



The First Smart Grid Project in Thailand, Pattaya City



By

Mr.Pongsakorn Yuthagovit

Deputy Director of System Planning Department and
Project Manager of the Smart Grid Pilot Project

Geo Smart Asia 2016, Kuala Lumpur, Malaysia
Strategic City Planning & Smart Electricity
18 October 2016

Outlines



PEA Smart Grid

3 Topics

1. About PEA

2. PEA Smart Grid Roadmap

3. PEA Smart Grid Project

Outlines



PEA Smart Grid

3 Topics

1. About PEA
2. PEA Smart Grid Roadmap
3. PEA Smart Grid Pilot Project

About PEA



PEA Smart Grid

Vision



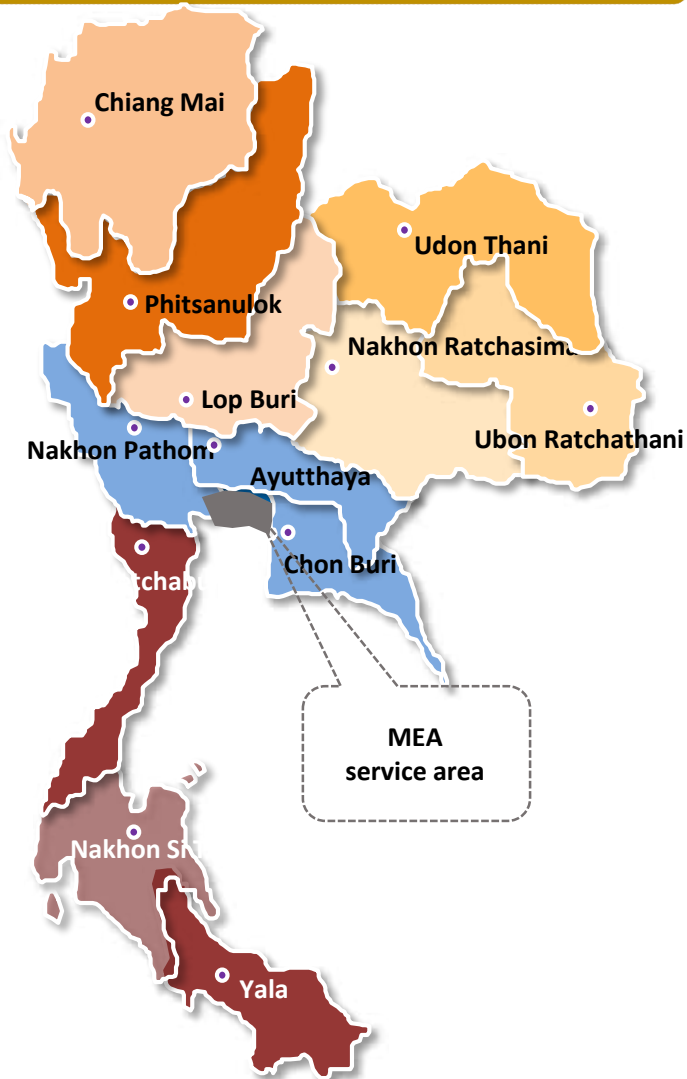
To provide efficient and reliable electricity services for quality of life and sustainability of economy and society.

About PEA



PEA Smart Grid

Service Area : as of 31 DEC 2015



| | |
|------------------------|---|
| Area | • 510,000 km2 (approx. 99%) |
| Province | • 74 provinces |
| Substation | • 539 Substations |
| Customer : | • 80,033 villages • 18.05 million households |
| Electrified customer : | • 99.97% (village) |

About PEA

General Info: as of 31 DEC 2015



Maximum Demand

- 18,596 MW

Total Sales of Electricity

- 90,531 Million Unit (kWh)

