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The First Smart Grid Project in Thailand, Pattaya City



By

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Deputy Director of System Planning Department and
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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



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About PEA



PEA Smart Grid

Vision



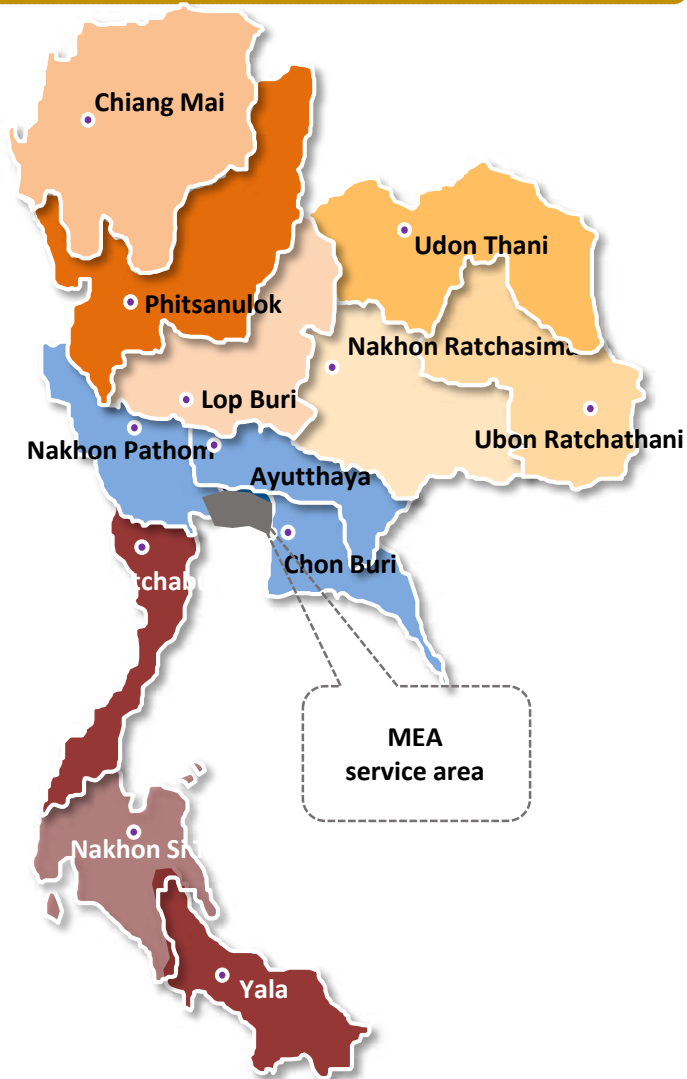
To provide efficient and reliable electricity services for quality of life and sustainability of economy and society.

