

Financing Trend Thailand POWER Sector

November 2018

Infrastructure

Transportation

roads, rails, mass
transit, ports, airports

Water supply

water supply, waste
water management

Electricity supply



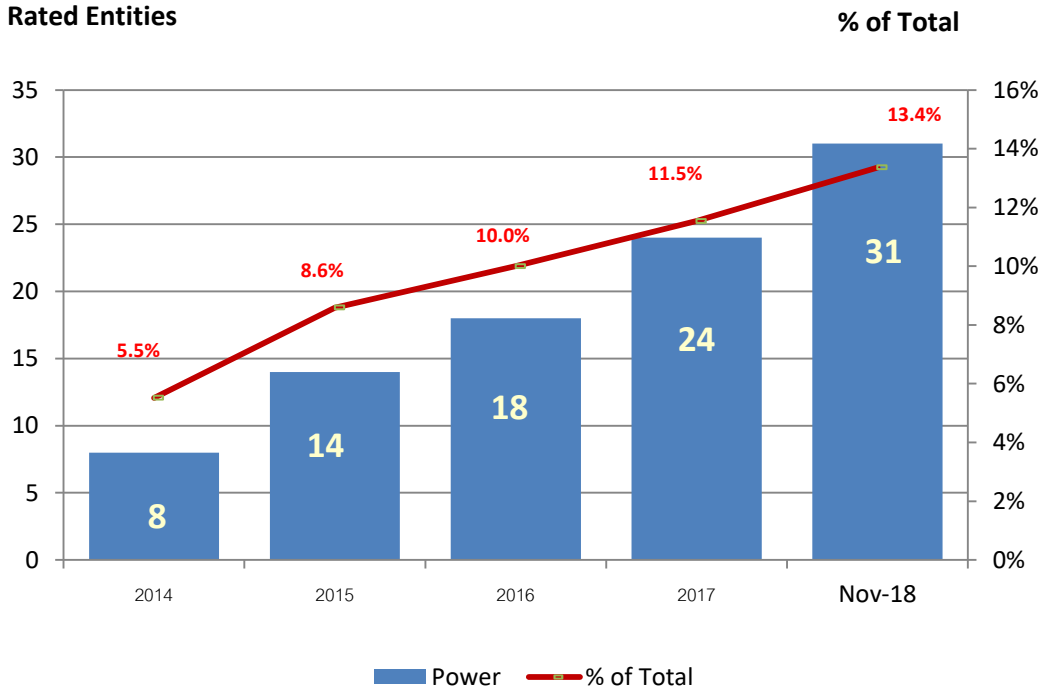
Electric power generation,
transmission

Telecommunications

Broadband connectivity

Rated Power Entities

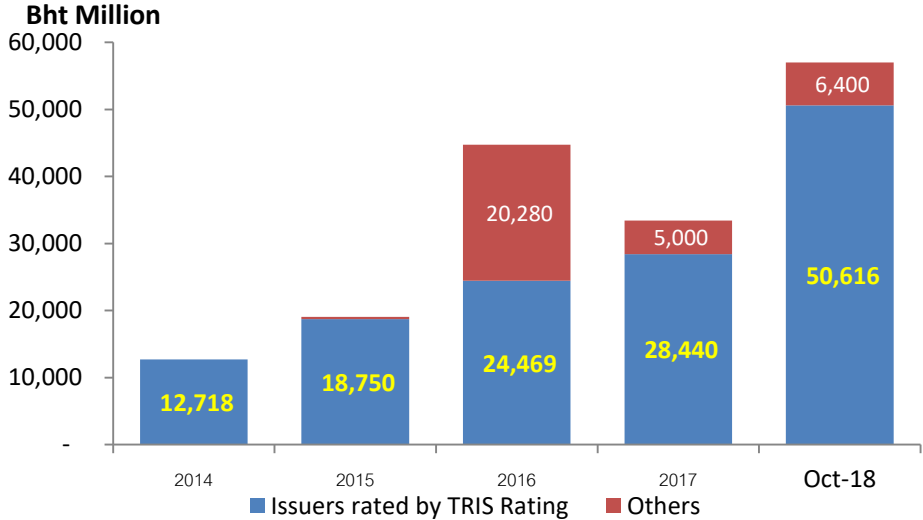
Entities rated by TRIS Rating	2014	2015	2016	2017	Nov-18
Power	8	14	18	24	31
Total	145	163	180	208	232
% of Total	5.5%	8.6%	10.0%	11.5%	13.4%



- Number of rated power entities sharply increased over past four years
- Power companies make up around 25% of newly rated entities each year
- Rising proportion of rated entities from power sector

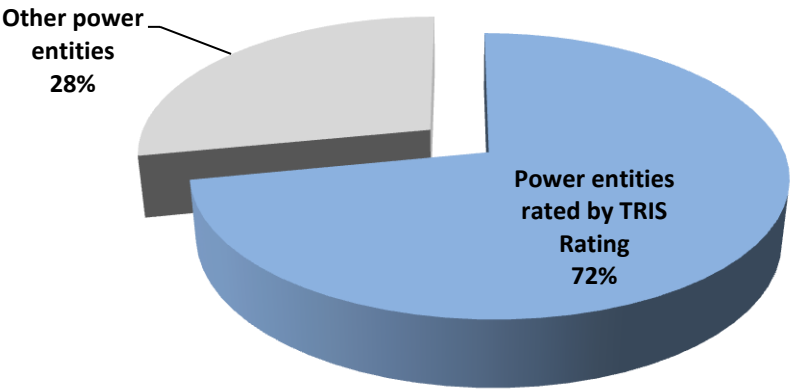
Power Sector Bonds Rated by TRIS Rating

Value of Bonds by Power Companies



- As of Oct. 2018, **88%** of aggregate value of bond issuances in the power sector are rated TRIS Rating.

Power Generation Capacity via EGAT GRID (MWe)

