



บริษัท โกลบอล เพาเวอร์ ซินเนอร์ยี จำกัด (มหาชน)  
Global Power Synergy Public Company Limited

# Corporate Presentation

## dbAccess 2016 PTT Group Day

*3<sup>rd</sup> June 2016*



# Introduction to GPSC, a “PTT Group’s Power Flagship”

GPSC, PTT Group’s Power Flagship, has been founded to be the power flagship of PTT Group. In 2013-2014, PTT Group were restructured and transferred Power Assets to GPSC. The integration results in a total generating capacity of 1,851 MW of electricity; thereafter GPSC has acquired more to have 1,922 MW of committed electricity, 1,582 tons per hour of steam, 2,080 cubic meters per hour of processed water and 12,000 refrigeration tons of chilled water. GPSC aims to expand to reach secured capacity of 2,800 MW in 2019

## KEY MILESTONES



Established Rayong Power Plant (339 MW, steam plant)

Transferred 8 PTT’s power assets to GPSC

Included in SET100



Complete total electricity capacity of 1,922 MW

1997



Established Sriracha Power Plant (700 MW, combine cycle plant)

2012

2013



Consolidated all PTT’s power asset under GPSC

2014

2015



**PTT Group’s Power Flagship,**  
Listed on Stock  
Exchange of Thailand

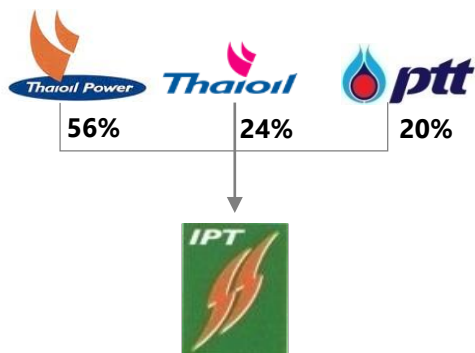
2016

**Market Cap\* USD 1.3 BN**  
or 0.3% of SET

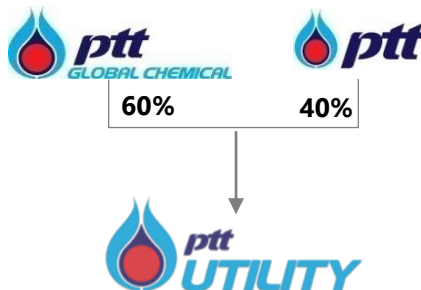
2019

**MSCI** Global Small Cap Indexes

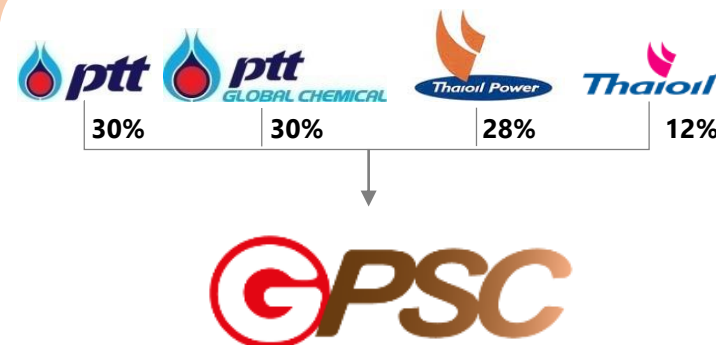
## Independent Power (Thailand)



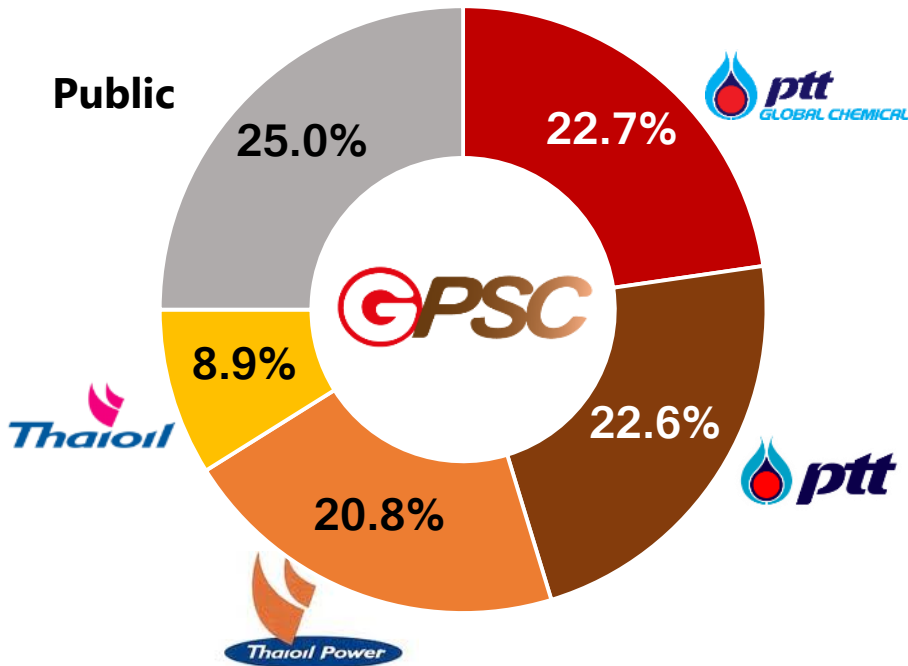
## PTT Utility



## GPSC’s Pre-listed Shareholding



## GPSC's Shareholding Structure\*



### Vision

**Global Best Practice in Power Business**

### Mission

**Being Power Flagship of PTT Group to Develop, Invest and Operate in Power Business Domestically and Internationally**

### Goal

- Aims to reach secured capacity of 2,800 MW in 2019
- At least 10% Renewable of GPSC's Portfolio
- At least 30% International Assets in Portfolio
- Attain Top Quartile Performance through OEMS



## BUSINESS PORTFOLIO



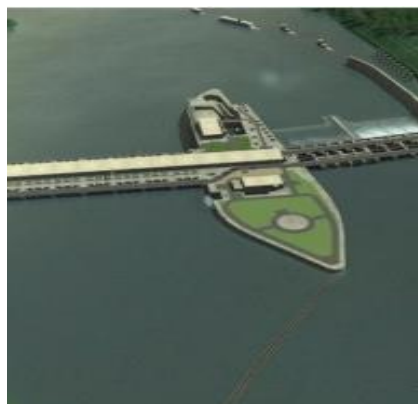
### Combined Cycle / Cogeneration

- Electricity 1,517 MW
- Steam 1,582 T/H
- Chilled Water 12,000 RT



### Renewable Energy

- Electricity 58 MW



### Hydroelectric

- Electricity 347 MW



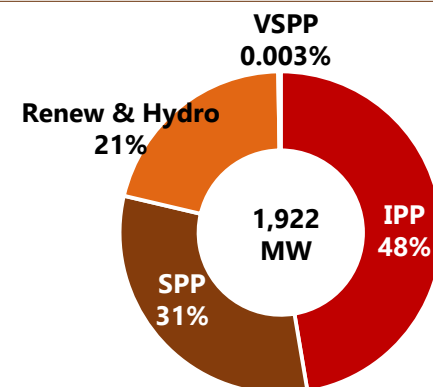
### Other Businesses

- 24M Technologies, Inc. (USA)
- Business Service Alliance Co.,Ltd.

Capacity	<b>STEAM</b> 1,582 T/H (operate 1,441 T/H)	<b>ELECTRICITY</b> 1,922 MW (operate 1,376 MW, under constriction 546 MW)
	<b>INDUSTRIAL WATER</b> 2,080 Cu.m./H	<b>CHILLED WATER</b> 12,000 RT

### ELECTRICITY CAPACITY BREAKDOWN

Unit: Megawatt



IPP Independent Power Producers  
SPP Small Power Producers  
VSPP Very Small Power Producers



## Thailand Power Industry Overview



Company Overview



Financial Performance

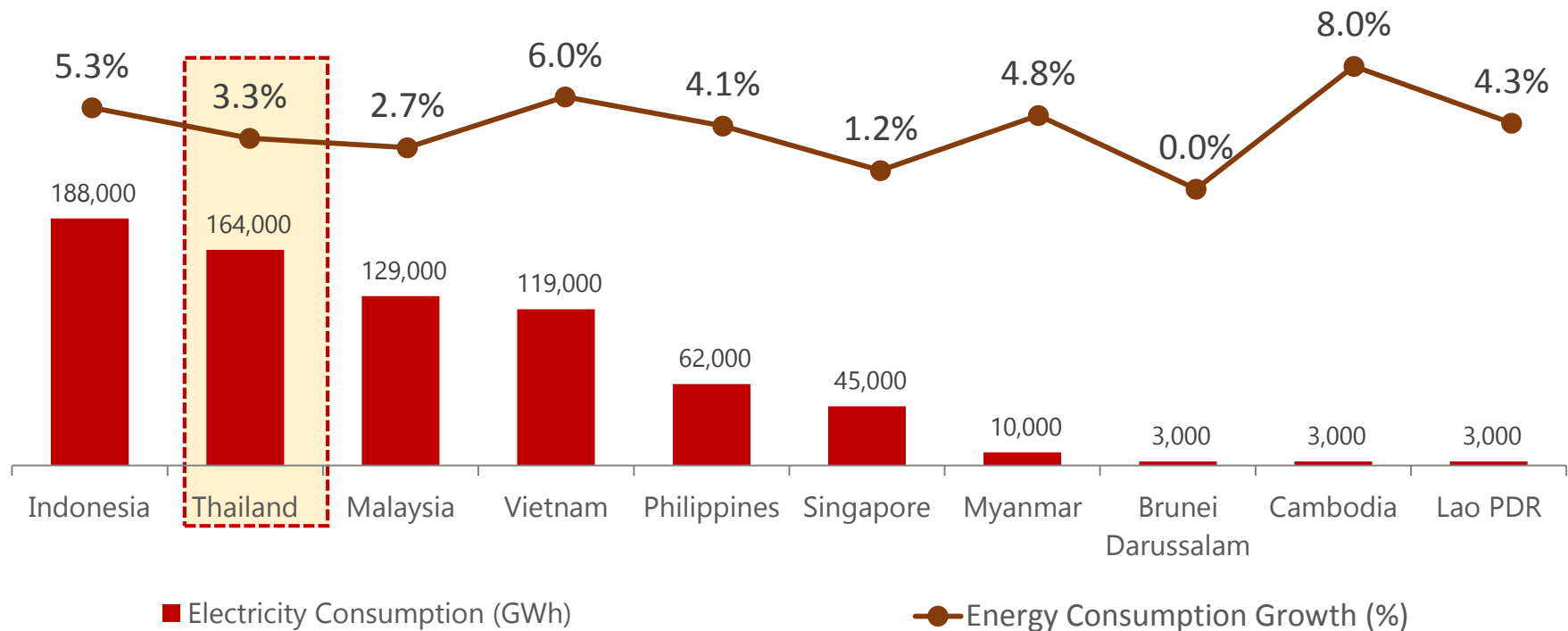


Key Takeaway

# Thailand is the second largest electricity consumer in ASEAN, with energy consumption growth of 3.3% CAGR in next 20 years

- **Thailand is the second largest consumer of electricity in ASEAN**, second only to Indonesia.
- Considering GPSC profile, whose portfolio is mainly in Thailand, Laos PDR, and potential projects in Myanmar; the company is located in one of the current largest consumers (Thailand) as well as in the emerging and potential consumers of the region (Myanmar and Laos PDR)

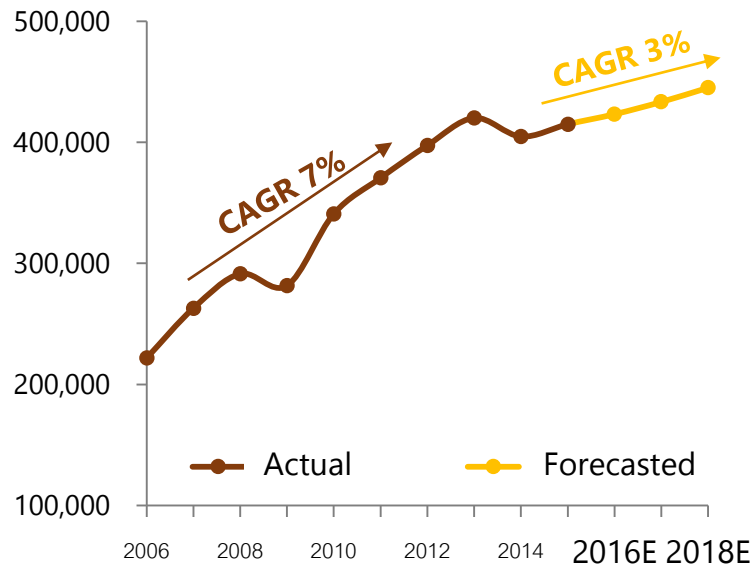
## Electricity Consumption & Forecasted Energy Consumption Growth (CAGR 2015-2035) (GWh)



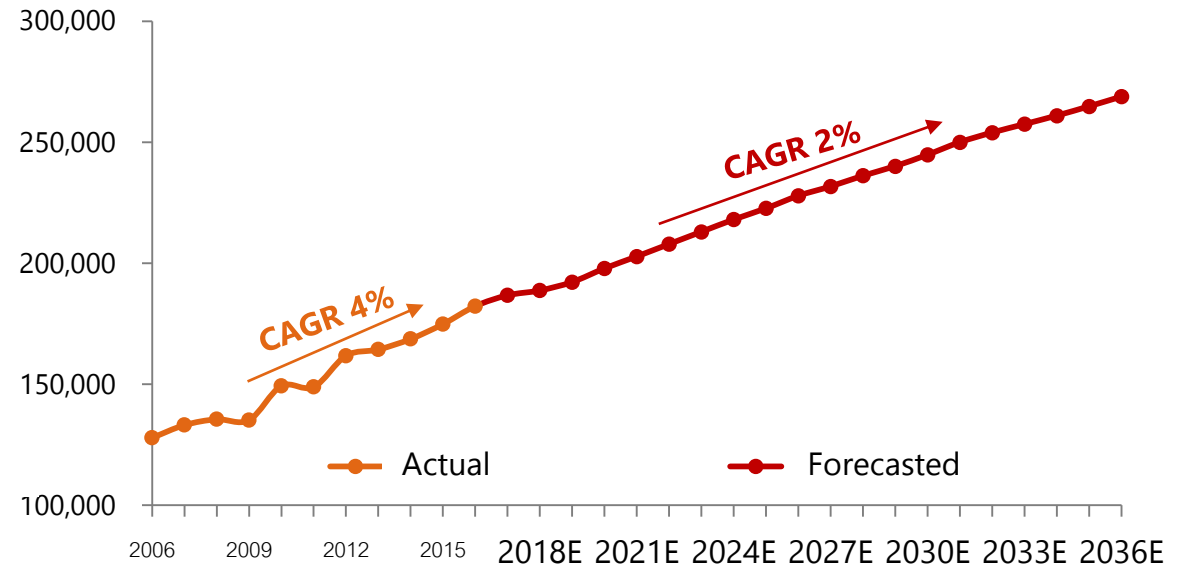
# Thailand's electricity consumption grows in tandem with economic growth

- Historically, Thailand's electricity power consumption has been driven by economic growth
- Thailand's GDP and Energy Consumption has expanded in tandem, **it is forecasted that GDP will grow at 3% CAGR (2016 onwards) and Electricity Power Consumption will grow at 2% CAGR (2016-2036).**
- Given higher economic growth in the future, there will be higher demand for electricity in Thailand

Thailand's historical and forecasted GDP (USD million)



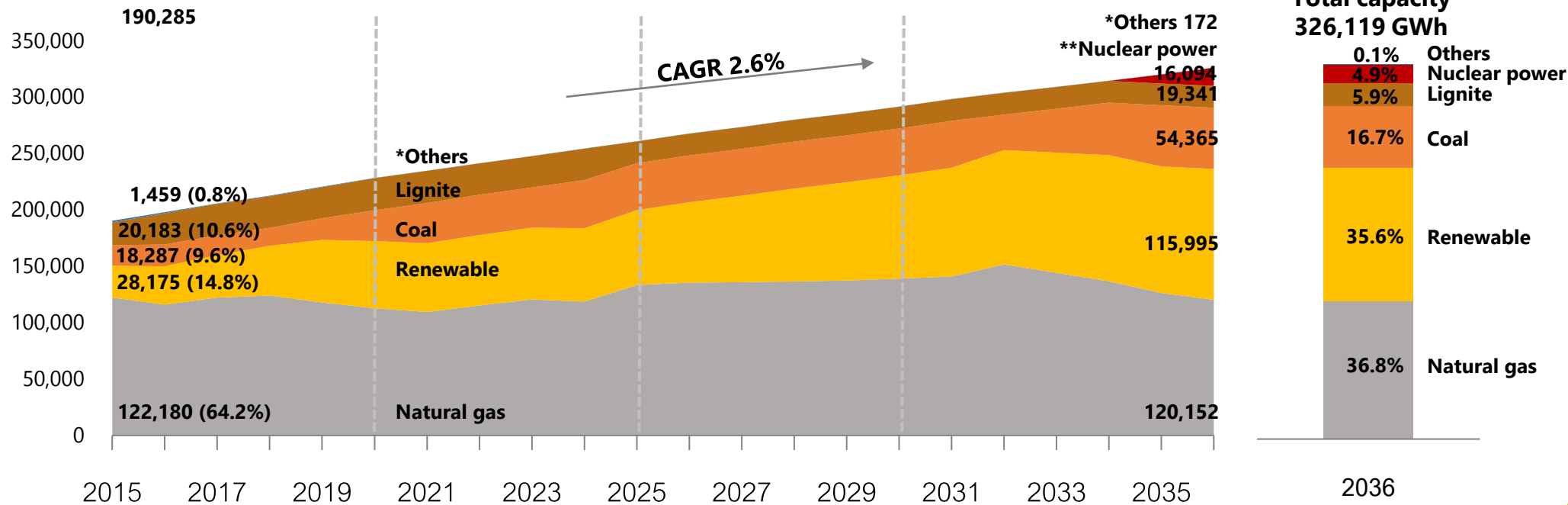
Thailand's Electricity Power Consumption (GWh)



# Natural gas and Renewable will be major sources of fuel in Thailand in 2036, together accounted for over 70%

- According to Thailand's Power Development Plan 2015 (PDP - by Energy Policy and Planning Office (EPPO), Ministry of Energy), power plant capacity in **Thailand will generate 326,119 GWh of electrical energy by the end of 2036, which accounted for 2.6% CAGR**
- Natural gas will still be a major source of fuel, accounted for 36.8% of total energy production

