



# Energy Absolute

Energy for Future



**A LEADER  
IN ASIA'S  
GREEN  
ENERGY  
BUSINESS**

Energy Absolute is leading the way in Thailand's fast growing alternative energy industry, maximizing the best knowledge and in-house technology to really make a difference.

# E@ at Glance

## Established

In 2006 to produce palm oil

## Core Business

Energy (Renewable and Utilities)

## Secondary Market

The Stock Exchange of Thailand since 30 Jan 2013

## Market Capitalization (as of 5/6/19)

Approximately THB 203 billion



1 Jul 2017



18 Oct 2018



FTSE Global  
15 Mar 2019

## Credit Rating

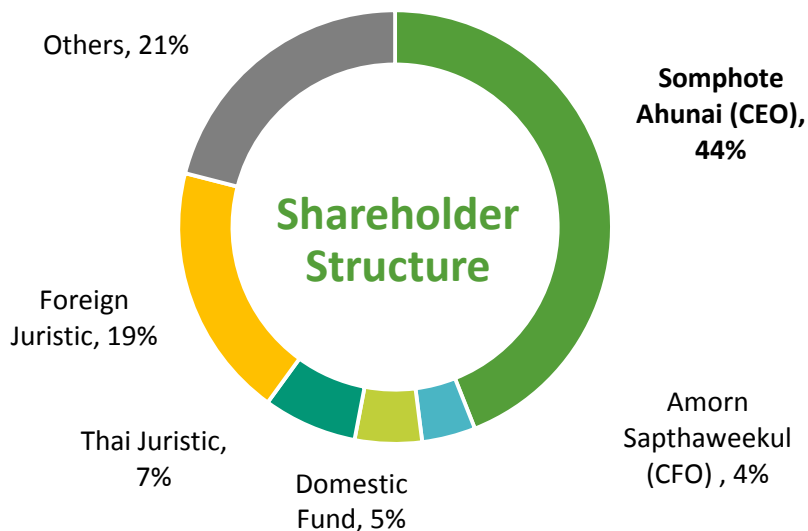
Corporate rating : A

## CG Rating

Excellent



## At the End of 2018



Mr. Somphote Ahunai  
Chief Executive Officer

### Education

- MBA from University of Pittsburgh, USA
- Bachelor of Engineering from Chulalongkorn University, Thailand

### Previous Experience

- Analyst and Researcher in USA.
- Managing Director of a Securities Brokerage company in Thailand
- Managing Director of a Renewable Energy company in Thailand

Mr. Amorn Saphaweekul  
Deputy CEO and Chief Finance Officer

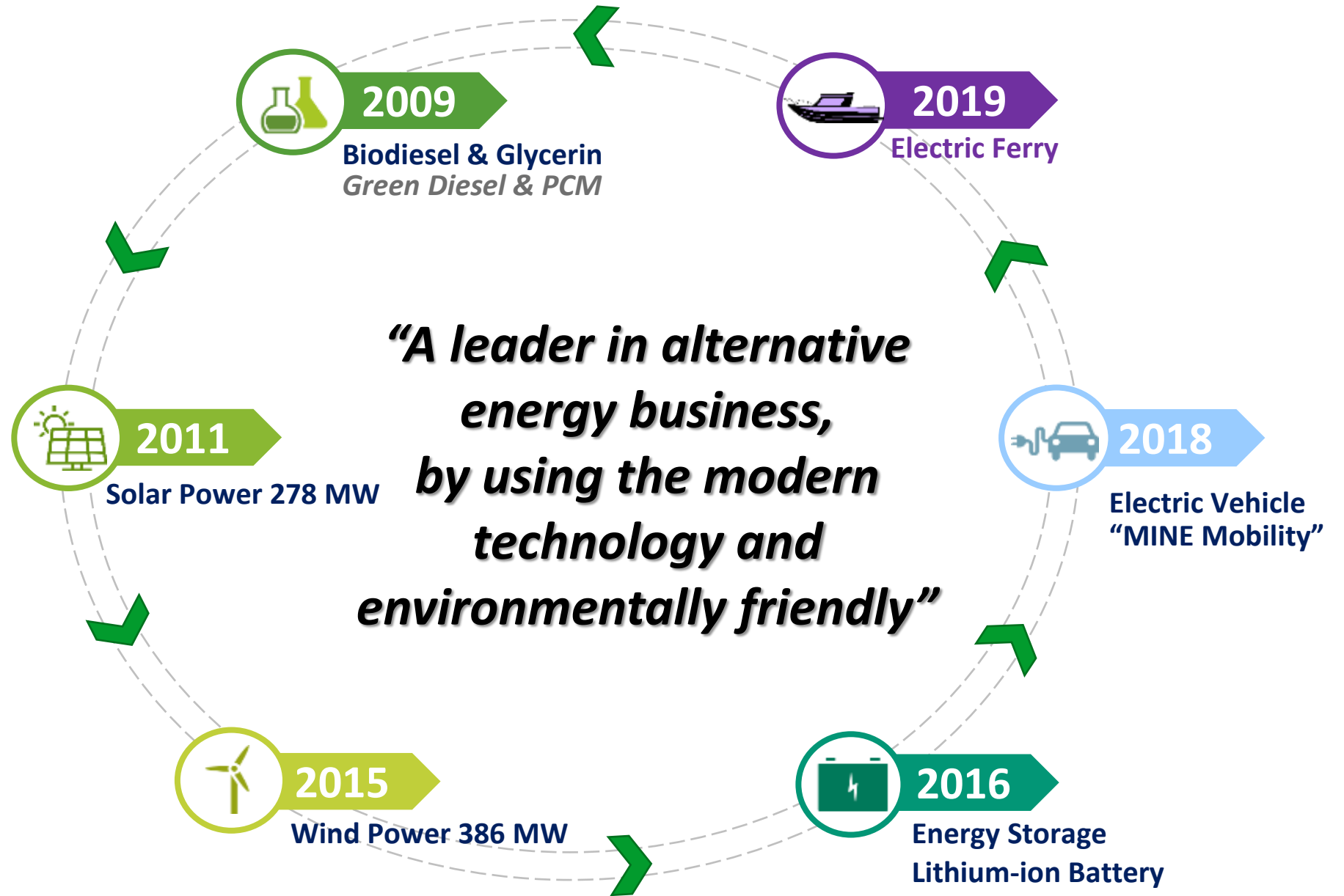
### Education

- Master of Science from Chulalongkorn University, Thailand
- Bachelor of Business Administration (Finance and Banking) from Thammasat University, Thailand

### Previous Experience

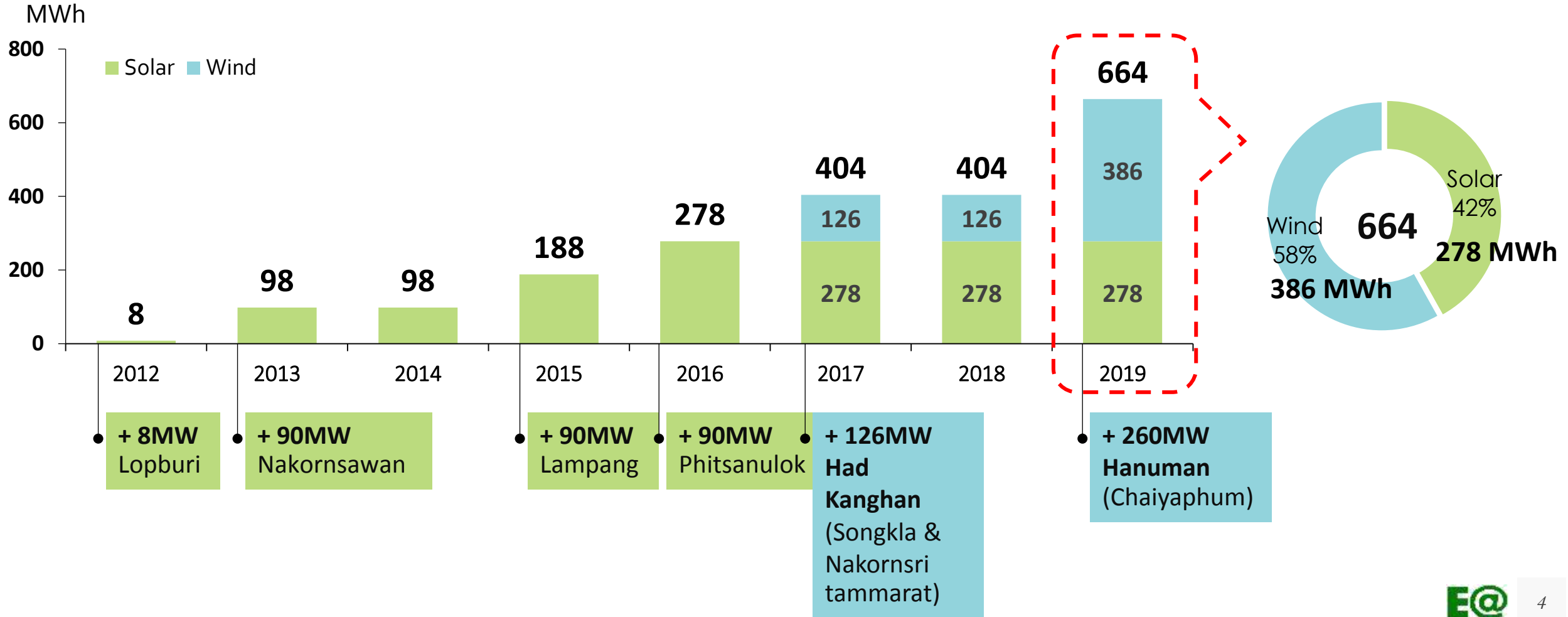
- Investment Banker and Financial Advisor,
- Director in a Renewable Energy company

# Our Integrated Business Building ECO System



# Renewable Power Business

Started from a small 8-MW solar power plant then gain knowledge to develop higher technology.



