

“Thailand- RE Community Power Plant”



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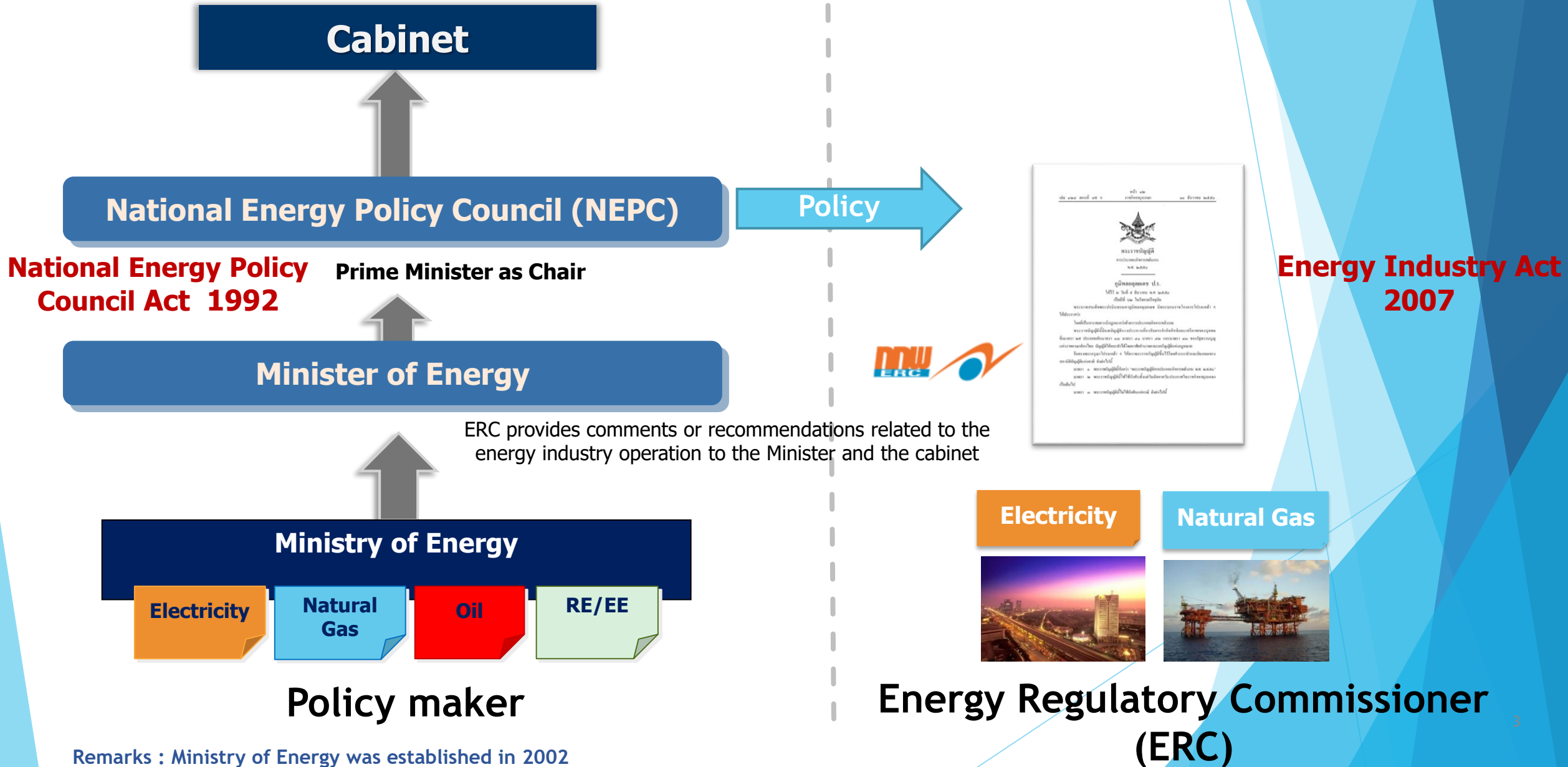


Thailand Overview

- Southeast Asia
- Tropical weather
- Population ~66 Million
- 6 Regions
- Currency : Thai Baht
(1 Euro ~ 37 Baht)



Thailand's Energy Sector Management



Remarks : Ministry of Energy was established in 2002

Regulate through Licensing Schemes

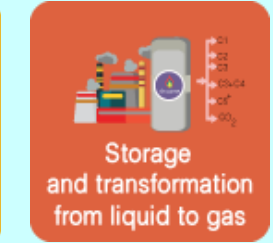
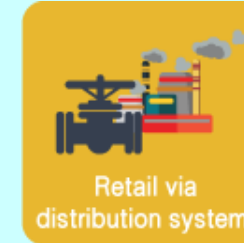
Electricity Industry

(5 License-Types)



Natural Gas Industry

(4 License-Types)



Energy Security

- Power Procurement as per PDP (IPP/SPP/VSP - RE)
- Give opinions on energy development plans (e.g. PDP)
- Network systems & SO
- Promote competition

Licensing & Standards

- One Stop Service Licensing
- Engineering & Environment (Code of Practice: COP)
- Quality of Services & Safety

Tariffs

- Power tariffs & NG transportation service tariffs
- Power tariff structure
- Formula
- TPA Codes & Electric Power Wheeling charge (Underway)

Consumers' Right Protection & Public Participation

- Handle complaints, appeals, disputes
- Compensation for energy infrastructure construction
- Rights protection
- Power Development Fund

Thailand Power Sector Development

1950 - 1991

State-owned Enterprise

- Self-regulation (EGAT MEA PEA)
- Accountable to PM/Cabinet/MOF (financial report)

