

**RATCH**



RATCHABURI  
ELECTRICITY GENERATING  
HOLDING PCL.

# Analyst Meeting

## 1Q2018

22 May 2018



- Highlights
- RATCH Overview
- Operating Performance
- Financial Performance
- Appendix

## Highlights

# Highlights:

## The repurchase of existing notes and the issuance and offering of newly-issued notes

- On 27<sup>th</sup> March 2018, RHIS repurchased “US\$300,000,000 3.50% notes due 2019” from investors overseas in aggregate principal amount of US\$193 Million. In Addition, RHIS completed its issue and offering of “US\$300,000,000 4.50% notes due 2028” to investors overseas.

The New Notes	
Aggregate principal	US\$300 Million
Loan tenor	10 years
Maturity Date	In 2028
Interest rate	4.50% per annum

“The net proceeds from the issue of the New Notes will be used to fund the repurchase of the Existing Notes and to finance the Group’s general corporate purposes”

# Highlights:

## Increase investment proportion in RAC from 80% to 100%



- On 20<sup>th</sup> April 2018, RHIS ("the Buyer") entered into an agreement and signed a Securities Sale Deed with Broadspectrum Pty Limited ("the Seller") to increase the investment proportion in RAC to 100%.
- On 3<sup>rd</sup> May 2018, both parties have complied all terms and conditions of the agreement and obtained approval from the Australian Foreign Investment Review Board. As a result, the Company's shareholding proportion in RAC has increased to 100%.

**The Buyer**



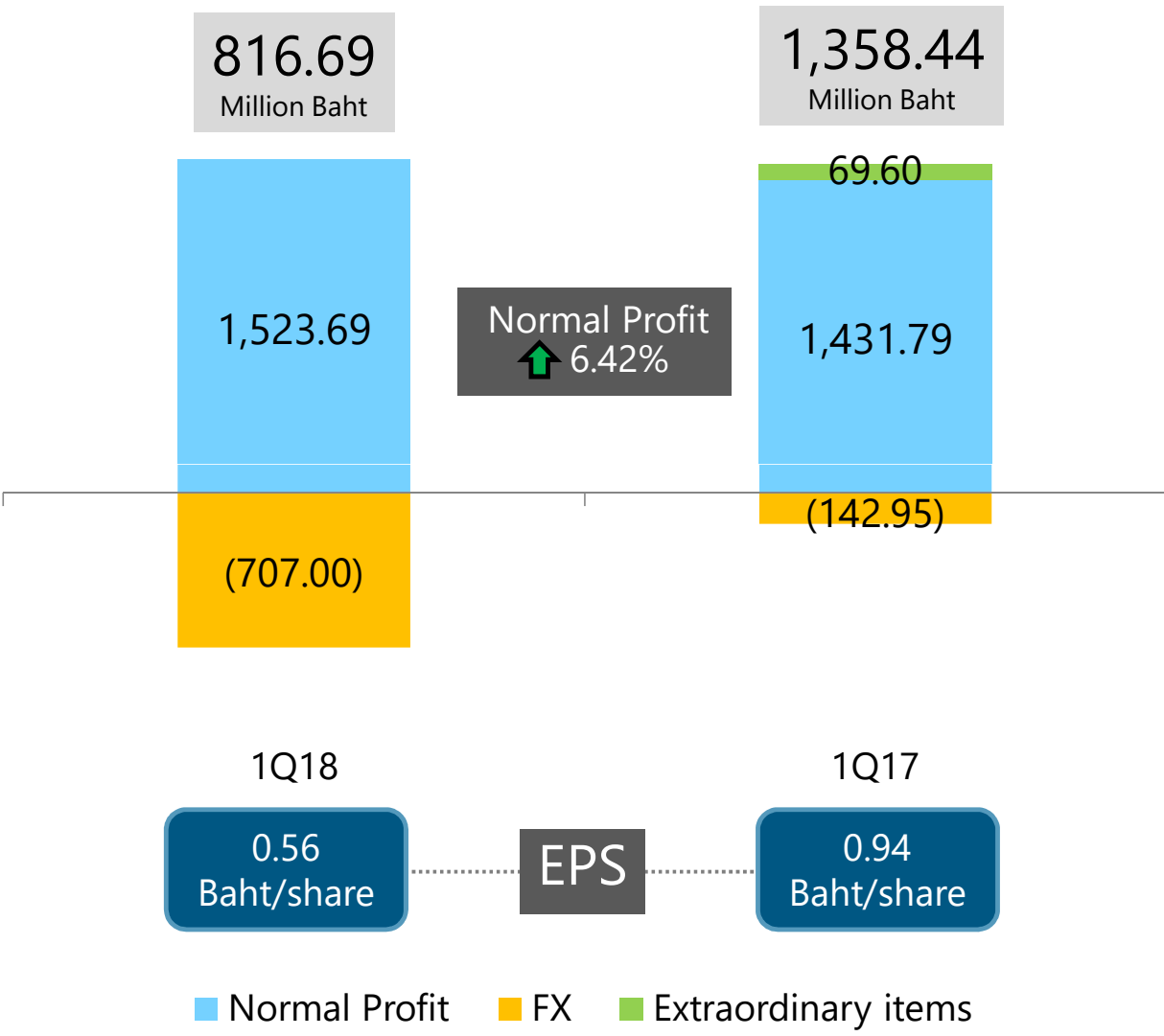
**The Seller**

**Broadspectrum  
Pty Limited**

### Assets being sold or purchased:

Ordinary shares and loan notes (including any rights attached to them) in RAC from the Broadspectrum Pty Limited who held a 20% interest at AUD 53.5 million (~THB 1,321 million)

# Profit for the period: Equity holders of the Company



## RATCH Overview

# Overview of RATCH projects

## Capacity until 2021 (Committed Projects)

Projects in operation		
	MW.	%
Gas	5,464.15	82.49%
Coal	751.20	11.34%
Hydro	268.11	4.05%
Wind	107.40	1.62%
Solar	29.37	0.44%
Biomass	3.96	0.06%
6,624.19 MW.		

## Projects in pipeline from 2018 to 2021

	Nuclear	MRT	Gas	Wind	Hydro	Solar	
MW.	236.00	191.00	175.76	180.45	102.50	42.50	<b>928.21 MW</b>

### MRT Pink Line Project and MRT Yellow Line Project

equivalent to 191 MW.

