementation of Viet Nam's forthcoming Green Growth Strategy.

1. Potential benefits from fossil fuel fiscal reform

1.1. Energy, climate change and economic uncertainties

Viet Nam has experienced strong economic growth since Doi Moi in the late 1980s, which has enabled the country to reduce poverty. Wealth has greatly increased, and so has energy consumption whilst energy demand is increasing rapidly. Having achieved Middle Income Country (MIC) status, Viet Nam now needs to address some of the typical challenges that come with that, including modernisation of its industry and strengthening its human resources.

Viet Nam faces several macro-economic challenges, including high inflation, a substantial trade deficit, annual Government budget deficits, and sovereign debt. The impact of the recent global financial crises also affected Viet Nam, by reducing demand for some export products.

The current economic situation is thus not conducive to increasing fuel prices, or to increasing investments. But climate change affects Viet Nam very strongly and the country will have to invest very substantially in climate change adaptation measures. Certain investments in climate change adaptation in the short and medium term makes long-term economic sense¹, whilst other investments are only needed in the long term. There is a need for public as well as private finance to improve safety and resilience in the face of climatic stresses and shocks.

Viet Nam is historically not an emitter of significant amounts of greenhouse gas (GHG) from the use of fossil fuels, and under the UN Framework Convention on Climate Change (UNFCCC) it is not obliged to reduce emissions. But GHG emissions are rising and current projections of especially future electricity produced from coal will accelerate this. It may also be able to reduce emissions in some sectors with economic, social and environmental benefits whilst international support for a transition to a more energy efficient economy may become available².

Viet Nam still has a considerably high energy intensity when compared to MICs, and its GHG emissions intensity per unit of GDP is comparatively high. Its forthcoming Green Growth Strategy is expected to address this, and set out ways to mitigate emissions growth through changes in industrial production technology and lifestyles, i.e. consumer behaviour.

Viet Nam is becoming more and more dependent on imported refined petroleum products and coal, whilst world market prices of those commodities are rising. Viet Nam is trying to protect consumers and business and control inflation but this is increasingly costly. This paper will show that Viet Nam's current fiscal policies of keeping energy cheap are not sustainable, are benefiting the better off more than the poor, and are counter-productive for future growth and modernisation, whilst also contributing to climate change; and reform may have many benefits.

1.2. International developments in fiscal policies on fossil fuels

It has been shown internationally that success with GHG emissions mitigation depends partially on domestic fiscal policies on fossil fuels. Fossil fuel fiscal reform concerns the phase-out of subsidies and other support measures as well as reform and increase of fuel taxes. It is widely agreed that phase-out of fossil-fuel subsidies is particularly important, because (a) these subsidies are costly (b) they drive energy demand and GHG emissions, and (c) because they benefit medium to high income groups instead of the comparatively poor³.

Phasing-out subsidies and phasing-in taxation to discourage carbon consumption makes the alternatives financially attractive. A shift towards energy efficiency measures and renewable energy production, such as wind and solar, is about technological innovation and modernization

of infrastructure and energy management which can have positive effects on GDP growth. This includes technological innovation in industrial production; improving energy efficiency of buildings and mass transport systems; new power infrastructure (including 'smart grid'); and changing behaviours of consumers. Taxing fossil fuels can increase national revenue unless accompanied by reducing other taxes or the introduction of compensation measures. Additional revenue can reduce Government budget deficit and can also be invested in social or environmental activities and infrastructure.

The G-20⁴ agreed in 2009 to 'phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest'⁵. APEC leaders, including the Vietnamese president, agreed similar action in the same year⁶. Removing such subsidies is also being proposed as a key issue to be addressed at the Rio+20 conference in June 2012⁷ because of the multiple benefits that are possible. This would enhance the agreements already reached in the G-20 and APEC.

Monitoring the initial efforts following the G-20 and APEC agreements is limited by the lack of a common definition of 'inefficient fossil fuel subsidies'; and by the diversity of support mechanisms and methods to estimate subsidies. A report after the first year following those political agreements suggests that although several countries have started to implement their commitments, total subsidies have increased in 2010 over 2009 because of a link to fossil fuel prices of some support measures⁸. The data also show that most subsidies are on refined petroleum (so proportionally less on coal and gas), and most are consumer subsidies (producer support is about a quarter of all direct and indirect subsidies).

Experience from India⁹ and Indonesia¹⁰ shows that impact of fuel taxes and removal of subsidies does not necessarily affect income distribution, partly because the poor use relatively little fuel. However, a differentiation between different types of fuels may be required. In India a fuel tax on diesel, gasoline and coal would be progressive (meaning it affects the better off more than the poor) and environmentally friendly. A kerosene tax, on the other hand, would be a burden on the poor because they use it for cooking, and could also lead to increased pressure on forests, as the poor would collect more fuel wood. In Indonesia fuel subsidies benefit the richest mostly, whilst Indonesia spends a quarter of total Government budget on fossil fuel subsidies.¹¹

Research also shows that energy efficiency differences between the US and the European Union (EU) are due to the high tax rate applied in the EU¹². Furthermore, long-run negative economic impact of higher fuel prices may be very limited, as higher energy efficiency is beneficial for the overall economy¹³. It has also been found that if fuel taxes in the EU are combined with reduced labour taxes, the macroeconomic conditions of a country could improve¹⁴: as labour becomes relatively cheaper than energy, firms re-orientate towards labour intensive investment and employment generation.

While the introduction of subsidies often has political and social benefits and objectives, phasing them out and increasing taxes can be extremely difficult, even if there are multiple benefits. Indonesia is gradually phasing-out fuel subsidies, which has led to street protests (2005, 2012), and this has happened in Nigeria too (2012). Many reform initiatives run into opposition from interest groups who benefit from the subsidies and support measures. Fiscal reform efforts must deal with that¹⁵, through policies that mitigate the potential losses of such interest groups, and by ensuring high transparency in the cost and purpose of subsidies, as well as the implications of tax reforms.

1.3. Quantifying global fossil fuel subsidies

Under a broad definition, fossil fuel subsidies are any government intervention that can reduce the cost of fossil fuel below what it would be without that intervention. But fossil fuel subsidies or

support measures are often complex and opaque, which makes their measurement difficult.

Globally, fossil fuel subsidies and support measures are estimated to have fluctuated between USD 300 billion and USD 554 billion annually in the period 2007-2010¹⁶. Most of these subsidies are provided to keep consumer prices low in oil producing countries. Fossil fuel subsidies often aim to improve energy access by poor people and to increase production, but globally these subsidies benefit the poorest 20 percent of households considerably less than the better off groups.

Consumption subsidies for fossil fuels aim to reduce costs for consumers. Typical consumption subsidies include price controls, price stabilization funds and the state provision of energy supply infrastructure. Consumption subsidies are common in transition and developing countries but rare in OECD countries.

Consumption subsidies are usually measured using a 'price-gap' approach. This method estimates the level of subsidy by comparing domestic price levels for fossil fuels with a 'reference price'. Reference prices reflect the price of fossil fuel on the international market adjusted for fuel quality and freight costs. Subsidy levels are estimated using a reference price based on the average cost of electricity generation adjusted for transmission and distribution, whilst the cost of new capacity is not included¹⁷. For several reasons the 'price-gap' approach tends to under-estimate the (direct and indirect) subsidies¹⁸.

The OECD estimated in a study of 24 member-countries that those countries collectively subsidise their fossil fuel companies between USD 45 and USD 75 billion annually¹⁹. These are mostly indirect production subsidies, and are much less than the direct and indirect (consumption) subsidies in oil producing countries and (other) developing countries, but phase-out in OECD countries may encourage other countries to follow their example.

The OECD identified about 250 support mechanisms in 24 of its member countries, some of which may not be seen as subsidies, but they are nevertheless support measures that are likely to influence the price. The OECD summarized the support measures into types and gives examples, as is reproduced in the Annex I²⁰. The support measures in Annex I may be typical for the OECD countries but many of the types are also found in developing countries, including Viet Nam.

Subsidies occur potentially at all points of the fossil fuel value-chain. Fossil fuel production subsidies include tax breaks for exploration activities, support to Research & Development (R&D) into fossil fuel extraction technologies, preferential access to financial and other resources, price controls on e.g. coal for the steel and electricity sectors, and limited liability for certain types of risk. Consumer subsidies include direct price subsidies on petroleum products and household electricity, price controls and tax breaks.

The direct and indirect production subsidies (or: support measures) encourage investment to enhance energy supplies or encourage the exploitation of natural resources. Some portion of these lower costs may be passed onto consumers, but a portion may also accrue to the companies producing and using fossil fuels.

When compared to the annual target of financing climate change actions in developing countries of USD 100 billion annually from 2020, including climate change adaptation, it is evident that effective GHG emissions mitigation, globally, is unlikely without the phasing out of these subsidies²¹. In addition, it should be noted that the direct and indirect support to renewable energy in OECD countries and elsewhere is only a small fraction of the support provided to fossil fuels.

1.4. Viet Nam's potential benefits from fossil fuel fiscal reform

Viet Nam is not providing much direct subsidy in the fossil fuel sector, and its fossil fuel taxes are modest by international comparison. However, price caps and support to state owned corporations in the energy sector do constitute substantial indirect subsidies. The IEA, using the 'price-gap' approach (explained above), estimated consumption subsidies for fossil fuels to be USD2.93b in 2010 (or 2.8% of GDP), which is mainly on electricity²².

This indirect support provides a significant disincentive for energy efficiency in industry, transport and households. Indeed, an APEC 'peer review' of energy efficiency in Viet Nam concluded that Viet Nam is a comparatively in-efficient user of energy²³, although global data show that Viet Nam's energy use in kg oil equivalent (KgOE) per unit GDP (PPP) has declined since 1990, meaning that energy efficiency is gradually improving²⁴.

There is thus considerable potential in Viet Nam to reduce indirect subsidies and also to introduce taxes, which could help meet several policy objectives. Fossil fuel fiscal reform may help to (a) improve energy security and limit fossil fuel imports; (b) stimulate modernization of energy efficient technologies in industry, transport, housing and office buildings, and renewable energy; (c) enhance GDP growth; (d) help maintain manageable government budget deficits and sovereign debt; (e) improve economic equity; (f) limit GHG emissions into the global atmosphere; and (g) limit local air pollution.

International experience does suggest that such win-win situations are indeed possible. However, removing subsidies and introducing tax on different fuel types may lead to different outcomes and degrees of effectiveness in terms of reducing GHG emissions, State revenue, or improving equity and growth. It is crucial to identify those subsidy removals and fuel taxes that have the highest potential for economic, social and environmental gains, and to determine mitigation measures to address any challenges including the threat of inflationary pressures.

1.5. Questions about Viet Nam fossil fuel fiscal policies

The following questions are explored in further depth in the next sections:

- a) What is the extent of Viet Nam's direct and indirect subsidies or support measures in fossil fuel markets, and what are its taxes and fees on different fuels?
- b) What are the potential benefits of phasing-out direct and indirect fossil fuel subsidies, and of introducing additional tax on fossil fuels, for GDP growth, industrial development, consumption, income distribution, Government revenue, as well as reducing GHG emissions and other pollution?
- c) How should fossil fuel fiscal reform be introduced, and what should be the primary mitigation strategy of any potentially negative effect of such reform?

For the purpose of this discussion paper, the value chains and policies of different fossil fuels were reviewed with a special emphasis on subsidies and taxation; and two model studies were performed to assess impacts on growth, income distribution and greenhouse gas (GHG) emissions. These were a computable general equilibrium (CGE) model of the Vietnamese economy and a energy accounting model of the economy. Two fossil fuel fiscal reform scenarios were compared with business as usual (BAU): a scenario with gradual phase out of subsidies and support measures; and a scenario with gradual phase out of subsidies and support measures as well as introduction of tax²⁵.

Section 2 takes a detailed look at Viet Nam's dependence on fossil fuel imports and international fossil fuel prices, examines the role of fossil fuel price controls and taxes in Viet Nam, and presents related policies. It looks in particular at the role subsidies play in the electricity and

refined petroleum sectors of the Vietnamese economy (above question a). In section 3 the results of model runs are presented, with findings on economic performance, distributional effects, and environmental impacts (above question b). The final section draws conclusions from the analysis and provides recommendations on how fossil fuel fiscal reform might be introduced, the potential need for mitigation measures, and also on the need for additional analytical work (above question c).

It is important to note that every effort has been made to collect and analyse the data, as documented in three research reports, and indeed we have identified important trends and likely effects of fossil fuel fiscal reforms against a BAU. However, data availability on a number of aspects is limited, and many data that are available are dispersed. In particular for quantifying the indirect subsidies (see section 2.3) we have had to rely primarily on international analysis of overall subsidies in Viet Nam based on the 'price-gap' approach, i.e. assessing the subsidies based on the gap between domestic and international prices. Whilst this approach is 'safe side' and tends to underestimate subsidies, we have not been able to verify the results with in depth analysis of financing of state owned energy enterprises due to a lack of detailed data.