1992 - 2003

Private Sector Participation

- 1992: SPP/IPP Programs
- 1994: 1st IPP Bidding
- 2002: VSPP Program
- Regulate private producers through PPAs

Generation

2003- Present

Enhanced Single Buyer

- Up-stream competition
- 2006: New Govt. Policy
 - ✓ to clearly separate policy-making from regulation
 - ✓ To cover both electricity and NG businesses
- 2007: Energy Industry Act
- 2008: ERC
- Intensified generation competition

Generation → EGAT

Distribution & Retail → MEA, PEA by area

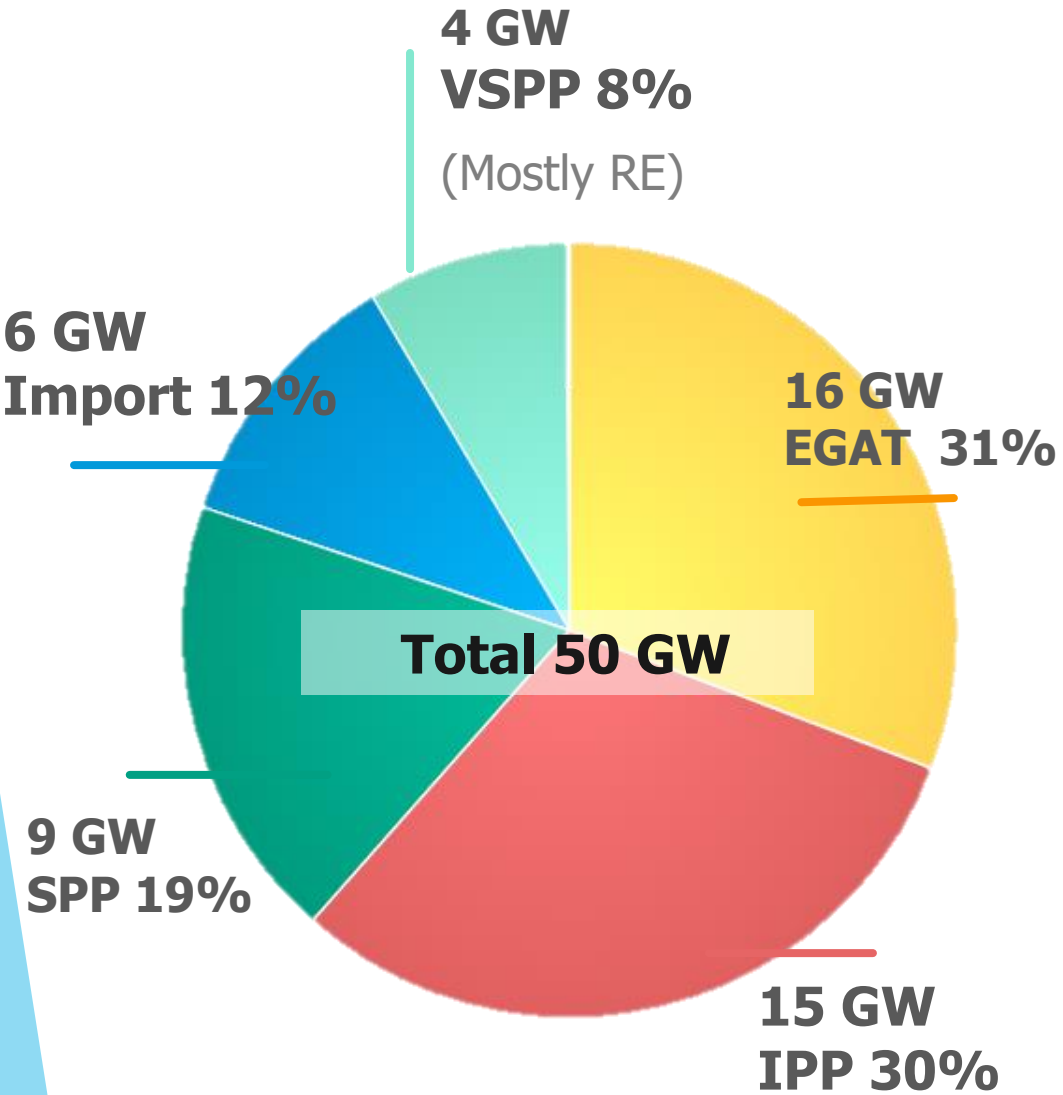
EGAT, MEA, PEA

EGAT, MEA, PEA
IPPs/ SPPs/ VSPPs

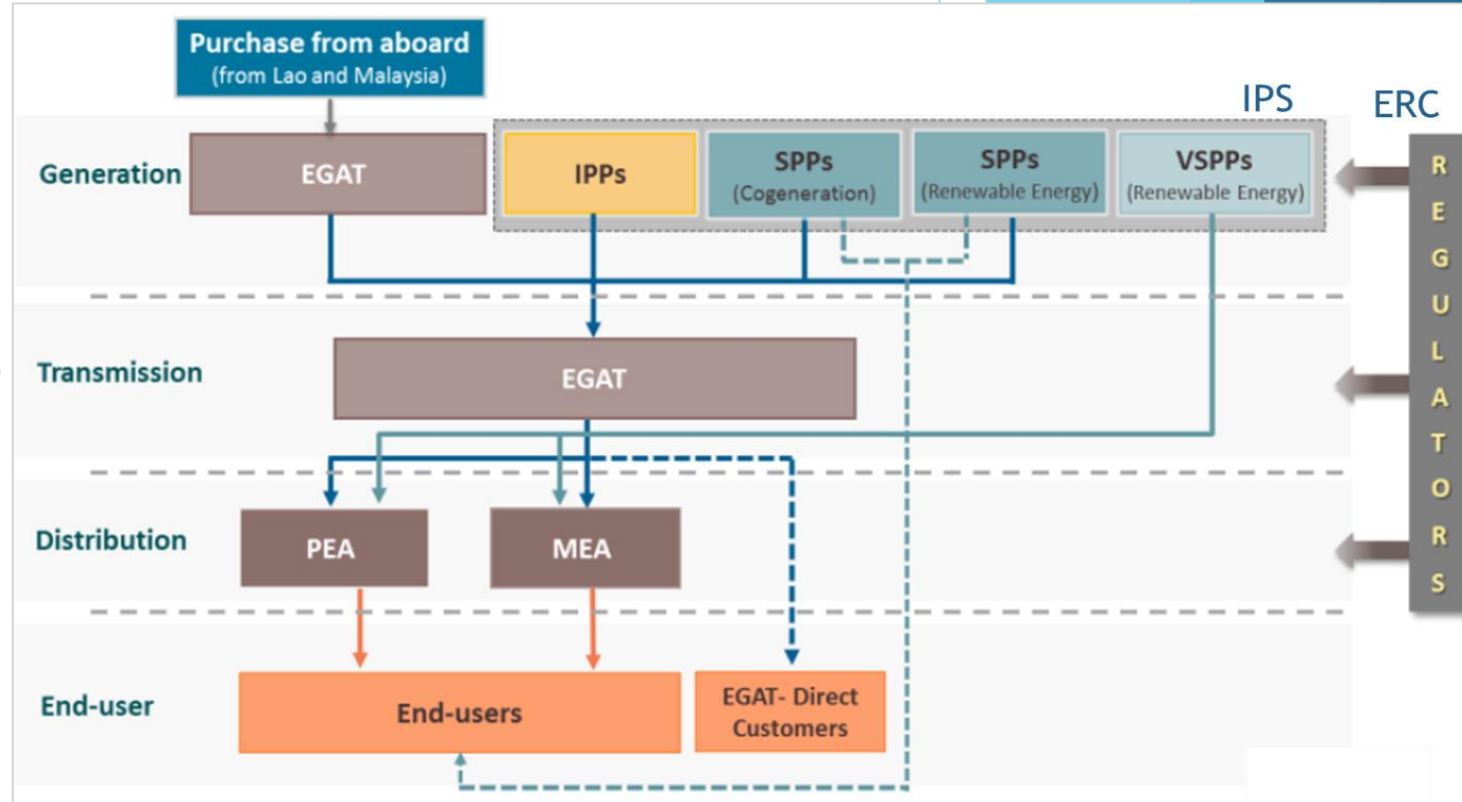
By Contracted Capacity

- Independent Power Producer (IPP) : >90 MW with EGAT → High Voltage 500 kV
- Small Power Producer (SPP): >10 MW to 90 MW with EGAT → Medium Voltage 115 kV
- Very Small Power Producer (VSPP) : ≤10 MW with MEA/PEA → Low voltage 22-33 kV