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

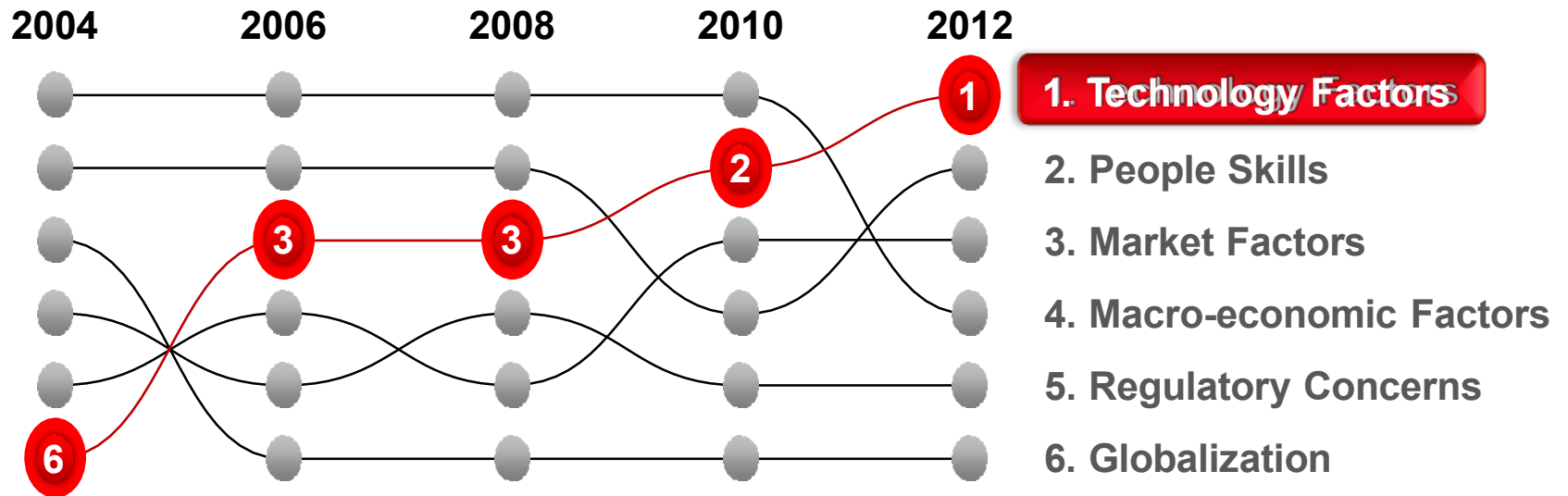
Distribution Loss

- 5.75 %

Factors Impacting Organizations



Smart Grid Planning Division

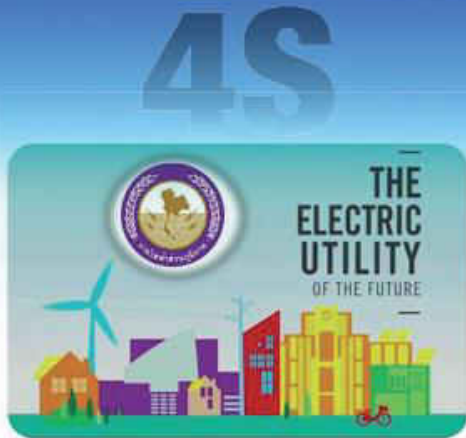


Source: IBM CEO Study 2012

Policy and Strategies



PEA Smart Grid



Strengthening

ความมั่นคงระบบไฟฟ้า

Standardizing

สร้างมาตรฐานที่เป็นเลิศ

Smart

มุ่งสู่ความทันสมัย

Sustainable

การเติบโตอย่างยั่งยืน

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

The Electric
Utility of the Future

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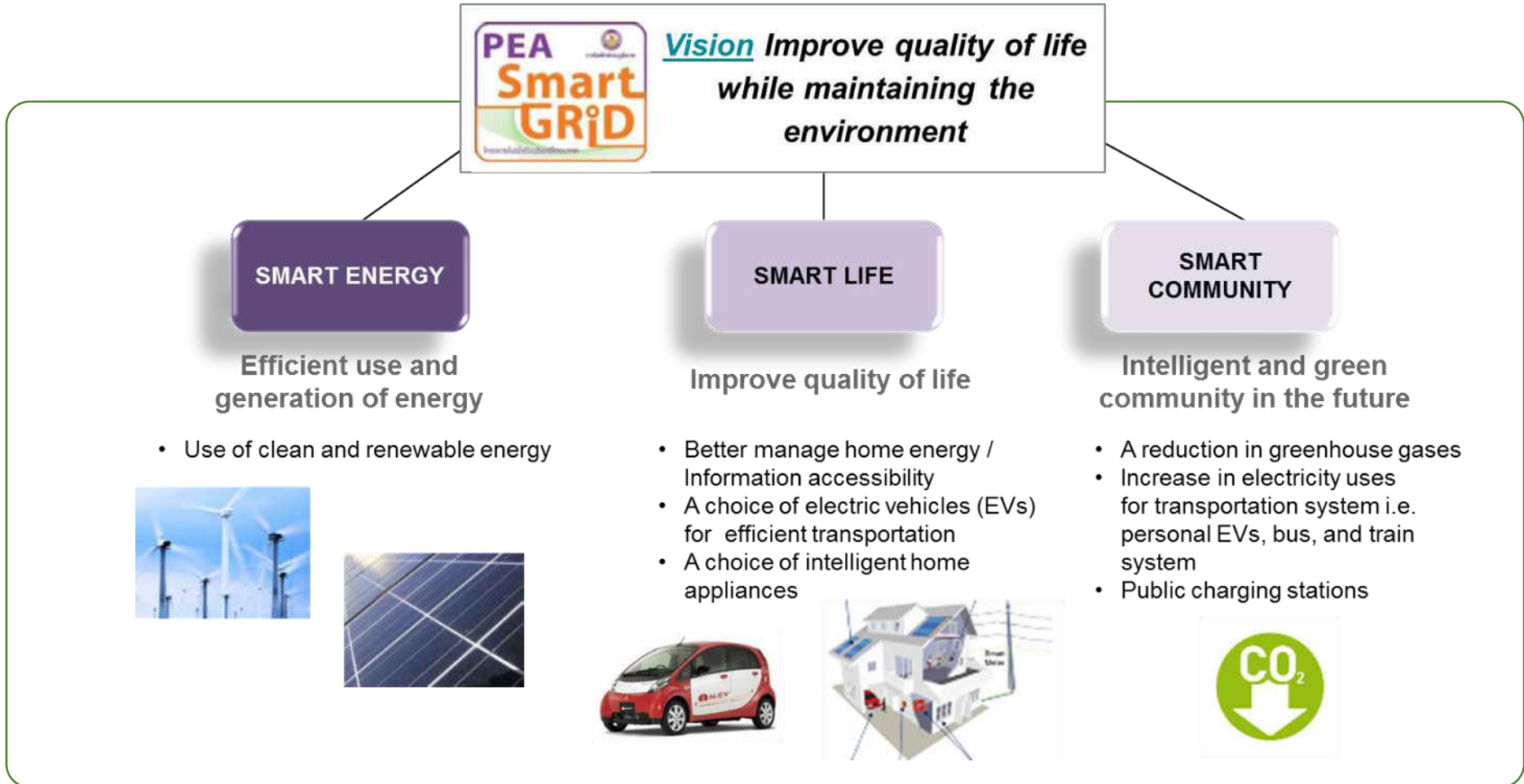
Drivers