### Guangxi Fangchenggang Nuclear Power (II)

236 MW.

### Riau Combined- Cycle Power Plant

141.03 MW.

**Collinsville Solar PV**  
42.50 MW.  
**Mount Emerald**  
180.45 MW.

**222.95 MW.**

**Xe Pian – Xe Namnoy**  
102.50 MW.  
**Berkprai Cogeneration**  
34.73 MW.

**137.23 MW.**

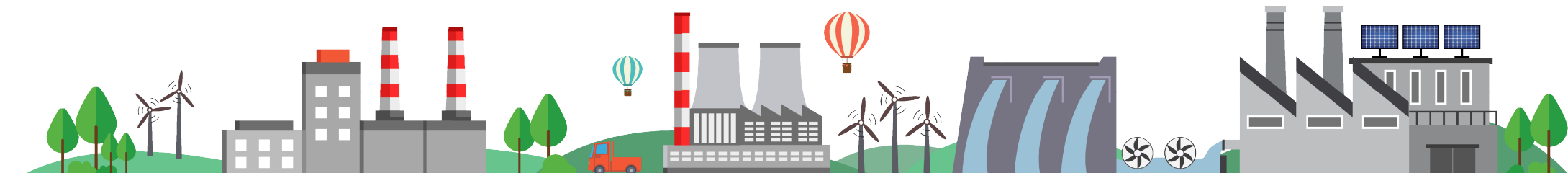
**568.03 MW.**

May  
2018

2018

2019

2021

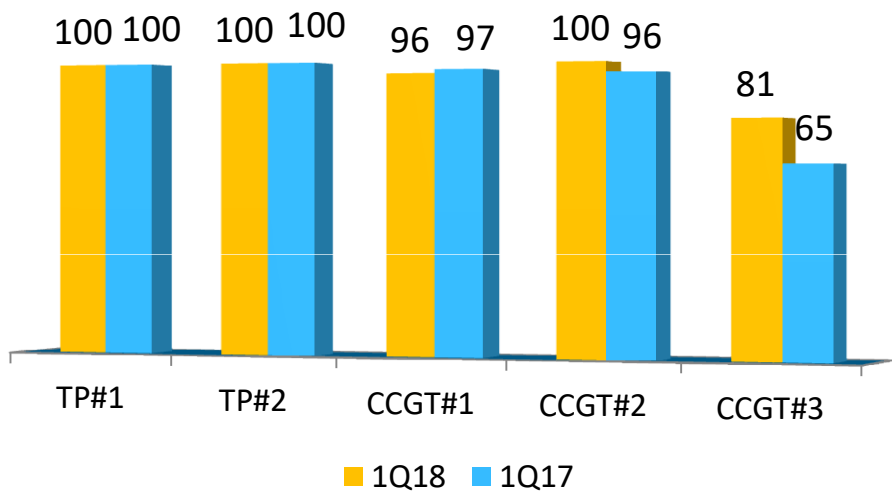




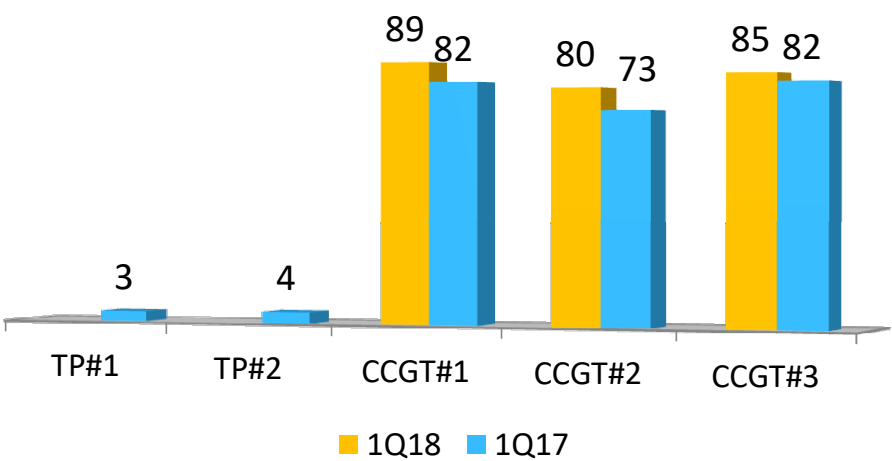
# Operating Performance

# Operation Performance : RATCHGEN

%Equivalent Availability Factor

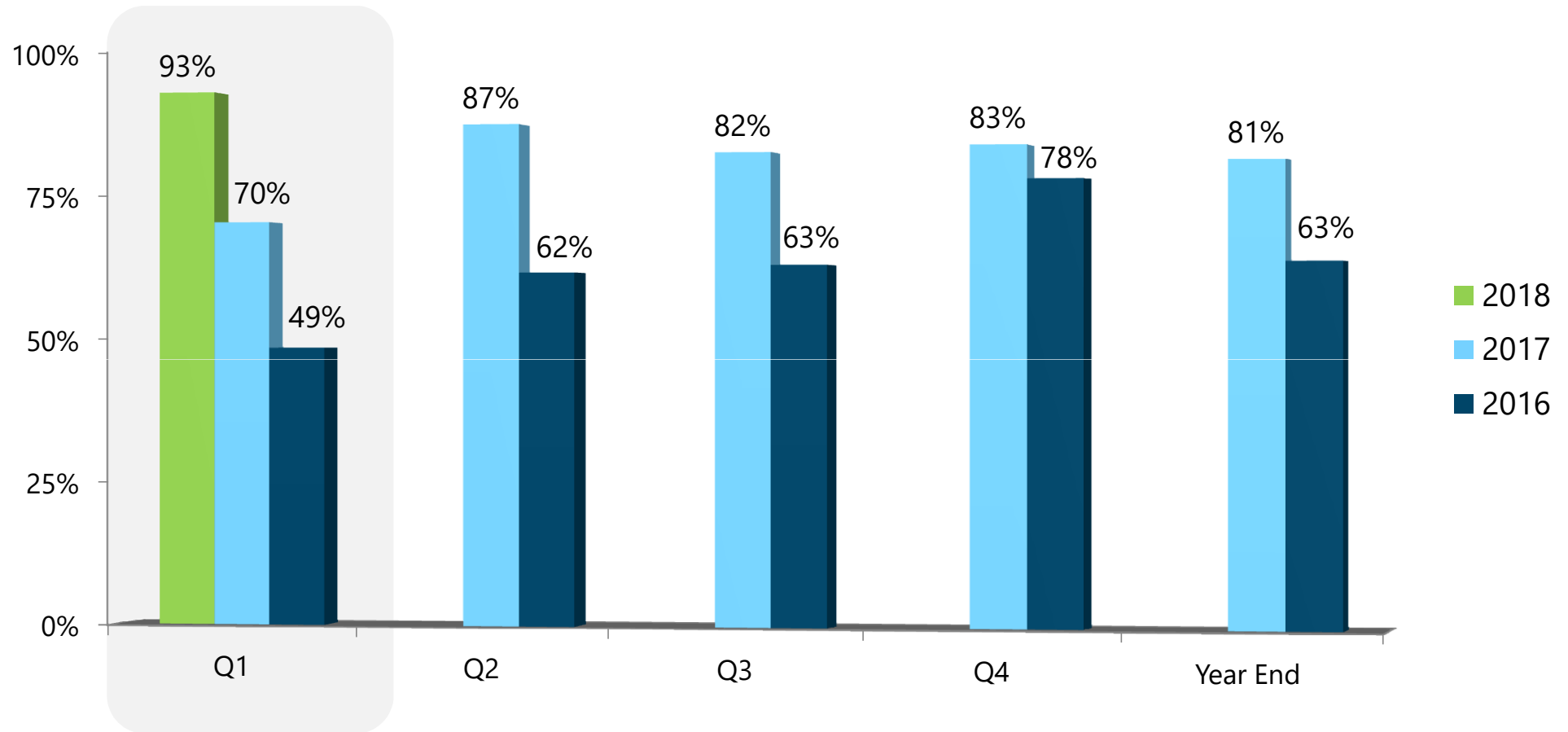


%Dispatch Factor



# Operation Performance : Hongsa

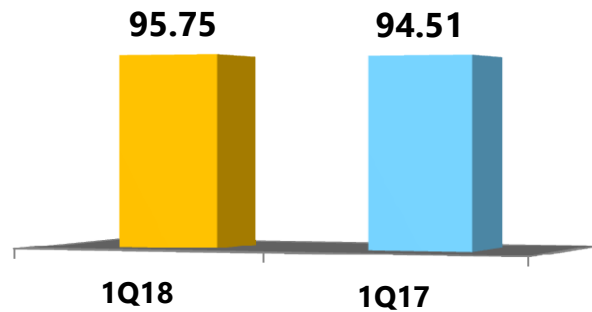
%Equivalent Availability Factor ( 3 Units)



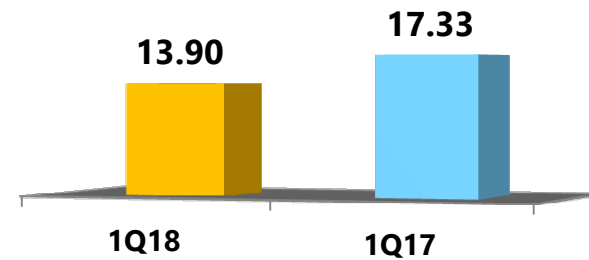
# Operation Performance : Huay bong

## Huay bong 2 (KR2)

Avg. Commercial Availability (%)

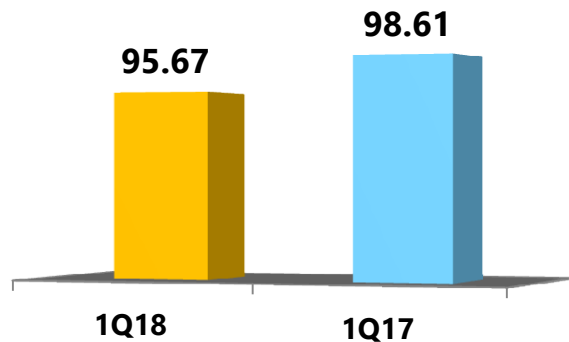


Capacity Factor (%)

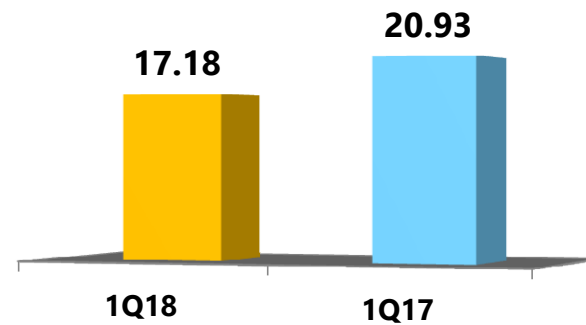


## Huay bong 3 (FKW)

Avg. Commercial Availability (%)

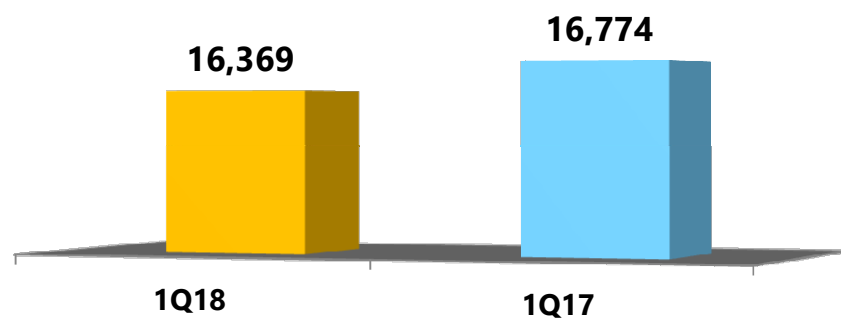


Capacity Factor (%)

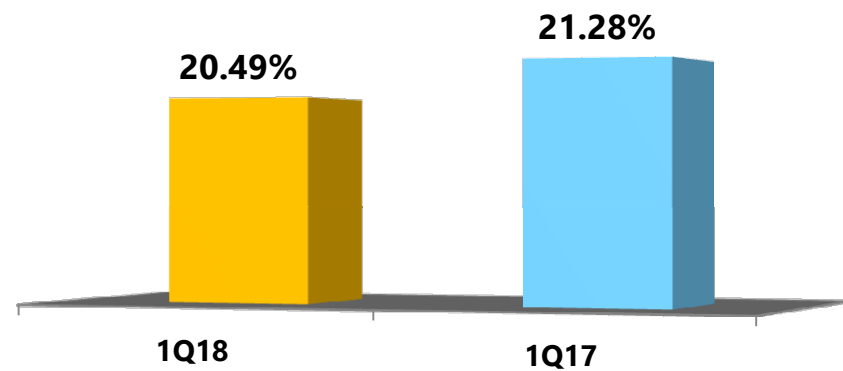


# Operation Performance : Solarta

Total Net Energy (MWh /Quarter)



