

Asia Smart City Week
Japan ASEAN Smart City
Network(ASCN)
Group 4:Smart Life

Energy Management Optimization Technology for Industrial Park

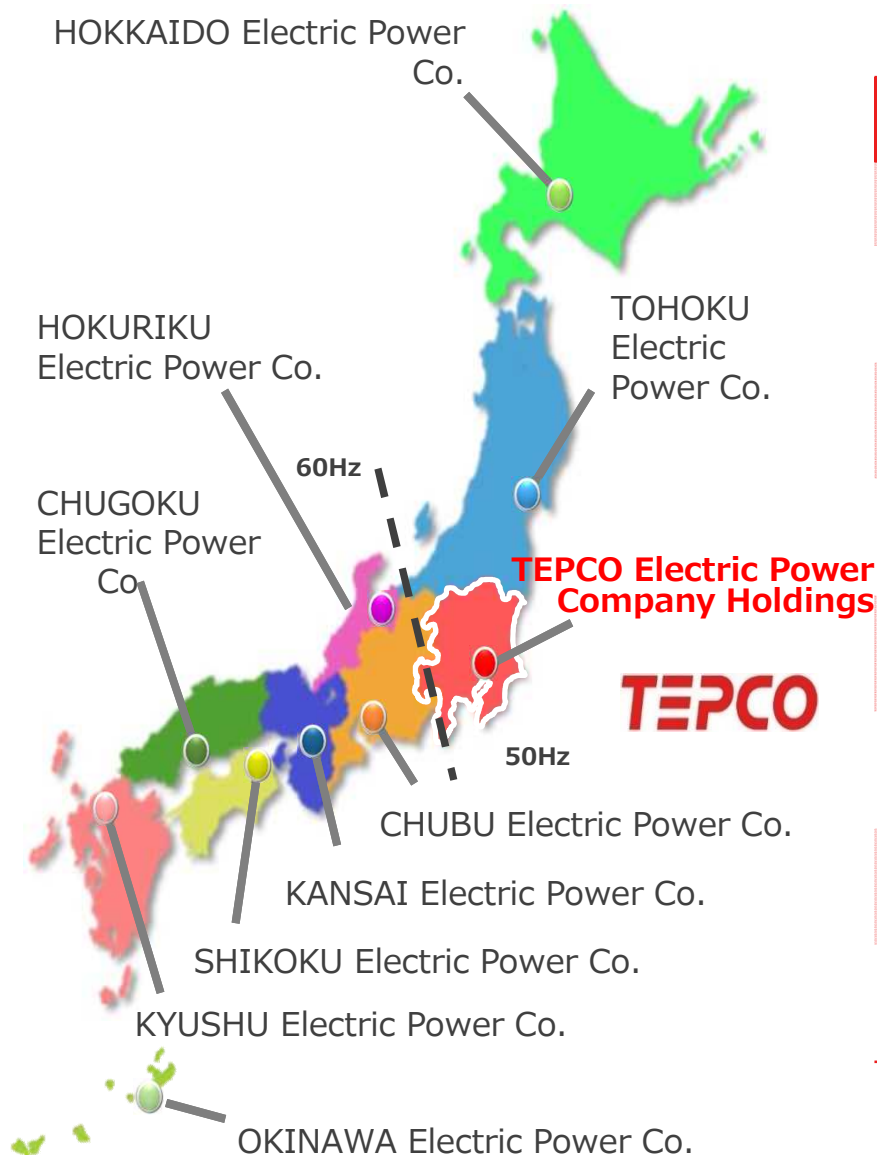
Oct 8th, 2019

TEPCO Energy Partner International(Thailand) Co.,Ltd.