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

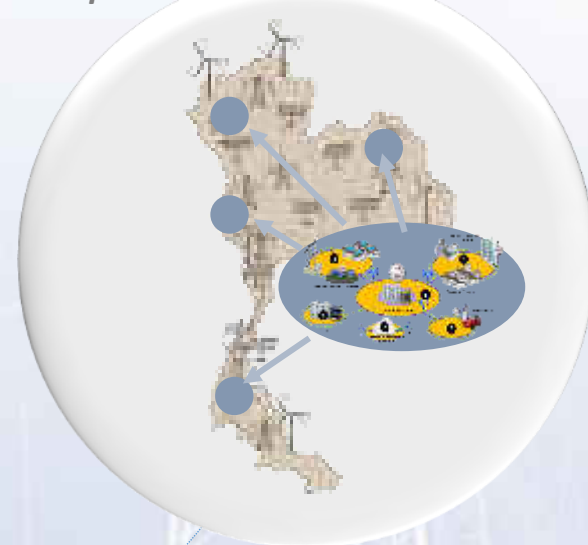


A Road to PEA Smart Grid

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

PEA SG Revision Aligned with National Roadmap

PEA Smart Grid

2015 2020 2025 2030 2035



Thailand Smart Grid Roadmap

Short Term (2017 – 2021)

Medium Term (2022 – 2031)

Long Term (2032 – 2036)

Preparation (2015-2016)

- Establish Smart Grid governance
- Determine platform used for Smart Grid development
- Encourage development of human resources and research

- Support study and research of pilot projects
- Determine policies to support utilities' investments in pilot projects

- Develop core infrastructure
- Revise policies and regulations to support the development of smart grid systems
- Encourage utilities to invest in development of core infrastructure

- Encourage utilities to invest in advanced smart grid infrastructure
- Establish policies to support and encourage consumers to adopt smart grid technologies
- Encourage utilities to invest in development of smart grid technologies



PEA Smart Grid Roadmap

Demo & Pilot (2016 – 2021)

STAGE 1: DEMO & PILOT
 Establish the foundation for customer-centric smart grid



National Rollout (2022 – 2036)

STAGE 2: NATIONAL ROLLOUT
 Replicate the success nationwide



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Pattaya Pilot

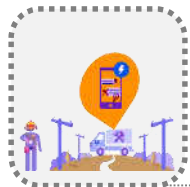
Scope of Work



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.

