

Phillip Riley Research Series

---

# The Future Is Renewable: Targets and Policies By Country

---

Thailand | April 2017



PHILLIP RILEY

# Introduction

---

This Phillip Riley research series is an investigation into the renewable energy policies of Australia, the United States and various Asia Pacific nations. The reports look into the countries' renewable energy potential, climate change targets and the success of their policy to date. Each report focuses on the current and future use of renewable energy and takes into account the political, geographical and economic challenges unique to each nation.

Phillip Riley is a specialist recruitment and consulting practice focusing on the Renewable Energy & Energy Efficiency sectors. We attract and retain talent across a broad range of job disciplines including **Pre-Construction** (Sales, Project Development, Corporate Finance), **Construction** (Construction, Commissioning, Consulting), Operations (O&M, Energy Information Systems) and **Retail** (Commercial and Industrial Solar, Energy Efficiency).

Our clients span the breadth of the Renewable Energy generation (Wind, Hydro, Solar PV, Solar Thermal, Bioenergy, Wave, Tidal) types, and includes supporting companies such as Original Equipment Manufacturers (OEMs), Engineer Procure Construction (EPCs), Transportation & Logistics, Project Development, & Consulting Firms. In addition, we are a recruitment partner to Transmission, Distribution & Energy Retail companies, and have demonstrable track record across the Private, Public & Not-For-Profit Sectors.

To view and download all reports of this Research Series, please visit the Research section of our website at <http://phillipriley.com.au/featured/research/>.

---

# The Future Is Renewable: Targets and Policies By Country

---

Thailand | April 2017

**Author:**

Sophie Matera

# Targets and Policies By Country: Thailand

---

Thailand's approach to increasing the proportion of renewable energy within their energy mix has been slow and gradual. However, a transformation within the Thai energy sector is expected to change this. Thailand currently has a short-term target, which aims to increase renewable energy to 20.3% by 2022<sup>1</sup>. As of 2015, the majority of the energy produced within the country was natural gas (64%), followed by coal (20%) and renewable energy (8%)<sup>2</sup>. Thailand's rapid growth coupled with a depletion in their supplies of natural gas has meant that a diversification of the Thai energy sector must inevitably occur. This transformation will allow for the production of a stable and diverse supply of energy, and an expansion of Thailand's renewable energy sector. In order to help achieve this expansion and diversification of the energy sector, the Thailand Integrated Energy Blueprint was released in 2015. Included within this was the country's long-term renewable energy targets. Thailand's 2036 target aims to increase renewable energy to 30% of their energy mix<sup>3</sup>. Despite the current low consumption of renewable energy technologies within Thailand, this 2036 target is very ambitious when compared to similar countries within the region. Hopefully, through a diversification of their energy sector, Thailand is able to continue to increase their renewable energy supply.

Despite the majority of Thailand's energy generation coming from natural gas, the country consumes mainly petroleum products (54%)<sup>4</sup>. This is likely due to the large amounts of petroleum imported into the country, coupled with a recent reduction in its price. Despite generating enough energy to be self-sufficient, Thailand is reliant on imports and exports, with large amounts of natural gas being imported from Myanmar.

<sup>1</sup> <https://www.iea.org/policiesandmeasures/pams/thailand/>

<sup>2</sup> Energy Policy and Planning Office: Ministry of Energy, Energy Statistics of Thailand, 2015, <http://www.eppo.go.th/info/cd-2015/index.html>

<sup>3</sup> Ministry of Energy, Alternative Energy Development Plan, 2015, <http://www.eppo.go.th/images/POLICY/ENG/AEDP2015ENG.pdf>

<sup>4</sup> Energy Policy and Planning Office: Ministry of Energy, Thailand Energy Report, 2015, <http://www.eppo.go.th/index.php/en/energy-information-services/report-2015>

Thailand likely relies on imports and exports as a result of their highly dependent energy mix and depleting supplies. This lack of diversity within their energy system and depleting supply of fossil fuels reserves will present Thailand with some future challenges regarding the security and sustainability of their energy system. In an attempt to minimise these problems before they arise, the Thai Government has developed a number of plans in order to diversify their power sector. This includes aims to increase the proportion of renewable energy within their energy mix.