**Projected Electricity Generating by source of fuel (GWh)**



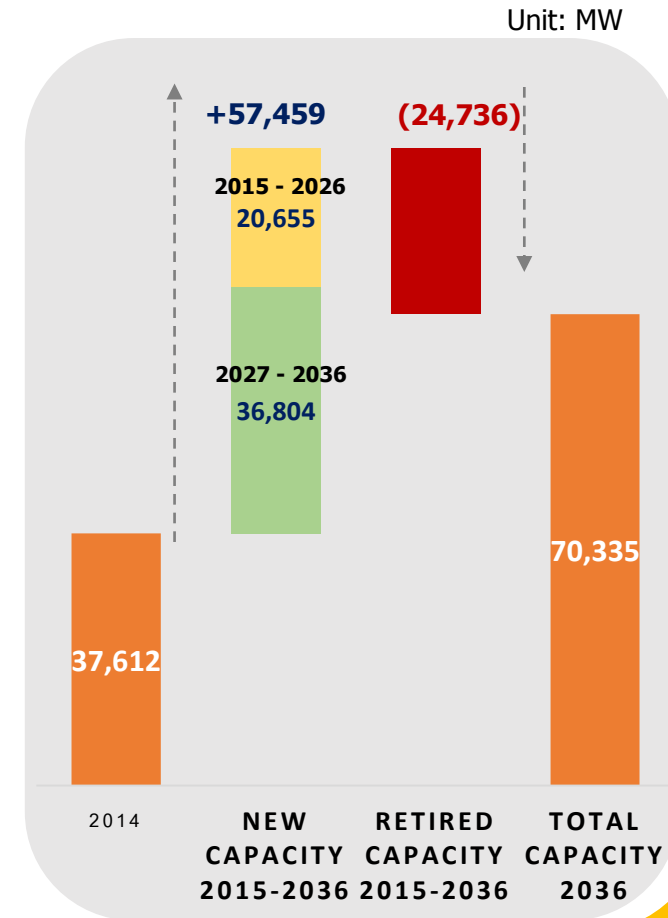
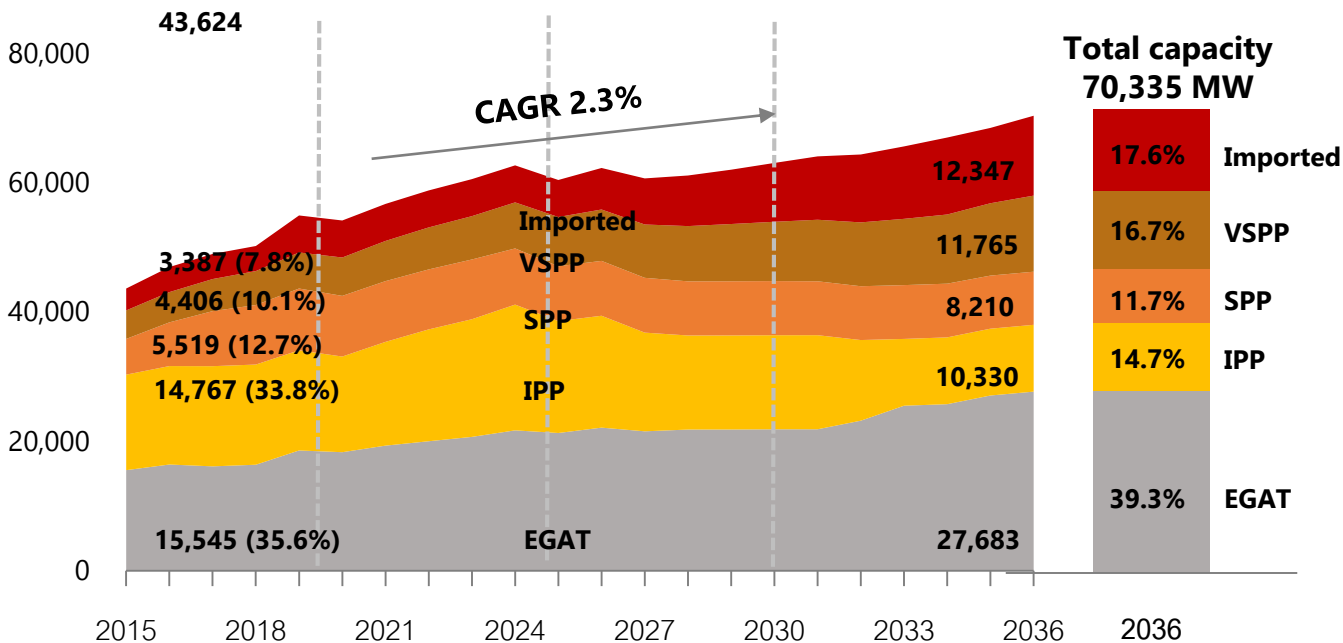
Remark: \*Others are Fuel oil, Diesel, Thai-Malaysian gas pipeline which account for less than 1% of total capacity, \*\*New clear power is added into plan in 2035 with projected capacity of 8,024 GWh  
Source: Power Development Plant 2015 - Energy Policy and Planning Office (EPPO), Ministry of Energy



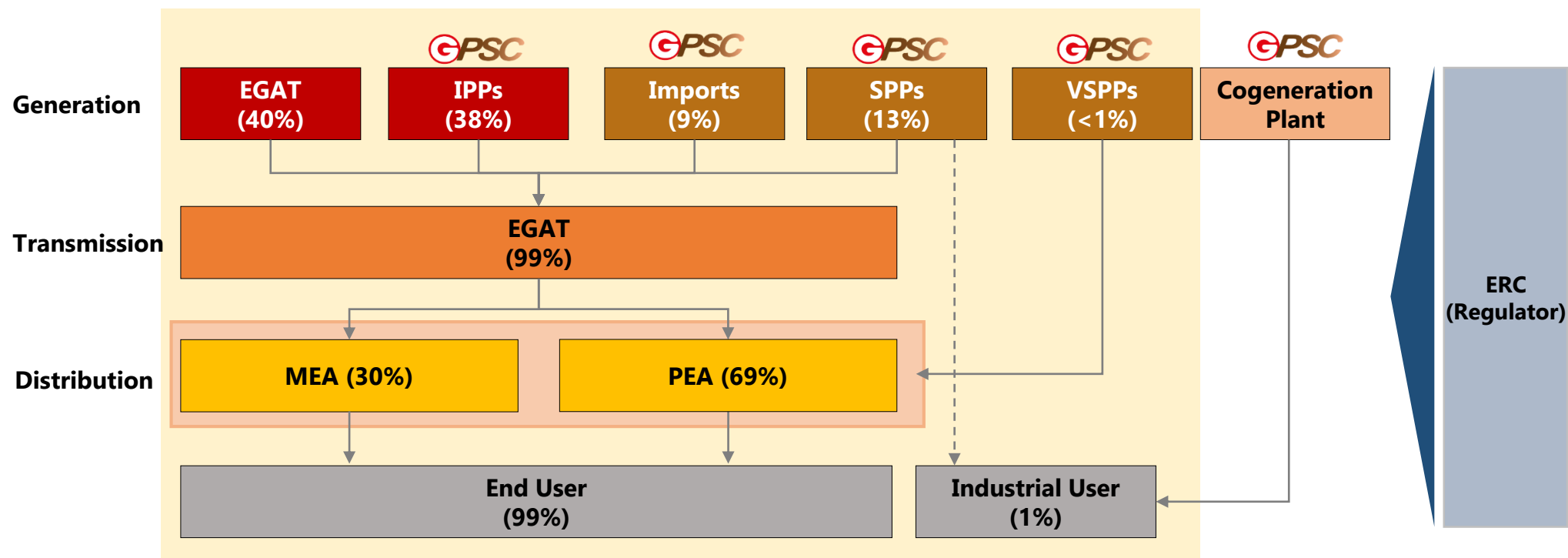
# By 2036, Imported electricity and VSPP will play more significant role in Thai power generation

- **By 2036 Imported & VSPP will increase its portion to 34.3%** of the total generating capacity nearly to EGAT, which is expected to be 39.3%
- **2.3% CAGR** of the power generating capacity by producer type is expected in PDP 2015

## Projected Power Plant Capacity by producer type (MW)



- **EGAT and IPPs dominate electricity generation market**, with the combined market share 83%.
- EGAT is the sole purchaser for almost all of the electricity generated, while VSPPs sell electricity directly to the MEA and PEA
- SPPs sell electricity to both EGAT and directly to industrial users



## Definition

EGAT	Electricity Generating Authority of Thailand
IPP	Independent Power Producers
SPP	Small Power Producers
VSPP	Very Small Power Producers
MEA	Metropolitan Electricity Authority
PEA	Provincial Electricity Authority

## IPP

### Independent Power Producer (IPP):

- A larger power producer who has electricity capacity more than 90 MW
- IPPs are obliged to sell their entire output to EGAT

## SPP

### Small Power Producer (SPP):

- A small power producer who sell their electricity no more than or equal to 90 MW to EGAT

#### SPP Type

Firm : Contract Term > 5 Years  
Non-Firm : Contract Term ≤ 5 Years

- SPPs can sell their electricity and steam to industrial customers located next to the SPP plant

## VSPP

### Very Small Power Producer (VSPP):

- A very small generator whose power generating process is generated from renewable energy, specific fuels, and energy with no more than 10 MW of electricity capacity
- VSPPs are able to sell power to the Distribution Utility

**Availability Payment**

+

**Energy Payment**



Availability %  
x  
Availability Payment Rate (APR)



Energy cost regarding % Dispatch to EGAT

### EGAT (Power)

Firm	Capacity Payment	+	Energy Payment
Non-Firm	K factor (seasonal weight)	×	Energy Payment

### Industrial Customers

Electricity	PEA tariff TOU Rate 4.2*
Steam	Steam Base Cost x (Gas index + CPI index)

\*<https://www.pea.co.th/Documents/Rate2015.pdf>  
Reference rate with conditions

**Base Tariff**

+

**Ft**

+

**adder**

**Feed in Tariff**

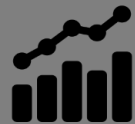




Thailand Power Industry Overview



**Company Overview**



Financial Performance



Key Takeaway

Operating capacity of 1,376 MW, with another 546 MW in pipeline

## Combined Cycle / Cogeneration

### Sriracha Power Plant (IPP)

100%

- Electricity: 700 MW
- Industrial water: 80 Cu.m./h



### Rayong Power Plant (SPP Non-firm) 100%

#### CUP 1-3

- Electricity: 339 MW
- Steam: 1,340 T/h
- Industrial water: 2,000 Cu.m./h



#### CUP-4

- Electricity: 45 MW
- Steam: 70 T/h

### IRPC Clean Power (SPP Firm)

51%

#### Total

- Electricity: 240 MW
- Steam: 300 T/h

#### Phase 1 COD

- Electricity: 45 MW
- Steam: 170 T/h



Phase 2 under construction

### Combined Heat and Power Producing (VSPP)

100%

- Electricity: 5 MW
- Chilled water\*: 12,000 RT



### Nava Nakorn Electricity Generation (SPP Firm)

30%

- Electricity: 125 MW
- Steam: 30 T/h



### Bangpa-in Cogeneration (SPP Firm)

25%

#### Phase 1

- Electricity: 117 MW
- Steam: 20 T/h



#### Phase 2

- Electricity: 117 MW
- Steam: 20 T/h

### Ratchaburi Power (IPP)

15%

- Electricity: 1,400 MW



## Renewable Energy

### Thai Solar Renewable (VSPP)

40%

- Electricity: 80 MW



### Ichinoseki Solar Power

99%

- Electricity: 20.8 MW



### Chanthaburi's Shrimp Farmer Cooperative (VSPP)

100%

- Electricity: 5 MW



## Hydroelectric

### Xayaburi Power (IPP)

25%

- Electricity: 1,285 MW



### Nam Lik 1 Power

40%

- Electricity: 65 MW



## Committed Capacity

### ELECTRICITY

1,922 MW

(operate 1,376MW)



### STEAM

1,582 T/H

(operate 1,441 T/h)



### INDUSTRIAL WATER

Operate 2,080 Cu.m./h



### CHILLED WATER

Operate 12,000 RT



## Other Businesses

### Business Service Alliance

25%



### 24M Technologies

17%



Project under construction



# Current Operating Asset (IPP): Sriracha



## Sriracha Power Plant

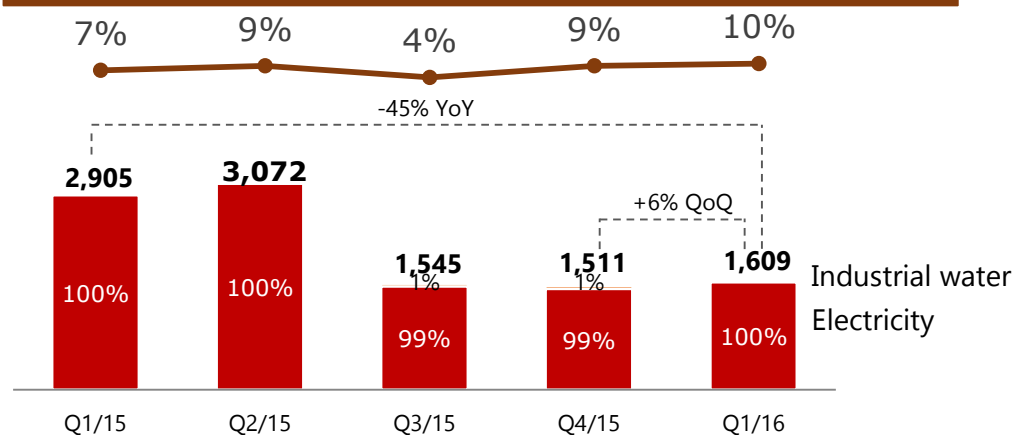
Chonburi Province (40 Rai leasehold land)

Type	Combined cycle
Capacity	<ul style="list-style-type: none"> <li>Electricity: 700 MW</li> <li>Industrial water: 80 Cu.m/h</li> </ul>
Customer	<ul style="list-style-type: none"> <li>Electricity: EGAT 700 MW</li> <li>Industrial water: Thailoil Power 50 Cu.m/h</li> </ul>
Supplier	<ul style="list-style-type: none"> <li>Natural Gas – PTT</li> <li>Raw Water – EASTW</li> <li>Power Back up – EGAT and TOP</li> </ul>
Construction	2005 - 2010
COD	2000
Contract	<ul style="list-style-type: none"> <li>25 Years</li> <li>End: 2025</li> </ul>

### Shareholding



### Quarterly revenue & Gross profit margin (THB million, %)



# Current Operating Asset (SPP): Rayong – Central Utility Plant 1-3 (CUP1-3)

CUP -1



CUP -2



CUP -3



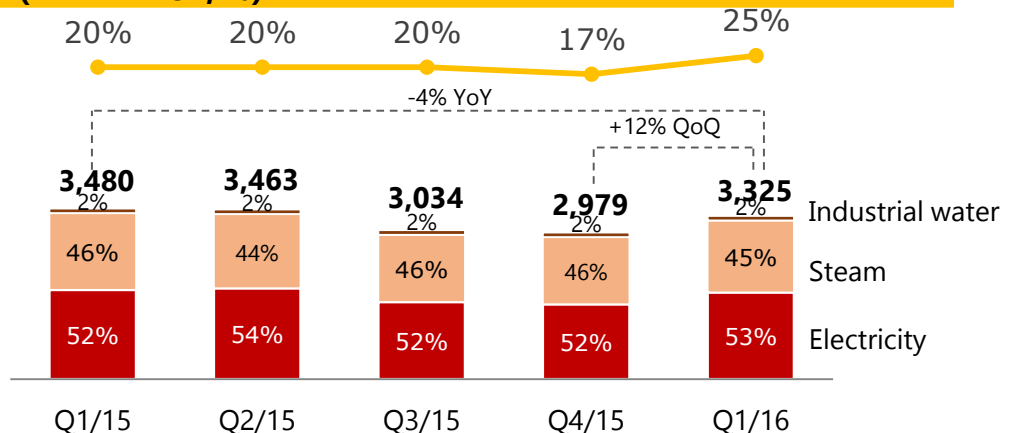
**Rayong Power Plant**  
Rayong Province

Type	Cogeneration
Capacity	<p>CUP-1</p> <ul style="list-style-type: none"> <li>Electricity: 226 MW</li> <li>Steam: 890 T/h</li> <li>Industrial water: 720 Cu.m/h</li> </ul> <p>CUP-2</p> <ul style="list-style-type: none"> <li>Electricity: 113 MW</li> <li>Steam: 170 T/h</li> <li>Industrial water: 510 Cu.m/h</li> </ul> <p>CUP-3</p> <ul style="list-style-type: none"> <li>Steam: 280 T/h</li> <li>Industrial water: 770 Cu.m/h</li> </ul>
Customer	• PTT Group / Other IU Customers / EGAT
COD	2006-2009
Contract	<ul style="list-style-type: none"> <li>CUP-1: 10-15 years ++</li> <li>CUP-2: 15 years ++</li> <li>CUP-3: 15 years ++</li> </ul>

Shareholding



## Quarterly revenue & Gross profit margin (THB million, %)





**Combined Heat and Power Producing Co., Ltd.**  
Bangkok Province

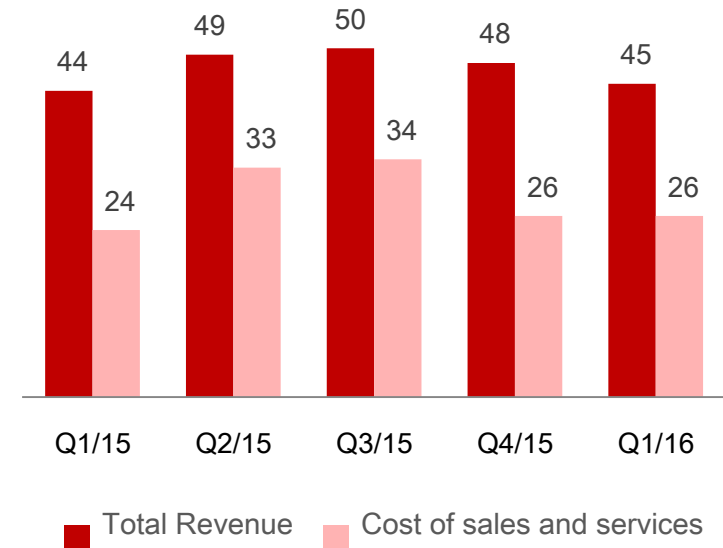
<b>Type</b>	Combined heat and power with district cooling (VSPP)
<b>Capacity</b>	<ul style="list-style-type: none"> <li>Electricity: 5 MW</li> <li>Chilled water: 12,000 RT</li> </ul>
<b>Customer</b>	<ul style="list-style-type: none"> <li>DAD 7,500 RT</li> </ul>
<b>COD</b>	<ul style="list-style-type: none"> <li>2008</li> </ul>
<b>Contract</b>	<ul style="list-style-type: none"> <li>30 Years</li> <li>End: 2038</li> </ul>



## Shareholding



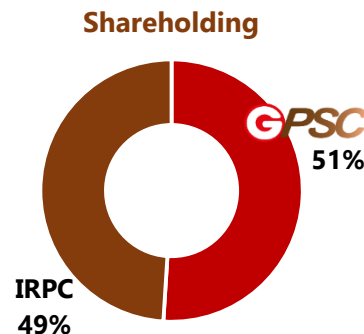
## 100% Financial Performance (THB million)



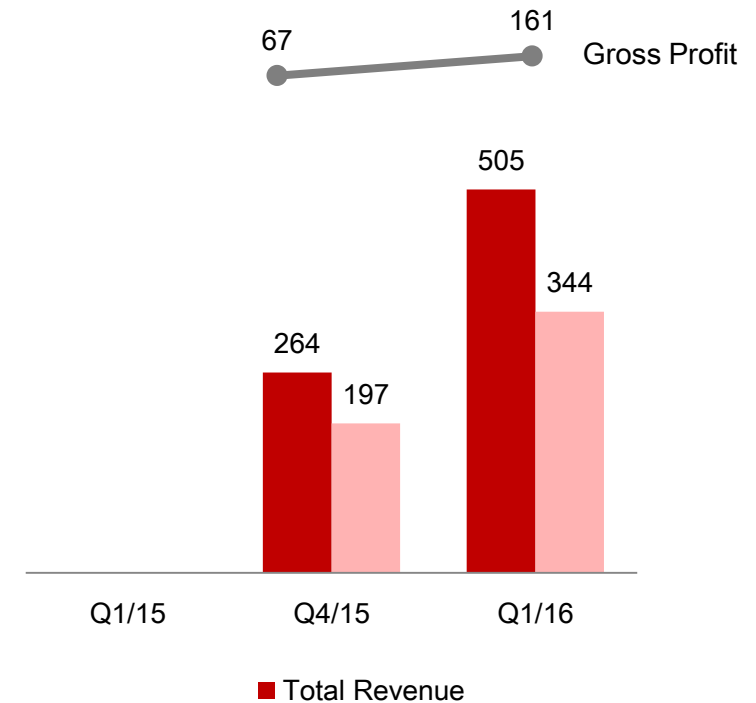


**IRPC Clean Power Company Limited**  
(IRPC-CP Phase 1)  
Rayong Province (118 Rai)

<b>Type</b>	Cogeneration (SPP)
<b>Capacity*</b>	<ul style="list-style-type: none"> <li>Electricity: 240 MW</li> <li>Steam: 180-300 T/h</li> </ul>
<b>Customer*</b>	<ul style="list-style-type: none"> <li>Electricity: EGAT 2x90 MW (25 years), IRPC 60 MW (27 years)</li> <li>Steam: IRPC 180-300 T/h</li> </ul>
<b>COD</b>	<ul style="list-style-type: none"> <li>2015</li> </ul>
<b>Contract</b>	<ul style="list-style-type: none"> <li>27 Years</li> <li>End: 2042</li> </ul>



## 100% Financial Performance (THB million)



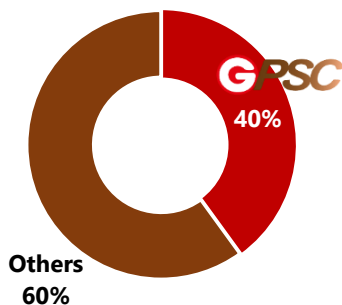


**Thai Solar Renewable Company Limited**  
Kanchanaburi and Suphanburi Province

Type	Solar
Capacity	• Electricity: 80 MW
Customer	• PEA
COD	• 2013-2014
Contract	• 10 Years • End: 2023-2024