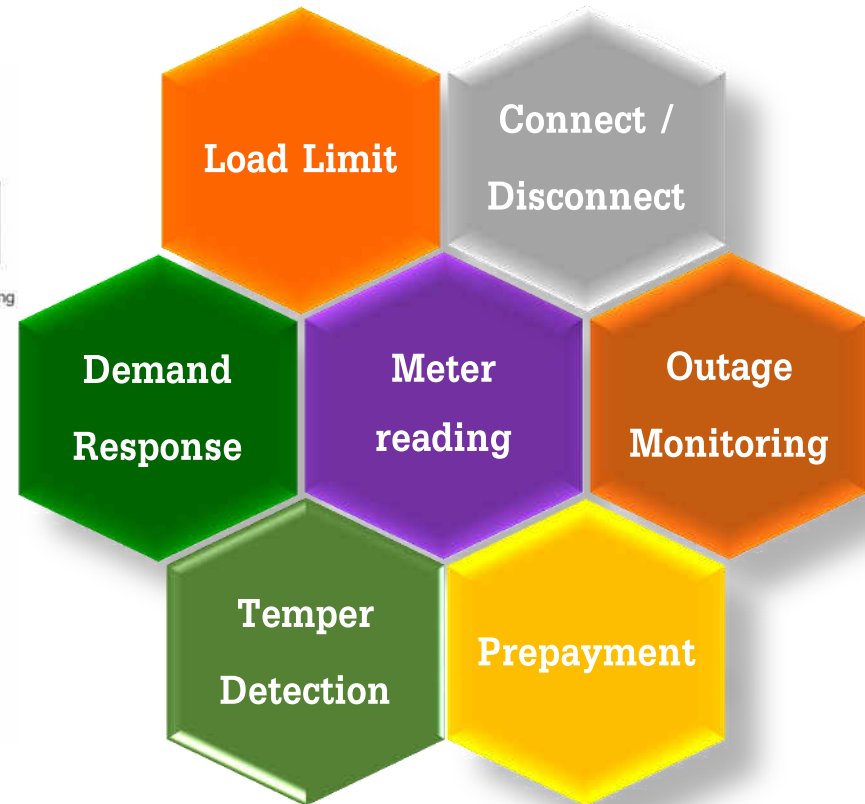
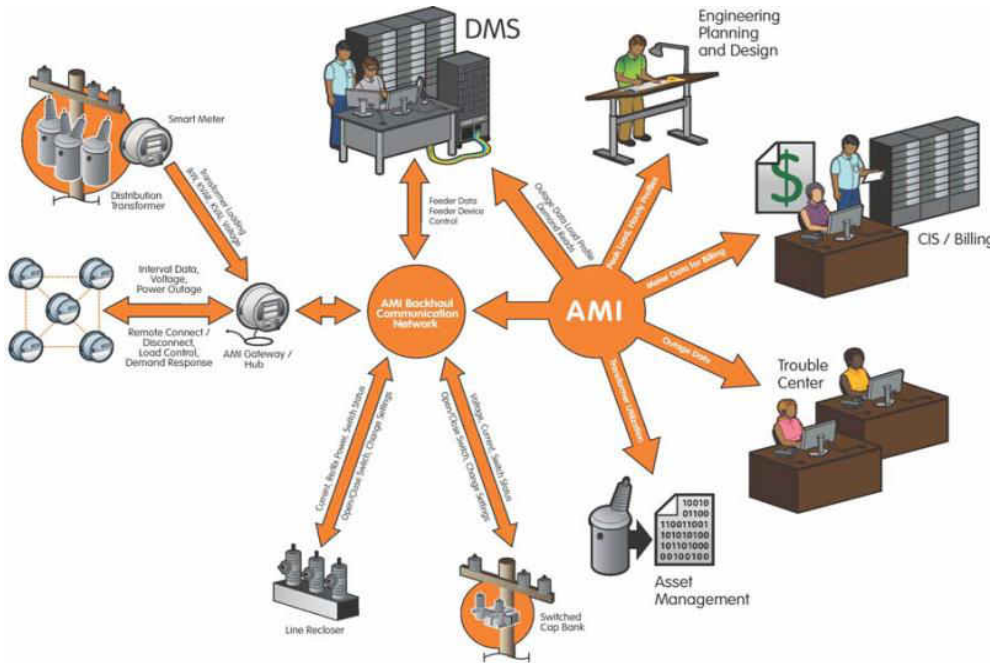