SAIFI

- 4.69 times/customer/year

SAIDI

- 153.61 minutes/customer/year

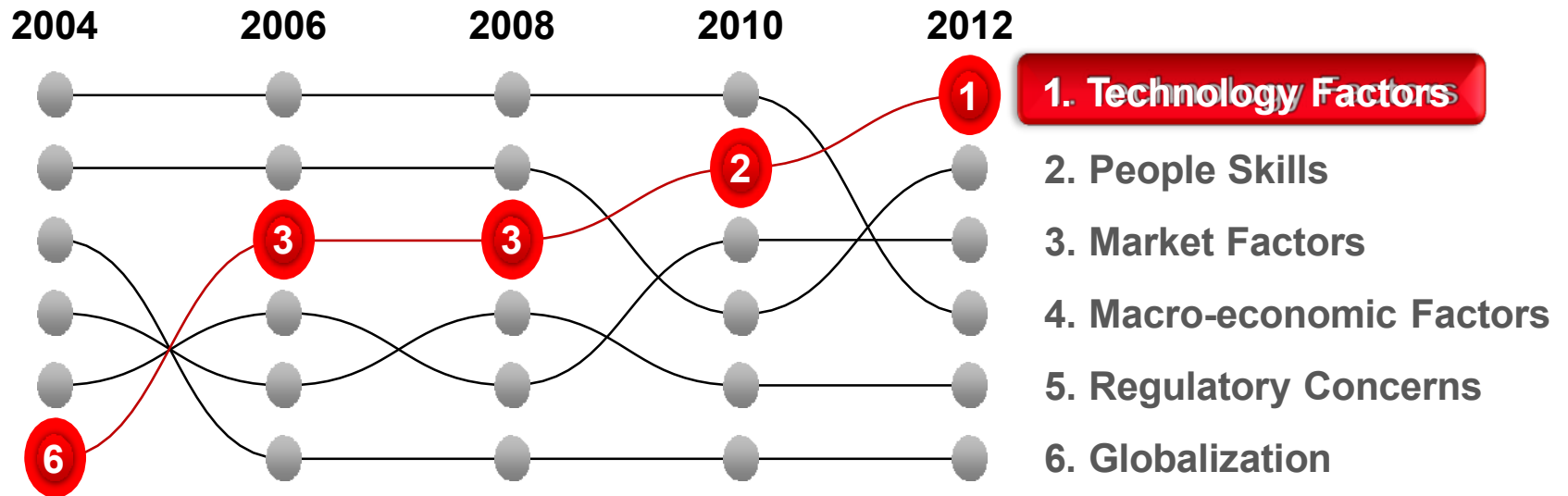
Distribution Loss

- 5.75 %

Factors Impacting Organizations



Smart Grid Planning Division



Source: IBM CEO Study 2012

Policy and Strategies



PEA Smart Grid

56
PEA



28th September 2016,
PEA celebrates its
56th anniversary with

“ Human resources
development
through innovation
and operational
performance through
technology ”

