

# dbAccess Thailand Corporate Day

24 June 2019



Hong Kong

Deutsche TISCO Investment Advisory



# Agenda

**01** Our Mission & Portfolio

**02** Group Performance

**03** Financial Performance

**04** Appendix

# Agenda

**01 Our Mission & Portfolio**

**02 Group Performance**

**03 Financial Performance**

**04 Appendix**

# Vision & Mission

## **Vision : To become a leading value-oriented *energy and infrastructure* company in Asia Pacific**

To ensure shareholders' value creation by continuously generating superior financial returns

**M1**

**M4**

To raise employees' awareness and motivation of self-development in preparation for future business competition

To achieve world-class operational excellence and enhance competitiveness

**M2**

**M5**

To support long-term domestic energy security and infrastructure

To be socially and environmentally responsible, conducting business in a fair and sustainable manner and complying with all related laws and regulations

**M3**

**M6**

To seek new opportunities and alternatives in related and other businesses to generate growth and expand business base for shareholders

# Goal

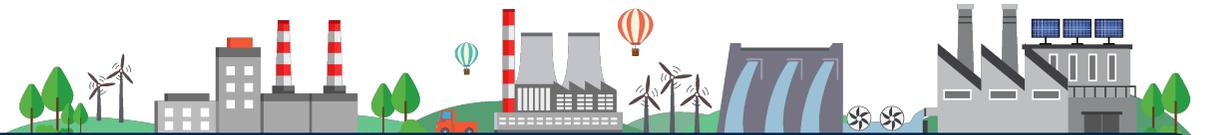


To increase generating capacity up to **10,000** MW or equivalent/to increase enterprise value (EV) up to 200 Billion Baht

To maintain the domestic revenue proportion not less than **50%** of the total revenue

To increase generating capacity in Renewable (including Hydro) not less than **20%** of total capacity from both domestic and oversea projects

To enhance organization on the principle of **HPO**  
**(High Performance Organization)**



# Valued Portfolio to Enhance Long-term Growth

- Electric Power Generation
  - : Gas, Coal, Mining, LNG
- Renewable Energy
  - : Wind, Solar, Hydro, Biomass, Nuclear, Geothermal, Wood Pallet
- O&M



**Power**

- Water Supply
- Waste Water Management



**Water Supply**

**Energy & Infrastructure**

**Transportation**

**Telecommunication**

- Roads
- Rails
- Mass Transit
- Ports
- Airports



- Underground Fiber Optic Network
- Smart Grid/Smart City
- Broadband Connectivity



# Excellent Track Record of Successful Diversified Portfolio

## Power Generation

Power plant projects in Thailand



Ratchaburi (RATCHGEN)  
3,645 MW



Tri Energy (TECO)  
720 MW



Ratchaburi Power (RPCL)  
372.50 MW



Ratchaburi World (RW Cogen)  
93.60 MW



Nava Nakhon (NNEG)  
55.65 MW



Berkprai Cogeneration  
34.73 MW

### Under Construction

Nana Nakhon (Extension)  
23.99 MW

## International Investment

Power plant and renewable projects outside Thailand



Num Ngum 2  
153.75 MW



Townsville  
234MW



Kemerton  
315.20 MW



BP Kwinana  
35.40 MW



Mount Emerald  
180.45 MW



Collinsville  
42.50 MW



Hongsa  
751.20 MW



Toora  
21 MW



Starfish Hill  
33 MW



Windy Hill  
12 MW



Asahan-1  
47.90 MW

### Under Construction

Xe-Pian Xe-Namnoy 102.5 MW  
Riau Combined-Cycle 145.15 MW  
Fangchenggang II Nuclear Power 236 MW

### Under Development

Collector Wind Farm 226.8 MW

## Renewable Energy

Renewable projects in Thailand



Huay Bong 2  
20.70 MW



Huay Bong 3  
20.70 MW



Solar Power (Korat 3, 4 and 7)  
8.64 MW



Solarta 20.73 MW



Songkhla Biomass 3.96 MW

## Related Businesses

### Power Plant Operation & Maintenance Services



CRESCO  
Chubu Ratchaburi Electric Services Co., Ltd.

### Fuel Supply

ບໍລິສັດ ຫຼູໄຟມາຍນິງ ຈຳກັດ  
Phu Fai Mining Company Limited



### Capital Investment



EDL-Gen  
114.97 MW

### Other Business

MRT Pink Line and Yellow Line Projects



Sandin Water Supply



Underground Fiber Network Project



# Continued Growth Projects Investment

## Current Projects in Operation

**6,937.58 MW**

**2019-2021: Committed Projects in pipeline 734.44 MW**

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	Expected COD
<b>2019</b>				<b>410.00</b>	<b>102.50</b>	
Xe-Pian Xe-Namnoy Hydroelectric Power Plant	Attapue and Champasak provinces, Laos	Hydro Power Plant	25	410	102.50	Dec 2019
<b>2020</b>				<b>286.77</b>	<b>250.79</b>	
Nava Nakorn SPP Power Plant (Extension)	Nava Nakorn Industrial Promotion Zone, Pathumthani Province	Cogeneration	40	59.97	23.99	Sep 2020
Collector Wind-Turbine Power Plant	New South Wales, Australia	Wind Power	100	226.80	226.80	In 2020
<b>2021</b>				<b>2,656.23</b>	<b>381.15</b>	
Riau Combined-Cycle Power Plant	Republic of Indonesia	Combined Cycle	49	296.23	145.15	May 2021
Fangchenggang II Nuclear Power Plant	Fangchenggang , China	Nuclear Power	10	2,360	236	In 2021