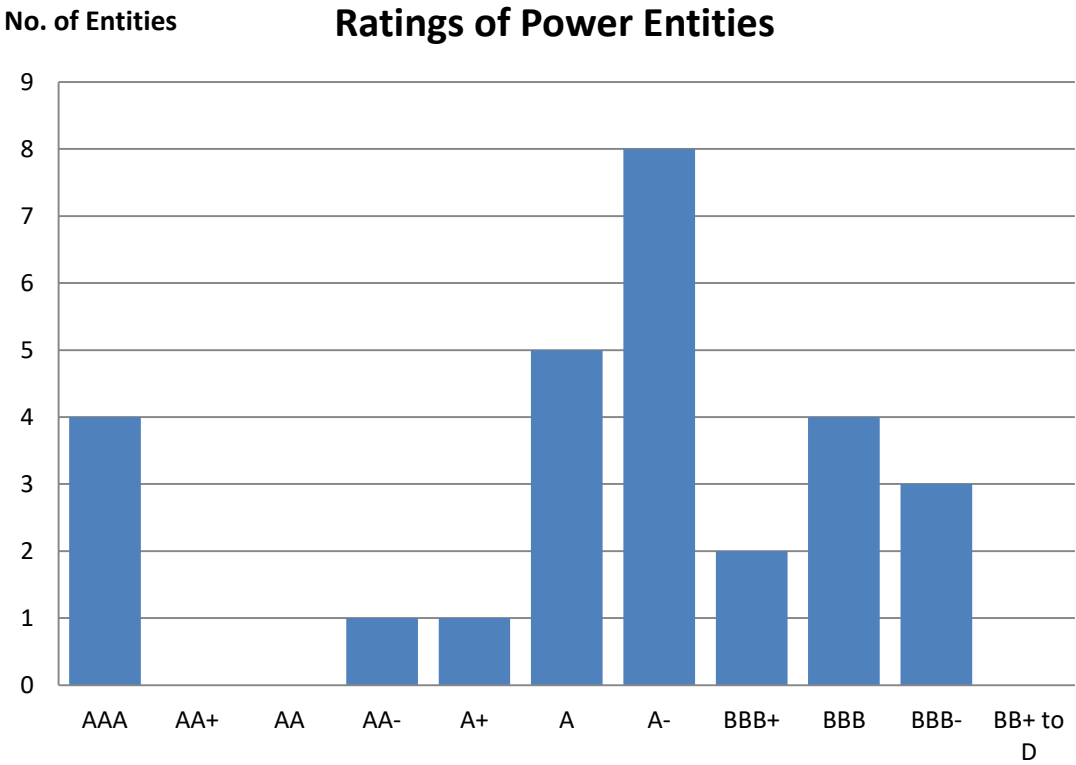


- Power entities rated by TRIS Rating represents **72%** of total power generation capacity connected to EGAT grid as of Dec-17.

- TRIS Rating also covers renewables (VSPPs), which sell electricity to PEA, and MEA.

Source: TRIS Rating

Ratings Distribution



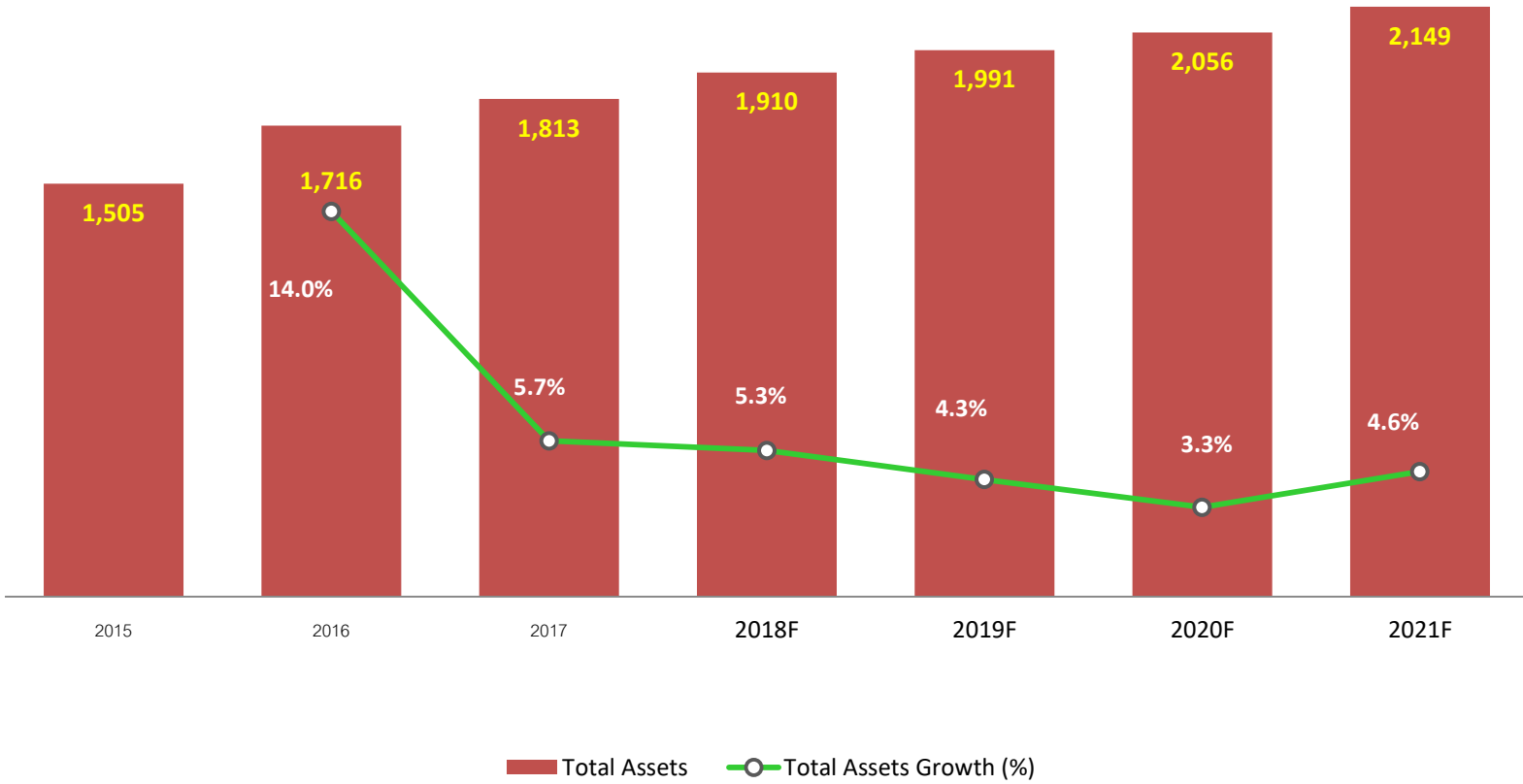
- Range from large and long-established operators to small-sized new comers
- From conventional fossil fuels to renewables
- Top electricity generators (e.g. EGAT, RATCH, GLOW)
- No. of rated entities : 28

Source: TRIS Rating

Power Sector Growth

Baht Bil.

