Chapter 1

Status on Renewable Energy SPP and VSPP

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Chapter 1

Status on Renewable Energy SPP and VSPP in Southern Thailand

This chapter reviews the status of small power producers (SPPs) and very small power producers (VSPPs) of renewable energy (RE) in Thailand, including the recent policy and privileges for purchasing RE.

1. History of Thailand's SPP Scheme

The SPP scheme was established on 17 March 1992 through an endorsement by Thailand's cabinet. The scheme aims to promote power generation by using alternative fuel and waste, including cogeneration, to efficiently use domestic alternative resources and by-product energy. This concept also decreases the government's duty to invest in power infrastructure.

The National Energy Committee, on 26 December 2006, endorsed the Electricity Generating Authority of Thailand (EGAT) to purchase 3,200 MW to 4,000 MW of electricity generated from all kinds of fuel. After that, EGAT, the Provincial Electricity Authority and the Metropolitan Electricity Authority issued the small power purchasing announcement in 2007. Purchasing would cover existing capacity of 10 MW–90 MW, which is classified by (i) SPP cogeneration firm contract, (ii) SPP firm contract (RE), and (iii) SPP non-firm contract.

In 2017, the Ministry of Energy launched a new SPP scheme called the 'SPP Hybrid-firm.' This allowed power producers to use two kinds of alternative fuel or more to generate power and sell to EGAT in order to increase production of stable power from RE. Several criteria were set under this scheme:

1) It is available to new RE power plants with an existing capacity of 10 MW–50 MW.

2) Power plants must operate 100% during peak time, and 65% in off-peak time.

3) Fossil fuel utilisation is prohibited (except during system start-up).

4) Purchasing rate is feed-in tariff (FiT) bidding at 3.66 baht (B)/kWh.

2. History of the VSPP Scheme of Thailand

The VSPP scheme started on 14 May 2006 when the Thai cabinet agreed to regulate the VSPPs. Power producers can enter into power purchasing contracts with the Metropolitan Electricity Authority or the Provincial Electricity Authority (depending on the power plant's location). This scheme aims to promote the use of domestic resources, increase the stability of national transmission by distributing power generation, reduce the government budget for the construction

of new power plants, as well as contribute to the operation of conventional power plants during peak time.

At the beginning, the VSPP contract was available to power plants with an existing capacity of less than 1 MW. In 2007, the Energy Policy Administrative Committee endorsed to extend the maximum capacity of the VSPPs from 1 MW to 10 MW. Then, adder, or feed-in premium, was established by topping-up a special rate to the normal purchasing price (Table 1.1).

Table 1.1: Adder Rates for the VSPP

RE Sources	Adder Rate (B/kWh)	Subsidy Period (year)
Solar	8.00	10
Wind	2.50	10
Municipal solid waste	2.50	7
Small hydro (50–200 kW)	0.40	7
Small hydro (less than 50 kW)	0.80	7
Biomass	0.30	7
Biogas	0.30	7

B = baht, kWh = kilowatt-hour, RE = renewable energy, VSPP = very small power producer.
Note: Adder for solar decreased from B8.00/kWh to B6.50/kWh in 2010.
Source: Provincial Electricity Authority (PEA), Thailand Adder Rates as of 2013.

In June 2007, the National Energy Committee endorsed the premium adder rate to promote power plants in border southern provinces (Yala, Pattani, and Narathiwat) and four districts in Songkhla Province (Nathawee, Saba Yoi, Jana, and Thepha). Biomass, biogas, municipal waste, and small and micro hydropower earned more 1 baht (B)/kWh topping up from ordinary adder, whereas solar and wind obtained more B1.50/kWh rate to normal adder.

With the SPP hybrid-firm announcement, the VSPP semi-firm scheme was replaced to subsidise power producers that can generate more electricity during peak periods. This scheme was available to new RE power plants that use biomass, biogas from wastewater or energy crop, and municipal solid waste (also called trash or garbage, defined nationally as wastes consisting of everyday items, which generate 10 MW or lower). Power plants must be operating for 6 months under a firm contract (100% power operation in peak time, and lower than 65% during off-peak), which must cover the maximum power consumption period (March to June) and 6 months for non-firm condition. Like the SPP hybrid firm, fossil fuel can be used only during the start-up period, and an energy storage system can be applied.