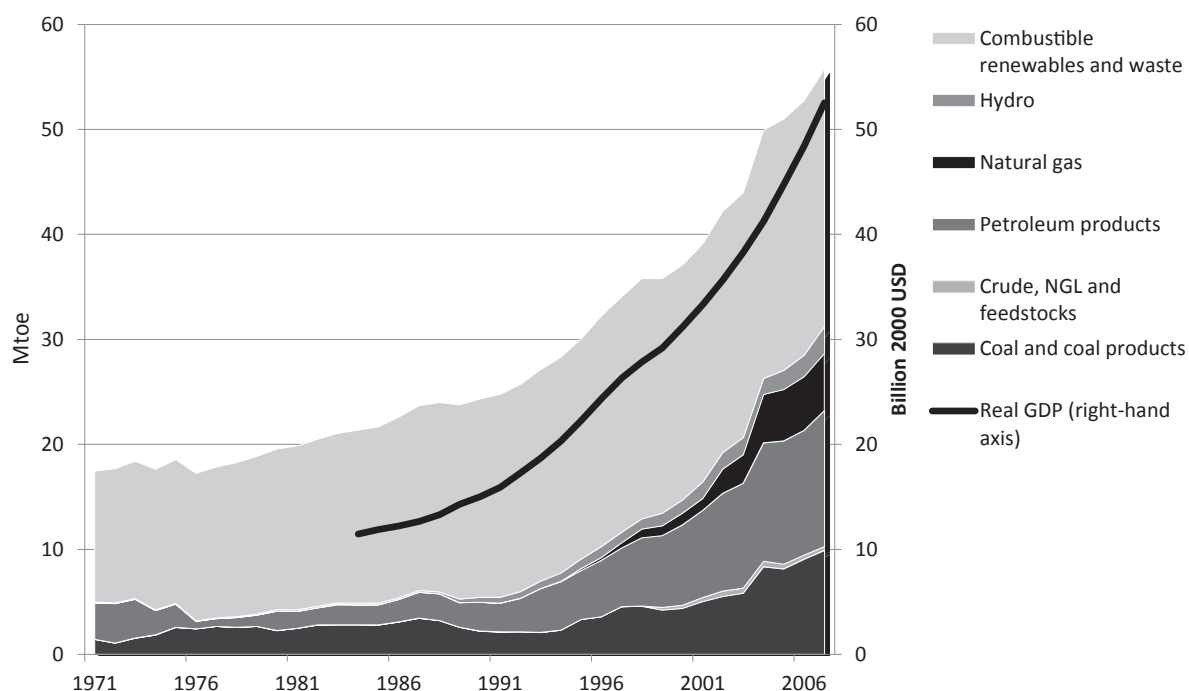
A further caveat that needs stressing is that the outputs of the two models are not predictions (see chapter 3). The models are based on empirical relationships between sets of variables. The sets of variables describing economies or energy systems are large and relationships between them are complex. The models are an internally consistent way of thinking about complex interactions, and an illustration of how variables interact²⁶. The models provide frameworks for understanding how changes in one set of variables, fossil fuel prices, might affect a number of other variables such as GDP growth or GHG emissions. The model outputs show likely trends, but should not be treated as quantified estimates of policy impacts.

2. Fossil fuel prices and fiscal policies in Viet Nam

2.1. Fossil fuels are critical for Viet Nam's growth

Fossil fuels are playing an increasingly important part in the energy mix of Viet Nam, and they are essential for economic growth. The share of fossil fuel consumption in total energy consumption has increased from around 20% in 1991 to 54% in 2008 (Figure 1). Increasing oil consumption in the transport sector, and coal and gas for electricity generation have driven this.

Figure 1. Viet Nam's total primary energy demand by fuel type and GDP 1971 - 2007



Source: IEA (2010), World Bank (2010b)

The data show that biomass (combustible renewables and waste) is still the most important primary energy source, but this is likely to change rapidly as household incomes increase²⁷. Furthermore, hydro-electric power currently provides only a very small percentage of primary energy (and about a quarter of all electricity; see also Figure 2).

Viet Nam's energy intensity has declined by about 35%, from 400 KgOE/1,000 USD GDP (PPP) in 1991 to around 260 KgOE/1,000 USD in 2008²⁸, but it was around 13% higher than the middle income country average in 2008: Viet Nam uses less energy per-person than most middle-income countries, but it does that less efficiently²⁹.

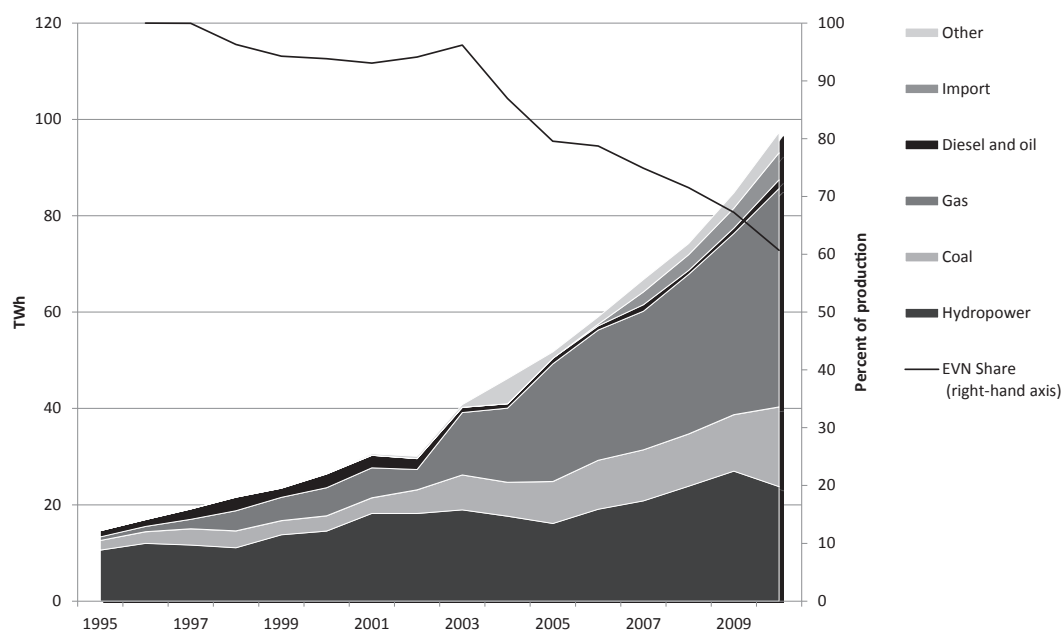
Continued exponential growth is expected in primary energy demand, and it is expected that this will be met mainly by fossil fuels, i.e. for electricity generation (section 2.1.1) and refined petroleum products for various uses (section 2.1.2).³⁰

2.1.1. Electricity demand and supply

Fossil fuels are increasingly important for electrical power in Viet Nam. Hydropower accounted for 72% of the annual 14.6 TWh (tera-Watt hour) of electricity production in 1995, but by 2010

it accounted for just over 24% of the annual electric power generation of 97.4 TWh. Gas turbine generation expanded from 746 MWh (mega-Watt hour) to 45 TWh from 1995 to 2010 (from about 5% to 47% of power production) and generation by coal fired thermal plants increased from 2 TWh to over 16.5 TWh (from about 13% to 17%), whilst there is increased import of electricity from China (see Figure 2).³¹

Figure 2. Changes in Viet Nam's Electricity production structure 1995-2010 (MW)



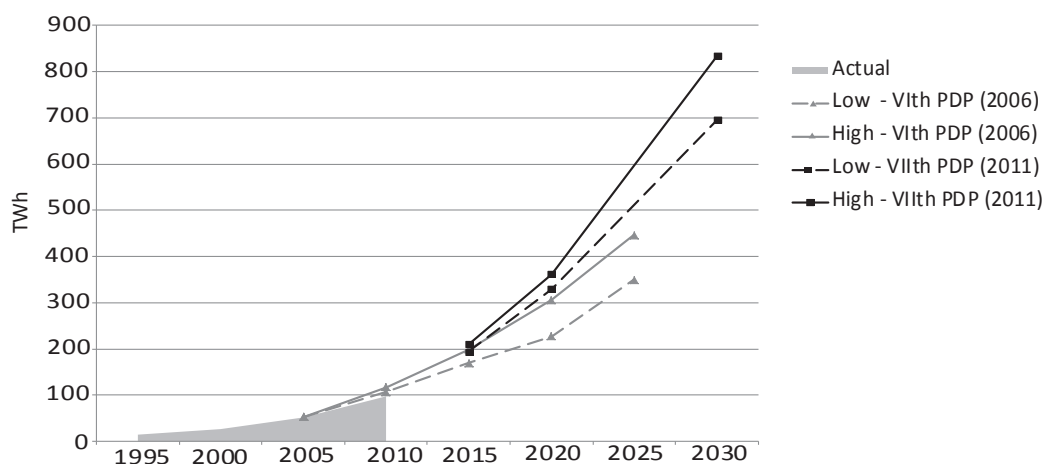
Source: EVN (2011)

The VIth and VIIth Power Development Plans (PDPs, for 2005-2025 and 2010-2030 respectively) envisage rapidly increasing electrical power demand. Demand is expected to grow at an average annual rate of between 9.9 - 11.2% for the 2005-2025 period. Annual electricity production is expected to increase from 97.4 TWh in 2009 to 227-305 TWh in 2020, and 695-834 TWh in 2030 (Figure 3).³²

Large hydropower projects offered the lowest marginal costs in the early years of electricity sector development³³. The availability of off-shore natural gas, shorter construction times for gas turbine generation capacity, and lower upfront costs for gas turbines compared to hydropower have resulted in rapid expansion of gas turbine capacity since the mid-1990s.

Viet Nam is becoming a net importer of coal. The VIIth PDP shows that by 2030 Viet Nam targets a total electricity production capacity of 146,800 MW, of which 75,000 MW is projected to be covered by coal fired plants. This will produce approximately 394 TWh electricity or 56.4% of projected total electricity production (the lower trajectory according to the VIIth PDP in Figure 3)³⁴. By 2030, 43,000 MW of that coal capacity (or roughly a quarter of Viet Nam's electricity production) is expected to rely on about 80 million tons of imported coal per year³⁵, which is equivalent to 160 average-sized international cargo ship loads, or 60,000 loads of coal by average sized river barge, posing important transport challenges³⁶.

Figure 3. Power demand projections in VIth and VIIth Power Development Plans



Source: IE (2005), IE (2011)

The electricity sector has faced difficulties in meeting demand, particularly during the dry seasons when hydropower plants often produce below capacity, resulting in power cuts at times of peak demand. This causes enterprises to maintain their own generators, raising costs and damaging Viet Nam's competitiveness. Demand shortfalls are expected to continue whilst climate change is causing more exceptionally dry years and additional stresses on hydroelectricity supply, especially towards the end of dry seasons.

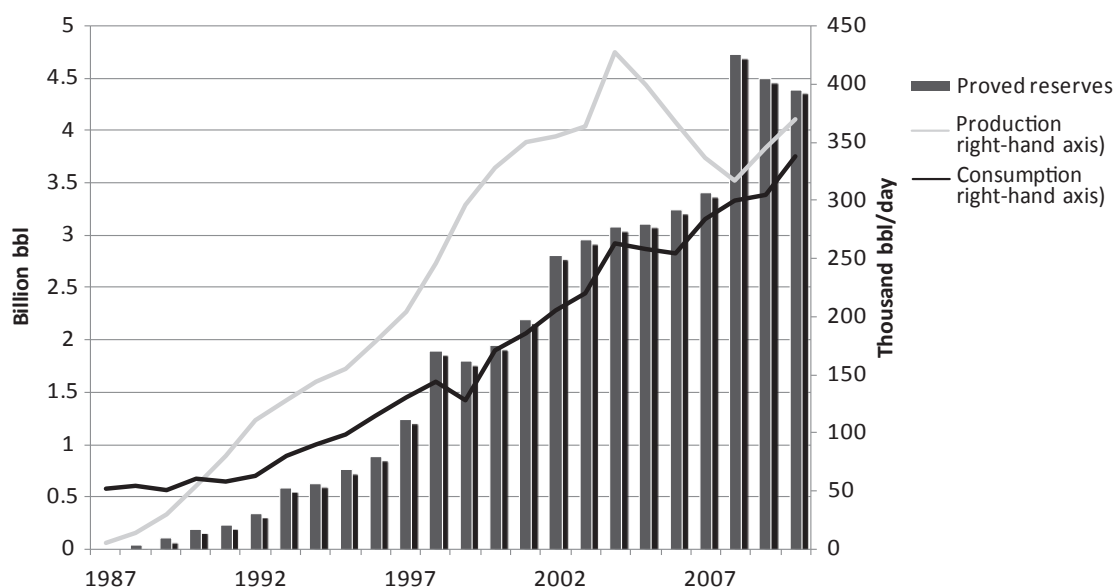
2.1.2. Demand and supply of refined petroleum products

Since 1990 refined petroleum products have accounted for the largest proportion of fossil fuel supply in Viet Nam, reaching around 23% of primary energy demand in 2007 whilst coal accounted for about 17% of total primary energy demand in 2007³⁷ (Figure 1). This may change as more and more coal will be used for electricity production, but the consumption of petroleum products is also expected to continue to rise significantly.

