

Country Assessment Report

Country/Region Name- Kingdom of Thailand:

Thailand is situated in SEA; bordered by Myanmar, Laos, and Cambodia. It has a population over 69 million and GDP over \$504 billion, growing at a rate of around 4%.

(World Bank 2018)

Economic structure and activity:

Thailand has a mixed economic system, combining centralised economic planning and regulation with some private freedom. The service sector accounts for the lion share of the nation's GDP (56.91%), with significant growth in financial and tourism services in recent years. Industry contributes 34.97% to Thailand's GDP with expertise in electronics, steel, cement, and plastics. The country also specialises in automotive manufacturing and is widely recognised as an assembly hub for global car brands such as Toyota, Honda, BMW, GM, and Suzuki. The textile industry is another key sector but declining as manufacturing services diversify and become more sophisticated. Agriculture accounts for 8.17% of Thailand's GDP and is the largest producer of rubber in the world. It is also a major exporter of rice, sugar, corn, cotton, and tobacco. The fishing sector is an important agricultural activity, with Thailand being one of the world's largest exporters of farmed shrimp.

(Statista 2018; Santander 2020)

Top private companies with RE commitments:

SCG (chemicals)- all SCG cement plants were installed with a solar cell system, with a total production capacity of 51 MW, reducing GHG emissions by 41,000 tons carbon dioxide per year. SCG are also currently developing a "Floating Solar Farm" using special grade plastic pellets as floating buoys to be installed atop non-utilized water bodies.

Charoen Pokphand Foods Public Company Limited (CPF)- installing their "CPF Solar Rooftop" project with a total capacity of 40 MWs, making it the largest ever in Thailand. CPF have also pledged to go coal free by the 2022.

Thaibev (beverages) - have begun installing solar panels across the rooftops of 27 of its factories in Thailand. Its expected completion date is 2025, with a total installed capacity of 20 megawatts (MWp). Two additional biogas plants are also being constructed in Nakhon Sawan and Nong Khai provinces, to complement its existing portfolio five biogas plants in Prachin Buri, Khon Kaen, Ubon Ratchathani, Buriram, and Surat Thani provinces.

Import	5,720.60	12.38
Total Purchase	30,171.04	65.30
Grand Total	46,205.87	100.00

Figure 1. Total installed capacity by type and share of electricity contribution.

Thailand's electrification rate is 99% and demand is 29,619MW. Demand has been increasing at a compound annual growth rate (CAGR) of 3.5% in the past 10 years, in line with Thailand's economic growth (+3.2%) over the same period.

(DBS 2017)

Electrical Interconnection and import/export:

- 2 existing interconnectors Malaysia (Peninsula) 380MW

- Sadao - Bukit Keteri
- Khlong Ngae – Gurun
- Cambodia 100MW
- Lao PDR 2111MW

Planned interconnections:

- Myanmar 11700MW
- 2 Malaysia (Peninsula) 400MW
- Lao PDR 2900MW

Imports (12.2TWh) are mainly from Lao PDR

Exports (1.6TWh) to Lao PDR 66%, Malaysia 1%, Cambodia 33%

Market Structure:

