



# Economic, social and environmental impacts of fuel subsidies: A revisit of Malaysia



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## ABSTRACT

Subsidizing energy has been widely used but is economically unfavorable. The Malaysian government has shown strong intention to reduce energy subsidies recently, but face challenges to prepare policy instruments to manage the impact. This study develops a Computable General Equilibrium (CGE) model with breakdown of households by income level to evaluate the potential impacts of removing energy subsidies on the Malaysian economy. It is shown that removing petroleum and gas subsidy would improve economic efficiency and increase GDP up to 0.65%. Budget deficit would be largely reduced after removing the petroleum subsidies, especially when the saved subsidy cost is not budgeted for other expenditure. Households would be worse off in most scenarios due to higher price level, but some compensation policy could make the lowest income group no worse than baseline, without harm the economy. The reduction in carbon emissions ranges 1.84–6.63% in different scenarios. The simulation results suggest Malaysia to completely remove all fuel subsidies and use the saved funding to cut budget deficit or spend on education, health and other service sector. It is also necessary to set a compensation scheme to minimize public resistance and make sure such scheme is affordable.

## 1. Introduction

Subsidy has been an important energy policy instrument in many countries due to social and political concerns, but is widely deemed as economically unfavorable. Although different in form, energy subsidies generally work by directly or indirectly lowering the net amount paid by energy consumers or raising the effective price received by energy producers (IEA, 1999). Subsidies to energy products make consumers lack incentive to conserve energy, as the subsidized energy prices cannot reflect the true costs of energy supply and disclose adequate information of resource scarcity. Subsidies to energy producers also hamper their efforts to optimize production and adopt more advanced technologies. Over-use of energy caused by both types of subsidies would accelerate the depletion of fossil resources and aggravate environmental degradation (e.g. climate change, acid rain and air pollution).

From social perspective, as differentiating customers is costly in practice, energy subsidies to households are usually applied to all income groups and may even spill over to industries in practice. Against the original intention of assisting disadvantaged groups, the universal energy subsidy benefits accrue disproportionately to higher income groups as the poor overall consumes much less energy. Over-

consumption arising from subsidized prices also tends to increase import demand of net energy importers or reduce exports by net energy exporters, which will deteriorate the country's balance of payments and raise concerns on energy security. These environmental, economic and social concerns have motivated governments and international organizations to vote for removing energy subsidies.

An evolving trend towards no or less energy subsidies originated in OECD countries during the 1990s, and has spread to developing and transition economies gradually. For developed countries, environmental problems (especially climate change) and the goal for sustainable development are their major motivations to phase out energy subsidies. Since the Rio Earth Summit in 1992, the wealthy countries have made great efforts to reduce the distortions in energy markets (OECD, 1997a). On the other hand, economic growth is the primary concern of developing and transition countries. Usually it is pressure from international community or/and financial burden on fiscal budget that force them to reform energy subsidies.

Particularly, subsidies to fossil fuels are prevailing and serious in the Association of Southeast Asian Nations (ASEAN), which amounted to \$51 billion in 2011 (IEA, 2013). Even so, Malaysia is an outstanding example in the neighborhood. In 2011, the share of after-tax fossil fuel subsidies to GDP was roughly 7.2% in Malaysia, only less than 8.4% in

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**Table 1**  
Overview of Malaysia's fuel subsidy policies.

Subsidies	Policy summary	Results
On Petroleum Products	<ol style="list-style-type: none"> <li>1. Provided by the government</li> <li>2. Officially, an Automatic Pricing Mechanism (APM) used to price petroleum products based on factors such as: reference product cost, operational costs and cooperate margins, tax and subsidy, etc.</li> <li>3. Actually, APM used to determine sale tax exemption or subsidy needed to cover the gap between a fixed retail price and the market price (IISD, 2013).</li> </ol>	<ol style="list-style-type: none"> <li>1. Based on Malaysia's official statistics, the budget for petroleum subsidies: <ol style="list-style-type: none"> <li>1. only RM 27 million in 1990</li> <li>2. rose to RM 3.2 billion in 2000</li> <li>3. peaked at RM 17.6 billion in 2008</li> <li>4. RM 9.6 billion in 2010</li> </ol> </li> </ol> <p>(Hamid and Rashid, 2012)</p>
On Natural Gas	<ol style="list-style-type: none"> <li>1. Provided by PETRONAS, Malaysia's state-owned oil and gas company</li> <li>2. To power generators at around 1/4 of the market price</li> <li>3. To industries and commercial sector at heavily subsidized prices as well, but lesser than to power generators</li> </ol>	<ol style="list-style-type: none"> <li>1. PETRONAS's foregone revenue in 2010 was estimated to be: <ol style="list-style-type: none"> <li>1. RM 11.2 billion for gas to power sector</li> <li>2. RM 7.9 billion for gas to non-power sectors</li> </ol> </li> </ol> <p>(Ilias et al., 2012)</p>
Reforms	<ol style="list-style-type: none"> <li>1. In May 2010, Subsidy Rationalization Programme (SRP) was launched, aiming to increase the prices of subsidized commodities including petroleum products by pre-specified amounts every 6 months until 2014</li> <li>1. In September 2013, an ad hoc increase in the price of diesel and petrol, the first adjustment since 2011</li> <li>1. At the end of 2014, subsidies for gasoline and diesel removed (Adam and Pakiam, 2014)</li> </ol>	<ol style="list-style-type: none"> <li>1. Most price adjustments did not take place</li> <li>2. Suspended in March 2012</li> <li>3. Government's concern on cost of living due to rising commodity prices (Teoh, 2012)</li> <li>1. No reform made to the APM.</li> <li>2. Compensate the poor through extended 1Malaysia People's Aid (BR1M) program</li> <li>3. Upgrade database system for previous welfare assistance program</li> <li>1. Possible due to diminished gap between reference prices and market price due to the low oil price</li> </ol>