Of the renewable energy technologies that have currently been implemented, biomass (55%) contributes the largest share followed by solar photovoltaic (29%)<sup>5</sup>. The reason behind the large implementation of biomass, compared to other renewable energy techniques, is largely due to agriculture being a key industry of Thailand. The majority of the sources of biomass include the lees of sugarcane, rice chaff and empty fruit branches of palm. Despite having vast resources of biomass, this renewable energy source is not utilised to its fullest potential. This may explain why the International Energy Agency ranks Thailand as one of the highest producers of renewable energy whilst simultaneously being one of the lowest consumers, ranking 12th and 98th out of 141 countries, respectively<sup>6</sup>. In an attempt to effectively increase the amount of biomass consumed, the Thai Government discusses the expansion of this fuel type in the Renewable Energy Development Plan<sup>1</sup>.

Solar photovoltaic also plays a major role in Thailand's renewable energy sector. Currently, of the solar systems that have been installed, almost 99% of them are large-scale (>1MW) ground mounted systems - such as solar farms. The remaining 1% of solar development in Thailand has been installed on commercial rooftops<sup>7</sup>. The lack of

<sup>5</sup> <http://www.sunwindenergy.com/review/understanding-thai-renewable-energy-market>

<sup>6</sup> <http://energyatlas.iea.org/#!/profile/WORLD/THA>

<sup>7</sup> [http://thaisolarpvroadmap.org/wordpress/?page\\_id=1189](http://thaisolarpvroadmap.org/wordpress/?page_id=1189)

installed devices on residential rooftops was the basis for the development of the Thai Solar PV Roadmap<sup>8</sup>. This initiative aims to scale-up installed solar photovoltaic within the country, with a particular focus on rooftop solar power. The roadmap also looks to increase rooftop solar through a feed-in-tariff (FiT) system<sup>9</sup>. Through offering long-term contracts and awarding a lower price per-kWh for small-scale photovoltaic systems, amongst other renewable energy technologies, the FiT program has increased the installation and capacity of solar photovoltaic systems within Thailand. The annual installation of solar photovoltaic has increased greatly under this scheme and the roadmap, with major growth occurring in 2014 and 2015. This rapid installation resulted in Thailand having more solar power capacity than compared to the rest of Southeast Asia combined in 2015<sup>10</sup>. Thailand's 2036 renewable energy target consists of sub-targets for each energy type. Currently, Thailand aims to increase installed solar power to 6,000 MW by 2036<sup>3</sup>. As of 2015, Thailand had a total of 1330 MW installed capacity<sup>2</sup>. Hopefully, through continued growth of this sector, Thailand is able to successfully achieve their long-term target.

In 2015, The Thai Ministry of Energy released the Thailand Integrated Energy Blueprint (TIEB). The blueprint incorporates and adapts all of Thailand's pre-existing energy plans into a master plan. This blueprint is the first of its kind that has been developed in the Thai energy sector. The main focus areas of the TIEB include energy security – which ensures energy supply meets the changing demand, economy – making sure energy costs are reasonable, and ecology - which looks into increasing domestic renewable energy production. The TIEB consists of the Thailand Power Development Plan (2015-2036), The Alternative Energy Development Plan (2015), the Thailand 20-Year Energy Efficiency Development Plan (2011-2030), amongst others.

<sup>8</sup> <http://thaisolarpvroadmap.org/>

<sup>9</sup> <https://www.iea.org/policiesandmeasures/pams/thailand/>

<sup>10</sup> [http://www.iea-pvps.org/index.php?id=6&elD=dam\\_frontend\\_push&docID=3195](http://www.iea-pvps.org/index.php?id=6&elD=dam_frontend_push&docID=3195)

The Thailand Power Development Plan 2015-2036<sup>11</sup> (PDP) was implemented in 2015 to respond to changes in economics and infrastructure within Thailand. The main aim of the PDP is to improve the power system reliability through a diversification of the sector. The plan aims to achieve this through reducing Thailand's dependence on natural gas generation, increasing generation of coal via clean coal technology, importing power from neighboring countries and developing/increasing renewable energy technologies. The PDP outlines the estimated percentage requirement each fuel type will contribute to the Thai energy mix in 2036. Renewable energy (excluding imports) is expected to account for 15-20% in 2036, up from 8% in 2014. Natural gas is expected to decrease from 64% in 2014 to 30-40% in 2036.

It is stated in the PDP that Thailand is looking to increase their percentage of coal, which is not in line with their 2036 renewable energy target. The Ministry of Energy justifies this increase by stating that in 2036 coal will account for no more than 25%, which is only a 5% increase from 2014 levels. The PDP also outlines the development of three coal-fired power plants, with the Thepa plant implementing clean coal technology. Clean coal is put forward as a cost effective, alternative to natural gas, which currently dominates energy generation.

