

IEA-Advanced Motor Fuels ANNUAL REPORT 2016

An aerial photograph of a city, likely Bangkok, Thailand, showing a dense urban area with many buildings, a river, and a large green forested area in the foreground. A highway with several lanes and billboards is visible in the lower part of the image.

Thailand

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Drivers and Policies

On the basis of worldwide climate change, international policies have established a framework for stabilizing atmospheric concentrations of greenhouse gas (GHGs) to avoid dangerous anthropogenic interference with the climate system. In 2015, the 2015 Paris Climate Change Conference (COP21) aimed to achieve universal agreement on the climate by keeping global warming below 2°C. Thailand, as a member of COP, volunteered to reduce GHGs by 20 to 25% in 2030, as well as reduce the country's high dependency on foreign energy, which puts its energy security at risk.

In 2016 (January through October), final energy consumption was 65,822 ktoe, an increase of 0.6% from 2015 [1]. The total value of final energy consumption was 680,676 million baht (19,228 million \$US). Moreover, Thailand's energy demand has been forecast on the assumption that the gross domestic product (GDP) will increase approximately 3.94% per year, on the basis of population growth rate, and on a model developed using statistical data dating back to 1994 to 2013. In order to respond to a growing economy, increased population, urbanization, and increased public awareness of fuel usage, as well as the need to reduce pollution, the Ministry of Energy established the Thailand Integrated Energy Blue Print 2015–2036. The plan consists of five integration master plans and focuses on security, economy, and ecology:

1. Thailand Power Development Plan (PDP 2015),
2. Energy Efficiency Plan (EEP 2015),
2. Alternative Energy Development Plan (AEDP 2015),
3. Natural Gas Supply Plan (Gas Plan 2015), and
4. Oil Supply Management Plan (Oil Plan 2015).

The goal of EEP 2015 is to reduce energy intensity by 30% in 2036, which aligns with the goals of the other four major energy plans issued by the Ministry of Energy. The main measures promoted in EEP 2015 will be applied to the transportation sector, with the target of decreasing the sector's energy consumption by approximately 30,213 ktoe of the predicted total energy consumption (56,142 ktoe) using 12 measures. These measures are laid out in EEP 2015 and include regulation of fuel prices to reflect actual cost, the introduction of electric vehicles, and the development of mass transportation infrastructure [1]. To strengthen the energy security of Thailand, the energy demand outlook in all national energy plans contributes to the AEDP 2015 goal of ramping up the ratio of renewable energy usage to 30% of final energy consumption in 2036 [2].

Advanced Motor Fuels Statistics

The final energy consumption by economic sector covers energy demand in the agriculture, commercial, residential, industrial, and transportation sectors. In 2016, transportation had the greatest portion of total energy consumption at 37.6%, followed by industrial at 36.4%, residential at 14.2%, commercial at 7.9%, and agricultural at 3.9% [3] (Figure 1).

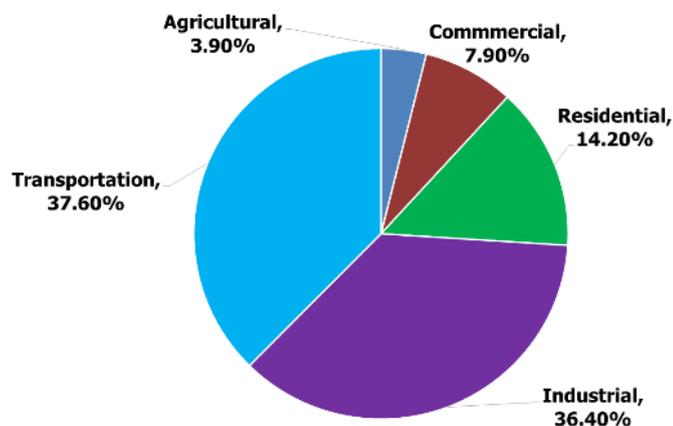


Fig. 1 Final Energy Consumption in Thailand by Economic Sector, January through October 2016

The Thai Government has officially promoted and implemented policies for the use of alternative energy. Therefore, the use of alternative energy, mainly biofuels in the transportation sector, has been significantly increasing. At the time this report was prepared (January–October 2016), biodiesel consumption was up to 3.49 ML/day, and ethanol consumption was up to 3.36 ML/day [3]. Moreover, alternative fuel consumption shared 13.97% of final energy consumption, an increase of 11.7% from 2015.

By the end of December 2016, there were 37,338,139 vehicles in Thailand. Of this number, 607,116 were newly registered. Gasoline vehicles accounted for 25,520,553 units, corresponding to 68.35% of the total. Diesel vehicles accounted for 9,887,129 units or 26.48% of the total, and bi-fuel vehicles (gasoline or diesel with liquid petroleum gas [LPG]) accounted for 1,174,646 units or 3.15% of the total. Table 1 shows the total number of vehicles in Thailand, by fuel, as of December 2016 [4]. Since the Thai Government has implemented policies to promote the use of alternative fuels, the consumption of ethanol blended fuel (E10, E20, and E85) accounts for 32% of total energy consumption for land transportation. Figure 2 presents the energy consumption for the land transportation sector in Thailand by the end of November 2016 [5].