Total Assets & Growth

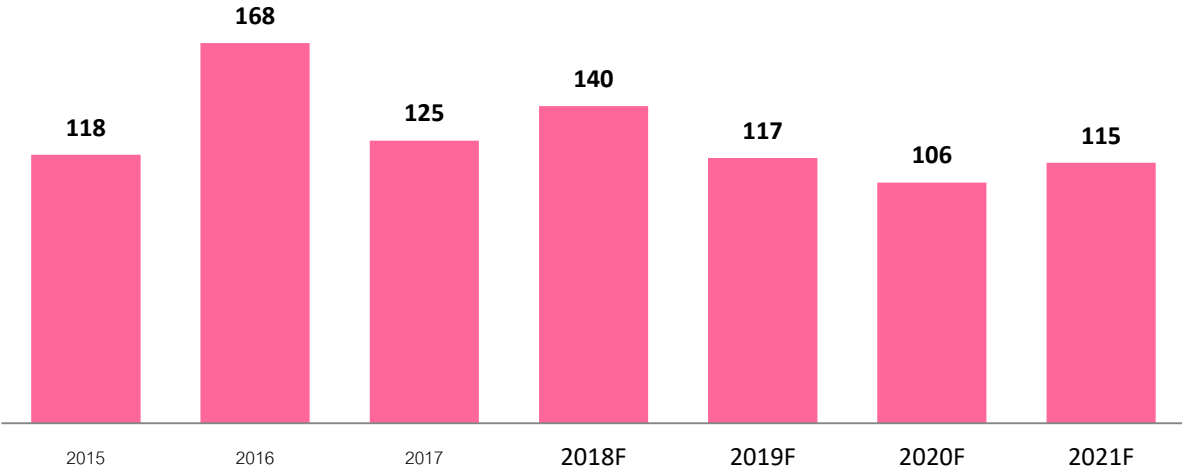


28 rated entities

Source: TRIS Rating

Investment by Rated Power Entities

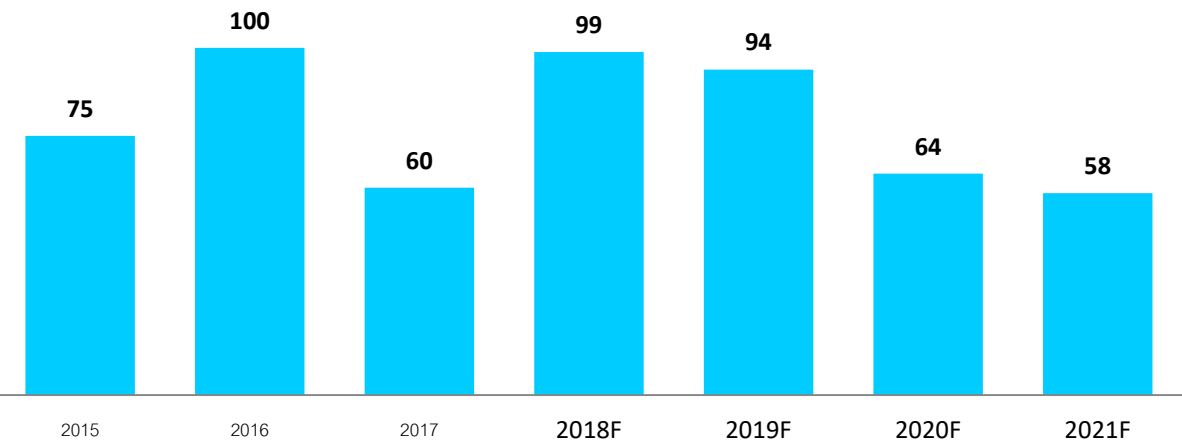
Investment and CAPEX (Bt. bil.)



28 rated entities

- Estimated investments and CAPEX for the whole sector

Investment and CAPEX (Bt. bil.)

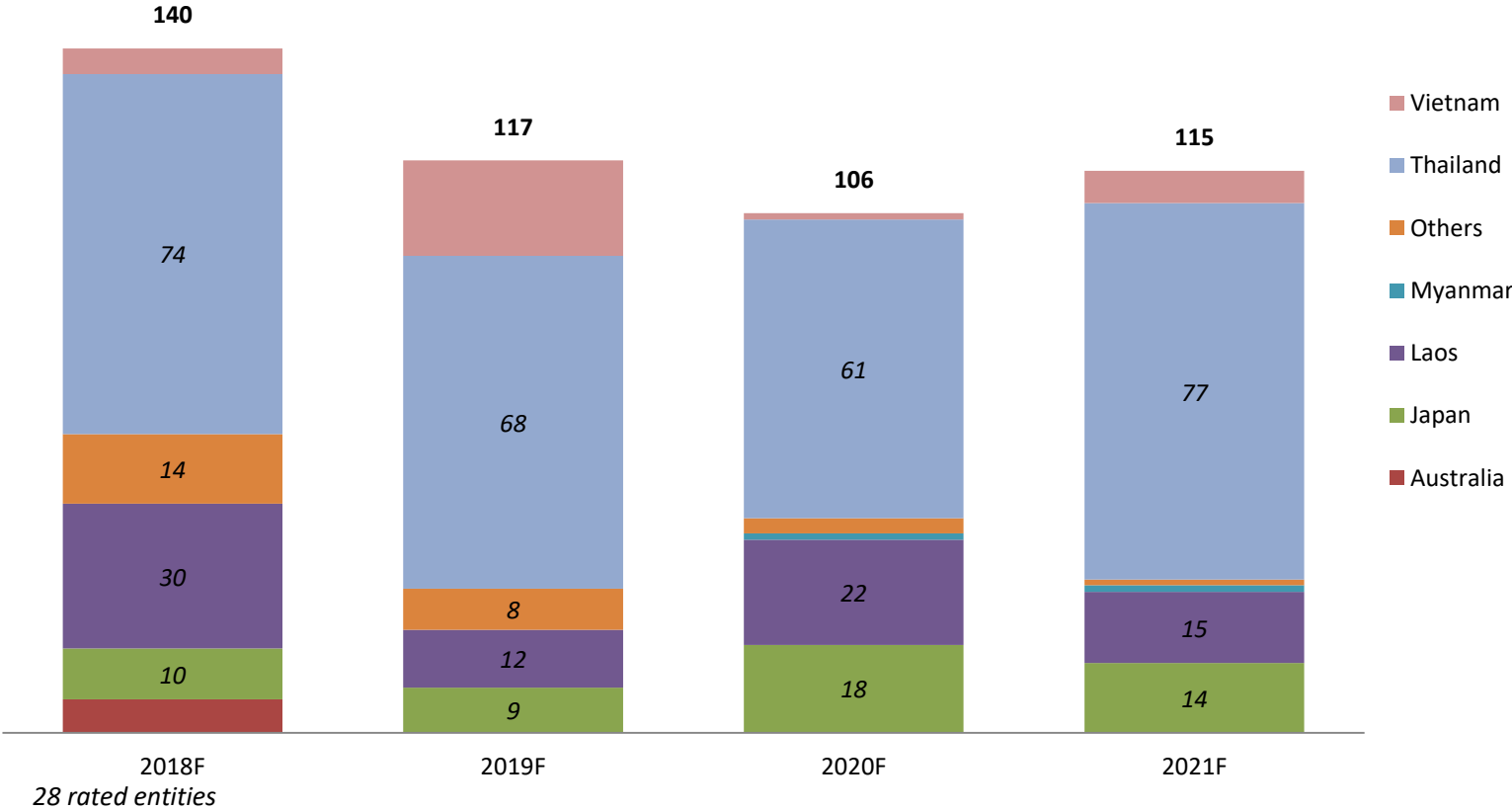


Excluding EGAT, EDLGEN

- Estimated investments and CAPEX by private power companies

Offshore Investment

Investment and CAPEX by country (Bt. bil.)