The PDP also outlines projects involving importing energy from neighbouring countries. The majority of the projects will generate hydropower and take place in Laos. The PDP does not discuss specific techniques to increase domestic renewable energy generation, but rather discusses the country's long-term renewable contract capacity. Thailand will focus on increasing solar power and biomass capacity by 4,400 MW and 3486.5 MW respectively. The PDP also discusses Thailand's Energy Policies, which are detailed in the Alternative Energy Development Plan and the Energy Efficiency Development Plan (both of which fall under the TIEB).

<sup>11</sup> Ministry of Energy, Thailand Power Development Plan 2015-2036, 2015, [http://www.eppo.go.th/images/POLICY/ENG/PDP2015\\_Eng.pdf](http://www.eppo.go.th/images/POLICY/ENG/PDP2015_Eng.pdf)

The Alternative Energy Development Plan 2015-2036<sup>12</sup> (AEDP) outlines the Thai 2036 targets, sub-targets and specific tactics to promote the development of renewable energy. As previously stated, Thailand's 2036 renewable energy target is to increase renewable energy to 30%. Within this target is a number of sub-targets outlining the specific quantities (MW value) of each renewable energy type. A summary of the sub-targets for each electricity type can be found on page 15 of the document. The AEDP is separated into three sections all aimed at achieving the 2036 target.

The first section looks into types of alternative (renewable) energy that can be installed or expanded upon, including solar power, biomass and hydropower. A particular tactic to promote the use of hydropower is aimed at the local level, focusing on individuals and families that are not connected to the national power system. The initiative encourages community ownership of a hydropower project, whilst also managing and maintaining it by themselves.

The document then looks into new types of energy for power generation, including geothermal. The AEDP states that there are currently obstacles preventing the development of geothermal within Thailand. Namely, most domestic sources do not contain a high enough thermal value. As a result, Thailand needs to develop a specific plan involving utilising both internal and external technology in order to implement geothermal as a significant energy source for Thailand.

Finally, the AEDP looks into alternative energy in the transportation sector, focusing on fuel substitution. A tactic involves replacing gasoline with ethanol, which would result in the increased output of cassava and sugarcane and promotes the commercial use of other alternative crops. The AEDP outlines very specific targets and sub-targets for Thailand to achieve by 2036. The document also details numerous other specific

<sup>12</sup> Ministry of Energy, Alternative Energy Development Plan 2015-2036, 2015, <http://www.eppo.go.th/images/POLICY/ENG/AEDP2015ENG.pdf>

energy types and tactics to increase the installation and generation of these, in order to help achieve the 2036 target. The AEDP has only recently been implemented so it is difficult to determine its success to date. Hopefully, the specific nature of the renewable energy targets will allow for a diversification of the Thai energy sector to occur, resulting in an increased renewable energy consumption.

The Thailand 20-Year Energy Efficiency Development Plan 2011-2030<sup>13</sup> (EEDP) differs from the other plans previously mentioned under the TIEB, as it looks into energy efficiency rather than expansion of Thailand's energy sector. The EEDP outlines an energy intensity target which aims to reduce energy intensity by 25% in 2030 when compared to 2005 levels. This target has since been updated to a reduction of 30% by 2036 when compared to 2010 levels. It is noted that in the past 20 years, energy consumption in Thailand has increased at an average annual rate of 4.4%<sup>13</sup>. As a result, if no changes are made, then greenhouse gas emissions from the energy sector will increase accordingly. Therefore, the EEDP aims to achieve this energy intensity target through focusing on making changes to energy-intensive economic sectors, including the transport and industry sectors.

The plan states that an emphasis will be placed on measures that bring about market transformation and energy consumers' behavioural change. An example of this includes the regulation which enforces energy efficiency ratings/labeling on appliances, buildings and vehicles. This will allow for consumers to actively select more energy efficient products. Furthermore, the EEDP also takes a top-down approach through requiring large-scale energy businesses to implement energy conservation promotion measures. This is to ensure energy use is reduced to a specified minimum standard as outlined in the Energy Efficiency Resource Standards<sup>14</sup>. The EEDP also