### Transportation

#### MRT Pink Line Project

**Technology:** Monorail

**Route:** Khae Rai-Min Buri

**Expected COD :** In 2021

#### MRT Yellow Line Project

**Technology:** Monorail

**Route:** Lad Prao-Sam Rong

**Expected COD :** In 2021

### Water Supply

#### Sandin Water Supply Project

**Type of Business :** Generating water supply

**Capacity :**

**Phase I:** 24,000 cubic meters/day (2018)

**Phase II:** 48,000 cubic meters/day (2031)

# Diversified Portfolio Across Core Locations

 **China**

**236 MW**

 **Nuclear 100%**

 **LAOS**

**1,122.42 MW**

 **Coal 66.9%**  **Hydro 33.0%**  
 **Solar 0.1%**

 **Thailand**

**5,020.20 MW**

 **Gas 98.5%**  **Wind 0.8%**  
 **Solar 0.6%**  **Biomass 0.1%**

 **Indonesia**

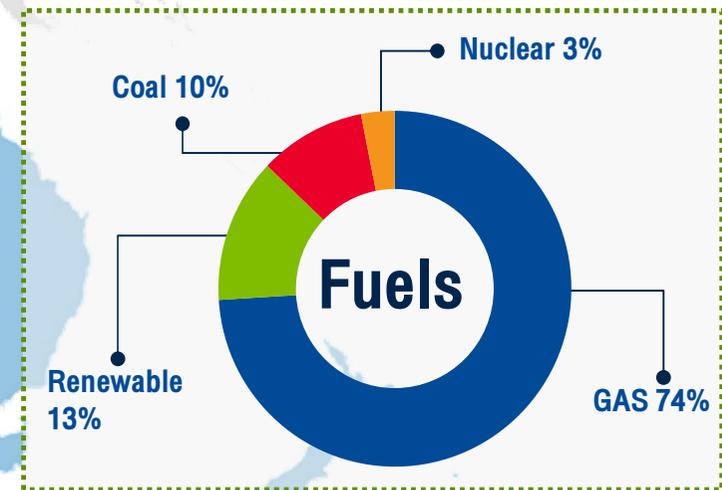
**193.05 MW**

 **Gas 75.2%**  **Hydro 24.8%**

 **Australia**

**1,100.35 MW**

 **Gas 53.1%**  **Wind 43%**  
 **Solar 3.9%**



# Agenda

01 Our Mission & Portfolio

**02 Group Performance**

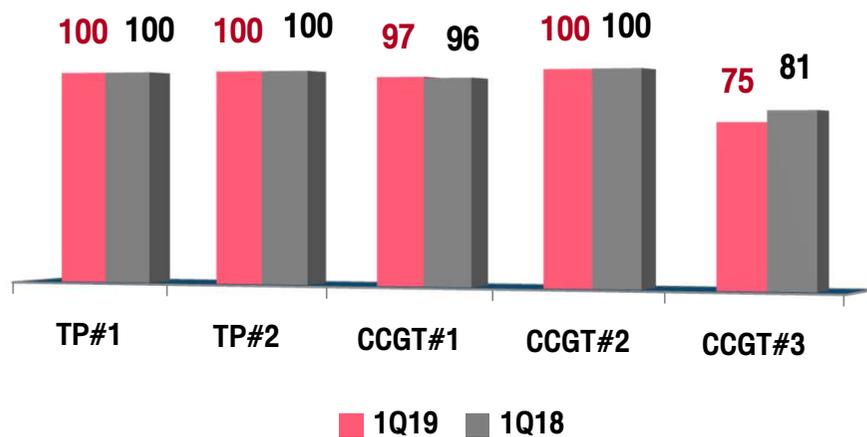
03 Financial Performance

04 Appendix

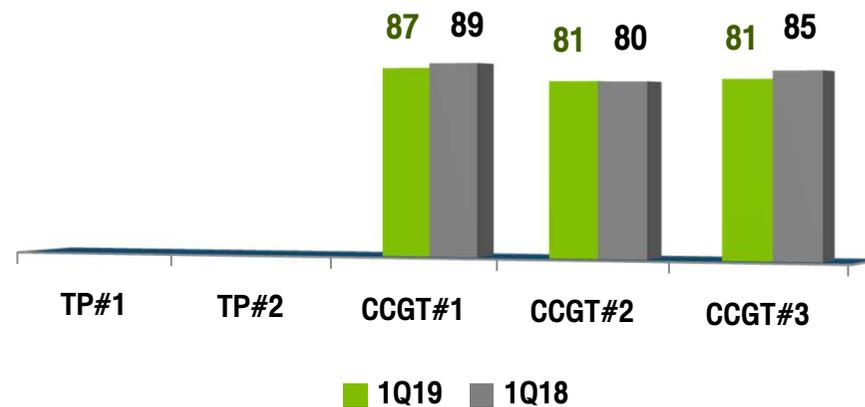
# Operation Performance : RATCHGEN



## %Equivalent Availability Factor



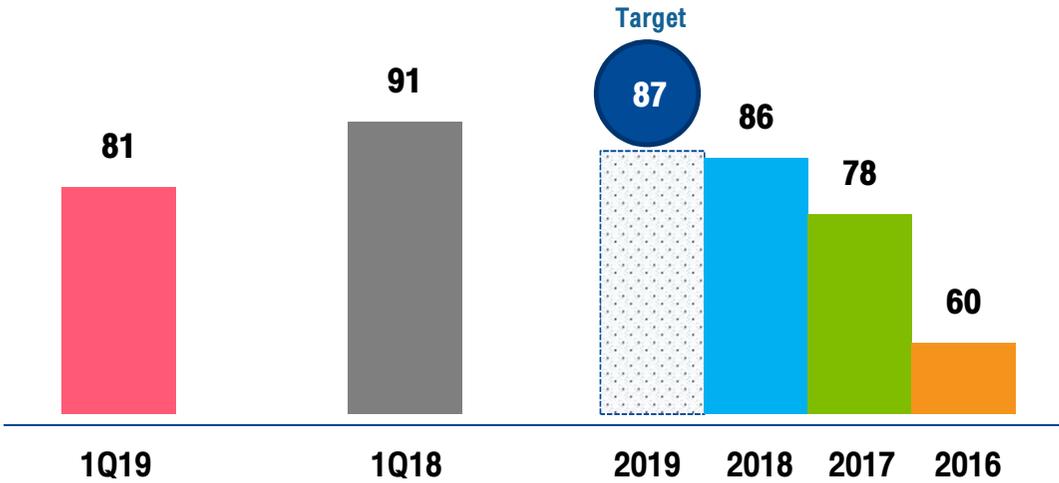
## %Dispatch Factor



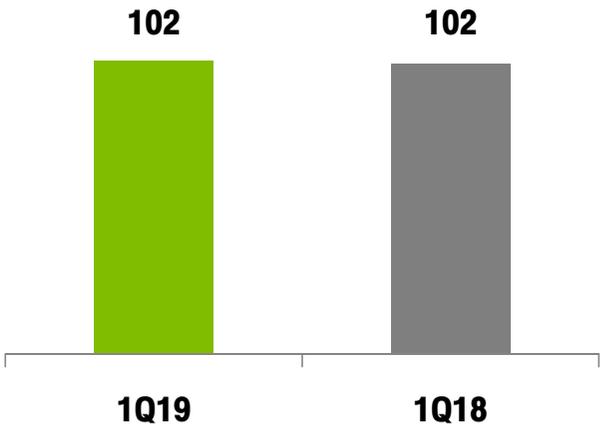
# Operation Performance : Hongsa



**% Commercial Equivalent Availability Factor ( 3 Units)**



**% Dispatch Factor ( 3 Units)**



# Operation Performance : Wind Projects



## Windy Hill

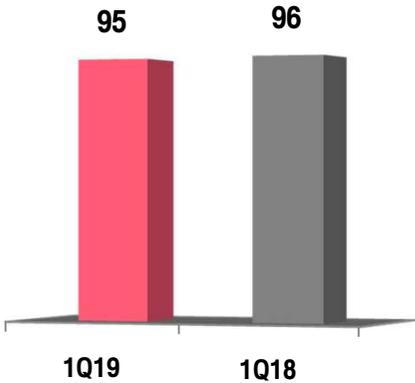
## Huay Bong 2-3

## Mount Emerald

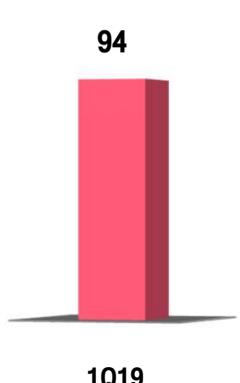
## Starfish Hill

## Toora

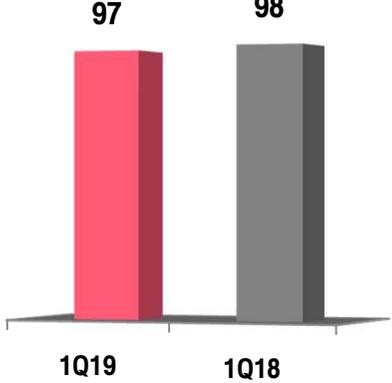
%Avg. Commercial Availability



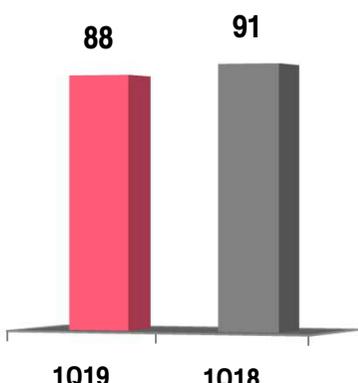
%Avg. Commercial Availability



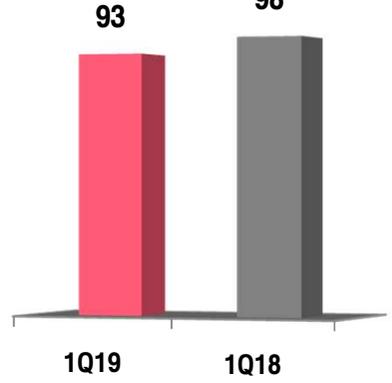
%Avg. Commercial Availability



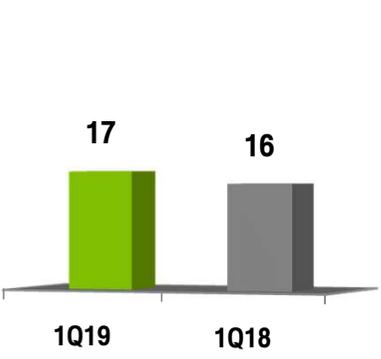
%Avg. Commercial Availability



%Avg. Commercial Availability



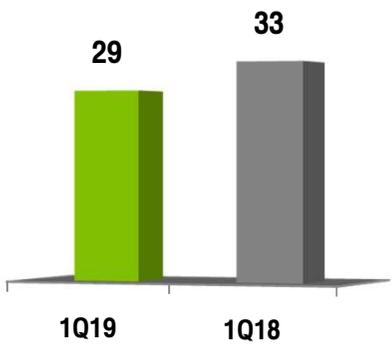
%Capacity Factor



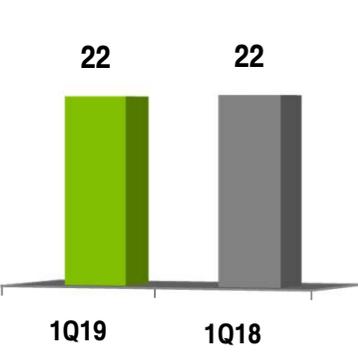
%Capacity Factor



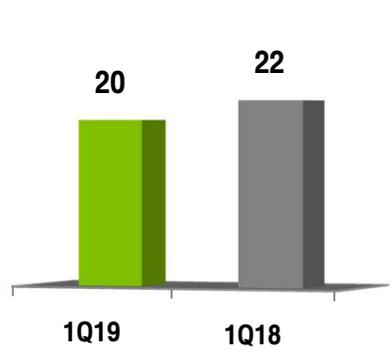
%Capacity Factor



%Capacity Factor



%Capacity Factor

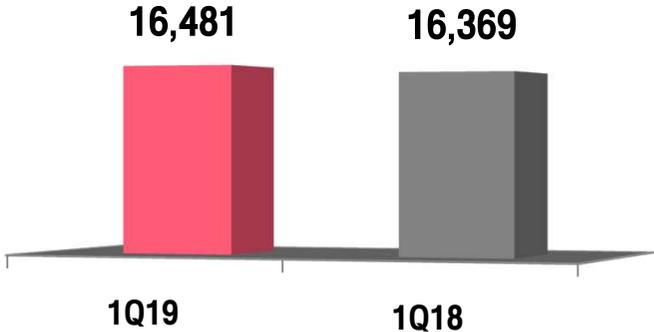


# Operation Performance : Solar Projects

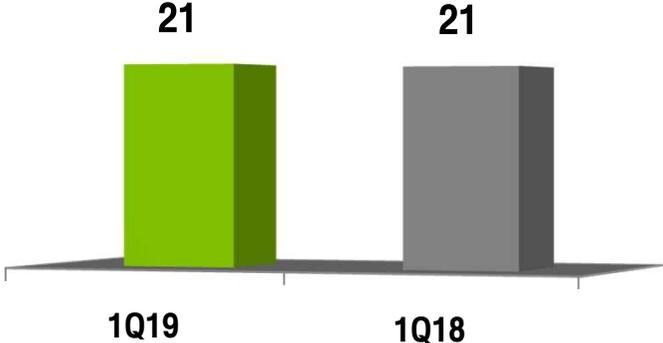


Solartha

Total Net Energy (MWh /Quarter)

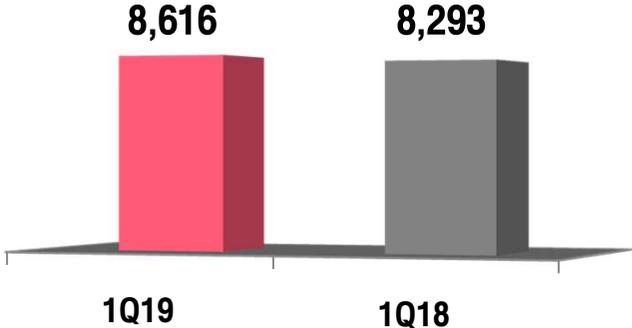


%Avg. Capacity Factor

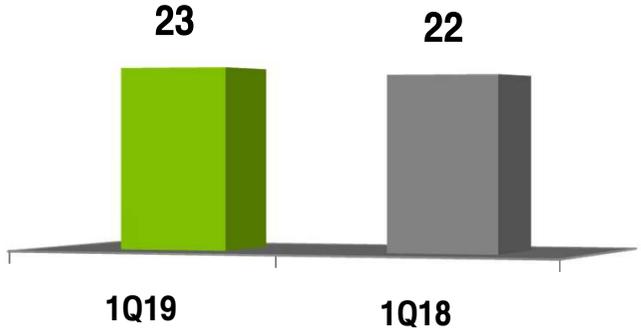


Korat 3 4 7

Total Net Energy (MWh /Quarter)



