

## Smart Meter – PEA Smart Grid Project in Pattaya

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# PEA in Brief

# Electricity Supply in Thailand

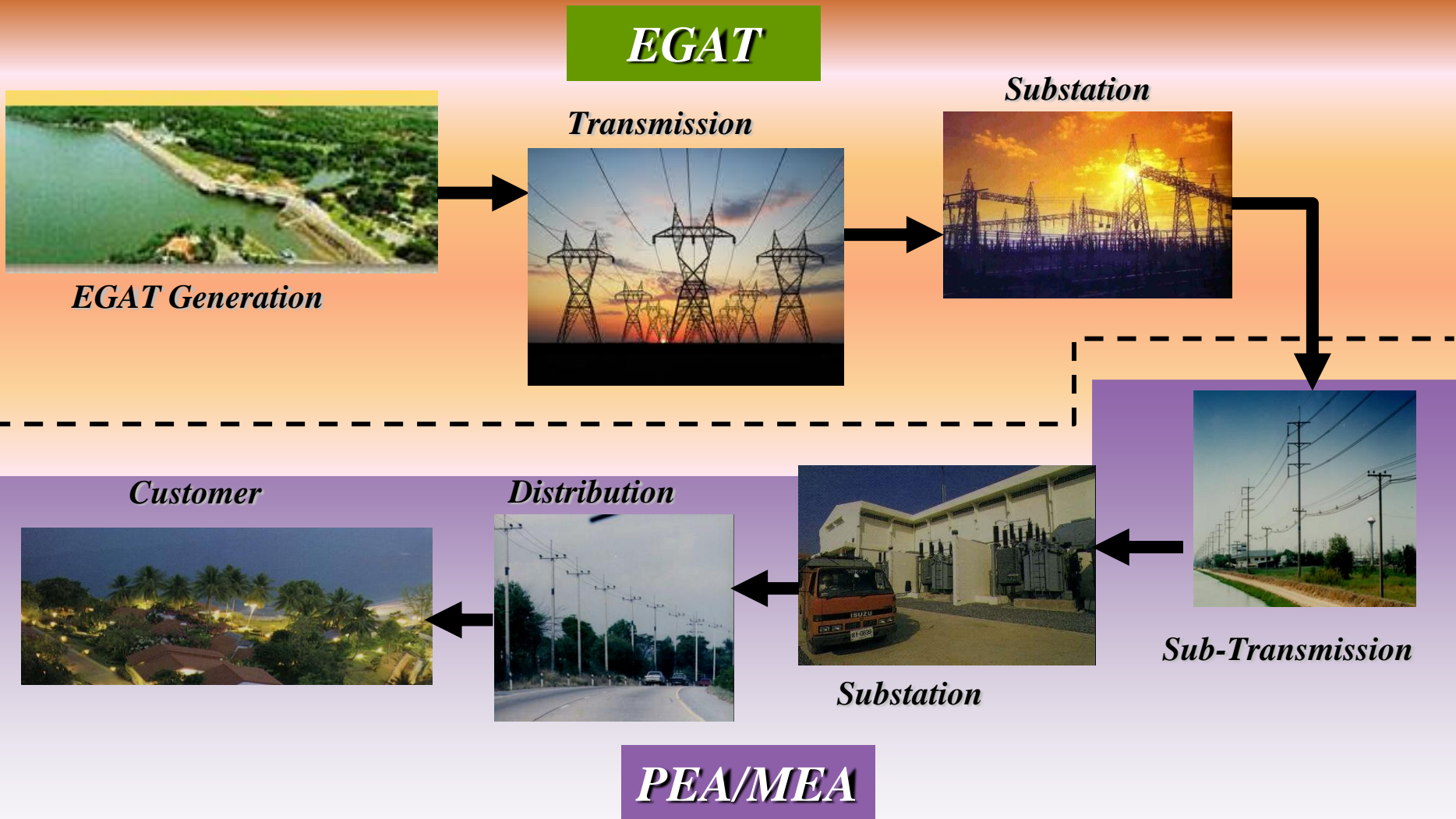
*Mainly comprises 3 state-enterprises*

**Electricity Generating Authority of Thailand (EGAT)**

**Metropolitan Electricity Authority  
(MEA)**

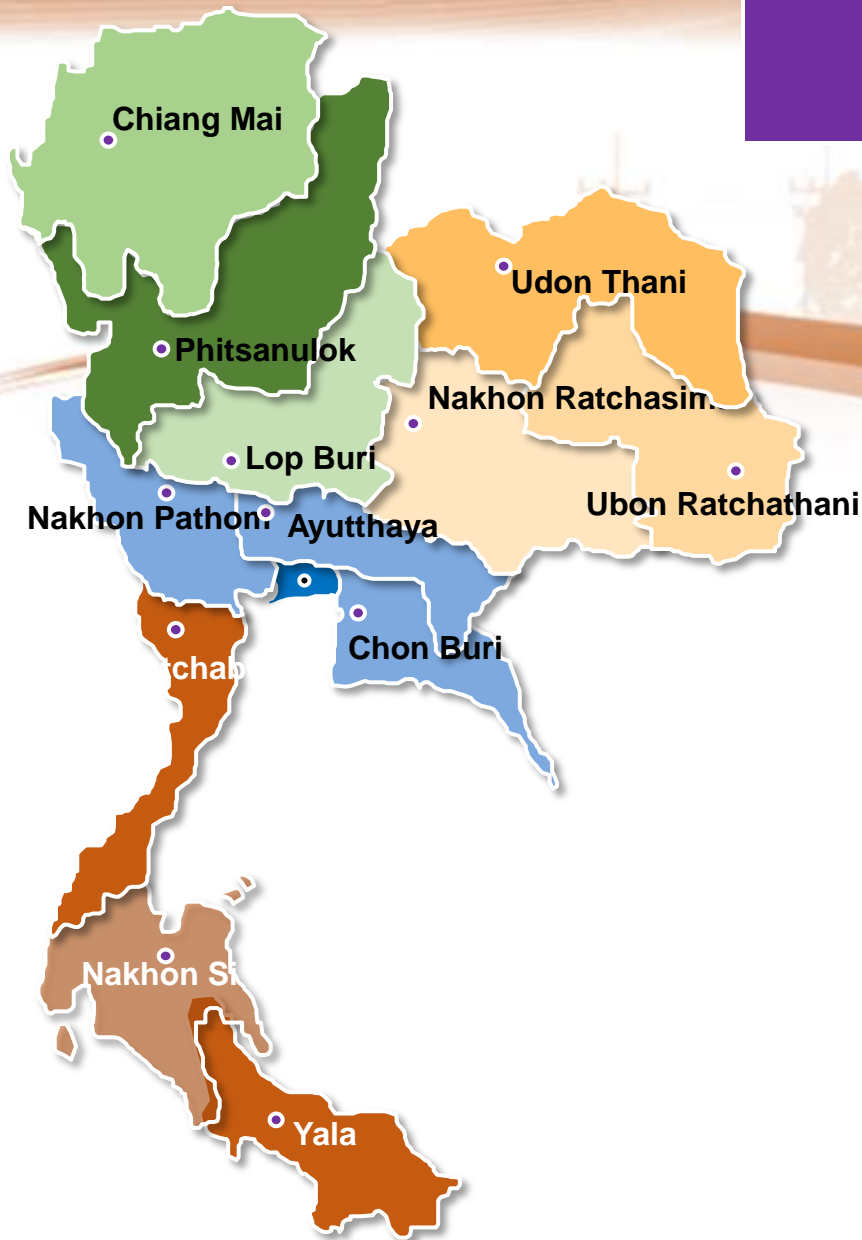
**Provincial Electricity Authority  
(PEA)**

# Thailand Electrical Power System





# Electricity Service of PEA



- **Approximately (km<sup>2</sup>)** 510,000  
**(99% of the country)**
- **Electrified Villages (%)** 99.98
- **No. of Customers** 17,293,128
- **No. of Employees:** 27,804
- **Peak Demand (MW)** 17,293
- **Losses (%)** 5.12
- **No. of Substation** 520
- **DG connected to PEA** 524  
**( about 5,000 MW)**

Update : July 2014

## PEA Targets

Existing in 2013	KPI	Targets in 2016
112,606 MWh	LOAD	> 141,060 MWh
17,293 MW	Peak Load	> 20,844 MW
17.29 Million	Customer	18.13 Million
249.45 Min/Customer/year	SAIDI	<161 Min/Customer/year
7.15 Times/Customer/year	SAIFI	< 5.2 Times/Customer/year