Power Purchase classified by Producers (COD) -as of Mar 2022-



Enhanced Single Buyer Model; ESB



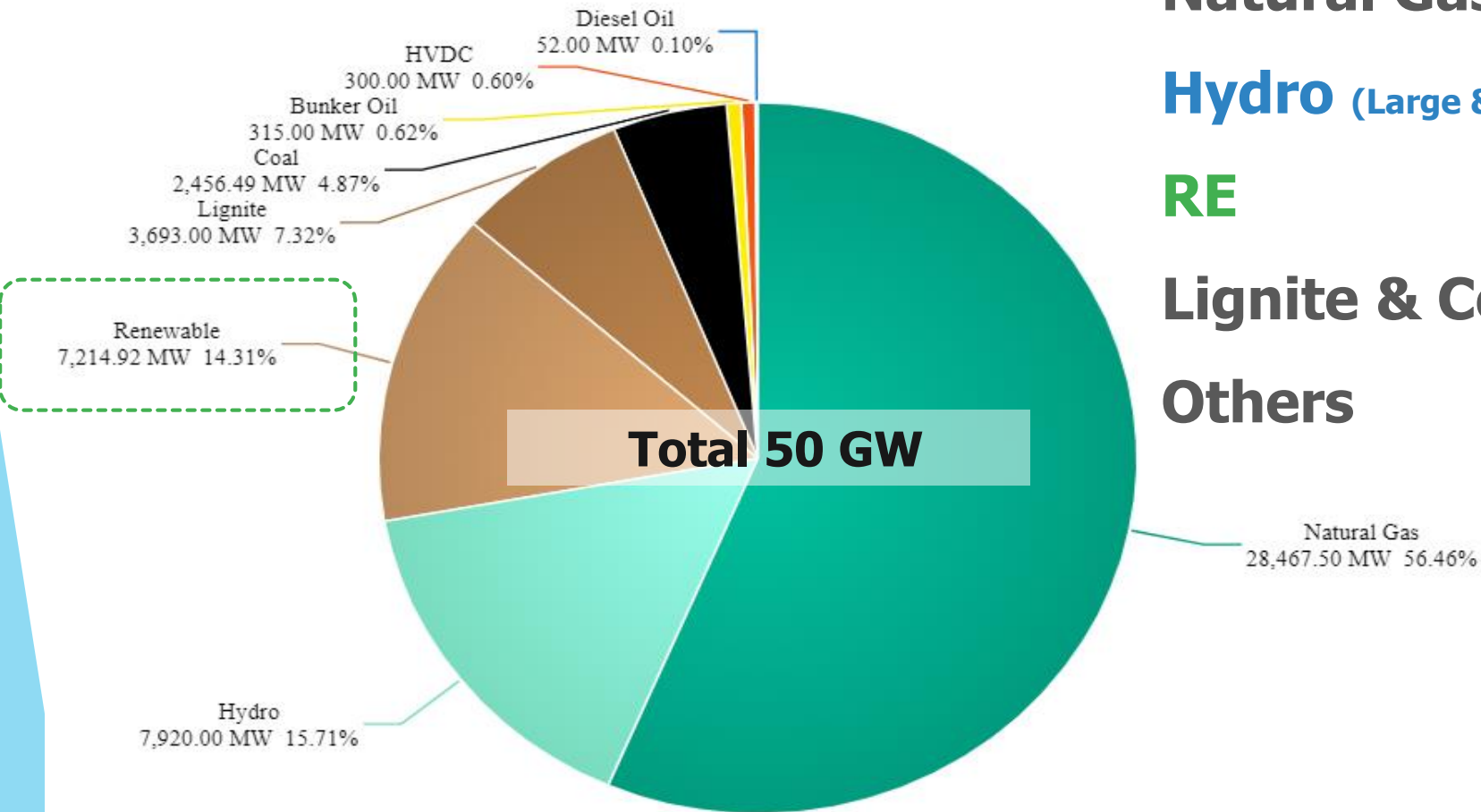
Contracted Capacity

- IPP : >90 MW with EGAT
- SPP: >10 MW to 90 MW with EGAT
- VSPP : ≤10 MW with MEA/PEA

EGAT, PEA, MEA : State-owned enterprise,

Share of Contracted Capacity by **Producer**

Generation Mix -as of Mar 2022-



Natural Gas **56%**

Hydro (Large & Import) **16%**

RE **14%**

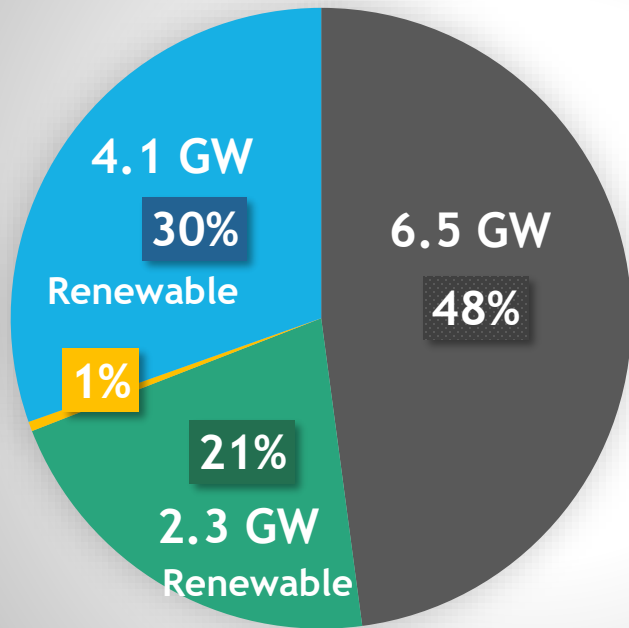
Lignite & Coal **12%**

Others **2%**

SPP and VSPP

- Small Power Producer (SPP): >10 MW to 90 MW
- Very Small Power Producer (VSPP) : ≤10 MW

Contracted Capacity (MW)



■ SPP Fossil → Most are Cogeneration (Natural Gas)

■ SPP Renewable

■ VSPP Fossil

■ VSPP Renewable

Approx. 13.6 GW

**Renewable (SPP & VSPP) in total
~ 6.4 GW**

- SPP ~ 160 PPAs
- VSPP ~ 1,100 PPAs (excluding Rooftop Solar)

Development of RE Promotion

Renewable : **Adder & First come, first served (Premium)**

Renewable : **Feed-in Tariff (FiT)**

B.E.

Adder to FiT

Competitive Bidding

Before the Energy ACT



08

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Renewable (Adder)

SPP : Firm / Non-Firm

Solar

Wind

VSPP : Non-Firm

Biomass

Waste

Biogas

FiT

Renewable : Feed-in Tariff (FiT)

Solar Rooftop
Factory, Business,
Residential

Solar Rooftop- Residential

Biomass
(South)