Mr. Samsakoul Klakaw
Governor of the Provincial Electricity Authority



Strengthening

ความมั่นคงระบบไฟฟ้า

Standardizing

สร้างมาตรฐานที่เป็นเลิศ

Smart

มุ่งสู่ความทันสมัย

Sustainable

การเติบโตอย่างยั่งยืน

The Electric
Utility of the Future

Outlines



PEA Smart Grid

3 Topics

1. About PEA

2. PEA Smart Grid Roadmap

3. PEA Smart Grid Project

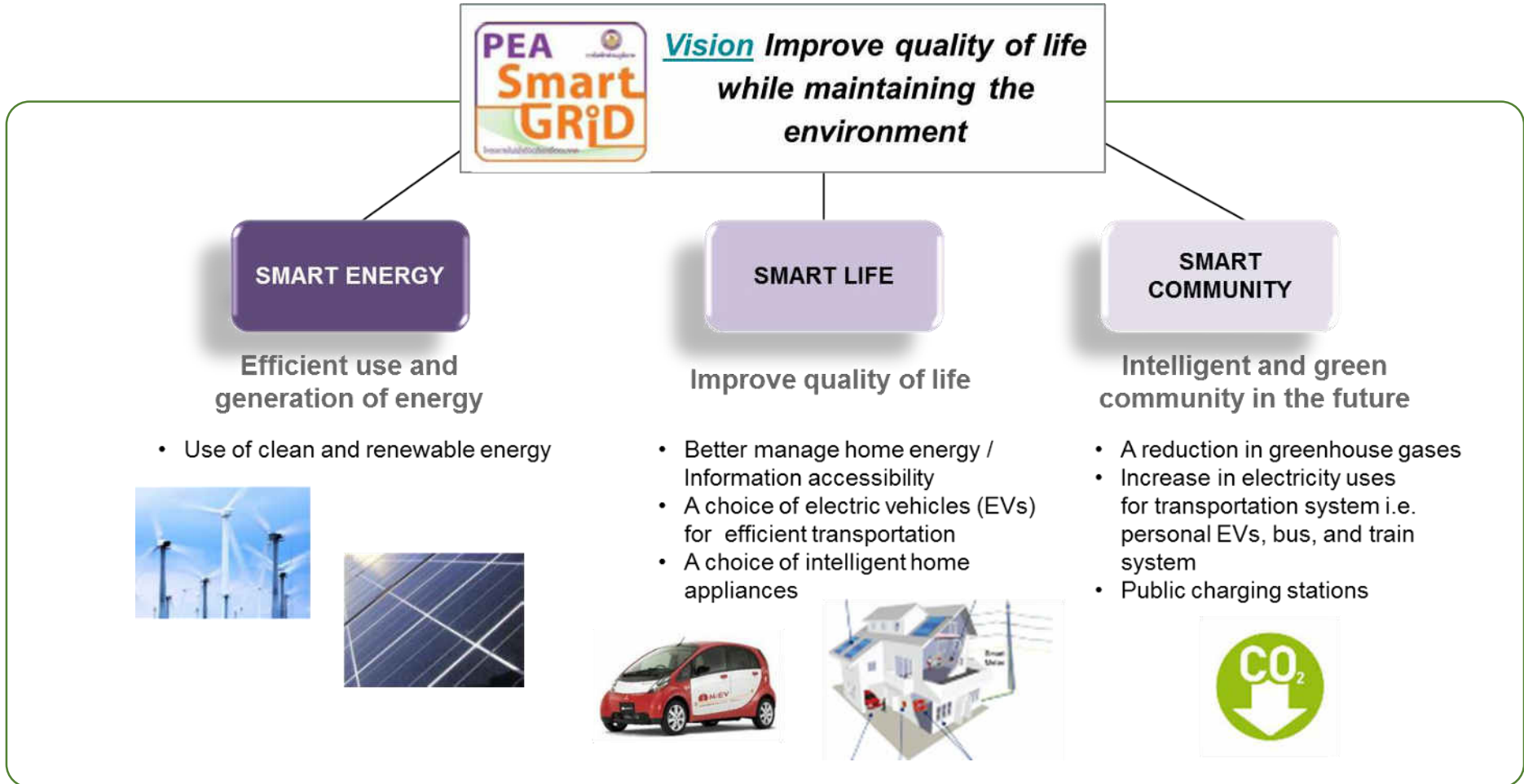
Drivers

In response to the global drivers, PEA has defined their own Smart Grid driver to align with the nation challenges, organizational vision and strategy



- ❖ Improve Power System Stability
- ❖ World Trends toward Low Carbon Economy & Sustainable Society
 - RE Promotion and future challenges of commercial fuel supply
 - Energy Efficiency both on Supply-side and Demand-side
- ❖ ICT Application to improve productivity and services
- ❖ Social responsibility and operate in an environment friendly manner
- ❖ Integration of PEA, MEA, EGAT Smart Grid Roadmaps, and strategic plans of related stakeholders
- ❖ Needs of Innovation for the country's competitiveness

PEA first announced PEA Smart Grid Roadmap in 2011

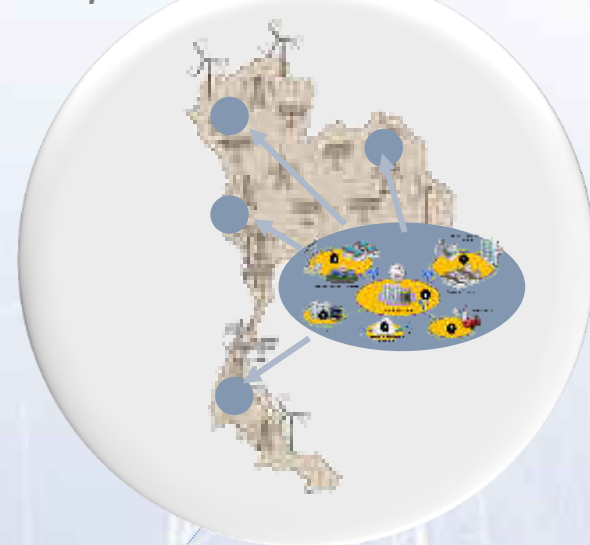


A Road to PEA Smart Grid

Vision of Our Energy Future

STAGE 2: NATIONAL ROLLOUT

Replicate the success nationwide



STAGE 1: DEMO & PILOT

Establish the foundation for customer-centric smart grid



TODAY: EXISTING GRID

Operate traditional & discrete grid capabilities



- **Planned** Micro Grid Pilot In Mae Sarieng
- **Approved** Pattaya Pilot Scope and Budget

