

# Country Update: Thailand

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# Outline

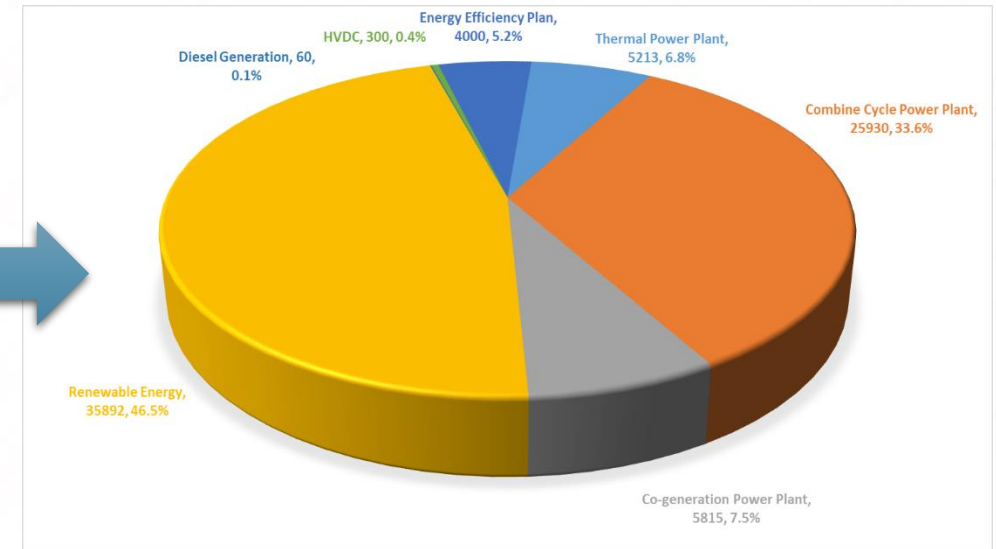
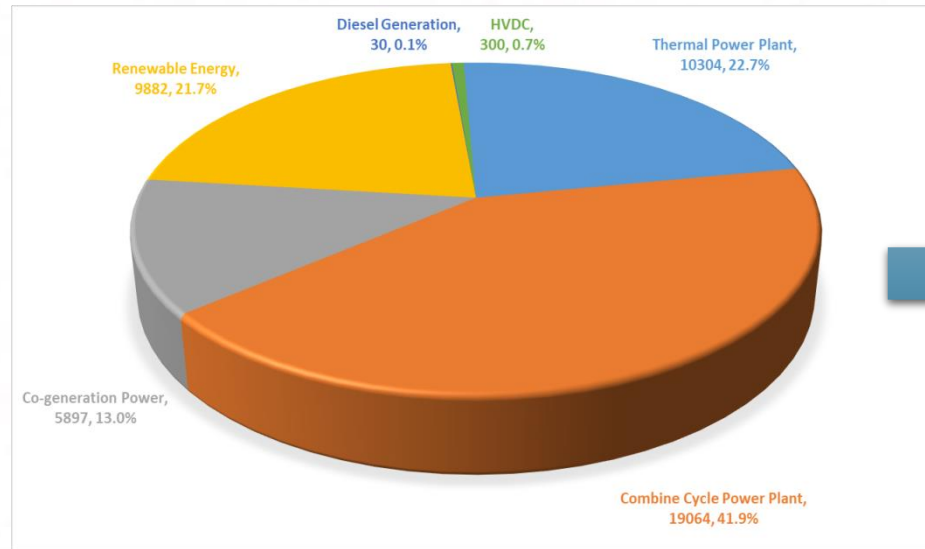
- ❖ Status of National Generation, Transmission and Distribution Master Plans
- ❖ Cross border cooperation (import and export)
- ❖ New development/initiative for renewable energy, energy efficiency and conservation, demand side management
- ❖ Latest policy initiatives being taken by the country





# **Status of National Generation, Transmission and Distribution Master Plans**

# Generation in Thailand



Now Thailand have total Contract Capacity of **45,477.87 MW**.

