



Renewable Project Connect Experience in Thailand

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1

Thailand Electricity Structure and RE Plan

2

Status for Renewable Energy Generation

3

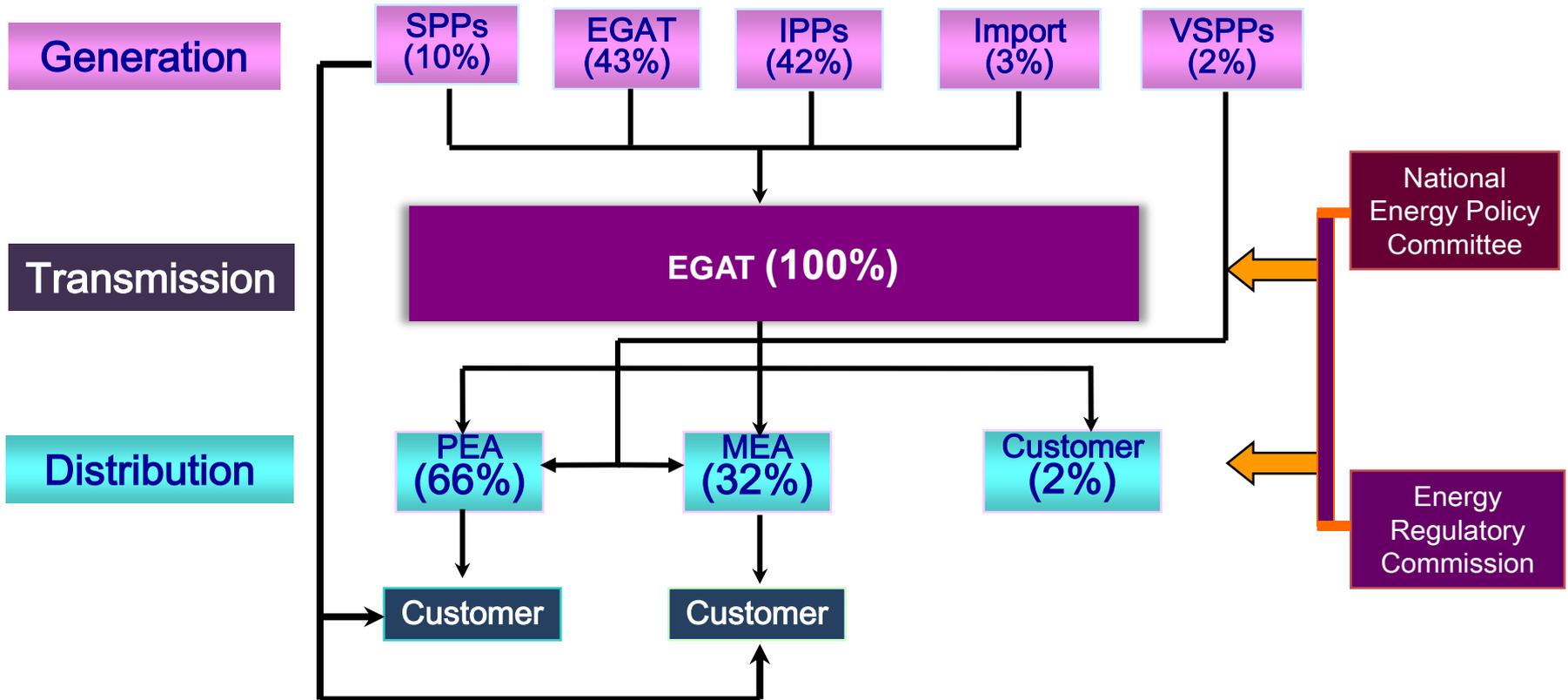
Impact of Renewable Energy Connection

4

Experience from Renewable Energy Connection



1. Thailand Electricity Structure





1. Thailand Electricity Structure

The power purchase from Private Power Producer



IPP : Independent Power Producer,

- Capacity > 90 MW
- (Power Purchased by Notice)