Consumption of refined petroleum products has grown rapidly in the last two decades at an average annual rate of 12.2% between 1991 and 2000 and of 5.1% between 2001 and 2007. Viet Nam has been a net exporter of by volume of oil and refined petroleum products since 1990 (Figure 4). It currently has proven reserves of 4.4 billion barrels of oil, which is expected to increase with exploration in deeper sea water areas. Income from crude oil exports accounted for around 21% of total Government revenues in 2008³⁸. Nevertheless, rapid demand growth is likely to outstrip domestic supply. Viet Nam is likely to become a net oil importer by volume within the next five years.

Rising demand for oil-based products has been driven especially by rapid growth in transportation. Freight and passenger transportation have grown with average annual growth rates in volume of 9.8% and 13.9% respectively between 1995 and 2010. Diesel used in public transportation (buses and trains) and in maritime and road transport increased rapidly, as well as gasoline for use in cars and motorbikes.

Figure 4. Oil reserves, production and consumption 1987 – 2010 (billion barrels)



Source: BP (2011)³⁹

Demand projections show further rapid rise in consumption of all refined petroleum products. LPG (for cooking, replacing much of the biomass in Figure 1) and diesel are expected to grow particularly fast, though at a slower rate than in past years (Figure 5). About half of all LPG is currently imported⁴⁰ and this proportion may rise.

Figure 5. Refined petroleum product demand projections 2010 - 2025

(in thousand tons)					
Product	2010	2015	2020	2025	Avrg Annual growth (%)
LPG (esp cooking)	1,900	3,600	6,400	10,000	11.7
Gasoline	3,850	4,400	5,500	6,700	3.8
Jet fuel	750	1,050	1,400	1,800	6
Kerosene (esp home use)	380	400	430	510	2
Diesel	7,300	10,150	13,850	18,950	6.6
Mazut (esp industrial use)	1,900	2,750	4,300	6,100	8.1
Total	16,080	22,350	31,880	44,060	7

Source: Nguyen et al. (2011)

Dung Quat refinery in Quang Ngai province was opened in 2009 and is Viet Nam's first refinery. It is processing 140,000 barrels (bbl) of oil per day, supplying a third of current domestic demand for refined products, and plans to increase capacity to 215,000 bbl/day by 2016. In 2011 construction started on the Nghi Son refinery with a planned capacity of 200,800 bbl/day, and a refinery is planned in Long Son with a capacity of 240,000 bbl/day. With a total refining capacity of 655,000 bbl/day (about 30 million tons), Viet Nam would be able to meet about two thirds of expected domestic demand for refined products in 2025.

2.1.3. Global prices of petroleum and coal

Crude oil prices at the New York exchange fluctuated between roughly 15 and 30 USD/bbl in the period 1996-2000, and since then steadily rose to peak at more than 145 USD/bbl in July 2008. It then dropped to 38 USD/bbl in December of that year as a result of the financial crisis. Since then it is steadily increasing again and reached over 100 USD /bbl in January 2012⁴¹. Although prices are likely to remain volatile, global demand is likely to push prices up further, as growth rates in large developing countries will be maintained and economic recovery is expected in developed countries.

Coal prices fluctuate less than oil and gas, but the monthly price of Australian thermal coal also peaked in July 2008 at USD193/ton, dropped significantly in the second half of that year to a low of USD65/ton in March 2009, has picked up since then, and is expected to increase further with global economic recovery⁴².

2.2. Viet Nam's policies to keep fossil fuels and electricity affordable

Based on international experience, the current energy price controls in Viet Nam are unlikely to be effective in increasing productivity and growth and reducing poverty, whilst they do not seem to enable sustainable public finances, energy security or greenhouse gas emissions mitigation⁴³.

But in order to ensure affordable access to energy for households and industry has been long been pursued through various forms of fossil fuel price control, subsidy and tax reduction. The main general energy policies, electricity and refined fuels policies are listed in Figure 6, Figure 7 and Figure 8, which are referred to in different parts of this paper⁴⁴.

The policy overviews demonstrate that electricity prices are still highly regulated, i.e. capped and differentiated for different users, although market reform has been set in motion by the Electricity Law of 2004. Domestic coal prices are set well below world market prices in order to enable cheap electricity production and manufacturing. There are also price ceilings in the refined petroleum markets, and there are various taxes and tax waivers. Direct subsidies are exceptions though they have happened, but most subsidies are indirect, e.g. through bail-outs of state owned enterprises (SOEs) that are loss-making because of price caps.

Viet Nam's price controls mean that SOEs in the energy market are forced to make losses, which are substantial and are compensated by the State because these monopolistic companies must continue to supply their services. The lack of competition in the energy market may also hide inefficiencies in the SOEs, at every step of the value chain of different energy products, which compound the losses and the need for bail-outs.

Losses also mean that the SOEs lack investment capital to increase supply and meet rising demand, or to invest in innovative technology for energy saving and renewable energy. Furthermore, the lack of a level playing field for SOEs and the domestic private and FDI sectors means that the latter hesitate to invest in energy markets, including in renewable energy generation.

Figure 6. General energy policies

1. Decision 1885/QĐ-TTg (27 December 2007) on the national energy development strategy up to 2020, with a vision to 2050. The aims are to assure national energy security; supply adequate energy; use energy resources in a rational and efficient manner; diversify forms of investment and business and develop energy markets; boost the development of renewable energy and nuclear power; and to develop the energy sector in association with environmental protection.
2. Decree 102/2003/ND-CP (9 March 2003) on Energy Conservation and Energy Efficiency. This aimed to establish energy standards, regulations and obligations; ensure reporting of achievements and plans; ensure energy conservation in transport, buildings and manufacturing; provide financial incentives; ensure research and development, education; and do energy diagnostics and labelling.
3. Decision No.79/2006/QĐ-TTg (14 April 2006), on the National Target Program on Energy Efficiency and Conservation, and Decree No.19/2005/CT-TTg, dated 02 June 2005, on electricity saving. These aimed to develop legislation on Energy Efficiency and Conservation for government agencies, businesses, local government, and households; reduce national power consumption by 3-5% for the period of 2006-2010 and by 5-8% of national power consumption for the period of 2011-2015.
4. The Environmental Tax Law, coming into force (with delay) in 2012, which sets (very low) tax rates for fossil fuels (coal and refined petroleum products)⁴⁵.
5. Viet Nam has agreed with climate policy decisions by the Conference of Parties (COP) to the UNFCCC, including decisions related to Nationally Appropriate Mitigation Actions (NAMAs) that will become vehicles for international technical and financial support to reduce emissions, notably from fossil fuel use.
6. Viet Nam is advanced in formulating its Green Growth Strategy, which is expected to aim for increasing the use of clean energy and renewable energy, and greening of both production processes and lifestyles.

Figure 7. The main electricity policies

1. The Electricity Law (2004), which initiated power industry reform, including restructuring and equitization of various units under EVN and mobilising /diversifying investment; encourage economical use of electricity and develop a competitive electricity market. It includes electricity pricing policy, gradually eliminating a the price subsidy regime. In July 2005 a road map was developed, with Phase I on establishment and operation of a competitive market for power supply, to be purchased by EVN. In Phase 2 wholesale competition, i.e. a wholesale market with several bulk buyers and sellers. Phase 3 (from about 2020) sees retail competition and customers will access different suppliers⁴⁶.
2. The VIth Power Master Development Plan (2006-2015, with a view to 2025), and the VIIth Power Development Plan, i.e. the National Master Plan for Power Development for the 2011 - 2020 Period With Vision to 2030 (Decision 1208/QĐ-TTg).
3. Decision 21/2009/QĐ-TTg, initiating electricity tariff reform, including moving towards cost recovery, increasing average tariffs and transparency in tariff setting, phasing out of cross subsidies from commercial user to residential users and on restructuring of block tariffs for residential users.
4. Price caps on electricity for sale to households and industries, through e.g. Decision 268/QĐ-TTg (23 February 2011), regulating electricity retail prices for different users (manufacturing and other businesses; administrative agencies, residents), depending on the time of the day and amounts used.
5. Decision 24/2011/QĐ-TTg allows EVN to increase electricity prices by 20% per year without seeking government approval, i.e. increase prices up to 5% on a quarterly basis without approval from the MoF.
6. Circular 05/2011/TT-BCT (25 February 2011), regulating the price of electricity in 2011 for all organizations and individuals buying and selling electricity from the national grid
7. Decision 268/QĐ-TTg, February 2011, re a small subsidy on electricity for 3.2 million low income households, i.e. a monthly payment of VND30,000 (US\$1.4) as well as lower prices for the first 50kwh of electricity use, VND993 per kwh rather than the new price of VND1,242 per kwh

8. Circulars on wholesale electricity prices, to be applied in price purchasing agreements (PPAs) that EVN must enter into, including other SOEs who have started to produce electricity.
9. Circular 2379/BTC-QLG (MoF, 26 February 2010) on prices of coal sold for electricity production, which increased on 1 March 2010.

Figure 8. The main policies on refined fuels

1. Announcement 244/TB-VPCP (OOG, 11 August 2009) on selling prices of coal for domestic use (excluding coal sold to power): lower than export prices up to 10%;
2. Decision 78/2008/QD-BTC (MoF, 16 September 2009) on reduction of the retail prices (inclusive of value-added tax) of diesel oil; and management mechanism for petrol and oil trading
3. Circular 70/2009/TT-BTC (MoF, 7 April 2009) with guidance on customs procedures for export, import of petrol and oil and import of materials for production and processing of petrol and oil
4. Decree 84/2009/ND-CP 15-Oct-09 on petrol and oil trading; planning of petrol and oil development; granting trading licenses; and production, trading and distribution
5. Decree 115/2009/ND-CP (24 December 2009), detailing the regulation on bidding for petroleum survey, exploration and exploitation
6. Decree 100/2009/ND-CP 3-Nov-09 re a surcharge on the volume of oil divided as profits to petroleum contractors when the price of crude oil increases; it regulates conditions for surcharge collection, rates, exemption and reduction
7. Circular 234/2009/TT-BTC (MoF, 9 December 2009), on the Fund for petrol and oil price stabilisation under Decree 84/ 2009/ND-CP (15 October 2009) on petrol and oil trading. The fund is capitalised by a small surcharge and – part of sudden, strong market increases will be covered by the Fund
8. Decision 190/2010/TT-BTC (MoF, 1 December 2010) Guiding preferential import duty rates on a number of refined petroleum products

The indirect subsidies are a problem for several reasons. They are an important drain on government finances, whilst Viet Nam will become a net energy importer and will be forced to pay the gradually increasing prices on the international market, which means that price controls will become more expensive. Viet Nam is also facing a weakening of the Vietnamese Dong (VND), whilst the Government is running a significant budget deficit.⁴⁷ In addition, there is empirical evidence of the harm that fossil fuel subsidies can bring in terms of regressive distributional impacts, energy efficiency, economic productivity, energy security, and environmental quality. The imperative to reform fossil fuel pricing policy is pressing.

Indeed, based on several of the listed policies, Viet Nam is actually on a path towards liberalising its energy markets, especially the electricity markets, which will reduce the need for support to SOEs and thus subsidies. An environmental tax has been introduced recently and over time such taxes and profits of SOEs could become important for State revenue. The current reform is not without challenges. Price control policies have created vested interests that could potentially lose out from price reform. Furthermore, the economy has been facing high inflation, rendering the introduction of energy price increases difficult. Nevertheless, reform may need to be accelerated in order to achieve the multiple benefits that are possible.

2.3. Estimating fossil fuel subsidies and taxes in Viet Nam

The IEA estimated consumption subsidies for a range of developing countries with the ‘price-gap’ approach, as explained in section 1.3 – these estimates tend to underestimate the total subsidies, but nevertheless demonstrate very significant totals. The estimates of (indirect) fossil fuel consumption subsidies in Viet Nam between 2007 and 2010 are given in Figure 9 by energy source, and the totals fluctuating between USD 1.2 and 3.6 billion.

The large fluctuation in subsidy levels per year reflects volatility in international fossil fuel prices. The oil price has been particularly volatile (see section 2.1) and market based pricing and lower international price levels for oil in 2009 and 2010 meant that price caps were not reached and subsidies were zero. Rising prices since late 2010 suggest that oil subsidies are significant again in 2011 and 2012, with global economic recovery and continued growth in particular in Asia.

Figure 9. Estimated consumption subsidies in Viet Nam 2007 - 2010⁴⁸

<i>(Billion USD)</i> Energy source	2007	2008	2009	2010
Oil	0.32	1.09	0	0
Gas	0.09	0.21	0.13	0.23
Coal	0.01	0.01	0.01	0.01
Electricity	1.68	2.25	1.06	2.69
Total	2.1	3.56	1.2	2.93
Total (% GDP in current USD)	2.95	3.94	1.24	2.83

Source: IEA (2011)

The data in Figure 9 are rough estimates only. They are not based on detailed analysis of the specific mechanisms in Viet Nam by which production and consumption prices are pushed below actual costs and SOEs are financed (compensated). Such analysis is extremely complex and financial data availability is limited, so analysis will almost certainly remain incomplete. However, some mechanisms are explained below, for electricity and for refined petroleum products.