Oct, 2020

According to PDP 2018, In year 2037 the total Contract Capacity will be **77,210 MW**.

# Existing Transmission & Distribution System in Thailand

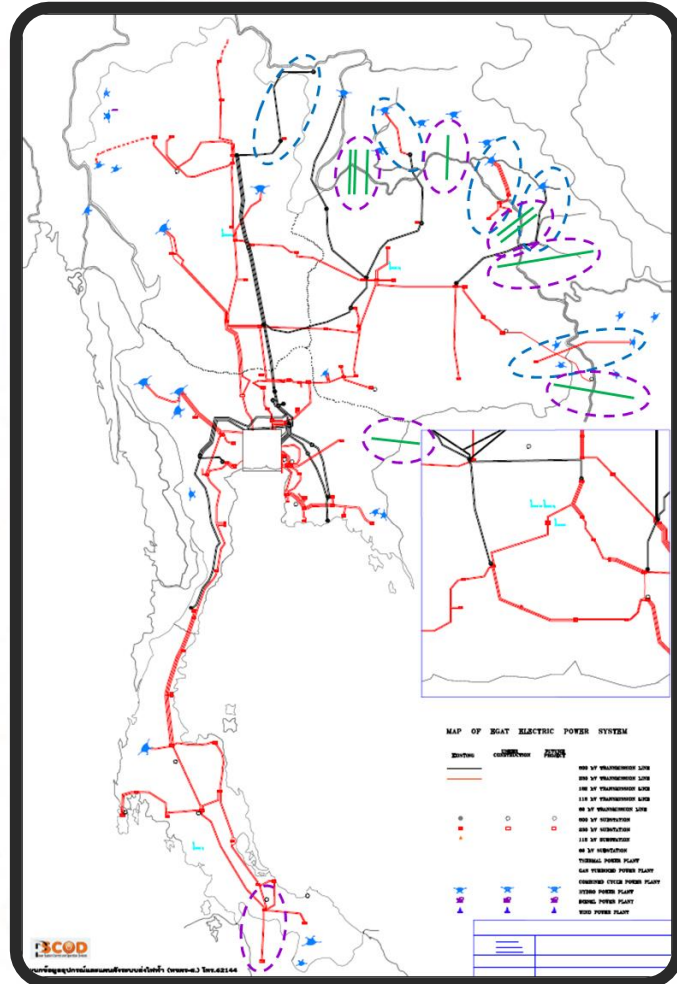
Substation, Transformer Rated & Transmission Line Length September 2020				
	Voltage Level	Substation		Transmission Line Length (Circuit-Kilometers)
		Number of Substation	Transformer Rated (MVA)	
Summation of Transmission System (EGAT)	500 kV	22	41,949.69	6,906.685
	230 kV	82	66,000.01	15,732.278
	115 kV	125	15,123.16	14,244.263
	132 kV	-	133.40	8.705
	69 kV	-	-	18.800
	300 kV HVDC	-	388.02	23.066
<b>Total</b>		<b>229</b>	<b>123,594.28</b>	<b>36,933.797</b>