%Avg. Capacity Factor

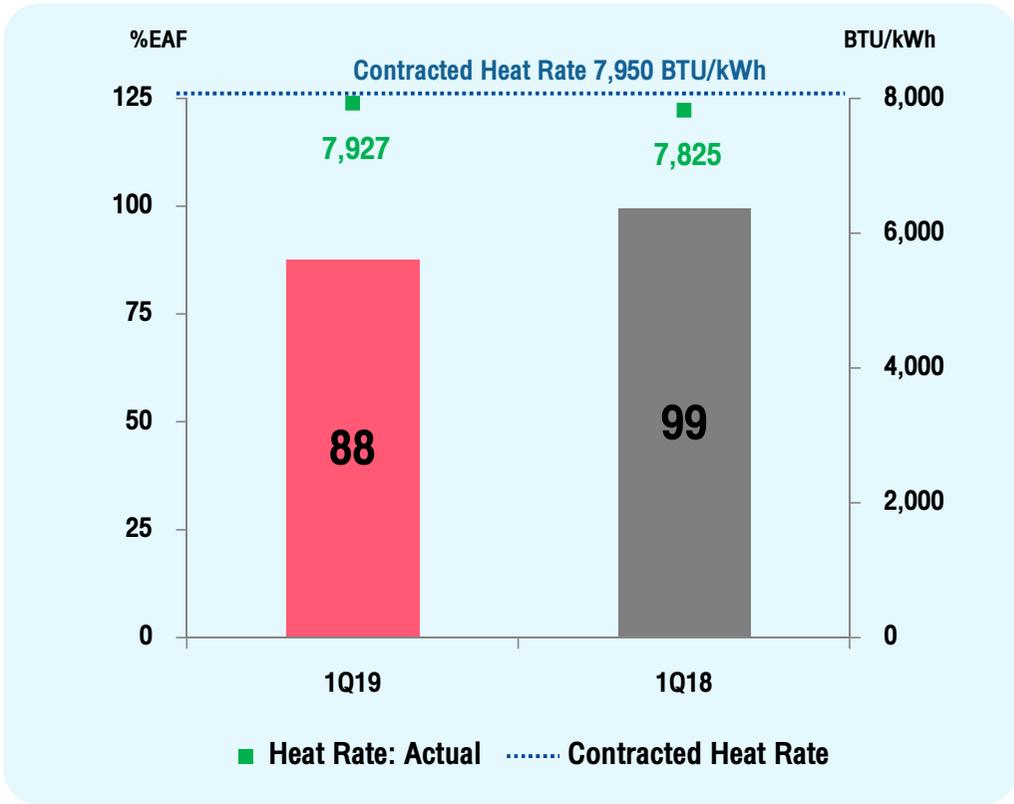
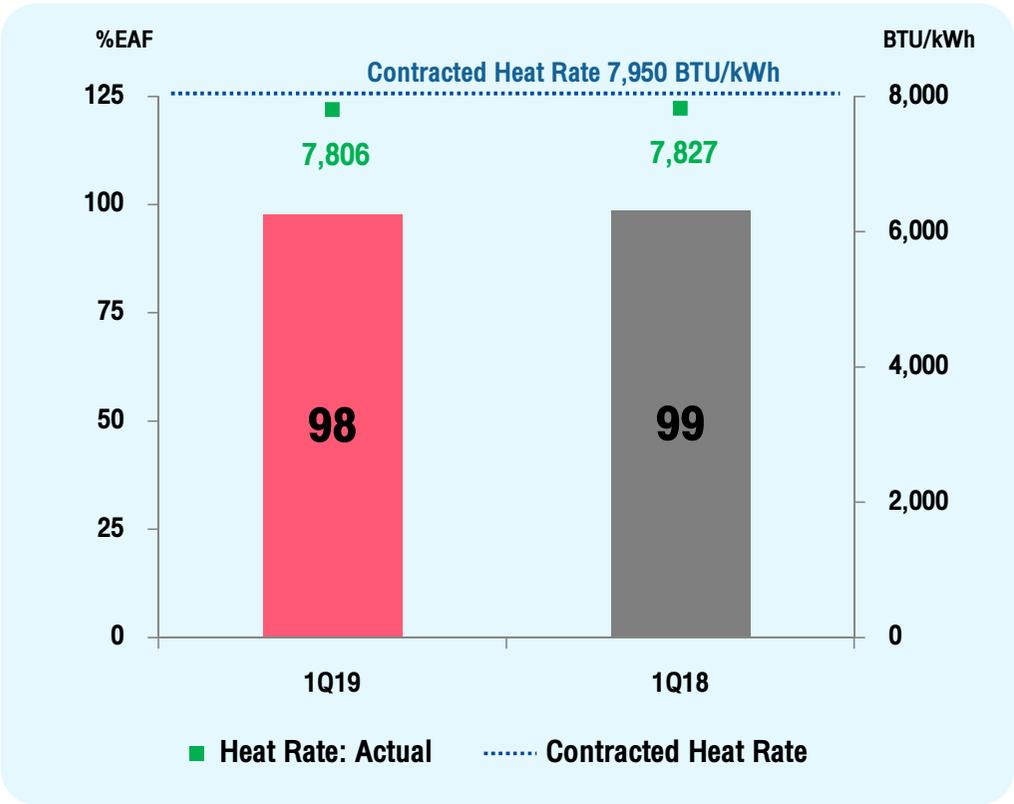


# Operation Performance : SPP Projects



## RW Cogen Block 1-2

## NNEG



# Agenda

01 Our Mission & Portfolio

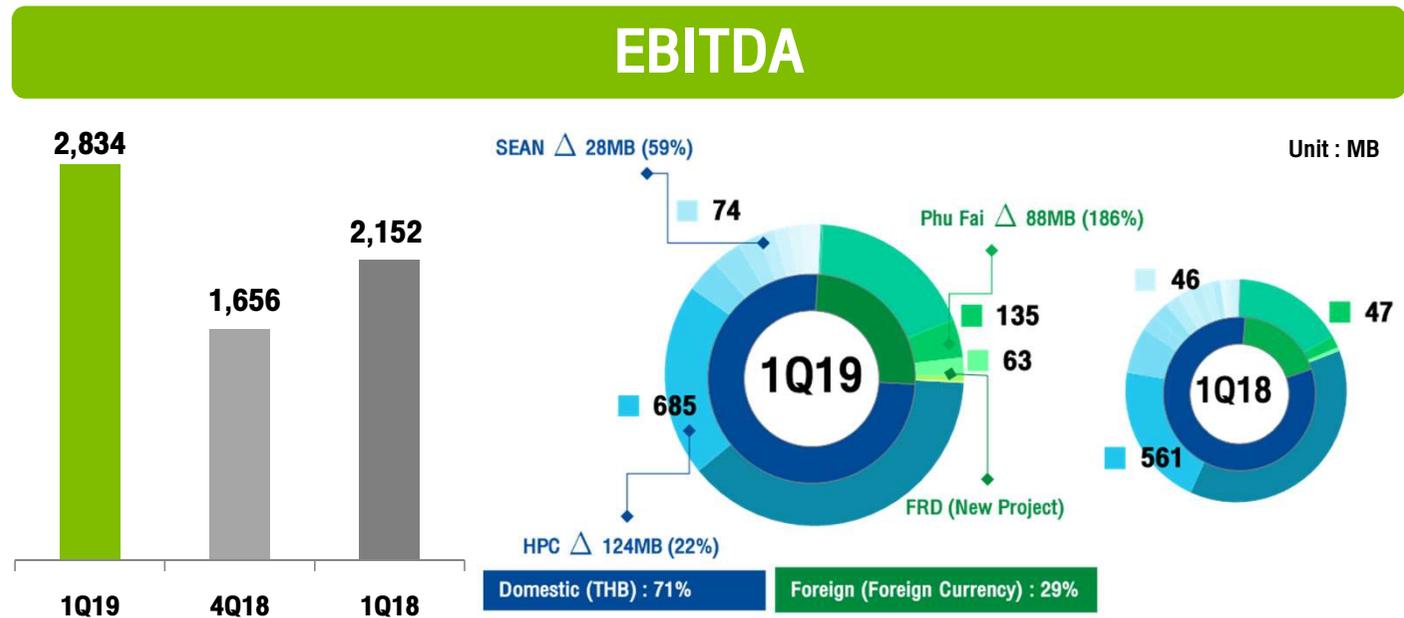
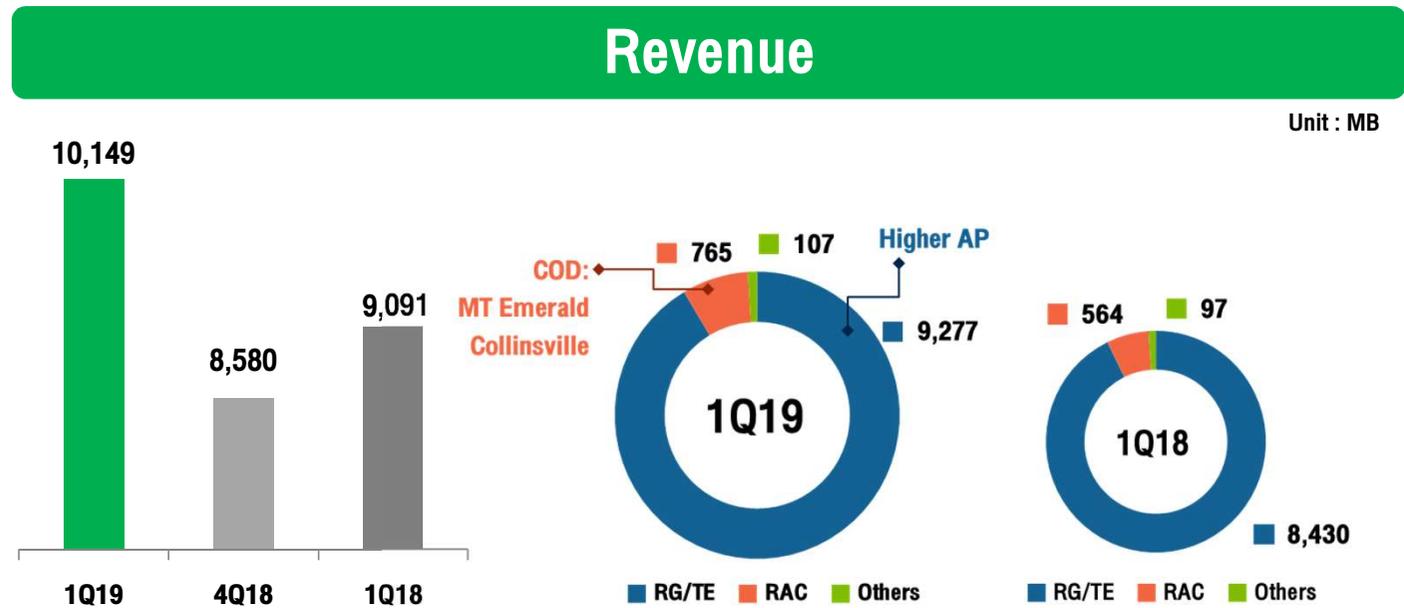
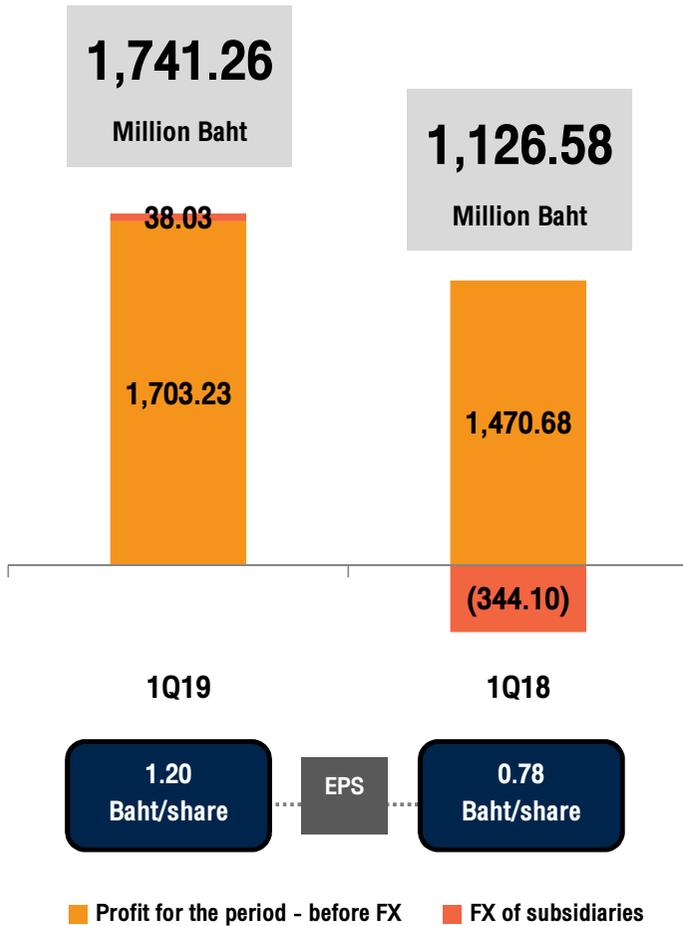
02 Group Performance