# 10 Policy management and energy development of PEA

1. Beyond SMART GRID

2. Road to LED

3. Green Investment

4. Green Office

5. 100% Electrified

6. ZERO Accident

7. Community Partnership

8. Moving to AEC

9. High Quality & Qualified Labor

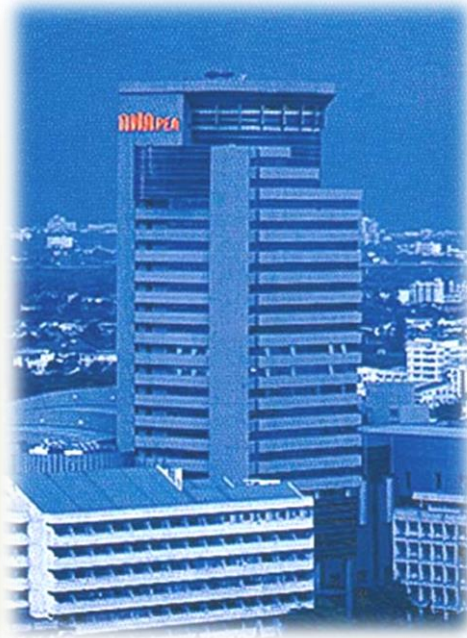
10. PEA Rebranding



**Performance & Modern  
Organization  
and  
Customer centric**



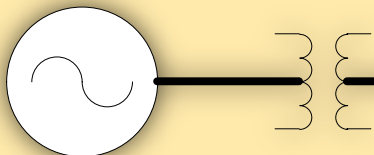




# PEA Smart Grid Roadmap

# PEA Smart Grid Applications

## Supply Side



RE and DG



Micro Grid



Virtual Power Plant



V2G

## Network

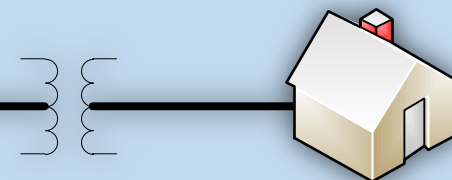


Smart Substation  
IEC 61850



Feeder  
Automation  
SCADA/DMS/EMS

## Demand Side



Advanced Metering  
Infrastructure, AMI



Smart Home  
HEMS

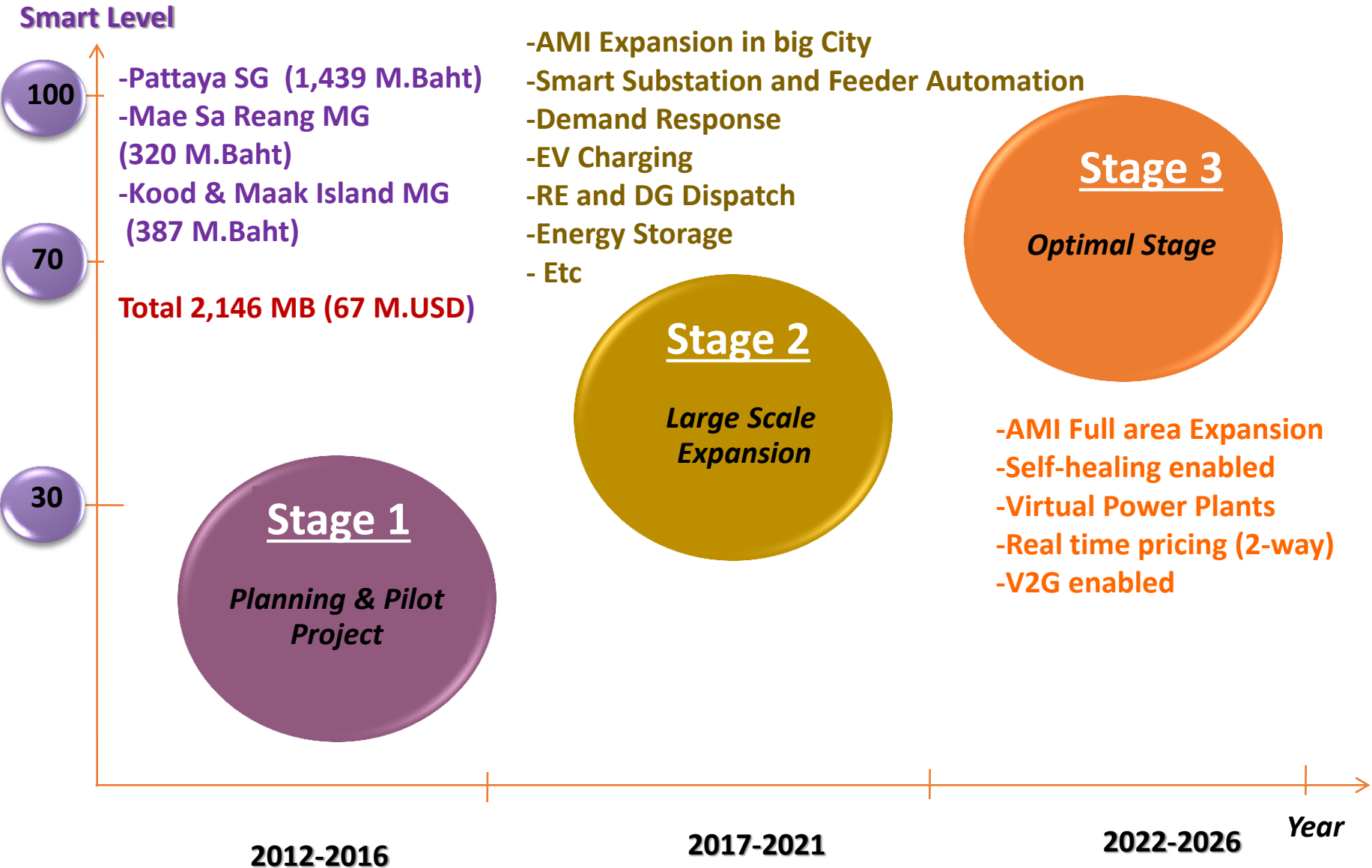