# Electricity Price Structure



<p><b>Peak Time:</b> Weekdays 09.00 – 22.00</p> <p><b>4.2243</b> Bt./kWh</p> <hr/> <p><b>Off-Peak Time:</b> Weekdays 22.00 – 09.00 + Weekend + Holidays</p> <p><b>2.3567</b> Bt./kWh</p>
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Solar		Wind
8 Bt.	6.5 Bt.	3.5 Bt.
Lopburi 8 MWh Until Oct 2022	Nakornsawan 90 MWh Until Dec 2023	HKH 1 = 36 MWh Until Mar 2027
	Lampang 90 MWh Until Feb 2025	HKH 2&3 = 90 MWh Until Jun 2027
	Phitsanulok 90 MWh Until Apr 2026	HNM 1&8 = 90MWh until Jan 2029
		HNM 5&9 = 90MWh until Mar 2029
		HNM 10 = 80MWh until Apr 2029

**-0.116** Bt./kWh  
For May – Aug 2019

*\* After 10-year of adder period, the price structure will be Base Tariff + Ft.*



# Solar Power 278 MW

## 3 Lampang (THB 8.07 bil)

Contracted Cap: 90 MW

Installed Cap : 128.396 MW

**Technology:** Tracking system

**COD :** 17 Feb 2015

Land area : 2,354 Rais (930 acres)

**Adder :** 6.50 baht/kWh

## 2 Nakornsawan (THB 6.7 bil)

Contracted Cap: 90 MW

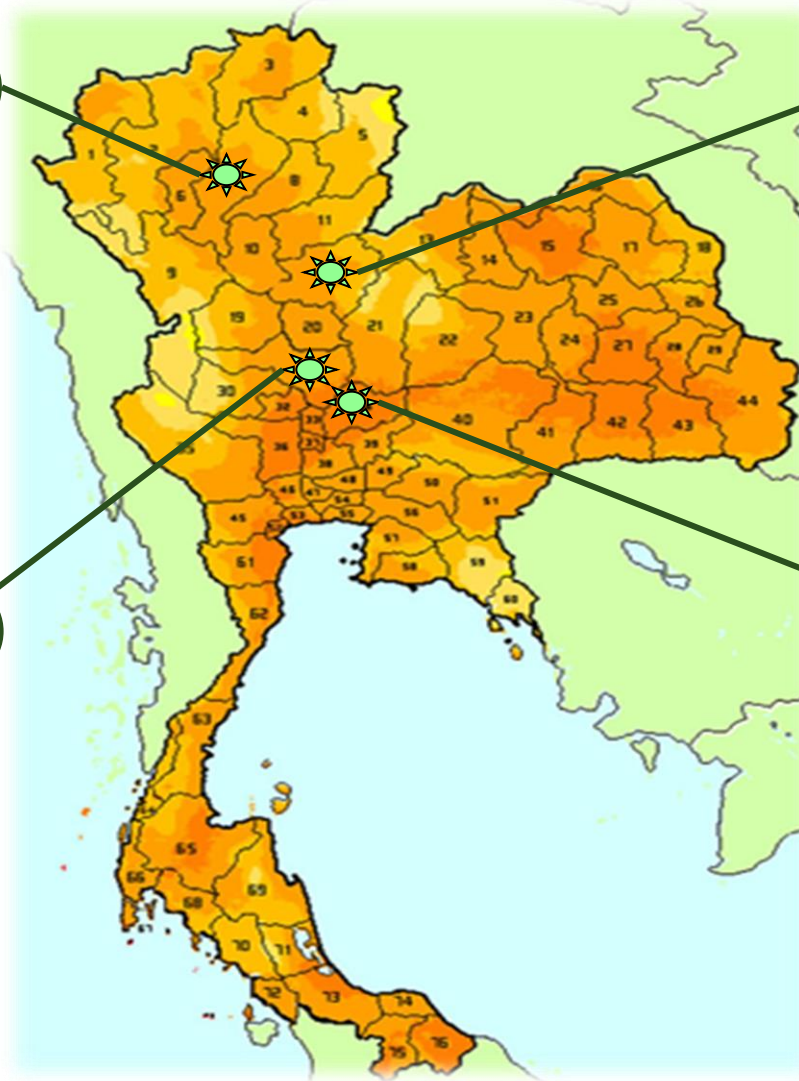
Installed Cap : 126.126 MW

**Technology:** Fixed system

**COD :** 23 Dec 2013

Land area: 1,858 Rais (735 acres)

**Adder :** 6.50 baht/kWh



## 4 Phitsanulok (THB 9.5 bil)

Contracted Cap: 90 MW

Installed Cap : 133.92 MW

**Technology:** Tracking system

**COD :** 1 Apr 2016

Land area : 1,800 Rais (732 acres)

**Adder :** 6.50 baht/kWh

## 1 Lopburi (THB 812 mil)

Contracted Cap: 8 MW

Installed Cap : 9.33 MW

**Technology:** Fixed System

**COD :** 17 Oct 2012

Land area: 315 Rais (124.5 acres)

**Adder :** 8 baht/kWh

# Wind Power 386 MW

**Hanuman : HNM  
(Chaiyaphum)  
THB 20 bil.**

Contracted Cap: 260 MW

**COD :**

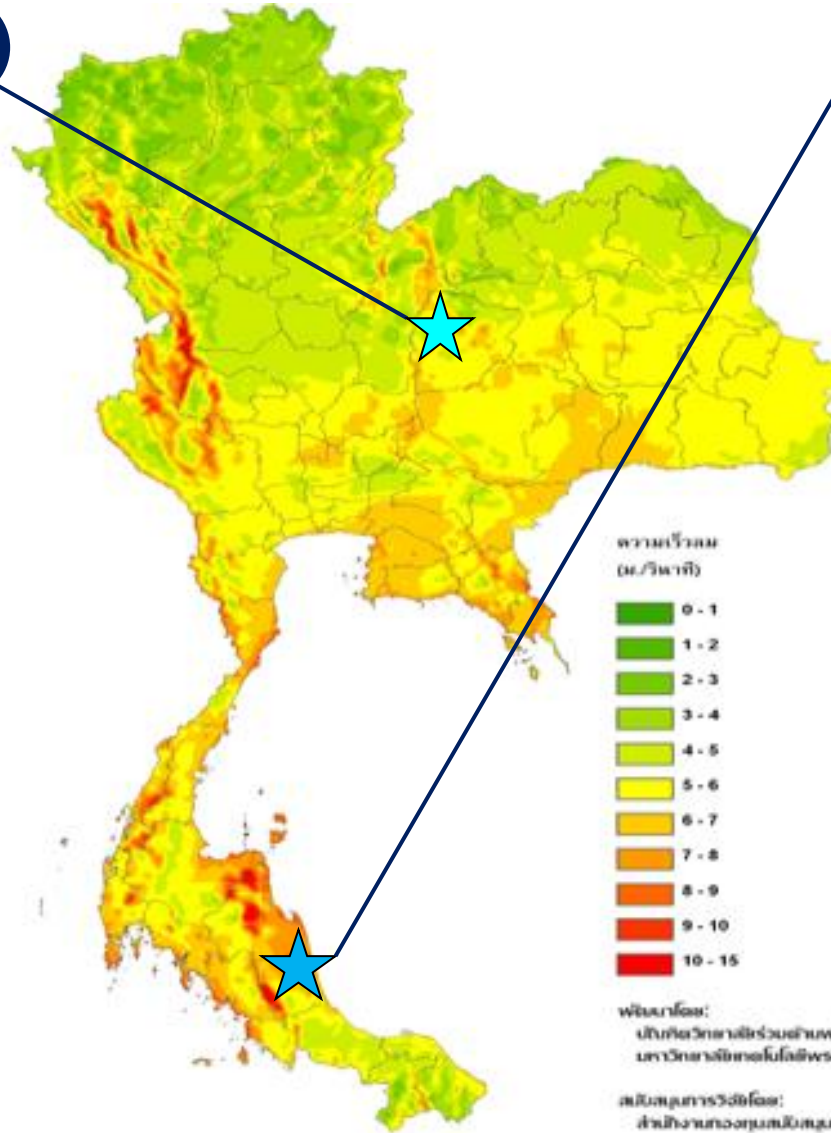
**HNM 1&8 = 90 MW    COD 25 Jan 19**  
**HNM 5    = 48 MW    COD 22 Mar 19**  
**HNM 9    = 42 MW    COD 30 Mar 19**  
**HNM 10   = 80 MW    COD 13 Apr 19**

Adder : 3.50 baht/kwh

Project Specification : Technology from  
Siemens Gamesa, Spain

- ✓ 103 sets of Wind Turbine Generator at 2.5 MWh each
- ✓ Hub height 153 m.
- ✓ Blade length 63 m.
- ✓ Cut in wind speed = 3 m/sec