## Shareholding



4 Solar farms at Kanchanaburi  
= 32 MW



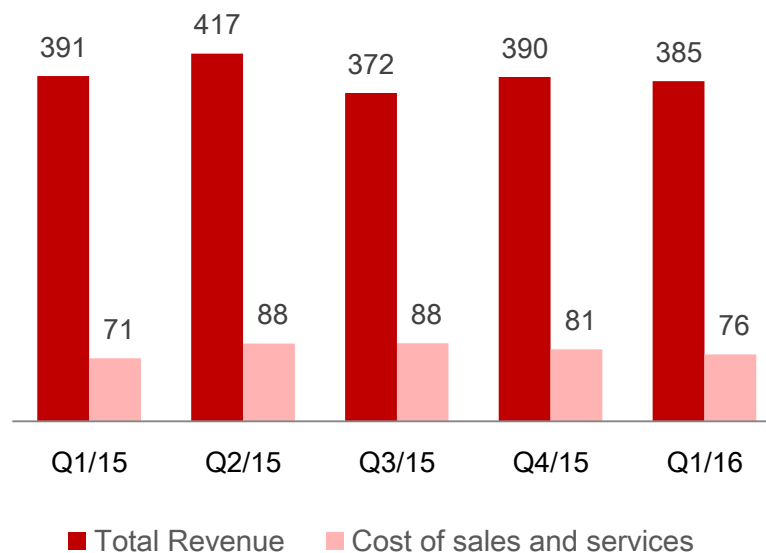
Guarantee/Quarter ~ 37,000 Mwh

SSE1 received 6.50 baht Adder  
for 10 years

**Diversified Assets**

6 Solar farms at Suphanburi = 48 MW

## 100% Financial Performance (THB million)

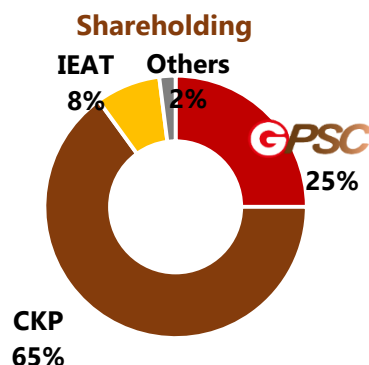




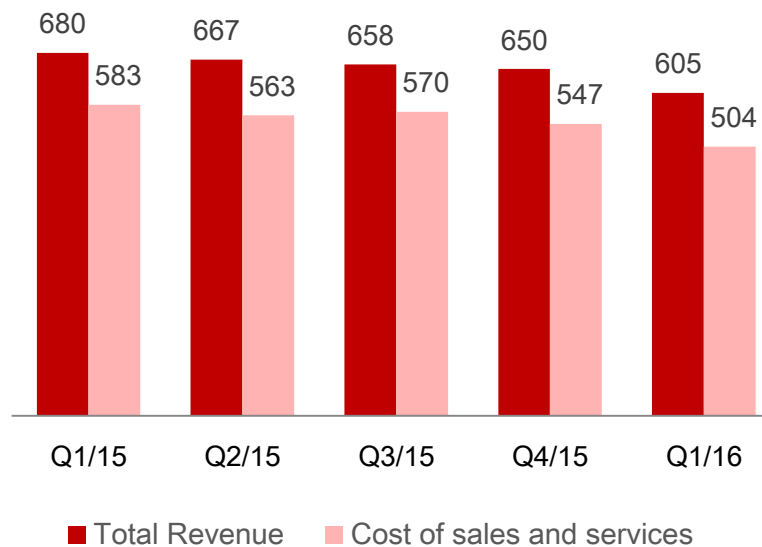


**Bangpa-in Cogeneration Company Limited**  
Ayutthaya Province

Type	Cogeneration (SPP)
Capacity	<ul style="list-style-type: none"> <li>Electricity: 117 MW</li> <li>Steam: 20 T/h</li> </ul>
Customer	<ul style="list-style-type: none"> <li>Electricity: EGAT 90 MW, IUs 27 MW</li> <li>Steam: 20 T/h</li> </ul>
COD	<ul style="list-style-type: none"> <li>28 Jun 2013</li> </ul>
Contract	<ul style="list-style-type: none"> <li>25 Years</li> <li>End: 2038</li> </ul>



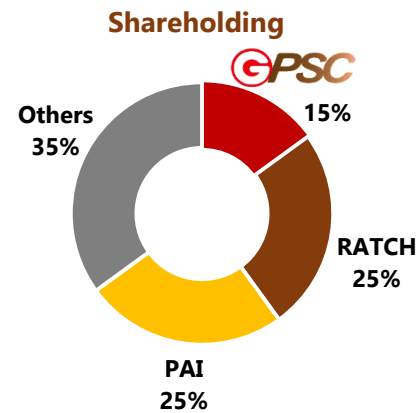
## Financial Performance (THB million)





## Ratchaburi Power Company Limited Ratchaburi Province

Type	Combined Cycle (IPP)
Capacity	<ul style="list-style-type: none"><li>Electricity: 1,400 MW</li></ul>
Customer	<ul style="list-style-type: none"><li>EGAT</li></ul>
COD	<ul style="list-style-type: none"><li>Mar 2008</li></ul>
Contract	<ul style="list-style-type: none"><li>25 Years</li><li>End: 2033</li></ul>

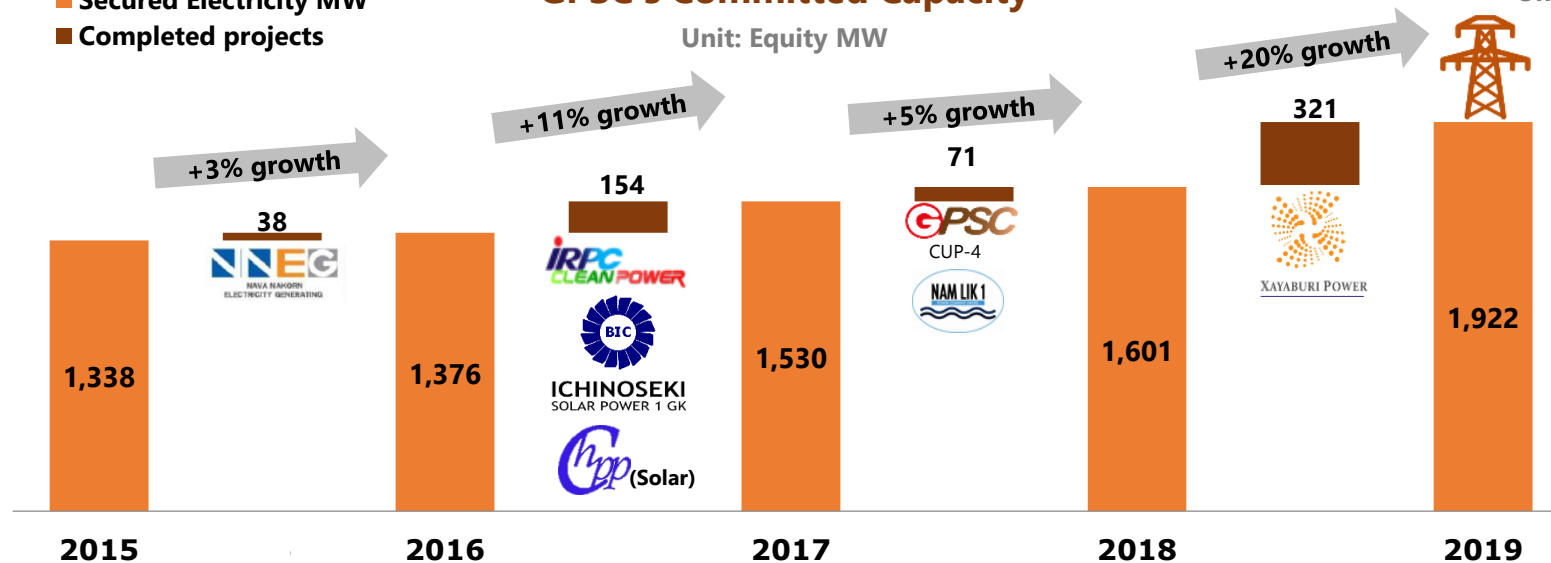


## GPSC's Committed Capacity

- Secured Electricity MW
- Completed projects

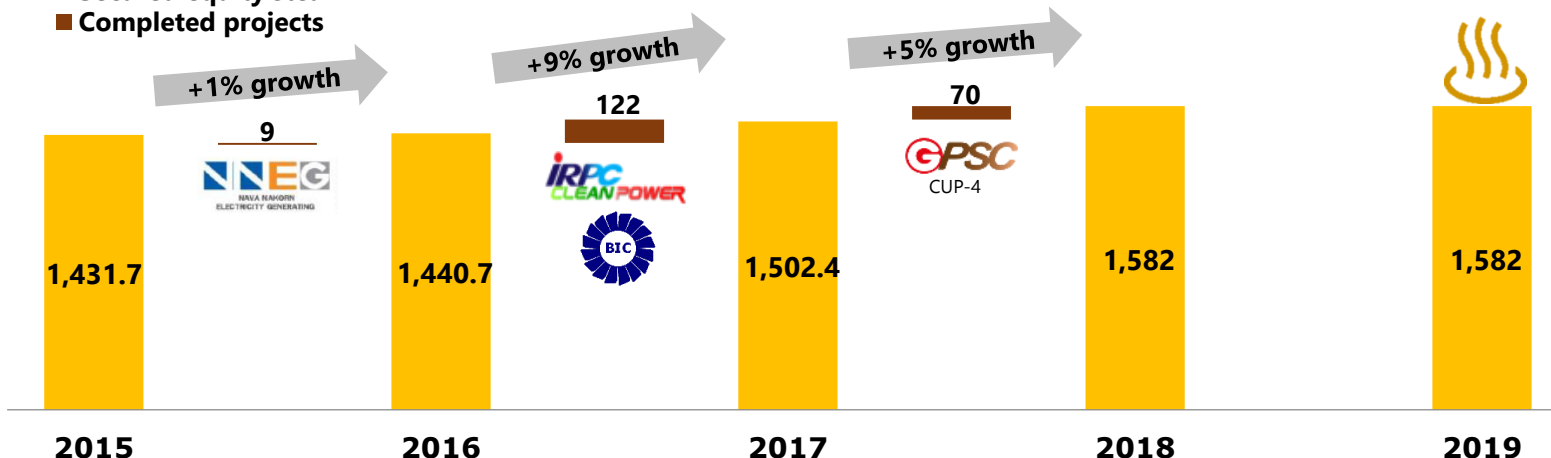
Unit: Equity MW

Unit: Equity MW



- Secured equity steam
- Completed projects

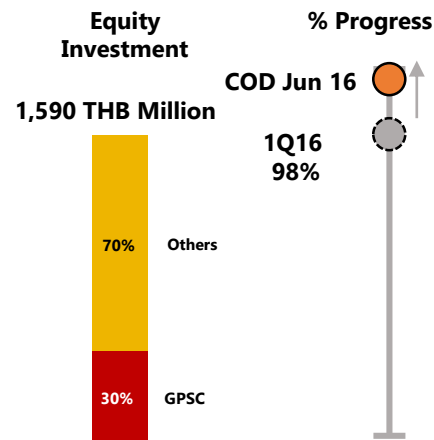
Unit: T/h





## Nava Nakorn Electricity Generating Company Limited (NNEG)

Pathumthani Province

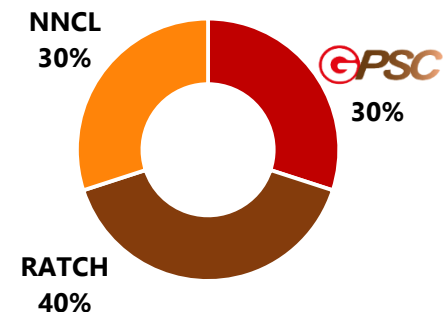


Type	SPP Cogeneration
Capacity	<ul style="list-style-type: none"> <li>Electricity: 125 MW</li> <li>Steam: 30 T/h</li> </ul>
Customer	<ul style="list-style-type: none"> <li>Electricity: EGAT 90 MW (25 years), IUs 35 MW</li> <li>Steam: IUs</li> </ul>
SCOD	June, 2016
Total Investment	6,360 THB Million
D/E	3:1

### Progress update

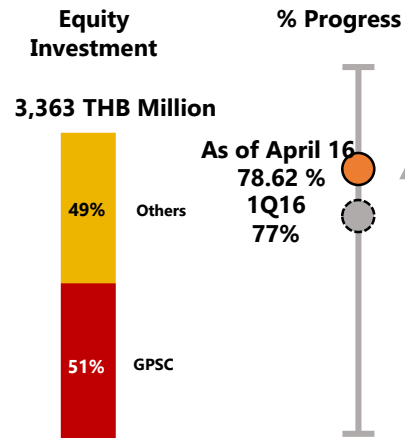
- NG&MRS construction progress 100%
- Secure MOU with IUs 38MW and 41T/h
- LTSA was signed
- O&M service agreement was completed
- In progress of plant commissioning
- Trial run, Load rejection and Emission tests was completed.
- Power plant construction progress 99%

### Shareholding





**IRPC Clean Power Company Limited (IRPC-CP)**  
In IRPC Industrial Zone at Choeng Noen, Rayong Province  
(118 Rai)



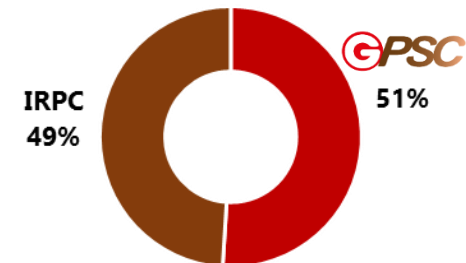
Type	SPP Cogeneration
Capacity*	<ul style="list-style-type: none"> <li>Electricity: 240 MW</li> <li>Steam: 180-300 T/H</li> </ul>
Customer*	<ul style="list-style-type: none"> <li>Electricity: EGAT 2x90 MW (25 years), IRPC 60 MW (27 years)</li> <li>Steam: IRPC 180-300 T/H</li> </ul>
SCOD	June, 2017
Total Investment	13,577 THB Million
D/E	3:1

## Progress update

### Phase2 Under Construction

- Overall Progress 78.62% against plan 80.47%

## Shareholding

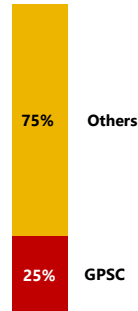






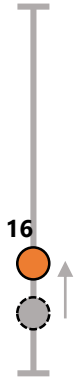
**Bangpa-In Cogeneration Company Limited  
(Phase 2)**  
Ayutthaya Province

**Equity Investment**  
1,335 THB million

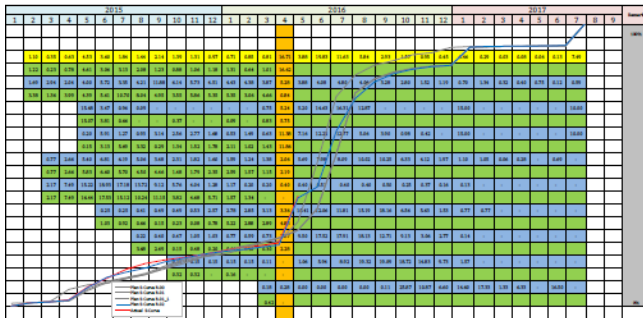


**% Progress**

As of April 16  
37.63%  
1Q16  
22%

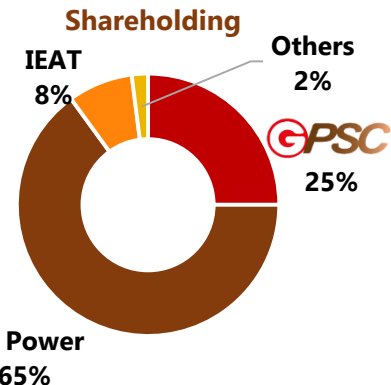


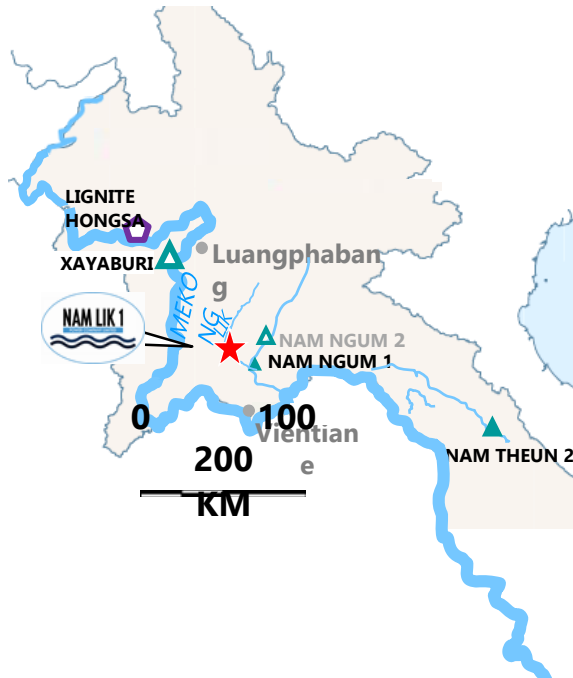
Type	Gas-Fired Power Plant
Capacity	<ul style="list-style-type: none"> <li>Electricity: 117 MW (gross)</li> <li>Steam: 20 T/h</li> </ul>
Customer	<ul style="list-style-type: none"> <li>Electricity: EGAT 90 MW (25 years), IUs 27 MW</li> <li>Steam: IUs 20 T/h</li> </ul>
SCOD	June, 2017
Total Investment	5,340 THB Million
D/E	3:1



## Progress update

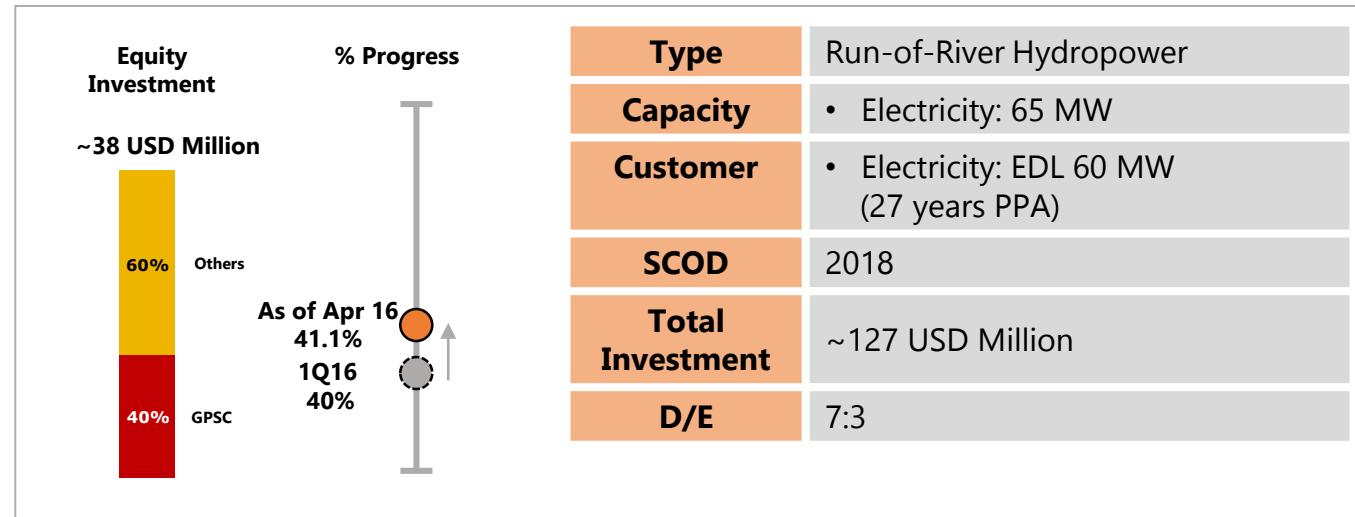
- EIA has been approved
- BOI has been approved
- Commenced construction in February 2015
- Power and steam sales is under negotiation with IUs within industrial estates
- Main equipment is in installation phase
- Overall project progress until April 16 was 37.63% (plan 36.93%)





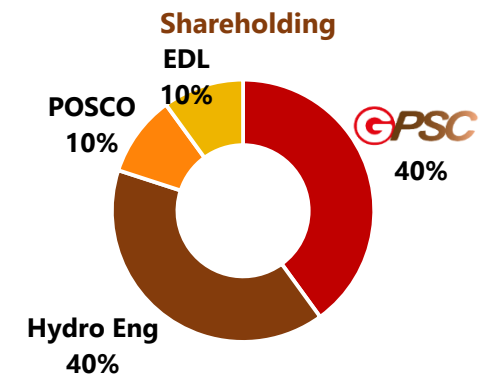
## Nam Lik 1 Power Company Limited (NL1PC)

Lao PDR



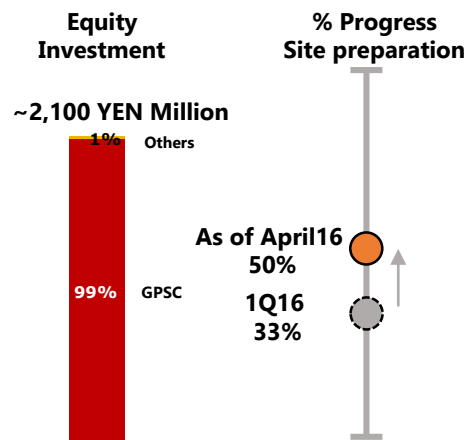
### Progress update

- The overall project progress until Apr 16 was 41.1%
- The main activities for this period were related to preparatory works, diversion works, powerhouse, spillway and transmission line 115 kV.