# Cross border cooperation (import and export)

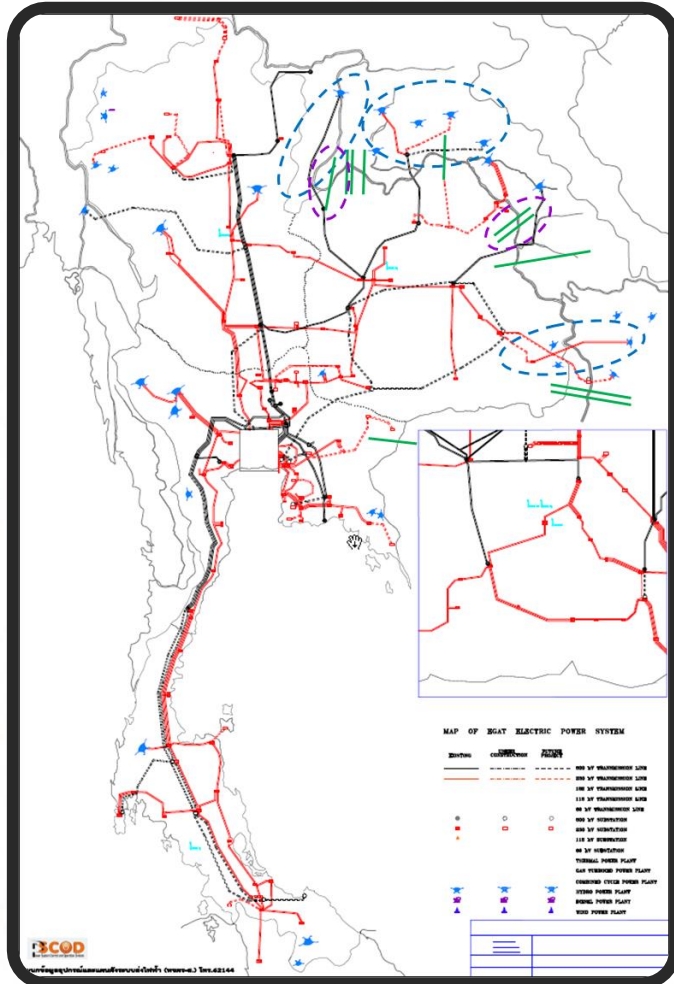
# Existing Foreign Generation & Interconnection



	FIPP	Contract Capacity (MW)	Interconnection	Circuits
FIPP	Theun-Hinboun	434	230 kV Nakhon Phanom 2 - Thakhek	2
	Houay Ho	126	230 kV Ubon Ratchathani 2 - Houay Ho	2
	Nam Theun 2	948	500 kV Roi Et 2 - Nam Theun 2	2
	Nam Ngum 2	596.6	500 kV Udon Thani 3 - Nabong	2
	Hongsa Power	1,473	500 kV Nan - Hongsa	2
	Nam Ngieb	261	500 kV Udon Thani3 – Nabong	2
	Xaiyaburi	1,285	500 kV Thali - Xaiyaburi	2
	Xe-Pain Xe-Namnoy	390	230 kV Ubon Ratchathani 3 - Xe-Pain Xe-Namnoy	2
Interconnection	EDL		115 kV Nong Khai - Thanaleng	1
	EDL		115 kV Nong Khai - Phone Tong	2
	EDL		115 kV Bung Kan - Pakxan	1
	EDL		115 kV Nakhon Phanom - Thakhek	2
	EDL		115 kV Mukdahan 2 - Pakbo	1
	EDL		115 kV Sirindhorn - Bangyo	1
	EDL		115 kV Thali - Paklai	1
	EDC		115 kV Wathana Nakhon – Siem Preap	1
	TNB	300	300 kV HVDC Khlong Ngae - Gugun	1



# Foreign Generation, Interconnection & Transmission Plan



	FIPP	Contract Capacity (MW)	Interconnection	Circuits	Complete
FIPP	Nam Theun1	523	500 kV Udon Thani 3 – Nabong (existing)	2	23 MAY 2022
	Nam Ngum3	440	500 kV Udon Thani 3 – Nabong (existing)	2	DEC 2026
Interconnection	EDL		115 kV Nakhon Phanom – Thakhek *	2	Waiting for Laos
	EDL		115 kV Sirindhorn 2 - Bangyo	2	DEC 2020