Solar Rooftop-Residential

Self consumption and
able to sell the rest to the Grid

Solar Farm

Solar Farm

Waste

Waste

FiT Bidding

Biogas

Biogas

Biomass

FiT Bidding

Community
Power Plant

Biogas

Biomass

FiT Bidding

SPP
Hybrid Firm

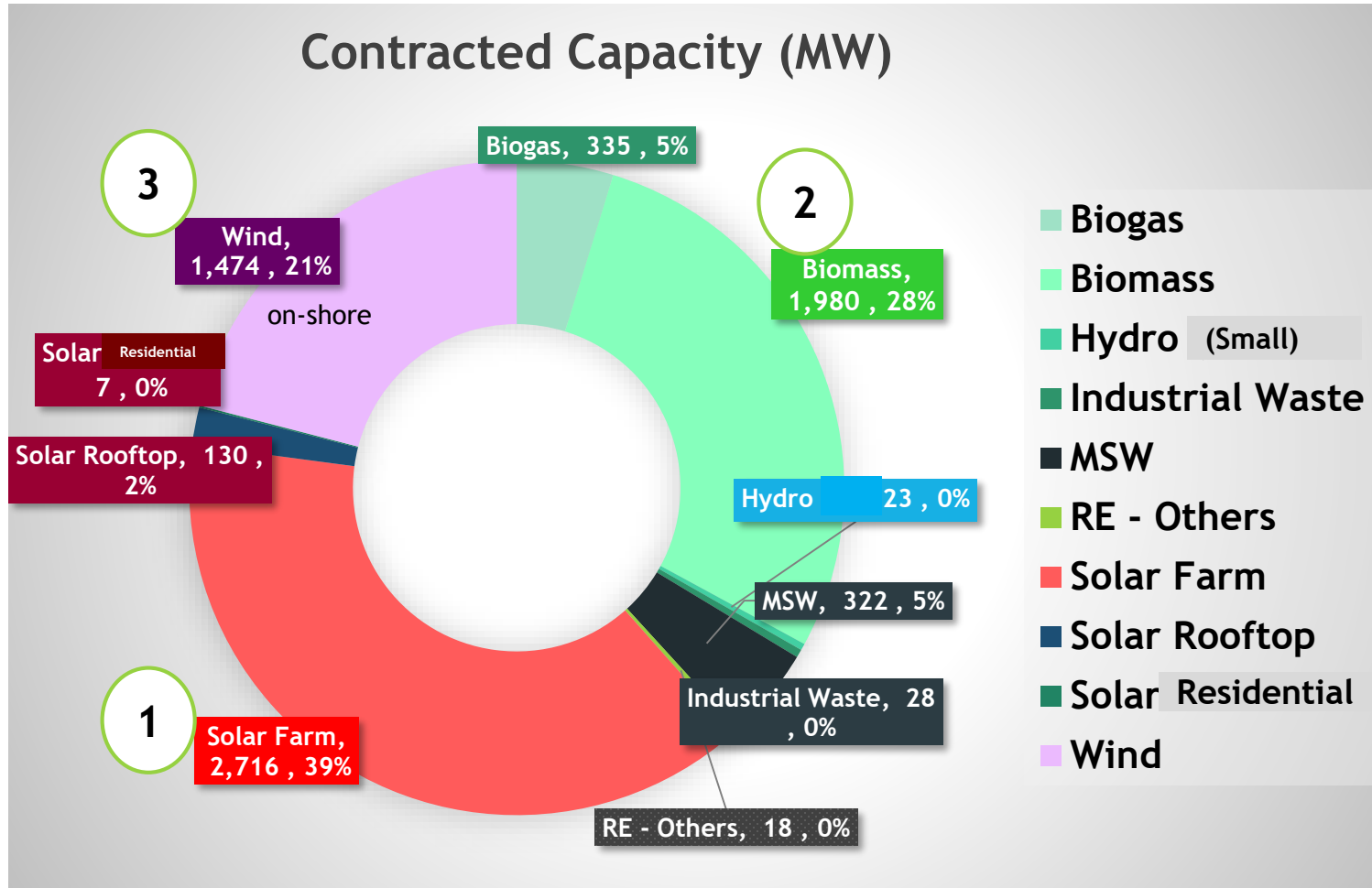
The “Adder” scheme is an additional payment on the top of Wholesale price

VSPP : Non-Firm

Firm

Renewable in Thailand (COD) - supplying to the Grid

Excluding imported hydro



Biomass : industrial-agricultural waste such as rice husk, bagasse fiber and palm shell.

Approx. 7 GW

Latest Country' Directions on Energy Policy

Thailand Energy Policy Framework (National Energy Plan : NEP)

4 August 2021

National Energy Policy Council Approved NEP framework

- 1 Increase the share of **new electricity generation with RE ratio of not less than 50%**, in line with the trend of lower RE costs, taking into account the cost of ESS, and will not increase the long term cost of electricity generation.
- 2 Change the use of transportation in the **transport sector to green electricity through EV** according to the policy **30@30** (30% of Thailand's total auto production are EVs by 2030)
- 3 Improve **energy efficiency by more than 30%**
- 4 Restructuring the energy industry to support the Energy Transition according to the **4D1E** guidelines.