Project Period : 2016-2018

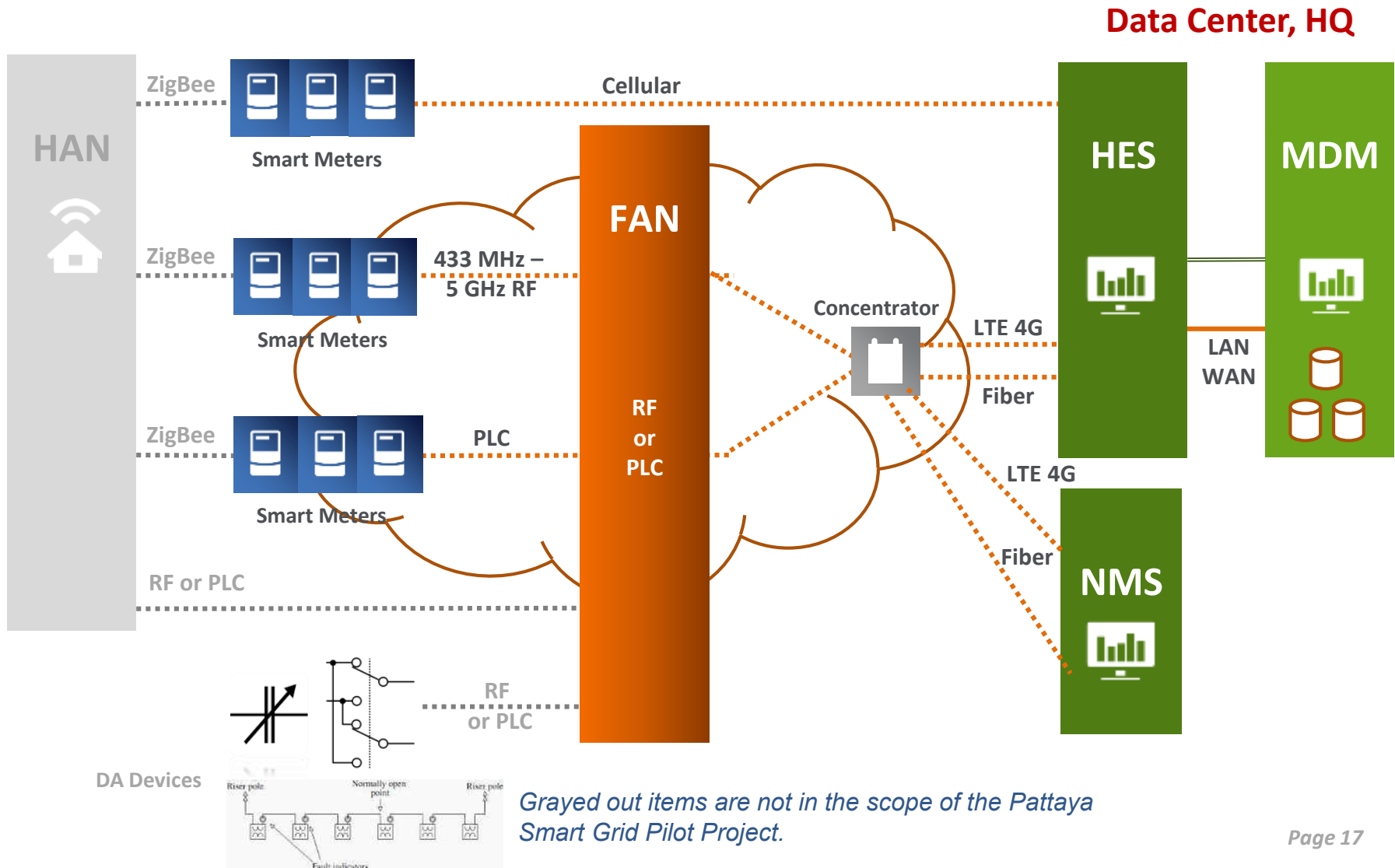
Budget : \$33.4 m

Smart Grid in Pattaya City, Chonburi Province Project

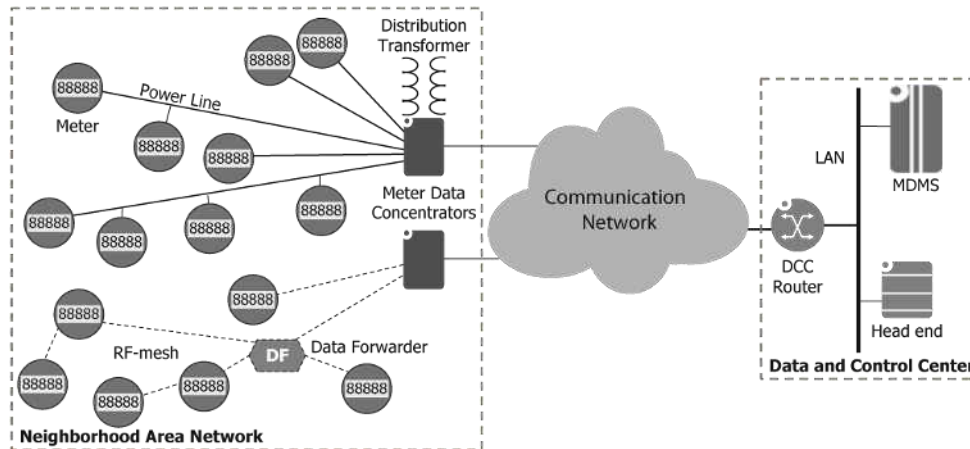
Functionalities



Smart Grid in Pattaya City, Chonburi Province Project



Technology Choices

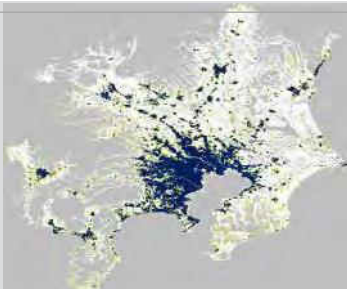
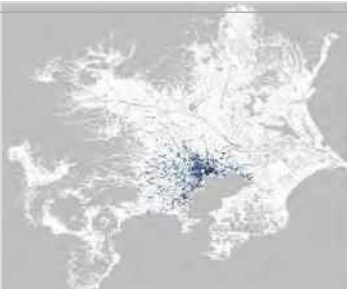
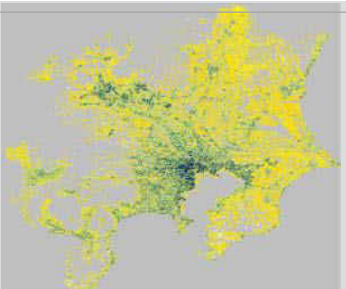


- Although AMI technology has emerged for more than a decade, but there is no right technology that can fit for all environments.
 - RF, PLC or Cellular? Each has its pros and cons.
 - Smart Meter -> Modular comm. module has better future in the long run?
 - Etc.