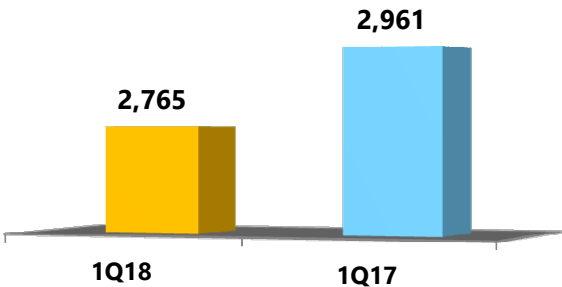
% Avg. Capacity Factor



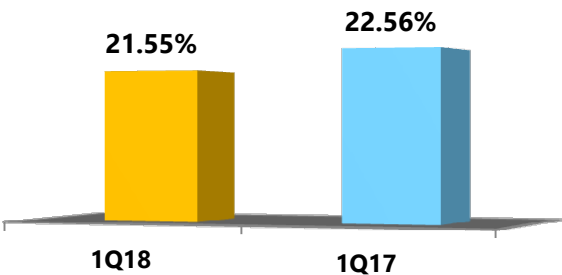
# Operation Performance : Solar Power

Korat 3

Total Net Energy (MWh/Quarter)

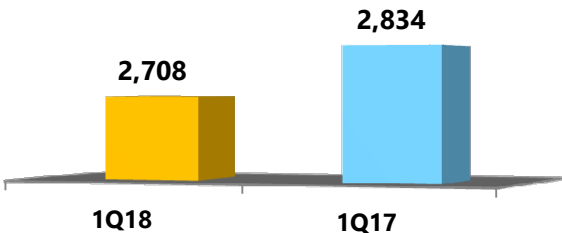


%Avg. Capacity Factor

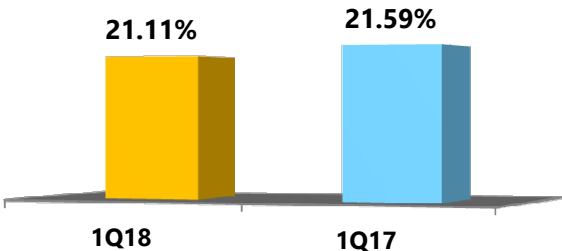


Korat 4

Total Net Energy (MWh/Quarter)

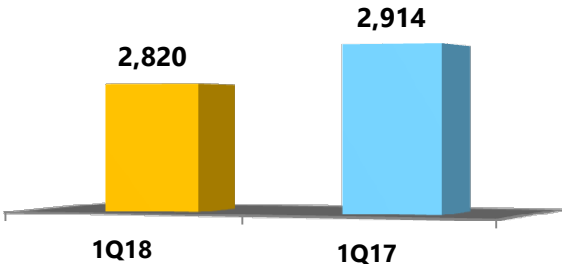


%Avg. Capacity Factor

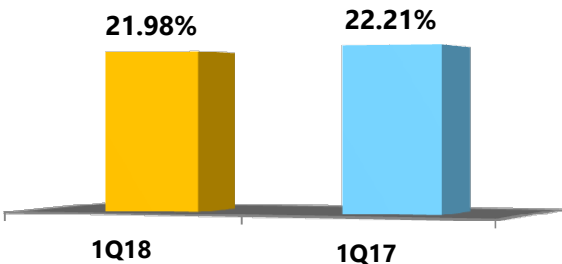


Korat 7

Total Net Energy (MWh/Quarter)



%Avg. Capacity Factor



## Financial Performance

# Income Statement

Unit : in Million Baht	1Q18	4Q17	3Q17	2Q17	1Q17
Revenues	9,091.07	10,289.79	11,303.72	11,150.26	9,978.02
Cost & Expenses	(7,827.81)	(9,529.59)	(9,800.90)	(9,412.26)	(8,477.49)
<b>EBITDA before Share of Profit and FX</b>	<b>1,263.26</b>	<b>760.20</b>	<b>1,502.82</b>	<b>1,738.00</b>	<b>1,500.53</b>
Share of profit of jointly-controlled entities and associates <u>excluding</u> gain (loss) on exchange rate	1,208.72	871.08	1,227.73	1,425.15	902.65
<b>EBITDA included share profit of JV before FX</b>	<b>2,471.98</b>	<b>1,631.28</b>	<b>2,730.55</b>	<b>3,163.15</b>	<b>2,403.18</b>
Gain (Loss) on exchange rate of subsidiaries	(344.10)	(29.20)	200.65	48.02	233.00
Gain (Loss) on exchange rate of JV	(362.90)	(173.01)	(278.40)	(33.17)	(375.95)
<b>EBITDA included share profit of JV and FX</b>	<b>1,764.98</b>	<b>1,429.07</b>	<b>2,652.80</b>	<b>3,178.00</b>	<b>2,260.23</b>
<i>Development cost - Nam Bak</i>	-	-	-	-	-
<i>O&amp;M Compensation – NN2</i>	-	-	-	-	-
<i>Insurance claim</i>	-	-	53.77	-	85.61
<i>Diesel price movement (RG &amp; RPCL)</i>	-	19.09	111.05	(53.65)	(16.01)
<i>Depreciation &amp; Amortization - Cost</i>	(292.41)	(284.25)	(305.38)	(322.87)	(319.16)
<i>Depreciation &amp; Amortization – Admin</i>	(19.80)	(29.80)	(32.51)	(33.70)	(35.11)
<b>EBIT</b>	<b>1,452.77</b>	<b>1,134.11</b>	<b>2,479.73</b>	<b>2,767.78</b>	<b>1,975.56</b>
Finance costs	(434.76)	(358.10)	(374.40)	(369.63)	(400.37)
Income tax expense	(229.05)	(127.99)	(262.60)	(233.25)	(247.06)
<b>Profit for the period</b>	<b>788.96</b>	<b>648.02</b>	<b>1,842.73</b>	<b>2,164.90</b>	<b>1,328.13</b>
Non-controlling interests	27.73	38.18	18.34	36.09	30.31
<b>Equity holders of the Company</b>	<b>816.69</b>	<b>686.20</b>	<b>1,861.07</b>	<b>2,200.99</b>	<b>1,358.44</b>



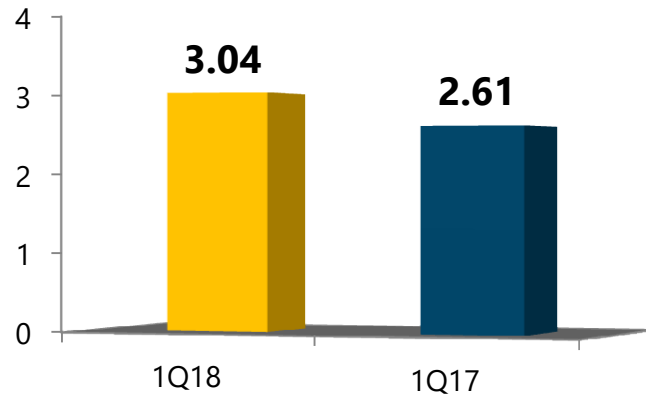
# Statements of Financial Position

As of 31 March 2018

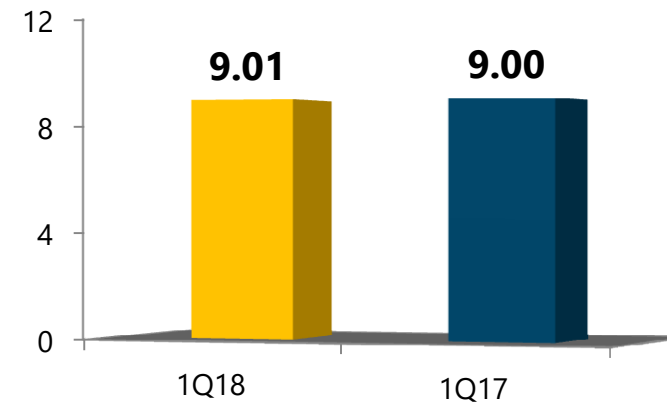
Total Assets	Million Baht	Total Liabilities & Equity	Million Baht
<b><u>Assets</u></b>		<b><u>Liabilities</u></b>	
Cash and cash equivalents	13,209.82	Loans from Related party, Financial Institutions & Debentures	26,975.45
Current investments	525.58	Other liabilities	8,271.51
Current Assets	9,957.19	<b>Total Liabilities</b>	<b>35,246.96</b>
Investment in Jointly-controlled entities/Associates/Others	29,966.69	<b><u>Equity</u></b>	
Financial lease receivables	20,351.36	Issued and paid-up share capital	16,031.78
Property, plant & equipments	19,043.06	Other components of equity	(5,453.15)
Other assets	5,042.89	Retained earnings	52,268.54
		<b>Total equity attributable to owners of the Company</b>	<b>62,847.17</b>
		Non-controlling interests	2.46
<b>Total Assets</b>	<b>98,096.59</b>	<b>Total Liabilities &amp; Equity</b>	<b>98,096.59</b>