Decarbonization

Decentralization

Electrification

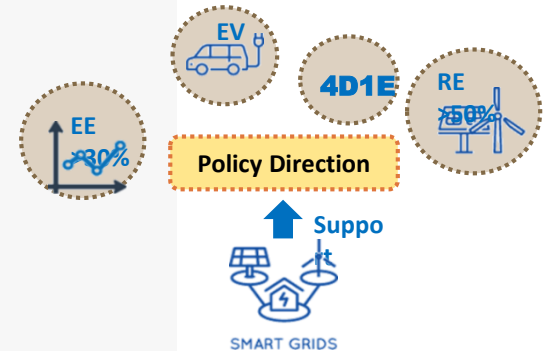
Digitalization

Deregulation

Carbon Neutrality

CO₂

No CO₂



COP26

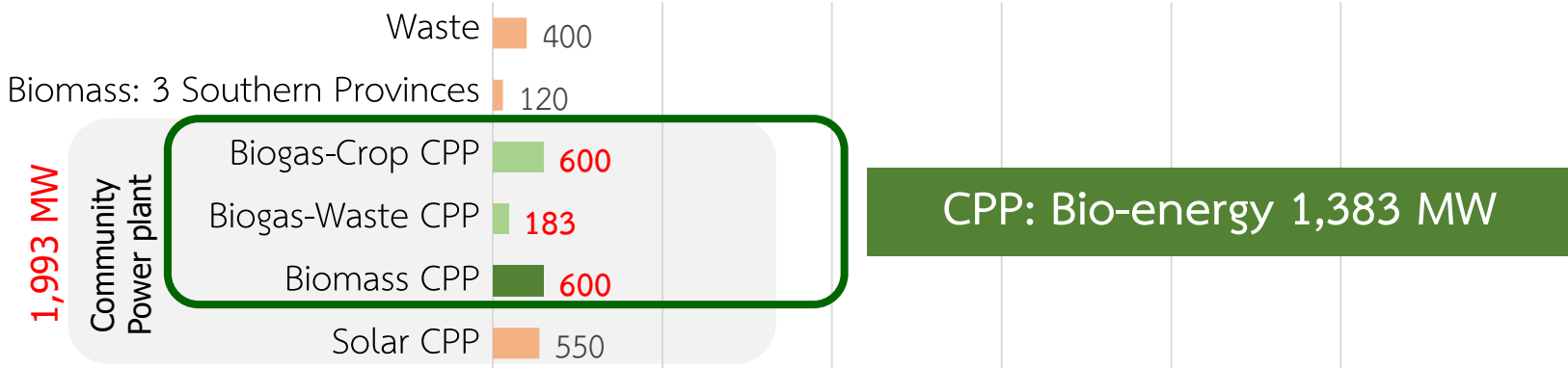
Thailand's aim to reach **carbon neutrality by 2050**,
and **net zero GHG emissions by or before 2065**

Country's Roadmap towards The Energy Transformation: "Bio-Circular-Green"

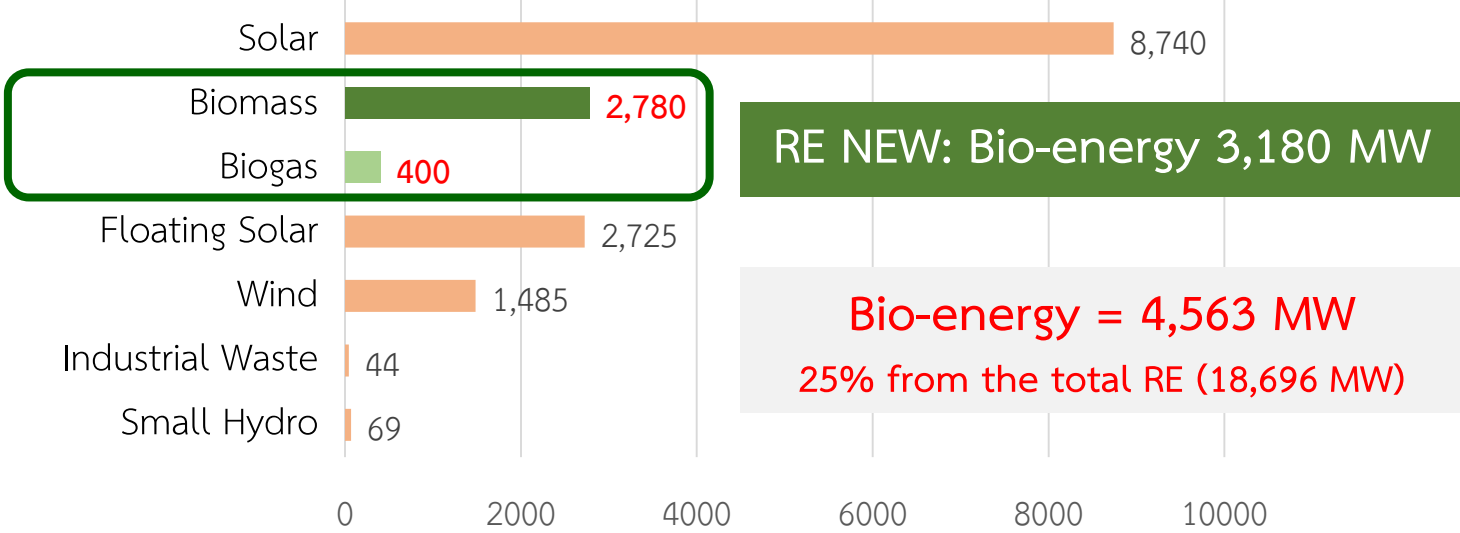
Renewable **NEW** Project : PDP2018 Rev.1 (2018-2037) **total 18,696 MW**