The Government collects much more revenue from refined petroleum products than from electricity: VND24,922 billion in 2009 compared to VND4,839 billion from electricity. Import duties from petroleum are comparable to taxes from electricity production, however VAT from petroleum in 2009, VND283 billion, was considerably lower than that from electricity sales, VND1,093 billion⁴⁹. The total revenue of nearly VND30,000 billion in 2009 equals about USD1.5 billion, which is more than the USD1.2 billion estimated consumption subsidies in that year, but much less than the subsidies for 2007, 2008 and 2010 (Figure 9), in other words the policy is costly for the Government.

2.3.1. Prices, support measures and investment needs in the electricity sector

Viet Nam's leading SOE for producing and distributing electricity is Electricity Viet Nam (EVN). EVN is facing increasing recurrent costs, many of which are beyond its control, as well as rapidly growing electricity demand and therefore capital investment needs.

In the past EVN has been able to control recurrent costs and the price of electricity because of cheap hydropower and domestic fuel supply. State resources provided most capital investment for electricity generation and the infrastructure to supply strategic sectors and households. The shift to fossil fuels for power generation has resulted in increased costs, and causes the prospect of further cost increases in the future, for several reasons:

- a) Coal and gas fuelled power plants have higher generation unit costs than hydropower.
- b) Domestic supplies of gas and coal have so far met electricity generation needs, and domestic electricity generation benefits from price caps on these fuels. Coal for example,

is sold to EVN at around 50-60% of the export price⁵⁰. Viet Nam is expected to become a net coal importer between 2012 and 2015, which means EVN will need to buy coal at international market prices.⁵¹

- c) An increasing proportion of EVN's costs are denominated in foreign currencies, while most of its revenues are denominated in VND, so the steady devaluation of the VND is increasing costs.⁵²

EVN is loss-making as a result of escalating costs and (set, capped) electricity tariff levels that are below the cost of production (see also Figure 7). Reports suggest losses for 2010 totalled VND 8.2 trillion (USD 397 million), and losses in the first half of 2011 were VND 3.5 trillion (USD 170 million). Furthermore, EVN has run up large debts totalling VND 10 trillion (USD 485 million) to Vinacomin and Petrovietnam (those SOEs also generate electricity and deliver fossil fuels to EVN power generation units).

Power sector losses at energy SOEs are essentially indirect subsidies (or: support measures) and must ultimately be borne by the central Government. It faces reduced tax returns and profits from these companies, and the Government must bail out SOEs through for example provision of low interest credit in order to maintain and expand electricity supply. EVN and other power generation companies enjoy preferential access to financial capital and to natural resources (cheap coal and gas, and water, land and forests for hydroelectricity). Some of these indirect subsidies are passed on to consumers through low power tariffs, but cheap money and access to natural resources also encourages inefficiencies in enterprises.

Block-tariff pricing schemes are in place for residential users, where end-users pay a lower rate for the first units of electricity and incrementally higher rates for higher levels of consumption. Tariffs for commercial and industrial users are dependent upon peak and off-peak tariffs and the size of their grid interconnection.

In 2011 the Government granted EVN greater authority to set prices, by allowing tariffs to be reviewed quarterly and to raise the electricity tariff by up to 5% at each review. This means that EVN now has the authority to raise tariffs by up to 20% per year⁵³, but it raised them by an average 17% in 2011, which is below inflation in 2011⁵⁴. This follows on from an increase of the average tariff by 25% between 2007 and 2010, which is also less than inflation over that period. In fact, inflation-adjusted prices for electricity have gradually declined since 1990 and energy price controls have been used to curb inflation.

Estimates of tariff levels expressed in USD cents (USc) suggest the price in 2010 was 7 USc/kWh for residential customers, 10 USc/kWh for commercial customers, and 6.5 USc/kWh for industrial customers. The average tariff was estimated to be 7 USc/kWh which is below the ASEAN region average of 10 USc/kWh⁵⁵.

The use of price controls and State investment in the electricity sector makes real-cost estimates difficult, but clearly electricity tariffs are below the long run marginal cost of supply, and EVN cannot achieve financial sustainability without increases in tariffs⁵⁶ and reform of investment policy. It has been estimated that the price will need to rise to 8-9 USc/kWh to allow the sector to operate on a sustainable financial basis⁵⁷, which would still be low by international comparison. This would mean an increase of power tariffs above inflation by 15-30% of the current price.

The capital investment needed to meet power demand is expected to be USD 48.8 billion between 2010 and 2020⁵⁸, but EVN cannot finance this expansion from its own resources. Bond issues can only cover a small portion of these investment needs and State financial resources are strained. One of the key objectives of the Electricity Law of 2004 and the liberalization of the electricity sector were to attract much needed private sector capital to power generation projects and to enable the sector to become financially self-sufficient.⁵⁹

Since 1997 EVN's share of electricity production has declined to about 60 % in 2010.⁶⁰ Most of the balance is produced by gas turbines owned and operated by other SOEs and also by some private investors (in particular medium sized hydroelectricity).⁶¹ Their contribution must grow substantially to meet Viet Nam's generation needs, but the (domestic and foreign) private sector is reluctant to invest unless the tariffs are set at a profitable level and indirect support to SOEs in the energy sector is phased out (so that the 'playing field is level'). This is part of the process of reform of the electricity markets⁶², but progress is partial as is witnessed by the USD2.93b indirect consumption subsidies in 2010 on energy (Figure 9) as well as the above estimated sustainable electricity tariff of 8-9 USc/KWh.

Low power tariffs act as a disincentive for users to invest in more efficient energy technology and hamper demand side management programs. Cheap power for energy intensive sectors is an incentive to increase electricity intensity, relative to alternative sources of energy. For example, the proportion of grid electricity consumed by heavy industries has increased considerably whilst the share of the market of coal they consumed was stable (Figure 10). Electricity consumption in industry has increased relative to coal in response to a 40% increase in coal prices compared to lower increases in electricity prices to these industries⁶³.

Figure 10. Proportion of energy by industry (% of total of that energy)

	2007	2008	2009	2010
Electricity use				
Steel	1.9	2.08	2.66	4.22
Fertilizers	0.39	0.43	0.55	0.88
Cement	2.08	2.28	2.92	4.63
Paper	2.43	2.66	3.4	5.39
Coal use				
Steel	10.76	10.43	10.27	10.4
Fertilizers	6.85	6.54	6.57	6.54
Cement	7.56	7.42	7.44	7.55
Paper	3.78	3.78	3.65	3.65

Source: GSO (2011)⁶⁴

The different forms of indirect support to the electricity sector in Viet Nam that have been identified are given in Figure 11, which follows the classification of subsidies in Annex I. This includes price controls and market access restrictions, as well as preferential loans and preferential tax treatment, and Government investment in infrastructure and R&D⁶⁵.

If electricity subsidies remain in place, increases in electricity generation costs and production will lead to increased losses which will be financially unsustainable and reduce EVN's ability to meet electricity demand. Financial support to recover costs is necessary to maintain the supply of to power to industry and households, and will happen – which also means that energy businesses lack incentives to improve efficiency.

The complex (indirect) subsidy regime makes assessments of the performance of energy companies difficult, whilst cost based pricing of electricity may clarify the losses made due to inefficient management.⁶⁶ Experiences with liberalization of the electricity sector in other countries have not allowed cost discovery to take place through competition in the way that advocates originally envisaged, but a more transparent cost based system should make any inefficiencies in the system clearer.

Figure 11. Direct and Indirect Subsidies to the Electricity sector⁶⁷

Support format	Support Tool					Regulations (see Figure 7)
Direct financial transfers	Grants to consumers	Grants to producers	Low-interest or preferential loans	Government loan guarantees		• Decision 268/QĐ-TTg
Preferential tax treatment	Tax credits, tax rebates	Deferred tax liabilities	Reduced tax rates	Exemptions on royalties, duties or tariffs		• Decision 24/2011/QĐ-TTg • Circular 05/2011/TT-BCT
Trade restrictions	Tariffs	Tariff-rate import quotas	Non-tariff trade barriers			• Decision 24/2011/QĐ-TTg • Circular 05/2011/TT-BCT
Energy-related services provided directly by government at less than full cost	Government-provided energy infrastructure	Public research and development on fossil fuels				• Electricity Law
Regulation of the energy sector	Demand guarantees	Mandated deployment rates	Price controls	Environmental regulations	Market-access restrictions	• Circular 05/2011/TT-BCT • Decision 24/2011/QĐ-TTg • Electricity Law 2004 • Decree 102/2003/ND-CP

Note:

Green means an active area of support or subsidy, direct or indirect. Yellow is support available at certain times or for certain participants in the sector. Orange means not yet used.

The State provision of (financial and natural) resources for power generation, and the bail-outs that must happen after loss making because of set prices, is likely to lead to less efficient use of financial and energy resources than would be the case in the competitive market place. The Electricity Law of 2004 and subsequent policy aims for reform of the power markets in the long term, with wholesale competition followed well after 2020 by competition in the retail market⁶⁸. Indeed, EVN as well as political leaders remain adamant that further reform will happen, declaring in early 2012 that EVN will cut costs and improve its efficiencies, and reduce power losses and improve efficiency of electricity use in all sectors, whilst moving towards market prices, allowing further rises in electricity prices and reducing State subsidies. Solar water heating installations will continue to receive VND 1 million (\$47) support per household (-installation) through EVN⁶⁹.

Nevertheless, the reform process appears too slow as debts and losses incurred are very substantial and expected to increase with rising global fossil fuel prices, increasing demand and imports, whilst they cause a drag on investment for increasing power supply from e.g. renewable sources and improved electricity distribution.

2.3.2. Prices, taxes and support measures for refined petroleum products

The market for refined fuels is also dominated by SOEs, with Viet Nam National Petroleum Corporation (Petrolimex) responsible for approximately 60% of imports. Dung Quat Refinery supplies around 30% of the market. Petrolimex also dominates the retail market with around 40% of sales in 2009. Other retailers include Saigon-Petro with a market share of around 31% and the Military Petroleum Company with around 25% of the market⁷⁰.

Prior to 2008, the Government strictly controlled retail prices. In response to large rises in international prices in 2008, leading to losses at retailers, the Government relaxed price controls and allowed retailers to change prices. In mid 2008 prices collapsed but since early 2009 they increased again, whilst international oil markets remain volatile. The Government set up a price stability fund to address this volatility (see Figure 8)⁷¹. Under this legislation fees ranging from

300VND/litre to 500 VND/litre are levied, depending on the type of fuel (1.5-2.6 US\$/litre). These fees are collected and held by fuel companies such as Petrolimex, and in the event of price rises, drawn down to maintain price stability. Under the same legislation, retailers are also allowed the freedom to change price levels if global prices increase by more than 7%, without seeking approval from the Ministry of Finance. However, this reform was rolled back in 2010 when the Government asked retailers to halt price increases as a measure to limit inflation.⁷²

With significant global price rises from late 2010, retailers were allowed to draw down their stabilization funds. Increased price levels were compounded by a weakening VND. Between late 2010 and February 2011 some estimates suggested that 11 trillion VND (around 564 million USD) in tax reductions and stabilization fund resources were used to maintain price levels⁷³. By February 2011 price stabilization funds were exhausted and price stability could only be maintained by losses to retailers⁷⁴. Issues were also raised regarding the stabilization funds held by Petrolimex, which were used to cover other losses and to gain interest that was not returned to the fund.

In April 2011 the Government reconsidered the retail pricing structure in light of the exhaustion of the stabilization fund, continued global price pressures and retail enterprise losses. It was reported that some retailers had stopped supplying gasoline altogether due to continued losses. In order to relieve pressure on retailers the Government temporarily suspended import tariffs and allowed the retail price of petroleum products a 15% increase.

It was hoped that this can reduce retail losses, keep prices at affordable levels and avoid further pressures on inflation.⁷⁵ Under the revised structure contribution to the stabilization fund will still be paid by consumers. Companies will continue to have their profits and operational costs set at a fixed level decided by the Ministry of Finance (see Annex II with the retail price structure of refined petroleum as of April 2011). However, retailers will continue to make a loss⁷⁶. Petrolimex's petroleum supply business unit recorded a loss of 219 billion VND in 2010 and 1.8 trillion VND to June 2011⁷⁷.

Subsidy estimates from the IEA suggest that subsidies for refined products declined to zero in 2009 and 2010 with the decline in global prices (Figure 9). Resurgent global prices, a weakening VND and remaining price caps suggest subsidies were also high in 2011 and may surge in 2012.