Table of Contents

- 1. TEPCO Overview**
- 2. Study on energy management technology for industrial park**
- 3. TEPCO Energy Partner International(Thailand)**

1.1 TEPCO: Tokyo Electric Power Company



【TEPCO Overview】

Items	Stats
Foundation	May, 1951
Area(km ²)	39,575 (approx 10% of nationwide)
Population(million)	44.8 (approx 30% of nationwide)
Number of Customers (million)	27* ¹ (approx 30% of nationwide)
Electricity Sales(TWh)	243.8* ² (approx 30% of nationwide)
Peak Demand(GW)	64.3(July 2001) 53.3(Aug 2016)
Generation Facilities(GW)	66.8* ³ (approx 25% of nationwide)
Number of Employees	33,476* ²

*1:in traditional TEPCO service territory(around Tokyo metropolitan area), before deregulation April 2016. *2:as of March 2017, *3:as of March 2016

1.2 TEPCO: Tokyo Electric Power Company Holdings

■ In April 2016, TEPCO introduced a **holding company structure** in preparation for the upcoming electricity system reform ahead of other electric power companies.



Japan's Energy For A New ERA

*Established in 2015, JERA to integrate the existing thermal power business in 2019

2.1 Study on energy management technology for industrial park

【NEDO* demonstration project: Nov/2018~Jun/2019】

- With rapid economical growth in Thailand, measures for **energy saving** and **CO2 reduction** are critical.
- This project is based on TEPCO groups' many years of technologies of **transmission/distribution networks' optimized control**, and know-how of **improving energy saving** in industrial plants, which can be utilized for overseas countries.
- And it is intended to make a contribution to **save energy and reduce green house gas emission** at Industrial Park in Thailand.
(targeted at Amata City Chonburi Industrial Park in this project)