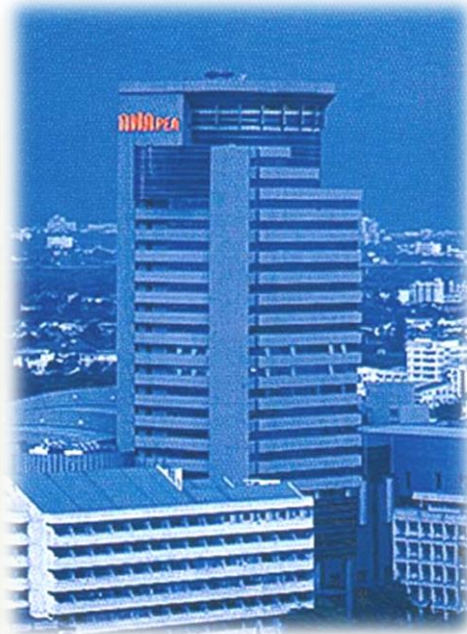
Demand Response



EV Charging  
Station

# PEA Smart Grid Road Map

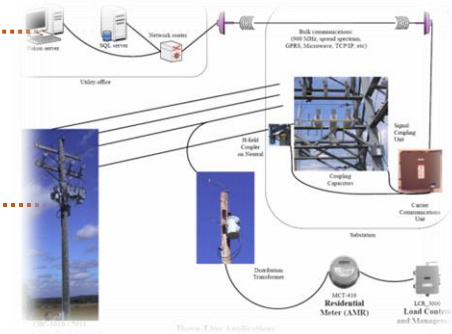




# PEA Smart Grid Drivers



Driven to Improve Power System Stability



Driven to the efficiency of PEA's organization

Driven to be socially responsible and operate in an environmentally friendly manner





# Driven to Improve Power System Stability

The latest power development plan (PDP 2010) indicates a compound growth in energy usage of over 5% per annum.

Increasing of DG and VSPP

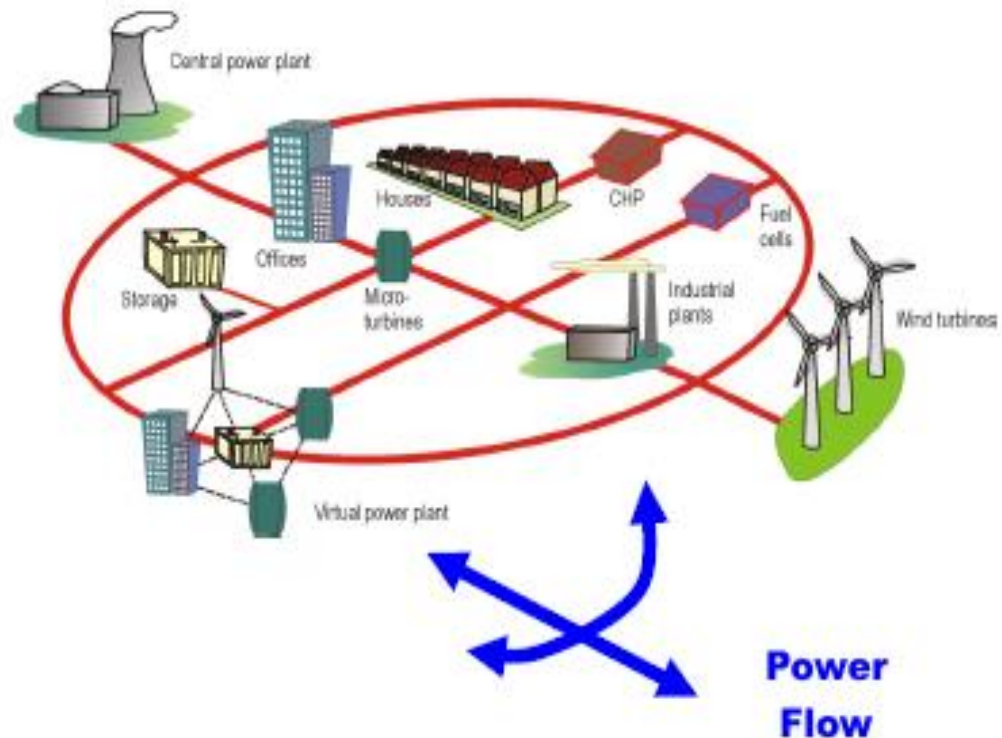


## Impact of DG & VSPP

- Increasing current fault in the distribution system
- Mis-operate of Protective Devices
- Interconnection between DG and Utility's Grid (Voltage, Power Factor, Harmonic, etc.)

