



Thailand

Renewable Energy Policy Paper 1/2018



1. Thailand's main energy regulatory framework: Thailand Integrated Energy Blueprint (TIEB)

'**Thailand Integrated Energy Blueprint**' (TIEB) is the major framework that describes Thailand's energy plans. TIEB consists of five master plans as the pillars of long-term energy development; including

- Power Development Plan 2015-2036 ([EN](#) / [TH](#))
- Energy Efficiency Plan 2015-2036 ([TH](#))
- Alternative Energy Development Plan 2015-2036 ([EN](#) / [TH](#))
- Gas Plan 2015-2036 ([TH](#))
- Oil Plan 2015-2036 ([EN](#) / [TH](#))

The PDP 2015 and EEP 2015 were developed by the Energy Policy and Planning Office (EPPO), the AEDP 2015 by the Department of Alternative Energy Development and Energy Efficiency (DEDE). The overview of PDP 2015 and AEDP will be explained in the following sections. The PDP is currently under revision.

2. Thailand Power Development Plan (PDP)

The Power Development Plan (PDP) is at the core of Thailand's electricity policy. The PDP includes the projection of electrical demand, allocation of future generation capacity (conventional & renewable energy) and the development of the transmission grid.

NEW! PDP Revision

PDP 2015 estimated energy demands for 2015- 2036 at 49,655 MW and estimated production capacity at 70,335 MW. EPPO is currently revising the PDP and it is expected that the projection of electricity consumption will be lower than PDP 2015, the main reason being decreased GDP projections from 3.9% growth to 3.78% as well as a decrease in population growth.

New policies will also affect the consumption of electricity. Promoting use of electric vehicles, the development of Eastern Economic Corridor or EEC, and the development of the high-speed train will increase electricity consumption. Nevertheless, this is offset by slower GDP growth, and stagnation in population growth. Overall, the new load projection is tentatively lower compared to the load projection of PDP 2015. Increase adoption of solar rooftop as a result of lower costs, leading to greater private electricity production

is considered as major factor in the new load projection. It can be expected that there will be a dedicated scenario for rapid increase of solar PV rooftop in Thailand.

By the end of 2017 the Ministry of Energy (MoEN) expects to complete load forecast scenarios for Thailand which will set pathways for the development of the new PDP 2018. In the first trimester of 2018, MoEN will enlist all electricity plants in the new PDP 2018 in which it will then seek the opinion of the public on the new PDP before implementation in mid-2018. The new PDP will be the first time Thailand incorporates self-electricity generation (“captive power”) into the plan.

EPPO held a public forum on the 29th of November 2017 to gain insight on the public’s opinion on the load forecast, a vital component to the new PDP. Accurate load forecasting is increasingly considered crucial to allow for proper planning and investments in Thailand’s electricity production.

Thailand’s current electricity demand forecast is a result of considering 1.2 million EV cars being on the roads by 2036 leading to 2,466MW of electricity consumption, high speed electric trains contributing to 163 MW by 2036 and the Eastern Economic Corridor programme (ECC) contributing 404 MW of consumption and Thailand’s condition of reducing its total

EGAT, PEA and MEA will be the 3 responsible bodies for the forecasting of Thailand’s electricity demands, the results will be given to EPPO and the Committee on Energy Policy Administration (CPEA) for consideration.

PDP 2015

PDP 2015 was approved by the National Energy Policy Council (NEPC) on May 14th 2015 and passed on to the cabinet for official announcement on June 30 2015. The official PDP2015 document can be found at (EN / TH). The plan is set out until the year 2036 and is based on three principles:

- **Security:** the security of power supply, transmission system and distribution system in response to the demand of electricity to support economic and social development plan is a guiding principle. A greater variety of fuels shall be used to avoid relying too much on gas

- **Economy:** Adjusting the electricity price to reflect the cost of energy more appropriately and ensuring an efficient energy consumption is considered to slow down the construction of new power plants and to reduce energy imports and is thus followed as a rationale for the new PDP.
- **Ecology:** To reduce negative impacts on the environment and communities the new PDP aims to reduce carbon dioxide emissions per unit of electricity production by promoting electricity production from renewable energy and promote energy efficiency.

PDP 2015 projects an average electrical demand growth of 2.67% per year, resulting in an energy demand of 326,119 GWh and peak demand of 49,655 MW in 2036. The values are based on an average GDP growth rate of 3.94% per year, a slight decrease from a growth rate of 4.49% used in the former PDP. The projection also took into account the 30% energy intensity (EI) reduction target by the EEP2015.