# Financial Ratios\*

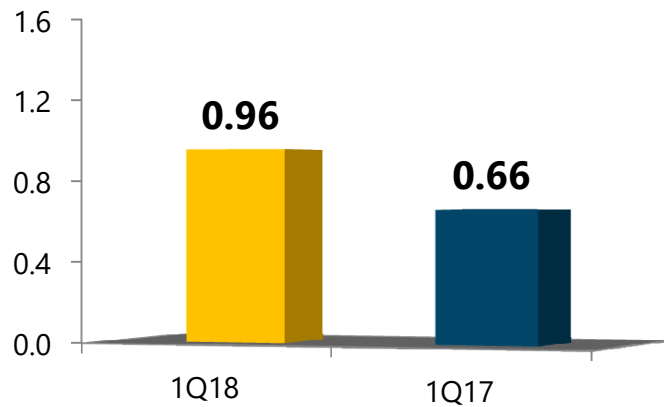
Current ratios (times)



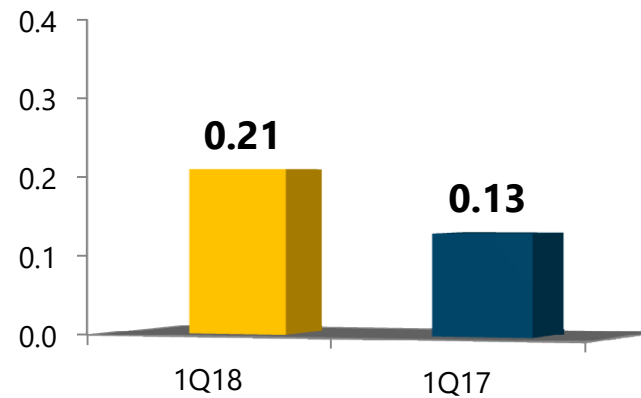
ROE (%)



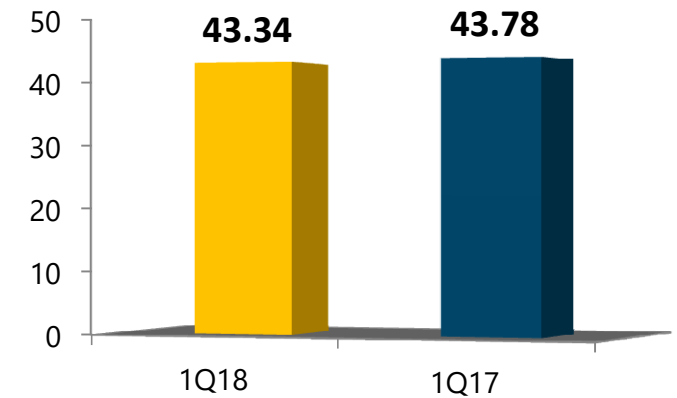
Net debt to EBITDA\*\* (times)



Net debt/Equity (times)



Book Value per share (Baht)



\* Not included the effect of foreign exchange rate

\*\* Included the change in lease receivable

## Appendix: Operating Performance

# RATCHGEN Operating Performance

Fuel Consumption			
By Type of Power Plant		1Q18	1Q17
<b>Fuel Consumption (TH#1-2)</b>			
- Gas	Million MMBTU	-	0.35
- Heavy Oil	Million Liters	-	22.43
<b>Fuel Consumption (CCGT#1-3)</b>			
- Gas	Million MMBTU	23.88	20.92
- Diesel	Million Liters	0.13	0.19
<b>Gas Price (Average) Baht/MMBTU</b>		<b>240.94</b>	<b>238.79</b>
<b>Heavy Oil Price (Average) Baht/Liter</b>		<b>n.a.</b>	<b>n.a.</b>
<b>Diesel Oil Price (Average) Baht/Liter</b>		<b>23.89</b>	<b>23.81</b>

# RATCHGEN Operating Performance

Net Generation (GWh)		
By Type of Power Plant	1Q18	1Q17
<b>Net Generation (TP#1-2) (GWh)</b>	-	<b>111.88</b>
- By Gas (GWh)	-	28.03
- By Heavy Oil (GWh)	-	83.85
<b>Net Generation (CCGT#1-3) (GWh)</b>	<b>3,356.12</b>	<b>2,948.2</b>
- By Gas (GWh)	3,356.12	2,948.12
- By Diesel (GWh)	-	-
<b>Total Net Generation (GWh)</b>	<b>3,356.12</b>	<b>3,060.00</b>

# Actual Outage

# Planned Outage at Ratchaburi Power Plant in 2017

Plant		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
RG	CCST-10											12 MI(26D)	7
	CCGT-11											23 CI (15D)	7
	CCGT-12											23 CI (15D)	7
RG	CCST-20								3 MI (30D)	2			
	CCGT-21								14 CI (19D)	2			
	CCGT-22								14 CI (19D)	2			
RG	CCST-30	1 MI (26d)	26										
	CCGT-31	28 MI (30d)	26										
	CCGT-32	28 MI (30d)	26										
RG	Thermal-1							6 MI (40D)	14				
RG	Thermal-1											19 MI (40D)	28
RG (TE)	CCST-10 - CCTE												
	CCGT-11 - CCTE							6 CI (9D)	14				
	CCGT-12 - CCTE				8 CI (11D)	18							
RPCL	CCST-10												
	CCGT-11										15 MI (34 D)	17	
	CCGT-12										15 MI (34 D)	17	
RPCL	CCST-20	3 CI (13D)	15										
	CCGT-21	3 CI (13D)	15										
	CCGT-22	3 CI (13D)	15										

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		<div>Page 22</div>
	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 2018

Plant		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
RG	CCST-10												
	CCGT-11											MO (52D)	25
	CCGT-12											MO (52D)	25
RG	CCST-20												
	CCGT-21									30	CI (15D)	14	
	CCGT-22									30	CI (15D)	14	
RG	CCST-30												
	CCGT-31		11 11	CI (15D)	11 25								
	CCGT-32		11 11	CI (19D)	1 25								
RG	Thermal-1												
RG	Thermal-2												
RG	CCST-10 - CCTE												
	CCGT-11 - CCTE										13	CI (10 D)	22
	CCGT-12 - CCTE											10	CI (10 D) 19
RPCL	CCST-10												
	CCGT-11										15	CI (9D)	24
	CCGT-12										15	CI (9D)	24
RPCL	CCST-20	14 14	MI (35 D)	15 15									
	CCGT-21	14 14	MI (35 D)	15 15									
	CCGT-22	14 14	MI (35 D)	15 15									
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		Page 23	
		Normal (WI**)		Gen.Rotor Removed (WI*)			(MI)			(MO)			
		26 Days		30 Days			26 Days			49 Days			

## Appendix: Financial Performance



# Revenues: 1Q18 & 1Q17

Unit : in Million Baht		1Q18	1Q17	Diff	%
<b>Sales</b>		<b>8,081.35</b>	<b>8,785.48</b>	<b>(704.13)</b>	<b>(8.01)</b>
AP	- RG/TECO	927.09	1,004.47	(77.38)	(7.70)
	- RAC	403.66	439.03	(35.37)	(8.06)
EP (Fuel)	- RG/TECO	6,596.77	7,167.63	(570.86)	(7.96)
	- RAC	153.83	174.35	(20.52)	(11.77)
<b>Revenue from financial leases - RG/TECO</b>		<b>885.23</b>	<b>1,056.21</b>	<b>(170.98)</b>	<b>(16.19)</b>
<b>Revenue from Rendering of services</b>		<b>12.41</b>	<b>12.57</b>	<b>(0.16)</b>	<b>(1.27)</b>
<b>Management service income</b>		<b>59.50</b>	<b>60.80</b>	<b>(1.30)</b>	<b>(2.14)</b>
<b>Dividend Income</b>		-	-	-	<i>n.a.</i>
<b>Interest Income</b>		<b>32.09</b>	<b>47.21</b>	<b>(15.12)</b>	<b>(32.03)</b>
<b>Other Incomes (exc. Extraordinary items)</b>		<b>20.49</b>	<b>15.75</b>	<b>4.74</b>	<b>30.10</b>
<b>Total Revenues</b>		<b>9,091.07</b>	<b>9,978.02</b>	<b>(886.95)</b>	<b>(8.89)</b>

# Share of profit from jointly-controlled entities : 1Q18 & 1Q17

Unit : in Million Baht	1Q18	1Q17	Diff	%
RPCL	43.30	95.61	(52.31)	(54.71)
SEAN	46.27	55.91	(9.64)	(17.24)
HPC	559.55	126.70	432.85	341.63
PHU FAI	47.38	33.87	13.51	39.89
CRESCO	3.14	14.61	(11.47)	(78.51)
SOLARTA	49.92	52.93	(3.01)	(5.69)
KORAT 3,4,7	21.08	22.35	(1.27)	(5.68)
FKW	26.18	34.20	(8.02)	(23.45)
KR2	18.79	29.24	(10.45)	(35.74)
KWINANA	9.60	8.46	1.14	13.48
PNPC	(95.19)	(50.21)	(44.98)	(89.58)
RW COGEN	67.14	57.88	9.26	16.00
NNEG	47.43	34.92	12.51	35.82
Songkhla Biomass	6.31	1.77	4.54	256.50
Others	(5.08)	8.46	(13.54)	(160.05)
<b>Total Share of profit from jointly-controlled entities</b>	<b>845.82</b>	<b>526.70</b>	<b>319.12</b>	<b>60.59</b>