## ICHINOSEKI SOLAR POWER 1 GK

**Ichinoseki Solar Power 1 (ISP1)**  
Japan

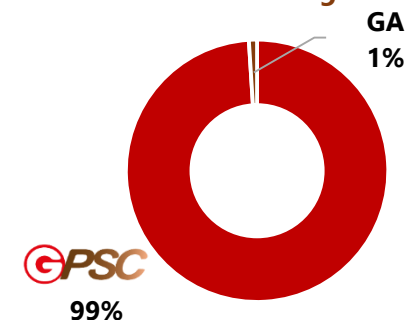


Type	Solar
Capacity	• Electricity: 20.8 MW
Customer	• Tohoku Electric Power (20 years)
SCOD	Q4 2017
Total Investment	~10,000 JPY million
D/E	4:1

### Progress update

- Project received permission to expand power capacity to 20.8 MWAC
- Already received relevant licenses including Grid Connection Agreement
- PPA contract with Tohoku Electric Power Company is finalized.
- EPC contracts and Facility agreement have been executed
- Kick off meeting with EPC contractors has been conducted in May 2016
- **Construction will start in Q2/2016**

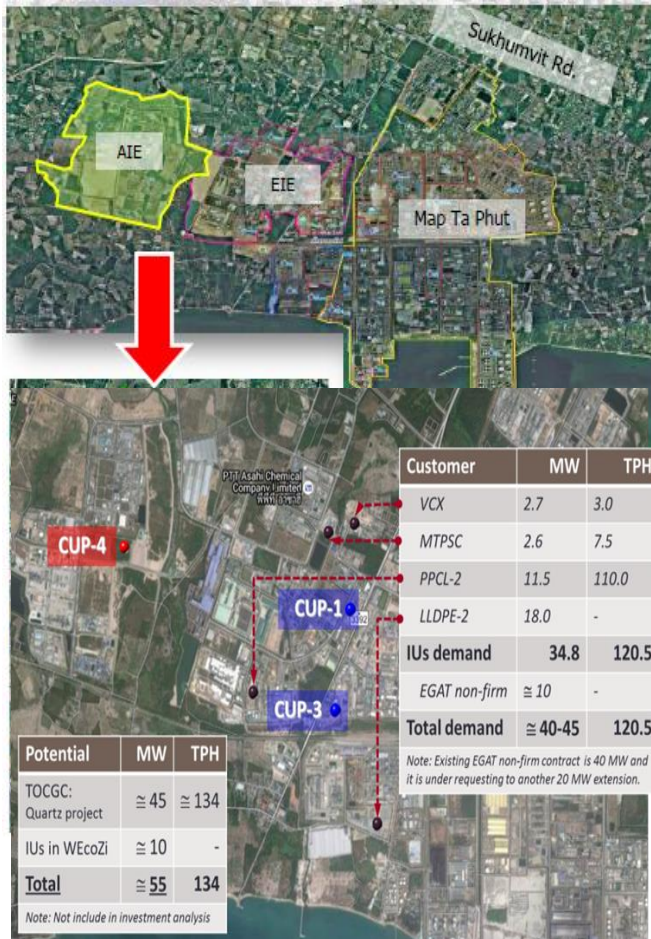
### Shareholding





## Central Utility Plant Project 4 (CUP-4)

PTT's WEcoZi, Asia Industrial Estate (AIE) Rayong Province



Equity Investment  
<4,000 THB Million



### Type

Gas-fired Cogeneration Power Plant/Utilities

### Capacity

- Electricity: Phase 1: 45 MW
- Steam: Phase 1: 70 T/H

### Customer

- Electricity: IUs 35 MW
- Electricity: Non-firm SPP 10 MW
- Steam: IUs 70 T/H

### SCOD

Q12018

### Progress update

- EIA has been approved
- Under apply all permits/ licences
- Secure agreements with IUs 35 MW, 70T/H
- SCOD: Q1/2018

### Shareholding

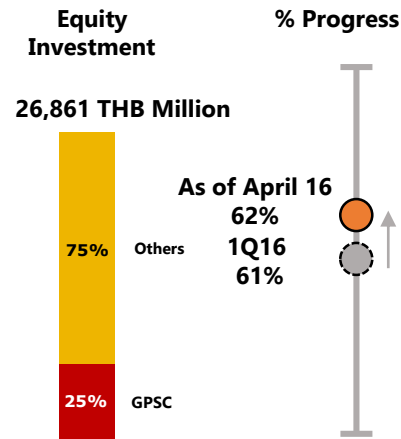






## Xayaburi Power Company Limited (XPCL)

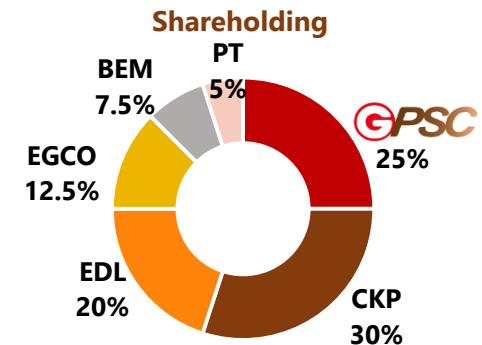
Xayaburi, Lao PDR



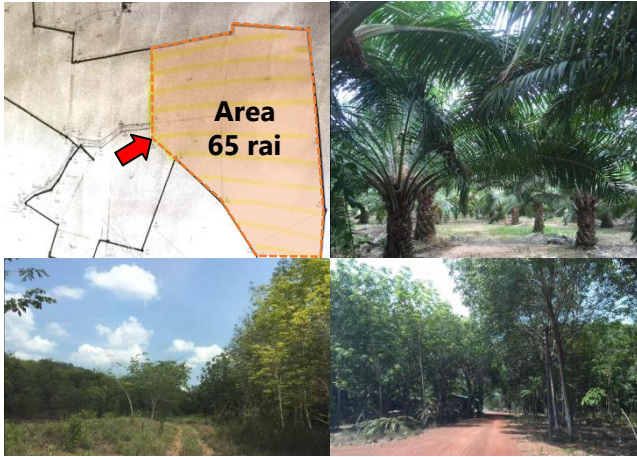
<b>Type</b>	Run-of-River Hydropower
<b>Capacity</b>	• Electricity: 1,285 MW
<b>Customer</b>	• Electricity: EGAT 1,220 MW (31 years), EDL 60 MW (31 years)
<b>SCOD</b>	October, 2019
<b>Total Investment</b>	136,751 THB million
<b>D/E</b>	4:1

### Progress update

- Overall project progress until April 16 was 62.03% (plan 49.85%)
- Concrete work at intermediate bock, powerhouse and Fish Ladder can continue with no interruption
- Hydro-Mechanical work and Electro-Mechanical work progressed as plan
- Erection of 500kV transmission line tower at section 2-3 work progressed as plan







## Chanthaburi's Shrimp Farmer Cooperative (Solar Farm) Chanthaburi Province

Type	Solar
Capacity	• Electricity: 5 MW
Customer	• PEA
SCOD	• 2017
Total Investment	• 244 THB million
D/E	• 3:1
Contract	• FiT THB 5.66/unit • 25 years • End 2042

### Progress update

- Solar installations on the ground (area 65 rai)
- For government agencies, and agricultural cooperatives
- In the process of financing and Engineering Procurement and Construction

### Shareholding



**24M Technologies, Inc. (24M)**

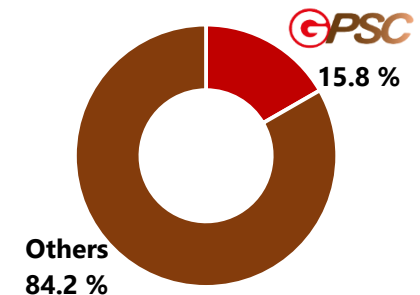
Cambridge, Massachusetts (MA), USA



<b>Business</b>	Lithium-Ion Battery (LFP) technology
<b>Application</b>	<ul style="list-style-type: none"> <li>Energy Storage System (ESS)</li> </ul>
<b>Status</b>	<ul style="list-style-type: none"> <li>Series B: Pilot Plant</li> </ul>
<b>Next Step</b>	<ul style="list-style-type: none"> <li>Series C: High Volume Manufacturer</li> </ul>
<b>Total Investment</b>	~21.67 USD million*

**Progress update**

- During process of Lithium-ion cells chemistry and Manufacturing process optimization for enhance the battery cells life cycle and the cells bill of materials cost
- GPSC invested in Series C with Venture Capital from USA and Industrial Company from Japan. 24M is expected COD of High Volume Manufacturing (HVM) in 2018
- Planning on joint R&D of Tropical Climate Battery with potential partner

**Shareholding**

## Target Growth

Unit: Secured MW

1,922

### Growth along with PTT Group

#### CUP-4 and Expansion

- Growth domestically and internationally along with upstream and downstream business of PTT Group
- Focus on SPP and Cogeneration as utilities provider along with PTT group presence

CAGR 10%

2,800

### Quick Win

Biomass

Solar

WTE

M&A

- Renewable business
- Acquisition of operating/ under-construction assets
- **Rayong Waste to Energy power plant in the process of PPA approval (6-9 MW)**

### Big Win

#### International

Coal

Gas

- Investment in international mega projects
- **3 projects in Myanmar in the process of MOA negotiation (total 3,400 MW)**
- **Potential opportunities in Indonesia**

### Adjacent & Support Opportunities

ESCO

24m

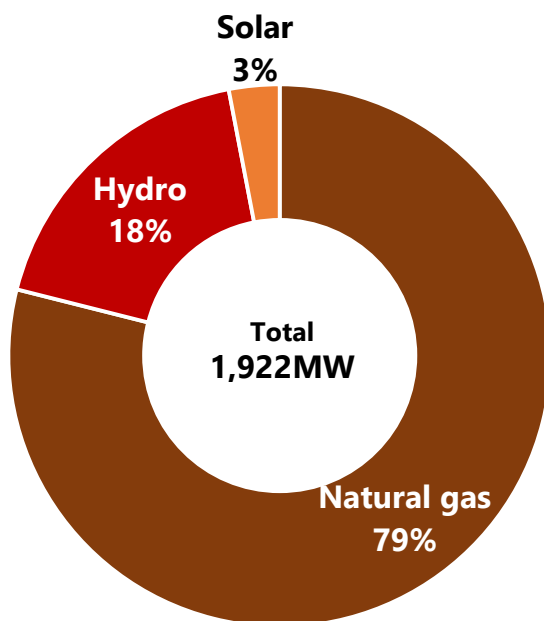
- Operation and Maintenance services
- Transmission and Distribution business
- Energy Storage technology

2016

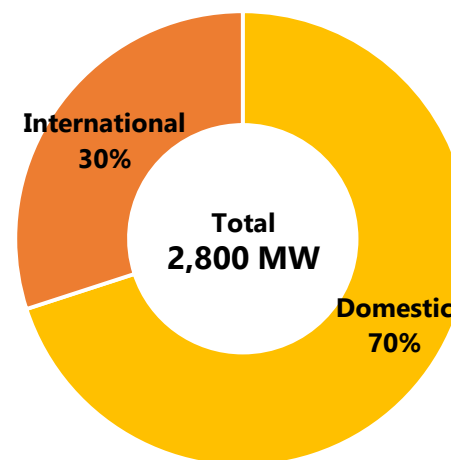
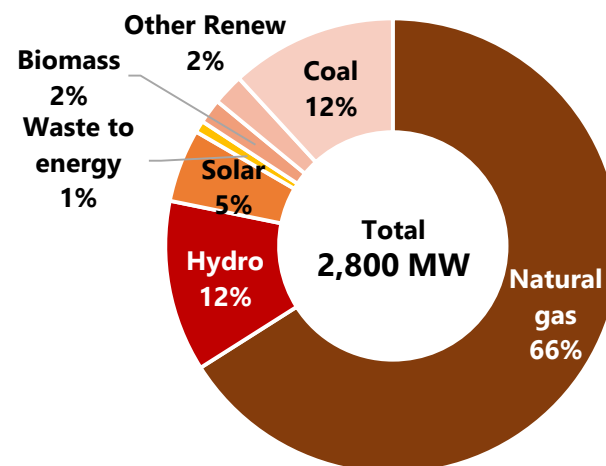
2019

# Target 10% of Renewable energy and 30% of International projects in 2019 GPSC's Portfolio

**2016 Committed Portfolio (MW)**



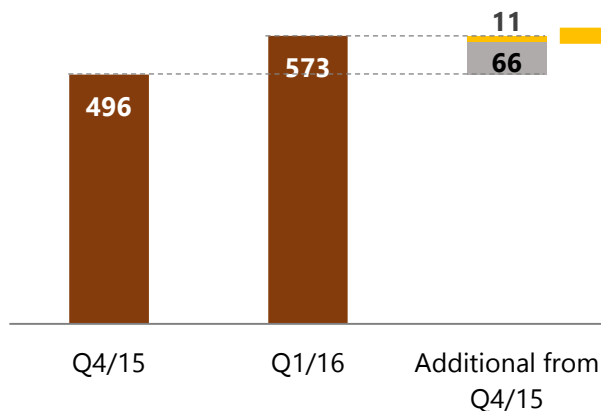
**2019 Committed Portfolio (MW)**



- GPSC target's "Total Renewable capacity 10% of 2,800 MW" lead to investment plan in various type in Renewable projects approx. 200~300 MW in both domestic and international
- GPSC target's "International Portfolio 30% of 2,80 MW" lead to investment plan in various type in both Conventional and Renewable projects approx. 850 MW

# New Projects of PTTGC support 'Growth Along with PTT Group' Strategy; resulting in higher sales revenue

## Quarterly Electricity Sales Volume (GWh)



### Additional 10.81 GWh of electricity to new projects

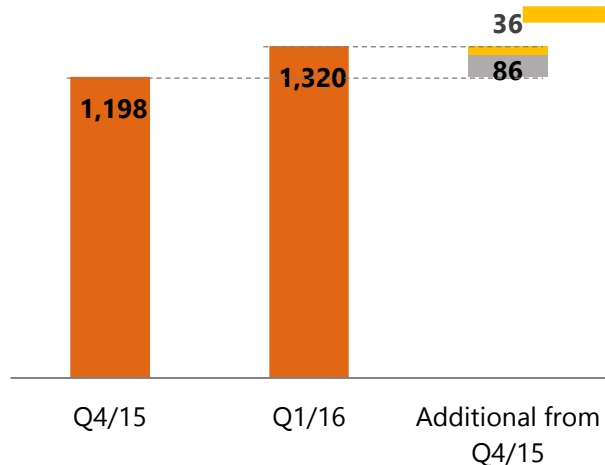


- **Phenol II:** 10 MW
- **Vencorex:** 2.7 MW
- **LLDPE 2 :** 18 MW
  - SCOD: April 2018

### Potential Future Projects



## Quarterly Steam Sales Volume ('000 tons)



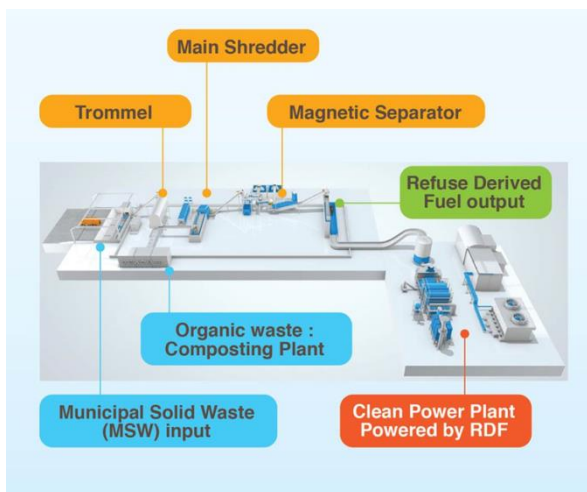
### Additional 36,000 tons of steam to new customer



- **Phenol II:** 110 T/H
- **Vencorex:** 3 T/H

### Potential Future Projects





## Waste Management Project Rayong Province

<b>Type</b>	Waste to Energy
<b>Capacity</b>	Electricity 6 – 9 MW ( Treat MSW 500 ton/day)
<b>Customer</b>	PEA
<b>SCOD</b>	2019
<b>Total Investment</b>	~2,000 THB million
<b>Contract</b>	<ul style="list-style-type: none"> <li>Waste Management Contract between GPSC &amp; Rayong PAO (Secure feedstock)</li> <li>Feed-in-tariff THB 5.08/unit</li> <li>20 years</li> </ul>

MSW = Municipal Solid Waste  
PAO = Provincial Administrative Organization

### Progress update

- Under the Public and Private Partnership (PPP), the Waste Management Contract is being proved by the Attorney General Thailand
- During process of apply PPA under Feed-in-tariff scheme
- ESA/CoP has been finished
- Completed Basic Engineering Design Package (BED)
- Construction of RDF Plant will start within Q4/2016 and power plant within 2017

### Shareholding





# Electricity prospects of strategic countries support the aim for GPSC's to expand regionally and internationally



## Electricity Prospect

### Thailand: Second largest electricity consumers with strong growth

- Power generation capacity to be increased to 71 GW in 2036
- Demand in electricity triggers more power plant capacity, including initiation of renewable energy



### Lao PDR: Hydropower haven of ASEAN

- Develop hydropower resources for domestic and export markets
- Improve transmission and links with Thailand and Vietnam



### Myanmar: Higher economic growth triggers more demands in electricity

- Myanmar is enhancing electrification across the country
- Both conventional and renewable energy sources are promoted

## GPSC's Strategy

### GPSC already established the brand as PTT Group's Power Flagship

- Company utilize the PTT brand as largest oil and gas conglomerate in Thailand
- In Thai market, GPSC is regarded as one of leading integrated electricity producer

### GPSC set up the hydropower plant in Lao PDR to capture hydropower potentials

- Given high potential for hydropower, Laos PDR is a popular investment destination for Thai electricity producers

### GPSC is investigating the investment in Myanmar

- Expanding market to Myanmar will diversify GPSC portfolio to a leading emerging Asian economy
- It allies with Myanmar's government to explore other forms of energy production

# GPSC also interest in investment in Indonesia and Japan as there are demand and source of energy



## Electricity Prospect

### Indonesia: Largest electricity consumer in the region

- Largest electricity consumer in ASEAN at 188 TWh, with massive scope for growth
- World's largest coal exporter and major LNG exporter

### Japan: Active investing country in alternative energy with the supportive financial factors

- Intermittent production of nuclear energy, resulting in the seek of the alternative sources
- Substantial government supports in alternative energy by offering attractive Tariff and low financing costs

## GPSC 's Strategy

### GPSC is aiming to leverage the PTT's footprint in coal industry

- PTT has already invested in two coal mines in Indonesia
- GSPC will take this opportunity to explore other energy investments through the connection and local accessibility.

### GPSC keeps expanding in Japan's solar productions

- GPSC has tapped into Japan market with the current 21 MW solar project.
- Still, given the high feed-in tariffs, low financing cost, there are still the unutilized solar-potential areas worth exploring further.