Outlines



PEA Smart Grid

3 Topics

1. About PEA

2. PEA Smart Grid Roadmap

3. PEA Smart Grid Pilot Project

Pattaya Pilot

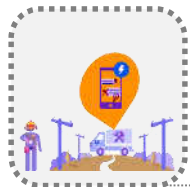
Scope of Work



AMI Installation 116,308 Units



**Substation
Automation** 3 Subs



**Mobile workforce
Management
System** 1 System



IT Integration 1 System

Status

Cabinet approved project and budget

Dec 23, 2014

**PEA is conducting public hearing and we
plan to launch the RFP in Dec.**

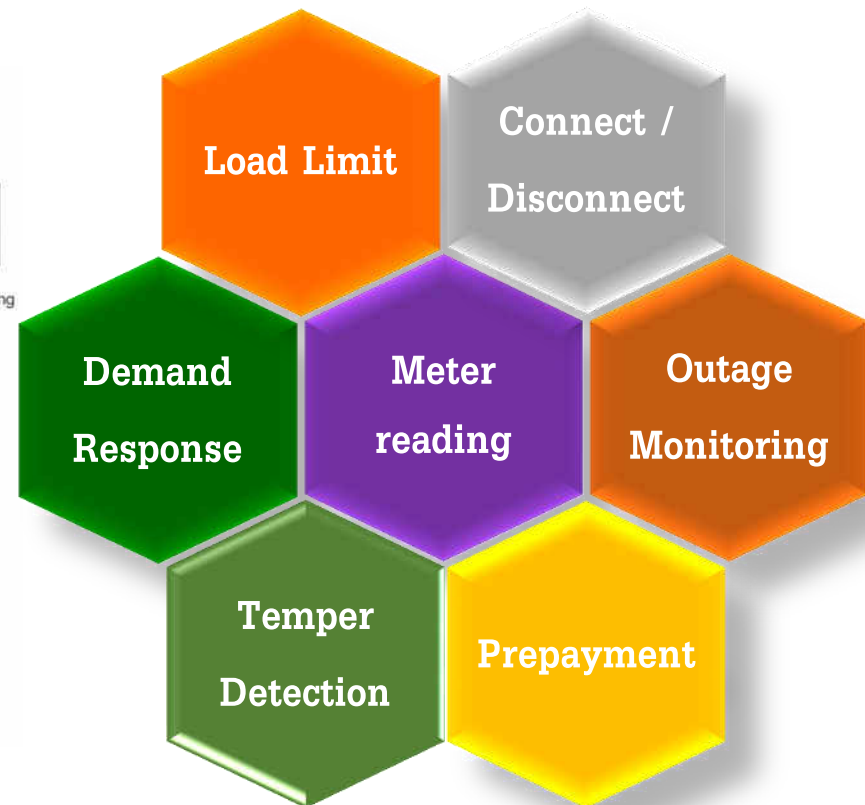
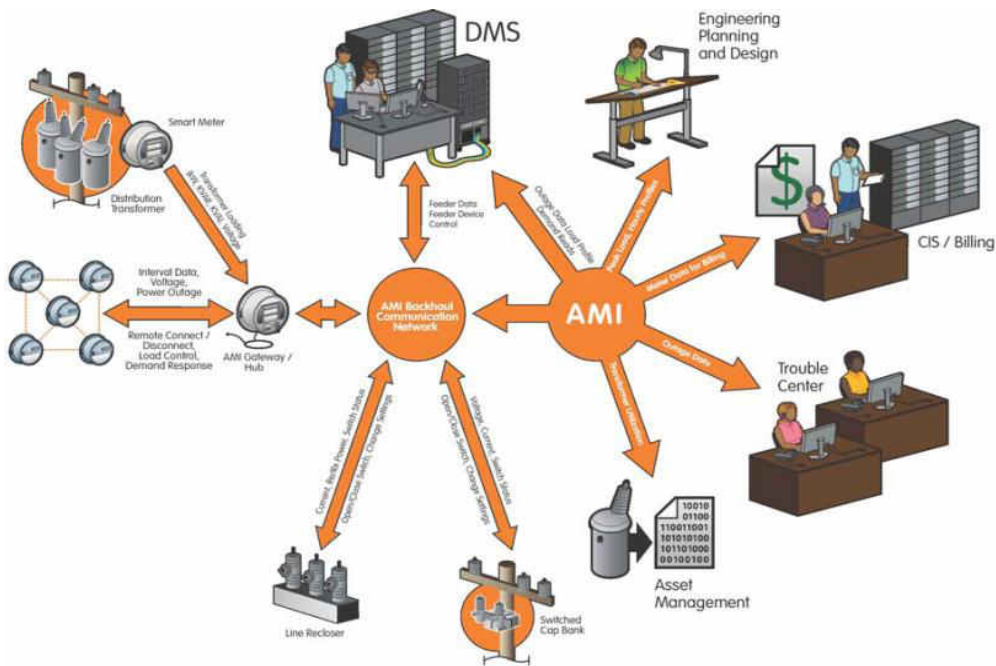