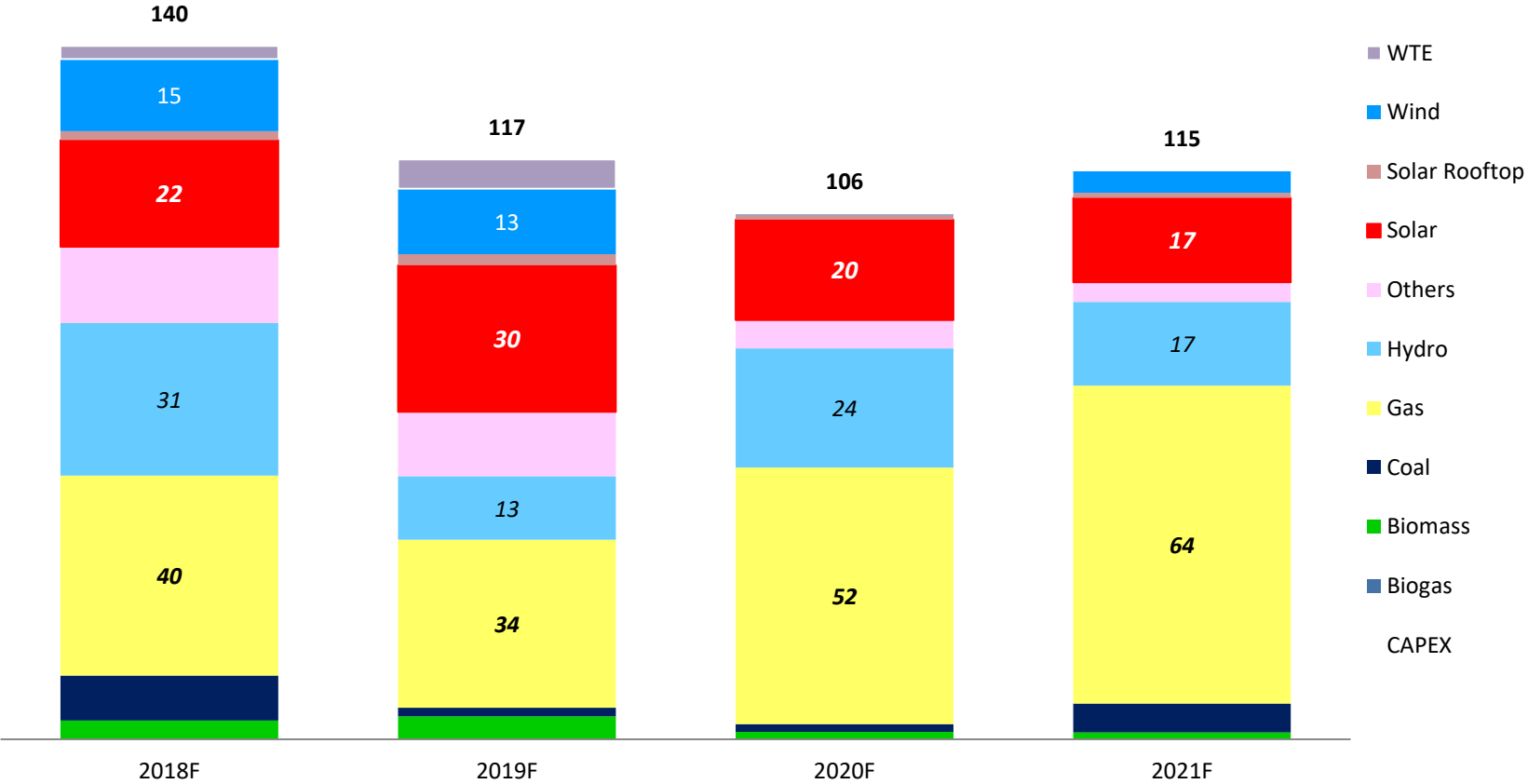
- Domestic power investments account for about 50%-60% for 2018-2021.
- With limited domestic investment opportunities, power companies are increasingly looking for opportunities outside Thailand for business expansion

Source: TRIS Rating

New Investment

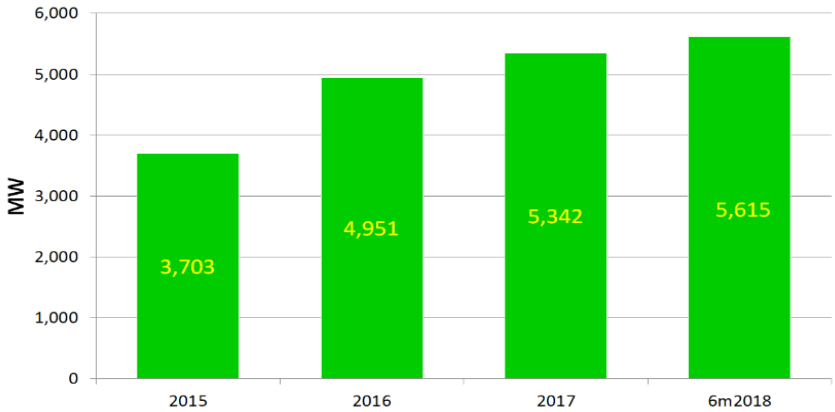
28 rated entities

Investment and CAPEX by Energy Source (Bt. bil.)