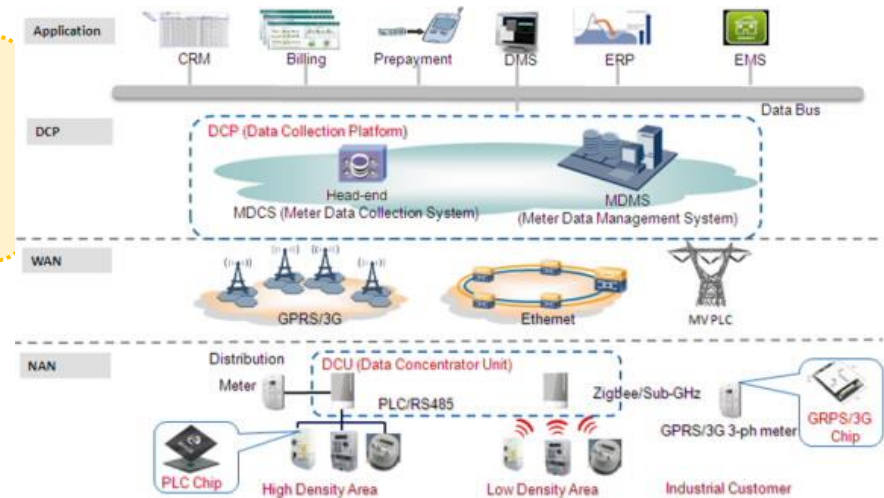
# Driven to Improve Power System Stability

In PEA's current infrastructure this would cause considerable problems and systems have to be modified to accommodate the increase in DG and VSPP



PEA needs to update infrastructure and advanced technology to develop electricity networks that can deliver power for more efficiently

## Upgrade Infrastructures and Technologies



Improve Quality of Service

# Driven to be socially responsible and operate in an environmentally friendly manner

The main culprits of greenhouse gas production is :

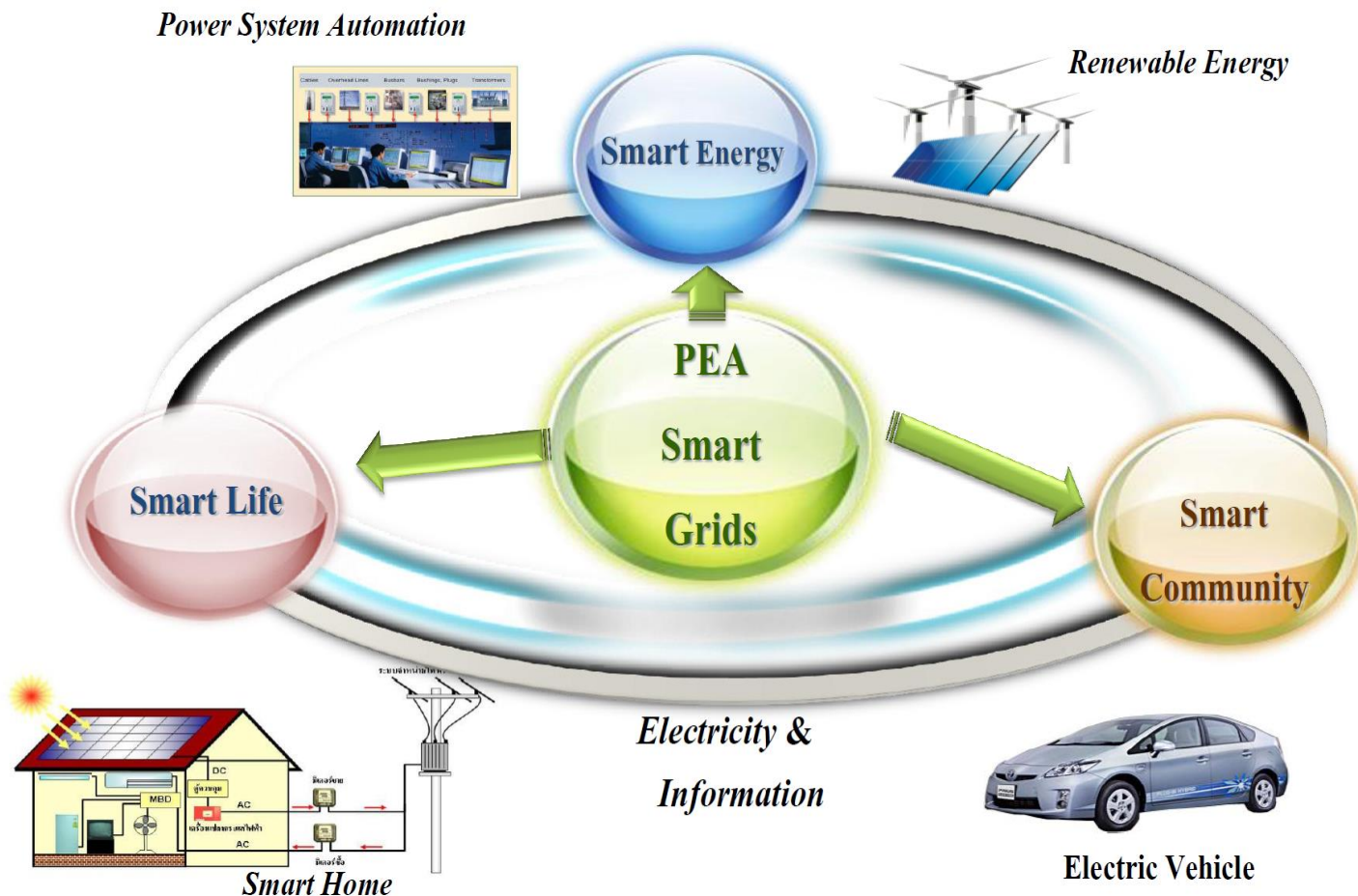
- Power generation particularly from the use of fossil fuels
- Transportation