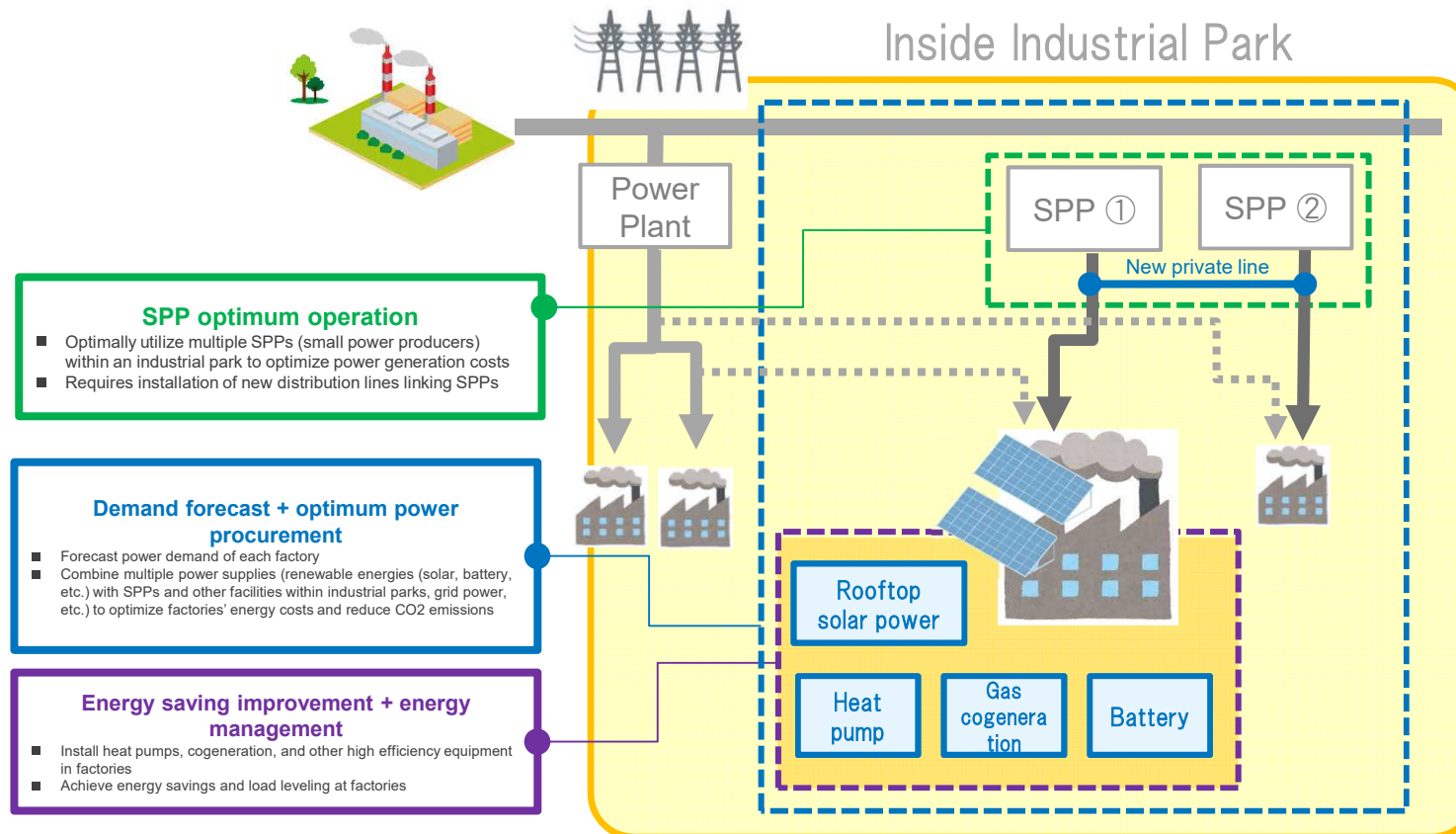


*New Energy and Industrial Technology Development Organization



2.2 Study on energy management technology for industrial park in Thailand

- The aim is to move away from the conventional provision of energy services measured in factory units and to establish an energy management business model in “area” units, comprising multiple factories.
- In cooperation with AMATA group, we are studying energy optimization in terms of both supply and demand, viewing AMATA’s industrial parks as mini grids through the utilization of IoT and other leading technologies.



2.3 Study steps

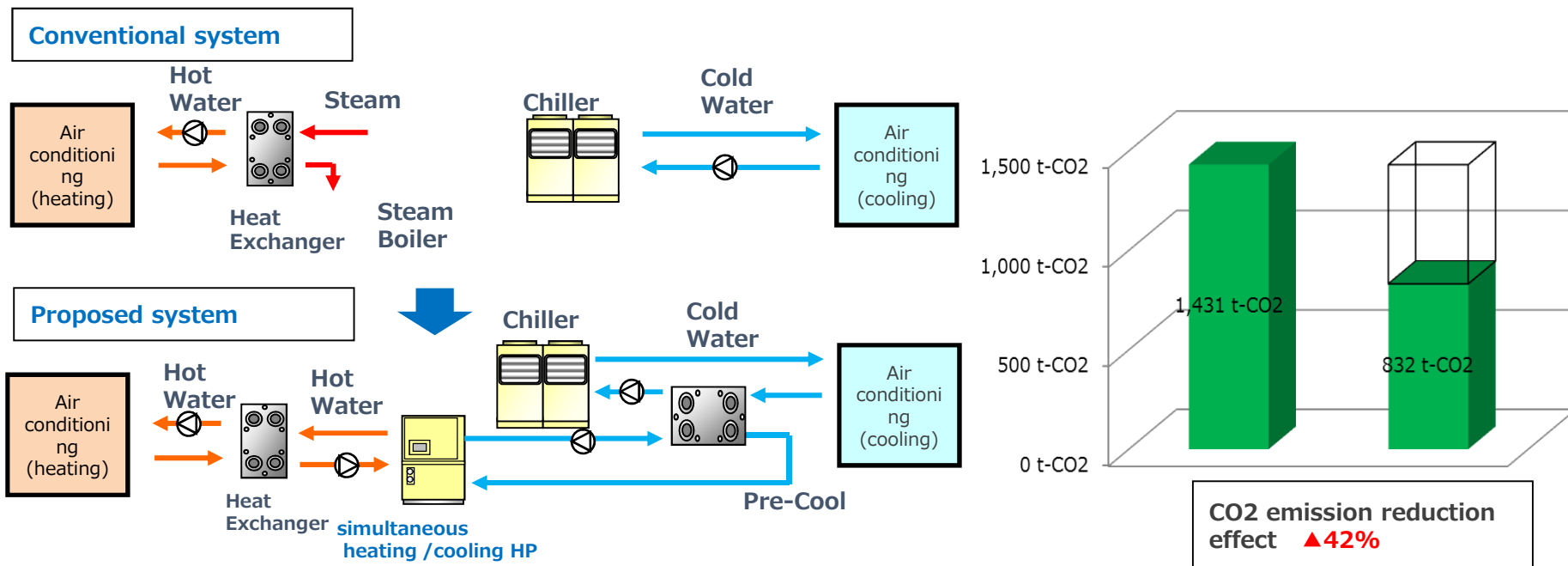
- In establishing a **new energy management service model**, the steps below will be followed and the scope gradually expanded.
- Ultimately, the aim is for a **collaborative smart city project** with Amata.