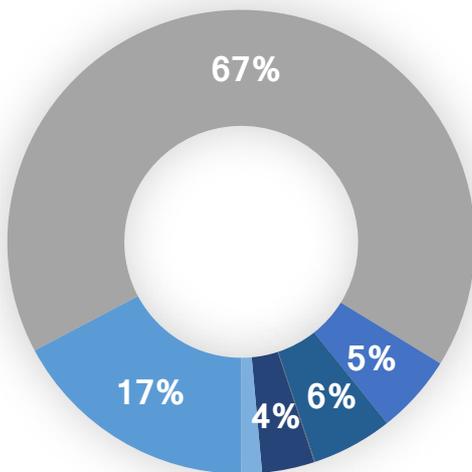
<sup>13</sup> Ministry of Energy, The Thailand 20-Year Energy Efficiency Development Plan 2011-2030, 2011, [http://www.eppo.go.th/images/POLICY/ENG/EEDP\\_Eng.pdf](http://www.eppo.go.th/images/POLICY/ENG/EEDP_Eng.pdf)

<sup>14</sup> [http://www.thai-german-cooperation.info/userfiles/4\\_EERS%20Thailand%20Design%20Options\\_khun%20Monthon.pdf](http://www.thai-german-cooperation.info/userfiles/4_EERS%20Thailand%20Design%20Options_khun%20Monthon.pdf)

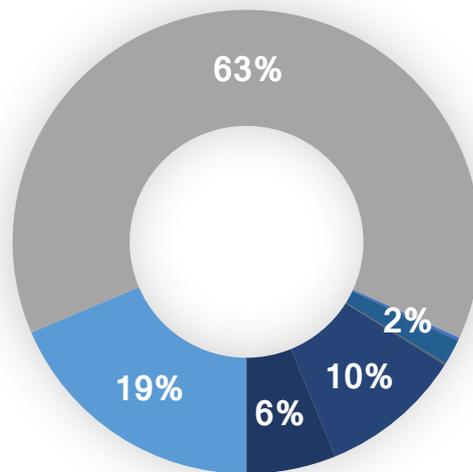
outlines a number of other strategies that have been implemented to bring about market change and increase the energy efficiency within Thailand. This, in turn, will help Thailand achieve their long-term goals and reduce their overall emissions.

Despite Thailand not having made much progress in the past towards implementing clean energy technologies, this is likely to change in the near future. Stemming from a growing population and a depletion in fossil fuel reserves, a transformation of the highly dominated Thai energy sector must take place in order for renewable energy technology to be implemented. The plans to help implement change in the Thai energy sector have only recently been developed. As a result, minimal changes in Thailand's energy mix have occurred. Despite this, the current 2036 renewable energy target is highly ambitious when compared to other similar countries. It will be interesting to see the transformation of Thailand's energy sector and whether they are able to achieve their highly specific long-term goals.

**Power Generation by Source, Thailand (2006)**

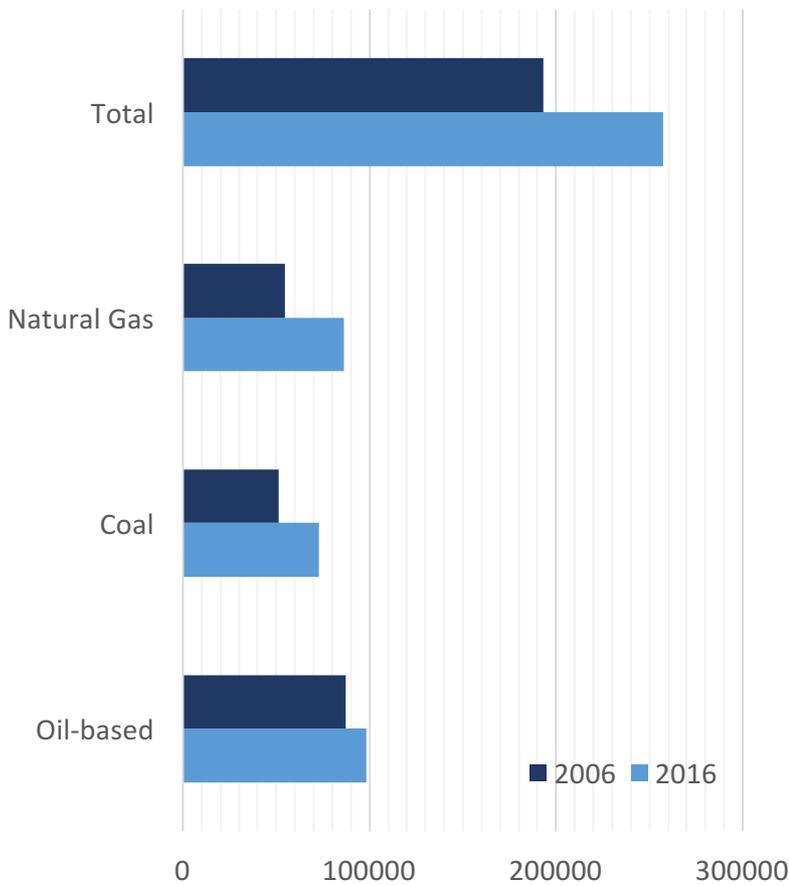


**Power Generation by Source, Thailand (2016)**



Resource: [http://www.eppo.go.th/index.php/en/en-energystatistics/electricity-statistic?orders\[publishUp\]=publishUp&isearch=1](http://www.eppo.go.th/index.php/en/en-energystatistics/electricity-statistic?orders[publishUp]=publishUp&isearch=1)