	Future 500 kV Transmission Line	Circuits	Complete
North-Eastern Area	500 kV Roi Et 2 - Ubon Ratchathani 3	1	DEC 2020
	500 kV Nakhon Ratchasima 3 - Ubon Ratchathani 3	2	SEP 2023
	500 kV Nakhon Ratchasima 3 - Chaiyaphum 2	2	SEP 2023
Metropolitan Area	500 kV Nakhon Ratchasima 3 - Khlong Mai	2	OCT 2023
	500 kV Tha Tako - Sam Khok	2	OCT 2022
Southern Area	500 kV Chom Bung - Bang Saphan 2	2	SEP 2021
	500 kV Bang Saphan 2 - Surat Thani 2	2	SEP 2021
	500 kV Surat Thani 2 - Puket 3	2	SEP 2021
	500 kV Surat Thani 2 - Thung Song	2	DEC 2022
	500 kV Thung Song - Hat Yai 3	2	DEC 2022



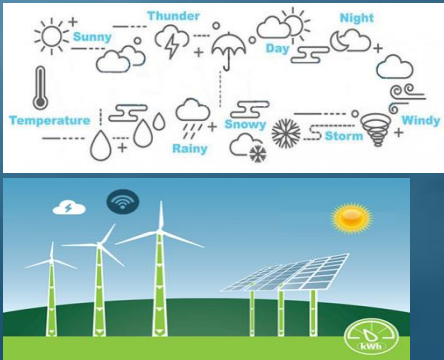


**New development/initiative for renewable energy,  
energy efficiency and conservation, demand side management**

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## RE Forecast Center

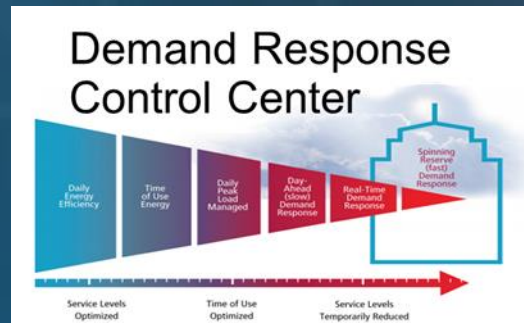
Forecast the electricity generated from RE for generation planning and power system control and operation by NCC



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## Demand Response Control Center

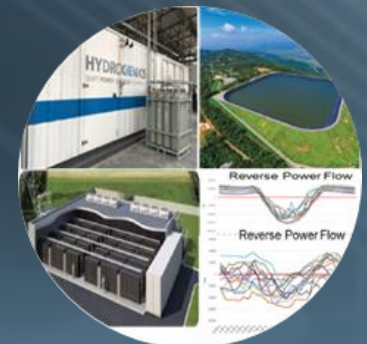
Demand side management as a tool for more system flexibility that is controllable by NCC



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## Energy Storage System

- Pump Storage
- Battery Energy Storage System
- Hydrogen Energy Storage





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- ✓ Be able to forecast generation output (wind and solar) for all SPPs (total 29 plants) before 2020
- ✓ Establish RE Forecast Center in 2021

➤ On going long-term projects:

- ✓ Attempt to forecast generation output (wind and solar) for VSPPs
- ✓ Large events forecast
- ✓ Continuously improve forecast accuracy by various methods



### ➤ 2020

- ✓ The use cases, protocol, data type, communication system, and specification have been established. Currently, procurement of hardware and software are being processing.