2.4 Study on energy management technology for industrial plant

Example①

- Conducted **study of energy saving diagnosis** at three industrial plants, which are selected in coordination with Amata at Amata City Chonburi Industrial Park.
- Installation of Heat Pump system is as follows;
 - > **Process of air conditioning(heating) and air conditioning (cooling) is existing individually.**
 - > Applying **HP system**(cold-hot simultaneous supply) for reduction of chiller's power by pre-cooling temperature before chiller.



2.5 Study on energy management technology for industrial plant

Example②

- **CO2 reduction effect** of three industrial plants are estimated as follows;
- The least effective plant to reduce CO2 would be **over 4% reduction** and the most effective plant would **over 30% reduction**.

Plant	CO2 reduction effect(t/yr)	Saving energy rate (as a whole plant)
A(Electric Appliance)	▲171 ~ ▲1,076	▲4.5%
B(Water supply)	▲1,052	▲31.7%
C(Food)	▲3 ~ ▲599	▲17.1%

2.6 Study on energy management technology for industrial park

- While Thailand is experiencing economic growth, it is recognized that **reduction of Green House Gas emission** is important.
- Under the circumstance, **TEPCO's proven energy management technology**, which is environmentally friendly and is efficient to keep its competitiveness for industrial park to **save energy** and reduce GHG emission, can be fully utilized.

【Amata Chonburi Industrial Park 】



(Source: Amata Corporation PCL)

3.1 TEPCO Energy Partner International(Thailand)

- Establishment of TEPCO Energy Partner’s first overseas subsidiary.
- Developing our **energy service business** in the Kingdom of Thailand.
- Providing **services**, related to the **design, procurement, construction, ownership** and **maintenance** of various types of energy equipment/ facilities.

【Opening Ceremony: August 9th, 2019】



【Company Profile】

Company Name	TEPCO Energy Partner International(Thailand) Co.,Ltd.
Representative	Yoshihiro Ueno, Managing Director
Established	May 14, 2019
Capital	2 million baht
Investment Ratio	TEPCO Energy Partner, Inc: 40% Japan Facility Solutions, Inc.: 9% Others: 51%
Business Overview	Energy service business

3.2 Three Pillars of TEPCO Proposals

Reducing energy use and improving operations



- Reducing losses in current facilities
 - Reducing energy use by improving the functions and performance of facilities
-