In February 2012 MOF reduced petroleum and jet fuel import taxes to between 3 percent and zero percent and tariffs on kerosene and diesel were reduced from 5 percent to 3 percent, in response to rising global market prices. Traders were forced to take additional losses, as prices at the pump were between VND1,300 and VND2,400 per litre lower than import prices for different products⁷⁸. This is roughly up to 12% of the price per litre of petrol and other products, which is evidently unsustainable considering the large and rising market volume.

While suppliers enjoy preferential access to financial resources and some measure of protection from competition, supply side subsidies in the refined petroleum sector are limited. Most subsidies are concentrated on the demand side, and as with the electricity sector are largely composed of the losses of state owned enterprises, which are eventually borne by the Government. In Figure 12 the types of support measures in the refined petroleum sector are summarised as per the OECD typology (for which see Annex I). Preferential loans cover some of the losses, preferential tax treatment as well as Government investment in energy infrastructure and R&D⁷⁹.

Figure 12. Direct and Indirect Subsidies to the Refined Petroleum Sector⁸⁰

<i>Subsidy format</i>	<i>Subsidy Tool</i>					<i>Guiding regulations (see Figure 8)</i>
<i>Direct financial transfers</i>	Grants to consumers	Grants to producers	Low-interest or preferential loans	Government loan guarantees		
<i>Preferential tax treatment</i>	Tax credits, tax rebates	Deferred tax liabilities	Reduced tax rates	Exemptions on royalties duties or tariffs		<ul style="list-style-type: none"> Decision 190/2010/TT-BTC
<i>Trade restrictions</i>	Tariffs	Tariff-rate import quotas	Non-tariff trade barriers			<ul style="list-style-type: none"> Decision 190/2010/TT-BTC Circular 234/2009/TT-BTC Decree 100/2009/ND-CP Circular 70/2009/TT-BTC
<i>Energy-related services provided directly by government at less than full cost</i>	Government-provided energy infrastructure	Public research and development on fossil fuels				
<i>Regulation of the energy sector</i>	Demand guarantees	Mandated deployment rates	Price controls	Environmental regulations	Market-access restrictions	<ul style="list-style-type: none"> Circular 234/2009/TT-BTC Decree 115/2009/ND-CP Decree 100/2009/ND-CP Decree 84/2009/ND-CP Decision 78/2008/QD-BTC

Note:

Green means an active area of support or subsidy, direct or indirect. Yellow is support available at certain times or for certain participants in the sector. Orange means not yet used.

Government revenue losses are likely to be greater than just those used to support loss making SOEs. In an effort to stabilize price levels and allow retailers adequate operating margins import tariffs and other taxes have been reduced. As with the electricity sector, the actual functioning of the subsidy regime, price caps and the stabilization fund is opaque and open to abuse, meaning it is sometimes difficult to differentiate between losses due to the pricing regime and losses due to inefficient management at the retail firms.

The landscape of support measures in the refined petroleum markets as well as electricity markets are too complex for all details to be analysed and aggregated into precise financial figures. Only the above proxies for understanding the extent of subsidies can be provided. To fully understand where the exact (indirect) subsidies are taking place and priority measures can be taken, increased transparency of SOE financing data is needed, and additional research should be done.

3. Potential effects of fossil fuel fiscal reform

3.1. Modelling the impacts of price changes

Two independent modelling exercises were conducted for the policy impact analysis. A computable general equilibrium model (CGE) which addressed overall economic and distributional impacts, and an emissions model⁸¹.

The CGE model is based on a social accounting matrix for Viet Nam in 2007, which defines the structure of the economy through a range of parameters. For the years 2007 to 2010, in as far

as possible the model took account of available empirical data. For the 2011-2020 period the model used established projections to define variables in the model, based on official plans and strategies and also international data. These include population growth and labour supply figures, estimates of autonomous technological change, domestic fossil fuel projections, estimates of domestic petroleum refining capacity, power generation capacity and world market fossil fuel prices. Based on these assumptions, several model runs generated simulations of economic and sectoral performance under different fossil fuel pricing scenarios⁸².

The emissions model was developed by the Institute of Energy (IE) for Viet Nam's Second Communication to the United Nations Framework Convention on Climate Change (UNFCCC)⁸³ using the Long-range Energy Alternatives Planning Software (LEAP)⁸⁴. LEAP is a scenario-based energy-environment modelling tool. Scenarios are based on a comprehensive accounting of how energy is consumed, converted and produced in a given economy. In the case of Viet Nam, energy demand until 2030 was estimated based on a function linking energy demand to changes in aggregate GDP, industrial GDP and population. As with the CGE model, key variables were taken from projections in planning documents, including population growth, GDP growth, power sector capacity and crude oil price⁸⁵. The assumptions for the LEAP model allowed a comparison between emissions presented in the Second Communication to the UNFCCC (i.e. a business as usual (BAU) scenario) and emissions resulting from changes in fuel pricing policy. However, some assumptions for the LEAP model differ from the assumptions made for the CGE model, whilst the two models are of a very different nature.

The two models compared the same three fossil fuel pricing scenarios, as follows:

- i) Business as usual (BAU) pricing policy;
- ii) Removal of the safe-side estimates of indirect subsidies for fossil fuels;
- iii) Removal of the safe-side estimates of indirect subsidies and introduction of environmental taxes on fossil fuels.

As explained in sections 1 and 2, the extent of fossil fuel subsidies is difficult to assess. The IEA estimates suggest (indirect) subsidies in Viet Nam are overall more 10% of the full cost of supply (see e.g. Figure 9). But depending on various estimates, refined petroleum products are more than 10% below commercial prices and electricity may be underpriced by as much as 30% (see section 2.4).

For the purposes of the modelling scenarios, the indirect subsidies were assumed to be 20% for coal, 5% for gasoline and other refined petroleum products, and 10% for electricity⁸⁶, i.e. 'safe-side' subsidies that are in all likelihood actually higher.

It was assumed for both models that these changes would be implemented over a three-year period from 2013 to 2015. Figure 13 gives the percentages of changes in prices that were assumed. The way in which demand for fossil fuels is influenced by changes in the price of fossil fuels is central to the functioning of both models.

The CGE model uses a production function that describes the rate at which different production inputs can be substituted for one another, which will happen in response to changes in relative price levels. It assumes that there is a degree of substitutability between labour and capital, and energy. That is, in some sectors the economy can move between more or less energy intensive methods of production in response to changes in relative input prices. It also assumes that different energy sources are substitutable to varying degrees, meaning that producers can switch between different energy sources in response to changes in energy price.⁸⁷

Figure 13. Assumed energy price increases due to fossil fuel subsidy removal and environmental tax imposition (% change)

Scenario	Fuel	2013	2014	2015
Subsidy removal	Coal	6	13	20
	Petroleum products	1.6	3.3	5
	Electricity	3.3	6.7	10
Fossil fuel tax	Coal	10	20	30
	Petroleum products	3.6	3.6	3.6
	Natural Gas	3	6	10
Subsidy removal & fossil fuel tax	Coal	16	33	50
	Petroleum products	5.2	6.9	8.6
	Electricity	3.3	6.7	10
	Natural Gas	3	6	10

Source: Willenbockel and Hoa (2011)

In the LEAP model the response of fossil fuel demand to changes in price, or the assumed own-price elasticity of demand, was based on a review of empirical literature.⁸⁸ Adjustments to price changes usually take a number of years to make, which means that in the short-run fossil fuel demand does not tend to respond very much to changes in price. In the long-run, demand tends to be more responsive to price changes, because over a number of years users can adopt new technology or change their behaviour. Thus short-run price elasticities tend to be smaller than long-run elasticities.⁸⁹ To accommodate this in the model, different long-run and short-run own-price elasticities were adopted. Different elasticities were also adopted for different types of energy source.⁹⁰

3.2. Economic impacts of price changes

Two scenarios were investigated in the modelling exercises by comparing them with a BAU scenario. Figure 14 gives the simulation results for growth rates in key economic aggregates for the scenario with subsidy cuts and the scenario with subsidy cuts and fossil fuel taxes, compared to BAU, for the 2007 – 2020 period. In both scenarios the model suggest average GDP growth rates would be slightly higher than in the BAU scenario and gross investment rates would be considerably higher. In the years immediately after the implementation of these policies GDP growth is lower due to lower consumption and higher production costs, but GDP growth rebounds strongly after the economy has adjusted to the change in energy prices. This is a result of the assumption that the funds released by the subsidy cut and revenues generated from additional taxation flow into additional productive capital investment, where the capital allocation is determined according to sectoral profitability.

This results in real GDP being about 1% higher in the subsidy cut scenario than in the BAU scenario and about 1.5% higher in the subsidy cut & carbon tax scenario. However, consumption growth would be lower relative to the base line, and imports and exports would be slightly lower. Real exchange rate appreciates slightly compared to the BAU scenario, suggesting that a deterioration in the current account balance due to the new policy would be unlikely.

Figure 14. Impact of subsidy removal and tax on average annual growth rates (AAGR) of real macroeconomic aggregates 2007-2020 (%)

Indicator	BAU AAGR	Subsidy cut		Subsidy cut & Carbon tax	
		AAGR	Change	AAGR	Change
Gross Domestic Product	6.31	6.41	0.1	6.47	0.16
Consumption	5.68	5.55	-0.13	5.39	-0.29
Gross Investment	4.11	4.59	0.48	4.9	0.79
Exports	9.39	9.28	-0.11	9.1	-0.29
Imports	7.8	7.7	-0.1	7.54	-0.26
Real Exchange Rate	-1.03	-1.07	-0.04	-1.12	-0.09

Source: Willenbockel and Hoa (2011).

Figure 15 shows how the policy change is likely to affect sectoral performance. While still showing robust overall growth rates, relative to the BAU scenario the coal, petrol refining and power sector see declines in output due to changes in pricing policy. Energy intensive sectors also see relative declines, which include heavy industry, raw materials processing and mining. In contrast light manufacturing (textiles and clothing manufacture, electrical equipment and other manufacturing) perform better than in the BAU scenario, as they are much more labour and capital intensive. The overall results suggest that the adoption of a subsidy cut and implementation of a carbon tax would lead to greater economic growth on a less carbon intensive growth path.

The model was also run under different assumptions about how the additional fiscal space created by subsidy reduction and tax imposition is used (see Figure 16). Four different actions are considered:

- additional revenue invested as efficiently as possible in the economy, that is in high return investments (this assumption is used to obtain the results in Figure 14 and Figure 15);
- a lump sum transfer to households from 2013 to exactly off set income losses due to price rises excluding the highest income quintile;
- lower personal and enterprise income tax;
- funding for low carbon investment through Research, Development and Dissemination (RD&D) of energy efficiency and renewable energy technologies.

Figure 15. Impact of subsidy removal and carbon tax relative to BAU on real output 2020 (% deviation from the 2020 baseline)

Commodity Group	Subsidy cut	Subsidy cut & Carbon tax
Agriculture and Forestry	0.1	0.2
Fishing	-1.4	-2
Aquaculture	-0.4	-0.6
Coal	-9.6	-36.7
Crude Oil	-0.2	-0.4
Natural Gas	-0.5	-1.2
Other Mining	-1.3	-6.3
Fish processing	-2	-2.2
Other Food Processing	-0.7	-1.7

Commodity Group	Subsidy cut	Subsidy cut & Carbon tax
Textiles, Clothing, Leather, Footwear	6.1	18.5
Oil Refining	-9.4	-23.3
Other Chemicals	-0.8	-2.7
Non-metallic Mineral Products	0	-3.9
Base Metals	-5.7	-20.3
Metal Products	-1.2	-6
Machinery and Equipment	-1.4	-4.5
Electrical Machinery	1.5	1.8
Vehicles, Other Transport Equipment	1.9	2.1
Other Manufacturing	2.1	2.7
Electricity	-6.8	-10.9
Trade Services	0.2	0.1
Road Transport	-0.7	-2.1
Air Transport	-5.6	-9.8
Other Transport Services	-0.6	-1.4
Public Admin, Education, Health	2.2	3
Other Services	0	0

Source: Willenbockel and Hoa (2011)

Figure 16. Impact of subsidy removal & tax on average annual GDP growth of real macroeconomic aggregates under different policy assumptions 2007-2020 (%)

Indicator	BAU	Subsidy Cut & Carbon Tax, with four revenue-use scenarios			
		High-Return Investment	Household Transfers	Tax Cuts	Low Carbon Investment
Gross Domestic Product	5.99	6.17	5.88	5.82	6.12
Consumption	5.67	5.38	5.4	5.4	5.59
Gross Investment	3.49	4.57	3.7	3.54	4.2
Exports	9.1	8.83	8.48	8.42	8.27
Imports	7.84	7.57	7.28	7.22	7.11

Source: Willenbockel and Hoa (2011)

There is a trade off between productivity growth and consumption. In all cases consumption is lower than the BAU case, although in the case where additional government revenue are used for low carbon investment the household consumption is only very slightly lower than in the BAU scenario. GDP growth is higher than BAU for two scenarios, i.e. where the additional Government revenue is used in high productivity investments or in low carbon investments. In the other two cases gross investment levels are also higher than under the BAU scenario, but only marginally. This limited improvement in investment is one explanation why in those two cases average annual GDP is slightly below the baseline, and (consequently) the consumption is lower than in the 'low carbon investment' case, despite the 'rebates' to consumers.