# Share of profit from jointly-controlled entities : 1Q18 & 1Q17

EXCL.FX	Unit : in Million Baht	1Q18	1Q17	Diff	%
	RPCL	23.14	64.98	(41.84)	(64.39)
	SEAN	(2.04)	10.35	(12.39)	(119.71)
	HPC	907.76	537.04	370.72	69.03
	PHU FAI	39.45	30.56	8.89	29.09
	CRESCO	1.99	13.03	(11.04)	(84.73)
	SOLARTA	49.92	52.93	(3.01)	(5.69)
	KORAT 3,4,7	21.08	22.35	(1.27)	(5.68)
	FKW	26.18	34.20	(8.02)	(23.45)
	KR2	18.79	29.24	(10.45)	(35.74)
	KWINANA	9.60	8.46	1.14	13.48
	PNPC	(4.12)	(3.98)	(0.14)	(3.52)
	RW COGEN	67.08	57.78	9.30	16.10
	NNEG	47.43	34.91	12.52	35.86
	Songkhla Biomass	6.31	1.77	4.54	256.50
	Others	(3.85)	9.03	(12.88)	(142.64)
	<b>Total Share of profit from jointly-controlled entities</b>	<b>1,208.72</b>	<b>902.65</b>	<b>306.07</b>	<b>33.91</b>

# Cost and Expenses : 1Q18 & 1Q17

Unit : in Million Baht	1Q18	1Q17	Diff	%
<b>Cost of Sale and rendering of services</b>	<b>7,441.98</b>	<b>8,076.87</b>	<b>(634.89)</b>	<b>(7.86)</b>
– Fuel Cost : RG/ TECO	6,539.55	7,072.29	(532.74)	(7.53)
– Fuel Cost : RAC	-	1.85	(1.85)	(100.00)
– Operation & Maintenance	367.80	357.52	10.28	2.88
– Repairing Expense (CSA)	254.78	285.09	(30.31)	(10.63)
– Spare parts	78.86	112.41	(33.55)	(29.85)
– Insurance Premium	96.02	118.86	(22.84)	(19.22)
– Standby Charge	49.29	61.40	(12.11)	(19.72)
– Others	55.68	67.45	(11.77)	(17.45)
<b>Selling and Admin- Expenses</b>	<b>385.83</b>	<b>400.62</b>	<b>(14.79)</b>	<b>(3.69)</b>
<b>Total Cost and Expenses*</b>	<b>7,827.81</b>	<b>8,477.49</b>	<b>(649.68)</b>	<b>(7.66)</b>

\*excluding depreciation & amortization

# Gain (Loss) From Foreign Exchange Rate

Unit : in Million Baht	1Q18	1Q17
<b>Gain (Loss) from Foreign Exchange Rate</b>	<b>(707.00)</b>	<b>(142.95)</b>
<b>The Company and Subsidiaries</b>	<b>(344.10)</b>	<b>233.00</b>
- RH	(69.78)	(53.51)
- RH Inter	(356.71)	220.63
- RG / RE / RL	82.39	65.88
<b>Jointly-controlled entities and Associates</b>	<b>(362.90)</b>	<b>(375.95)</b>
- SEAN (33.33%)	48.31	45.56
- RPCL (25%)	20.15	30.63
- HPC (40%)	(348.21)	(410.34)
- PNPC (25%)	(91.07)	(46.23)
- Others (CRESCO, PMPC, RW Cogen, FKW, KR2, NNEG, Solarta, RICI)	7.92	4.43

Foreign Exchange Rate as at 30 December 2017 =32.659 Baht/USD and as at 31 March 2018= 31.215 Baht/USD

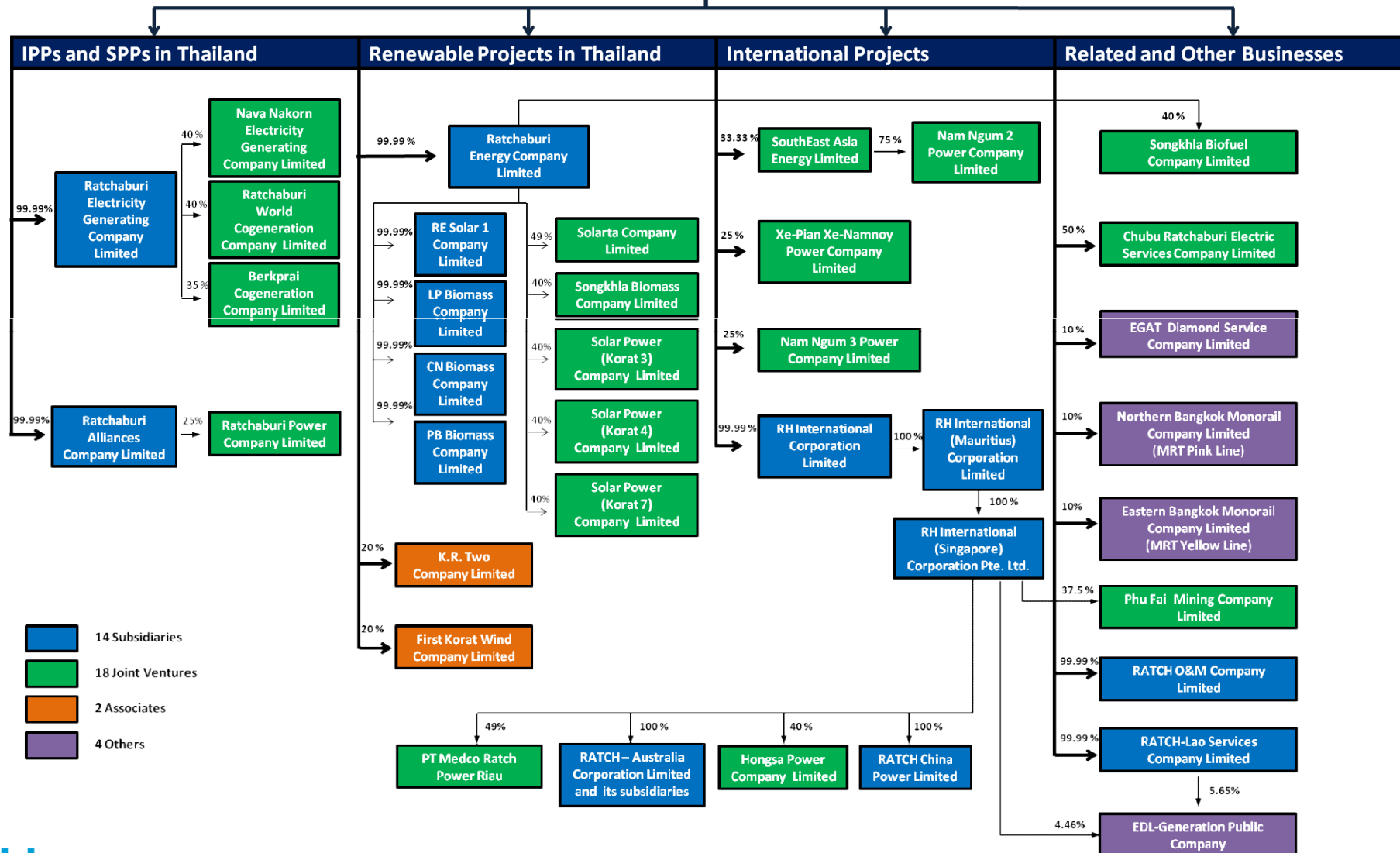
Foreign Exchange Rate as at 30 December 2016 = 35.820 Baht/USD and as at 31 March 2017 = 34.450 Baht/USD

## Appendix: RATCH Projects

# Company Structure



As of May 2018



# Portfolio by Core Business

## IPPs and SPPs in Thailand

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH’s Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
In Operation							
Ratchaburi Power Plant	Ratchaburi Province	Thermal	1,470	1,470 (100%)	EGAT	25 years/ 2025	N/A
		Combined Cycle	2,175	2,175 (100%)	EGAT	25 years/ 2027	N/A
Tri Energy Power Plant	Ratchaburi Province	Combined Cycle	720	720 (100%)	EGAT	20 years/ 2020	N/A
Ratchaburi Power Power Plant	Ratchaburi Province	Combined Cycle	1,490	372.50 (25%)	EGAT	25 years/ 2033	N/A
Ratchaburi World Cogeneration Project	Ratchaburi Industrial Estate, Ratchaburi Province	Cogeneration	234	93.60 (40%)	EGAT	Block 1: 25 years/ 2039 Block 2: 25 years/ 2040	N/A
Nava Nakorn Electricity Generating Project	Nava Nakorn Industrial Promotion Zone, Pathumthani Province	Cogeneration	139.13	55.65(40%)	EGAT	25 years/ 2041	N/A
Total			6,228.13	4,886.75			
Under Construction							
Berkprai Cogeneration	Ratchaburi Province	Cogeneration	99.23	34.73 (35%)	EGAT	25 years/2044 (Expected COD: 2019)	N/A
Total			99.23	34.73			
Grand Total			6,327.36	4,921.48			



# Portfolio by Core Business

## Renewable Projects in Thailand

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH's Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
In Operation							
Huay Bong 2 Wind-Turbine Power Plant	Nakorn Ratchasima Province	Wind-Turbine	103.50	20.70 (20%)	EGAT	5 years/ 2018	Automatic renewal for a further 5 years every 5 years
Huay Bong 3 Wind-Turbine Power Plant	Nakorn Ratchasima Province	Wind-Turbine	103.50	20.70 (20%)	EGAT	5 years/ 2022	Automatic renewal for a further 5 years every 5 years
Solar Power Projects (Korat 3, Korat 4, Korat 7)	Nakorn Ratchasima Province	Solar Power	21.60	8.64 (40%)	PEA	5 years/ 2022	Automatic renewal for a further 5 years every 5 years
Solarta Power Projects	Ayutthaya, Nakhon Pathom, and Suphanburi Provinces	Solar Power	42.30	20.73 (49%)	PEA	Ayutthaya Province : 5 years / 2021 Suphanburi and Nakhon Pathom Provinces : 5 years / 2022	Automatic renewal for a further 5 years every 5 years
Songkhla Biomass Power Project	Songkhla Province	Thermal	9.90	3.96 (40%)	PEA	20 years/2035	N/A
Total			280.80	74.73			
Grand Total			280.80	74.73			