## Thanlyin Project

<b>Location</b>	Yangon Region, Myanmar
<b>Type</b>	Combined Cycle Gas Turbine
<b>Capacity</b>	Approx. 400 MW (Phase 1: approx. 100MW)
<b>Customer</b>	• MEPE
<b>SCOD</b>	• 2020
<b>Status</b>	• FSR Clarification



## Myeik Project

<b>Location</b>	Tanintharyi Region, Myanmar
<b>Type</b>	Coal-Fired Power Plant
<b>Capacity</b>	2,500 MW
<b>Customer</b>	• MEPE • EGAT
<b>SCOD</b>	• 2022+
<b>Status</b>	• FSR Clarification



## Ayeyarwady Project

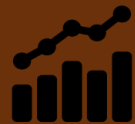
<b>Location</b>	Ayeyarwady Region, Myanmar
<b>Type</b>	Combined Cycle Gas Turbine
<b>Capacity</b>	Approx. 500 MW
<b>Customer</b>	• MEPE
<b>SCOD</b>	• 2020
<b>Status</b>	• Negotiating MOA



Thailand Power Industry Overview



Company Overview



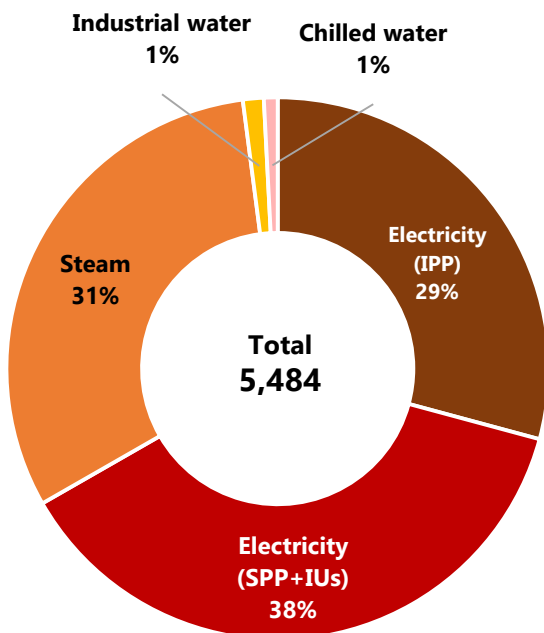
**Financial Performance**



Key Takeaway

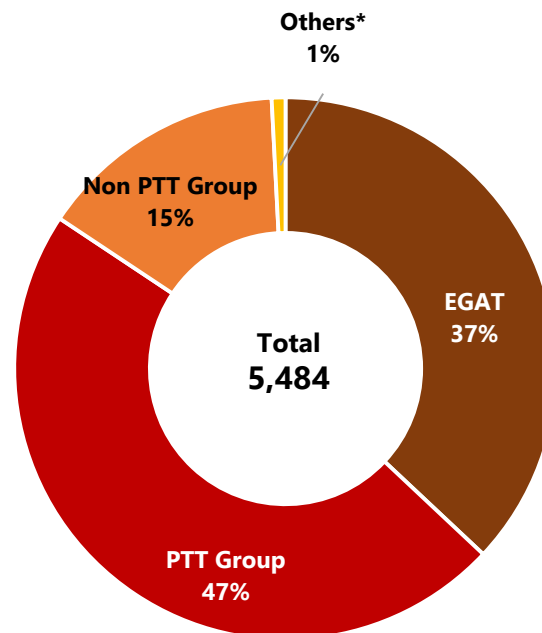
# 70% of GPSC's revenue is from electricity, PTT Group is GPSC's major customer

**Q1/16 Revenue by product**  
(THB million)



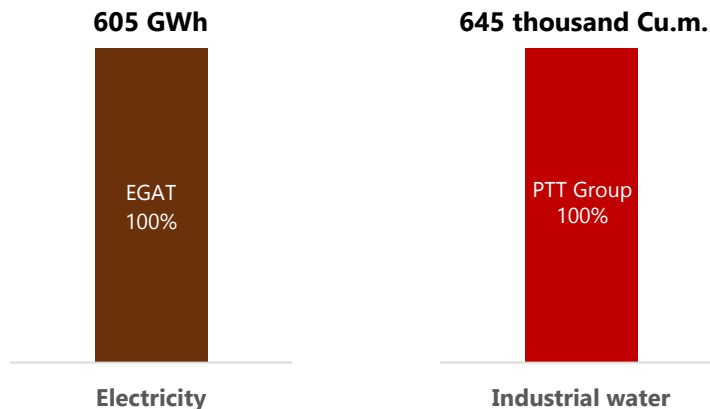
- Electricity and Steam are major source of GPSC's revenue, accounted for 98% of total revenue.

**Q1/16 Revenue by customer**  
(THB million)

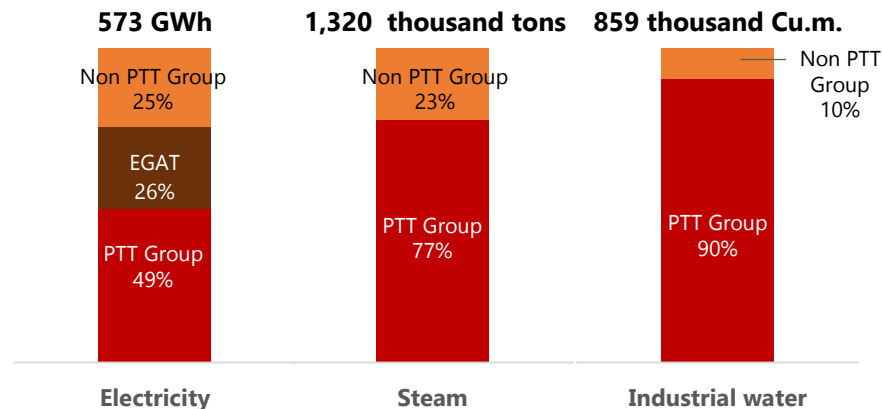


- Accounted for almost 50% of total revenue, PTT Group is the largest customer of GPSC in Q1/16.

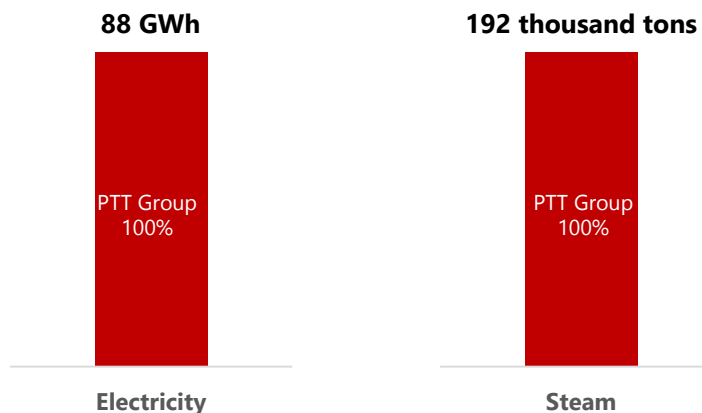
## Sriracha Power Plant (IPP)



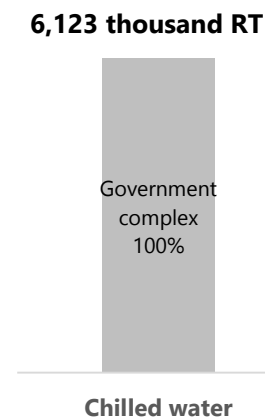
## Rayong Power Plant (SPP)



## IRPC Clean Power (IRPC-CP) Phase 1 (SPP)

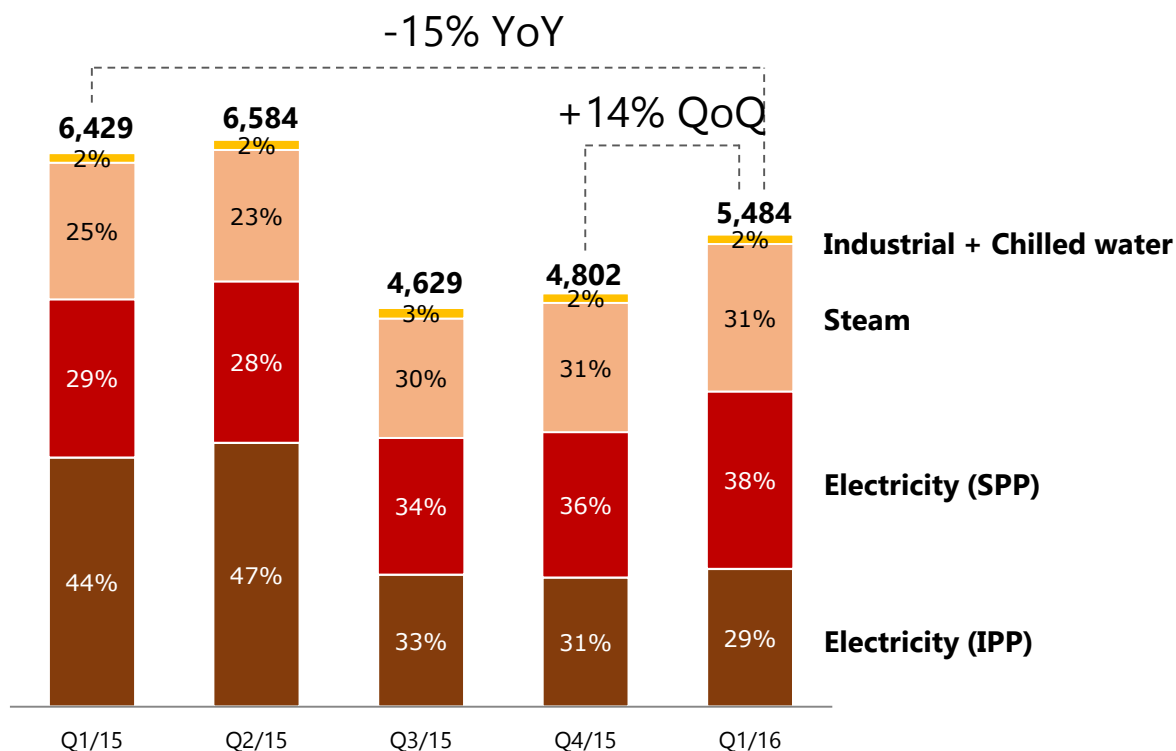


## Combine Heat and Power Producing (VSPP)





## Quarterly revenue (THB million)



### Q1/16 VS Q4/15 (QoQ)

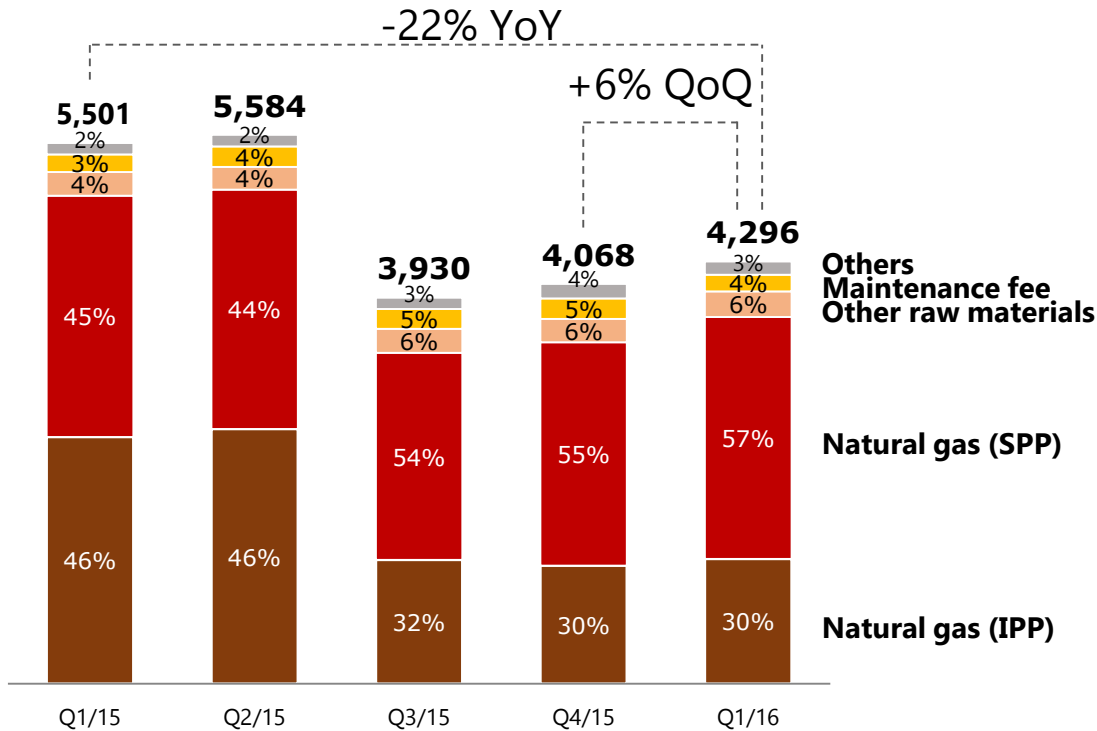
- Total revenue in Q1/16 **increased by THB 682 million or 14%.**
- The increase were mainly caused **by higher sales volume** from the company's operating power plants.
- In addition, the **first full operating quarter of IRPC-CP Phase 1** also helped enhance the total revenue in Q1/2016.

### Q1/16 VS Q1/15 (YoY)

- Total revenue in Q1/16 **decreased by THB 945 million or 15%.**
- The decrease was mainly caused by the decline in revenue from Energy Payment (EP), which were resulted from the **lower sales volume of Sriracha power plant** as EGAT's dispatch instruction.

# Increase in cost of sales and services was in line with the increase in production volume

**Quarterly Cost of sales and services\***  
(THB million)



## Q1/16 VS Q4/15 (QoQ)

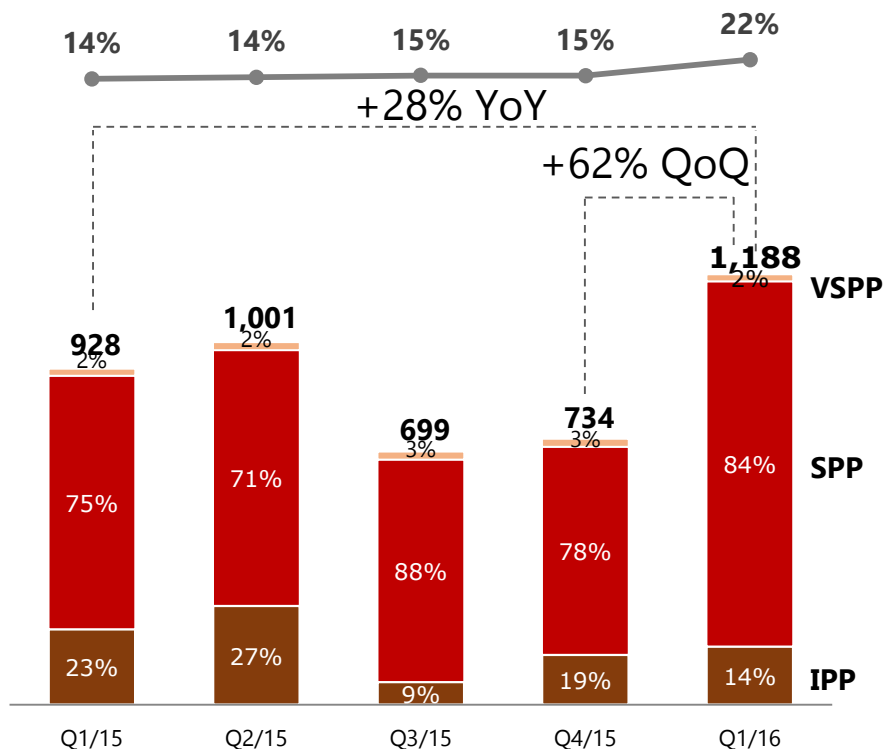
- Cost of sales and services in Q1/16 **increased by THB 228 million or 6%.**
- The increase in natural gas cost was resulted from the **increase mainly from the production volume.**
- While the total production costs increased due to the higher production volume, production **costs per unit reduced mainly from the plant optimization**, resulting in higher gross profit margin.

## Q1/16 VS Q1/15 (YoY)

- When compared with Q1/15, cost of sales and services **decreased by THB 1,205 million or 22%.**
- The decrease was caused by a **drop in cost of raw materials** from lower dispatch to EGAT and natural gas price together with the **decrease in maintenance costs** due to the boiler inspection and cooling tower and GTG motor renovation costs at Rayong plant that occurred in Q1/2015.

# Gross profit improved 62% QoQ from plant optimization and higher SPP's sales volume

**Quarterly gross profit and Gross profit margin\***  
(THB million, %)



## Q1/16 VS Q4/15 (QoQ)

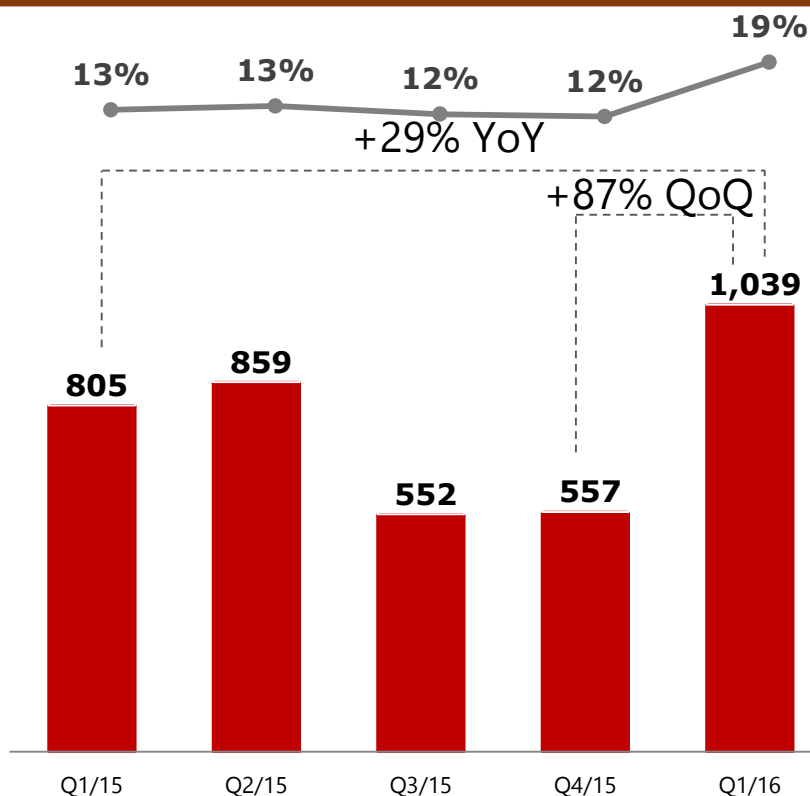
- Gross profit in Q1/16 was THB 1,188 million **increased by THB 454 million or 62%.**
- This was mainly thanks to an increase in Rayong's sales volume from **higher demand** from both existing and new customers together with **company's process improvement** through plant optimization. Moreover, **IRPC-CP Phase 1** was also a key factor in enhancing the company's gross profit from its **first full quarter of operation.**

## Q1/16 VS Q1/15 (YoY)

- Compare with Q1/15, gross profit **increased by THB 260 million or 28%.**
- The increase was mainly caused by the **more efficient production** process from Rayong's plants optimization and **the drop in maintenance costs.**

# Q1/2016 EBITDA strongly increased by 87% QoQ with better EBITDA margin of 19%

Quarterly EBITDA and EBITDA margin  
(THB million, %)



## Q1/16 VS Q4/15 (QoQ)

- EBITDA in Q1/16 was THB 1,039 million which showed a **strong increase by THB 482 million or 87%**.
- The favorable outcome was mainly caused by **the increase in sale volume** and **the drop in production cost** resulting from the plant optimization and **lower business development expenses**.

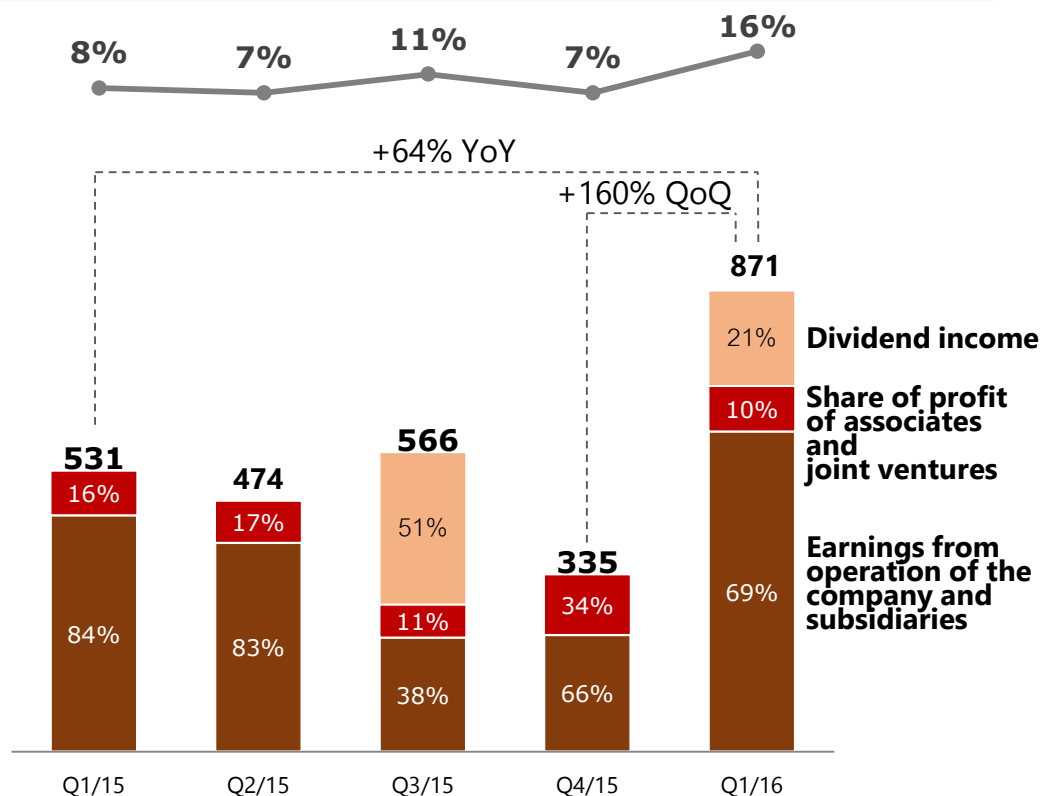
## Q1/16 VS Q1/15 (YoY)

- In comparison with Q1/15, **EBITDA increased by THB 234 million or 29%**.
- The increase was mainly caused **by the lower cost of raw materials from the drop in natural gas price**.