3.3. Social impacts of price changes

The welfare impacts of the fossil fuel subsidy reform by household group depend on the shares of fossil fuel and power expenditure compared to total household expenditure. It is frequently argued that fossil fuel subsidies are regressive because wealthy households use greater amounts of fossil fuels and capture most of the benefits of subsidies. This seems to be the case in Viet Nam where higher income quintiles use larger proportions of their consumption expenditure on energy. The highest income quintile, however tends to use a lower proportion of their consumption expenditure on energy than the middle groups. This pattern is reflected in the modelled impacts of fossil fuel price changes on different income groups, given in Figure 17.

Figure 17. Impact of subsidy removal and tax on average annual growth rates (AAGR) in household consumption by income quintile 2007-2020 (%)

HH Group	BAU	Subsidy cut		Subsidy cut & Carbon tax	
		AAGR	Change	AAGR	Change
Urban Q1	5.46	5.31	-0.15	5.14	-0.32
Urban Q2	5.43	5.26	-0.17	5.07	-0.36
Urban Q3	5.38	5.21	-0.17	5.03	-0.35
Urban Q4	5.46	5.29	-0.17	5.11	-0.35
Urban Q5	5.47	5.33	-0.15	5.16	-0.31
All Urban	5.46	5.3	-0.16	5.14	-0.32
Rural Q1	5.71	5.59	-0.12	5.44	-0.28
Rural Q2	5.75	5.63	-0.12	5.48	-0.27
Rural Q3	5.87	5.74	-0.13	5.58	-0.29
Rural Q4	5.93	5.8	-0.13	5.65	-0.28
Rural Q5	5.71	5.59	-0.12	5.45	-0.26
All Rural	5.8	5.67	-0.13	5.53	-0.28
All Farm	5.88	5.76	-0.12	5.61	-0.27
All Non-Farm	5.34	5.18	-0.16	5.01	-0.34
Poorest HH	5.69	5.57	-0.12	5.41	-0.28
All	5.68	5.55	-0.13	5.36	-0.3

Source: Willenbockel and Hoa (2011)

Note: Q1 = Lowest income quintile; Q5 = Highest income quintile

The poorest and the wealthiest households see their consumption growth affected the least. Similarly, farm and rural households, with lower levels of energy consumption also see lower impacts on consumption growth. The results show that the poorest and rural households lose least consumption growth under both scenarios, when expressed as a proportion of consumption growth, the poor are the least affected though the difference between the different income groups is quite small, especially given the significant levels of consumption growth over the 2007-2020 period. However, the low income households may feel small changes more than the better-off, whilst the modelling does not allow for analysis of effects on specific social groups.

User prices for coal, refined fuels and electricity, rise because of subsidy cuts and introduction of fossil fuel tax, but prices also rise in sectors that use energy sources intensely. The sectors with the largest cost rises are non-metallic mineral production (which includes cement production); the fishery sector (because of diesel costs); and metal production (Figure 15). These are sectors with a predominantly male workforce except for fish processing. Expansion is evident for low energy

intensive industries such as textiles and footwear, which are labour intensive and have a mainly female workforce; and electrical machinery and vehicle manufacture.

To support transitions as a result of fossil fuel fiscal reform, there will be a need for e.g. re-training, job search and mobility costs for which a portion of the revenue savings may be used⁹¹. Furthermore, targeted household transfers or tax cuts may also be applied in order to protect poor households and enable workers to make transitions.

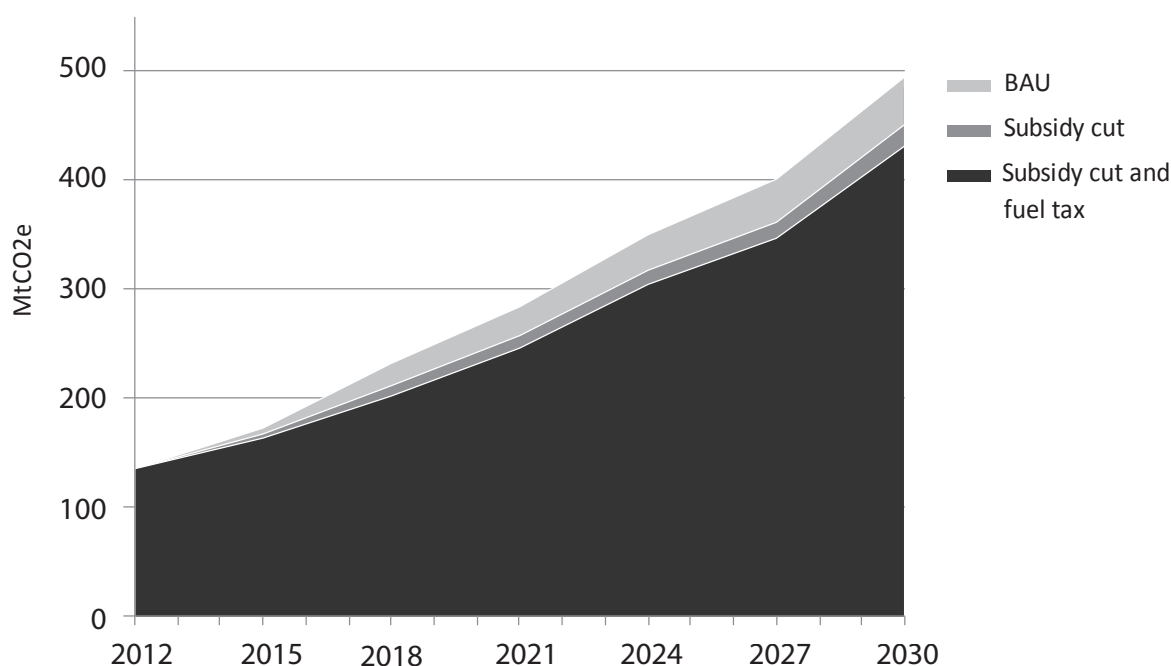
3.4. Environmental impacts of price changes

The emissions modelling for the energy sector shows that both the cuts in fuel subsidies and the imposition of tax on fossil fuels could result in significant reduction in emissions against BAU as demand is moderated in response to higher fossil fuel prices (Figure 18).

Under the subsidy cut scenario, decreases in the demand for fossil fuels could result in emissions reductions of over 9% against BAU by 2020 and remaining at that level to 2030, a reduction of 24.8 MtCO₂e by 2020, and 44.2 MtCO₂e by 2030 in absolute terms.

Under the subsidy cut & fossil fuel tax scenario larger reductions in emissions reflect greater price rises for fossil fuels. Projected aggregate emissions reductions according to the model study, based on a number of assumptions, could be 13.5% by 2020 and around 12.9% by 2030. In absolute emissions reductions this is around 35.8 MtCO₂e by 2020, and 63.9 MtCO₂e by 2030.

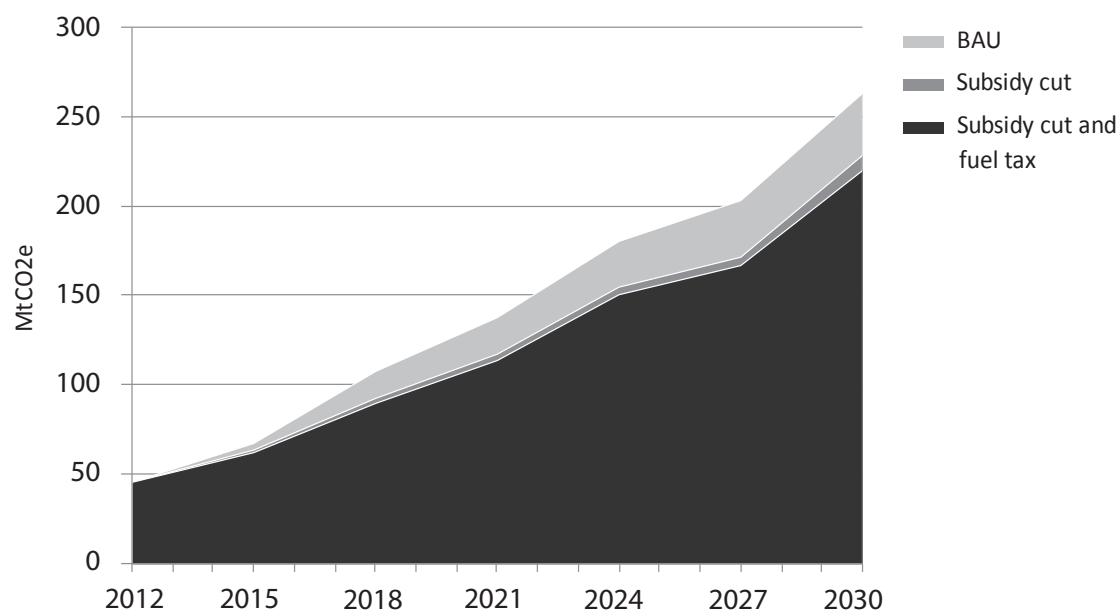
Figure 18. Aggregate emissions under different fossil fuel price scenarios 2012-2030



Source: LEAP model used by Bao and Sawdon (2011)

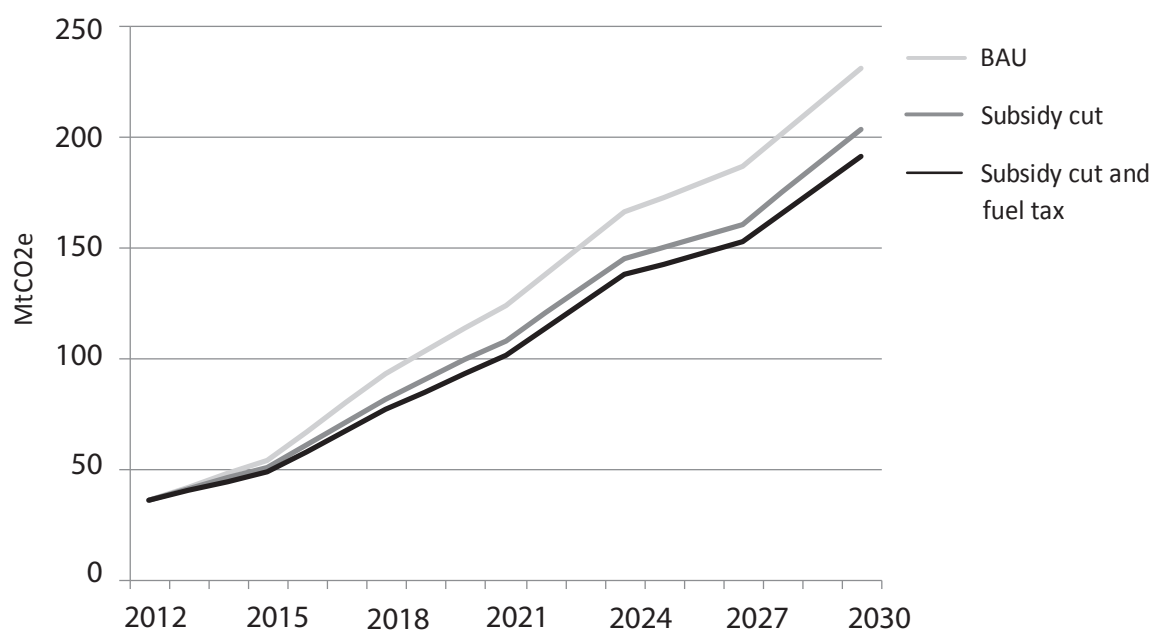
The power sector is the largest consumer of fossil fuels and the largest emitter of GHGs. It also accounts for the largest decline in emissions due to the price changes under both scenarios (see Figure 19). Under the subsidy cut scenario, emissions reductions attributable to the power sector constitute 77% by 2020 and 79% by 2030. In the subsidy cut & carbon tax scenario the sector contributes 62% of total emissions reductions by 2020 and 67% by 2030.