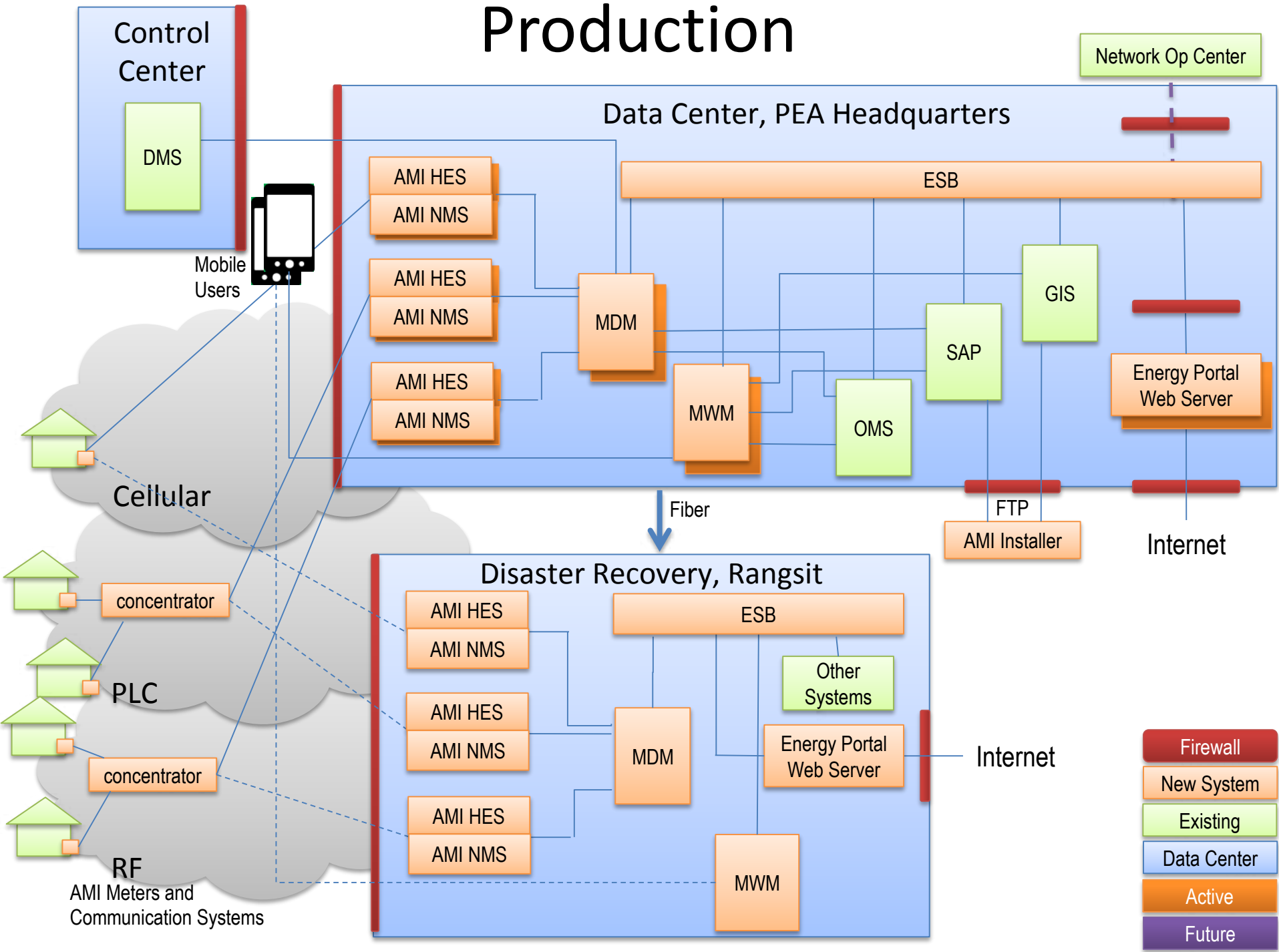
“No single technology can guarantee a project success.”