As of December 2014, the installed capacity of all generation amounts to 37,612 MW. PDP 2015 aims to install an additional capacity of 57,459 MW throughout the plan, totalling the country’s electricity capacity at 70,335 MW in 2036 (after excluding power plants that will be decommissioned). It focuses mainly on the increase of so called “cleaner fuels” and the reduced reliance on natural gas. According to the plan, added capacities should mainly come from gas-fired power plants, renewable energy, imported hydro power and “clean coal”. By the end of the PDP 2015, the aim of policy makers is to cut natural gas to a share of 30-40% from the current 64%. The proportion of renewable energy will rise to 15-20% from 8% (as of 2015). The new plan foresees a rising share of coal and lignite, up from currently 20% to 20-25% in 2036. An unspecified amount of this capacity is supposed to be delivered as “clean coal” by carbon capture and storage technology (which is currently at 0%). Imported hydro power should deliver 15-20% and a share of 0-5% is supposed to come from nuclear power. All shares mentioned refer to total electricity production.

In addition, the transmission system is supposed to be extended and smart grid technologies should be implemented to support increasing shares of renewable energy. For this reason Thailand’s Smart Grid Development Master Plan 2015-2036 was announced in February 2015 (TH).

3. Alternative Energy Development Plan (AEDP)

Thailand’s Alternative Energy Development Plan (AEDP) is a policy framework for development of renewable energy in Thailand. The AEDP defined renewable energy targets within three energy segments: (1) electricity, (2) thermal energy, and (3) fuels for transportation. On the electricity part, the AEDP is well aligned with the PDP.

NEW! AEDP Adjustment

The AEDP 2015 is still an official plan at the time of this factsheet publication. However, the government is planning to develop a new AEDP to be consistent with the new PDP. Also, the prime Minister recently announced to raise the RE target to 40%. Higher RE target in the new AEDP can be expected.

AEDP 2015 - 2036

AEDP 2015 was approved by NEPC on September 17, 2015. Original document can be found here ([EN](#) / [TH](#)). To focus on the section of electricity generation, the plan targets an installed capacity of renewable energy at 19,635 MW in 2036, which would be a significant increase from 2014 installed capacity of ~4,495 MW. It has to be noted, however, that current installed large hydro capacity of 2,905 MW for some reason was not counted into the figure of 2014 total installed RE capacity, but it is included in the 2036 target number. The current capacity (as of 2016) and 2036 targets for each generation source are shown in [table 1](#). In terms of energy, the current electricity generation from renewable energy amounts to 17,217 GWh or 9.87% of the national electrical demand at 174,467 GWh. The target for 2036 is 20.11% of the national electrical demand, or 65,558 GWh out of the 326,116 GWh, to be produced by renewable energy.

Key summary of AEDP 2015-2036:

- Target 30% share of renewable energy
- Set timeline of the plan to match other energy plans (PDP, EE Plan, Oil plan, Gas plan)
- Set up merit order by RE source of generation
- Allocation of renewable energy generation capacity according to the demand and potential in regions/provinces (RE zoning)
- Competitive bidding will be employed as a selection process for FIT application instead of first-come first-serve
- Support net-metering to support self-consumption usage of RE

Table 1: AEDP Targets by RE Source of Generation

Type	Community waste	Industrial waste	Biomass	Biogas (waste/wastewater)	Biogas (Energy crops)	Wind	Solar	Mini hydro	Large hydro	Total (MW)
Current Capacity* (2016)	145	-	2,812	412	-	306	2,761**	182	2,906	9,424
Target (2036)	500	50	5,570	600	680	3,002	6,000	376	2,906.40***	19,684.40

* Figures are in including off grid power generation. Data as of October 2016, Source: DEDE, http://www.dede.go.th/ewf_news.php?nid=42079

** Data as of October 2016, source

*** This value is the installed capacity in 2014 and until then there will be no added capacity.

Source: <http://www.eppo.go.th/images/POLICY/ENG/AEDP2015ENG.pdf>

4. Renewable Energy Support Scheme

NEW! SPP Hybrid Scheme (2017)

The Small Power Producer (SPP) Hybrid Scheme was announced in June 2017. It is a new feed-in policy program which requires producers to combine different RE technology to achieve more consistent feed-in to the grid. Single firm PPA contracts are being awarded to power systems sized 10-90 MW. The total for the program is set at 300MW with a FiT rate of 3.66 baht/kWh. The goal is to have all systems CODed by 2021. A firm PPA contract means for the power plant to supply a defined amount of power during certain peak and off-peak hours.

- During peak hours (9:00 – 22:00 of Monday - Friday) – Generation capacity (MW) must be kept at 100% of total sale capacity
- During off-peak hours (22:00 – 9:00 of Monday – Friday; Saturday, Sunday, Public holiday) – Generation Capacity (MW) is limited at 65% of total sale capacity

The scheme could also use a competitive bidding process with the total quota of 300 MW. These power plants developed under this scheme are to be online (COD) between January 2020 and December 2021.

As of November 2017, the ERC received 42 applications for the SPP Hybrid Scheme which equivalent to 1062.2 MW installed capacity.

Thailand Feed-in Tariff

Thailand has feed-in tariffs in place for certain renewable energy technologies (see [Table 2](#)). However, this does not automatically imply that developers / investors can immediately receive the FiT. Usually, the government announces purchases of power from renewable energy resources with limited quotas for each opening round.