**2**



**1**

**Hadkanganhan : HKH  
(East Coast Southern)  
THB 10.4 bil.**

Contracted Cap: 126 MW

**COD :**

**HKH 1 = 36 MW    COD 3 Mar 17**  
**HKH 2 = 45 MW    COD 10 Jun 17**  
**HKH 3 = 45 MW    COD 23 Jun 17**

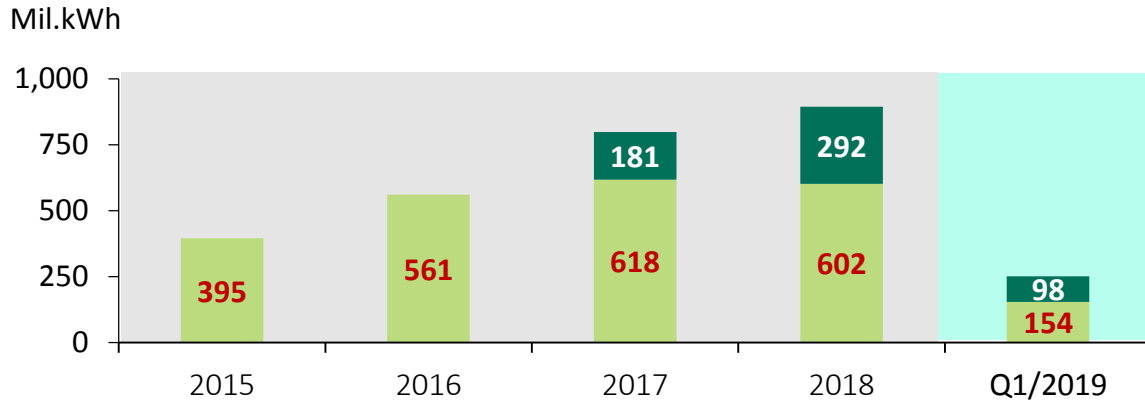
Adder : 3.50 baht/kwh

Project Specification : Technology from  
Vestas, Denmark

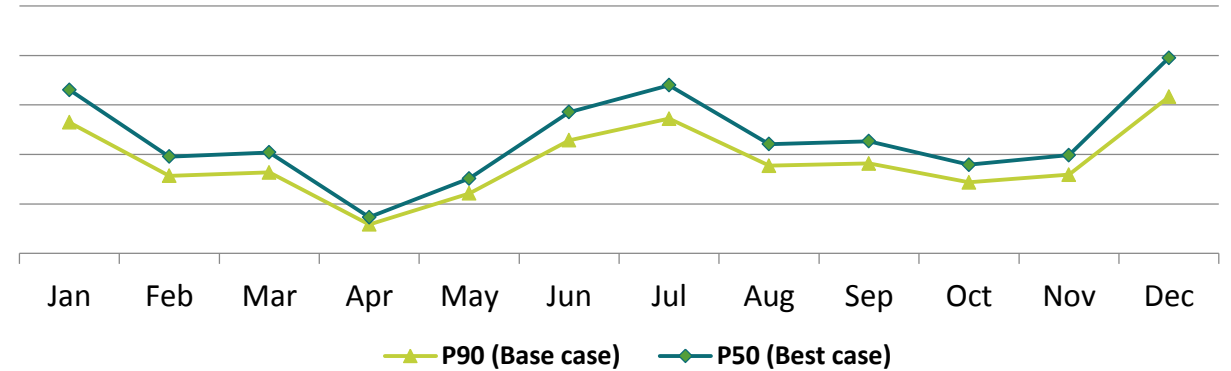
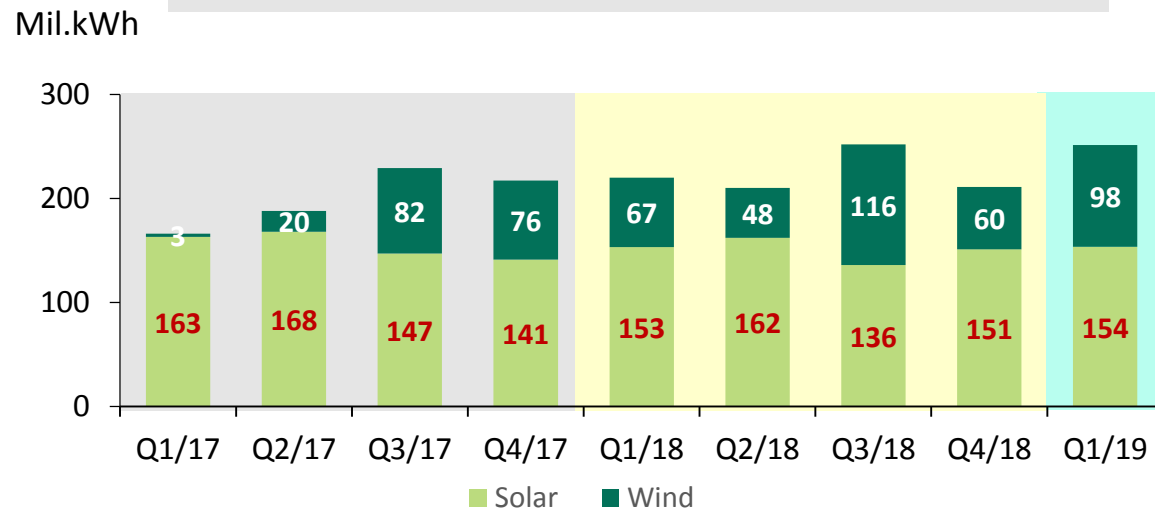
- ✓ 70 sets of Wind Turbine Generator at 1.8 MWh each
- ✓ Hub height 137 m.
- ✓ Blade length 51 m.
- ✓ Cut in wind speed = 3 m/sec

# Output from power production

## Total Capacity : YOY



## Total Capacity : QOQ



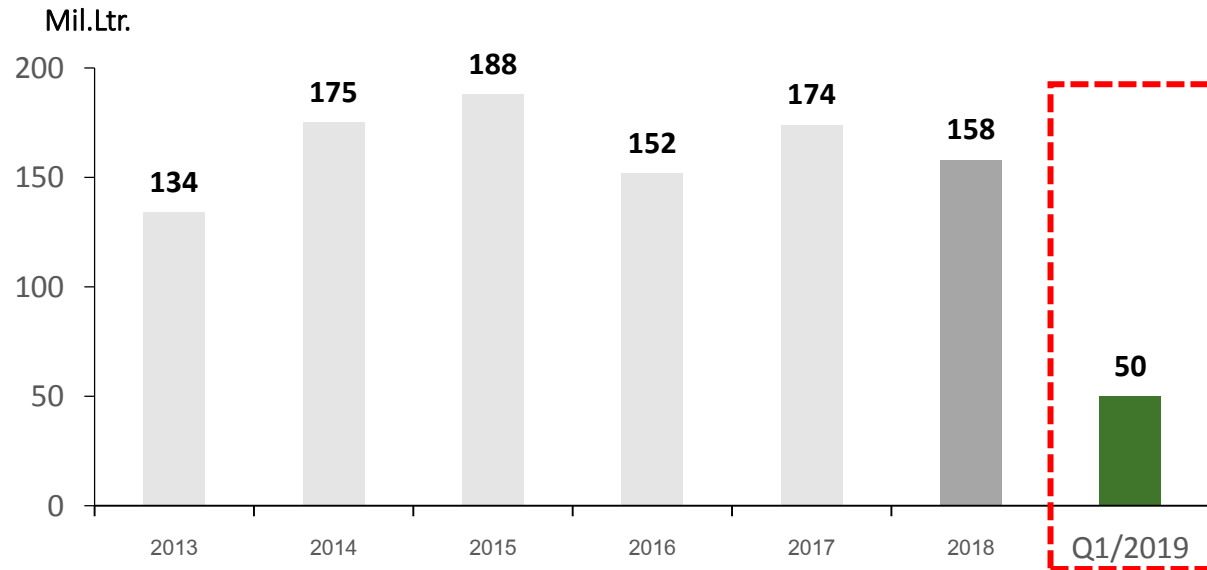
**In Q1/2019** : Total power output = 251.29 million kWh. increased from Q1/2018 = 31.51 million kWh.

**Power production output from Wind Power Plants** increased 45.37% from Q1 last year due to delaying of monsoon that normally occurs at the end of year (Dec) to the beginning of this year (Jan), and additional output from HNM 1, 5, 8 and 9 which started commercial operation in Q1 this year.

**Power production output from Solar Power Plants** stayed the same.



# Biodiesel Production



<b>Location</b>	Kabinburi Industrial Estate, Prachinburi under BOI promotion & privileges
<b>Plant Capacity</b>	<ul style="list-style-type: none"> <li>Biodiesel 800,000 Liters per day</li> <li>Pilot production of green diesel/PCM 1 Ton per day</li> <li>Refined Glycerin 80 Tons per day (by product)</li> </ul>

- B100 volume in Q1/2019 = 50.18 mil.liters increased 15.72% but average price decreased 19.98% due to over supply of raw material and high competition.
- Blending of B100 to high speed diesel = 7%
- Glycerin volume in Q1/2019 = 3.8 mil.kg. increased 15.29% price decreased 35.26% due to high competition