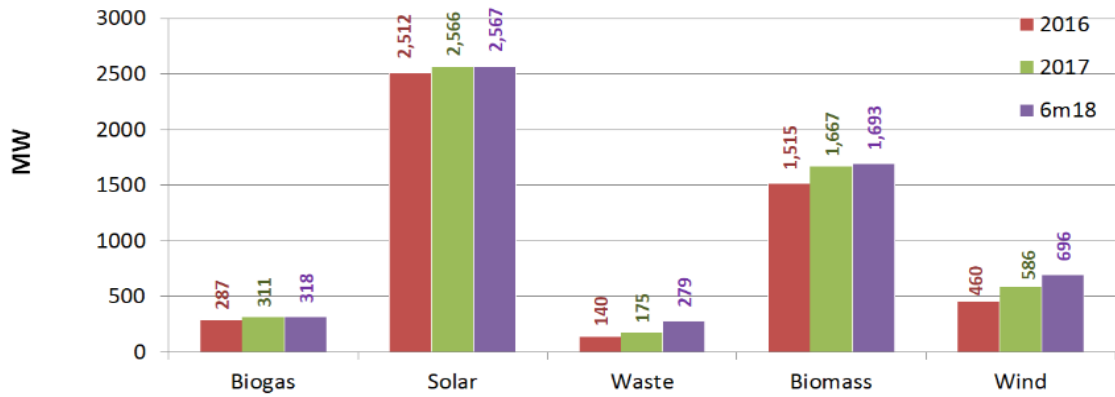


Renewable Power

Renewable Power Capacity of Thailand



EGAT capacity does not included
Source: ERC

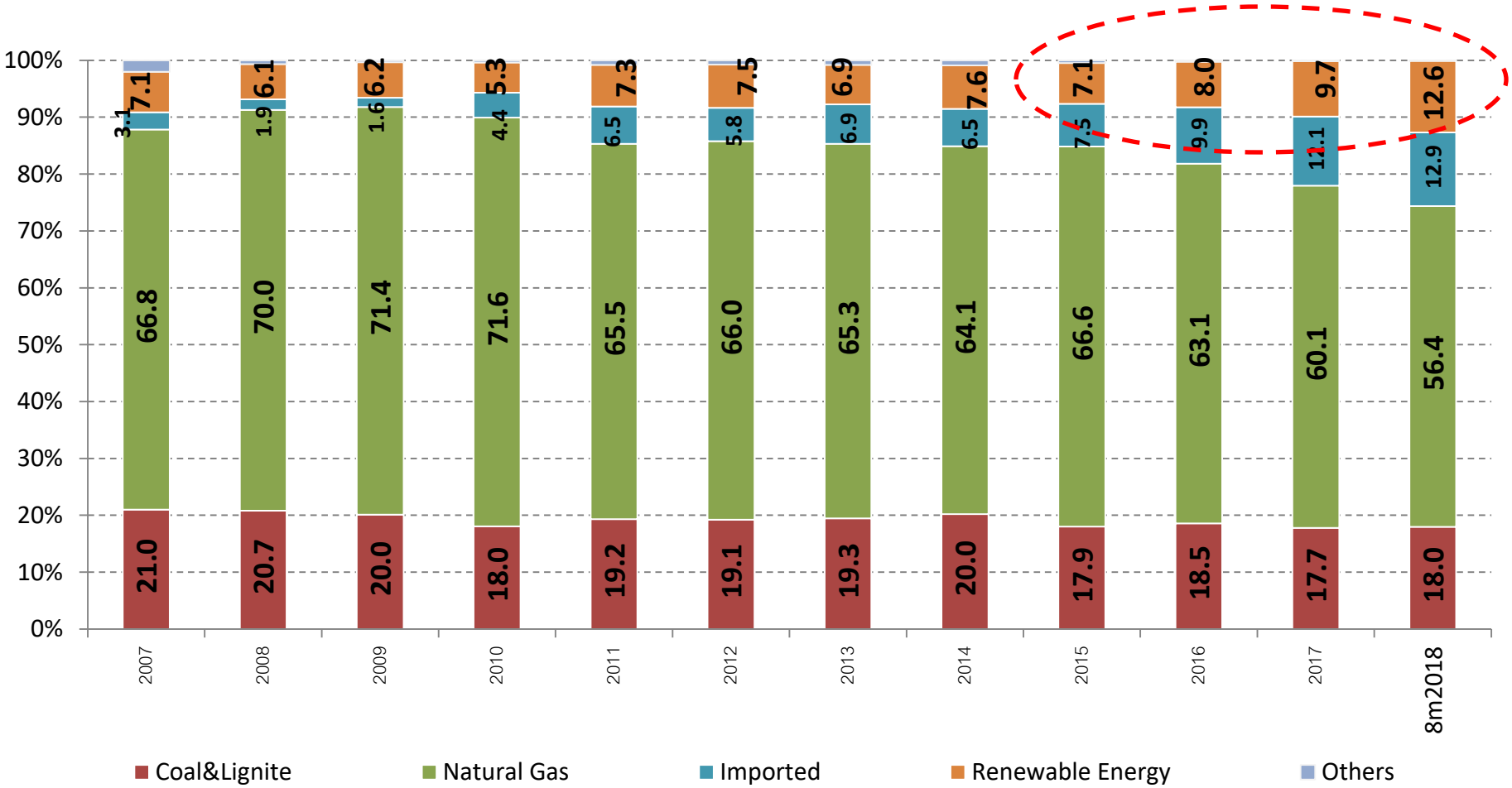


Wait for COD (MW)	Biogas	Solar	Waste	Biomass	Wind
	54	146	96	449	847

EGAT capacity excluded
Source: ERC, แผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก (AEDP)

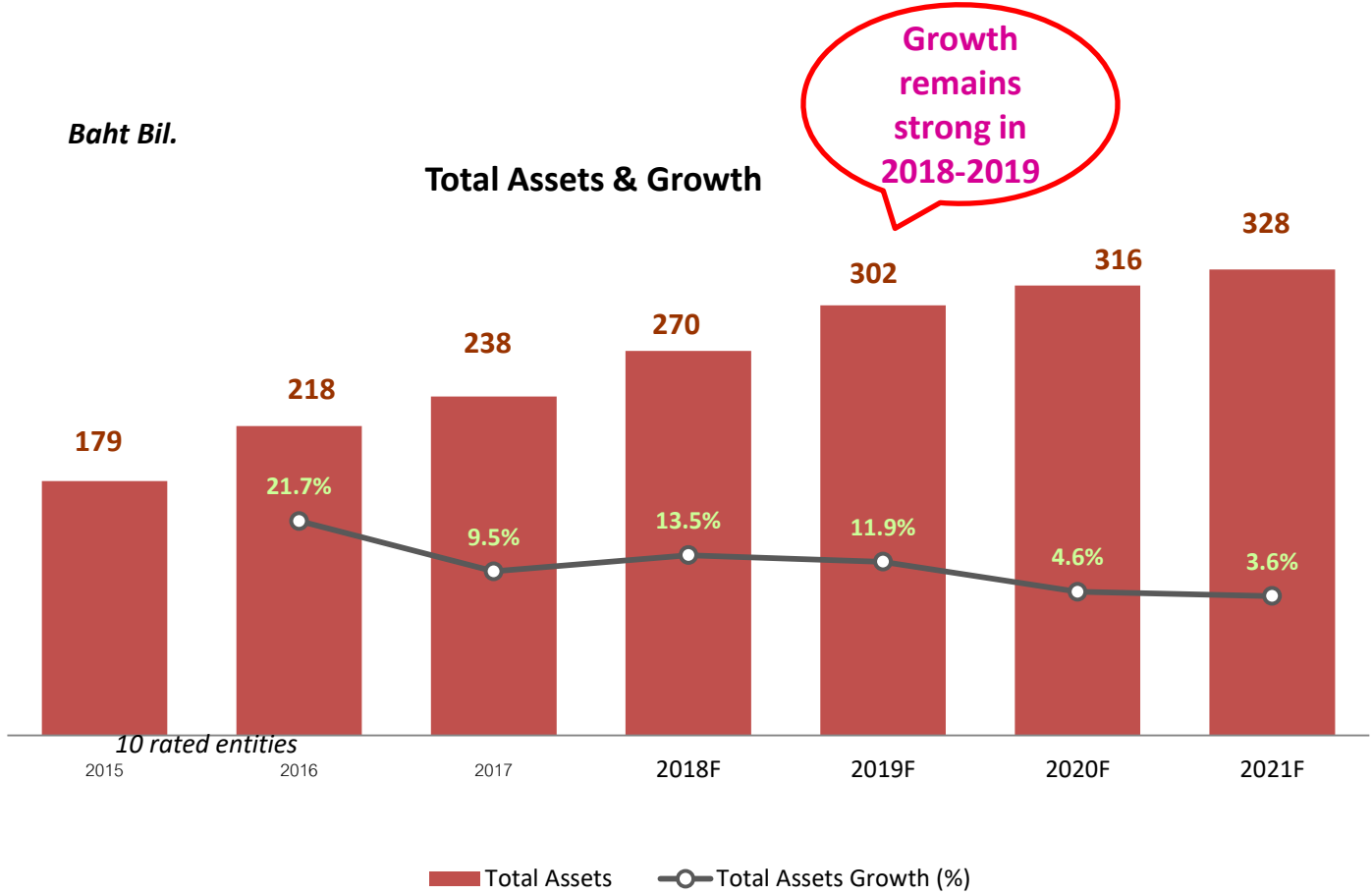
- Growing capacity of renewables
- Solar power makes up 45% of current capacity.
- Solar power reach around half of PDP target (i.e. approx. 3,000 MW vs 6,000 MW target at the end of 2036)

Electricity Generation for EGAT Grid



Source: EPPO

Rated Renewable Power Companies



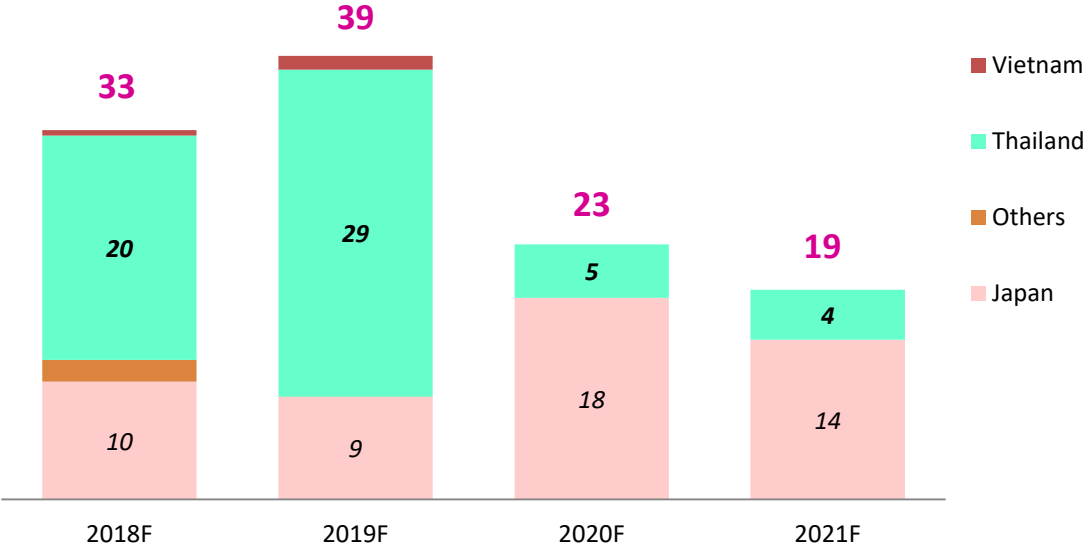
Growth remains strong in 2018-2019

- Include **10** rated entities that primarily engage in renewable power generation (Exclude entities with power-generating assets primarily for fuels and hydro power)