SPP : Small Power Producer, Capacity <= 90 MW

- Cogeneration, Firm (Power Purchased by Notice)
- Renewable Energy, Firm , Non-firm



VSPP : Very Small Power Producer, Capacity <= 10 MW

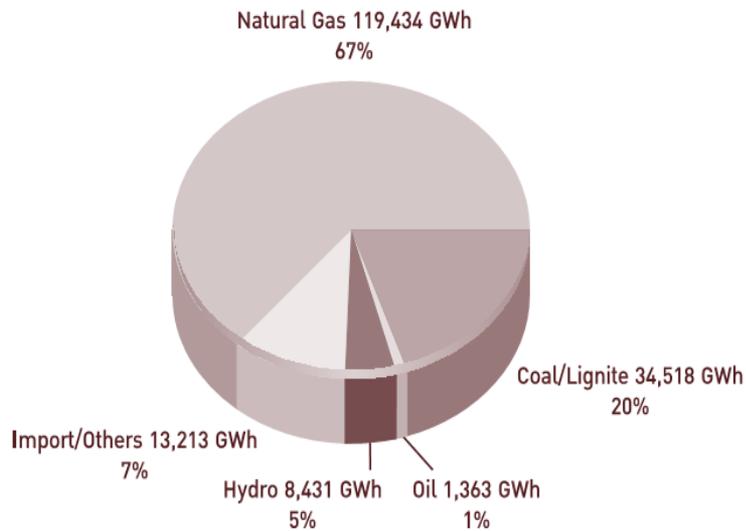
- Cogeneration
- Renewable Energy



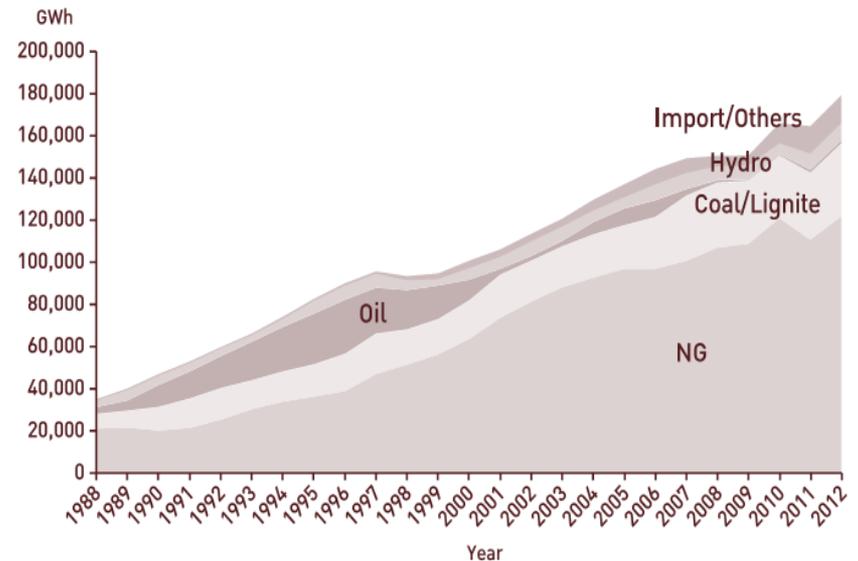
1. Thailand Electricity Structure

Thailand Power Generation by Fuel Type

Share of Power Generation by Fuel Type in 2012



Power Generation by Fuel Type



Ref: www.eppo.go.th

1. Thailand Electricity Structure

Alternative Energy Development Plan (AEDP)

Committed to the Development of
Low-Carbon Society

Government Funding on
R&D Activities

Alternative Energy Development Plan
(AEDP: 2012-2021)

Encouraging
Private-Led
Investment

Target 25% of RE in Total Energy Consumption by 2021

New Energies		solar	Wind	Hydro-electric			Bio-energy			Biofuels		
Tidal	Geothermal			Micro	Mini	Pump Storage	Biomass	Biogas	MSW	Ethanol	Biodiesel	New Fuel Replacing Diesel
2 MW	1 MW	3,000 MW	1,800 MW	324 MW	-	4,800 MW	3,600 MW	400 MW	9 Mill It/d	5.97 Mill It/d	25 Mill It/d	
3 MW		4,800 MW		324 MW			8,800 MW					