**Revising a new PDP
MW to be changed**

1. Project under the Government Policy 2,453 MW



2. RE Fuel type 16,243 MW



Energy Crop

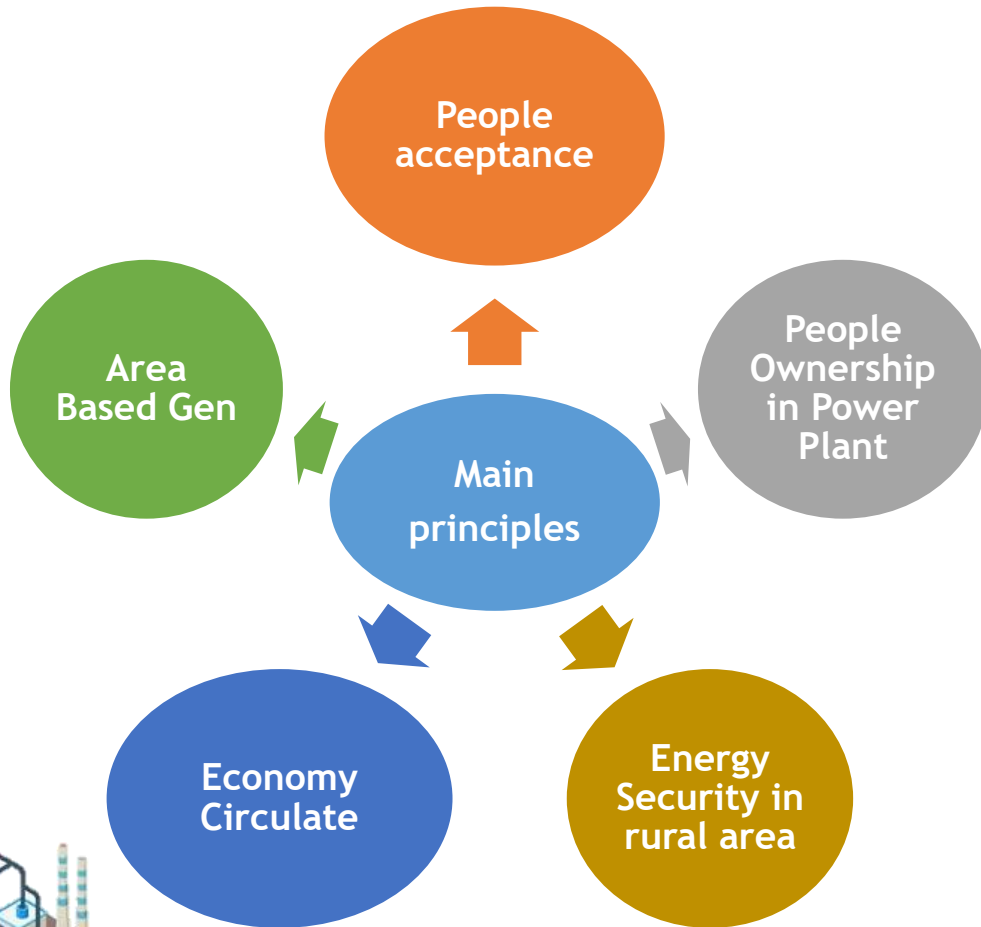
livestock farming/ residues in agricultural sector



- ✓ **Assessing the RE potential of the country** and promote investment in renewable energy technology market.
- ✓ **Develop biomass market** as a base country for Bioeconomy.
- ✓ **Sustainable Development Goal**

Community Power Plant

Policy Framework: community owned energy schemes by investing in local will deliver better value for money for a local economy.



Benefits :

- Community will earn income from owning a community power plant and reduces the burden of the community's expenses.
- Community will earn income from selling agricultural materials as fuel for electricity generation.
- Create jobs, and strength in communities network.
- Expand the amount of money circulating within a region's economy.
- Create added value in the occupation such as cold storage, agricultural processing machinery, etc.

Policy Area : to establish concrete returns to communities, such as Power Plant Profit Share to the Community, Income from selling Agricultural Material

Social welfare, Healthcare, Education

Community Power Plant (Pilot Project 150 MW)

Contracted Capacity

Biomass ≤ 6 MW

Biogas ≤ 3 MW

private company
Common shares 90%

3

Profit returns to the local community



Social welfare, Healthcare, Education



Preferred shares 10%



Community Enterprises
(≥ 200 households)

2

Contract Farming (≥ 80%)



Biogas / Biomass
Quantity / Quality/ Price

Energy Crop must be obtained
from the community enterprise
or community enterprise networks
Or farmers near by.

20-year project
(PPA term)



Investors

Proposal

MEA/PEA

Condition under
Power purchase
regulation

Technical review:
Pass / Non-pass

Selection Criteria:
Bidding Scheme

Quota of 150 MW

Biomass	Biogas
75 MW	75 MW
<ul style="list-style-type: none"> >3 MW and ≤ 6 MW 4.2636 Baht/Unit 	<ul style="list-style-type: none"> ≤ 3 MW Energy Crop 100% / Energy Crop + waste water ≤ 25%
<ul style="list-style-type: none"> ≤ 3MW 4.8482 Baht/Unit 	<ul style="list-style-type: none"> 4.7296 Baht/Unit

(1 Euro ~ 37 Baht)

- ✓ Promote self-sufficient **Power Generation on Community Scale**
- ✓ Increase opportunities and generate **revenue for the community**

Community Power Plant (Pilot Project 150 MW)

Target 150 MW
(Biomass 75 MW & Biogas 75 MW)