Project Period : 2016-2018

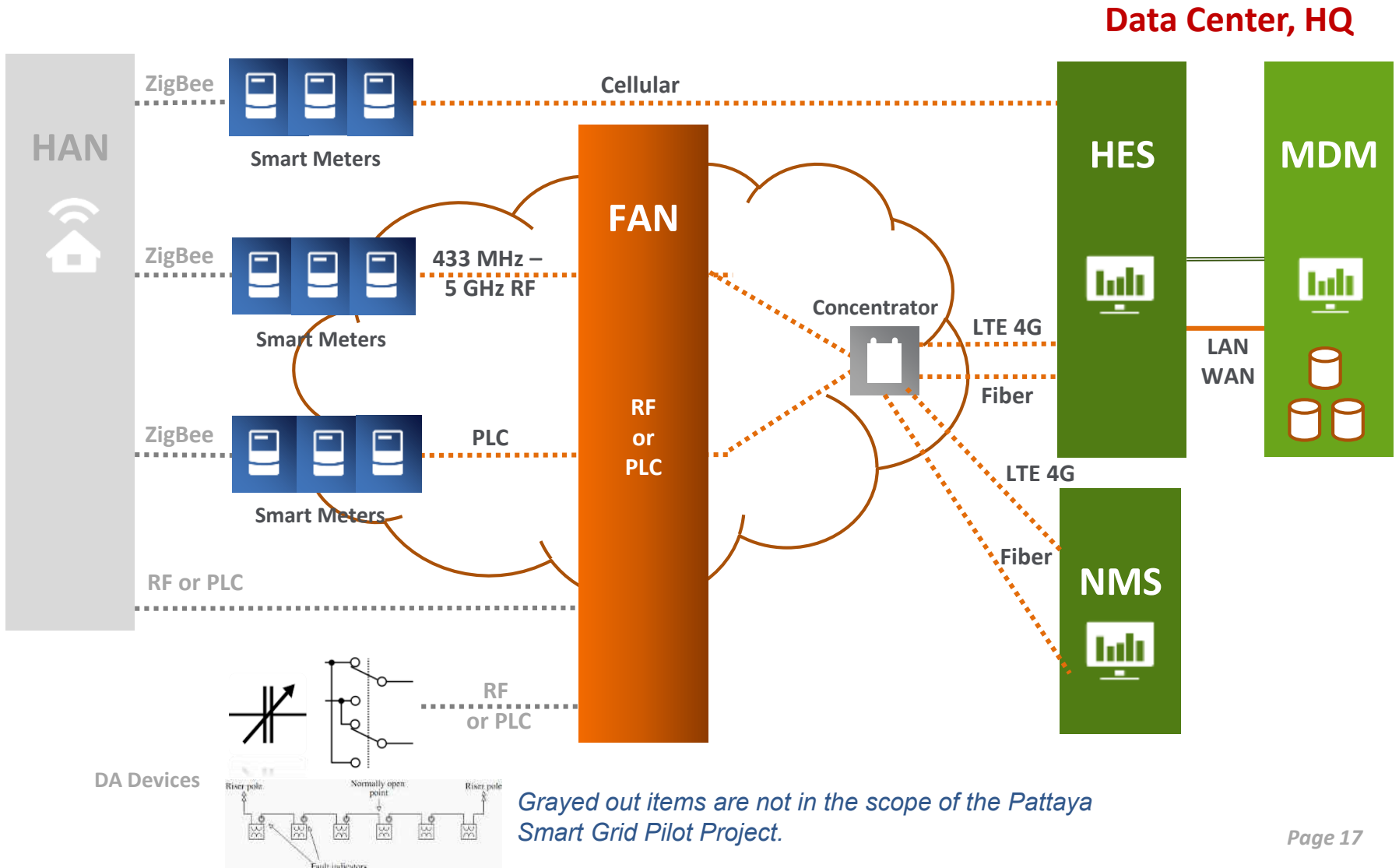
Budget : \$33.4 m

Smart Grid in Pattaya City, Chonburi Province Project

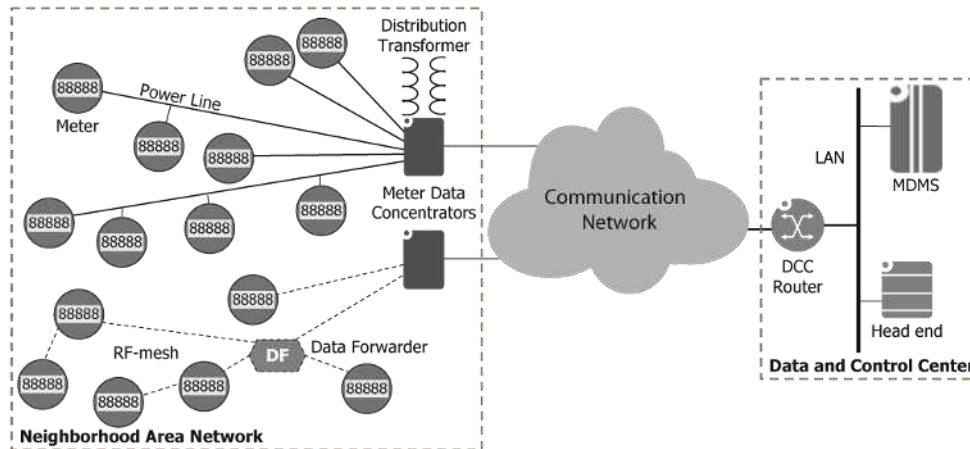
Functionalities



Smart Grid in Pattaya City, Chonburi Province Project



Technology Choices

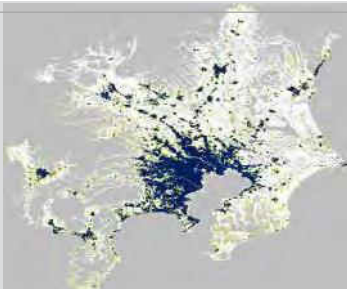
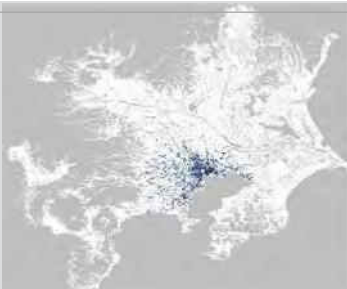
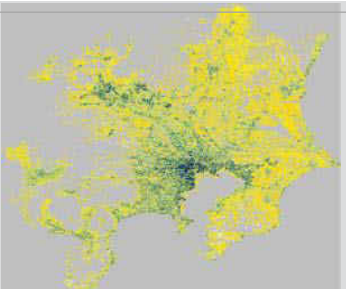


- Although AMI technology has emerged for more than a decade, but there is no right technology that can fit for all environments.
 - RF, PLC or Cellular? Each has its pros and cons.
 - Smart Meter -> Modular comm. module has better future in the long run?
 - Etc.