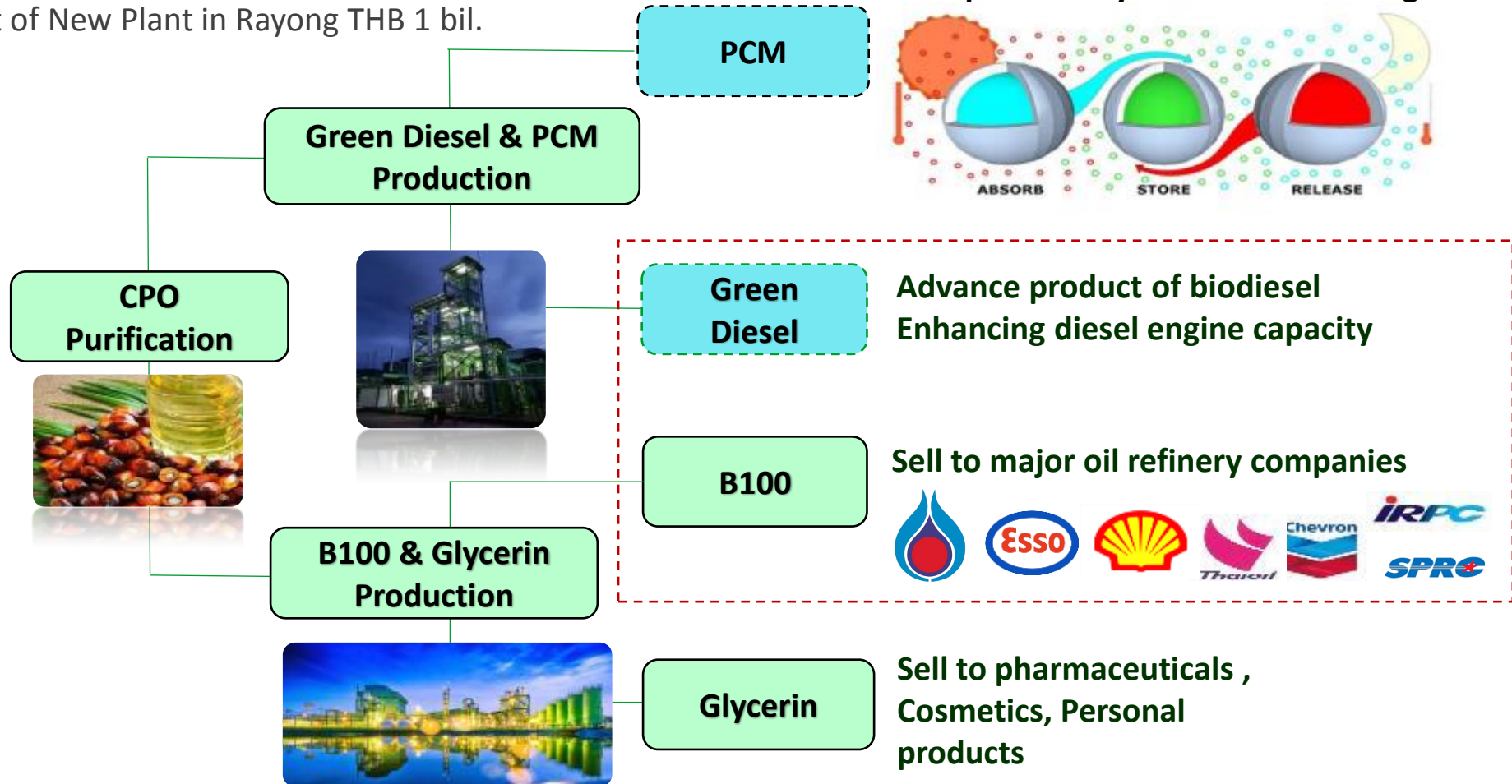


# Biodiesel Business

Started from B100 and pure glycerin then expand to higher value products, Green Diesel and PCM

Total feed capacity 130 tons/day

Total Investment of New Plant in Rayong THB 1 bil.



Phase I : = 65 tons (feed)/day to be completed within 2019

Phase II : To be completed within 2020

**BioPCM works as a thermal storage battery and is pre-frozen or warmed for a particularly hot or cold evening.**



**Green Diesel**  
Advance product of biodiesel  
Enhancing diesel engine capacity

**B100**  
Sell to major oil refinery companies



**Glycerin**  
Sell to pharmaceuticals,  
Cosmetics, Personal products

# Started new era of advance technology Energy Storage Business

- Started investing in Amita Technologies Inc., Taiwan in Dec 2016
- Dr. Jim Cherng established Amita Technologies Inc. in March 2000 to produce lithium-ion power battery with strong material science research and long test data accumulation supported by ITRI.\*
- Main Businesses
- High Power Battery for EV, E-Scooter, Power Plant
- OEM (Original Equipment Manufacturer)
- PDCA- Post Dry Cell Battery
- Turnkeys of High Technology Battery Factory for EV in Beijing
- Current production capacity and capability : 44Ah power battery cell or over 500MWh per year

\* ITRI, a nonprofit R&D organization of Taiwan, who played a vital role in Taiwan's economic growth, strengthen capabilities of innovation and cooperation with international partners all over the world.

Lynx E-Carver with  
Amita Batteries

has branched out into the sights of  
the energy storage applications market  
new strategic thinking electric....

youtube

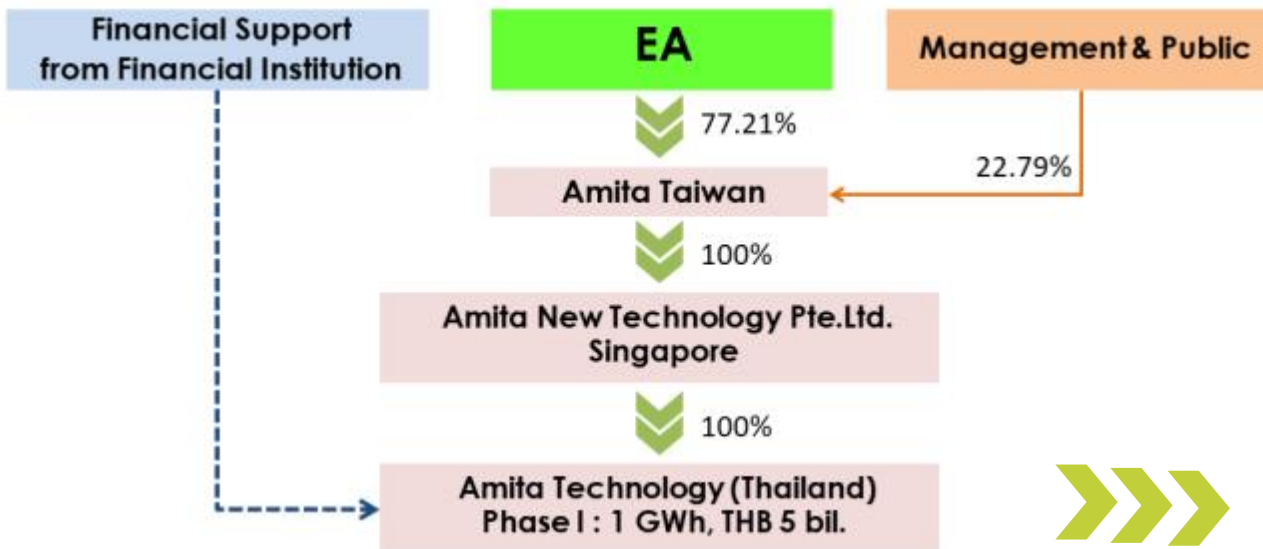
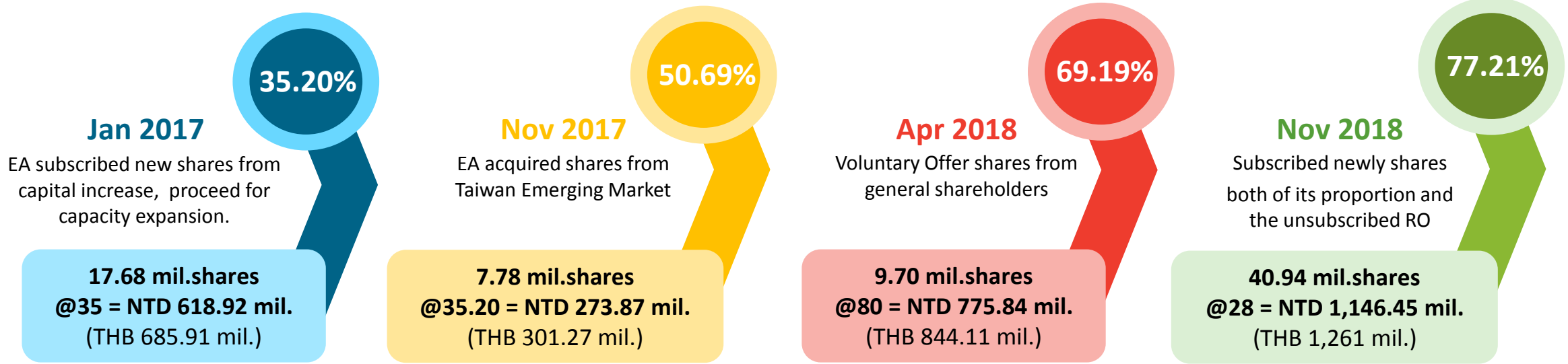


ESS

Passion for Charging Your  
Up Power Station



# Investment in Amita



**2017 R&D 100 WINNER**

### Technical Support from Strategic Partners

**Growatt**  
POWERING TOMORROW

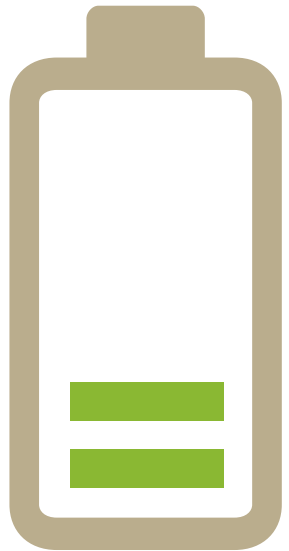
- Lead Power Control System (PCS) for Battery

**ITRI**  
Industrial Technology Research Institute

- One of the World's Leading Technology R&D
- Co-Developed STOBA Technology with Amita



# Energy Storage Factory



**1 GWh**

**2018-2019**

Phase I : EA group  
Start developing of  
1 GWh worth THB 5 bil.