Source: TRIS Rating

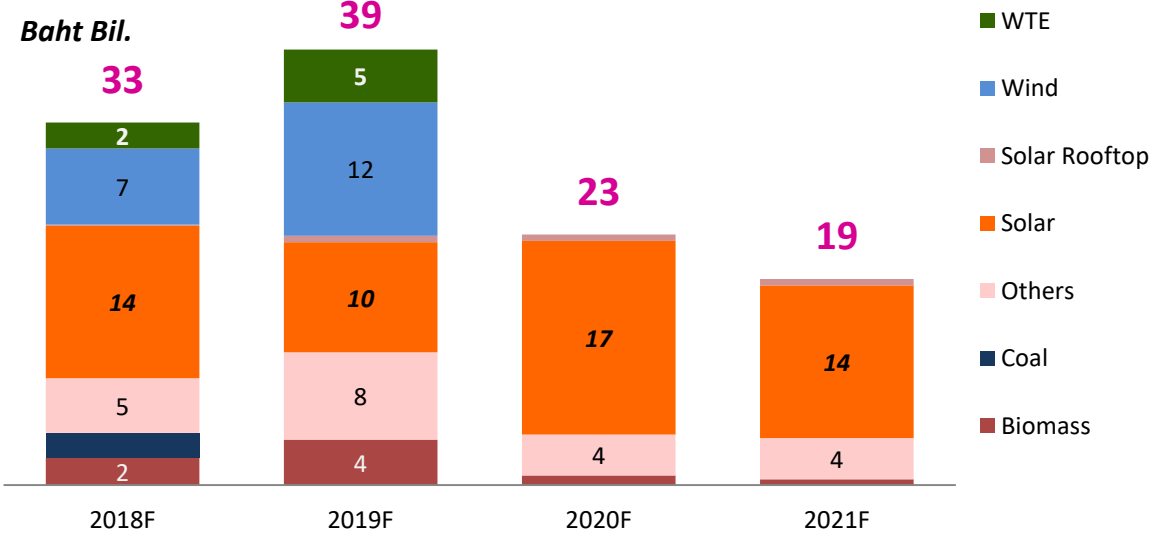
Investment by Rated Renewables

Baht Bil. Investment and CAPEX by country

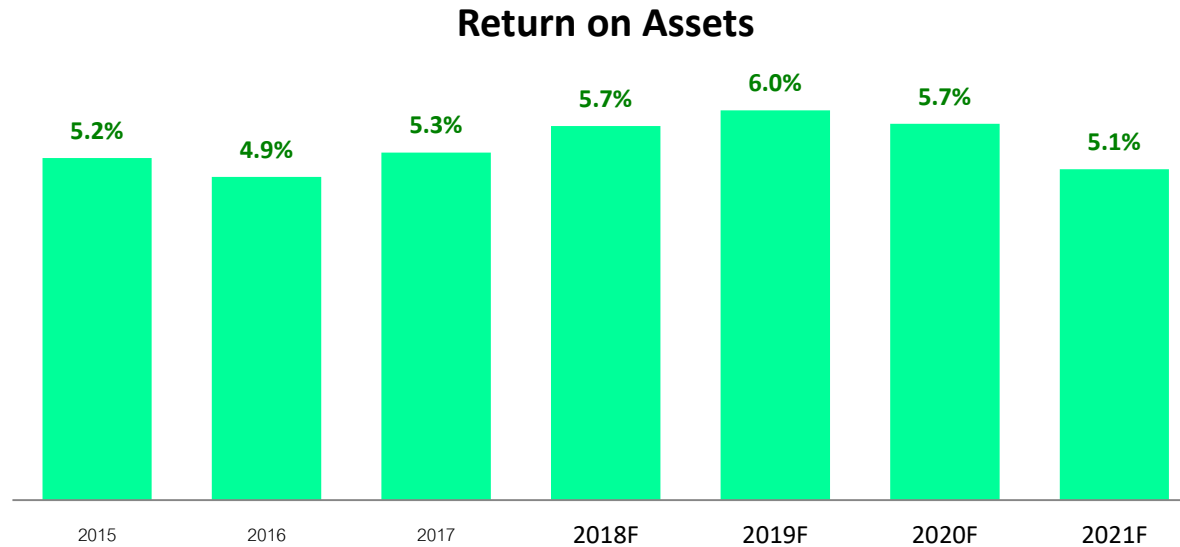


- Investments expand from simple solar power towards more challenging and complex projects such as WTE, biomass.
- Yet solar power maintains the largest portion
- Significant investments in solar power in Japan
- We are seeing more investments in Vietnam, given the lack of domestic opportunities, and currently unfavorable Japan tariffs for solar projects