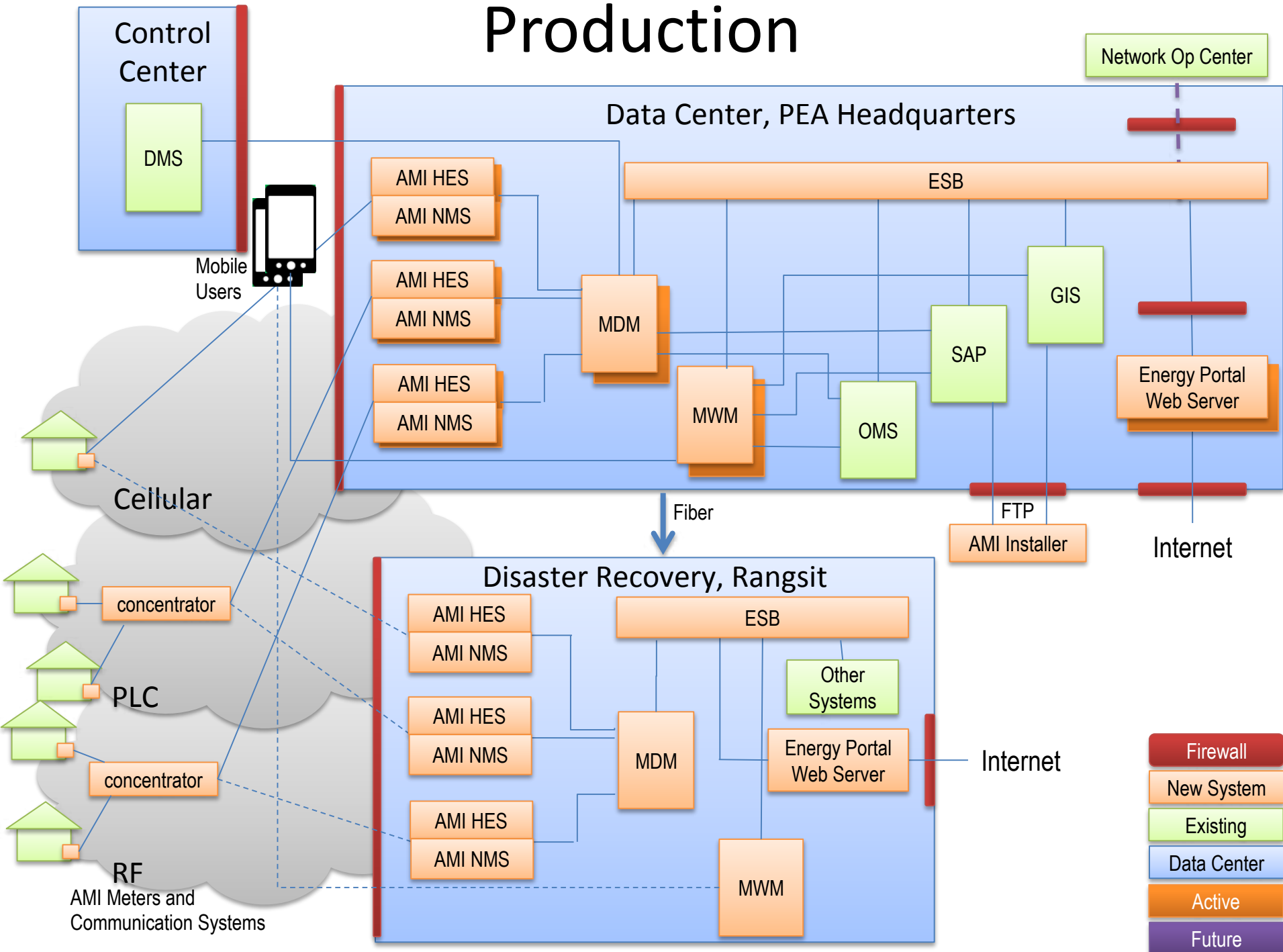
“No single technology can guarantee a project success.”

Technology Choices

Comparison of Technology Attributes

| | Wireless Mesh | PLC | Cellular |
|------------------|--|---|---|
| Environment | <ul style="list-style-type: none"> High density Low cost Economical | <ul style="list-style-type: none"> Complex buildings Multiple meters per room | <ul style="list-style-type: none"> Remote Areas Low-density areas |
| Proportion | The Rest | 10-15% | 5-10% |
| Concept | Meter density is higher than designed threshold, including metropolitan areas | Complex buildings where number of units exceeds defined threshold | Remaining areas (even mesh) to keep 95% of connected ratio at early stage |
| Deployment Areas |  |  |  |