**03 Financial Performance**

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# Profit for the period: Equity holders of the Company

## Profit for the period: Equity holders of the Company



# Income Statement : 1Q19 & 1Q18

Unit : in Million Baht	1Q19	1Q18
<b>Revenues</b>	<b>10,149.12</b>	<b>9,091.07</b>
Cost & Expenses	(8,396.64)	(7,827.81)
<b>EBITDA before Share of Profit and FX</b>	<b>1,752.48</b>	<b>1,263.26</b>
Share of profit of jointly-controlled entities and associates <a href="#">including</a> gain (loss) on foreign exchange	1,081.13	888.83
<b>EBITDA</b>	<b>2,833.61</b>	<b>2,152.09</b>
Depreciation & Amortization - Cost	(330.54)	(292.41)
Depreciation & Amortization – Admin	(18.33)	(19.80)
<b>EBIT</b>	<b>2,484.74</b>	<b>1,839.88</b>
Finance costs	(481.02)	(161.78)
Income tax expense	(300.49)	(229.09)
<b>Profit for the period</b>	<b>1,703.23</b>	<b>1,449.01</b>
Non-controlling interests	-	(21.67)
<b>Profit for the period:</b>	<b>1,703.23</b>	<b>1,470.68</b>
<b>Equity holders of the Company - before FX</b>		
Gain (Loss) on foreign exchange of subsidiaries	38.03	(344.10)
<b>Profit for the Company</b>	<b>1,741.26</b>	<b>1,126.58</b>

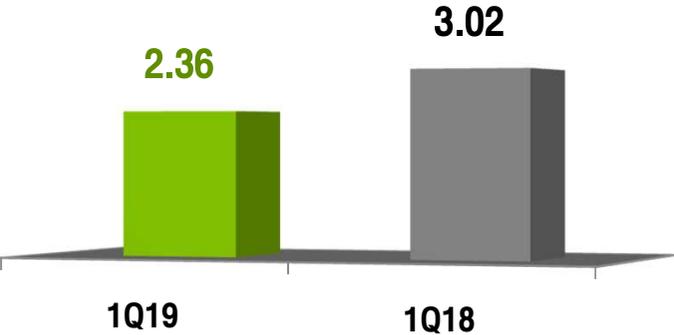
# Statements of Financial Position

As of 31 March 2019

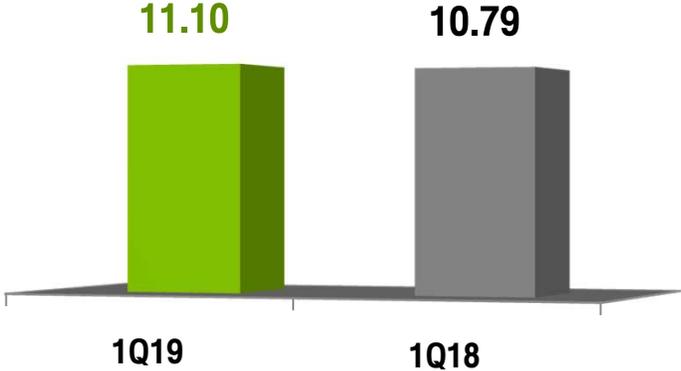
Total Assets	Million Baht	Total Liabilities & Equity	Million Baht
<b>Assets</b>		<b>Liabilities</b>	
Cash and cash equivalents	14,479.72	Loans from Related party, Financial Institutions & Debentures	32,770.43
Current investments	1,062.83	Derivative liabilities	721.46
Other Current Assets	10,476.21	Other liabilities	9,030.41
Investment in Jointly-controlled entities/Associates/Others	34,403.99	<b>Total Liabilities</b>	<b>42,522.30</b>
Derivative assets	203.16	<b>Equity</b>	
Financial lease receivables	17,275.97	Issued and paid-up share capital	16,031.78
Property, plant & equipments	19,685.38	Retained earnings	51,510.24
Other assets	5,598.54	Other components of equity	(6,878.52)
		<b>Total equity</b>	<b>60,663.50</b>
<b>Total Assets</b>	<b>103,185.80</b>	<b>Total Liabilities &amp; Equity</b>	<b>103,185.80</b>

# Financial Ratios\*

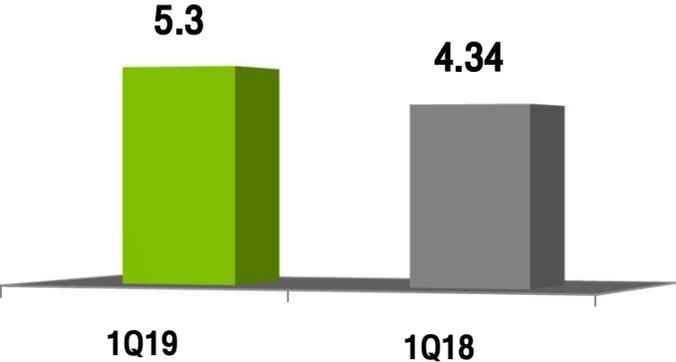
Current Ratio (times)



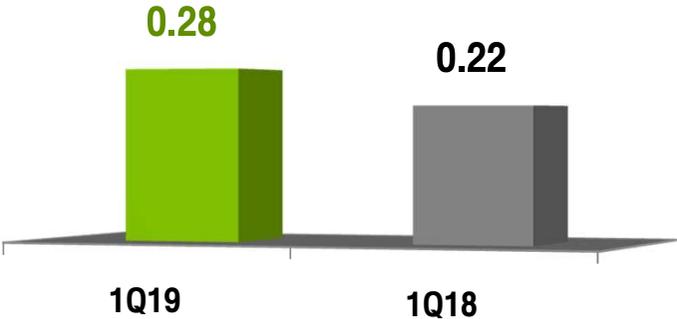
ROE (%)



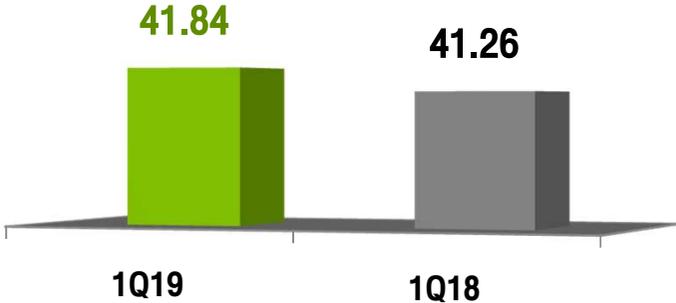
Net Debt to EBITDA\*\* (times)



Net Debt to Equity (times)



Book Value per share (Baht)