**2020**

Phase I :  
Start commercial operation

**The production in Phase I at 1 GWh will be served to power plant to stabilize the system and to electric vehicle i.e. car and ferry.**

**Potential 50 GWh**

**Onwards**

Phase II :  
Potential partnership  
investment to expand the  
production further to meet  
growing demand





# Energy Storage Applications

## Mobile

### Electric Transport



Batteries for plug-in electric vehicles

Batteries for hybrid vehicles

Batteries for other electric vehicles (buses, train etc)

### Electronic Devices



Mobile Phones, Smart phones

Laptops

Power tools

Mobile games

## Stationary

### On/Off grid Storage



Storage for utilities

Used to shift energy produced

Useful for integrating intermittent energy source

Provide grid stability and range of other benefits

Low

Energy Requirements (kW or MW)

High

High

Technology & Market Maturity

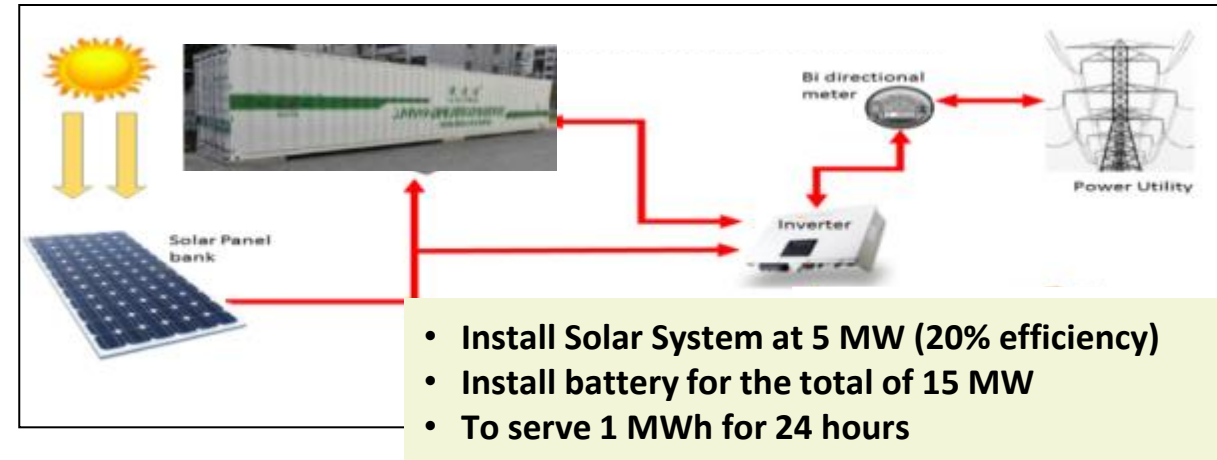
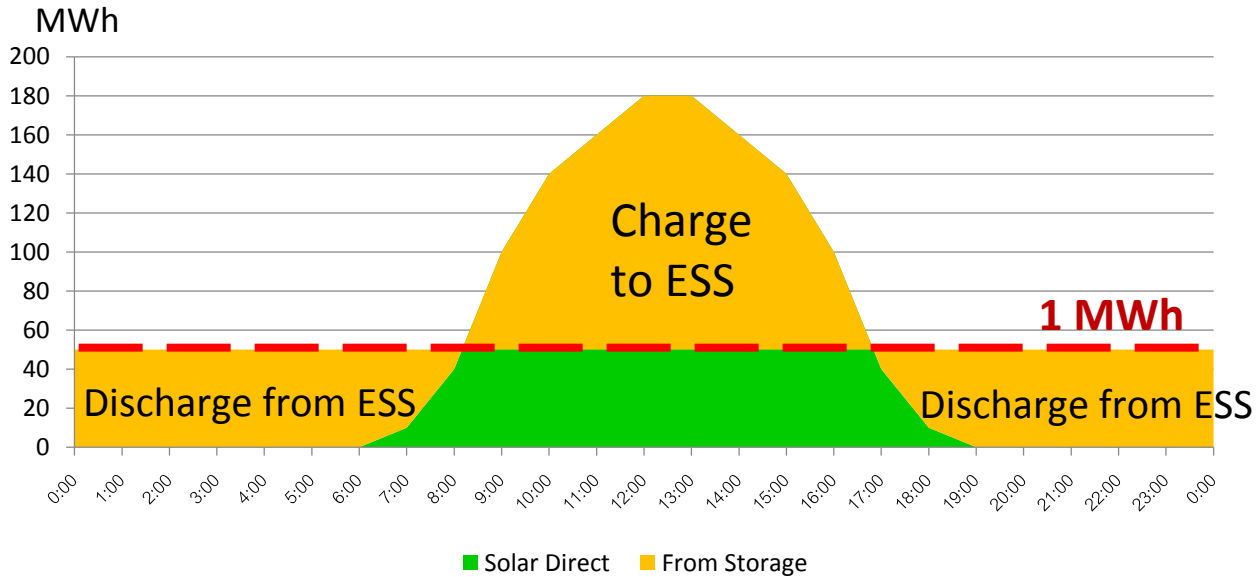
Low



EA's 50 GWh energy storage factory is planned to set up in EEC zone with strongly supported under BOI best scheme and EEC promotion as a quick win project in New S-curve

Industrial Technology Research Institute (ITRI), EA and Amita, Taiwan agreed to co-develop new technology of battery with high safety for EA's new 50 GWh factory.

# Example Of Solar System + Battery at 50 MWh



This model is suitable for remote area i.e. island, mountain, rural, desert to serve independently. Thus it can help reduce the huge investment cost in electrical transmission line from main power plant.



# Rolling out 1,000 EV Charging station

Partnership investment with landlord to secure strategic location and roll out 1,000 charging stations with mobile application



# Launch the First Thai EV

MINE SPA 1 : 5 seat MPV with 30 kWh lithium-ion battery for up to 200 km. drive range/charge (15 minutes with quick charger)



In the event, EA signed an MOU with Suvarnabhumi Pattana Credit Union Cooperative Limited, taxi service operator, for a prior subscription of 3,500 units



# Launch Electric Ferry

800 kWh battery, for 200 Passengers  
Clean and safe transportation along Chao Phraya River

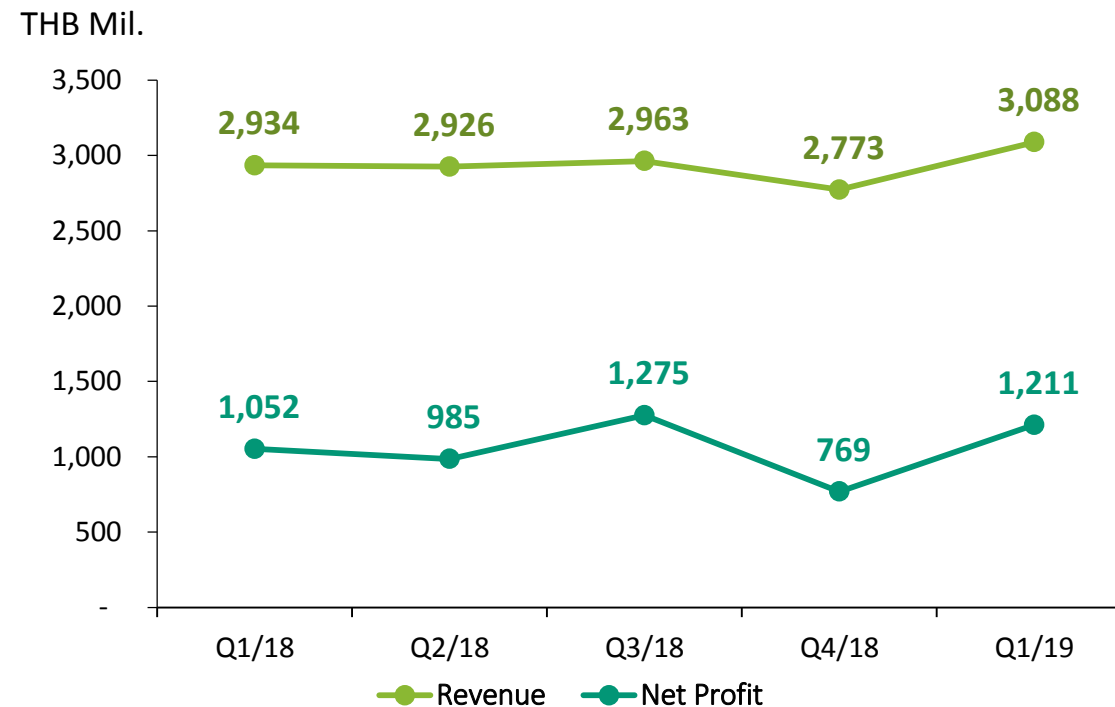
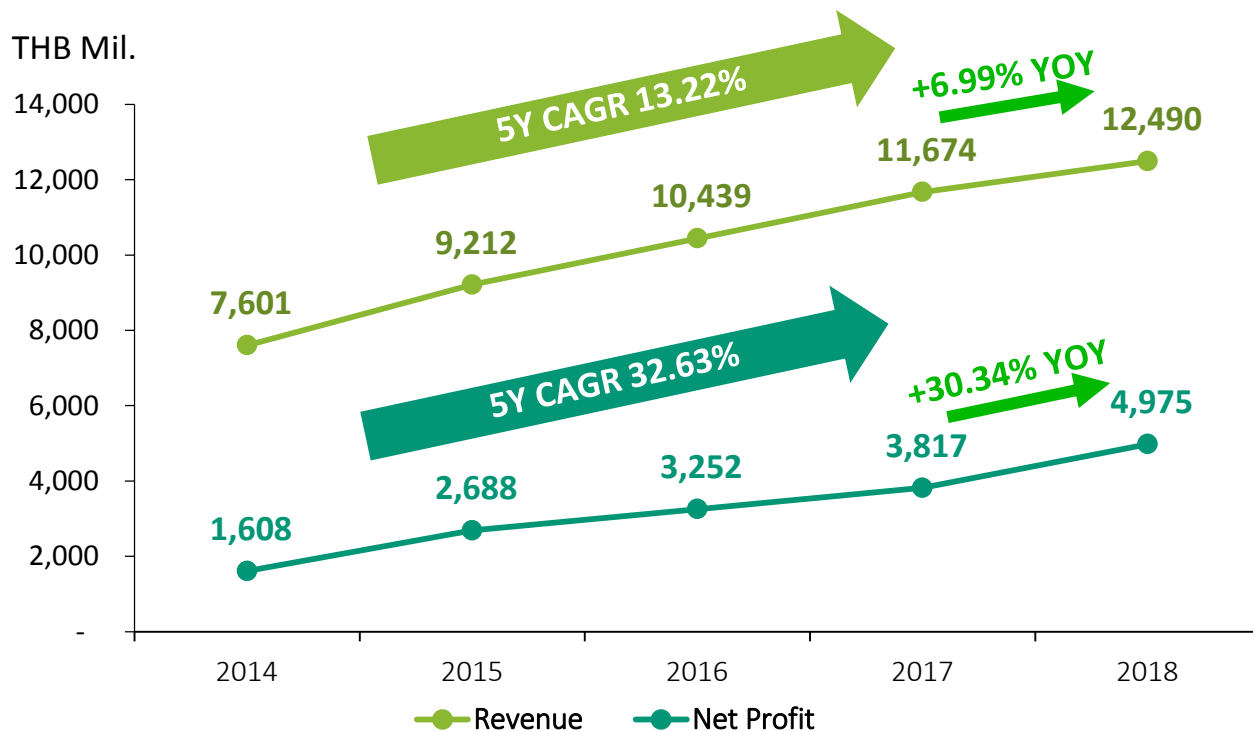
$\frac{2019}{22} + \frac{2020}{20} = 42$   
**E-Ferry**  
THB 1 billion