Figure 19. Power sector emissions under different fossil fuel price scenarios 2012-2030



Source: LEAP model used by Bao and Sawdon (2011)

Figure 20. Power sector emissions from coal; different fossil fuel price scenarios 2012 - 2030

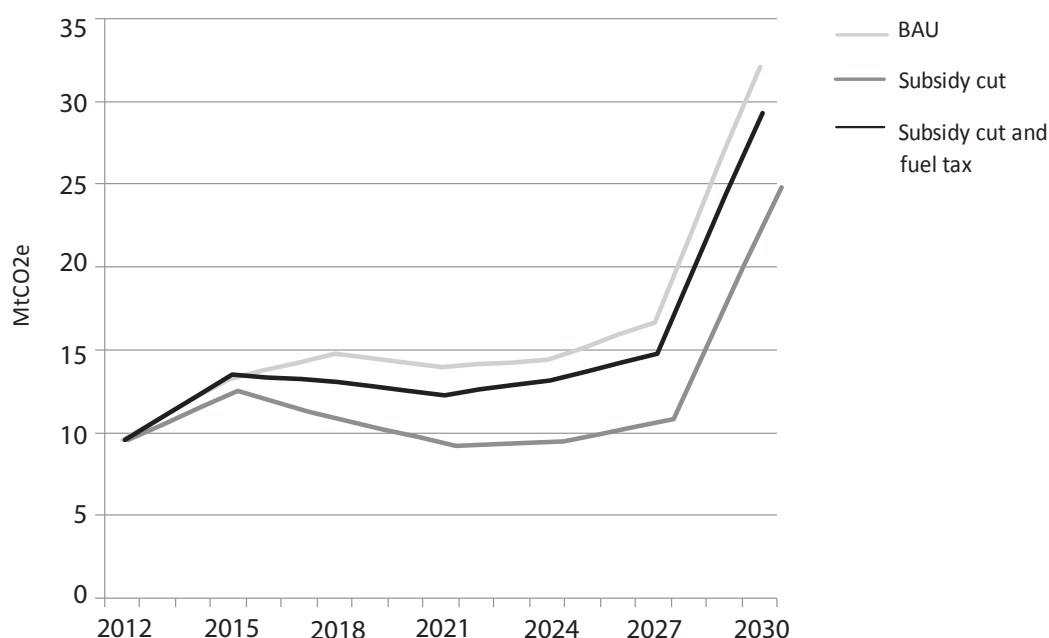


Source: LEAP model used by Bao and Sawdon (2011)

Coal emissions decline strongly with the significant increase in coal price in both scenarios, even though model assumptions on coal price increase are conservative. By 2030 emissions are 12% below BAU for the subsidy cut scenario and 17% below BAU in the subsidy cut & tax imposition scenario (Figure 20). Emissions from natural gas in the subsidy cut scenario are 23% less than BAU scenario by 2030, and 9% less by 2030 relative to BAU in the subsidy cut & tax imposition

scenario (Figure 21). This reflects the switch of power generators towards gas in response to an assumed strong price increase of coal. However, the extent to which this switching can occur is constrained by technological characteristics of power supply.

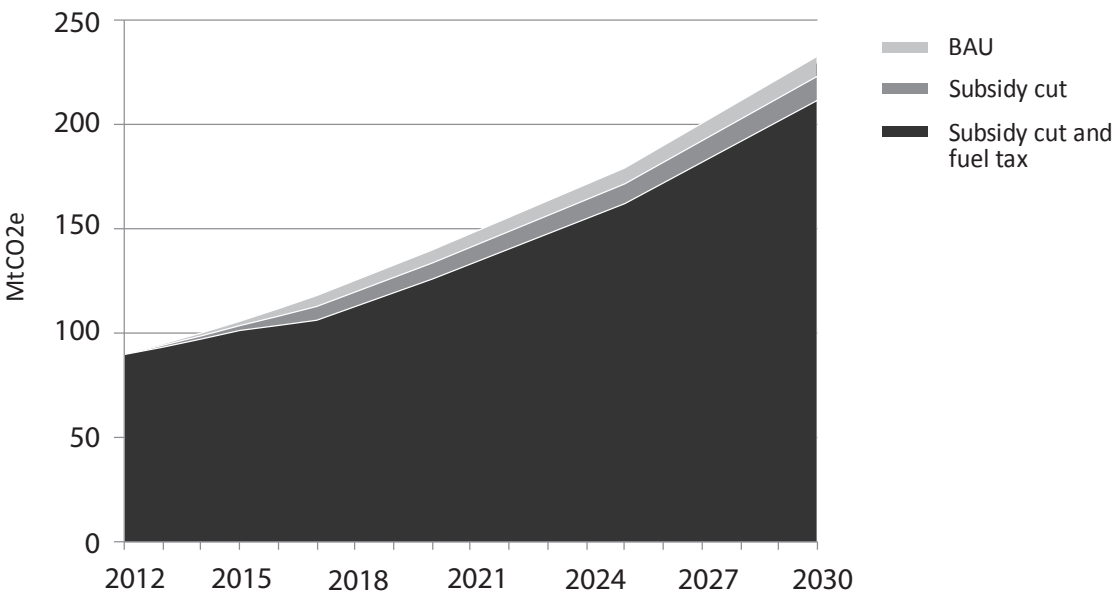
Figure 21. Power sector emissions from natural gas; different fossil fuel price scenarios 2012-2030



Source: LEAP model used by Bao and Sawdon (2011)

Emissions attributable to end-use energy consumption, or demand side energy emissions include those from transport, industry, commercial and residential sectors (see Figure 22). Reductions in these sectors are expected to be modest when compared to power sector emissions. Emissions reductions under the subsidy removal scenario are around 2% below BAU by 2015, and about 4% from 2020 onwards. Emissions reductions in the subsidy removal and tax imposition scenario are about 4% below BAU in 2015 and around 10% below BAU from 2020 onwards. The main energy sources used in these sectors are expected to experience relatively modest price increases in each of the reform scenarios when compared to electricity. Moreover, long run and short run elasticities are relatively low for products such as petrol and diesel, which make up a large proportion of the fuels in this sector, so price increases do not reduce demand by much. Reducing consumption and emissions against BAU will require investment in development and transfer of new technologies.

Figure 22. Demand-side emissions under different fossil fuel price scenarios 2012-2030



Source: LEAP model used by Bao and Sawdon (2011)

4. Proposals for fiscal reform of fossil fuels in Viet Nam

4.1. Conclusions

Energy price controls and thus the (mostly indirect) fossil fuel subsidies in Viet Nam on electricity and refined fuels aim to ensure cheap access to energy by all households and strategically important industries (such as steel and cement production), and to control inflation. While such policy aims may be justified, the policy means are not effective. Fiscal reform of fossil fuels could lead to increased (private sector) investment in energy production and access to energy services, and to greener, more equitable and higher growth. There is a particular need for accelerated change in the financing and operation of energy SOEs.

4.1.1. *The extent of Viet Nam's fossil fuel subsidies*

Electricity prices are capped and differentiated for different users, domestic coal prices are set below world market prices, and there are price ceilings in the refined petroleum markets. In addition, there are various taxes and tax waivers as well as other support measures such as infrastructure investment and Government support to R&D. Direct subsidies in the Vietnamese energy sector are exceptions but have happened too.

The IEA estimates through the 'price-gap approach' that (indirect) consumption subsidies on fossil fuel in Viet Nam between 2007 and 2010 fluctuated between USD 1.2 and 3.6 billion, and are found especially on electricity. Rising world market prices and fossil fuel demand will mean that maintaining price levels will be increasingly expensive. Viet Nam is becoming a net energy importer, which will increase the cost of maintaining energy price caps because it will have to pay international prices for an increasingly large portion of its energy needs. This contrasts with the situation in the past when domestic financial and natural resources were adequate to meet energy supply needs.

Government revenue from refined petroleum was VND24,922 billion in 2009 and VND4,839 billion from electricity. This is in total about USD1.5 billion, which is substantially higher than the (indirect) subsidies in 2009, but considerably lower than the subsidies in 2007, 2008 and 2010.

Energy sector losses by SOEs are essentially indirect subsidies because they must ultimately be borne by the central Government or by for example state owned credit suppliers. The losses are mainly caused by price caps. However, the landscape of support measures is too complex for all details to be analysed and aggregated into precise financial figures and only proxies for understanding the extent of subsidies can be provided.

In 2011 the Government granted EVN greater authority to set electricity prices, but over the period including 2011 it raised them by rates below inflation. The average electricity tariff in 2010 was about 7 USc/kWh, which is below the ASEAN average of 10 USc/kWh. To become financially sustainable would require an increase of tariffs above inflation by 15-30% of the current price.

A price stability fund was set up with fees for every litre petrol sold, in order to deal with rising prices after early 2009. But in e.g. early 2011 funds were exhausted and to cope with inflation the initial price liberalisation was halted. The petrol retail losses became severe and import tariffs were suspended, allowing the retail price of petroleum a 15% increase, but retailers still make losses.

Resurgent global prices, a weakening VND and remaining price caps suggest subsidies will surge in 2011 and 2012. Indeed, in February 2012 MOF reduced petrol and jet fuel import taxes, but prices at the pump were between VND1,300 and VND2,400 per litre lower than the import prices

for different products, which is roughly up to 12% of the price per litre and evidently unsustainable considering the large and rising volume of the market.

4.1.2. Benefits of phasing-out fossil fuel subsidies, and increasing taxes on fossil fuels

Subsidies in Viet Nam result in low prices and are causing inefficient use of energy, in particular at large energy users in industry such as steel, paper and cement manufacturing. These energy users benefit from preferential access, which results in much higher demand for energy than would otherwise be the case. The preferential energy tariffs these sectors enjoy may also distort the economic structure and hamper the development of more competitive industries.

A CGE model of the economy and an emissions accounting model with a range of parameters were used to assess future economic and emissions trends by comparing two scenarios with 'business as usual' (BAU): one where estimated subsidies are removed, and one where in addition to subsidy cuts fossil fuel taxes are introduced. Analysis was also done of different options for re-investing additional Government revenue, into economically the most productive investments, into low carbon investments, and returning it to customer as 'rebate' or a reduction of taxes.

The model results are not predictions, but demonstrate trends under sets of reasonable assumptions. The modelling results confirm international experience⁹², and found that cutting subsidies and imposing a carbon tax would have several positive effects, as follows:

- 1) The CGE modelling of both scenarios indicated that if funds saved from subsidies and generated from additional tax revenues are invested in the currently most productive sectors, or into low carbon activities, then GDP growth rates would be slightly higher than under the BAU scenario with subsidies over the period to 2020. Initially GDP growth is lower due to lower consumption and higher production costs, but GDP growth rebounds strongly after the economy has adjusted to the higher energy prices. The economic structure will change, with reduced growth in energy intensive sectors and increased growth in for example light manufacturing, when compared to BAU.
- 2) If revenue savings and increases are productively invested, including in low carbon investments, the exchange rate appreciates slightly compared to the BAU scenario, suggesting that a deterioration in the current account balance due to the new policy is unlikely.
- 3) The CGE model indicates that an increase in fossil fuel prices would lead to lower household consumption growth relative to the BAU scenario, although overall consumption growth would remain robust. The poor, rural and farm households would generally see the lowest impact on the growth of their income, with urban, non-farm and middle income households would see the largest reduction of consumption growth rates. Because the top income quintile spends a lower portion of their income on fossil fuels this group would also see lower consumption growth impacts than middle-income groups. Overall, the proportional difference in the impact of the policy changes between income groups is small.
- 4) However, low income households may feel small changes more than the better-off. The modelling does however not allow for analysis of effects on specific social groups and further research may be required to assess such impacts. Also, there will be a relative decline in high energy sectors with a predominantly male workforce (e.g. fisheries, metal) and shift towards low energy and often labour intensive sectors (e.g. textile and footwear) with a predominantly female workforce.
- 5) For the scenarios where the additional Government revenue is used for household transfers or tax cuts there is a small improvement in investment but average annual GDP would be slightly below the baseline. And despite the 'rebates' to consumers the consumption is lower than in the 'low carbon investment' case. Full scale transfer of increased Government

revenue to households does therefore not look favourable, but targeted household transfers, tax cuts or investment in special re-training programs may be applied in order to protect poor households from any negative impacts and to enable workers to make transitions.

- 6) The emissions modelling indicated that annual GHG emissions levels could decline significantly in response to subsidy cuts and taxation, relative to the BAU scenario developed for the Second Communication to the UNFCCC. This is commonly associated with a significant reduction of other (air) pollutants too, which is good news for local environmental quality.
- 7) The power sector is the largest consumer of fossil fuels and the largest emitter of GHGs. It also accounts for the largest decline in emissions due to the price changes under both scenarios. Emissions from coal in particular could decline considerably, against BAU, even though model assumptions on higher coal prices are conservative. There would be a switch of power generators towards gas in response to the assumed price increase of coal.
- 8) Elasticities are relatively low for petroleum products such as petrol and diesel, so price increases do not reduce demand by much.

4.2. Recommendations: accelerate and deepen ongoing reforms

The large state owned energy companies in Viet Nam are kept functioning despite losses that are primarily incurred because of price caps. The SOE losses are eventually compensated by the Government through a variety of subsidies, including preferential access to financial resources as well as land, water and other natural resources, and a (near-)monopoly position in energy markets.

This situation has many drawbacks and therefore Viet Nam should reinforce the reforms in the energy sector that were started in the last decade with for example the Electricity Law of 2004. Market reform should be reinforced, in order to remove indirect subsidies and selectively introduce differentiated fossil fuel taxes that are more far reaching than the approved environmental tax law.

There is also a strong need to mitigate any potentially negative effect of such reform, i.e. reform must include ways to compensate the 'losers' as vested interests may otherwise block reform initiatives. Furthermore, the multiple benefits of the fossil fuel fiscal reform will not come automatically and require additional measures. The following would reinforce the ongoing energy sector reforms and make them considerably 'greener'.