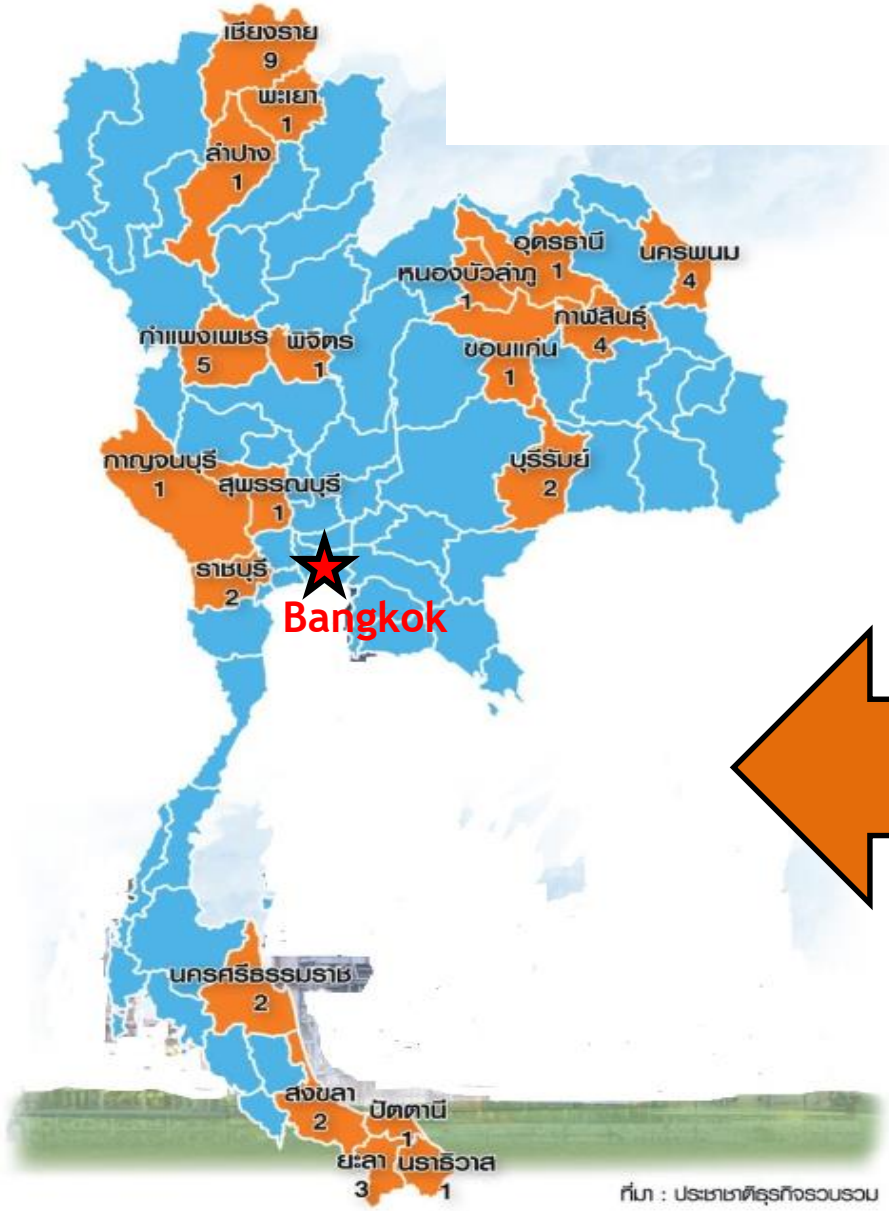
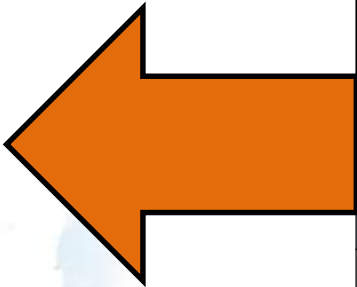
246 proposals received 864 MW



Technical qualified 169 Proposals

43 proposals/projects Selected

Type	Proposals	MW
Biomass	16	75
Biogas	27	74.50
Total	43	149.50



ที่มา : ประชาชาติธุรกิจรวบรวม

Community Power Plant (Pilot Project 150 MW)

Installed Capacity (MW)	Ceiling Price	FiT (Baht/unit)		PPA term (years)	FiT Premium (Baht/unit)	
	FiT _F	FiT _{V,2019}	FiT (FiTF+FiTv)		Located in 3 most southern provinces	
Biomass						
EURO cents						
Installed Capacity ≤ 3 MW	2.61	2.2382	4.8482	13.1	20	0.50
Installed Capacity > 3 MW	2.39	1.8736	4.2636	11.5	20	0.50
Biogas (Energy Crop)						
	2.79	1.9369	4.7269	12.8	20	0.50

Selection Criteria:
Bidding Scheme



% discounted from FiT_F

Type	Projects	MW	FiT (Bath/unit)
Biomass	16	75.00	2.80
Biogas	27	74.50	3.57
Total	43	149.50	3.18

EURO cents

7.6

9.7

Average Discount -31%
(Biomass -38% และ Biogas -25%)

8.6 EURO cents

FX : 1 EURO = 37 Baht

“Renewable Community Power Plant”

Sustainable Development

Agriculture & Biotechnology



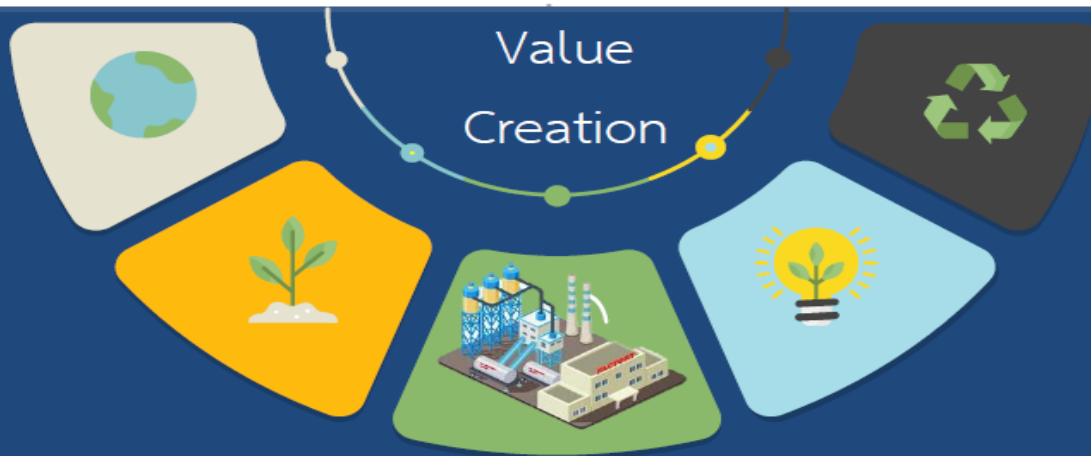
Smart Grid

Smart Farming

Renewable Energy



Value
Creation



Thank you

www.erc.or.th