Renewable energy businesses



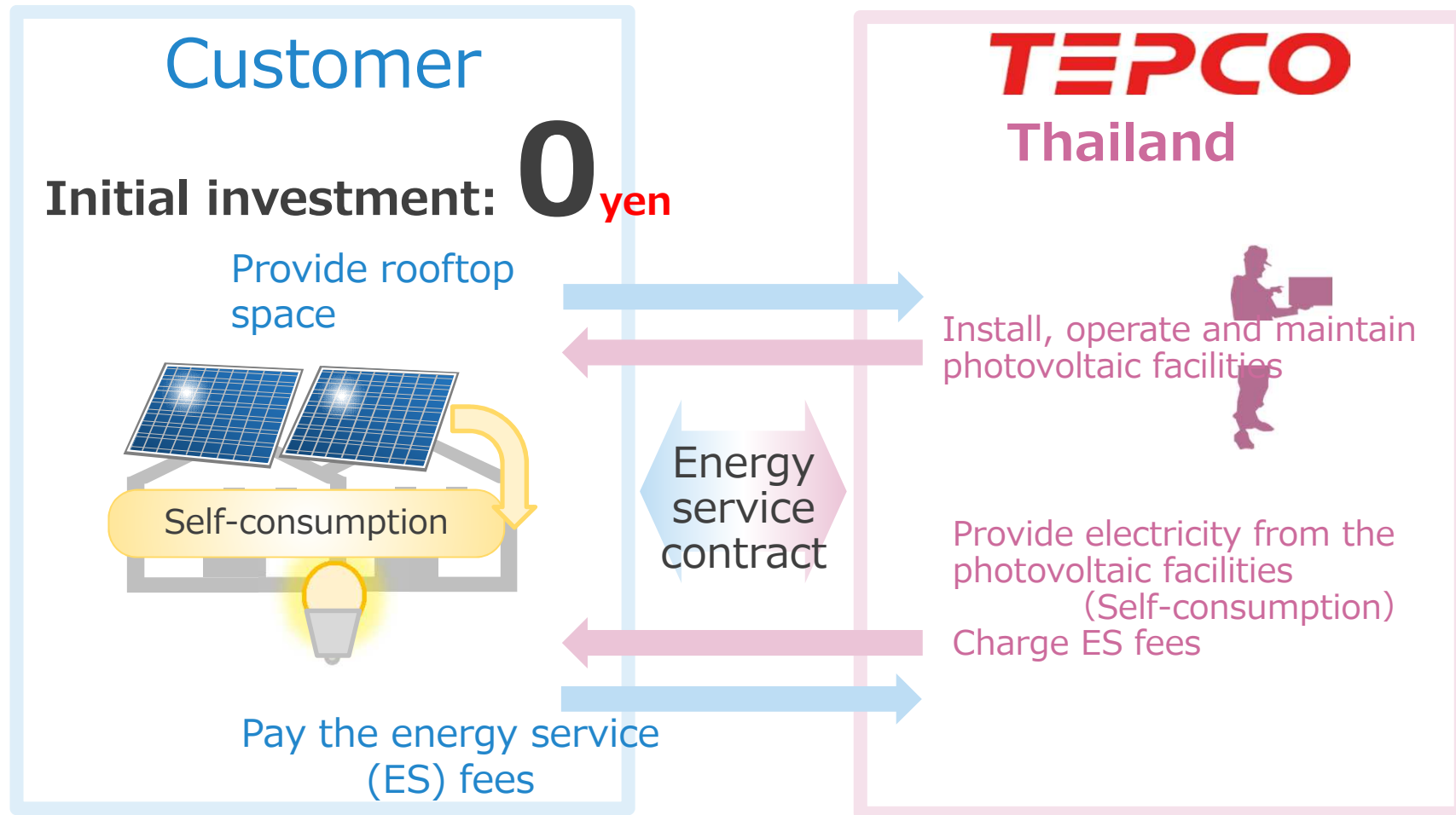
- Increase the ratio of renewable energy by introducing mega solar photovoltaic facilities
 - Provide a one-stop shop for acquiring all licenses
-

Outsourcing



- Providing the best quotes on EPC and O&M
 - Removing the asset off the balance sheet, providing full maintenance
-

3.3 Energy Service Mechanism





TEPCO

TEPCO Energy Partner, Inc.