Table 1 Number of Vehicles, by Fuel, in Thailand, as of December 31, 2016 [4]

Fuel Type	Units	Percentage of Total
Gasoline	25,520,553	68.35
Diesel	9,887,129	26.48
Bi-fuel (gasoline or diesel with LPG)	1,174,646	3.15
Bi-fuel (gasoline or diesel with compressed natural gas [CNG])	341,270	0.91
Hybrid	79,711	0.21
Mono-fuel CNG	63,225	0.17
Mono-fuel LPG	22,882	0.06
Electric	1,488	0.00
Non-fuel and others	247,235	0.66
Total	37,338,139	100.00

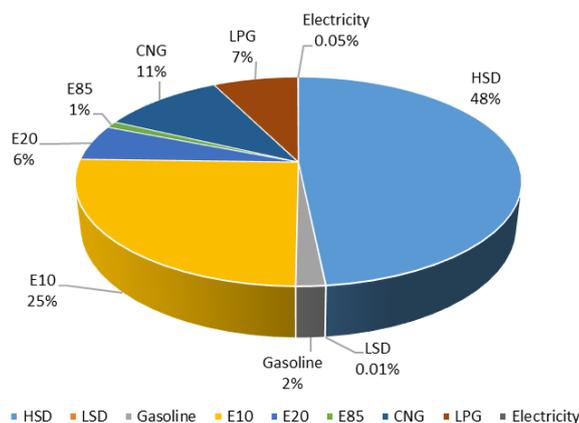


Fig. 2 Energy Consumption in Thailand for Land Transportation, January–November 2016 [5]

Research and Demonstration Focus

Thailand has policies in place to support the development of domestic renewable energy technology and to carry out research and development to promote the country's competitiveness in the international market. The Thai Government is encouraging research in the development of renewable energy in the following areas in 2015–2016:

1. Biodiesel
 - a. Research is focusing on boosting the biodiesel content in the transportation sector to comply with EEDP 2015 and AEDP 2015 [6].

2. Ethanol
 - a. Research is focusing on reducing the cost of ethanol production in the commercial scale [6].
 - b. Research is focusing on the use of gasohol E85 in small agricultural engines and motorcycles [7].

Outlook

Biofuel development in Thailand has followed the Government's initiative since a decade ago, when a policy for the country's energy security and renewable energy was established with a special focus on replacing diesel and gasoline with domestic production of biofuel. The development of renewable energy is a part of the overall policy framework, which drives the AEDP 2015. Within the AEDP 2015, the Ministry of Energy presents strategies to advocate for renewable energy development in electricity production, heat production, and biofuels in the transportation sector. Under Thailand's energy outlook, in Oil Plan 2015, fuel demand in the transportation sector is projected to be approximately 34,798 ktoe, thus meeting the AEDP 2015 goal of increasing the ratio of renewable energy. The target in the promotion of biofuel production takes into account the energy demand in the transportation sector and biofuel production capacity, as shown in Table 2.

Table 2 Status and Target of Fuel Production from Renewable Energy in the Transportation Sector in Thailand

Energy Type	2016 ^b	2036	
	ML/day	ML/day	ktoe
Biodiesel	3.49	14.00	4,404.82
Ethanol	3.63	11.30	2,103.50
Pyrolysis oil	–	0.53	170.87
Compress bio-methane (ton/day)	–	4,800.00	2,023.24
Other alternative energy ^a	–		10.00
Total	6.10		8,712.43

^a For example, bio oil, hydrogen.

^b Average data from Jan–Oct 2016.

Additional Information Sources

- [1] Ministry of Energy, 2016a, Energy Efficiency Plan 2015, Energy Policy and Planning Office, <http://www.eppo.go.th/index.php/th/plan-policy/tieb/eep> (in Thai)
- [2] Ministry of Energy, 2016b, Alternative Energy Development Plan 2015, Energy Policy and Planning Office, <http://www.eppo.go.th/index.php/th/plan-policy/tieb/aedp> (in Thai)
- [3] Ministry of Energy, 2016c, Energy Situation (January–October 2016), Department of Alternative Energy Development and Efficiency, http://www.dede.go.th/ewt_news.php?nid=44451 (in Thai)
- [4] Ministry of Energy, 2016d, Number of vehicles registered by fuel as of December 31, 2016, Transport Statistics Subdivision, Planning Division, Department of Land Transport
- [5] Department of Alternative Energy Development and Efficiency, 2016, Thailand Energy Commodity Account January–November 2016, http://www.dede.go.th/ewt_news.php?nid=42079 (in Thai)
- [6] Ministry of Energy, 2016e, Biodiesel, Department of Alternative Energy Development and Efficiency, http://www.dede.go.th/more_news.php?cid=402&filename=index (in Thai)
- [7] Ministry of Energy, 2016f, Gasohol, Department of Alternative Energy Development and Efficiency, http://www.dede.go.th/more_news.php?cid=84&filename=index (in Thai)

Benefits of Participation in the AMF TCP

Thailand is pleased to be a participant in the AMF TCP and to be part of the global effort to solve the grave issue of climate change. The AMF TCP provides a database of knowledge that enables participating countries to learn from one another.