# Net profit for the company increased outstandingly from a better operating result and dividend income

## Quarterly net profit and Net profit margin

(THB million, %)



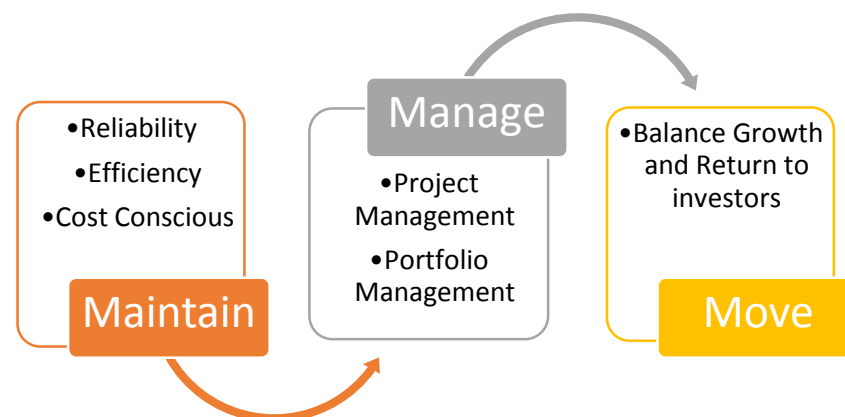
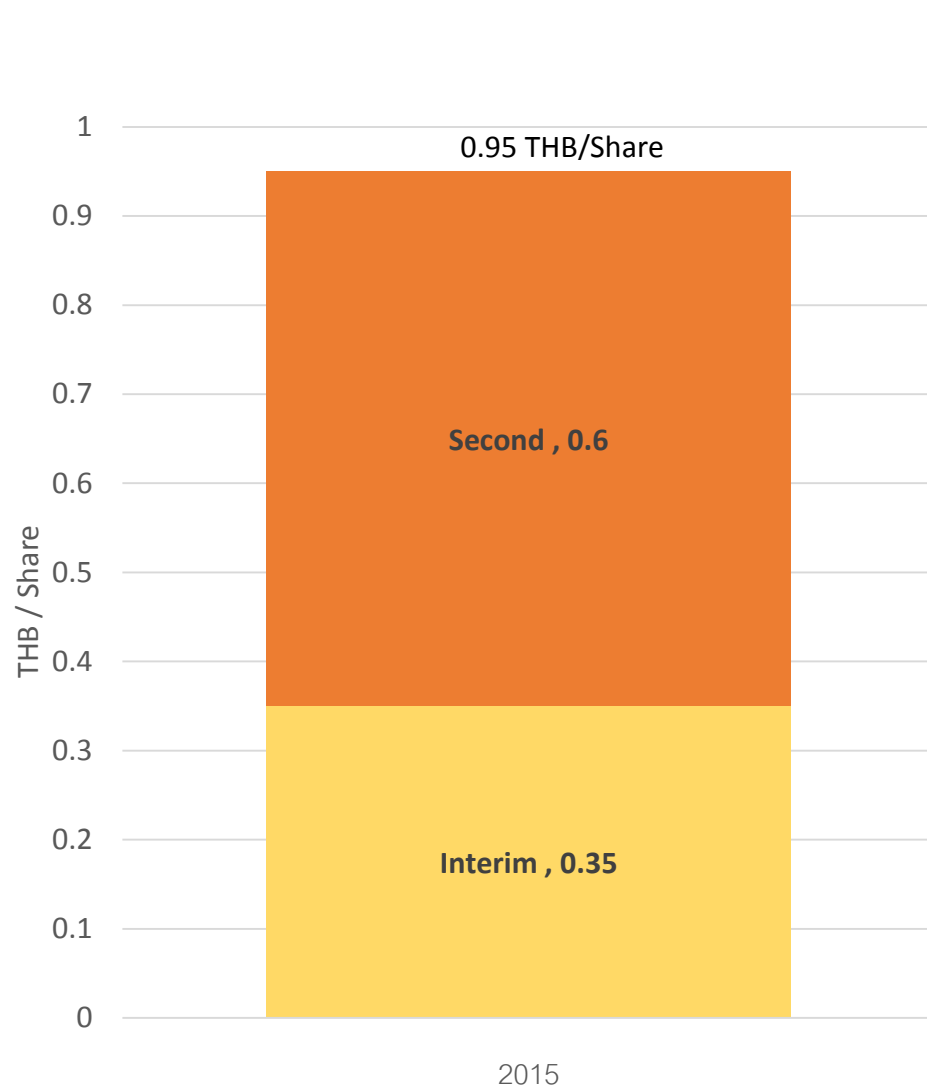
### Q1/16 VS Q4/15 (QoQ)

- Net profit for the company was THB 871 million increased by **THB 536 million or 160%**.
- The outstanding increase in the net profit mainly came from the **rising in sales volume** from the expansion of production capacity of the operating power plants and the **optimization** of the power plant's production process. Furthermore, the company gained **dividend income from Ratchaburi Power Company Limited (RPCL)** for Baht 180 million during Q1/16.

### Q1/16 VS Q1/15 (YoY)

- In comparison with Q1/15, net profit for the company **increased by THB 340 million or 64%**.
- The increase was mainly caused by the **increase in demand** of electricity and steam consumptions from the existing and new customers and the **better production cost management** resulted from the plant optimization.





## Historical Dividend Payment after IPO

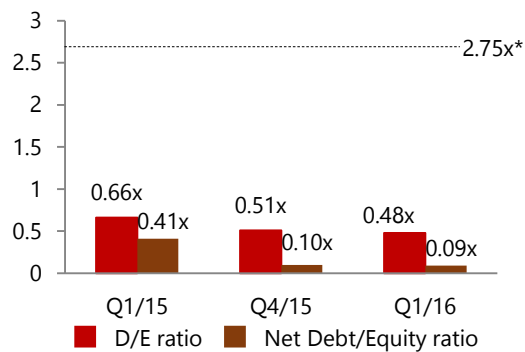
GPSC has paid the dividend from 2015 operating results at THB 0.95 per share or 75% dividend payout

## Dividend Policy

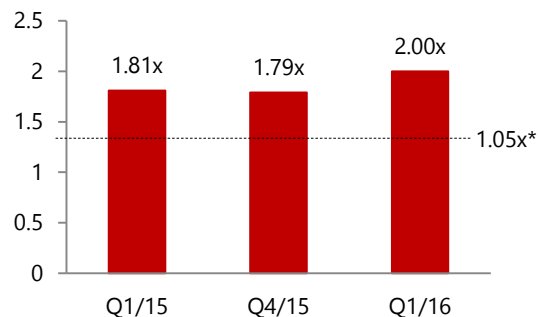
The Company has policy to pay dividend the minimum of 30% of net profit according to a financial statement, after deductions of tax, reserve capital requirement and the commitment as in terms of borrowing agreement. Nevertheless, the dividend policy relies on the investment plan, necessity of investment as may deem appropriate.

# Q1/16 Earning per share (EPS) significantly increased with a strong financial position

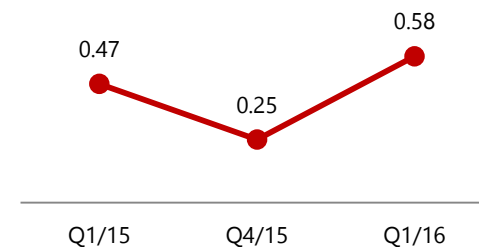
**Total D/E and Net Debt/ Equity ratio (Times)**



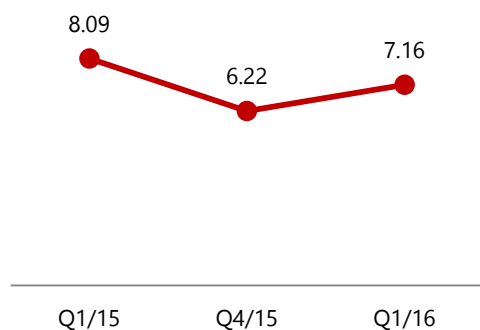
**DSCR (Times)**



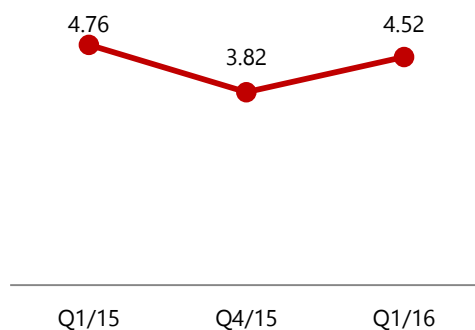
**Earning per share (EPS) (Baht/share)**



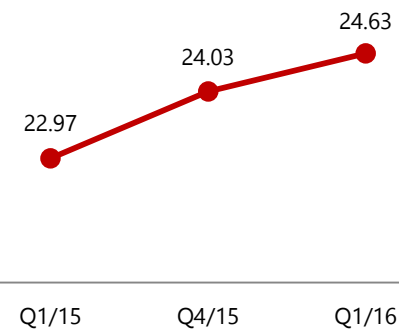
**ROE (%)**



**ROA (%)**



**Book value per share (BVPS) (Baht/share)**

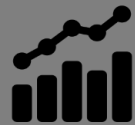




Thailand Power Industry Overview



Company Overview



Financial Performance



**Key Takeaway**

- ✓ GPSC is PTT Group's Power Flagship. PTT Group is Thailand's largest oil and gas conglomerate and the 3<sup>rd</sup> largest ASEAN company by market capitalization\*
- ✓ GPSC's portfolio is mainly in Thailand (one of the current largest consumers), Laos PDR, and potential projects in Myanmar (the emerging and potential consumers of the region)

## 8.7% committed CAGR

New 5 MW solar farm project has been recently added to GPSC's committed projects. GPSC's existing committed projects will add 546 MW more to achieve 1,922 operating MW by 2019, marking 8.7% committed CAGR within 3 years.



## Profitability

GPSC achieved significant higher profit in Q1 2016 by 64% YoY and 160% QoQ from capacity expansion of operating power plants and the optimization of the power plants' production process. Moreover, dividend income contributed to net profit by THB 180 million.



## Operational Effectiveness

GPSC's Sustainability Framework drives business growth paralleling with sustainability to achieve DJSI listing within 2019. In 2016, GPSC focus on Operational Effectiveness to improve operating performance. In Q1/2016, Rayong Power Plant's optimization has improved gross profit margin to 25%.



## 7 projects in progress

GPSC's Management team ensure efficient project management and high competent staffs, both domestic and international projects in order to meet the construction schedule and COD according to predetermined schedule.



## Appendix





# Power Plant Portfolio

Name	Type	Location	Fuel Type	Technology	GPSC's share %	Total capacity (MW)	Equity capacity (MW)	Steam (T/h)	Industrial water (Cu.m/h)	COD	Tenure/ Expiry year
IN OPERATION											
Sriracha	IPP	Chonburi	Natural gas	Combined cycle	100%	700	700	-	80	2006	25/2025
CUP-1	SPP	Rayong	Natural gas	Cogeneration	100%	226	226	890	720	2006	10-15/2021
CUP-2	SPP	Rayong	Natural gas	Cogeneration	100%	113	113	170	510	2008	15/2022
CUP-3	SPP	Rayong	Natural gas	Cogeneration	100%	-	-	280	770	2009	15/2023
CHPP	VSPP	Rayong	Natural gas	Combined heat and power with district cooling	100%	5	5	-	-	2008	30/2038
IRPC-CP Phase 1	SPP	Rayong	Natural gas	Cogeneration	51%	240	122 (Phase 1: 23 MW)	86.7	-	2015	25/2030
TSR	VSPP	Suphanburi & Karnchanaburi	Solar	Solar	40%	80	32	-	-	2013	10/2023
NNEG	SPP	Pathum-thani	Natural gas	Cogeneration	30%	125	38	9		2016	25/2041
BIC-1	SPP	Ayutthaya	Natural gas	Cogeneration	25%	117	29.25	5	-	2013	25/2038
RPCL	IPP	Ratchaburi	Natural gas	Combined cycle	15%	1,400	210	-	-	2008	25/2033
Total operating							1,376	1,441	2,080		
UNDER CONSTRUCTION											
CHPP (Solar)	VSPP	Chanthaburi	Solar	Solar	100%	5	5			2016	
CUP-4	SPP	Rayong	Gas-fired Cogeneration	Cogeneration	100%	45	45	70		2018	-
ISP1	Solar	Japan	Solar	Solar	99%	20.8	20.6	-		2017	20/2037
IRPC-CP Phase 2	SPP	Rayong	Natural gas	Cogeneration	51%	240	122 (Phase 1: 99 MW)	66.3		2017	25-27/2044
NL1PC	Hydro	Lao PDR	Hydro	Run-of-river	40%	65	26	-		2018	27/2044
BIC-2	SPP	Ayutthaya	Natural gas	Cogeneration	25%	117	29.25	5		2017	25/2042
XPCL	IPP	Lao PDR	Hydro	Run-of-river	25%	1,285	321	-		2019	29/2048
Total under construction							546	141			
Total capacity							1,922	1,582	2,080		

# Presently, GPSC's business portfolio is located in Thailand, Lao PDR and Japan

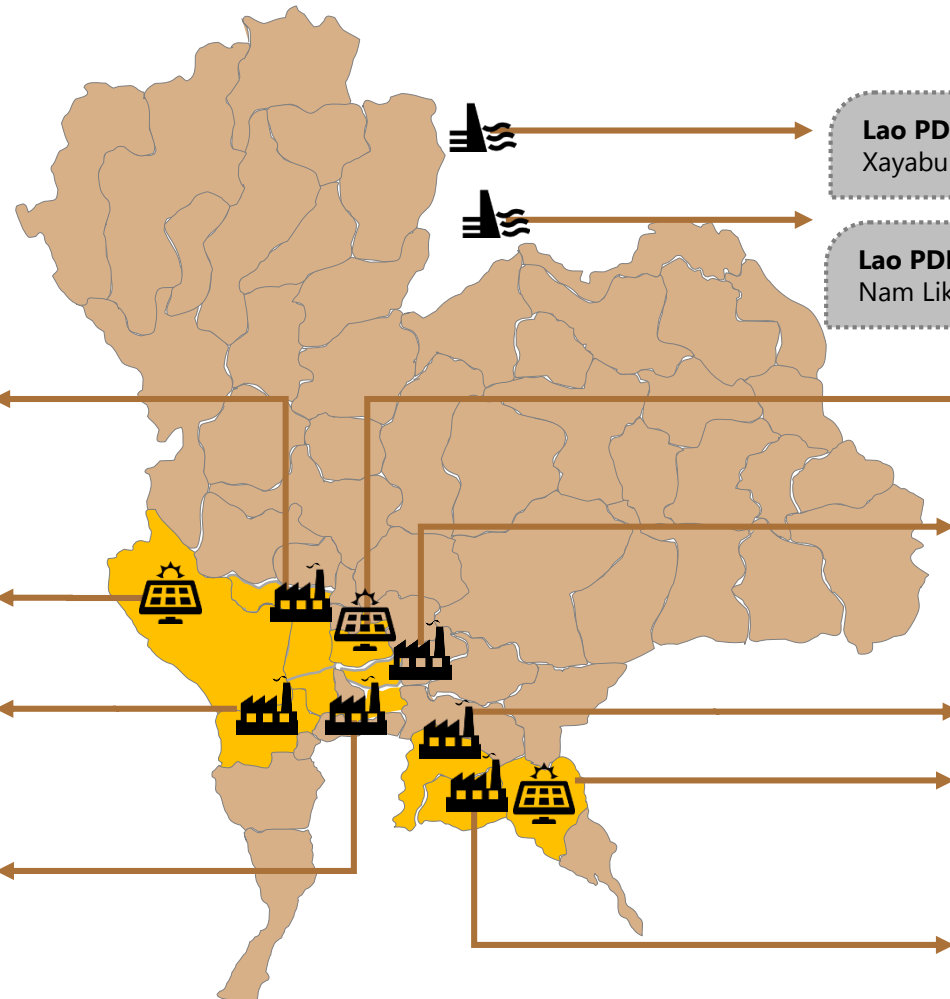
- Project under construction
- Gas Power Plant
- Hydro Power Plant
- Solar Power Plant

**Ayutthaya**  
BIC-1  
BIC-2\*

**Karnchanaburi**  
TSR

**Ratchaburi**  
RPCL

**Bangkok**  
CHPP



**Lao PDR**  
Xayaburi

**Lao PDR**  
Nam Lik 1

**Suphanburi**  
TSR

**Pathumthani**  
NNEG

**Chonburi**  
Sriracha

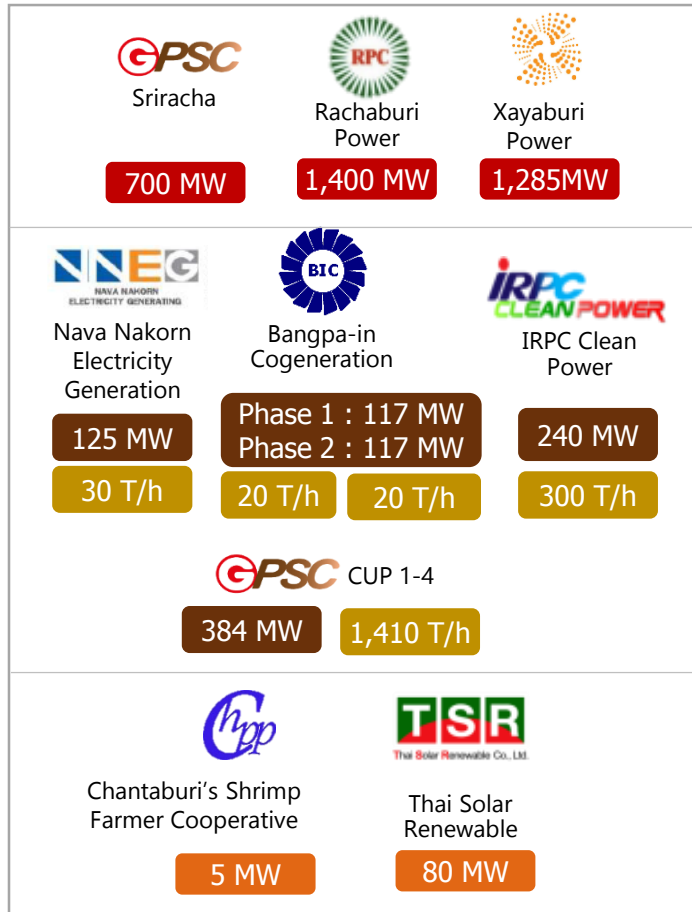
**Chanthaburi**  
CHPP (Solar)

**Rayong**  
IRPC-CP Phase 1  
CUP-1, 2, 3  
IRPC-CP Phase 2\*  
CUP-4\*

**Japan**  
Ishinoseki

**ICHINOSEKI**  
SOLAR POWER 1 GK

## GPSC's Business Portfolio



**Japan : ISP1 20.8 MW**

**Lao PDR : NL1PC 65 MW**

## Pricing Structure

**IPP/Import = Availability Payment + Energy Payment**

Investment cost	<ul style="list-style-type: none"> <li>• Equity Return</li> <li>• Financing Cost</li> <li>• Fix O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Fuel Cost</li> <li>• Variable O&amp;M</li> </ul>
-----------------	--	---

**SPP (firm) = Capacity Payment + Energy Payment**

<ul style="list-style-type: none"> <li>• Vary by type of fuel &amp; Contract Period</li> <li>• FX adjustment</li> </ul>	<ul style="list-style-type: none"> <li>• Vary by type of fuel</li> <li>• Fuel adjustment</li> </ul>
---	---