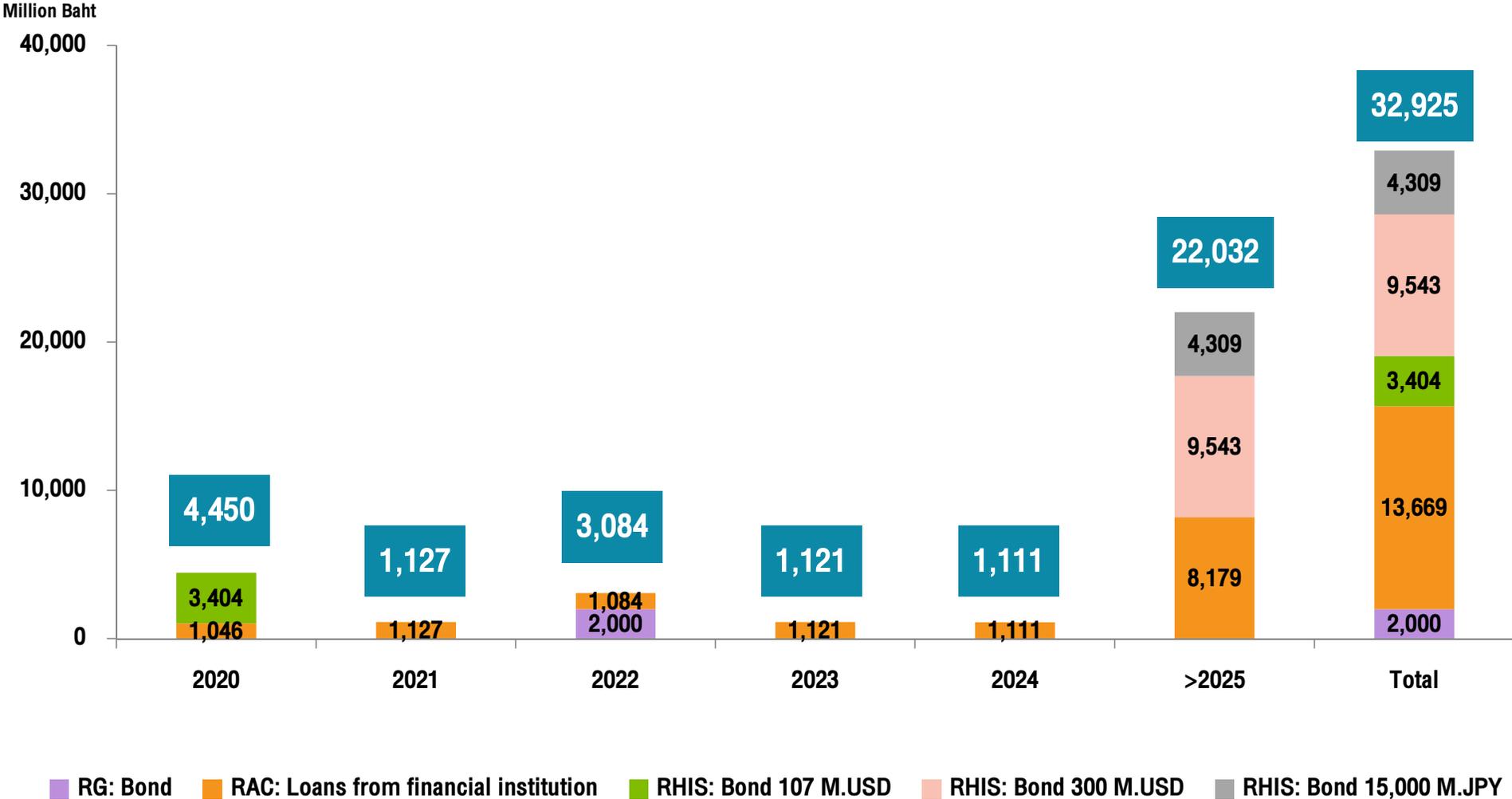


\* Not included the effect of foreign exchange rate

\*\* Included the change in lease receivable

# Debt Profile

As of March 2019

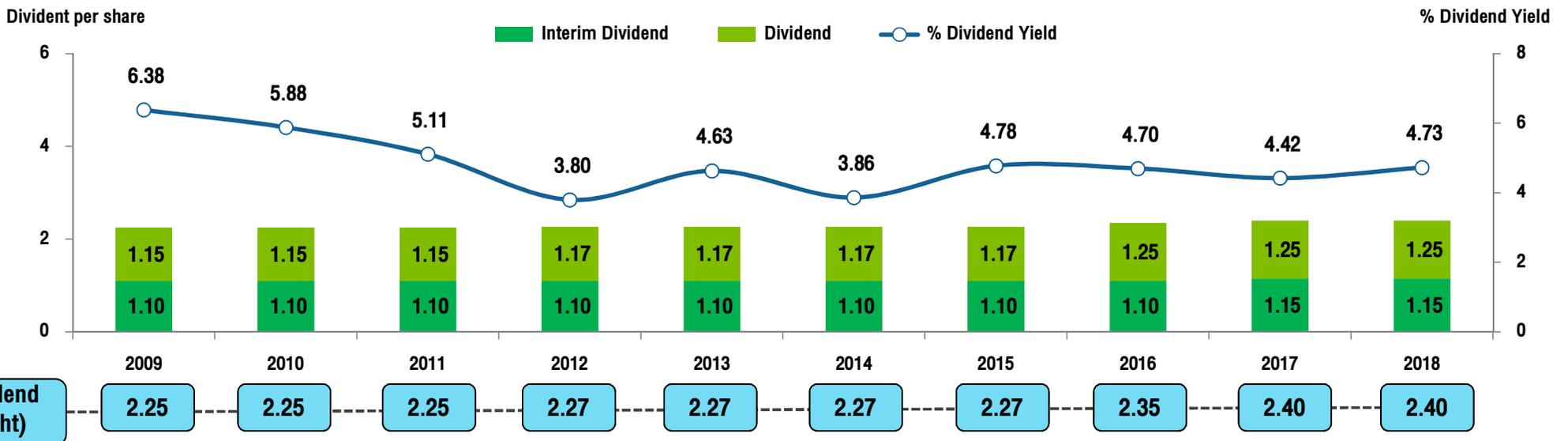
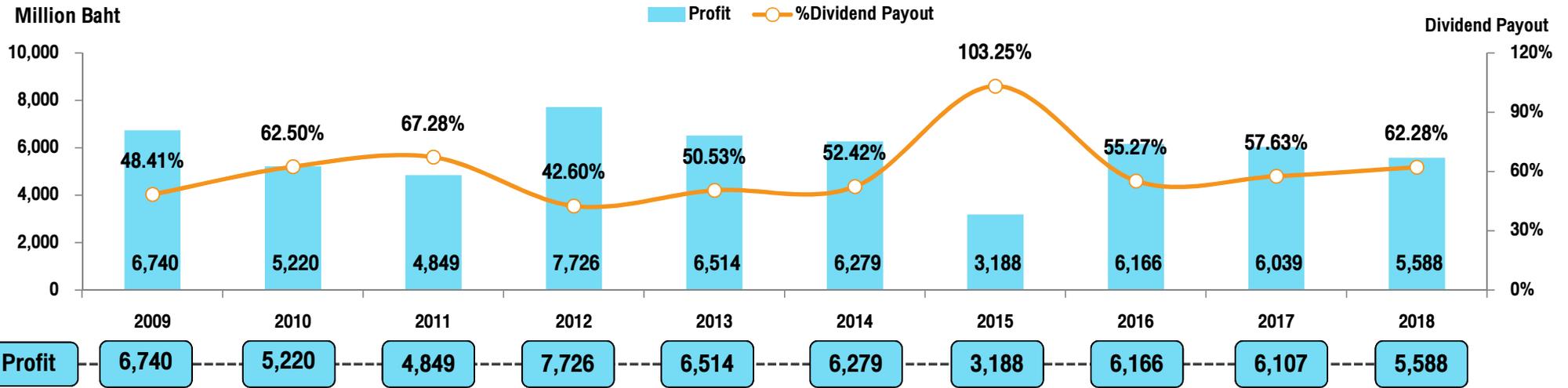


# Dividend Policy

**RATCH has a dividend payout policy of no less than 40% of the net profit**

2009-2018  
Avg. %Dividend Payout  
**60%**

2009-2018  
Avg. %Dividend Yield  
**4.83%**



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# Company Overview

## OVERVIEW

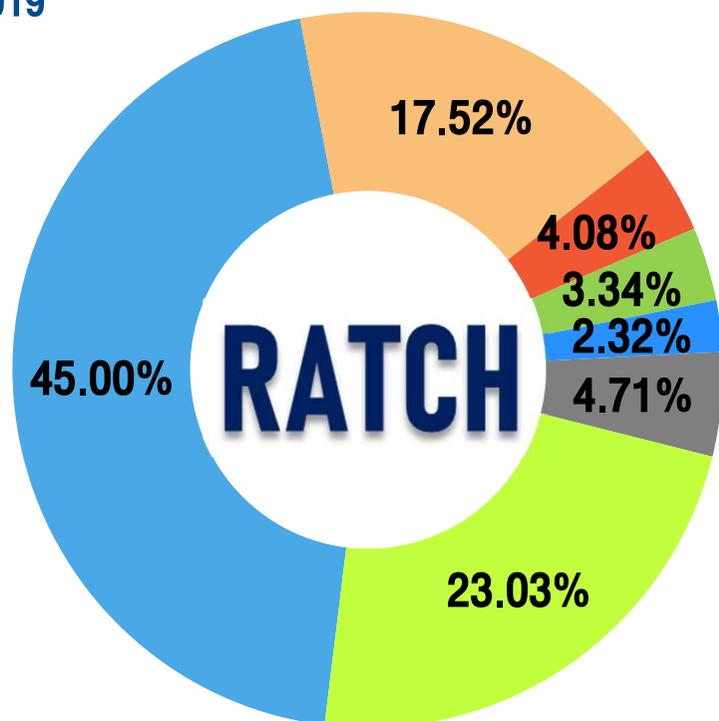
- Listed on the Stock Exchange of Thailand since 2 November 2000
- Investment company in the electricity generation business based in Thailand
- Largest independent power producer (“IPP”) based in Thailand by total capacity
- Primarily involved in the construction, development and operation of power plants in Thailand, Laos, Australia and China
- Market Cap of USD 2,970 million\* (THB 92,800 million) as at 19 June 2019

Note: \*Foreign Exchange Rate as at 19 June 2019= 31.245 Baht/USD

Credit Rating	S&P Global Rating	Moody’s Investor Service
<b>RATCH</b>	<b>BBB+</b>	<b>Baa1</b>
<b>Thailand</b>	<b>BBB+</b>	<b>Baa1</b>