The first FIT bidding scheme was implemented in 2016 for biomass and biogas projects only, in parallel, feed-in tariffs were announced for Solar PV. The information here excludes solar, please refer to [GIZ's Solar Policy Update paper for more details on solar](#).

More background information on Thailand Feed-in tariff

On 22th October 2014, the NEPC acknowledged the principle for employing a new feed-in tariff (FIT) developed by Ministry of Energy which replaces the former adder program that has been in place for several years. The full policy for the FIT for Very Small Power Producer (VSPP) of less than 10 MW installed capacity was approved by NEPC on 15th December 2014 (find the original document [here](#)). Following NEPC's resolution, ERC announced the regulatory framework for purchasing power from VSPP RE projects in the governmental gazette on February 22, 2015 ([link](#) to original document).

The main changes from the adder scheme to the FIT scheme are 1) Tariff structure 2) Support duration 3) Selection by competitive bidding. The FIT tariff differs greatly depending on power plant capacities and fuel types and different bonuses are being granted for certain systems, shown in [table 2](#). The FIT rates favour smaller size systems (less than 1 MW) which is in line with the government direction to promote renewable energy uptake in communities. It also corresponds with the guidelines for AEDP (2015-2036), which would focus on waste-to-energy, biomass and biogas as a priority.

FIT Tariff Structure:

The new FIT is composed of three components:

$$\text{FIT} = \text{FIT (F)} + \text{FIT(V)} + \text{FIT Premium}$$

FIT(F), or FIT fixed, is a portion of the remuneration that is fixed throughout the whole support period.

FIT(V), or FIT variable, is a portion that varies according to the inflation rate. Variable portions are applicable only for certain technologies for which the feedstock price is considered to be volatile such as for biomass and biogas from energy crops as well as waste-to-energy projects (excluding landfill gas projects). The FIT(V) rates are predetermined for projects which dispatch electricity to the grid in 2017 (FIT(V2017), after that the FIT(V) will be updated on an annual basis in accordance with the core inflation to reflect actual feedstock costs.

FIT Premium, the last component is given for projects that match the criteria:

- For projects that use bioenergy fuel/feedstock will be granted an FIT Premium for the first 8 years of project lifetime
- For projects that are located in the three southern border provinces (Yala, Pattani, Narathiwat) and four districts of Songkla province (i.e. Chana, Thepa, Saba Yoi and Na Thawi) are also granted the FIT Premium for the whole duration of the project.

Support Duration:

The FIT will be granted for 20 years, with an exception of power systems fuelled by landfill gas which will receive support for only 10 years. The PPA with the utility is also 20 years.

Competitive Bidding:

The bidding process was introduced to better select projects. The selection of applications for projects changed from “first-come, first-serve” to a competitive bidding system. Meaning that the most cost-competitive offers will be selected until the quota is reached. Power producers have to hand in bids for FIT(F) component, the rates specified in [Table 2](#) are the ceiling price for the bids. The other 2 components, FIT (V) and FIT Premium, are not subject to bidding.

Table 2: Overview of current FIT

(1 € = 40 THB)	FiT(F) THB/kWh	FiT (V2017) THB/kWh	Total calculated FiT THB/kWh	Period of support Years	FiT Premium	
					For Bio-Energy (8 years) THB/kWh	Southern Provinces ² (project lifetime) THB/kWh
1. Industrial Waste						
Existing WTE plants ¹	2.39	2.69	5.08	20	0.70	0.50
New WTE plants	2.39	2.69	6.08	20	0.70	0.50
New WTE plants using plasma technology	2.39	2.69	6.08	20	1.70	0.50
2. Municipal Solid Waste, MSW (e.g. incineration, gasification)						
Capacity ≤ 1 MW	3.13	3.21	6.34	20	0.70	0.50
Capacity > 1-3MW	2.61	3.21	5.82	20	0.70	0.50
Capacity > 3 MW	2.39	2.69	5.08	20	0.70	0.50
3. Waste (landfill gas)						
	5.60	-	5.60	10	-	0.50
4. Biomass						
Capacity ≤ 1MW	3.13	2.21	5.34	20	0.50	0.50
Capacity > 1 to 3MW	2.61	2.21	4.82	20	0.40	0.50
Capacity > 3MW	2.39	1.85	4.24	20	0.30	0.50
5. Biogas (from wastewater / waste products)						
	3.76	-	3.76	20	0.50	0.50
6. Biogas (from energy crops)						
	2.79	2.55	5.34	20	0.50	0.50
7. Hydro power						
Capacity ≤ 200 kW	4.90	-	4.90	20	-	0.50
8. Wind power						
	6.06	-	6.06	20	-	0.50

¹ Waste-to-energy power plants that are operational before 16 February 2015

² Including the provinces of Yala, Pattani, Narathiwat and 4 districts in Songkla province (i.e. Chana, Thepa, Saba Yoi and Na Thawi)

Source: Derived from NEPC Resolution 15th December 2015 ([Link](#)) and NEPC Resolution 16th February 2016 ([Link](#))

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