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

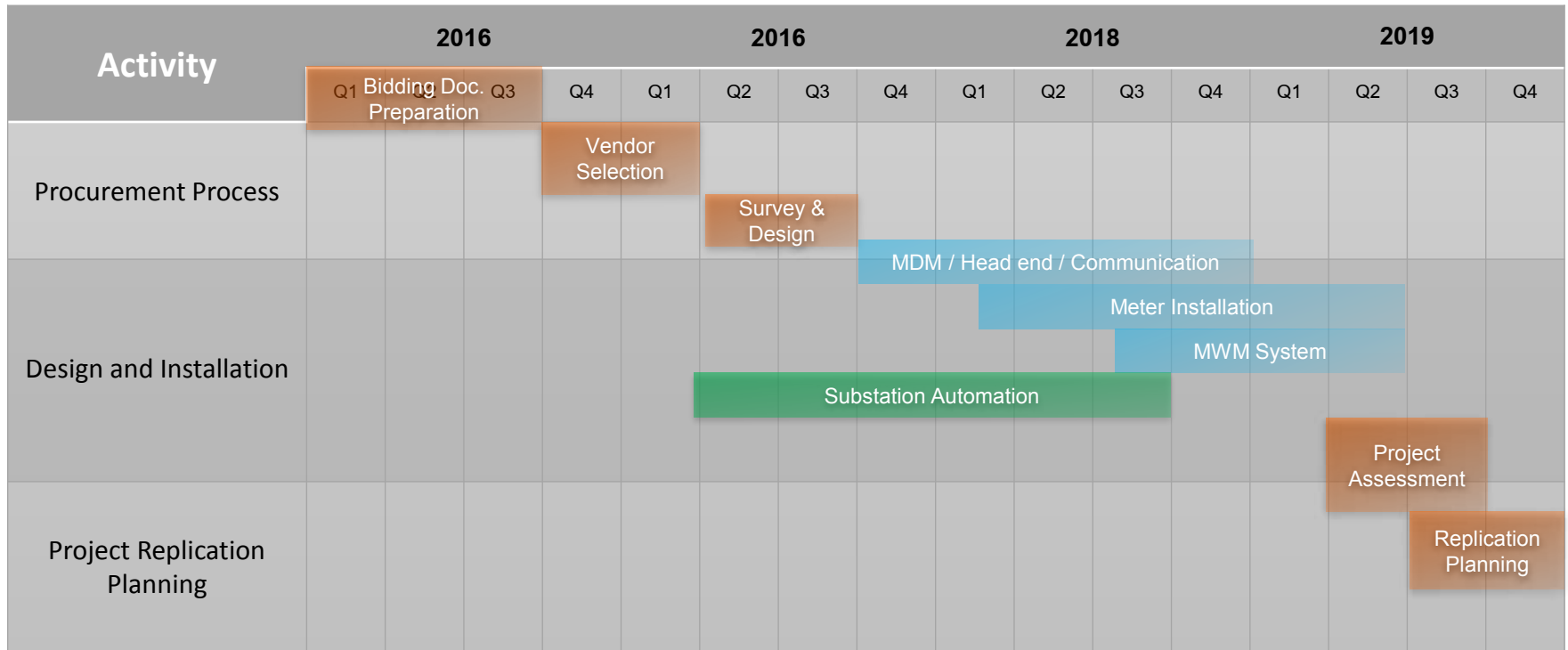


Smart Grid in Pattaya City, Chonburi Province Project



PEA Smart Grid

Project Timeline

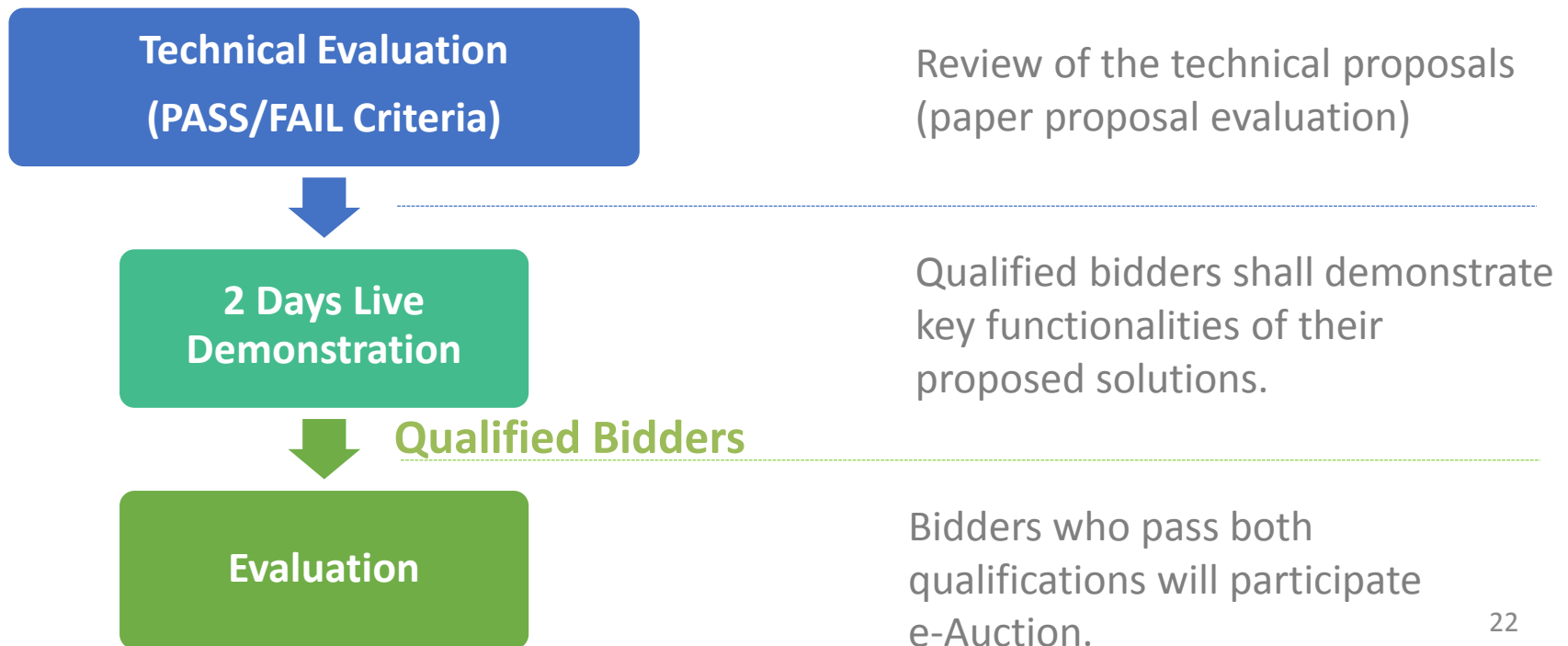


Procurement Strategy



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

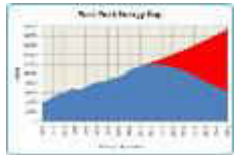


The Key Benefits of PEA Smart Grid Project



Key Benefits

Better power planning
(demand VS supply)



% Reserve margin
reduction

Capital investment
deferment