# Portfolio by Core Business

## International Projects in Australia

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH's Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
In Operation							
Townsville Power Plant	North Queensland, Australia	Combined Cycle Gas Turbine	234	234 (100%)	AGL/Arrow	February 2025	N/A
Kemerton Power Plant	Western Australia, Australia	Open Cycle Gas/Diesel Turbine	308	308 (100%)	Synergy	October 2030	N/A
BP Kwinana Power Plant (30 % owned by RAC)	Western Australia, Australia	Cogeneration	118	35.40 (30%)	Verve Energy/BP	December 2021	N/A
Starfish Hill Wind-Turbine Power Plant	South Australia, Australia	Wind-Turbine	33	33 (100%)	Alinta Energy	In 2020	N/A
Toora Wind-Turbine Power Plant	Victoria, Australia	Wind-Turbine	21	21 (100%)	Merchant	N/A	N/A
Windy Hill Wind-Turbine Power Plant	Queensland, Australia	Wind-Turbine	12	12 (100%)	Ergon Energy Queensland (EEQ)	December 2018	N/A
Total			726.00	643.40			

# Portfolio by Core Business

## International Projects in Australia

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH's Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
Under Construction							
Mount Emerald Wind Farm	Queensland, Australia	Wind-Turbine	180.45	180.45 (100%)	Ergon Energy Queensland (EEQ)	12.5 year (Expected COD: Nov 2018)	N/A
Collinsville Solar PV Project	Queensland, Australia	Solar Power	42.50	42.50 (100%)	Alinta Energy	12.5 year (Expected COD: July 2018)	N/A
Total			222.95	222.95			
Grand Total			948.95	866.35			

# Portfolio by Core Business

## International Projects in Laos

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH’s Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
In Operation							
Nam Ngum 2 Hydroelectric Power Plant	Laos	Hydro Power Plant	615	153.75 (25%)	EGAT	27 years/ 2038	N/A
Hongsa Power Plant	Sainyaburi Province, Laos	Lignite-Fired Power Plant	1,878	751.20 (40%)	EGAT & EDL	25 years/ 2040	N/A
Total			2,493	904.95			
Under Construction							
Xe Pian - Xe Namnoy Project	Attapue and Champasak provinces, Laos	Hydro Power Plant	410	102.50 (25%)	EGAT EDL	27 years/ 2046 (Expected COD: 2019)	N/A
Total			410	102.50			
Grand Total			2,903	1,007.45			

# Portfolio by Core Business

## International Projects in China & Republic of Indonesia

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH's Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
Under Construction							
Guangxi Fangchenggang Nuclear Power (II)	Fangchenggang , China	Nuclear Power	2,360	236 (10%)	N/A	30 year (Expected COD: 2021)	N/A
Total			2,360	236			
Under Development							
Riau Combined-Cycle Power Plant	Republic of Indonesia	Combined Cycle	287.81	141.03 (49%)	PT PLN (PERSERO)	20 year (Expected COD: 2021)	N/A
Total			287.81	141.03			
Grand Total			2,647.81	377.03			

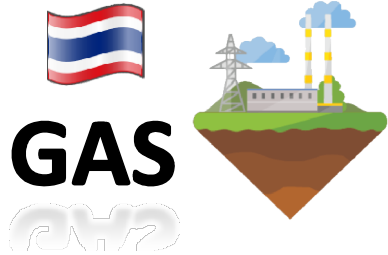
# Portfolio by Core Business

## Related Businesses

Name of Power Plant/Project	Location	Technology	Total Installed Capacity (MW)	Installed Capacity contributed to the RATCH's Group (MW)	Terms of the PPA		
					PPA Party	Tenure/ Expiry Year	Renewal/ Option to Extend
In Operation							
EDL-Generation	Laos	Hydro Power Plant	1,131.15	114.36 (10.11%)	N/A	N/A	N/A
Total			1,131.15	114.36			
Under Construction							
MRT Pink Line Project and MRT Yellow Line Project	Nonthaburi and Bangkok Province	Elevated Straddle Monorail	~1,910 MW	~191.00 MW (10%)	N/A	30 years/2051 (Expected COD: 2021)	N/A
Total			1,910	191.00			
Grand Total			3,041.15	305.36			

# IPPs and SPPs in Thailand

## In Operation



### Project Cost (100%)

60,775 Million Baht

### Debt to Equity

2.3 : 1

### Project Cost (RATCH Portion)

60,775 Million Baht

## Ratchaburi Power Plant (RATCHGEN)



### Location

Ratchaburi Province

### Technology

Thermal & Combined Cycle

### Total Installed Capacity

3,645 MW (holds 100%)

### PPA

25-Year

### COD

TH#1-2 : 31 Oct 2000

CCGT #1-2 : 18 Apr 2002

CCGT#3 : 1 Nov 2002

### Partner

Ratchaburi Electricity Generating  
Company Limited holds 100%

## Tri Energy Power Plant (TECO)



### Location

Ratchaburi Province

### Technology

Combined Cycle

### Total Installed Capacity

720 MW (holds 100%)

### PPA

20-Year

### COD

1 July 2000

### Partner

Ratchaburi Electricity Generating  
Company Limited holds 100%

### Project Cost (100%)

404.75 Million USD

### Debt to Equity

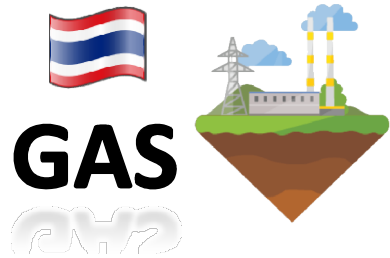
3 : 1

### Project Cost (RATCH Portion)

- In 2005, RATCH holds 50% of the total share, at the amount 202.50 Million USD
- In 2014, RATCH has purchased 50% of the total share, at the amount 21.32 Million USD

# IPPs and SPPs in Thailand

## In Operation



### Project Cost (100%)

840 Million USD

### Debt to Equity

2.5 : 1

### Project Cost (RATCH Portion 25%)

210 Million USD

## Ratchaburi Power Plant (RPCL)



### Location

Ratchaburi Province

### Technology

Combined Cycle

### Total Installed Capacity

1,490 MW (372.5 MW holds 25 %)

### PPA

25-Year

### COD

Block 1: 1 March 2008

Block 2: 1 June 2008

### Partner

- Ratchaburi Alliances Company Limited holds 25%
- PAI International Power (Mauritius) Company Limited holds 25%
- Global Power Synergy Company Limited holds 15%
- Chubu Electric Power Company International B.V. holds 15%
- Saha-Union Public Co., Ltd. holds 10%
- Toyota Tsusho Corporation holds 10%

## Ratchaburi World Cogeneration (RW Cogen)



### Location

Ratchaburi Province

### Technology

Cogeneration

### Total Installed Capacity

234 MW (93.60 MW holds 40%)

### PPA

25-Year

### COD

Unit 1: November 2014

Unit 2: March 2015

### Partner

- Ratchaburi Electricity Generating Company Limited holds 40%
- Major Shareholder Group of Thai Agri Food PCL holds 60%

### Project Cost (100%)

10,620 Million Baht

### Debt to Equity

75 : 25

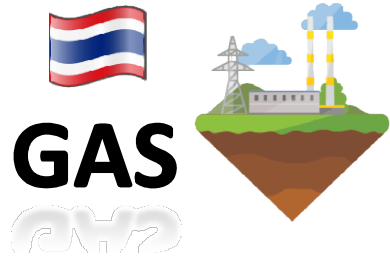
### Project Cost (RATCH Portion 40%)

4,248 Million Baht



# IPPs and SPPs in Thailand

## In Operation



**Project Cost (100%)**  
6,000 Million Baht

**Debt to Equity**  
75 : 25

**Project Cost (RATCH Portion 40%)**  
2,400 Million Baht

### Nava Nakhon Electricity Generating (NNEG)



**Location**  
Pathum Thani Province

**Technology**  
Cogeneration

**Total Installed Capacity**  
139.13 MW (55.65 MW holds 40%)

**PPA**  
25-Year

**COD**  
3 June 2016

#### Partner

- Ratchaburi Electricity Generating Company Limited holds 40%
- Global Power Synergy Public Company Limited holds 30%
- Nava Nakhon holds 30%

### Berkprai Cogeneration (Former name: Ratchaburi Cogeneration)

**Location**  
Ratchaburi Province

**Technology**  
Cogeneration

**Total Installed Capacity**  
99.23 MW (34.73 MW holds 35%)  
Steam Generation 15 ton/hour

**PPA**  
25-Year

**Expected COD**  
In 2019

**Progress**  
41.59% as of February 2018

#### Partner

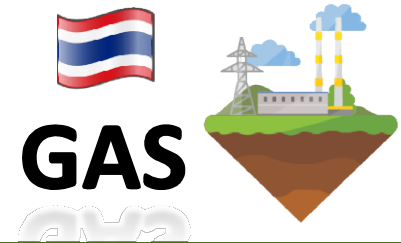
- Ratchaburi Electricity Generating Company Limited holds 35%
- Rajburi Sugar Company Limited holds 65%

**Project Cost (100%)**  
5,323 Million Baht

**Debt to Equity**  
75 : 25

**Project Cost (RATCH Portion 35%)**  
1,863 Million Baht

## Under Construction



### About Berkprai Cogeneration

On 15<sup>th</sup> September 2014, Ratchaburi Electricity Generating Company Limited has entered into Shareholders Agreement with Rajburi Sugar Company Limited

On 30<sup>th</sup> October 2014, Ratchaburi Electricity Generating Company Limited purchased 35 % of Ratchaburi Cogeneration Company Limited's total shares from Rajburi Sugar Company Limited

On 27<sup>th</sup> January 2015, Ratchaburi Cogeneration Company Limited changed its name to Berkprai Cogeneration Company Limited (the project).