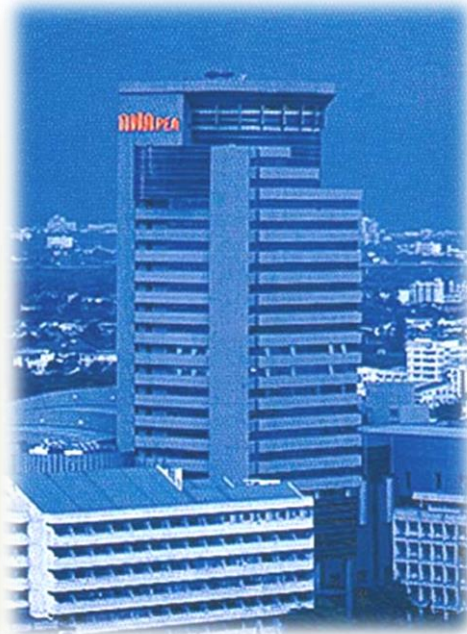




# PEA Smart Grid Vision

*“PEA’s Smart Grid focus is to improve quality of life while maintaining the environment.”*





# PEA Smart Grid Project

# PEA Smart Grid Project

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**1**

**Smart Grid in Pattaya City, Chonburi Province**

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**2**

**Micro Grid Development Project (Koh Kood and Koh Mak)**

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**3**

**Micro Grid Development Project  
(Mae Sareang district, Mae Hongson province)**

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# Smart Grid in Pattaya City, Chonburi Province (Pilot Project)