Baht Bil. Investment and CAPEX by Energy Source



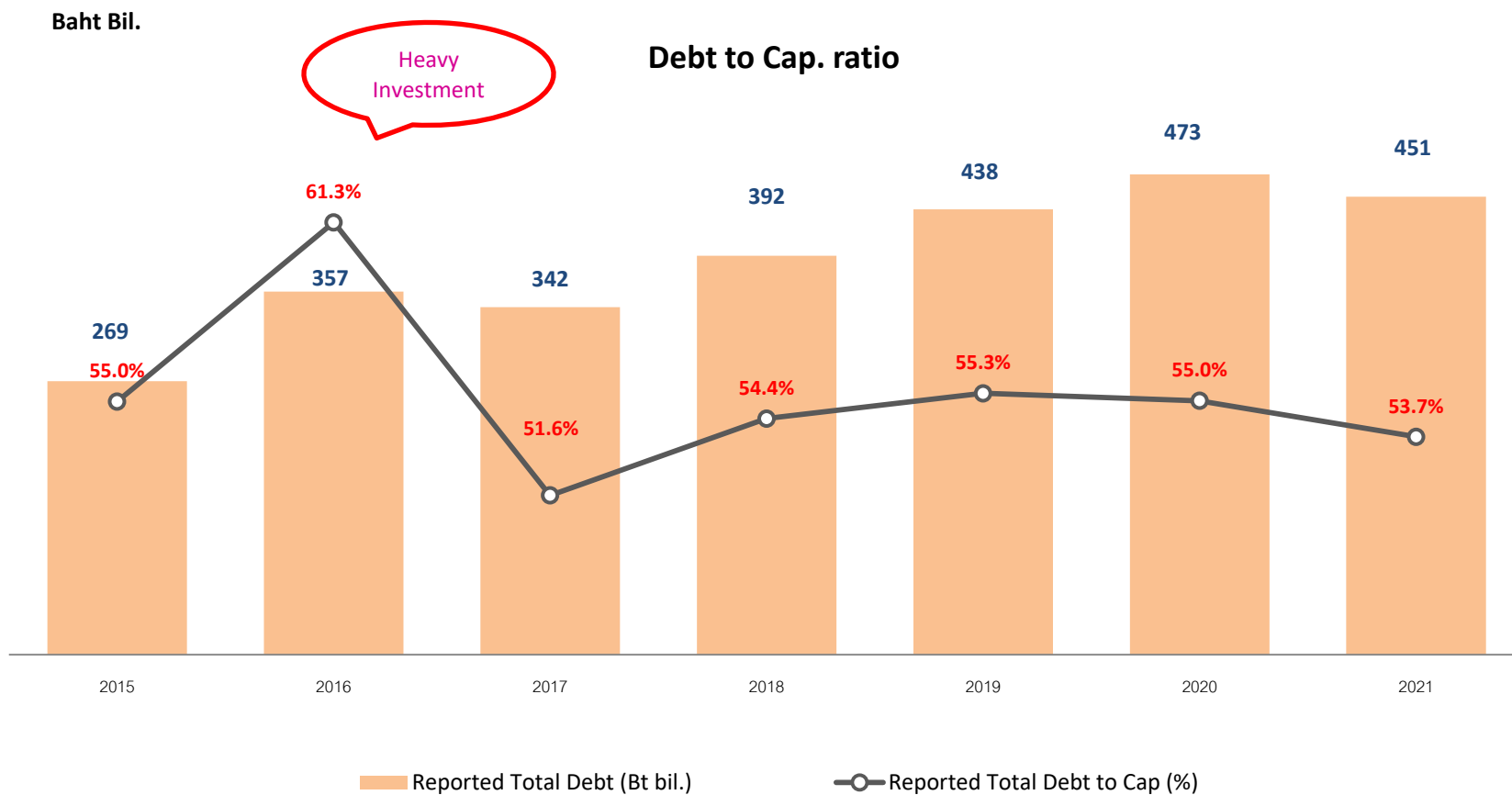
Source: TRIS Rating



Despite lower project costs, return on assets is on a downward trend due to:

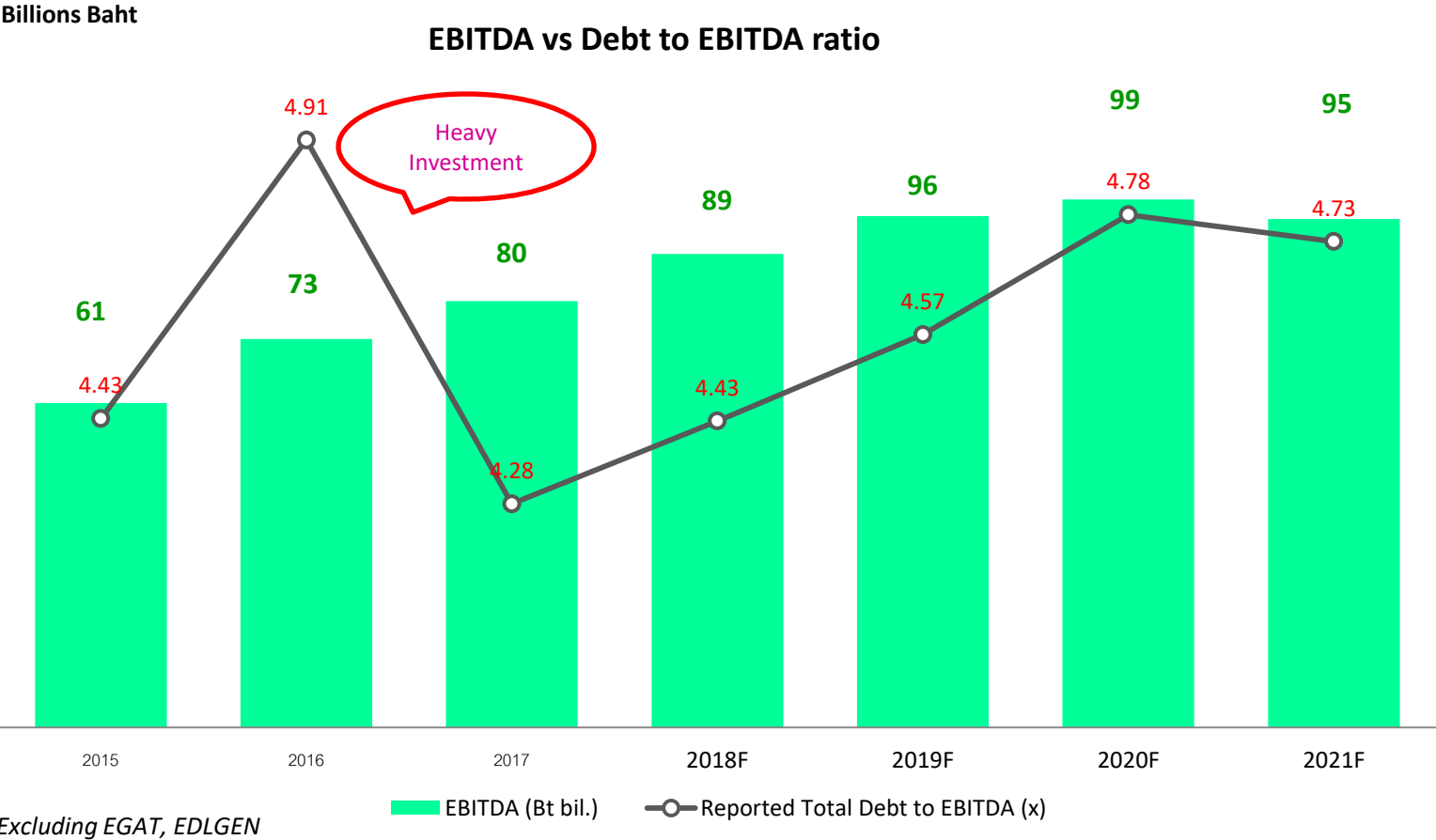
- **Expiration of adders**
- **Lower supportive tariff**
- **Bidding price scheme**
- **Potential rise in financial cost**

Leverage of Power Companies



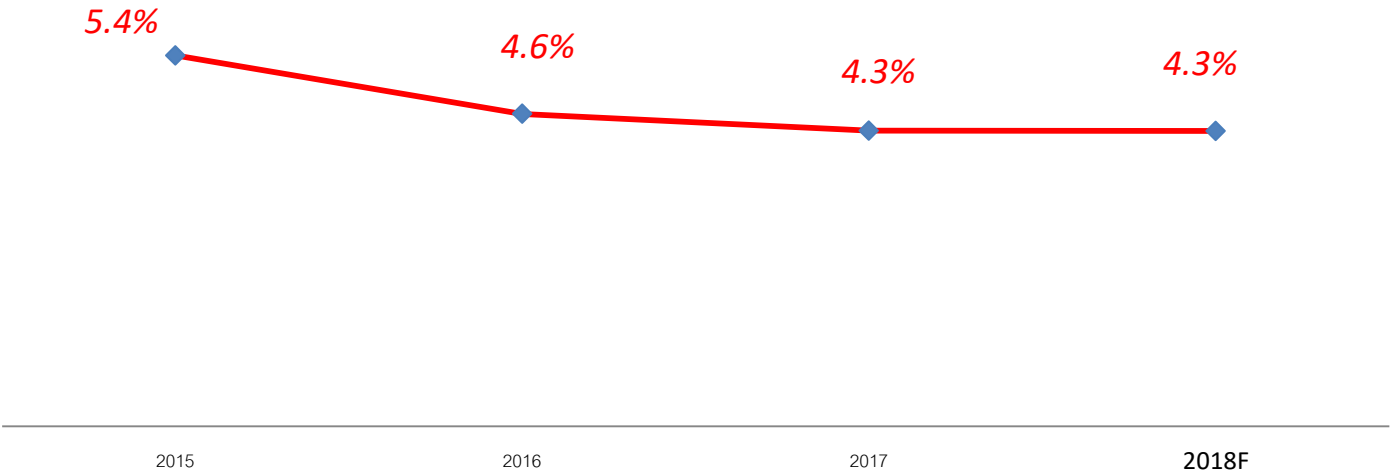
Excluding EGAT, EDLGEN

Leverage of Power Companies



Source: TRIS Rating

Average cost of debt (%)