3. Feed-in Tariff

Replacing adder, the FiT scheme for rooftop and ground-mounted solar photovoltaic power projects was introduced with a total capacity of 200 MW and 800 MW, respectively, and contract duration of 25 years. The target was to fulfil the allocated capacity cap by 2014. Then, for non-solar renewables, the Ministry of Energy launched the FiT scheme for the VSPPs with less than 10 MW installed capacity covering power from waste gasification, landfill gas, biomass, biogas, hydro, and wind in 2014.

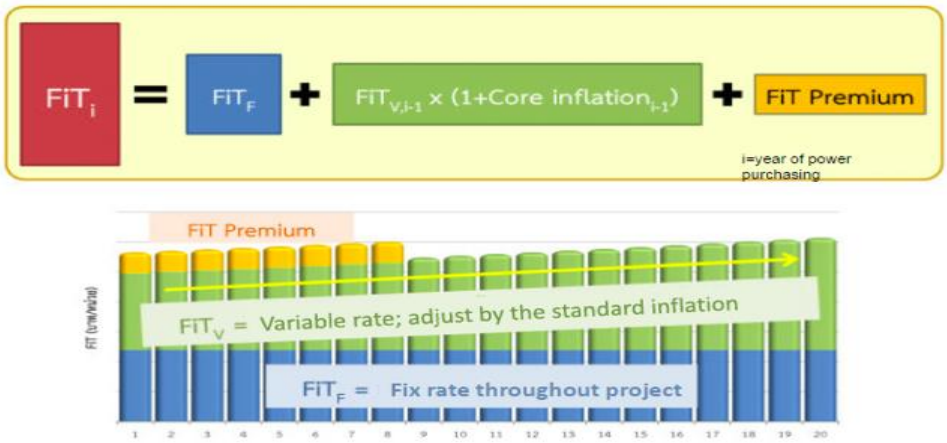
RE sources of power generation in Thailand are varied, such as hydropower, biomass, biogas, solar cell. These technologies must face the uncertain resource availability pattern and fluctuating fuel prices. Therefore, the FiTs for this group are formulated with three components, as follows:

1) a fixed-based tariff (FiT_F), which is calculated from capital, and operations and maintenance (O&M) costs of each renewable technology;

2) a variable-based tariff (FiT_V) for bioenergy (except landfill projects) calculated from the fuel cost and dependent on the inflation rate; and

3) an additional premium (FiT_P) for projects that use bioenergy (except landfill projects) for the first 8 years.

Figure 1.1: Structure of FiT for RE Technologies Using Bioenergy



FiT = feed-in tariff, RE = renewable energy.
Source: Energy Policy and Planning Office (EPPO), Ministry of Energy, as of 2015.

Table 1.2: FiT Rate for Electricity Generated from Bioenergy Sources

Capacity (MW)	FiT (B/kWh)			Support Duration (Years)	FiT Premium (B/kWh)	
	FiT_F	FiT_V	FiT*		Bioenergy projects (First 8 years)	Adder for Southern Provinces**
Bioenergy projects						
1. Waste-to-energy (integrated waste management)						
Installed capacity ≤ 1 MW	3.13	3.21	6.34	20	0.7	0.5
Installed capacity 1–3 MW	2.61	3.21	5.82	20	0.7	0.5
Installed capacity > 3 MW	2.39	2.69	5.08	20	0.7	0.5
2. Waste (landfill)	5.60	-	5.60	10	-	0.5
3. Biomass						
Installed capacity ≤ 1 MW	3.13	2.21	5.34	20	0.5	0.5
Installed capacity 1–3 MW	2.61	2.21	4.82	20	0.4	0.5
Installed capacity > 3 MW	2.39	1.85	4.24	20	0.3	0.5
4. Biogas (wastewater, manure)	3.76	-	3.76	20	0.5	0.5
5. Biogas (energy crop)	2.79	2.55	5.34	20	0.5	0.5
6. Hydro energy Installed capacity ≤ 200 MW	4.90	-	4.90	20	-	0.50
7. Wind energy	6.06	-	6.06	20	-	0.50

Notes: B/kWh = Thailand baht per kWh of electricity

FiT = feed-in tariff.