## Major Shareholders

as of 5 March 2019

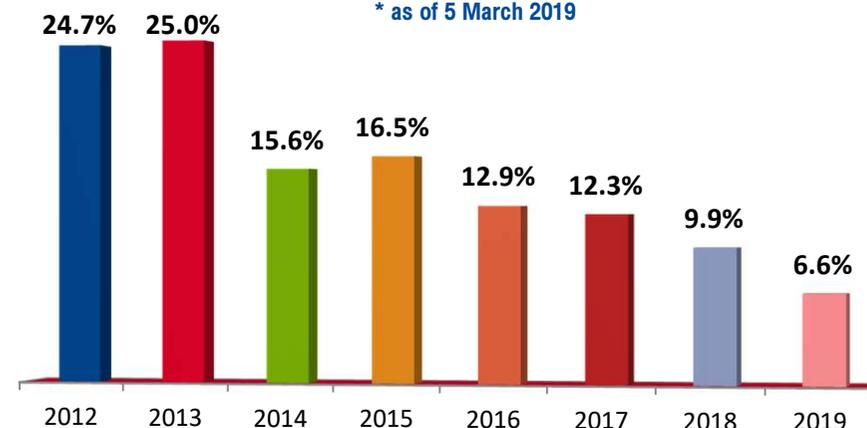


- Electricity Generating Authority of Thailand
- Thai NVDR Company Limited
- EGAT Saving and Credit Cooperative Limited
- Social Security Office
- SOUTH EAST ASIA UK (TYPE C) NOMINEES LIMITED
- Other Major Shareholders
- Other Shareholders

## % Foreign Shareholders

Data are as of AGM closing date in each respective year

\* as of 5 March 2019



Remark:

On 17 July 2014, the SILCHESTER INTERNATIONAL INVESTORS LLP transferred its common shares of RATCH by the amount of 157,297,300 shares (equivalent to 10.85% of the Company's common shares) to Thai NVDR Company Limited.

## Other Major Shareholders

Other Major Shareholders consisted of

- Mr. Min Tieworn **1.38%**
- AIA COMPANY LIMITED - EQ3-P **1.15%**
- STATE STREET EUROPE LIMITED **1.14%**
- Thanachart Bank Public Company Limited **0.61%**
- EGAT Saving and Credit Cooperative Limited Private Fund by Krungthai Asset Management PCL 2 **0.43%**

# Industry Overview

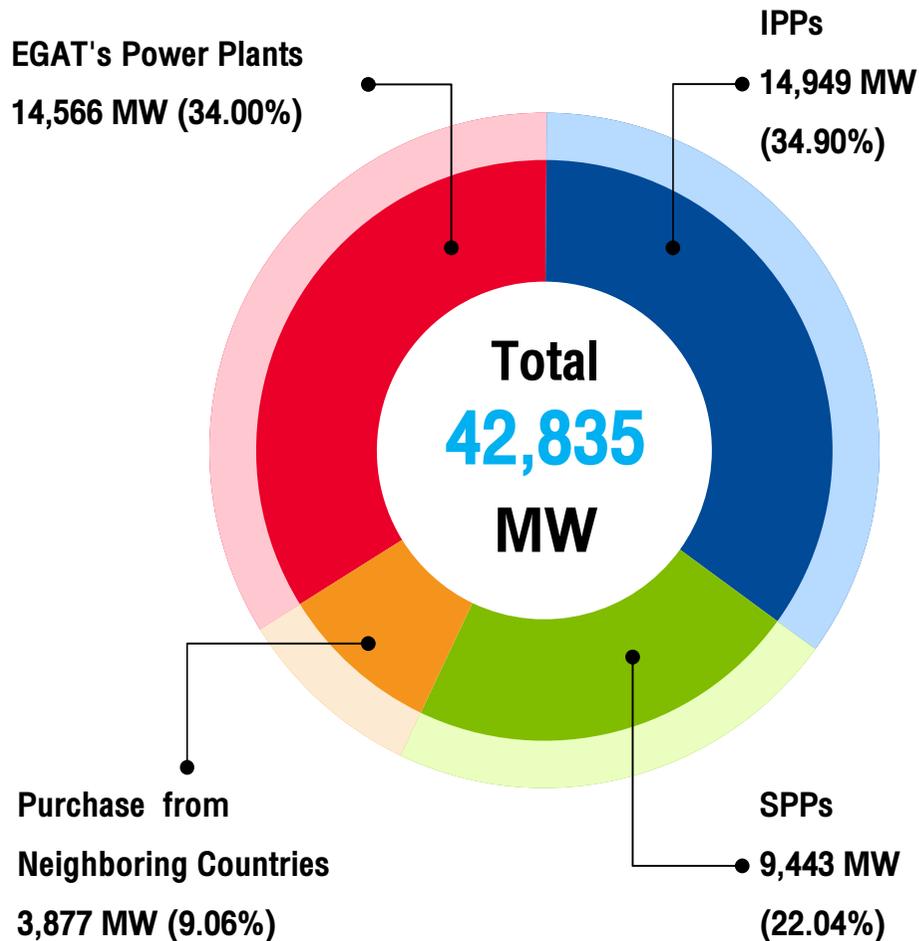
## Thailand : Power Generation

### Total Contracted Capacity

“42,835 MW”

As of May 2019

EGAT's Power Plants  
14,566 MW (34.00%)



Source: EGAT

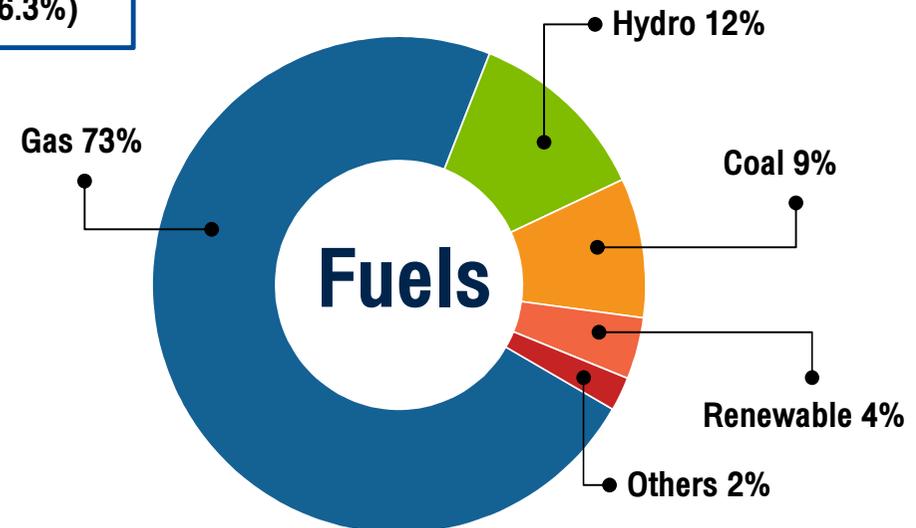
## RATCH

is the largest IPP in the Thailand

- ▶ RATCH 4,531 MW (30.3%)
- ▶ EGCO 2,337 MW (15.60%)
- ▶ GLOW 1,373 MW (9.20%)
- ▶ GULF 1,280 MW (8.60%)
- ▶ Other 5,427 MW (36.3%)

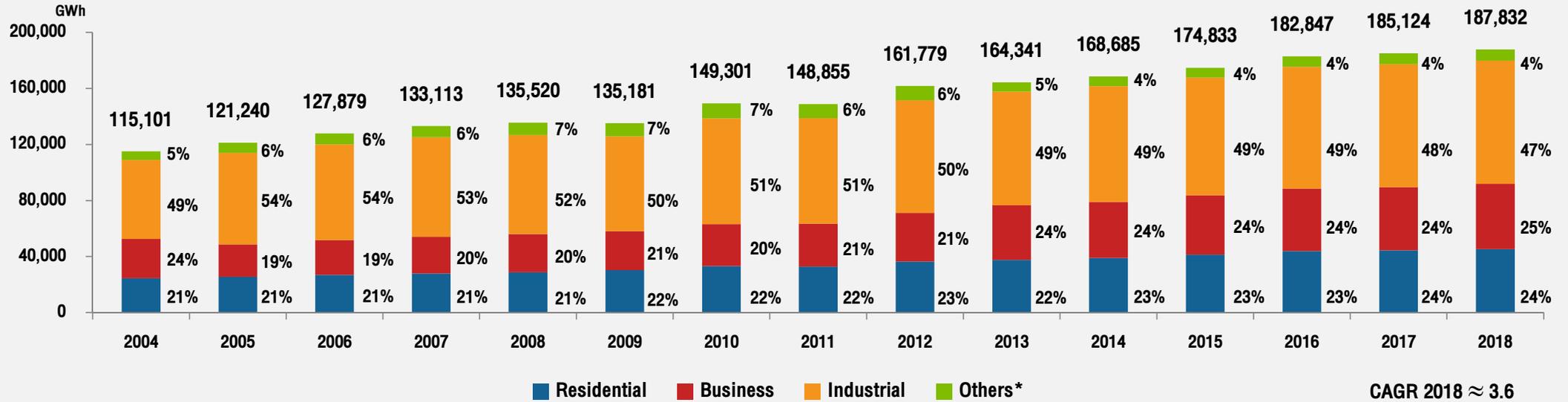


### Breakdown by Type of Fuels

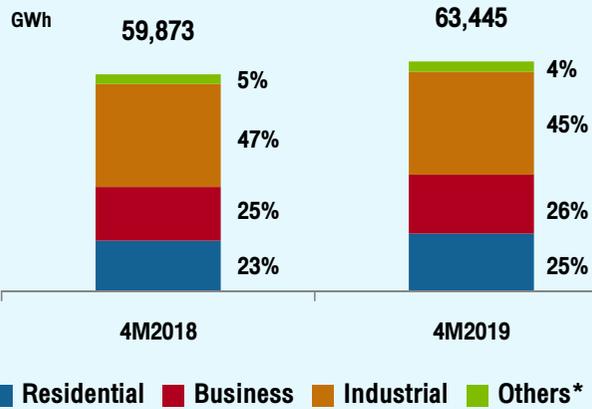


# Electricity Consumption

## 2004-2018

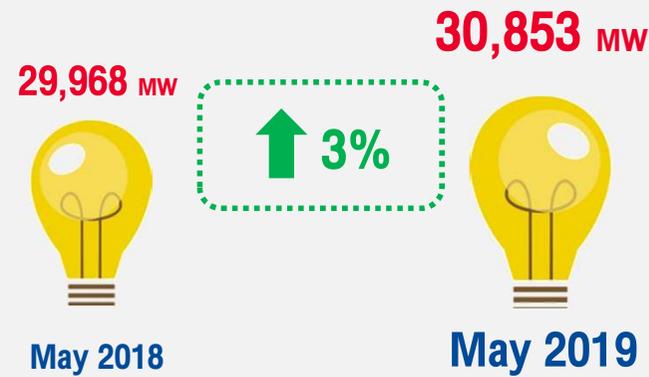


## 2M2018 & 2M2019



\* Others consisted of Agriculture Pumping / Government and Non-Profit / Free of Charge-Public Infrastructure