การรถไฟฟ้าขนส่งมวลชนแห่งประเทศไทย  
Mass Rapid Transit Authority of Thailand



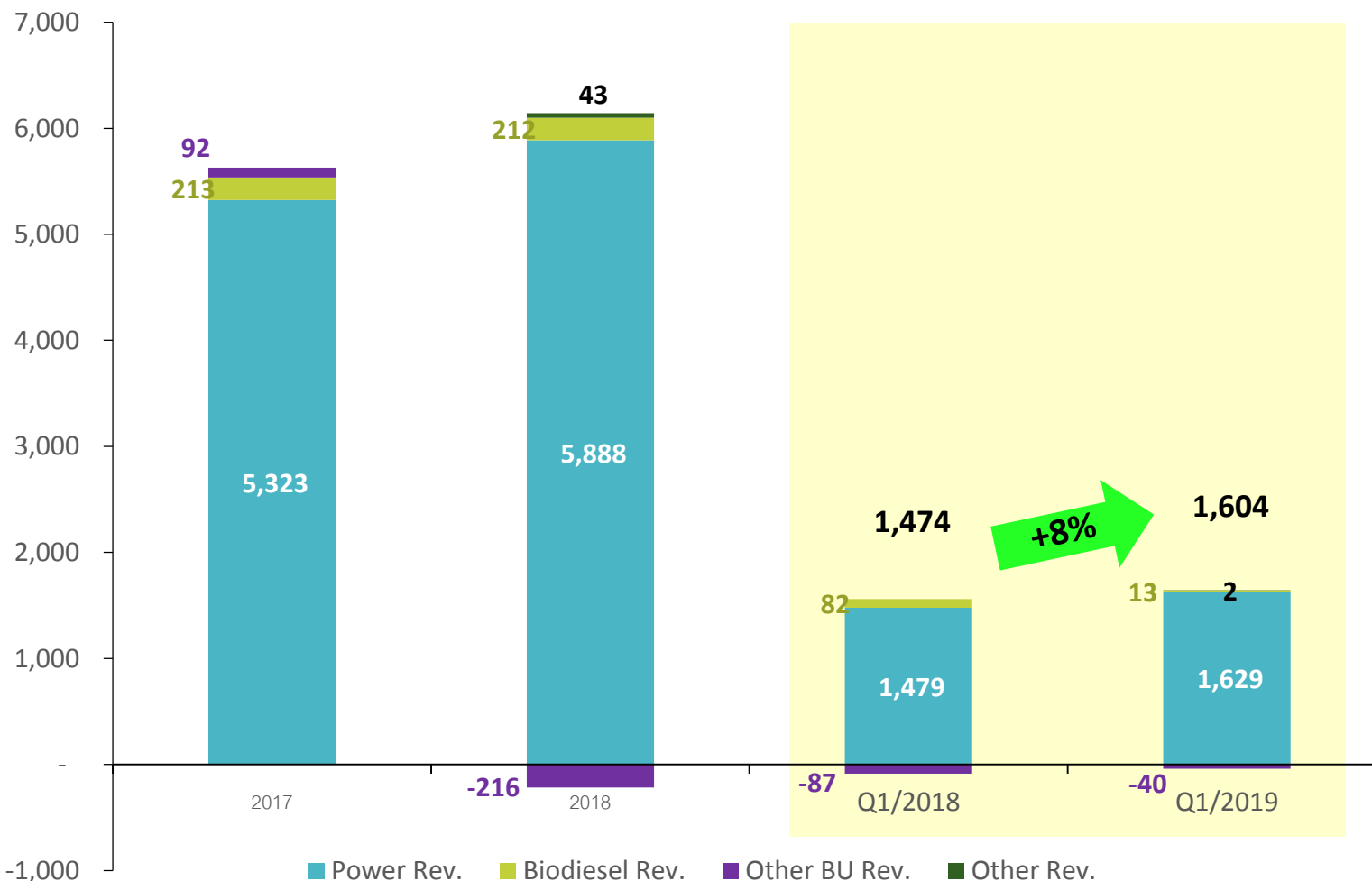
# High Growth from Renewable Power



- **Revenue from normal business operation in 2018** : THB 11,596 mil. Decreased 0.67% resulted from high competition and over supply in Bio diesel business
- **Net Profit from normal business operation in 2018** : THB 4,166 mil. Increased 9.15% resulted from full operation of Wind Power plant in 2018
- **High revenue and net profit in Q1/2019** : resulted from high power production of HKH and COD of HNM

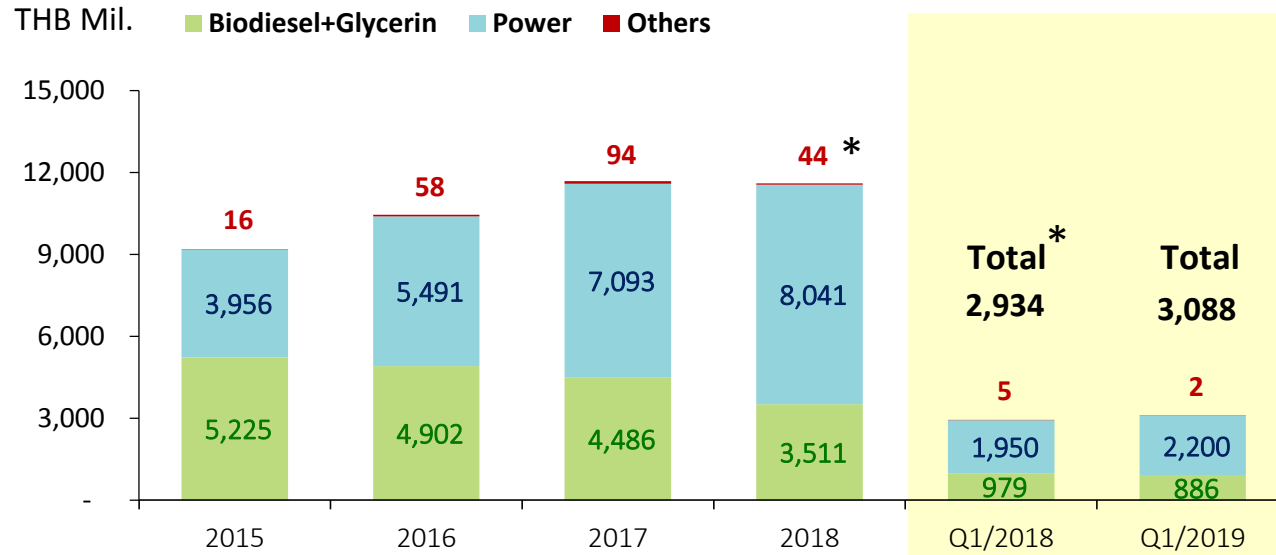
# Gross Profit Margin Q1/2019

THB mil.