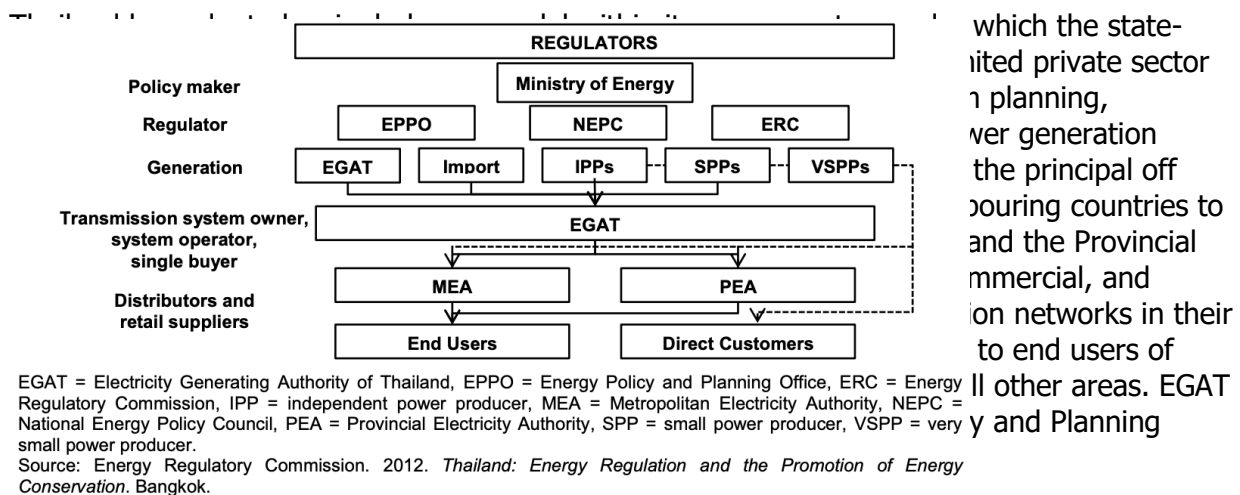


Figure 2. Thailand's power market structure (Energy Regulatory Commission 2012)

Responsible Government Department: (include key contacts)

Ministry of Energy (MoE) is responsible for oversight of the overall operation of the energy sector, including fossil fuels, electric power, and rural energy supply, in addition to managing the Thailand Oil Fund. It is also mandated to propose energy policies and regulations, establish energy plans/strategies, and oversee their implementation. The MoE is supported by its four operational departments covering energy policy and planning, managing mineral fuels, supervising energy business operations, and promoting alternative and energy efficiency, respectively.

EPPO (Energy Policy and Planning Office) Ministry of Energy. EPPO is entrusted with the following six missions:

1. Recommend energy policies and integrate/review energy management plans of the country;
2. Recommend national strategies for energy conservation and alternative energy promotion;
3. Recommend measures to solve and prevent oil shortage in both short and long terms;
4. Supervise, monitor, and evaluate the effectiveness of national energy policy and energy management plans;
5. Administer the information and communication technology (ICT) regarding energy issues of the country; and
6. Enhance EPPO to become a strategic organization.

NEPC (National Energy Policy Council) is responsible for recommending national energy policy and energy management and development plans to the government through the cabinet and to establish the tariff structure for energy sales in Thailand. The NEPC's secretariat, the Energy Policy, and Planning Office, is responsible for drafting all energy-related policies and proposing development plans to the NEPC.

Department of Alternative Energy Development and Efficiency (DEDE) promotes renewables and energy efficiency measures as an instrument to reduce or minimise the growth in energy demand. The Permanent Energy Secretary oversees the operation of this department, while the Director-General is the commanding officer for, and thus responsible for the performance of, the department.

ERC (Energy Regulatory Commission) regulates the sector and monitors the energy market conditions, reviews tariffs, issues licenses, approves power purchases, and reviews development planning and investment in the electricity industry.

Existing/Planned Energy Legislation: (is there a CPO)

Power Development Plan (PDP) for 2015-2036 details a 21-year investment strategy for the power sector, including the types of generation to be developed and a detailed schedule for development. The guiding principles of the PDP are:

- Security, which in this context means ensuring adequate supply and increasing the overall diversity of the generation fleet.
- Economy, which means ensuring that all relevant costs can be recovered via the tariff and that the development plan is affordable.
- Ecology, which means limiting the environmental impact of the generation fleet as a whole.

National Energy Policy Council Act, B.E. 2535/2550/2551 determined the mandates, powers, duties, operational mechanism, and institutional structure of, and under, the NEPC – the highest governmental entity in oversight of energy sector management reporting to the Cabinet in Thailand. It also defined the scope for energy, renewable energy, non-renewable energy, and fuel, to be used as reference in, for instance, the Energy Industry Act, B.E. 2550 (2007).