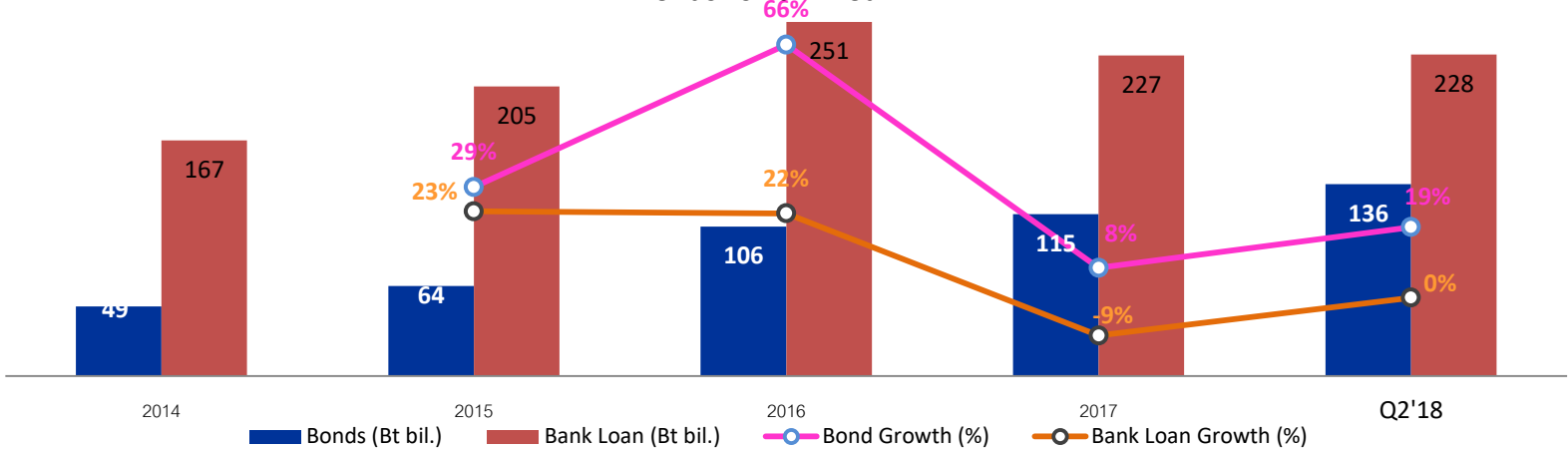
Excluding EGAT, EDLGEN

- **Cost of borrowings declined to around 4.3%, but will likely rise in the medium term**

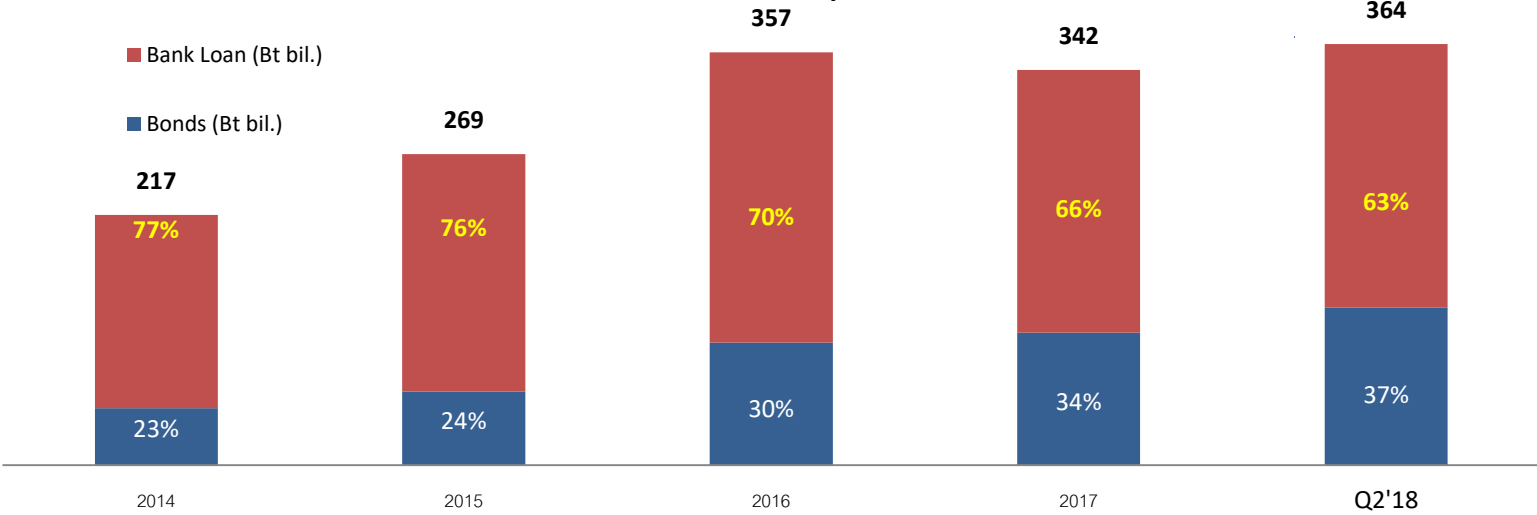
Debt Financing

Excluding EGAT, EDLGEN

Bonds vs Bank Loan



Bonds and Bank loan portion to Total Debt



Summary

- The power sector in Thailand will continue to grow, but at a decelerating rate
- Offshore expansion seems inevitable to achieve targeted growth
- Potential higher risk from offshore investments
- Renewable energy will face challenges in securing expansion opportunities with acceptable investment risk and return
- Rising cost of debt in the medium term
- Bond financing will continue taking up more share in power companies' debt profiles



Sakda Pongcharoenyong

President

TRIS Rating Co., Ltd.

Mr. Sakda Pongcharoenyong assumed his new position as President of TRIS Rating Co., Ltd. in January 2018. He joined TRIS Rating in May 2016, and was previously First Senior Executive Vice President heading the analytical team for banking and some other industries in the corporate sector.

He has more than 20 year experience in the Thai credit markets, including his 13 year stint with Citibank Thailand where he pursued his banking career in corporate finance, covering primarily loan and debt capital market products. His last position with Citibank Thailand was Head of Corporate Finance and Managing Director of Citicorp Securities Thailand Ltd. He also had a short stint with Thai Military Bank as Executive Vice President in corporate banking and debt capital markets.

He holds an M.B.A. degree from the Graduate Business School of San Francisco State University, California.