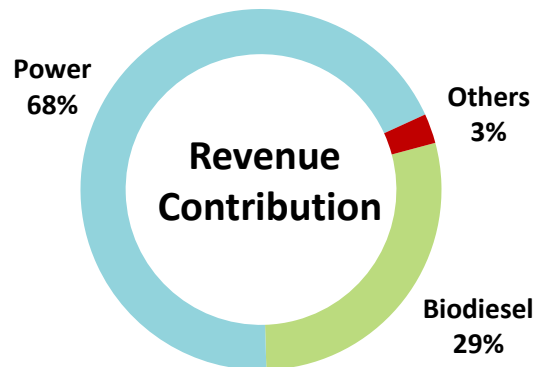


Gross Profit Margin	Q1/18	Q1/19
<b>Biodiesel BU.</b>	2%	8%
<b>Note:</b>		
<ul style="list-style-type: none"> <li>Decreasing from COGS because of lower AVG price of CPO</li> <li>Decreasing from glycerin price while COGS is stable.</li> </ul>		
<b>Power BU.</b>		
• <b>Solar</b> (Increasing price from adj. Ft)	82%	82%
• <b>Wind</b> (HNM COD since Jan 2019)	62%	64%
<b>Total GPM</b>	<b>50%</b>	<b>52%</b>

# Growth from Power Business



\*In 2018, Excluding 894.58 mil.bt. from accounting gain on business combination achieved without the transfer of consideration (AMITA)



## Power Business : contribution 68%

- Total capacity was 584 MW comprised of 278 MW of solar and 306 MW of wind
- **Solar** : Sale volume are the same as previous year while average selling price per kWh increase due to the increase of ft. Total revenue from Solar was increased 1.00%
- **Wind** : The revenues increased by THB 213.35 mil. (or +11.19%) due to Hanuman 1, 8, 5, 9 wind power plants totaling of 180 MW started COD on Jan 25, Mar 22 and Mar 30. The remaining of HNM 10 for 80 MW started COD in Q2/2019.

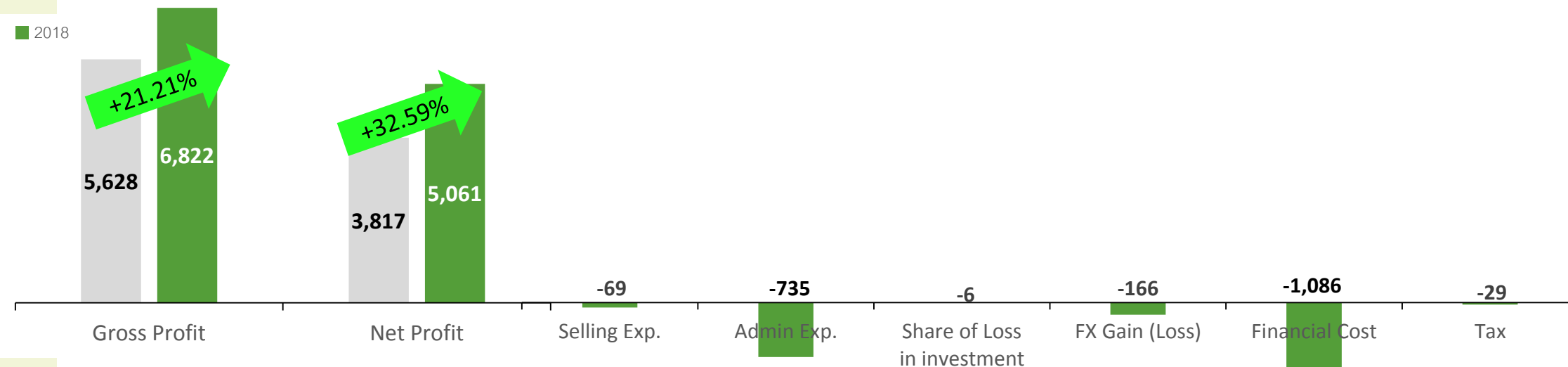
## Biodiesel Business : contribution 29%

- **B100** : Total sale volume increased 15.72% and average selling price decreased 19.98% resulted from over supply of crude palm oil that effected the total market
- **Glycerin** : Revenue from Glycerin decreased 25.36% effected from the decrease of selling price by 35.26% while increase of sale volume compared to the same period in previous year by 15.29%

# Effects on Net Profit

## YOY

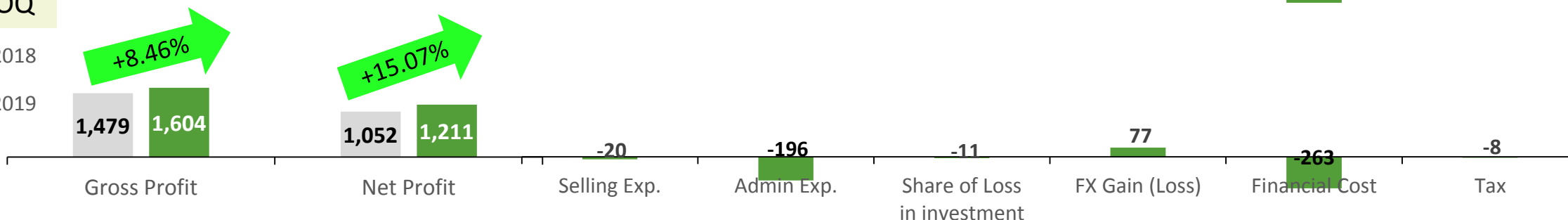
■ 2017 ■ 2018



## QOQ

■ Q1/2018 ■ Q1/2019

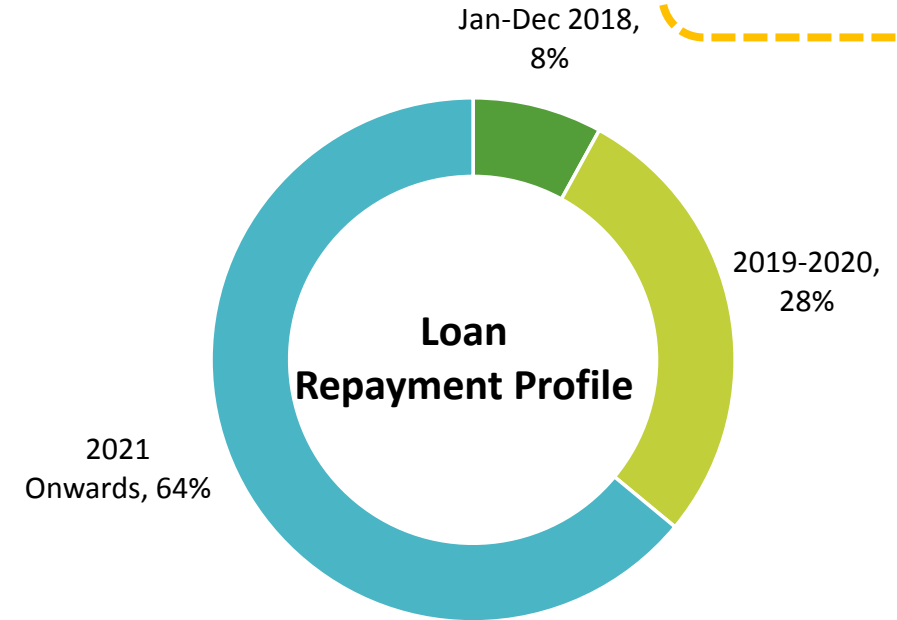
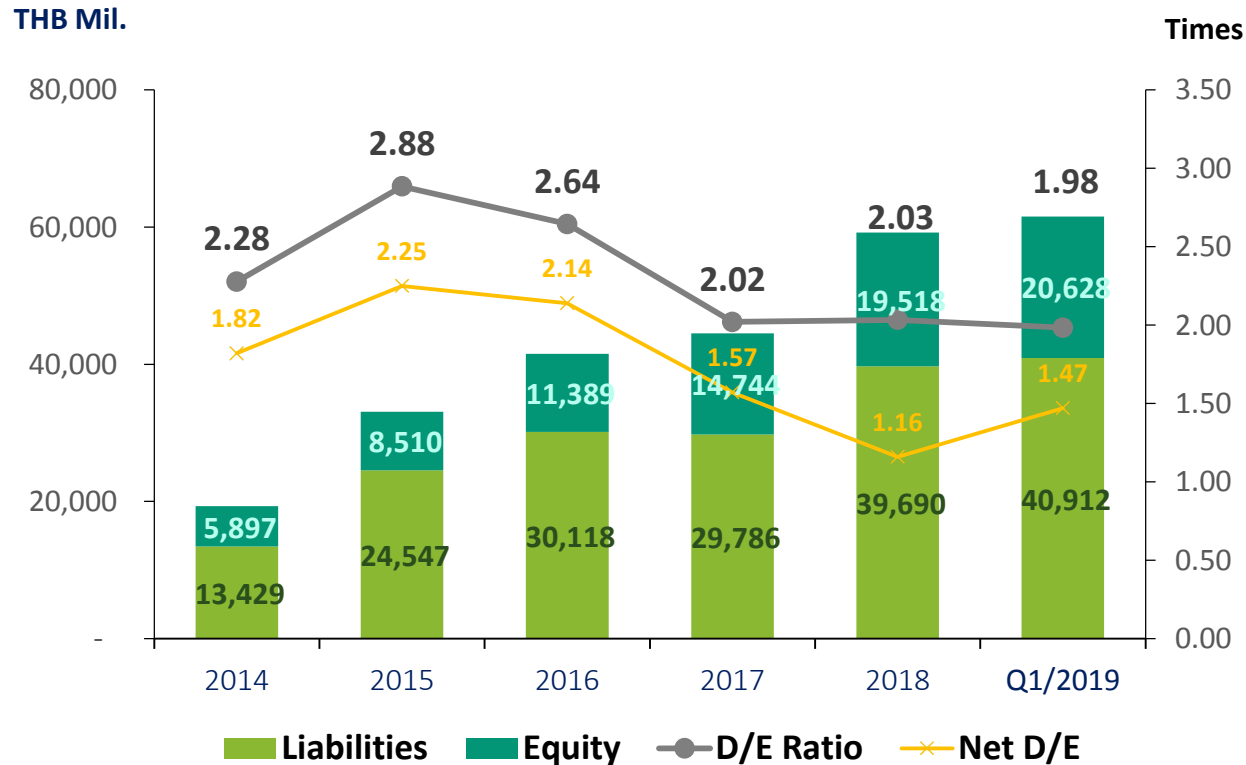
■ Q1/2019



- Total admin expense THB 196.46.76 mil. (+THB 25.93 mil. ) from personal exp. THB 8.91 mil. and PR, advertising and activities expenses including R&D expenses from subsidiaries THB 17.02 mil. to promote new businesses following to EA's strategic plan.
- Finance cost decreased by THB 25.62 mil. (-8.87%) mainly from capitalization of some finance costs to construction in progress of Hanuman Project.