FiT_F = fixed-based tariff, calculated from initial investment of the power plant construction and the full lifetime of its operation and maintenance cost.

FiT_V = variable-based tariff, feed-in tariff variable, calculated from investment cost of raw materials used for power generation that changes according to time.

* = FiT = FiT_F + FiT_V. This FiT rate will only apply to projects that feed electricity into the system within the year 2017. After 2017, FiT_V rate will continuously increase according to the core inflation rate. This only applies to waste (integrated waste disposal), biomass, and biogas (energy crops) categories.

** = Projects in Yala, Pattani, Narathiwat and Chana, Thepha, Saba-Yoi, and Na-Thawi districts in Songkhla provinces.

Source: Energy Policy and Planning Office (EPPO), Ministry of Energy, as of 2015.

4. Status of the SPPs and the VSPPs in Southern Thailand

The Energy Regulatory Committee summarised the overall status of RE SPPs and VSPPs. In November 2018, 13 SPPs were using renewable sources with 347.90 MW in existing capacity, while the total purchasing capacity was 313.47 MW.

For the VSPPs, 122 plants were using RE, with total existing capacity of 534.20 MW and total purchasing electricity of 476.61 MW. Table 1.3 summarises the SPP and VSPP status.

Table 1.3: Status of Renewable SPPs and VSPPs in Southern Thailand

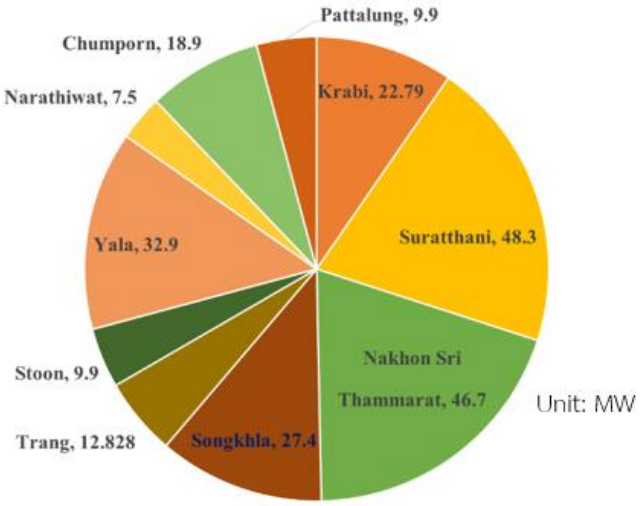
Type	SPP			VSPP		
	Amount of Plant	Existing (MW)	Purchasing (MW)	Amount of Plant	Existing (MW)	Purchasing (MW)
Accepted for purchasing (not yet PPA)	6	143	116.85	-	-	-
Already PPA (not COD yet)	2	46	41.62	25	134.33	129.80
Already COD	5	158.90	155	97	399.87	346.81
Total	13	347.90	313.47	122	534.20	476.61

COD = commercial operation date, PPA = power purchasing agreement, SPP = small power producer, VSPP = very small power producer.
Source: Energy Regulatory Commission (ERC), as of November 2018.

5. Biomass Power Plant in Southern Thailand

Southern Thailand is rich with biomass, such as rubberwood; entrepreneurs are thus attracted and interested to invest in biomass power plant projects in the area. Likewise, due to special privileges granted by the government in the southern provinces, both SPPs and VSPPs are mechanisms to encourage constructed and supplied electricity to the national transmission line.

Figure 1.2: Existing Capacity of COD Biomass Power Plant



Source: Energy Regulatory Commission (ERC).
http://www.erc.or.th/ERCSPP/default.aspx?x=0&muid=23&prid=41

In November 2018, biomass power plants had already sold 237.11 MW of electricity to the grid (COD). Suratthani and Nashon Sri Thammarat became the two power plants with the highest existing capacity (48.3 MW and 46.7 MW, respectively). These provinces have a large rubberwood plantation area. Also, Phuket, Pang Nga, Pattani, and Ranong do not have biomass power plants.