

# Study of Renewable Energy Development

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**CASE STUDY IN SEVERAL COUNTRIES**

**CURRENT SITUATION OF RENEWABLE ENERGY IN INDONESIA**

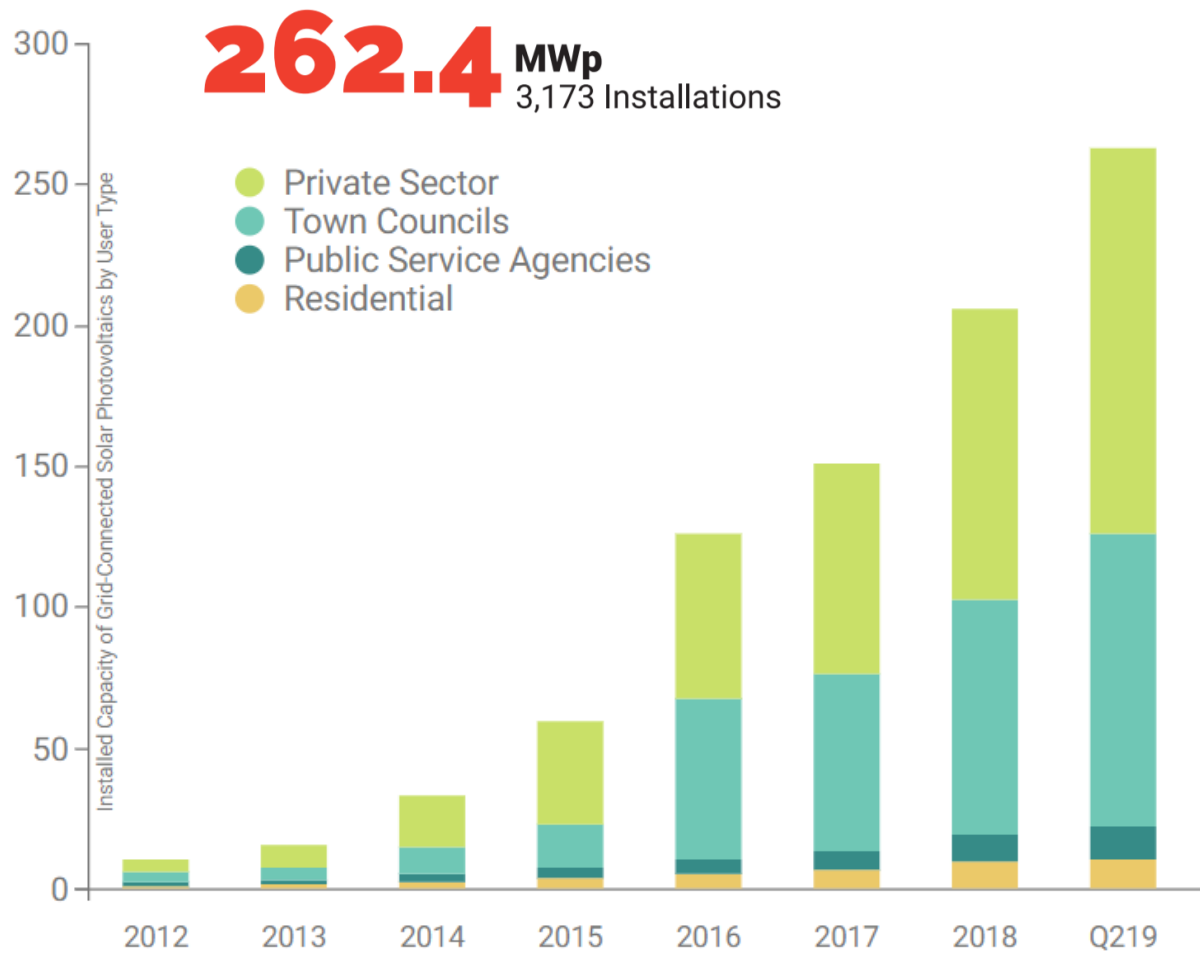
**OPPORTUNITIES & CHALLENGES**

**PRESENTED BY: GATOT S. PRAWIRO**

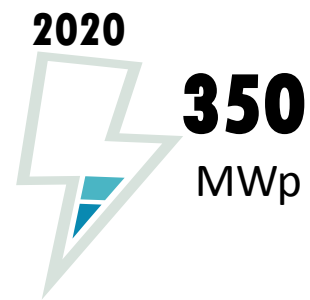
A stylized illustration at the bottom of the slide depicts various renewable energy sources. On the left, there are three wind turbines. In the center, there are several modern buildings. On the right, there are two solar panels. The background consists of soft, rounded shapes in shades of green and yellow, suggesting a landscape or sky.