Prudent macro-economic management

The reform process must consider the macro-economic challenges that Viet Nam is facing. Phase-out of subsidies and introduction of additional fossil fuel taxes should serve multiple macro-economic aims, including a reduction of annual budget deficits and public debt; improved efficiency of energy utilities and other SOEs; improved international competitiveness; increased foreign and private sector investment in the (low carbon) energy sector; and maintenance of a reasonably strong VND.

Reform must happen gradually and in a phased manner, in order to avoid shocks in various markets and pushing up inflation, for example by a gradual removal of various price caps; followed by step wise introduction of selected taxes. It should also include a number of mitigation measures, some of which are suggested below. Phasing out of subsidies and introduction of taxes may be more gradual than what was used in the model studies reported here, and will need to be accompanied by further restructuring of energy SOEs, as well as the introduction of competitive energy markets (as has been envisaged already for electricity markets).

Improve financial sustainability and attract more investment into the energy sector

The current price caps are hampering much needed investment in the energy sector, in particular the electricity sector, which has large capital investment needs over the next two decades. With the current price levels EVN is unable to accumulate sufficient capital investment resources from retained earnings and to pay energy generated by independent power providers. Petroleum product traders also make losses. The gradual removal of price caps and increase of electricity prices above inflation should aim to improve investment capacity of the energy SOEs.

However, EVN, Vinacomin and Petrolimex should not simply be able to charge higher prices to avoid future debt and to generate investment capital, but energy SOEs should also operate more efficiently. This may be achieved by increasing competition in for example wholesale electricity markets and (later) in retail electricity markets – this has been planned, but implementation of the plans may be accelerated. Would-be private sector investors in for example electricity production are concerned that prices are insufficient to allow an adequate return on investment (i.e. they are below the long run marginal cost of new generation capacity). Increased competition in for example petrol import and retail markets will also result from removal of price caps and relaxing of regulatory restrictions on domestic and foreign private businesses to trade in Viet Nam. Increased competition is expected to improve efficiencies, limit price increases and improve services.

Energy SOEs need to be restructured also to make sure that they focus on their core functions (energy SOEs currently have significant investments outside their core businesses, such as in banking and real estate). But their current debts may also need to be restructured before they can operate adequately even with higher energy prices.

Make sure that GHG emissions mitigation is optimised and that energy security increases

Fossil fuel subsidies hamper the adoption of energy efficiency measures and investments in renewable energy, and result in high levels of pollution. With higher energy efficiencies forced by higher prices and increased domestic production of renewable energy the relative dependency on imports of for example coal would be reduced, when compared to BAU, and there will be environmental benefits whilst modernizing technology and creating economic opportunities.

The expansion of renewable energy production, in particular through (domestic, foreign) private investment cannot be expected from removal of subsidies and introduction of carbon taxes alone, at least not in the short term. Until the production costs of e.g. wind and solar energy come down further there is a need to regulate for appropriate feed-in tariffs that would be paid to potential investors, and for increased targets for total renewable energy production⁹³. These above-market tariffs will lead to increased consumer prices, most likely over a limited period of time until costs of production have come down further. The additional costs could be directed towards richer consumers through block-tariff electricity pricing (see below). It is thus proposed that indirect subsidies on fossil fuels are phased out and that selective subsidies are introduced for a limited period of time to stimulate the renewable energy production.

Fiscal policy reform should occur in the context of development, registration and implementation of Nationally Appropriate Mitigation Actions (NAMAs; see also Figure 6). NAMAs are at an early stage of development in Viet Nam, involving several Ministries and international agencies, notably in order to help mitigate emissions from the energy sector. They will in all cases involve a combination of a financing strategy (likely with a mixture of international and national, public and private finance) and technology development and transfer with international support. NAMAs represent an opportunity to limit the costs to Vietnamese consumers and businesses from fossil fuel fiscal policy reform, and they could speed up the adoption of modern, clean technology.

Protect low income households, workers and other potential losers from fossil fuel fiscal reform

Energy subsidies tend to be regressive, as more affluent households with higher levels of energy consumption are able to capture most of the benefits of subsidies. However, the modelling work also suggests that low income groups will see a modest reduction in consumption growth and specific groups of households and workers may be affected more than others.

The reform will need to consider the different sectoral impacts. Some sectors are likely to be affected more severely than others, such as the capture fishery sector and the metal sector, in which workers are mainly men. Sectors that would experience growth, such as the textile and footwear sectors employ predominantly women. These transitions caused by fiscal reform will be gradual but may require e.g. targeted household transfers, tax cuts or investment in special re-training programs in order to compensate workers whose employment opportunities will reduce.

Viet Nam has a block-tariff electricity pricing scheme in place for residential electricity users (a lower rate for the first units of electricity) which must be maintained, and possibly made more “progressive” as one way to compensate low income groups for increased prices, which means that richer high-consumers will cross-subsidize poorer low-consumers. As of early 2011 Viet Nam compensates low income electricity users for price hikes in electricity through direct transfers of small subsidies. There is also a system in place for subsidised installation of solar water heaters. These approaches merit further assessment as there appear to be administrative inefficiencies and collecting small subsidies can be cumbersome to consumers, but they could possibly be reformed, repeated and/or expanded for compensating low income households and workers.

The current price stabilisation fund has its limitations, has led to some degree of mis-use of the funds and may become costly and complex with further international price rises. In-depth assessment is required of the actual effects on price levels and stability of this mechanism.

Conduct additional research and analysis of the barriers to fossil fuel fiscal reform, especially on ‘winners and losers’ of fossil fuel fiscal reform, and ways of mitigating the downsides of reform

Additional in-depth research is needed on the precise nature and quantity of indirect subsidies at different steps in the fossil fuel value chains, and the barriers to cutting the indirect subsidies and improving the operating efficiencies of the SOEs⁹⁴. It is important that the impacts of recent changes in regulation of the electricity and petrol markets are assessed. And the potential benefits from moves towards a competitive electricity wholesale market and the operation of new purchasing agreements between power generators and EVN should be assessed.

Markets for petroleum products also need to be made more competitive, in order to keep prices comparatively low. But due to low elasticities fiscal policy reform will have limited impact on demand and achieving increased efficiencies and reduced emissions will also require analysis and (subsequently) removal of other barriers to technological renewal and investments, for example in the context of formulation and implementation of NAMAs.

There is a particular need to increase the transparency of data on financing and operating of energy SOEs, including incentive structures for personnel and contractors. The ways in which the losses of SOEs are funded and how these losses occur in specific industries is not fully clear, and further analysis would enable the formulation of detailed and effective reform actions.

International experience has shown that entrenched vested interests often thwart reform efforts.⁹⁵ There is thus a need for further research on the ‘winners and losers’ of fossil fuel fiscal reform. Additional research must look at male and female workers and low income households affected by the expected transitions. Such social-economic research, including clear gender analysis is essential for effective targeting of mitigation measures.

There are also ‘winners and losers’ in industry. Some industries are benefiting from the current low electricity and coal prices, or cheap diesel. The role of low energy costs in the competitiveness of specific industries needs to be examined; their energy efficiency and potential improvements need to be assessed; and to what extent higher prices for coal and electricity will impact on them.

The above additional research and analysis will inform how to implement the suggested fossil fuel fiscal reforms in Viet Nam, and enable a transition to a more competitive as well as greener economy. It would critically inform the implementation of Viet Nam’s forthcoming Green Growth Strategy.

Annex I Matrix of fossil fuel support measures (in 24 OECD countries), with examples

Output returns	Production								Direct consumption	
	Transfer Mechanism (how a transfer is created)	Enterprise income	Cost of intermediate inputs	Cost of production factors			Knowledge	Unit cost of consumption	Household or enterprise income	
				Labour	land	capital				
Direct transfer of funds		Output bounty or deficiency payment	Operating grant	Input-price subsidy	Wage subsidy	Capital grant linked to acquisition of land	Capital grant linked to capital	Government R&D	Unit subsidy	Government subsidized life-line electricity rate
Tax revenue foregone		Production tax credit	Reduced rate of income tax	Reduction in excise tax on input	Reduction in social charges (payroll taxes)	Property-tax reduction or exemption	Investment tax credit	Tax credit for private R&D	VAT or excise-tax concession on fuel	Tax deduction related to energy purchases that exceed given share of income
Other government revenue foregone		Reduced resource rent tax		Under-pricing of a good, government service or access to a natural resource		Under-pricing of access to government land; reduced royalty payment		Government transfer of intellectual property right	Under-pricing of access to a natural resource harvested by final consumer	
Transfer of risk to government		Government buffer stock	Third-party liability limit for producers	Provision of security (e.g., military protection of supply lines)	Assumption of occupational health and accident liabilities	Credit guarantee linked to acquisition of land	Credit guarantee linked to capital		Price-triggered subsidy	Means-tested cold-weather grant
Induced transfers		Import tariff or export subsidy	Monopoly concession	Monopsony concession; export restriction	Wage control	Land-use control	Credit control (sector-specific)	Deviations from standard IPR rules	Regulated price; cross subsidy	Mandated life-line electricity rate

Source: OECD (2011)

Annex II Retail Price structure for Refined Petroleum in Viet Nam (April 2011)

Component of basic price		Unit	Type			Notes (see also Figure 8)	
		P e t r o l RON92	Diesel 0.05S	K e r o - s e n e	M a z u t 3.5S		
Global price		VND/l	15,751	17,487	17,488	13,996	Singapore market; Exchange rate of state-owned commercial banks applied since 11 Feb 2011
T a x e s and fees	Import tariff	0 - 17 %	0	0	0	0	Import tariff = CIF price x tariff rate (%). 17% -> 12% -> 6% -> 0% for petrol since 1/1/2011. Temporarily suspended since 24 Feb 2011 (Circular 24/2011/TT-BTC dated 23/2/2011, MoF)
	Special consumption tax	%	1,575	0	0	0	Special consumption tax = (CIF price + Tariff) x tax rate (%). 10% applied for petrol.
	VAT	-10%	1,853	1,869	1,868	1,500	VAT Law
	Petroleum fee	VND/l	1,000	500	300	300	Decsn 03/2009/QĐ-TTg dated 09/01/2009 Prime Minister
I t e m s defined by MOF	Fixed operational costs	VND/l	600	600	600	400	Circular 234/2009/TT-BTC dated 09/12/2009 MOF
	Fixed profit	VND/l	300	300	300	300	Circular 234/2009/TT-BTC dated 09/12/2009 MOF
	Extracted for Price Stabilization Fund	VND/l	300	300	300	300	Circular 234/2009/TT-BTC dated 09/12/2009 MOF
Basic price		VND/l	21,379	21,056	20,856	16,796	Decree 84/2009/NĐ-CP dated 15/10/2009 GoV; Circular 234/2009/TT-BTC dated 09/12/2009
Retail price		VND/l	21,300	21,100	20,800	16,800	Decision 048/XĐ-QĐ-TGD dated 24/02/2011 Petrolimex
Comparison (Basic price/retail price)		%	100.40	99.80	100.30	100.00	

Source: Petrolimex, cited in Tran and Jones (2011)

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88. The ease of substitution between energy inputs is governed by the elasticities of substitution. The assumed elasticities in the CGE model study are 0.4 for substitution between energy and value added, 0.15 for substitution between electricity and fossil fuels, 0.25 for substitution between coal and the oil-gas composite, and 1 for substitution between oil and gas. These elasticities are based on estimates from empirical studies of advanced economies. They have been reduced by 50% to reflect greater structural rigidities in the Vietnamese economy relative to advanced economies. Overall they represent conservative assumptions on the scope for energy substitution (for more detail see Willenbockel and Hoa (2011) pages 12-15).
89. The price elasticity of demand is defined as the proportionate change in the quantity of demand divided by the proportionate change in price, holding all other factors, which may affect demand constant. As demand usually declines in response to increases in price, price elasticities are usually negative.
90. For example, the IMF recently estimated that short-run own price elasticity of oil was -0.02, meaning an increase of the oil price by 10% would result in a decrease in demand of only 0.2%. Long-run elasticities (over 20 years) were over three times as high as short-run elasticities at -0.07 (IMF 2011c).
91. For greater detail on this see Bao and Sawdon (2011), pages 16-19.
92. Willenbockel and Hoa (2011)
93. See for example IEA, OPEC, OECD, and World Bank (2011); GSI and IISD (2011)
94. National GHG emissions and (related) renewable energy targets that are more ambitious compared to the VIIth power development plan may be included in the forthcoming Green Growth Strategy (see also Figure 8). See also: Willenbockel, D (2010) Impact Assessment Report of Draft Environmental Tax Law for Viet Nam. Final Report, June 2010. GTZ, Danida, Institute of Development Studies (IDS), University of Sussex, Department of Economics, University of Copenhagen
95. This would essentially mean an update and expansion of the study by Tran and Jones (2011), looking at the political economy of energy SOEs.
96. David Victor (2009) The Politics of Fossil-Fuel Subsidies. The Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), a paper in the series "Untold billions: fossil-fuel subsidies, their impacts and the path to reform."



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