Energy Development and Promotion Act, B.E. 2535 (1992) replaced the National Energy Act B.E. 2496 (1953), as amended, while specifying the implications for the enforcement of other decrees, regulators or orders issued under the previous act. It changed the title of "National Energy Administration" to the "Department of Energy Development and Promotion" of the then Ministry of Science, Technology and Energy (the present Ministry of Science and Technology). It also defined the department's authorities, duties and operational mechanism and principles that should be followed.

Energy Industry Act, B.E. 2550 (2007) established a new regulatory framework, with independent performance of energy policy making, regulation, formulation, and implementation, for the electric power and natural gas sectors. Its key objectives were to encourage engagement of the private sector and the general public through active participation and increased competition, promote the efficient and environmentally responsible use of energy resources, and also promote the use of renewable energy sources. It established the Energy Regulatory Commission and defined its authorities and duties and the specifics of certain operations such as setting tariffs, energy network system supervision and power

development funding. It also provided comprehensive guidance for energy industry policy making and defined the powers of the Minister.

No CPO evident.

(IRENA 2017)

Environmental Legislation for RE:

None found.

Existing/Planned Certificate Systems: (purpose, extent)

None found.

Energy type	Reference (2015) *	Target in 2021	Target in 2036	Reference (2015)	Target in 2021	Target in 2036
Power	Final energy consumption (ktoe)	Capacity (MW)	No. of power plants	Capacity (MW)	Capacity (MW)	Capacity (MW)
Municipal waste	44	214	261	131	410	500
Industrial waste	-	26	26	-	50	50
Solid biomass	1 104	2 059	2 910	2 726	3 940	5 570
Biogas	92	234	313	372	448	600
Biogas (energy crop)	-	225	395	-	387	680
Small hydropower	24	79	115	172	259	376
Wind	28	64	403	233	475	3 002
Solar	202	358	716	1 419	2 993	6 000
Large hydropower	290****	446	446	2 906	2 906	2 906
Sub-total	1 786	3 706	5 588	7 962	11 871	19 684
Thermal	ktoe	ktoe	ktoe			
MSW	88	178	495	-	-	-
Biomass	5 990	8 649	22 100	-	-	-
Biogas	495	716	1 283	-	-	-
Solar	5	43	1 200	-	-	-
Other alternative energy**	-	0.35	10	-	-	-
Sub-total	6 578	9 586	25 088	-	-	-
Biofuel	ktoe	ktoe	ktoe	Million litres/day	Million litres/day	Million litres/day
Ethanol	879	892	2104	3.5	4.79	11
Biodiesel	1 063	1 126	4 405	3.4	3.58	14
Pyrolysis Oil	-	4	171	-	0.011	0.53
Compressed biogas (tonne/day)	-	33	2 023	-	78	4 800
Other alternative energy***	-	-	10	-	0.001	10
Sub-total	1 942	2 055	8 713	6.9	-	-

RE market potential:

Thailand is well endowed with RE potential, which could be converted into an installed capacity of 19,684 MW by 2036 (see table 1). Deployment of large hydro has been paused because of concerns over its environmental and social impacts. Average solar irradiation levels are 5kWh/m²/day, with most potential reported to be in the northeast and central parts of Thailand. Wind potential is also significant, with average wind speeds of up to 6 m/s at a height of 90. The most promising sites are situated in the northeast, west and south, which collectively could be converted into an installed capacity of 13 GW.

Table 1. Electricity generation targets by type (IRENA 2017).

Market risks and challenges:

None found.

Extent of Engagement with Government: (brief summary of any contact already made with the national government regarding certification in general and I-REC)

None

Expected response from Government:

Current Environmental Reporting in Energy:

Any other Relevant Information:

The Alternative Energy Development Plan (AEDP2015) sets out a target for renewables deployment that is among the most ambitious in Southeast Asia. Solar photovoltaics (PV) make up the largest portion of planned renewable generation (6,000 MW), followed closely by biomass (5,570 MW), and then onshore wind (3,000MW). This would more than triple, in absolute terms, the amount of renewable capacity in the Thai system by 2036.

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Code Manager Observation

There is no obvious impediment to I-REC being offered in Thailand. Government engagement would be very useful.

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