**CO<sub>2</sub> Emissions by Energy Type (1,000 Tons), Thailand**



Resource: [http://www.eppo.go.th/index.php/en/en-energystatistics/co2-statistic?orders\[publishUp\]=publishUp&isearch=1](http://www.eppo.go.th/index.php/en/en-energystatistics/co2-statistic?orders[publishUp]=publishUp&isearch=1)

**CO<sub>2</sub> Intensity of nations in the region**

CO <sub>2</sub> Emissions per capita (t CO <sub>2</sub> / population)*	
1. Australia	15.81
2. South Korea	11.26
3. Taiwan	10.68
4. Japan	9.35
5. Singapore	8.29
6. Malaysia	7.37
7. China	6.66
<b>8. Thailand</b>	<b>3.60</b>
9. Indonesia	1.72
10. Philippines	0.97

\*From fuel combustion only

resource:

<http://www.iea.org/statistics/statisticsearch/>

# Further Resources

---

Renew Economy, Thailand adding 1,000MW of solar with feed-in tariffs, 2013, <http://reneweconomy.com.au/thailand-adding-1000mw-of-solar-with-feed-in-tariffs-19250/>

UK Reuters, Thailand ignites solar power investment in Southeast Asia, 2015, <http://uk.reuters.com/article/thailand-solar-idUKL3N0ZM2JB20150712>

Ministry of Energy, Department of Alternative Energy Development and Efficiency, <http://weben.dede.go.th/webmax/content/10-year-alternative-energy-development-plan>

Ministry of Energy, Energy Policy and Planning Office, <http://www.eppo.go.th/index.php/en/>

Ministry of Energy, Energy Policy and Planning Office, National Energy Policy by Dr. Wannarat Channukul, Minister of Energy 12 Jan 2009, 2016, <http://www.eppo.go.th/index.php/en/component/k2/item/7537-en-wannarat>

Ministry of Energy, Energy Policy and Planning Office, Oil Plan, 2015, [http://www.eppo.go.th/images/POLICY/ENG/oil\\_plan2558.pdf](http://www.eppo.go.th/images/POLICY/ENG/oil_plan2558.pdf)

International Energy Agency, Policies and Measures: Thailand, <https://www.iea.org/policiesandmeasures/renewableenergy/?country=Thailand>

Ministry of Energy, Energy Policy and Planning Office, Renewable Energy Development in Thailand, 2015, <http://eepmekong.org/index.php/resources/reports-presentations/eep-mekong-stakeholders-meeting-documents/bangkok-thailand/143-renewable-energy-in-thailand/file>

Recycling and Renewable Energy in Thailand, <https://www.angloinfo.com/how-to/thailand/housing/setting-up-home/environmental-issues>

International Energy Agency, Thailand Electricity Security Assessment 2016, [https://www.iea.org/publications/freepublications/publication/Partner\\_Country\\_Series\\_Thailand\\_Electricity\\_Security\\_2016\\_.pdf](https://www.iea.org/publications/freepublications/publication/Partner_Country_Series_Thailand_Electricity_Security_2016_.pdf)

Ministry of Energy, Energy Policy and Planning Office, Energy Overview 2014, <http://www.eppo.go.th/info/cd-2015/pdf/info1.pdf>

Renewable Energy World, Thailand Announces \$11.3BN 10-year Plan to Build Sugarcane and Cassava Bioeconomy, 2017, <http://www.renewableenergyworld.com/articles/2017/01/thailand-announces-11-3bn-10-year-plan-to-build-sugarcane-and-cassava-bioeconomy.html>

Ministry of Energy, Energy Policy and Planning Office, Summary Statistics, [http://www.eppo.go.th/index.php/en/en-energystatistics/summary-statistic?orders\[publishUp\]=publishUp&issearch=1](http://www.eppo.go.th/index.php/en/en-energystatistics/summary-statistic?orders[publishUp]=publishUp&issearch=1)