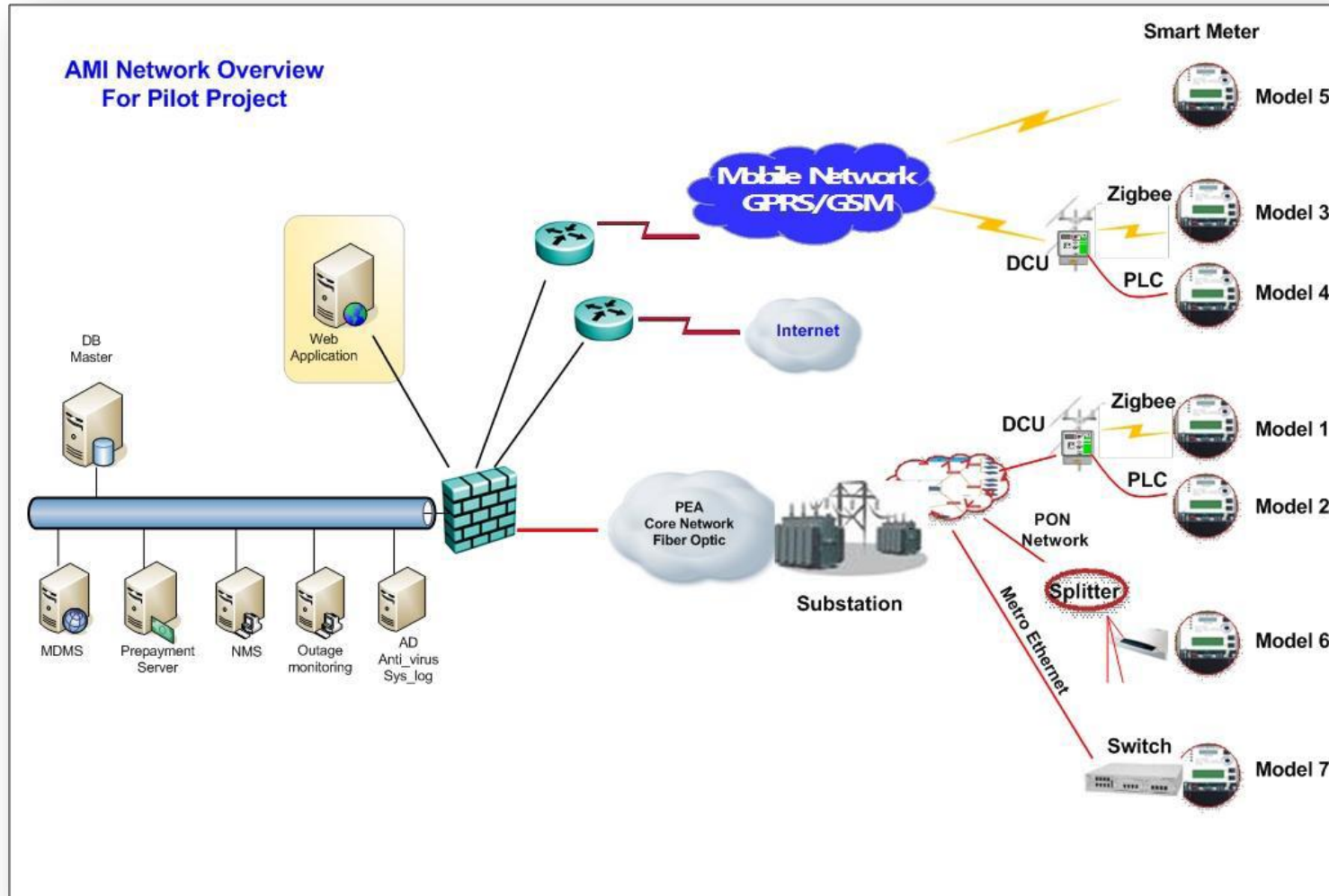
## Scope of Work

• Data Center System	1	System
• Smart Meter	116,308	Meters
• Communication Infrastructure	1	System
• Mobile Workforce Management System	1	System
• IT Integration system	1	System
• Substation Upgrade to IEC 61850	3	Substations