## Peak Demand



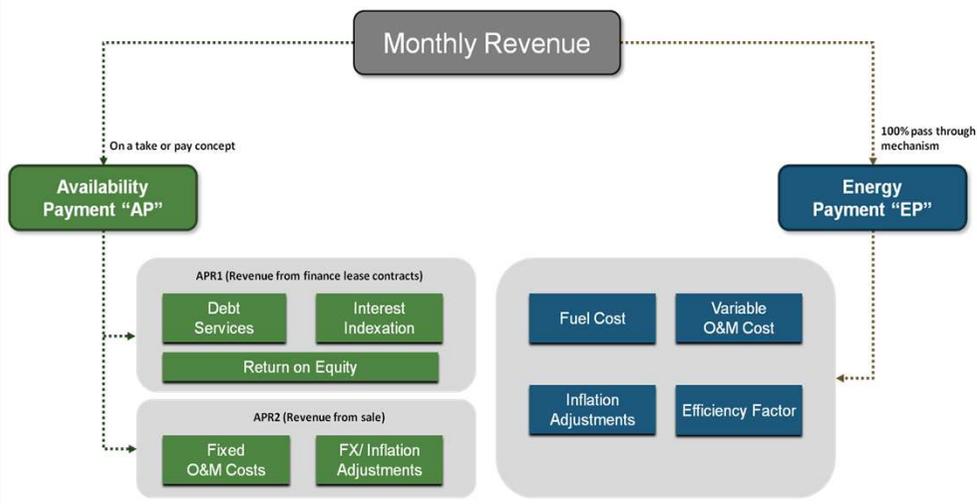
Source: EGAT

# Thailand's Electricity Structure

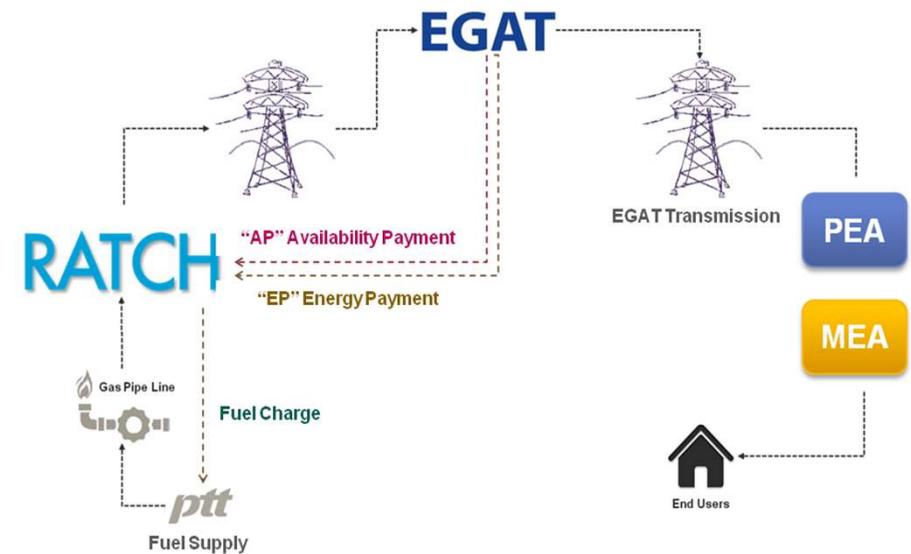
## EGAT Overview

- Thailand's state-owned power utility under the Ministry of Energy
- Responsible for electric power generation and transmission for the whole country as well as bulk electric energy sales
- EGAT is the single buyer that purchases bulk electricity from private power producers and neighboring countries
- Sells electricity to Provincial Electricity Authority ("PEA"), Metropolitan Electricity Authority ("MEA"), neighboring countries and others
- Owns and operates a high voltage transmission network which covers all parts of Thailand

## PPA Tariff Structure



## Thailand's Electricity Structure



### Provincial Electricity Authority "PEA"

- ✓ Thai state enterprise under the Ministry of Interior
- ✓ Generation, procurement, distribution and sale of electricity
- ✓ Covers approximately 99.4% of Thailand, with the exception of Bangkok, Nonthaburi and Samut Prakarn provinces



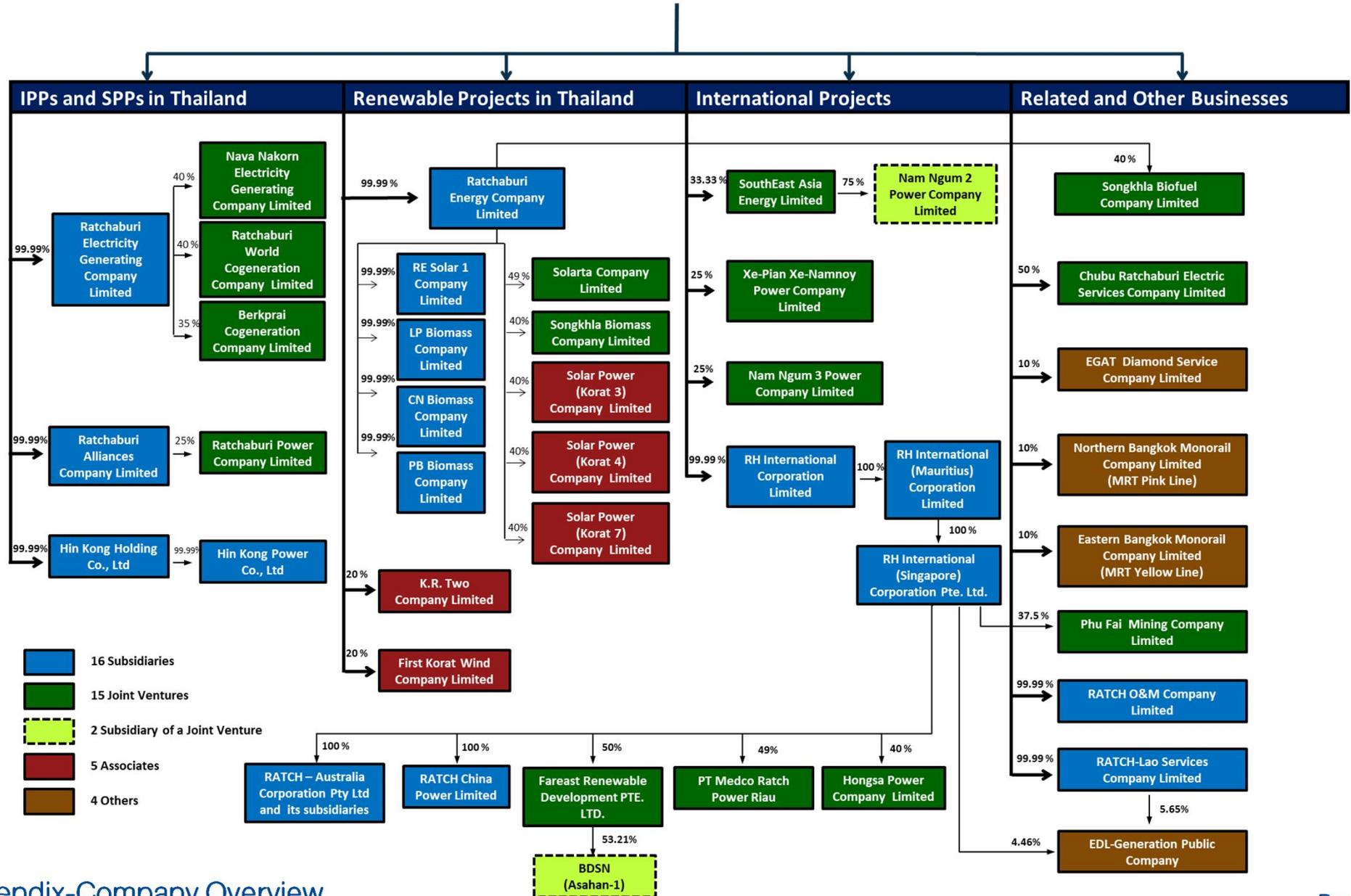
### Metropolitan Electricity Authority "MEA"

- ✓ Thai state enterprise under the Ministry of Interior
- ✓ Distribution/Sales of electricity in Bangkok, Nonthaburi, and Samut-Prakarn Provinces

# Company Structure



As of May 2019



# IPPs and SPPs in Thailand

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Ratchaburi Power Plant	Ratchaburi Province	Thermal	100	1,470	1,470	2000	EGAT	25 years/ 2025	N.A.
		Combined Cycle	100	2,175	2,175	2002	EGAT	25 years/ 2027	N.A.
Tri Energy Power Plant	Ratchaburi Province	Combined Cycle	100	720	720	2000	EGAT	20 years/ 2020	Possibility to extend on mutually agreed terms
Ratchaburi Power Plant	Ratchaburi Province	Combined Cycle	25	1,490	372.50	2008	EGAT	25 years/ 2033	N.A.
Ratchaburi World SPP Power Plant	Ratchaburi Industrial Estate, Ratchaburi Province	Cogeneration	40	234	93.60	1#2014 2#2015	EGAT	Block 1: 25 years/ 2039 Block 2: 25 years/ 2040	N.A.