2. Status for RE

Status of Renewable Project on May 2015 compared with the target in Alternative Energy Development Plan (AEDP) of 25% for 10 years as following

Type of Fuel	COD	Target AEDP
	Installed Capacity	
	(MW)	(MW)
Solar Farm	1,502	3,000
Solar Rooftop	53	
Wind	216	1,800
Hydro	15	324
Biomass	2,429	4,800
MSW	113	400
Biogas	235	3,600
Total	4,563	13,924



2. Status for RE

EA SOLAR (90 MW)



Located : Lampang Province
COD : Dec 2014

2. Status for RE

First Khorat Wind (SPP 90 MW)



Located : Nakhonratchasima Province
COD : April 2012

Thai Solar Energy 5 MW



Located : Kanchannaburi Province
COD : 2013

2. Status for RE

Erawan Power(Sugar cane power plant)



8 MW
Located Nongbualumpoo
Province

Decha Biogreen (Rice husk fuel)



7.5 MW Located
Supanburi Province

2. Status for RE

Thai Biogas
(palm oil wasted water)



Mass Solid Waste
(Land Fill)



Mass Solid Waste
(Incineration)



โรงเผาขยะเทศบาลนครภูเก็ต

6.5 MW Located Phuket Province



2.8 MW
Located Surathani Province

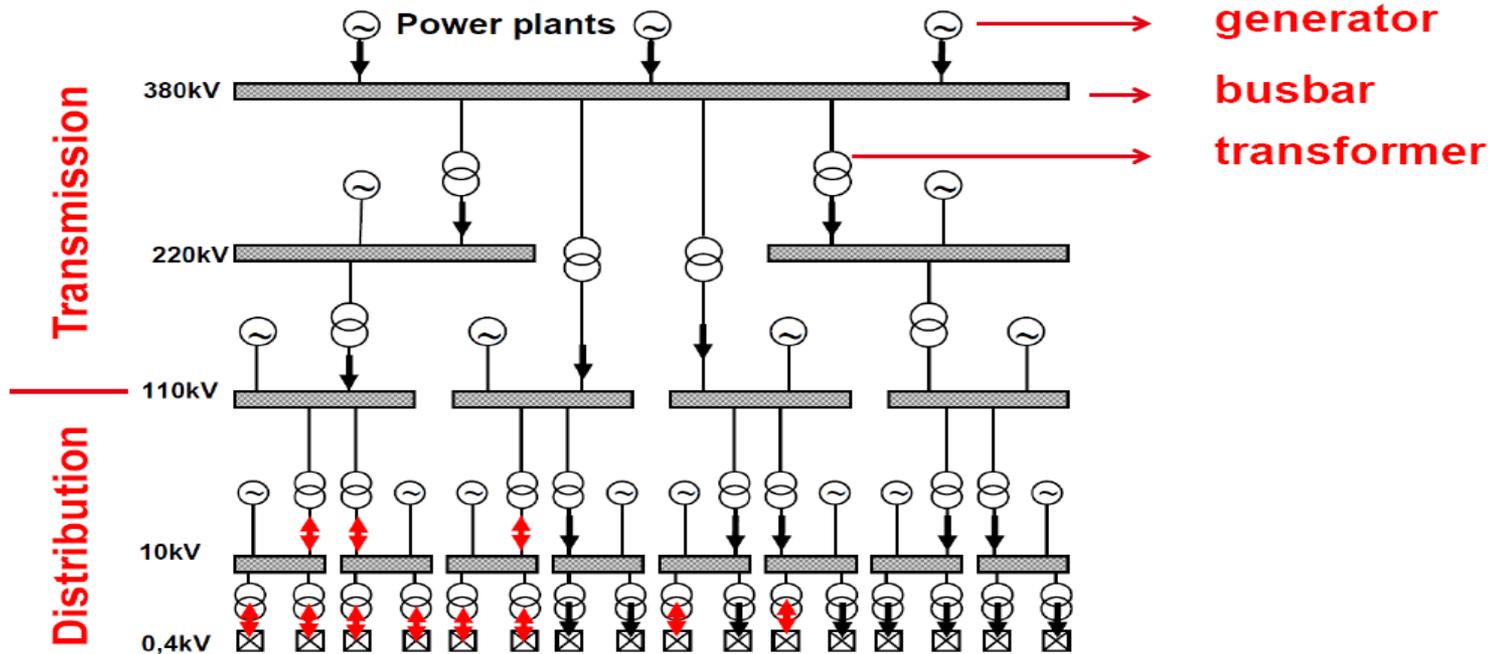


Zenit Green 8 MW
Located Kampangsarn
Nakornpratom Province

3.1 Reverse Power Flows

3.2 Voltage Control in Distribution Grid

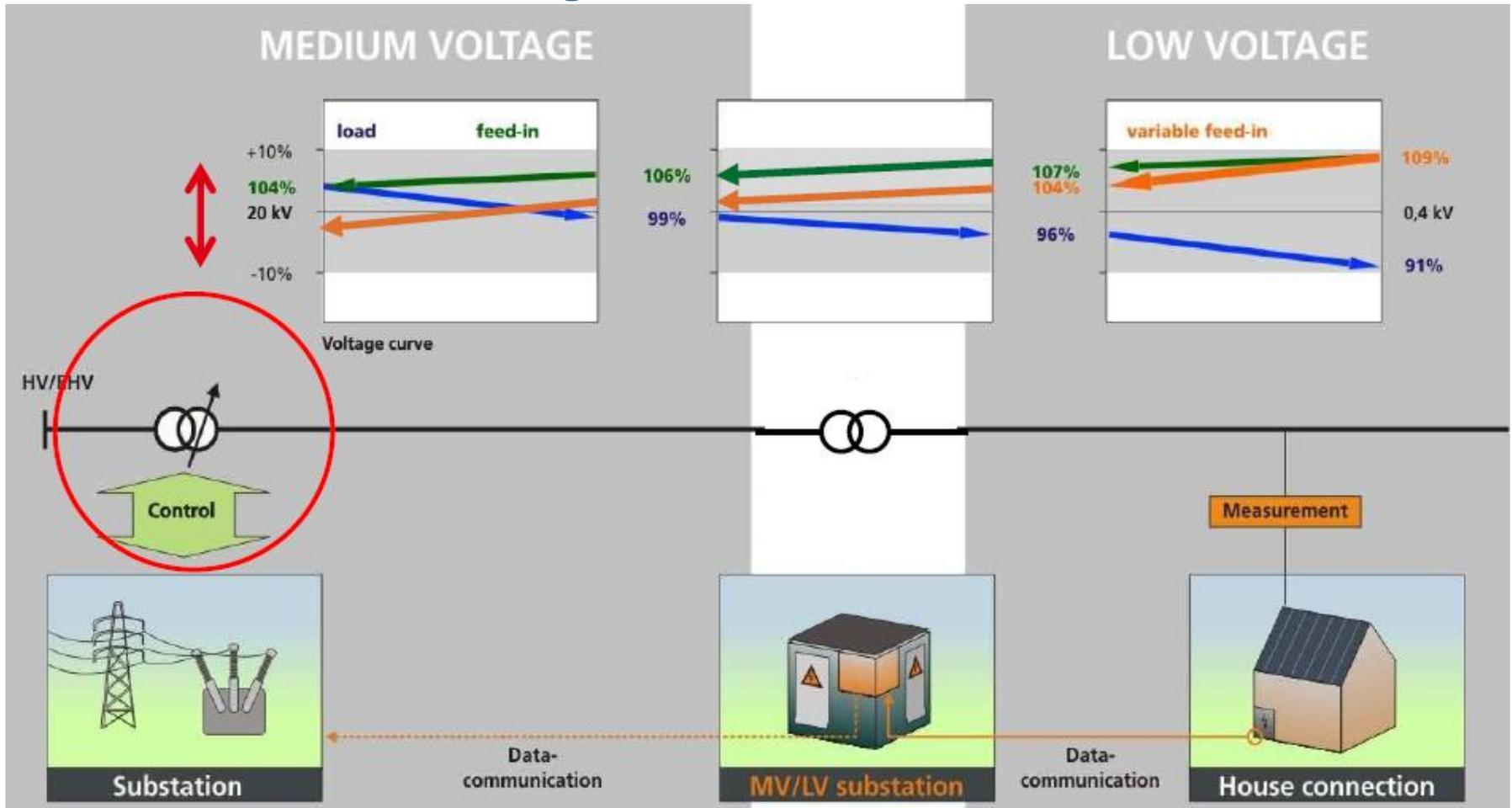
3.3 Protection Coordination in Distribution Grid