On 28<sup>th</sup> September 2016, the project increased its registered capital from 100 Million Baht to 1,331 Million Baht


On 6<sup>th</sup> June 2017, the project has signed Facilities Agreement with Bangkok Bank. The loan amount is 4,000 Million Baht for the period of 20 years from the agreement signed date.

# Renewable Projects in Thailand



<b>Project Cost (100%)</b> 6,100 Million Baht
<b>Debt to Equity</b> 70 : 30
<b>Project Cost (RATCH Portion 20%)</b> 1,220 Million Baht


Huay Bong 2 Wind-Turbine Power Project	
	
<b>Location</b>	Nakorn Ratchasima Province
<b>Technology</b>	Wind-Turbine
<b>Total Installed Capacity</b>	103.5 MW (20.7 MW holds 20%)
<b>PPA</b>	5 years with automatic renewal for a further 5 years every 5 years
<b>COD</b>	8 February 2013
<b>Partner</b>	<ul style="list-style-type: none"> <li>• RATCH holds 20%</li> <li>• Aeolus Power holds 60%</li> <li>• Chubu Electric Power Korat, BV holds 20%</li> </ul>

Huay Bong 3 Wind-Turbine Power Project	
	
<b>Location</b>	Nakorn Ratchasima Province
<b>Technology</b>	Wind-Turbine
<b>Total Installed Capacity</b>	103.5 MW (20.7 MW holds 20%)
<b>PPA</b>	5 years with automatic renewal for a further 5 years every 5 years
<b>COD</b>	14 November 2012
<b>Partner</b>	<ul style="list-style-type: none"> <li>• RATCH holds 20%</li> <li>• Aeolus Power holds 60%</li> <li>• Chubu Electric Power Korat, BV holds 20%</li> </ul>


<b>Project Cost (100%)</b> 6,500 Million Baht
<b>Debt to Equity</b> 70 : 30
<b>Project Cost (RATCH Portion 20%)</b> 1,300 Million Baht

# Renewable Projects in Thailand



Solar Power Projects (Korat 3, Korat 4, Korat 7)

Location Nakorn Ratchasima Province
Technology Solar Power
Total Installed Capacity 21.60 MW (8.64 MW holds 40%)
PPA 5 years with automatic renewal for a further 5 years every 5 years
COD Korat 3 : 9 March 2012 Korat 4 : 14 May 2012 Korat 7 : 30 May 2012
Partner <ul style="list-style-type: none"> <li>• Ratchaburi Energy Company Limited holds 40%</li> <li>• Solar Power holds 60%</li> </ul>

<b>Project Cost (100%)</b> 1,950 Million Baht
Debt to Equity 75 : 25
Project Cost (RATCH Portion 40%) 780 Million Baht

Solarta Power Projects

Location Ayutthaya Province Suphan Buri Province Nakon Pathom Province
Technology Solar Power
Total Installed Capacity 42.30 MW (20.73 MW holds 49%)
PPA 5 years with automatic renewal for a further 5 years every 5 years
COD Ayutthaya Province : 7 April 2011 Suphan Buri Province : In 2012 Nakon Pathom Province : In 2012
Partner <ul style="list-style-type: none"> <li>• Ratchaburi Energy Company Limited holds 49%</li> <li>• Yanhee Power holds 51%</li> </ul>

<b>Project Cost (100%)</b> 4,400 Million Baht
Debt to Equity 75 : 25
Project Cost (RATCH Portion 49%) 2,156 Million Baht

# Renewable Projects in Thailand

## BIOMASS



**In Operation**

### Songkhla Biomass Power Project

#### Location

Songkhla Province

#### Technology

Thermal Power Plant

#### Total Installed Capacity

9.9 MW (3.96 MW holds 40%)

#### VSP

20-Year

#### COD

9 November 2015

#### Partner

- Ratchaburi Energy Company Limited holds 40%
- Precise Power Producer holds 40%
- Assiddeek Saving Cooperative holds 20%

#### Project Cost (100%)

846 Million Baht

#### Debt to Equity

75 : 25

#### Project Cost

**(RATCH Portion 40%)**

338.40 Million Baht

### ESP



### Boiler & Economizer



### Fuel Storage Silo



# International Projects



**Project Cost (100%)**  
30,832 Million Baht

**Debt to Equity**  
2.5 : 1

**Project Cost (RATCH Portion 25%)**  
7,708 Million Baht

## Num Ngum 2 Hydroelectric Power Plant



**Location**  
Lao PDR

**Technology**  
Hydro Power Plant

**Total Installed Capacity**  
615 MW (153.75 MW holds 25%)

**PPA**  
27-Year

**IOD/COD**  
In 2011 / In 2013

### Partner

- SEAN\* holds 75%
- GOL holds 25%

\* Remark: SEAN's shareholder consist of

- RATCH holds 33.33%
- CK Power PCL holds 55.99%
- Other holds 10.68%

## Hongsa Power Plant Unit 1-3



**Location**  
Lao PDR

**Technology**  
Lignite-Fired

**Total Installed Capacity**  
1,878 MW (751.2 MW holds 40%)

**PPA**  
25-Year

**COD**  
Unit 1 : 2 June 2015  
Unit 2 : 2 November 2015  
Unit 3 : 2 March 2016

### Partner (Power Plant)

- RHIS holds 40%
- Banpu Power holds 40%
- Lao PDR holds 20%



### Partner (Phu Fai Mining)

- RHIS holds 37.5%
- Banpu Power holds 37.5%
- Lao PDR holds 25%

**Project Cost (100%)**  
3,710 Million USD

**Debt to Equity**  
75 : 25

**Project Cost (RATCH Portion 40%)**  
1,484 Million USD



# International Projects



## Xe-Pian – Xe Namnoy Project

### Location

Lao PDR

### Technology

Hydro Power Plant

### Total Installed Capacity

410 MW (102.5 MW holds 25%)

### PPA

27-Year

### Expected COD

In 2019

### Progress

87.22% as of February 2018

### Partner

- RATCH holds 25%
- SK Engineering holds 26%
- Korea Western Power holds 25%
- Lao PDR holds 24%

### Project Cost (100%)

1,020 Million USD

### Debt to Equity

70 : 30

### Project Cost (RATCH Portion 25%)


255 Million USD




# International Projects



Townsville Power Plant	
	
<b>Location</b>	North Queensland, Australia
<b>Technology</b>	Combined Cycle Gas Turbine
<b>Total Installed Capacity</b>	234 MW (234 MW holds 100%)
<b>COD</b>	In 1999
<b>Contract end date</b>	February 2025
<b>Contract counterparty</b>	AGL / Arrow

Kemerton Power Plant	
	
<b>Location</b>	Western Australia
<b>Technology</b>	Open Cycle Gas / Diesel Turbine
<b>Total Installed Capacity</b>	308 MW (308 MW holds 100%)
<b>COD</b>	In 2005
<b>Contract end date</b>	October 2030
<b>Contract counterparty</b>	Synergy


BP Kwinana Power Plant	
	
<b>Location</b>	Western Australia
<b>Technology</b>	Co-generation
<b>Total Installed Capacity</b>	118 MW (35.40 MW holds 30%)
<b>COD</b>	In 1996
<b>Contract end date</b>	December 2021
<b>Contract counterparty</b>	Verve Energy / BP


# International Projects



Toora

<b>Location</b> Victoria, Australia
<b>Technology</b> Wind Farm
<b>Total Installed Capacity</b> 21 MW (21 MW holds 100%)
<b>COD</b> In 2002
<b>Contract end date</b> n.a.
<b>Contract counterparty</b> Merchant

Starfish Hill

<b>Location</b> South Australia
<b>Technology</b> Wind Farm
<b>Total Installed Capacity</b> 33 MW (33 MW holds 100%)
<b>COD</b> In 2003
<b>Contract end date</b> In 2020
<b>Contract counterparty</b> Alinta Energy

Windy Hill

<b>Location</b> Queensland, Australia
<b>Technology</b> Wind Farm
<b>Total Installed Capacity</b> 12 MW (12 MW holds 100%)
<b>COD</b> In 2000
<b>Contract end date</b> December 2018
<b>Contract counterparty</b> Ergon Energy Queensland



# Related Businesses



**In Operation**

## EDL-Generation Public Company (EDL-Gen)

### Location

Lao PDR

### Technology

Hydro Power Plant

### Total Installed Capacity

1,131.15 MW  
(114.36 MW holds 10.11%\*)

### Shareholders

- RATCH-Lao holds 5.65%
- RH International (Singapore) Corporation Pte. Limited holds 4.46%
- EDL holds 75%
- Others holds 14.89%

### \*Remark:

- EDL-Gen has been traded on Lao Securities Exchange since 2010.
- In 2016, RATCH acquired 169.78 million shares, or equivalent to 3,254 Million Baht.