**Cogen (SPP non-firm) = K factor(seasonal weight) x EP**

**Cogen (Sell to IU) = Electricity + Steam**

<ul style="list-style-type: none"> <li>• Base Tariff (PEA : TOU 4.2) + Ft</li> </ul>	<ul style="list-style-type: none"> <li>• Cost Plus Basis</li> </ul>
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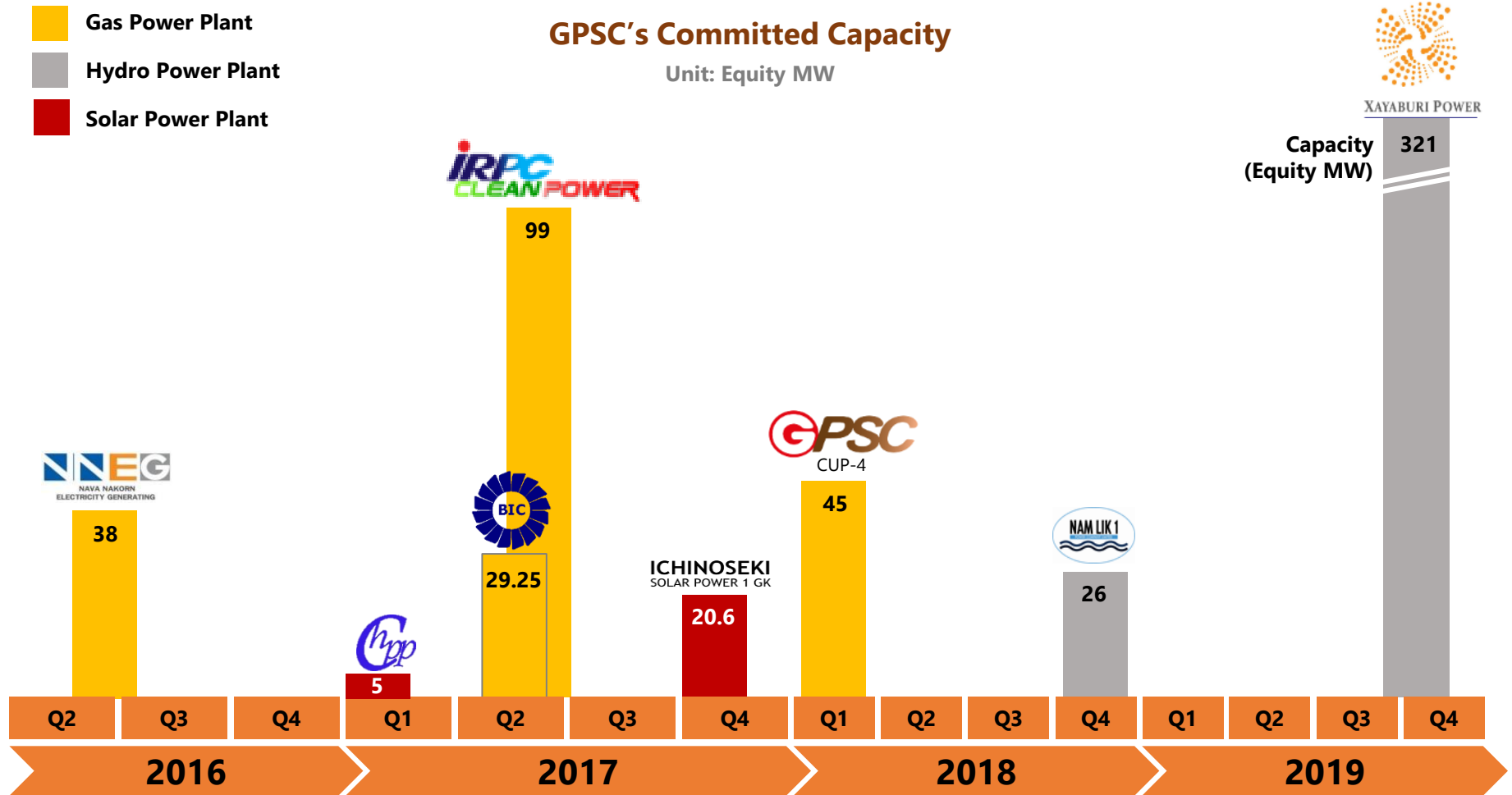
**VSPP Renewable = Base tariff + Ft + Adder**

**VSPP Renewable = FiT**

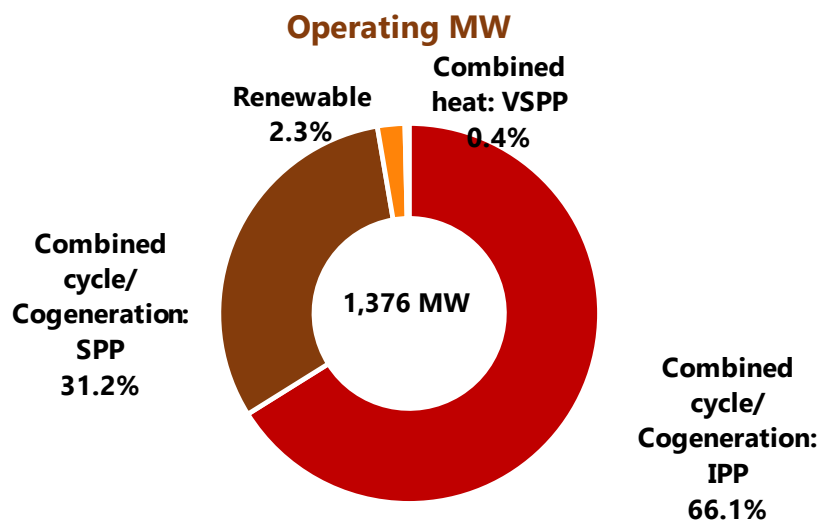
**Renewable = FiT**

**Renewable = Fixed Rate with escalation**

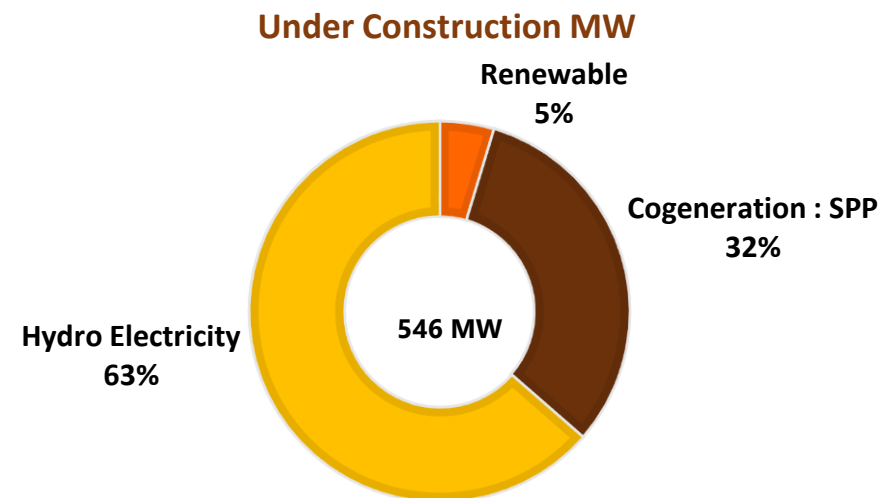
# 8 Committed Projects to operate by 2019



# Electricity: Operating capacity of 1,376 MW, with another 546 MW in pipeline

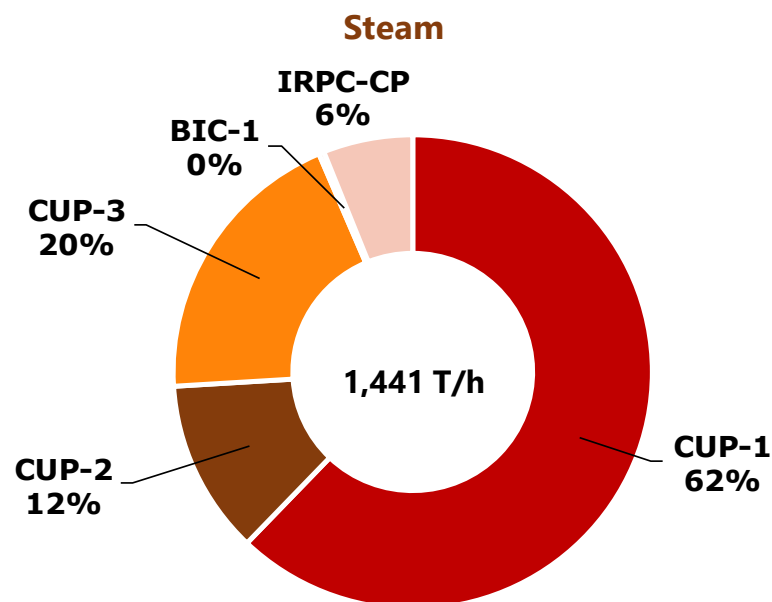


Name	Type	GPSC's share %	Total capacity (MW)	Equity capacity (MW)
Sriracha	IPP	100%	700	700
CUP-1	SPP	100%	226	226
CUP-2	SPP	100%	113	113
CHPP	VSPP	100%	5	5
IRPC-CP Phase 1	SPP	51%	45	23
TSR	Solar	40%	80	32
NNEG	SPP	30%	125	38
BIC-1	SPP	25%	117	29.25
RPCL	IPP	15%	1,400	210
<b>Total</b>			<b>1,376</b>	



Name	Type	GPSC's share %	Total capacity (MW)	Equity capacity (MW)	SCOD
CHPP	VSPP	100%	5	5	2017
ISP-1	Solar	99%	20.8	20.6	2017
IRPC-CP Phase 2	SPP	51%	195	99	2017
CUP-4	SPP	100%	45	45	2018
NL1PC	Hydro	40%	65	26	2018
BIC-2	SPP	25%	117	29.25	2017
XPCL	Hydro	25%	1,285	321	2019
<b>Total</b>				<b>546</b>	

# Steam : Operating capacity of 1,441 T/H, with another 141 T/H in pipeline

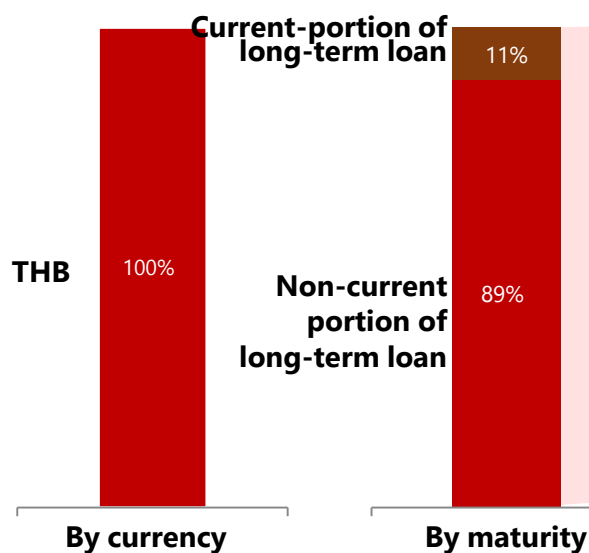


Name	Operating capacity (T/h)	Under construction Capacity (T/h)
CUP-1	890	
CUP-2	170	
CUP-3	280	
BIC-1	5	
IRPC-CP Phase 1	86.7	
NNEG	9	
CUP-4		70
IRPC-CP Phase 2		66.3
BIC-2		5
<b>Total</b>	<b>1,441</b>	<b>141</b>

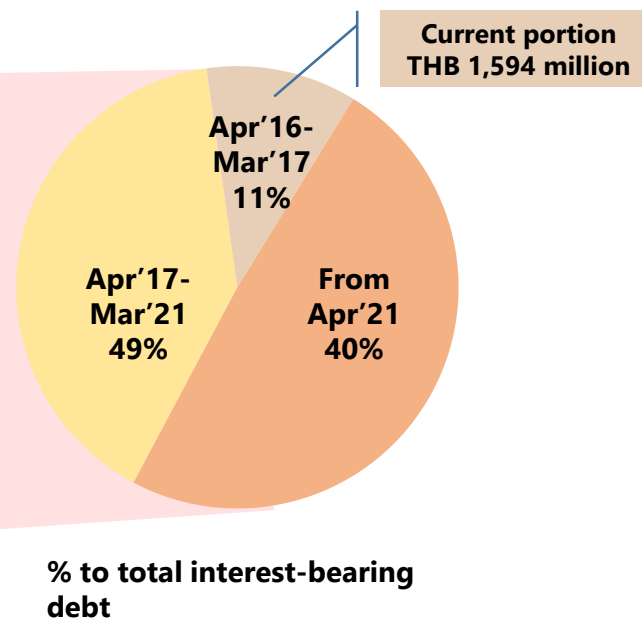


## Debt profile

Total interest-bearing debt: THB 14,840 million



## Debt repayment plan



- All debt balance as at 31 March 2016 is in THB currency.
- 100% of total interest-bearing debt is long-term loan which includes 11% of current portion.

- Non-current portion of long-term debt equals to THB 13,246 million while current portion equals to THB 1,594 million.
- 49% of total interest-bearing debt will **be repaid between April 2017 – March 2021.**

Ratios	Formula
Gross profit margin	$\frac{\text{Gross profit}}{\text{Revenue from sales of goods and service} + \text{Revenue from finance lease}}$
Net profit margin	$\frac{\text{Net profit}}{\text{Total Revenue}}$
Debt to Equity	$\frac{\text{Total liabilities}}{\text{Total shareholder's equity}}$
Net debt to Equity ratio	$\frac{\text{Interest bearing debts} - (\text{Cash and cash equivalents} + \text{Restricted cash} + \text{Current investments})}{\text{Total shareholder's equity}}$
DSCR	$\frac{\text{EBITDA for DSCR for the last 12 months}}{\text{Principal and Interest to be paid in the next 12 months}}$
Earning per share (EPS)	$\frac{\text{Net profit for the company}}{\text{Weighted average number of shares}}$
ROE	$\frac{\text{Net profit for the company}}{\text{Average shareholder's equity}}$
ROA	$\frac{\text{Net profit (last 12 months)}}{\text{Average assets}}$
Book value per share (BVPS)	$\frac{\text{Shareholder's equity for the company}}{\text{Average shareholder's equity for the company}}$



# Maintenance schedule

Plant	Tag no.	Description	2016											
			Q1			Q2			Q3			Q4		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CUP-1	H-13701	Aux. Boiler.11			15 <b>3Y</b> 27									
	N-13901	GTG11	5 <b>HG</b> 18											
	H-13702	HRSG11	5 <b>3Y</b> 18											
	N-13902	GTG12						2 <b>1Y</b> 12						
	H-13703	HRSG12												
	N-13903	GTG13						20 <b>1Y</b> 30						
	H-13704	HRSG13												
	N-13904	GTG14	31/01 <b>MI</b> 21/02											
CUP-2	H-13705	HRSG14	31/01 <b>3Y</b> 21/02											
	N-13961	GTG15							31/07 <b>MI</b> 21/08					
	H-13761	HRSG15							31/07 <b>3Y</b> 21/08					
	N-13962	GTG16										2 <b>MI</b> 23		
	H-13762	HRSG16		22/02 <b>1Y</b> 3/03								2 <b>3Y</b> 23		
	H-23701	Aux. Boiler.21						21/06 <b>3Y</b> 3/07						
	N-23901	GTG21												
	H-23701	HRSG21	26/01 <b>1Y</b> 5/02								1 <b>3Y</b> 30			
CUP-3	N-23902	GTG22												
	H-23702	HRSG22											26/11 <b>1Y</b> 6/12	
	N-23911	Steam Turbine21												
	H-33701	Aux. Boiler 31								6 <b>3Y</b> 18				
CUP-3	H-33711	Aux. Boiler 32										14 <b>3Y</b> 26		
	H-33712	Aux. Boiler 33									23/09 <b>3Y</b> 5/10			
SRC	11MB	GT11										16 <b>CI</b> 24		
	1-211-SG-101	HRSG#1				<b>3Y</b>								
SRC	12MB	GT12										16 <b>CI</b> 24		
	1-211-SG-201	HRSG#2				<b>3Y</b>								

## Notes

MI  
HGPI  
MO  
Mi  
1Y  
3Y  
1Y  
3Y

## Rayong Site

Major Inspection for Gas Turbine  
Hot Gas Path Inspection for Gas Turbine  
2nd Major Overhaul for Steam Turbine  
Minor Inspection for Steam Turbine  
One Year Inspection Aux. Boiler  
Three Year Inspection Aux. Boiler  
One Year Inspection HRSG  
Three Year Inspection HRSG

22 days  
14 days  
27 days  
15 days  
11 days  
13 days  
11 days  
14 days

## Notes

CI  
MO

## Sriracha Site

Combustion Inspection for Gas Turbine  
Major Overhaul for Gas Turbine

9 days  
33 days

# GPSC's is Thailand's largest energy conglomerate, namely, Petroleum Authority of Thailand PCL (PTT)



## Petroleum Authority of Thailand PCL (PTT)

**Market Capitalization:** USD 23.32 bn  
**Major Shareholder:** Ministry of Finance, Thailand (51.11%)

### Nature of Business:

PTT is a fully integrated national petroleum and petrochemical company. As an operating and holding company, PTT features business conducted by itself and through PTT Group companies (subsidiaries, joint ventures, and associates)

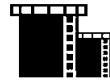
Source: Capital IQ as of 12/04/2016

## PTT-Operated Business



### Gas Business Unit

- The entire chain of natural gas from exploration and production, procurement, transportation to gas separation and marketing of natural gas



### Oil Business Unit

- Engaging in marketing and distribution of refined fuels, LPG and lubricating products



### International Trading Business Unit

- A fully international trading business covering procurement, international trading of crude oil, condensate, petroleum, petrochemical products as well as other specialty substances



### Infrastructure Business Unit

- Engaging in maximizing efficiency of infrastructural asset management and promote proficiency in professional project management such as land development businesses, standards and operating systems for sustainability, engineering and maintenance services etc.

## Business invested through PTT Group companies



### Petroleum exploration and production (E&P)

- PTT conducts the exploration and production business (domestic and international) through PTT Exploration and Production PCL (PTTEP)



### Coal Business

- PTT invests in the coal business and coal mining business in Indonesia for sale to China, Korea, Japan, and Taiwan through PTT Energy Resources Co., Ltd (PTTER)



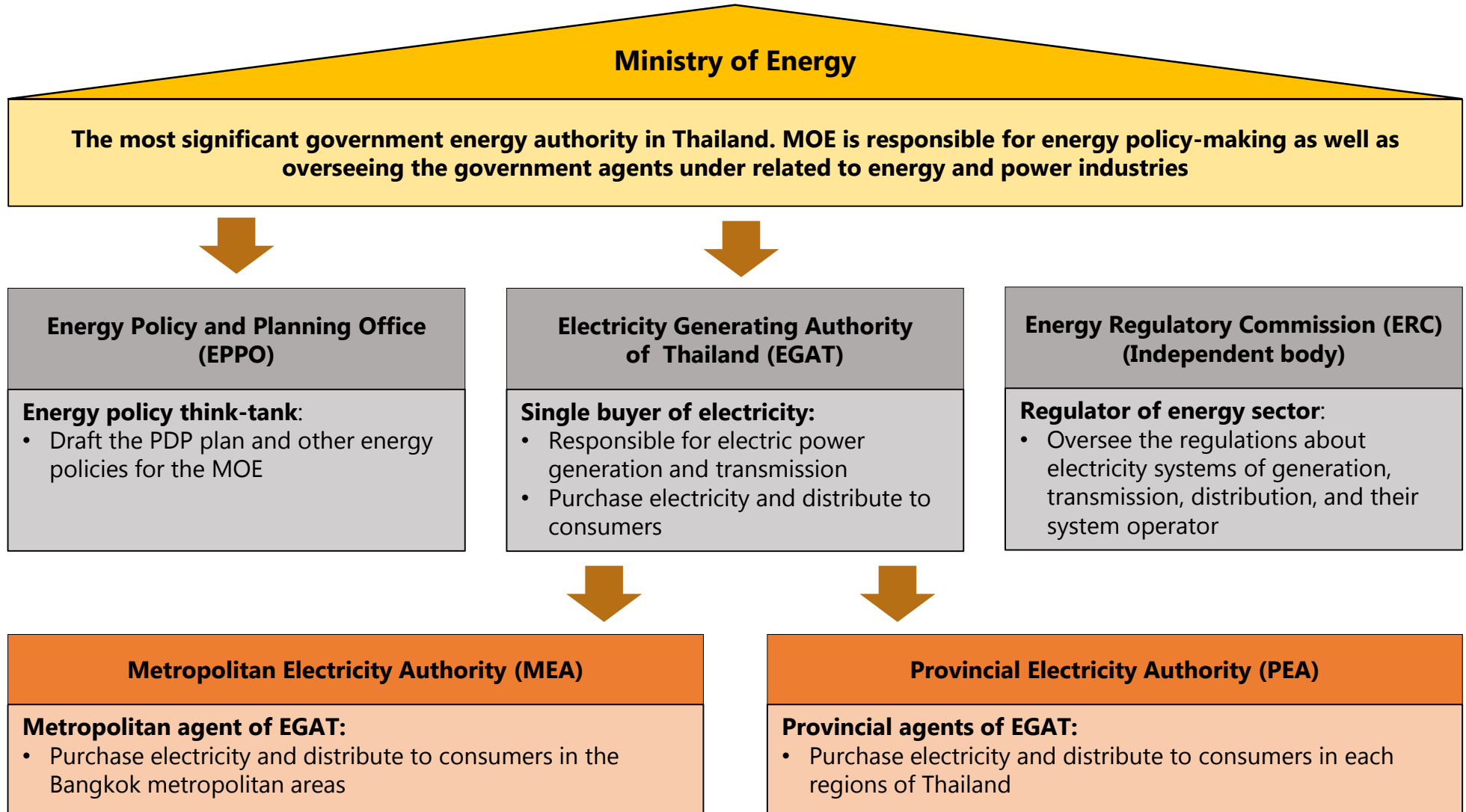
### Power Business

- PTT engages in the power business through Global Power Synergy PCL (GPSC)
- As PTT's power-business flagship, GPSC produces public utilities (electricity, steam, demineralized water, chilled water) for industrial users and Electricity Generating Authority of Thailand (EGAT)