Production

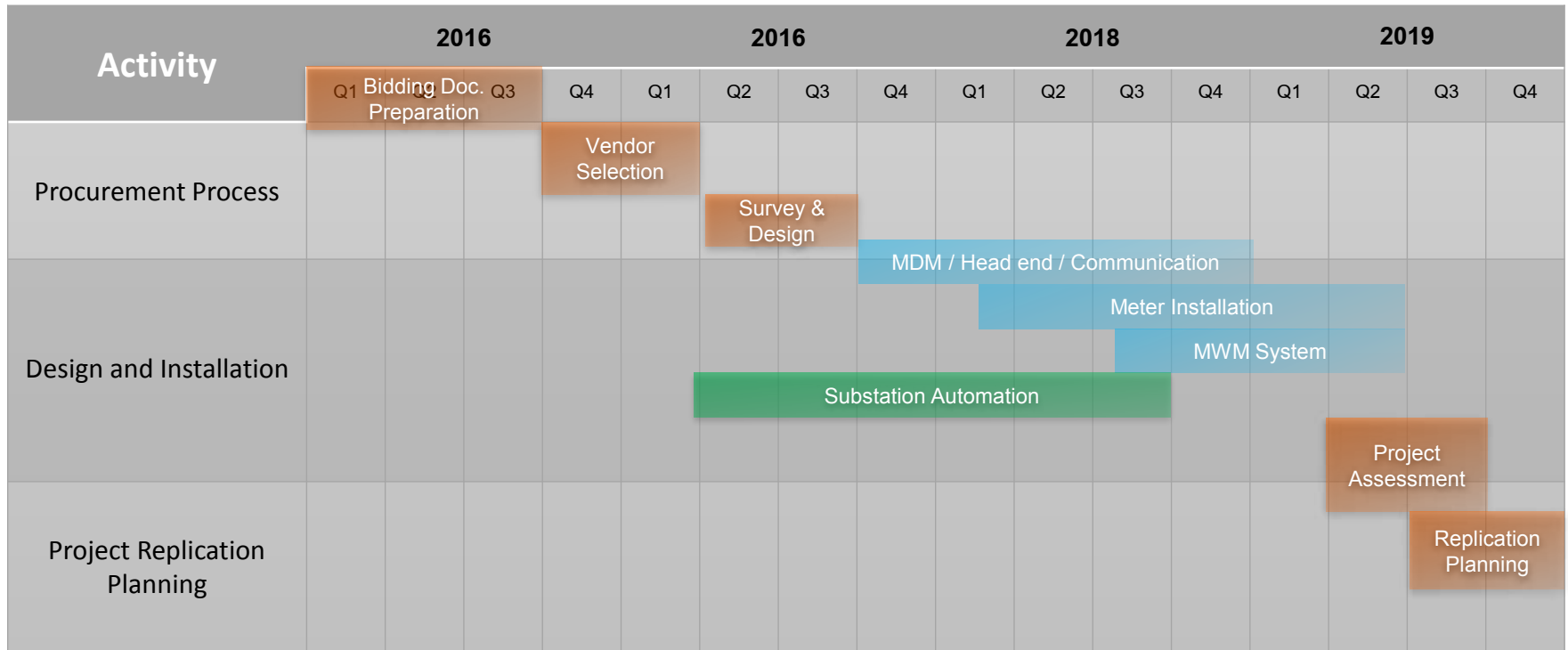


Smart Grid in Pattaya City, Chonburi Province Project



PEA Smart Grid

Project Timeline

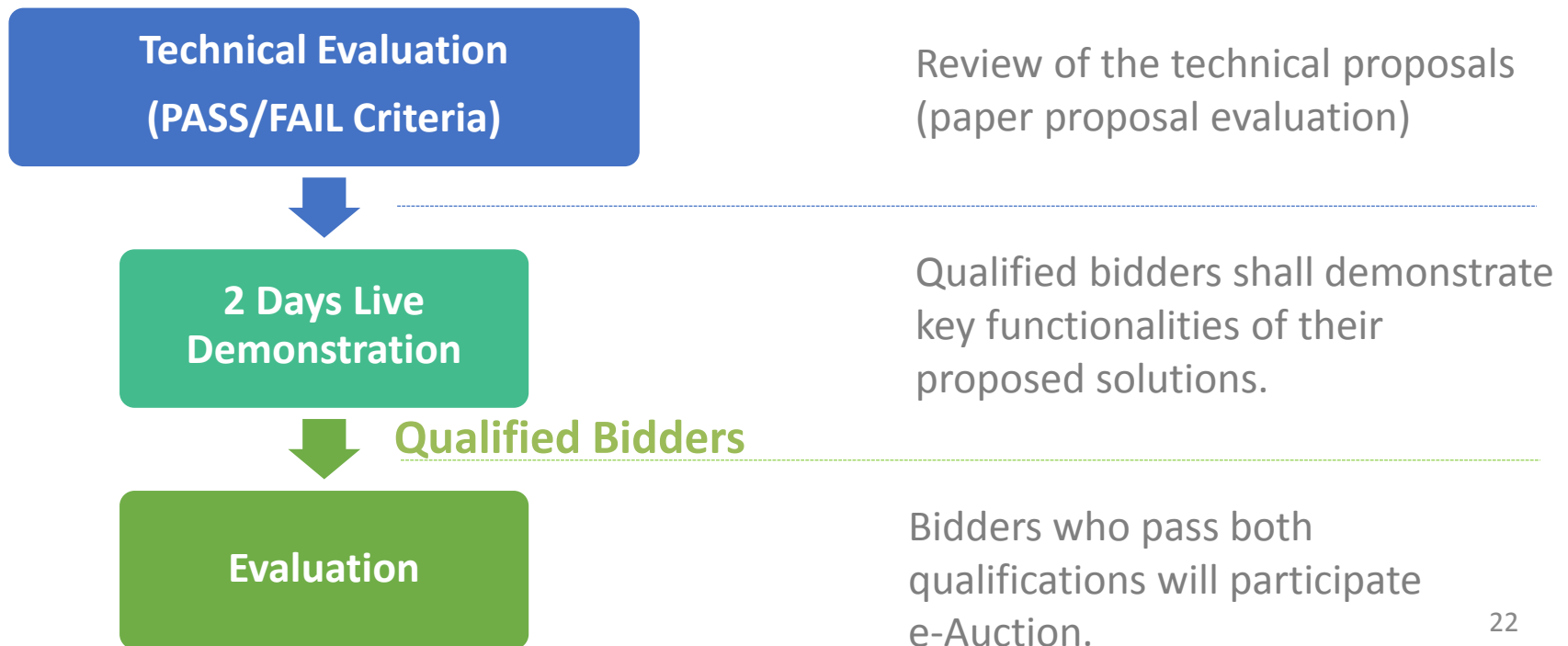


Procurement Strategy



Smart Grid Planning Division

- An AMI project not only involves most of players in organization but may also change the way they work
 - Need to cooperate with all relevant parts and work out in detail
- Setting up a Proof of Concept (Live Demo.) during a procurement process
 - This is a good idea to ensure interoperability and system performance

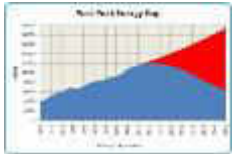


The Key Benefits of PEA Smart Grid Project



Key Benefits

Better power planning
(demand VS supply)



% Reserve margin
reduction

Capital investment
deferment



Improved power reliability