### ➤ 2021

- ✓ System installation and testing, and put it to real use

### ➤ 2022

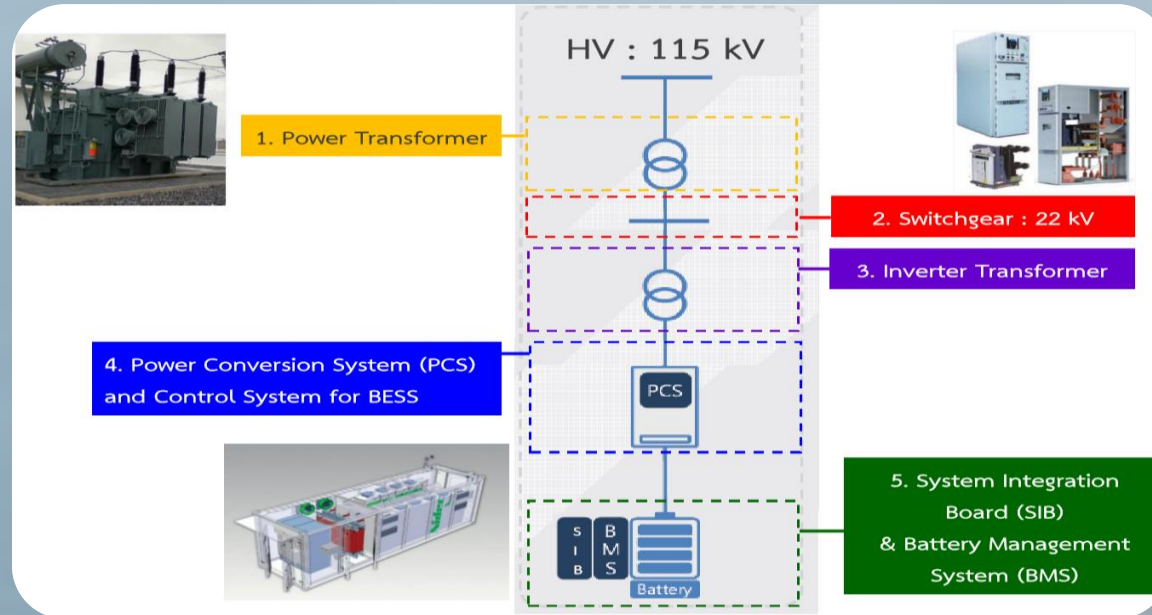
- ✓ More commercial formats and applications will be implemented.





# Battery Energy Storage System

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➤ A BESS Pilot project, it is expected to commission in late 2021. (It is delayed from September 2020 due COVID-19 Pandemic)

✓ Batteries will be installed at two substations:

- ❖ Chai Badan 21 MW
- ❖ Bamnet Narong 16 MW

✓ BESS will be use for ancillary service; frequency regulation.





**Latest policy initiatives being taken by the country**



# Roadmap towards The Energy Transformation



**4D+1E**



**DECARBONIZATION**



**DECENTRALIZATION**



**ELECTRIFICATION**



**DIGITALIZATION**



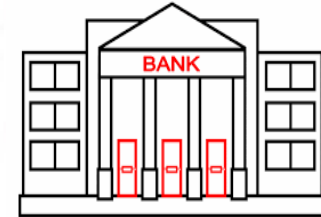
**DE-REGULATION**

# Community Power Plant



## Community Power Plant Format

Proposed generation capacity based on local demand and availability of the transmission and distribution systems.



Initial investment is provided by the private entity, then communities may invest after SCOD.

Community-based enterprise (Shareholder)



Communities sell agricultural residues as fuel to the power plants.



Private Entity (Shareholder)

PEA/MEA

Purchased price based on FiT



Financial benefits returns to the community

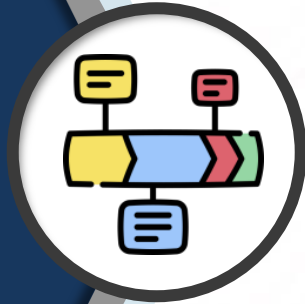


# What's Next ?

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Revise Thailand long-term final energy consumption & load forecast amid Corona virus pandemic



Revisit Thailand Integrated Energy Blueprint (TIEB)



Thailand Smart Grid Master Plan  
Short term Action Plan



Medium term Action Plan

- ▶ DR&EMS
- ▶ RE forecast
- ▶ Micro grid & Prosumer
- ▶ Energy Storage System
- ▶ EV Integration





**- Thank You -**