3. Impact of RE Connection

3.2 Voltage control in distribution grid

Advanced voltage control for HV/MV transformer





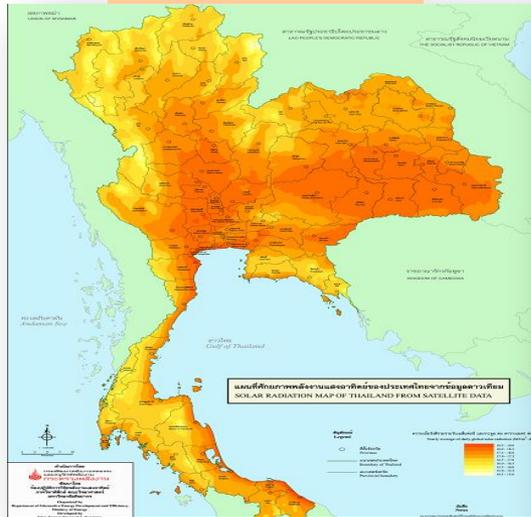
4. Experience from RE Connection

- 4.1 Plan for Using Renewable Energy
(Find Exactly RE Potential Area)**
- 4.2 Redesign Power Grid for RE Connection
(Expand Grid to RE Area)**
- 4.3 Use Smart Grid Device & Equipment
(Move to Smart Grid ERA)**