# International Projects



**Under Construction**



## Mount Emerald Wind Farm

### Location

Queensland, Australia

### Technology

Wind Farm

### Total Installed Capacity

180.45 MW (180.45 MW holds 100%)

### Expected COD

November 2018

### Contract end date

December 2030

### Contract counterparty

Ergon Energy Queensland\*

\* State Enterprise of Queensland, Australia

### Project Cost (100%)

~380 Million AUD

### Debt to Equity

68 : 32

### Project Cost (RATCH Portion 80%)

~304 Million AUD

## About Mount Emerald Wind Farm

On 27<sup>th</sup> November 2016, Mount Emerald Wind Farm Pty has entered into PPA with Ergon Energy Queensland ("EEQ") a power state enterprise of Queensland. The agreement will expire on 31<sup>st</sup> December 2030 or totaling the agreement period of approximately 12.5 years.

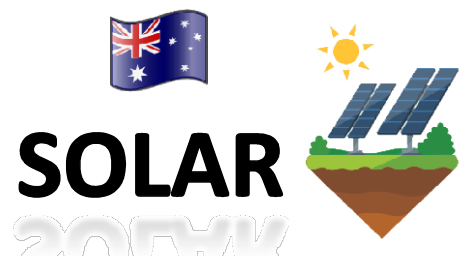
On 28<sup>th</sup> June 2016, RAC has entered into share purchase agreement of Mount Emerald Wind Farm Pty with Port Bajool Pty Ltd. who had jointly invested in the Project with RAC in the proportion of 50 : 50. After the purchase was complete, RAC would hold 100 % stake in Mount Emerald Wind Farm Pty.

On 1<sup>st</sup> November 2016, Mount Emerald Wind Farm Pty the developer of Mount Emerald Wind Farm Project, has successfully sourced loan for the development of the Project by entering into Financial Agreement with 4 financial institutes namely Australia and New Zealand Bank, National Australia Bank, The Bank of Tokyo Mitsubishi, and Societe Generale.





# International Projects



**Under Construction**



## Collinsville Solar PV Project

### Location

Queensland, Australia

### Technology

Solar Power

### Total Installed Capacity

42.50 MW (42.50 MW holds 100%)

### Expected COD

July 2018

### Contract end date

December 2030

### Contract counterparty

Braemar Power Projects

### Project Cost (100%)

95 Million AUD\*

\* Loan from financial institute at approximately 60 percent, grant fund from ARENA at 10 percent and equity investment at approximately 30 percent.



Source: <http://www.cimic.com.au/>

### Remark

The Project has Power Purchase Agreement with the Braemar Power Projects, a subsidiary of Alinta Energy, for 70 percent. Such Power Purchase Agreement will be expired on 31<sup>st</sup> December 2030. The other 30 percent of the generated electricity will be sold in Australia's National Electricity Market (NEM).

# International Projects



## NUCLEAR



### Under Construction

#### Guangxi Fangchenggang Nuclear Power (II)

##### Location

Fangchenggang , China

##### Technology

HPR1000 (Hualong-1)

Total Installed Capacity  
2,360 MW (236 MW holds 10%)  
(2 unit x 1,180 MW)

##### PPA

30-Year

##### Expected COD

In 2021

##### Partner

- China General Nuclear Power Corporation (CGN) holds 51%
- Guangxi investment Group Co./ Ltd (GIG) holds 39%
- RATCH China Power Limited holds 10%

##### Project Cost (100%)

200,000 Million Baht

##### Debt to Equity

62.5 : 37.5

##### Equity Investment (RATCH Portion 10%)

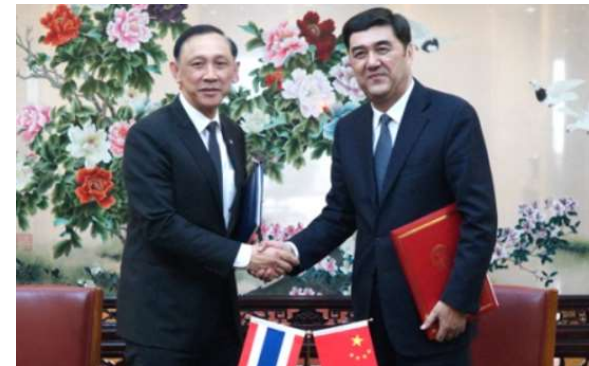
7,500 Million Baht



The signing of the equity joint venture contract (Image: CGN)

On 25<sup>th</sup> January 2016, RATCH has agreed to take a stake in the two Hualong One reactors being built as Phase II of the Fangchenggang nuclear power plant in China's Guangxi province.

source: world nuclear news



Kanchanarat (left) and Bekri shake on the agreement (Image: NEA)

On 29<sup>th</sup> March 2017, China and Thailand have signed an agreement to cooperate in the peaceful use of nuclear energy. The agreement was signed in Beijing by Nur Bekri, director of China's National Energy Administration (NEA), and Thai energy minister Anantaporn Kanchanarat.

source: world nuclear news



# International Projects



**Under Development**



## Riau Combined-Cycle Power Plant

### Location

Republic of Indonesia

### Technology

Combined-Cycle

### Total Installed Capacity

287.81 MW (141.03 MW holds 49%)

### PPA

20-Year

### Purchaser

PT PLN (PERSERO)

### Expected COD

In 2021

### Partner

- RH International (Singapore) Corporation Pte. Limited holds 49%
- PT Medco Power Sentral Sumatera holds 51%

### Project Cost (100%)

300 Million USD

### Debt to Equity

75:25

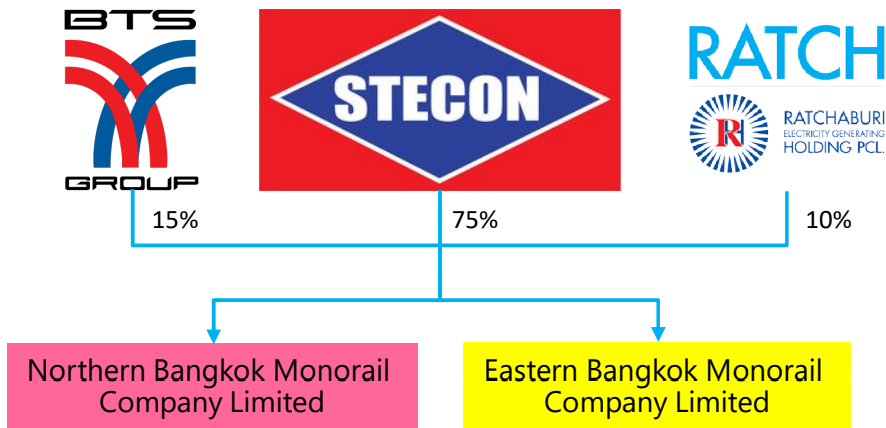
### Equity Investment (RATCH Portion 49%)

36.75 Million USD



# International Projects

## MRT Pink Line Project and the MRT Yellow Line Project



	Pink Line	Yellow Line
Route	Khae Rai-Min Buri	Lat Phrao - Samrong
Line length	34.5 km	30.4 Km
Stations	30	23

### About MRT Pink Line Project and the MRT Yellow Line Project

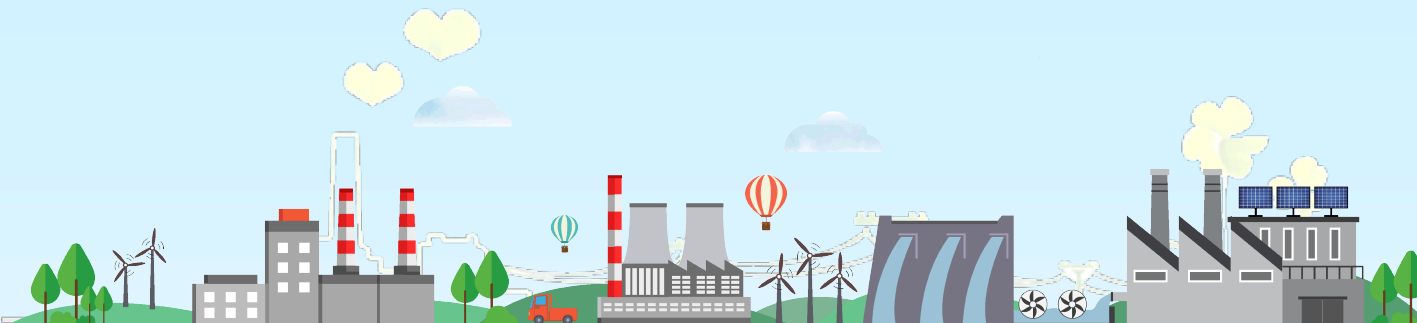
- On 7 November 2016, the Company, BTS Group Holding Public Company Limited (BTS) and Sino-Thai Engineering & Construction Public Company Limited (STEC) have jointly submitted the proposals under the name of "BSR Joint Venture" for the biddings of the MRT Pink Line and the MRT Yellow Line Project.
- On 14 December 2016, MRTA has issued letters No. MRTA 004/3227 and MRTA 004/3228, notifying that BSR Joint Venture was the bidder who proposed the best offer for the MRT Pink Line Project and the MRT Yellow Line Project.
- On 12 June 2017, the BSR Joint Venture established companies namely "Northern Bangkok Monorail Company Limited" and "Eastern Bangkok Monorail Company Limited".
- On 16 June 2017, Northern Bangkok Monorail Company Limited and Eastern Bangkok Monorail Company Limited have entered into the Concession Contracts including of the obligation for extensions of the MRT Pink Line Project and MRT Yellow Line Project with Mass Rapid Transit Authority Of Thailand (MRTA).
- On 10 October 2017, the BSR Joint Venture signed the syndicated loan agreement between Bangkok Bank, Siam Commercial Bank and Krung Thai Bank at a total value of up to THB 63,360 Million

# RATCH



RATCHABURI  
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HOLDING PCL.

# Q & A



# Thank you