# Source of Fund Management

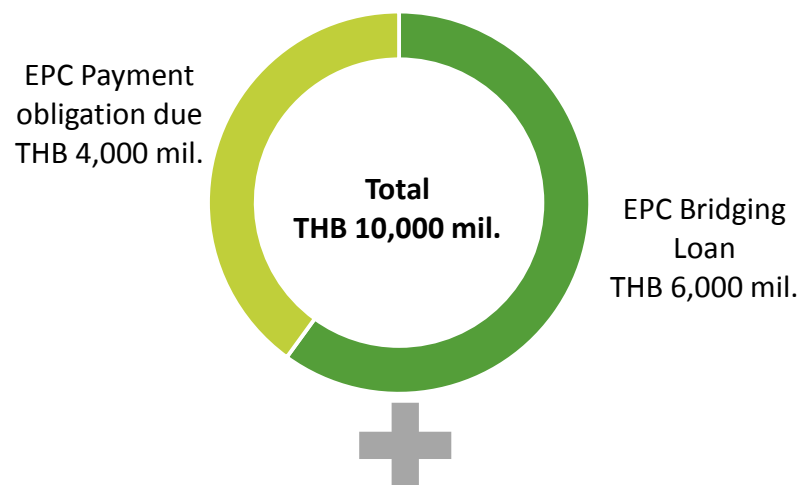


Debentures	Amount	Maturity	Interest rate
Tranche 1: Partial secured	THB 1,000 mil.	Jul 2019	fixed 2.36%
Tranche 2: Fully secured	THB 3,000 mil.	Jul 2020	fixed 2.22%
Tranche 3: Fully secured	THB 4,000 mil.	Jul 2021	fixed 2.37%

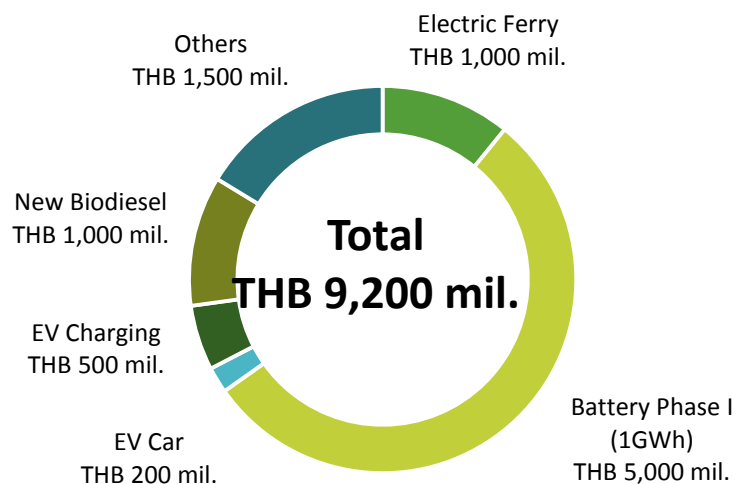
Loan	Debt O/S (mil.bt)	Interest rate
<b>EA</b>	<b>16,200</b>	
• S/T Loan	2,500	1.89% - 2.45%
• L/T Loan	5,700	2.77% - 3.74%
• Debenture	8,000	2.22% - 2.37%
<b>Subsidiaries</b>	<b>18,400</b>	3.30% - 4.50%
<b>Total</b>	<b>34,600</b>	

# Investment Plan in 2019-2020

## Remaining CAPEX for Hanuman Wind Farm Project



## New Investment



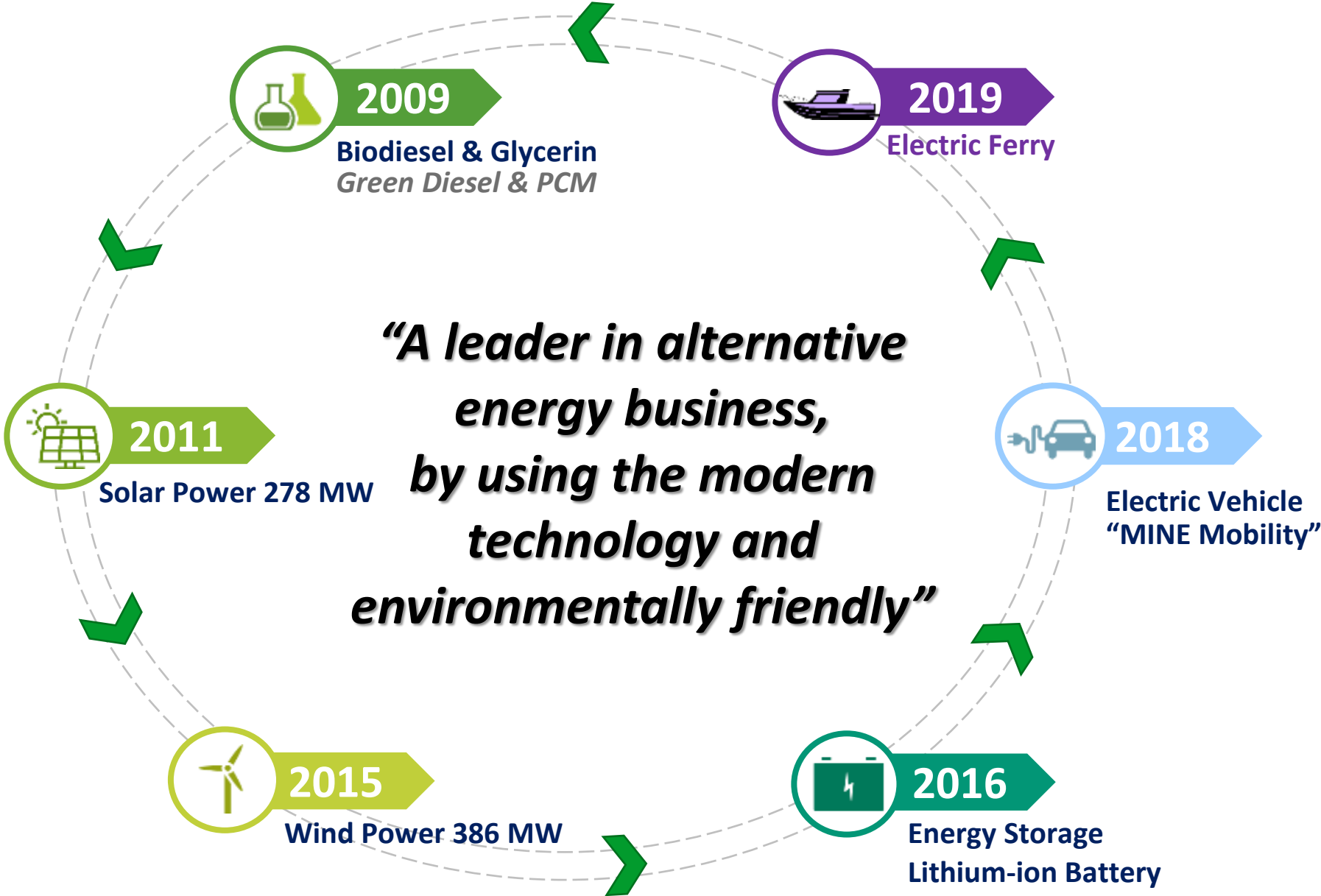
Remaining CAPEX	Progress	Source of Fund
Hanuman Wind Farm Project (Associated development/construction costs )	Already COD since Early 2019	Internal Cash + Supplier Credit

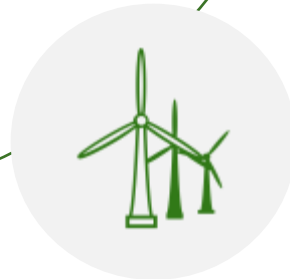
Investment Plan	Progress / Target	Source of Fund
Biodiesel Business (Including Expansion + Green Diesel + PCM)	To be completed in 2019	Internal cash + long term debt
Energy Storage Phase I : 1GWh (Including infrastructure)	Ordered machinery, under construction To be completed in Q1/2020	Internal cash + long term debt
Electric Ferry (54 unit)	To be completed the first 20 units in Dec 2019	Internal cash + long term debt
EV Car (MPV 5,000 unit)	Release 5,000 cars starting from Q1/2020	Internal cash
EV Charging 1,000 stations	Achieved 200 Stations in 2018	Internal cash

## Sources of financing

Net cash	THB 4,000 mil.
Operating Cash in Flow in 2019	THB 9,000 mil.
New issue of Debentures and/or Long term financing	THB 15,000 mil.

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