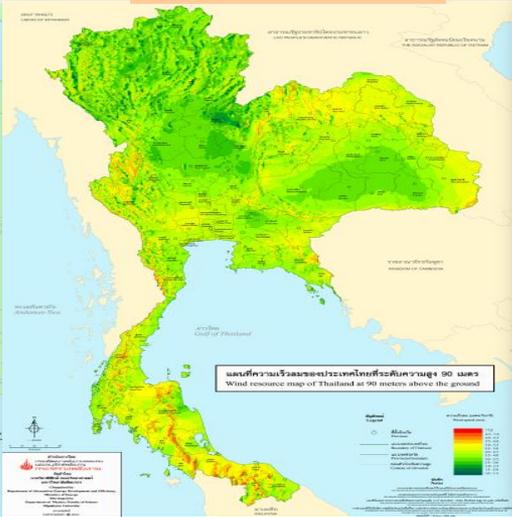
4.1 Find Exactly RE Potential Area

4.2 Expand Grid to RE Area

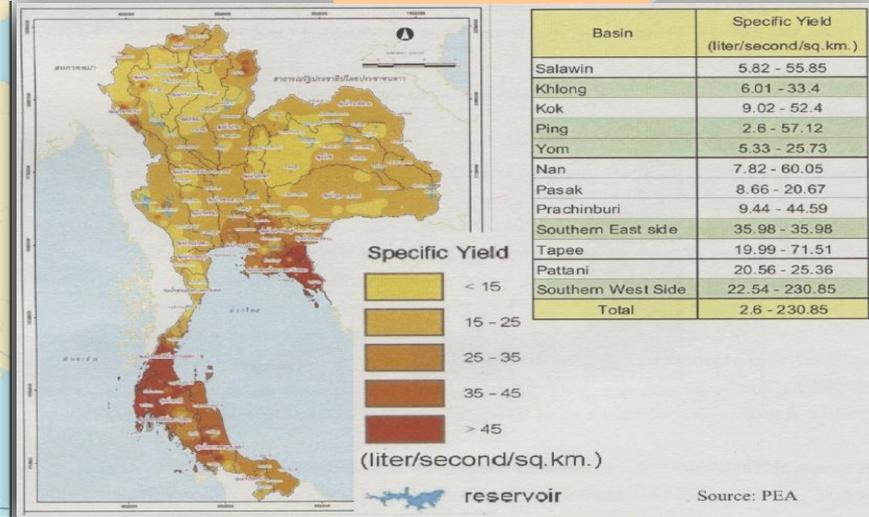
Solar



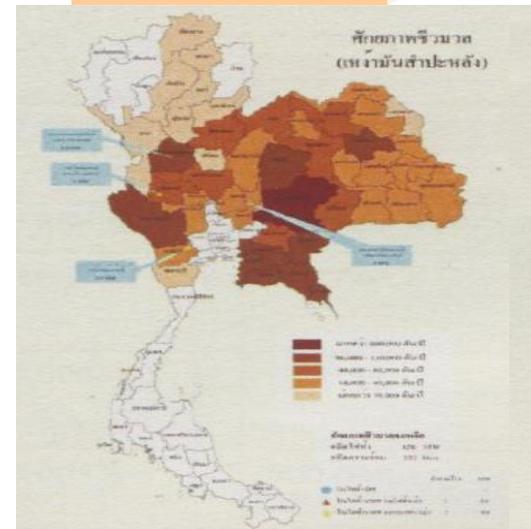
Wind



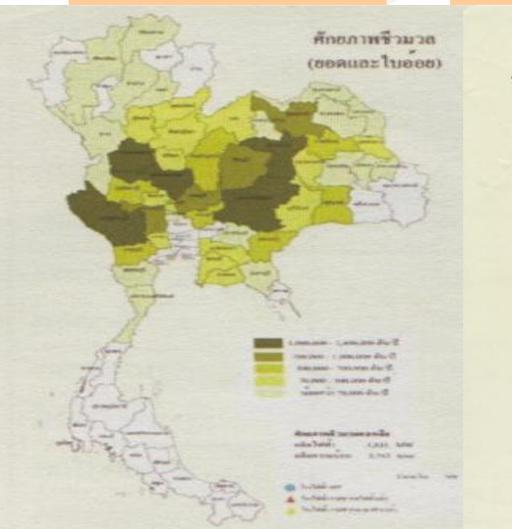
Micro Hydro



Cassava root



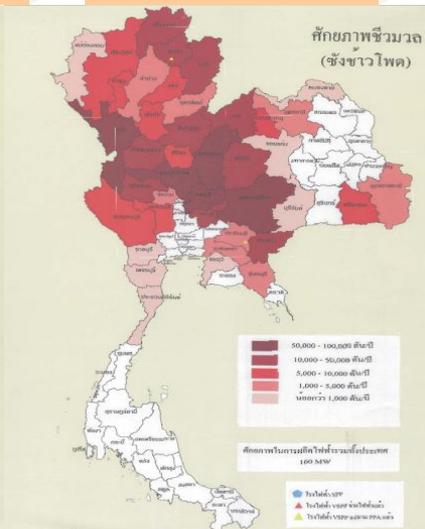
bagasse



Empty bunches of oil palm

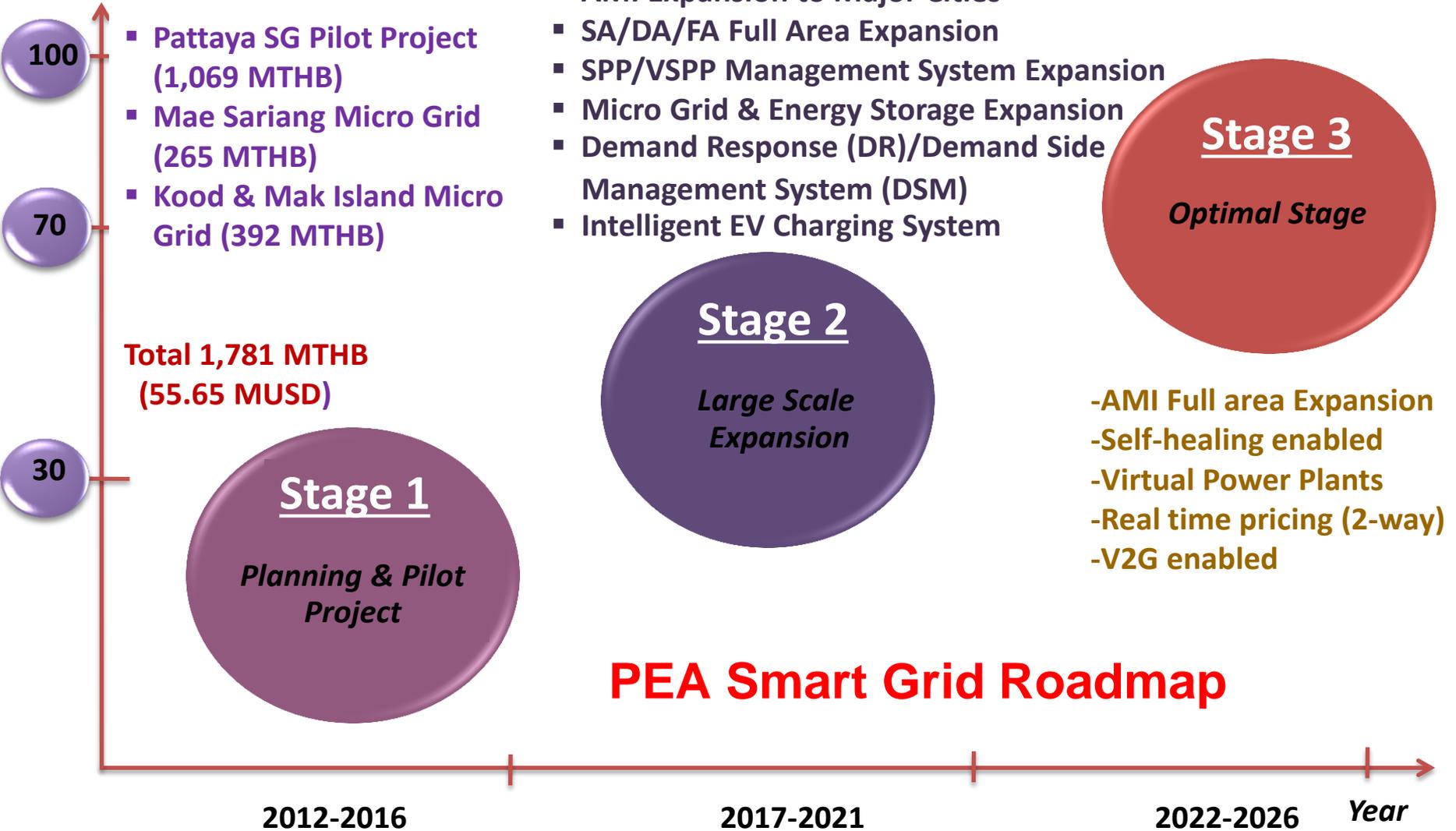


Corn maize



4.3 Use Smart Grid Device

Smart Level



- AMI Expansion to Major Cities
- SA/DA/FA Full Area Expansion
- SPP/VSP Management System Expansion
- Micro Grid & Energy Storage Expansion
- Demand Response (DR)/Demand Side Management System (DSM)
- Intelligent EV Charging System

- AMI Full area Expansion
- Self-healing enabled
- Virtual Power Plants
- Real time pricing (2-way)
- V2G enabled



Question & Answer

**Renewable Energy First Priority
(Think the Environment First, Save the Earth)**

THANK YOU

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