# IPPs and SPPs in Thailand

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation (Cont.)</b>									
Nava Nakorn SPP Power Plant	Nava Nakorn Industrial Promotion Zone, Pathumthani Province	Cogeneration	40	139.13	55.65	2016	EGAT	25 years/ 2041	N.A.
Berkprai Cogeneration SPP Power Plant	Ratchaburi Province	Cogeneration	35	99.23	34.73	Expected COD : June 2019	EGAT	25 years/2044	N.A.
<b>Total</b>				<b>6,327.36</b>	<b>4,921.48</b>				
<b>Under Construction</b>									
Nava Nakorn SPP Power Plant (Extension)	Nava Nakorn Industrial Promotion Zone, Pathumthani Province	Cogeneration	40	59.97	23.99	Expected COD : Sep 2020	EGAT	25 years/2045	N.A.
<b>Total</b>				<b>59.97</b>	<b>23.99</b>				
<b>Grand Total</b>				<b>6,387.33</b>	<b>4,945.47</b>				

# Renewable Projects in Thailand

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Huay Bong 2 Wind-Turbine Power Plant	Nakorn Ratchasima Province	Wind-Turbine	20	103.50	20.70	2013	EGAT	5 years/ 2023 Adder 3.5 Baht (10-Year)	Automatic renewal for a further 5 years every 5 years
Huay Bong 3 Wind-Turbine Power Plant	Nakorn Ratchasima Province	Wind-Turbine	20	103.50	20.70	2012	EGAT	5 years/ 2022 Adder 3.5 Baht (10-Year)	Automatic renewal for a further 5 years every 5 years
Solar Power Power Plant (Korat 3, Korat 4, Korat 7)	Nakorn Ratchasima Province	Solar Power	40	21.60	8.64	2012	PEA	5 years/ 2022 Adder 8 Baht (10-Year)	Automatic renewal for a further 5 years every 5 years
Solarta Solar Power Plant	Ayutthaya, Nakhon Pathom, and Suphanburi Provinces	Solar Power	49	42.30	20.73	2011-2012	PEA	Ayutthaya : 5 years / 2021 Suphanburi and Nakhon Pathom: 5 years / 2022 Adder 8 Baht (10-Year)	Automatic renewal for a further 5 years every 5 years
Songkhla Biomass Power Plant	Songkhla Province	Thermal	40	9.90	3.96	2015	PEA	20 years/2035	N.A.
<b>Total</b>				<b>280.80</b>	<b>74.73</b>				
<b>Grand Total</b>				<b>280.80</b>	<b>74.73</b>				

# International Projects in Australia

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Townsville Power Plant	North Queensland, Australia	Combined Cycle Gas Turbine	100	234	234	1999	AGL Energy /Arrow	February 2025	N.A.
Kemerton Power Plant (Included Black Start)	Western Australia, Australia	Open Cycle Gas/Diesel Turbine	100	315.20	315.20	2005	Synergy	October 2030	N.A.
BP Kwinana Power Plant (30 % owned by RAC)	Western Australia, Australia	Cogeneration	30	118	35.40	1996	Verve Energy/BP	December 2021	N.A.
Starfish Hill Wind-Turbine Power Plant	South Australia, Australia	Wind-Turbine	100	33	33	2003	Alinta Energy	In 2020	N.A.
Toora Wind-Turbine Power Plant	Victoria, Australia	Wind-Turbine	100	21	21	2002	Merchant Market	N.A.	N.A.
Windy Hill Wind-Turbine Power Plant	Queensland, Australia	Wind-Turbine	100	12	12	2000	Merchant Market	N.A.	N.A.

# International Projects in Australia

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Mount Emerald Wind-Turbine Power Plant	Queensland, Australia	Wind-Turbine	100	180.45	180.45	2018	Ergon Energy Queensland	December 2030	N.A.
Collinsville Solar PV Power Plant	Queensland, Australia	Solar Power	100	42.50	42.50	2019	Alinta Energy	12.5 year	N.A.
			<b>Total</b>	<b>956.15</b>	<b>873.55</b>				
<b>Under Development</b>									
Collector Wind-Turbine Power Plant	New South Wales, Australia	Wind-Turbine	100	226.80	226.80	Expected 2020	Merchant Market	N.A.	N.A.
			<b>Total</b>	<b>226.80</b>	<b>226.80</b>				
			<b>Grand Total</b>	<b>1,182.95</b>	<b>1,100.35</b>				

# International Projects in Laos

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Nam Ngum 2 Hydroelectric Power Plant	Laos	Hydro Power Plant	25	615	153.75	2011	EGAT	27 years/ 2038	N.A.
Hongsa Thermal Power Plant	Sainyaburi Province, Laos	Lignite-Fired Power Plant	40	1,878	751.20	1# 2015 2# 2016	EGAT & EDL	25 years/ 2040	N.A.
EDL-Generation	Laos	Hydro Power Plant	10.11	1,131.15	114.36	N.A.	N.A.	N.A.	N.A.
EDL-Generation	Laos	Solar Power	10.00	6.00	0.61	2017	N.A.	N.A.	N.A.
				<b>Total</b>	<b>3,630.15</b>	<b>1,019.92</b>			
<b>Under Construction</b>									
Xe-Pian Xe-Namnoy Hydroelectric Power Plant	Attapue and Champasak provinces, Laos	Hydro Power Plant	25	410	102.50	Expected COD : Dec 2019	EGAT & EDL	27 years/ 2046	N.A.
				<b>Total</b>	<b>410</b>	<b>102.50</b>			
				<b>Grand Total</b>	<b>4,040.15</b>	<b>1,122.42</b>			

# International Projects in China & Republic of Indonesia

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Asahan-1 Hydroelectric Power Plant	Republic of Indonesia	Hydro Power Plant	26.61	180	47.90	2011	PT PLN (PERSERO)	30 year / 2040	N.A.
<b>Total</b>				<b>180</b>	<b>47.90</b>				
<b>Under Construction</b>									
Riau Combined-Cycle Power Plant	Republic of Indonesia	Combined Cycle	49	296.23	145.15	Expected COD: May 2021	PT PLN (PERSERO)	20 year	N.A.
Fangchenggang II Nuclear Power Plant	Fangchenggang , China	Nuclear Power	10	2,360	236	Expected COD: 2021	N.A.	30 year	N.A.
<b>Total</b>				<b>2,656.23</b>	<b>381.15</b>				
<b>Grand Total</b>				<b>2,836.23</b>	<b>429.05</b>				

# Infrastructure Projects

Name of Power Plant/Project	Location	Technology	RATCH's stake (%)	Installed Capacity (MW)	Attributable Capacity (MW)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>Under Construction</b>									
MRT Pink Line Project and MRT Yellow Line Project	Nonthaburi and Bangkok Province	Elevated Straddle Monorail	10	N.A.	N.A.	Expected COD: In 2021	Concession Contracts with MRTA	30 years/2051	N.A.

# Infrastructure Projects

Name of Power Plant/Project	Location	Type of Business	RATCH's stake (%)	Generating Capacity (cubic meters/day)	Attributable Generating Capacity (cubic meters/day)	COD	Terms of the PPA		
							PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
<b>In Operation</b>									
Sandin Water Supply Project (Phase 1)	Laos	Generating water supply	40	24,000	9,600	2018	Concession Contracts with Nampapa Nakhone Luang	50 years	N.A.
<b>Total</b>				<b>24,000</b>	<b>9,600</b>				
<b>Under Development</b>									
Sandin Water Supply Project (Phase 2)	Laos	Generating water supply	40	24,000	9,600	Expected COD: In 2031	Concession Contracts with Nampapa Nakhone Luang	50 years	N.A.
<b>Total</b>				<b>24,000</b>	<b>9,600</b>				
<b>Grand Total</b>				<b>48,000</b>	<b>19,200</b>				

# Planned Outage at Ratchaburi Power Plant in 2018

Plant		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
RG	CCST-10												
	CCGT-11											4 MO (52D)	25
	CCGT-12											4 MO (52D)	25
RG	CCST-20												
	CCGT-21									30 CI (9D)	8		
	CCGT-22									30 CI (9D)	8		
RG	CCST-30												
	CCGT-31		11 CI (15D)	25									
	CCGT-32		11 CI (19D)	1									
RG	Thermal-1												
RG	Thermal-2												
RG	CCST-10 - CCTE												
	CCGT-11 - CCTE												5 CI (20 D)
	CCGT-12 - CCTE									22 CI (12 D)	3		24
RPCL	CCST-10												
	CCGT-11										21 CI (14D)	3	
	CCGT-12										21 CI (14D)	3	
RPCL	CCST-20	14 MI (35 D)	17										
	CCGT-21	14 MI (35 D)	17										
	CCGT-22	14 MI (35 D)	17										

Thermal Plant	Minor Inspection (MI)		40 Days	Major Overhaul (MO)		57 Days		
Gas Turbine	Warranty Inspection (WI)			Combustion Inspection		Minor Inspection	Major Overhaul	
	Normal (WI)	Gen.Rotor Removed (WI*)		(CI)		(MI)	(MO)	
	26 Days	32 Days		15 Days		30 Days	52 Days	
Steam Turbine	Warranty Inspection (WI)			Minor Inspection		Major Overhaul		
	Normal (WI**)	Gen.Rotor Removed (WI*)		(MI)		(MO)		
	26 Days	30 Days		26 Days		49 Days		

Actual Outage  
Planned Outage

# Planned Outage at Ratchaburi Power Plant in 2019

Plant		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
RG	CCST-10											24	MI (26D) 19
	CCGT-11												CI (15D) 19
	CCGT-12												CI (15D) 19
RG	CCST-20								1	MI (26D) 26			
	CCGT-21							6	MO (52D) 26				
	CCGT-22							6	MO (52D) 26				
RG	CCST-30	2											
	CCGT-31	13											
	CCGT-32	13											
RG	Thermal-1								1	MO (57D) 27			
RG	Thermal-2										3	MO (57D) 29	
RG	CCST-10 - CCTE												
	CCGT-11 - CCTE										19	CI (9D) 28	
	CCGT-12 - CCTE											9	CI (9D) 18
RPCL	CCST-10												
	CCGT-11										20	MO (33D) 21	
	CCGT-12										20	MO (33D) 21	
RPCL	CCST-20												
	CCGT-21	3											
	CCGT-22	3											

Thermal Plant	Minor Inspection (MI)		40 Days	Major Overhaul (MO)		57 Days		
Gas Turbine	Warranty Inspection (WI)			Combustion Inspection			Minor Inspection	Major Overhaul
	Normal (WI)	Gen.Rotor Removed (WI*)		(CI)			(MI)	(MO)
	26 Days	32 Days		15 Days			30 Days	52 Days
Steam Turbine	Warranty Inspection (WI)			Minor Inspection			Major Overhaul	
	Normal (WI**)	Gen.Rotor Removed (WI*)		(MI)			(MO)	
	26 Days	30 Days		26 Days			49 Days	

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