# Smart Grid in Pattaya City, Chonburi Province

## AMI System



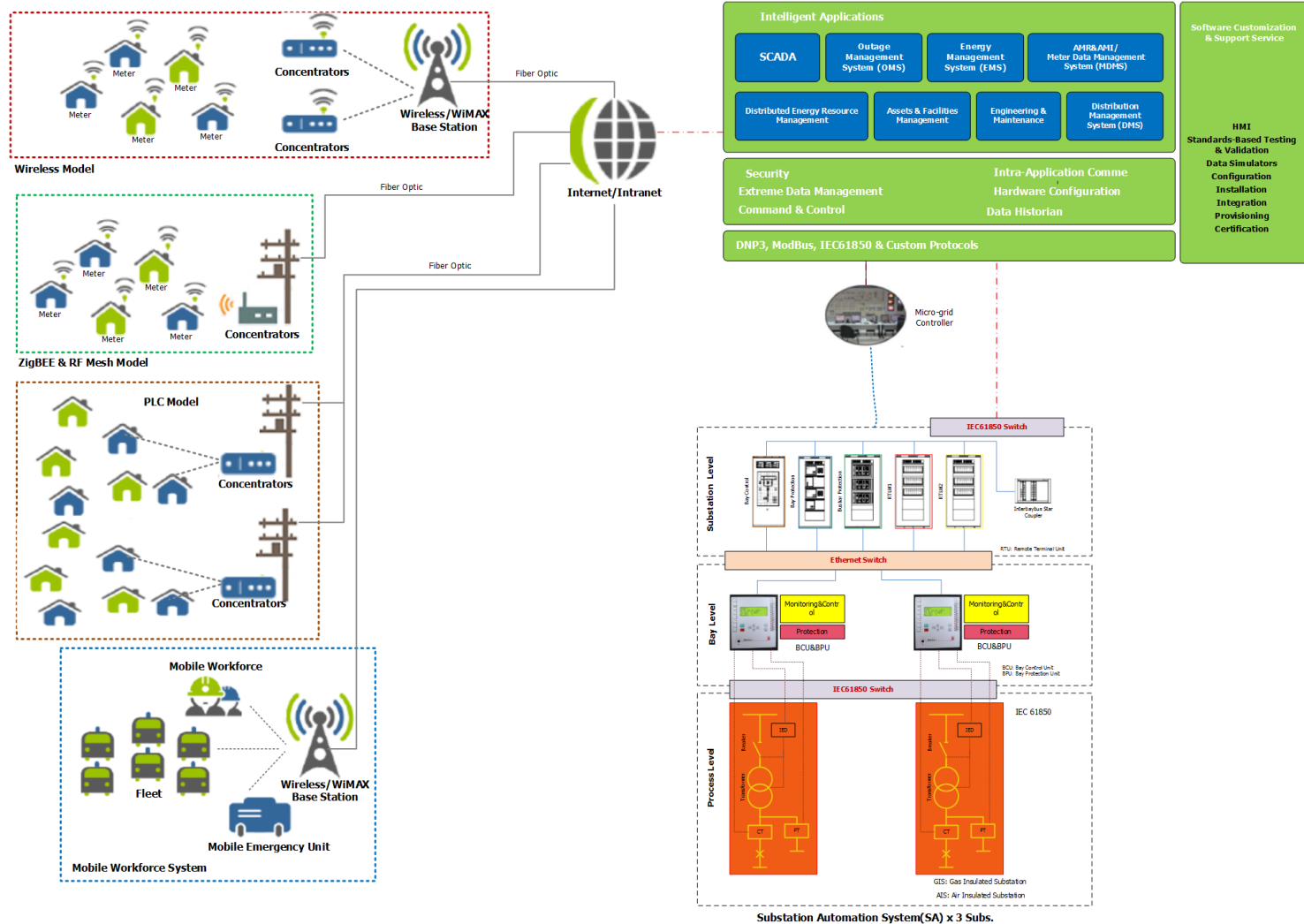
# Smart Grid in Pattaya City, Chonburi Province

## AMI System

Narrow Band Service								
Solution	Technology			Customer				
	Backbone	WAN	Last Mile	Single phase		Three Phase		Total
	(MDMS to Sub.)	(Sub. to DCU)	(DCU to meter)	2555	2556	2555	2556	
Model 1	F/O	PON	Zigbee	1,700	35,000	800	2,600	40,100
Model 2	F/O	PON	PLC	1,700	35,000	700	2,600	40,000
Model 3	GPRS		Zigbee	1,673	12,640	712	2,600	17,625
Model 4	GPRS		PLC	1,673	12,638	712	2,500	17,523
Model 5	GPRS			10	30	10	-	50
Broadband Service								
Model 6	F/O	PON		200	200	100	500	1,000
Model 7	F/O	Metro Ethernet		-	-	10	-	10
Total				6,956	95,508	3,044	10,800	116,308
				102,464		13,844		

# Smart Grid in Pattaya City, Chonburi Province

## Total Diagram Smart Grid



# Smart Grid in Pattaya City, Chonburi Province

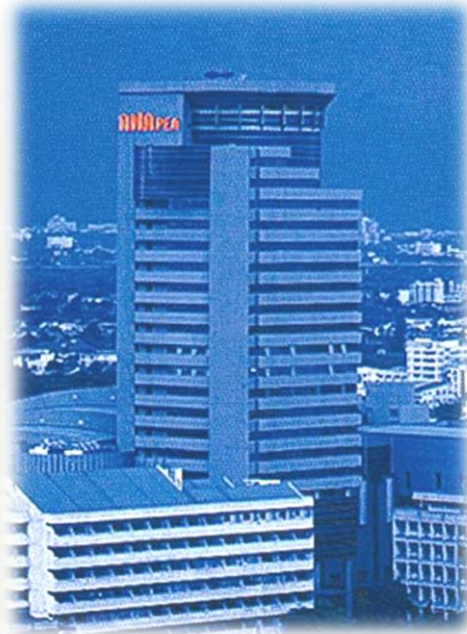
## Investment

No.	Item	Budget (M. Baht)	Budget (M. US dollar)
1	AMI System	917	28.66
2	Mobile Workforce Management	12	0.38
3	Substation Automation System	104	3.25
4	IT Integration System	36	1.13
Total		1,069	33.42

## Status

- Implementation Plan of Smart Grid in Pattaya City has been completed and approved by PEA's Board of Directors on 24 April 2013
- The National Economic and Social Development Board (NESDB) have approved Project on 3 March 2014
- The Energy Regulatory Commission of Thailand (ERC) have approved Project on 21 August 2014
- Pilot Project is preparing to the Cabinet submission for final approval





**Thank you for your attention**