



2017 International Conference on Alternative Energy in Developing Countries and Emerging Economies  
2017 AEDCEE, 25-26 May 2017, Bangkok, Thailand

## Impact of Transportation Restructuring on Thailand Energy Outlook

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### Abstract

The objective of this study is to explore the impact of the transportation restructuring via three possible energy scenarios; the reference scenario (REF), the undone scenario, and the achievement scenario. The REF scenario was developed based on the previous policy targets (up to the year 2012) with systematic planning and implementation. In the second scenario, the projection was demonstrated under the condition that the policy targets are delay or unsuccessful. Lastly, the achievement scenario was also analyzed under the condition that all policy targets and new policies suggested by the authors are achieved. An energy accounting model named Long-range Energy Alternative Planning system or LEAP [1] is used to demonstrate an analysis of Thailand's energy situation and its forecasts from 2013 to 2035, based on 2012 database as the reference year. The analysis was accumulated from various types of fuel and energy supplies, incorporating the trend of energy development in Thailand based on information available from several reliable sources, including national and international research studies. In the REF scenario, the electricity consumption in all sectors expands largely, imported or purchased electricity from the neighboring countries will gradually increase. The transport and the industrial sectors remain to be most energy-intensive users. The energy efficiency improvement in the transport sector will reduce 34% in final energy demand between the Achievement Scenario and Undone Scenario. The national policy directs on three aspects; 1) demand side management, 2) transportation infrastructure, and 3) automotive technology and renewable energy. The results clearly indicate that the greenhouse gas emission can be reduced. Two most effective mitigation options are the demand side management and the transportation infrastructure development.

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Peer-review under responsibility of the scientific committee of the 2017 International Conference on Alternative Energy in Developing Countries and Emerging Economies.

*Keywords:* Energy outlook; Energy policy; Transportation restructuring; Energy efficiency; Energy-related greenhouse gases; Scenario analysis

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### 1. Introduction

This paper consists of an analysis of Thailand’s current (year 2012) energy situation and its forecasts (year 2013 to 2035). The analysis was accumulated from various types of fuel and energy supplies, such as power, petroleum, coal and renewable energy, incorporating the trend of energy development in Thailand. The outlook was constructed in 2013, based on 2012 database, as the reference year. The energy position targets and the energy development plans for different sectors proposed in this study, thus, were also derived on the same basis. In this research, three main energy scenarios are the core of discussion; the reference scenario (REF), the undone scenario, and the achievement scenario. The REF scenario was developed based on the previous policy targets with systematic planning and implementation. In the second scenario, the projection was demonstrated under the condition that the policy targets are delay or unsuccessful. Lastly, the achievement scenario was also analyzed under the condition that all policy targets and new policies suggested by the authors are achieved.

### 2. Thailand energy outlook

Thailand energy outlook is a forecast of Thailand’s energy situation based on the directions of the current (year 2012) national economic and social development plans. In this section, the situation of Thailand’s energy supply and demand is projected to the year 2035, building a picture of the country’s “Energy Scenario”. Major assumptions that are incorporated into the scenario analysis are 1) GDP at 4% per year mainly driven by industrial and commercial sectors, 2) oil price stable at 125 USD per barrel in 2035, 3) the population size would reach a level of 67 million people in 2035, 4) completion of the mass transit systems; Bangkok Metropolitan area, double-track railways, and the nation-wide Mass Rapid Transit system by 2035, 5) national energy efficiency and renewable energy targets achieved, 6) commercial operation of the new and replacing utilities as provided by PDP rev.3, and 6) Oil and gas reserve to reach the 2P level.

#### 2.1. Primary energy demand and Final energy demand

An increasing trend of the total primary energy demand for all fuels that lasts into the year 2035 is shown in Fig. 1a. The oil and gas remain to be the main sources of energy. It can be observed that a small growth in the oil demand is realized, similar to the gas demand (Fig. 1b). The transport and the industrial sectors remain to be most energy-intensive users (Fig. 2). The main fuels used in these sectors are petroleum products, significantly with growing shares of biofuels and natural gas. In the industrial sector, all fuels are predicted to grow dramatically in demand. However, the rate of growth of the oil products is not as significant. This is because the fuel switching measure is predicted to be implemented, as a countermeasure to mitigate the impacts of the oil price fluctuation. The demand growth in the residential sector is also a minimum, following the declining rate of population and household size growth. The traditional fuels, such as charcoal and wood, continue to be replaced with LPG and electricity. In the agricultural sector, the majority of consumption is derived from diesel fuel for agricultural machinery.

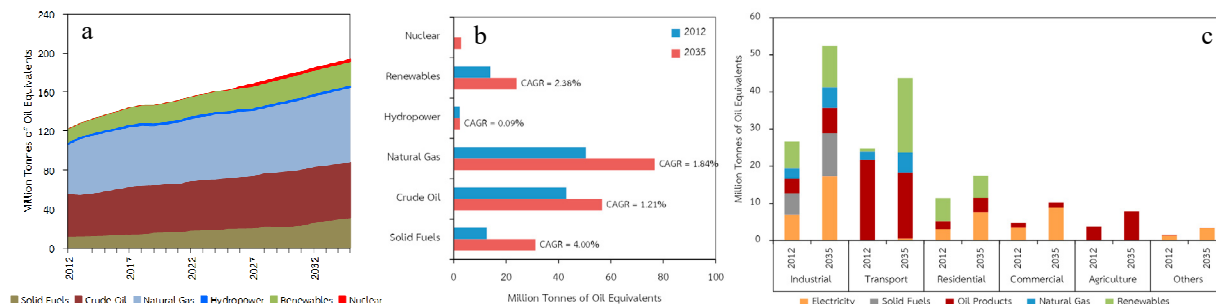


Fig. 1. Reference Scenario’s (a) primary energy demand forecast; (b) primary energy demand classified by types of fuel; (c) final energy consumption classified by sectors.

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