Brunei but much higher than the world average of 2.7% (Clements et al., 2013). In terms of the ratio of energy subsidies to overall government budgets, Malaysia had the highest ratio in ASEAN at about 32.9%, which was much higher than the world average of 8.1% (Clements et al., 2013). Estimates show that higher-income groups got more than 70% of the fuel subsidies in Malaysia (NEAC, 2009). Table 1 gives an overview of Malaysia's subsidy policies for fossil fuels.<sup>1</sup> Generally, budget for petroleum subsidies in Malaysia has grown substantially overtime since 2000. Gas subsidies provided indirectly by PETRONAS do not explicitly appear on the fiscal budget, but implicitly affects government revenue through reduced corporate tax base. The amount of PETRONAS' foregone revenue is much larger than petroleum subsidies in size.

Malaysian government proposed to gradually rationalize commodity subsidies in the "2010–2015 Malaysia Plan", motivated by rising budget deficit and national debt, dwindling current account surplus and currency depreciation partially due to lacking actions to cut budget deficit (IISD, 2014). However, the initial government plans did not succeed, except an ad hoc increase of petroleum price in September 2013 (see Table 1). Only the low oil price at the end of 2014 finally made it possible for Malaysia to overhaul fossil fuel subsidies to some extent (Adam and Pakiam, 2014). But the fundamentals of petroleum subsidy policy has not been changed, and it is not clear whether the fossil fuels subsidies will come back if the oil prices increase again (Shi, 2016).<sup>2</sup>

However, while the majority of citizens may support the subsidy rationalization policy, the rest who are not willing to part with the subsidies may hamper the reform. A poll conducted by the government shows that 61% of the Malaysian public supported reducing subsidies (IISD, 2013). The 2013 adjustment still incurred fierce oppositions from political parties and the public, and triggered several protests across Malaysia due to corruption concerns and doubts on the government's promises (IISD, 2014). Therefore, it is timely to investigate the economic, social and environmental impacts of different reform schemes, identify the most vulnerable sectors and income groups, and evaluate

<sup>1</sup> Electricity consumers may receive monthly rebate and even a discount on bills (e.g. government schools and welfare homes). As the amount is small if compared with subsidies to fossil fuels, direct electricity subsidy would not be discussed in this study.

<sup>2</sup> An Incentive Based Regulation framework for natural gas was scheduled to be introduced in January 2016, but so far no obvious action has been taken or publicized.

potential compensation to households. A static computable general equilibrium (CGE) framework is developed based on Malaysia's input-output (I-O) tables to implement the assessment.

Compared to existing studies on energy subsidies in Malaysia, this paper contributes to the literature in the four aspects. First, households are disaggregated into four groups by income so that the differential impacts of fuel subsidy reform on different income groups and compensation policies targeting the poor could be analyzed. Second, in addition to petroleum subsidies that are the major topic in previous studies, natural gas subsidy provided by state-owned gas supplier is also analyzed in this study. Third, different settings are simulated for the use of saved budget or increased tax revenue stemming from subsidy reform, which could provide policy makers a range of potential impacts depending on government behavior. Last, this study uses the recently released Malaysia's 2010 I-O tables, while previous CGE studies are based on its 2005 or older I-O tables.

The paper proceeds as follows: Section 2 briefly reviews literature on energy subsidies and studies relevant to Malaysia. Section 3 introduces the CGE model and scenario settings. Simulation results and interpretations are reported in Section 4. The last section discusses the policy implications and concludes the paper.

## 2. Literature review

Although advocated by economists and environmentalists, not all the interest groups support abolishing energy subsidy. Major opponent opinions are that disadvantaged groups would not be able to couple with the market prices of fuels and electricity, and firms would face higher production costs which would be partially passed on to consumers and partially undertaken by the firms. In other words, the general public and also the industries would not support such policy. The debates have been ongoing for decades, and public protests or even riots took place when some countries attempted to revise exiting policies for energy subsidy. For example, when the government raised the petroleum prices by 23% on February 2006, the public expressed their dissatisfaction and anger through protests (Bacon and Kojima, 2006). Moreover, fuel subsidy removal is also often used as a weapon in domestic politics (Shi and Kimura, 2014).

Along with the years of debates and practices, a large body of research has been conducted to investigate energy subsidy related issues. The research was primarily initiated and has been driven by

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