and sustainability

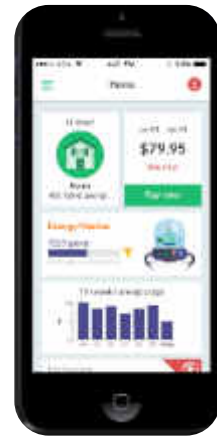
Carbon Emission
Reduction

Ability to shave peak
through Demand
Response

Improved household
consumption visibility /
energy theft reduction

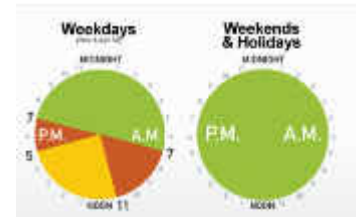
Improved outage
detection, investigation
and restoration

Ability to control over the
power bill; view and manage
consumption



Ability to lower power bill

More choices on
tariff and energy
services



Received better and new
customer experiences (i.e.
real-time troubleshooting,
digital channels)



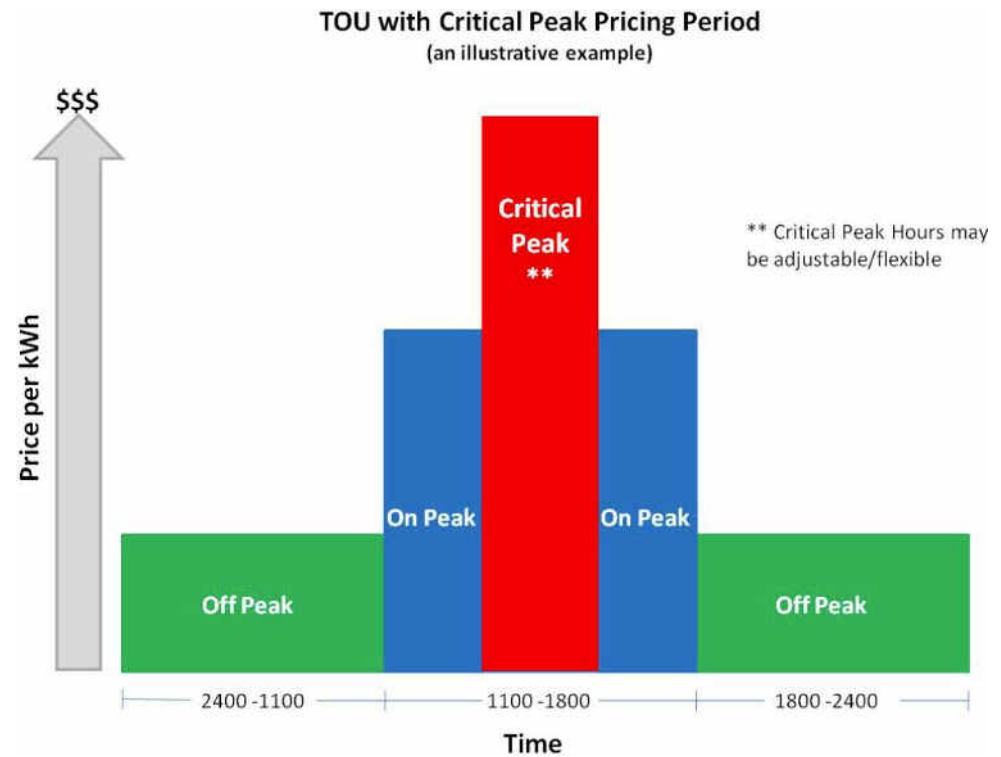
Home Energy
Management

Demand Response Programs



PEA Smart Grid

- Time-of-Use (TOU)
- Critical Peak Pricing (CPP)
- Direct Load Control (DLC)
- Peak Time Rebate (PTR)
- Real Time Pricing (RTP)



Source: AEIC

Q&A