### Petrochemical & Refining Business

- PTT invests through 10 subsidiaries in doing Petrochemical & Refining Business
- The scope is from fuel processing, production and sales of upstream, intermediate, and downstream petrochemicals, together with various polymers, worldwide marketing business, and integrated logistical services



# Thai government policy advocates growth of energy and electricity sectors



- **Ensure consistency and security of electricity and energy** supply by seeking energy from neighboring countries



- **Improve electricity and energy infrastructure** to enhance competitiveness especially in transmission line in regional areas



- **Diversify sources of energy**, esp. the alternative energy such as clean coal, to maintain self-sufficiency



- **Ensure price affordability** to stabilize the energy sector and help end-consumers



- **Energy policies is more environmental-concerned**, supported by the use of clean-coal energy and other non-fuel sources

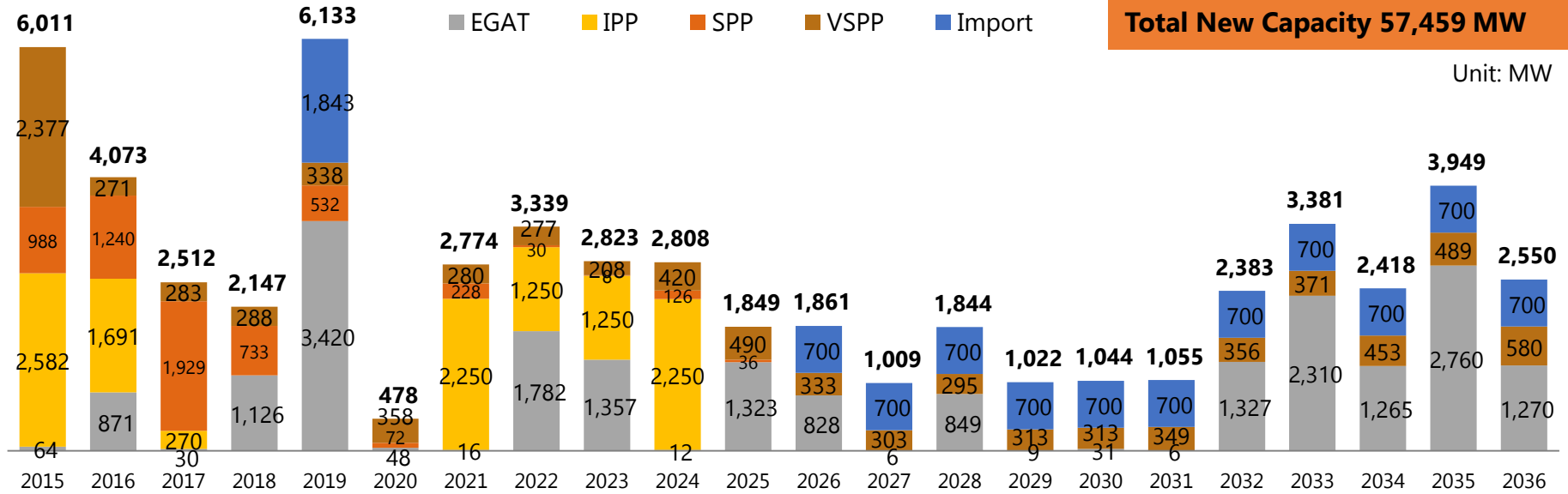


- **Promote research and development in energy sector**, especially exploration of new energy sources and technologies

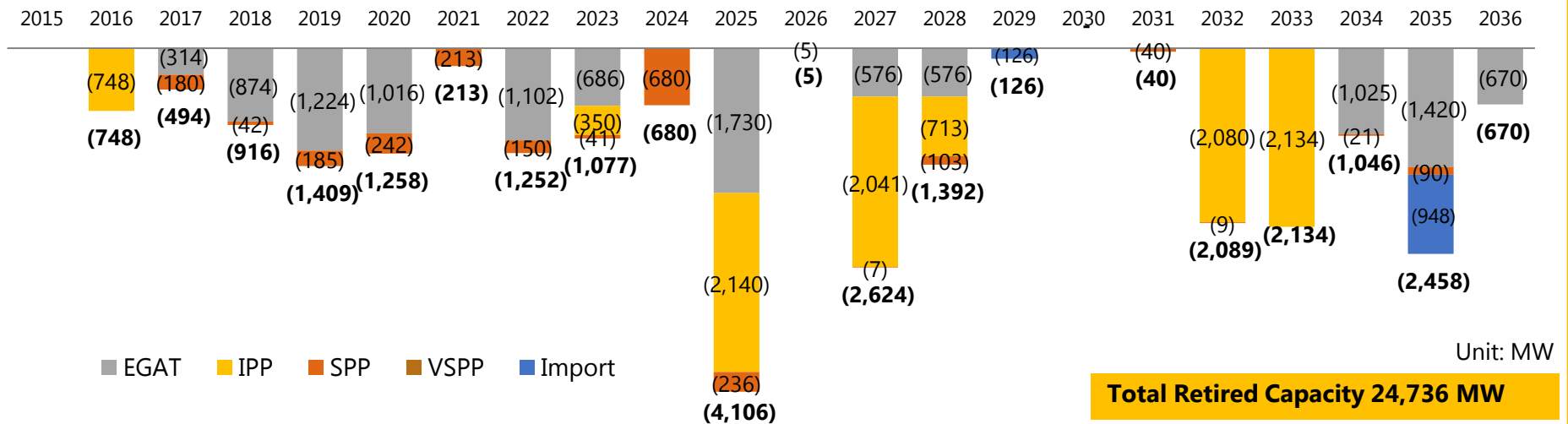


# Most of total new and retired power capacity during 2015-2036 are from EGAT and IPP, respectively

Thailand's power new capacity during 2015-2036



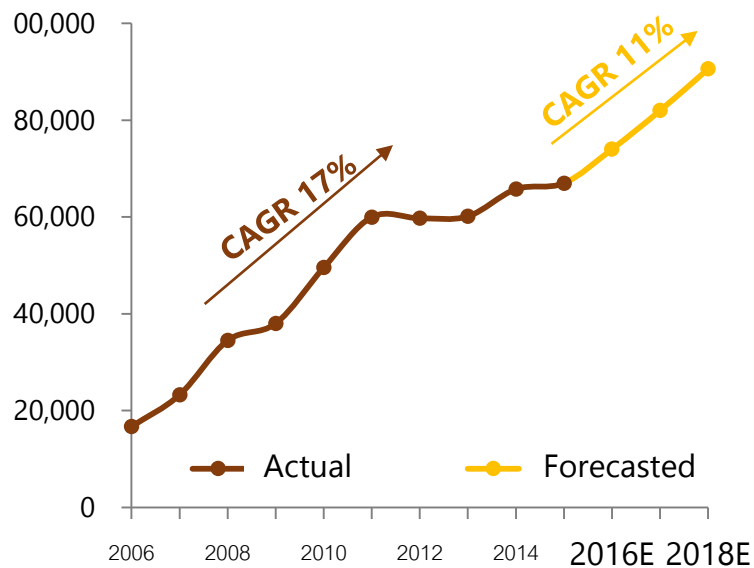
Thailand's power retired capacity during 2015-2036



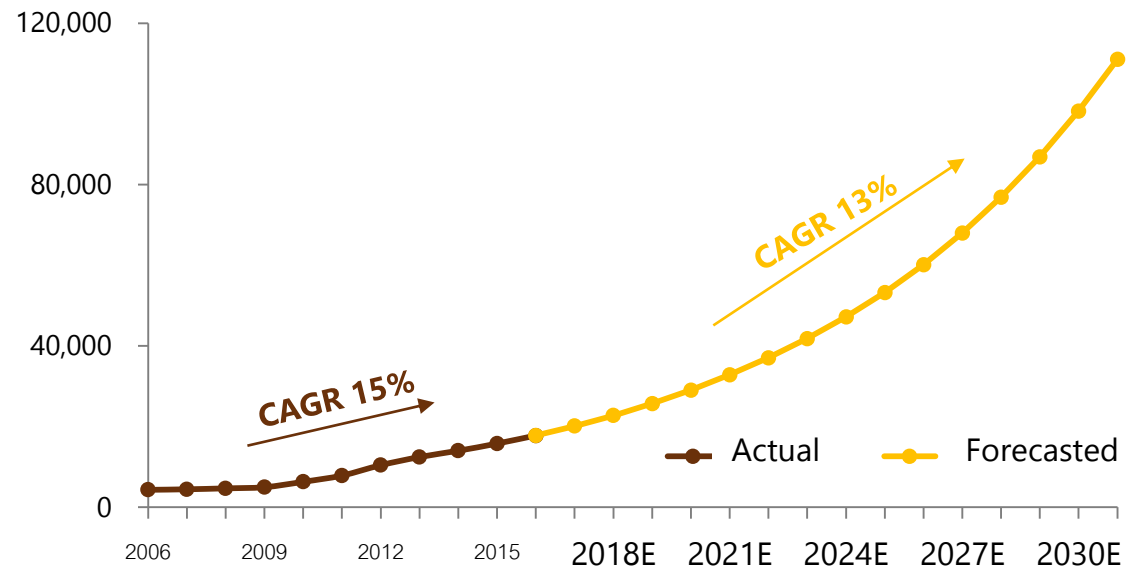
# Myanmar's electricity consumption is expected to grow at 13% CAGR, in line with its growing GDP

- Myanmar's electricity power consumption has historically increased in line with the GDP; **the forecasted electricity power consumption of 13% CAGR (2016-2031) is therefore driven by the forecasted GDP growth at 11%.**
- With such high growth, the government also heavily invests in domestic electricity production and has launched the electrification policy to better serve such high demand in the countries.

**Myanmar's historical and forecasted GDP**  
(USD million)



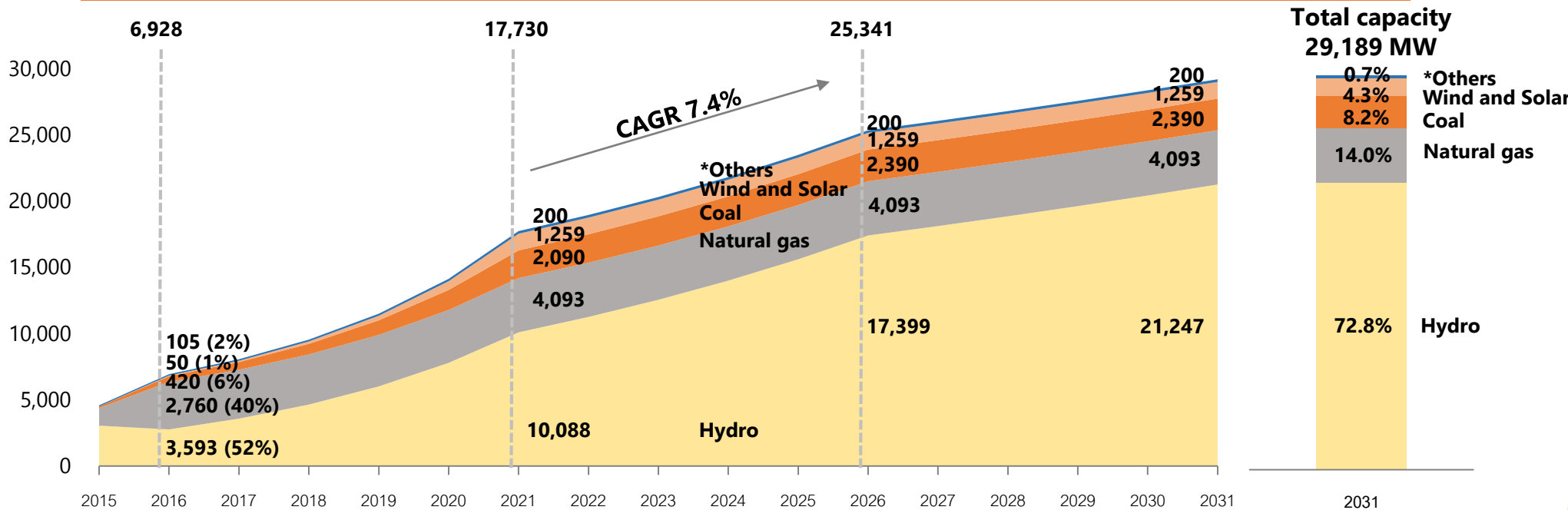
**Myanmar's Electricity Power Consumption**  
(GWh)



# Myanmar: Hydro will be increasingly essential in electricity generation, followed by Natural Gas and Coal

- According to Myanmar's Power Development Plan (2016-2031,) it is anticipated that Myanmar will be able to generate 29,189MW of electricity by 2031, which accounts for 7.4% CAGR from current capacity.
- Electricity source will be highly dependent on the Hydropower (72.8%), followed by Natural Gas and Coal.**

## Projected Electricity Generating by source of fuel (MW)

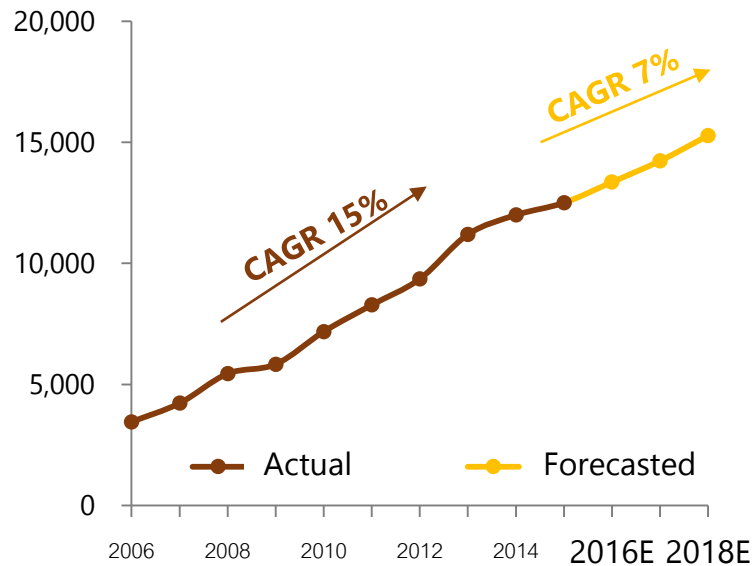


Remark: \*Others are Geothermal and Fuel oil,

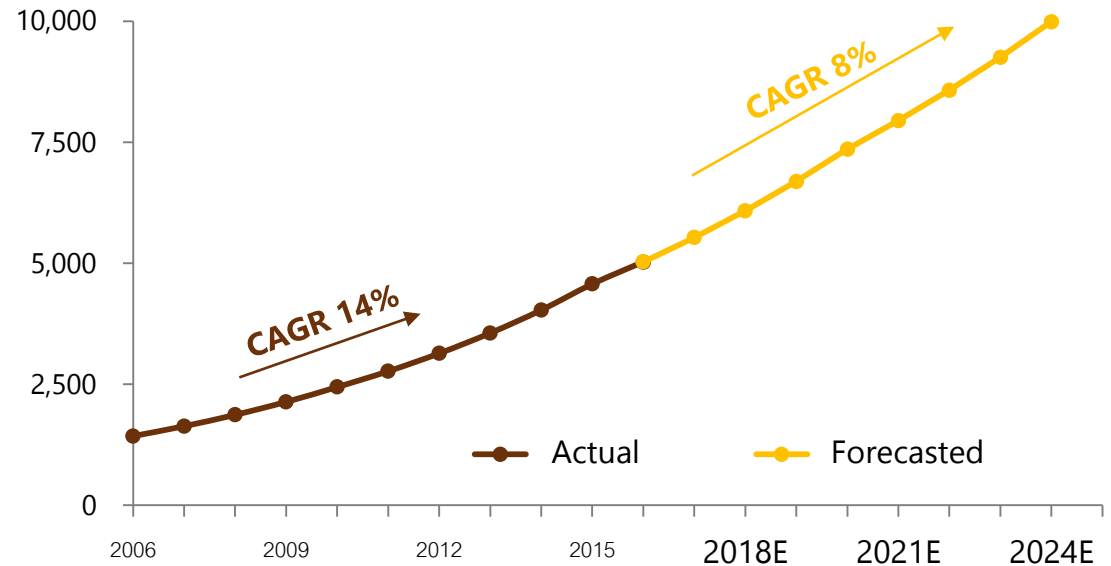
Source: Power Development Plant 2015 - Energy Policy and Planning Office (EPPO), Ministry of Energy

- Historically, Lao's electricity power consumption grew at 14% CAGR, resulting from the high economic growth.
- Given higher economic growth in the future, It is expected that **the consumption of electricity will continue to increase at 8% CAGR** following its economy.

**Lao's historical and forecasted GDP**  
(USD million)



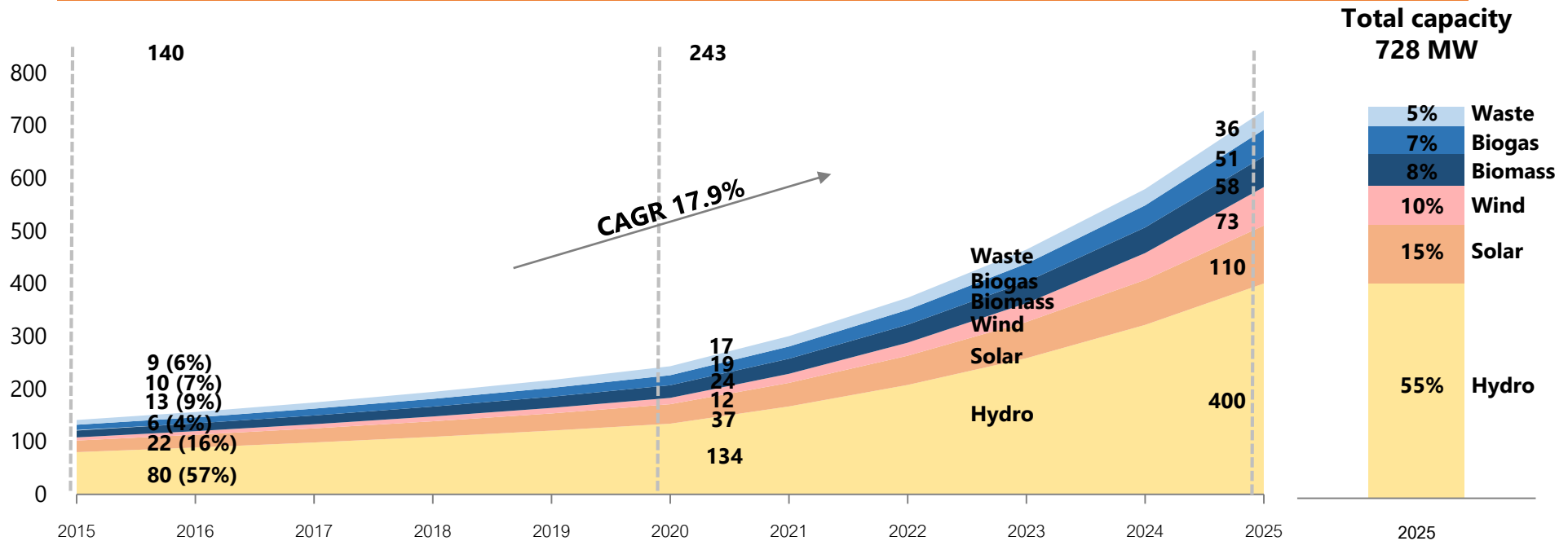
**Lao's Electricity Power Consumption**  
(GWh)



# Lao: Hydro will continue to dominate the electricity generation, while overall concentration is towards renewable energy

- According to Lao's Power Development Plan (2015-2025,) it is obvious that **the country will expand the electricity generation towards renewable energy sector.**
- The capacity is expected to reach 728 MW by 2025, accounting for 17.9% CAGR over 2015-2025.

## Projected Electricity Generating by source of fuel (MW)



# THANK YOU

## **Global Power Synergy Public Company Limited**

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Vibhavadi Rangsit Rd. Chatuchak, Bangkok 10900

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