Improved power reliability
and sustainability

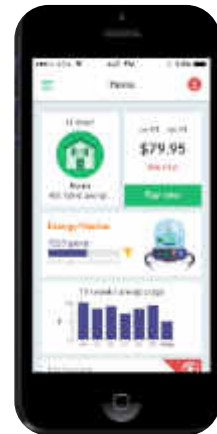
Carbon Emission
Reduction

Ability to shave peak
through Demand
Response

Improved household
consumption visibility /
energy theft reduction

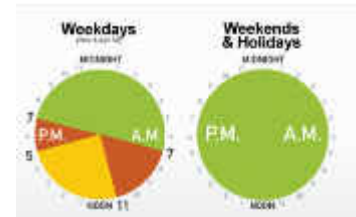
Improved outage
detection, investigation
and restoration

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)



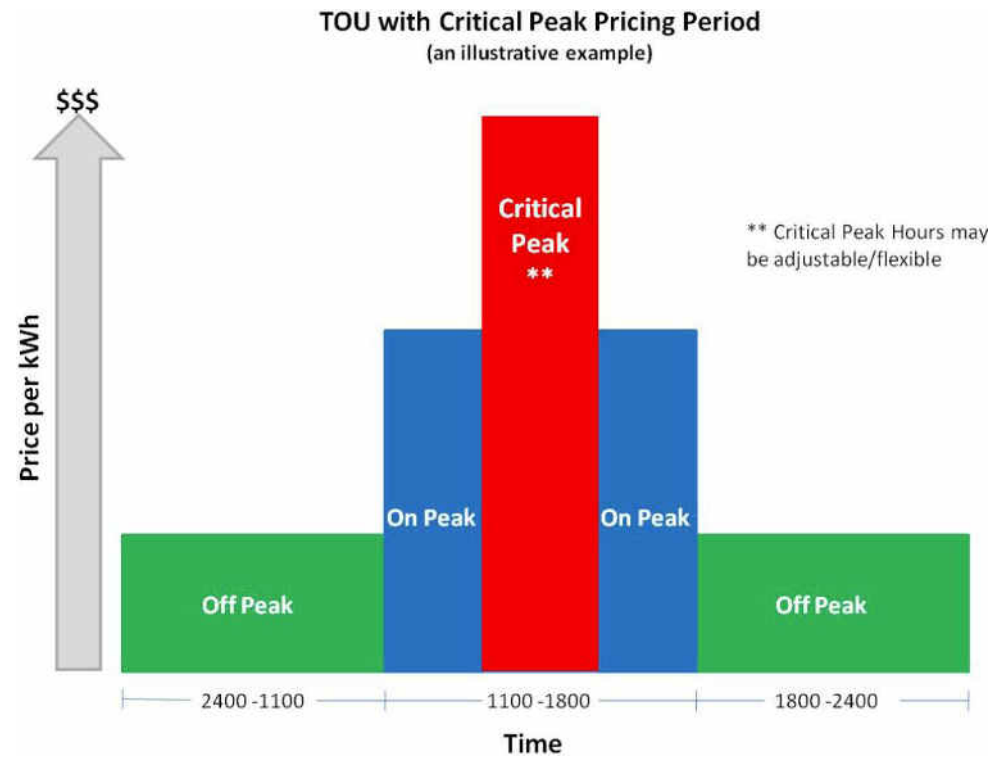
Home Energy
Management

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