# Singapore Solar Power



Target Solar PV & how to achieve:



SolarNova Programme



Floating PV Farm at reservoirs



Energy transaction from customers





# Singapore Success Story

## Co-Creation

All Stakeholders



Singapore allows solar power consumers to sell the excess energy through different payment schemes:

### Simplified Credit Treatment

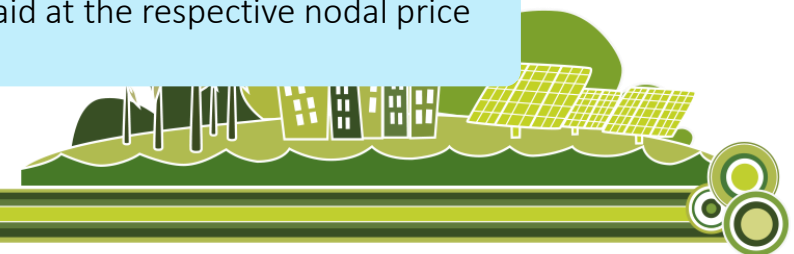
- Non-contestable consumers
- Capacity < 1 MWp
- Consumers will be paid at the prevailing tariff minus grid charges

### Enhanced Central Intermediary Scheme

- Contestable consumers
- Capacity < 10 MWp
- Consumers will be paid at the prevailing half-hourly wholesale tariff

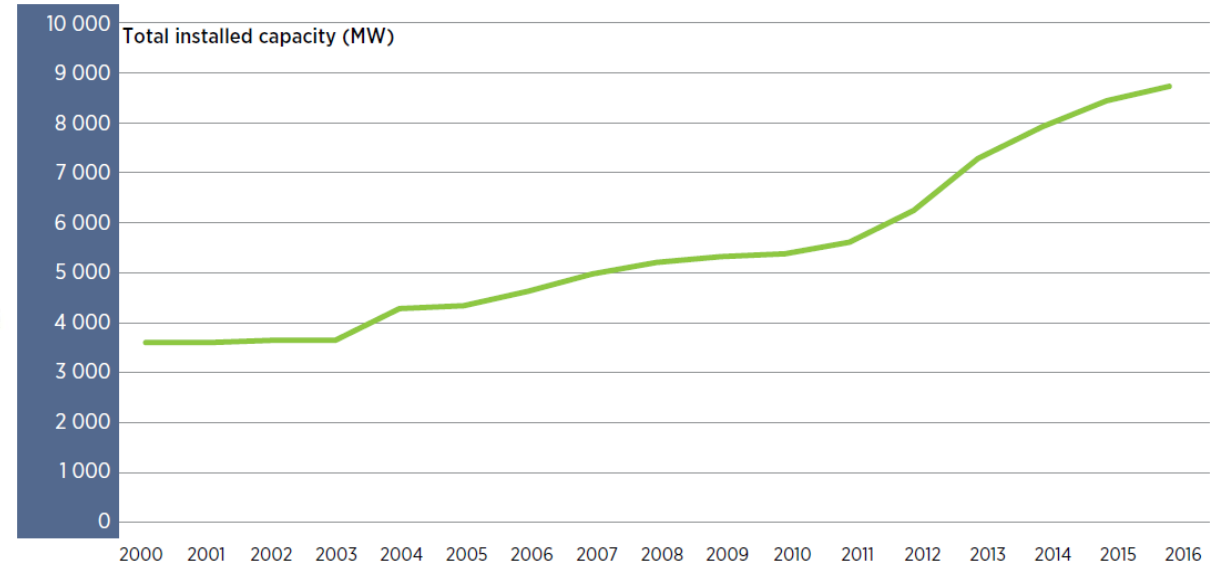
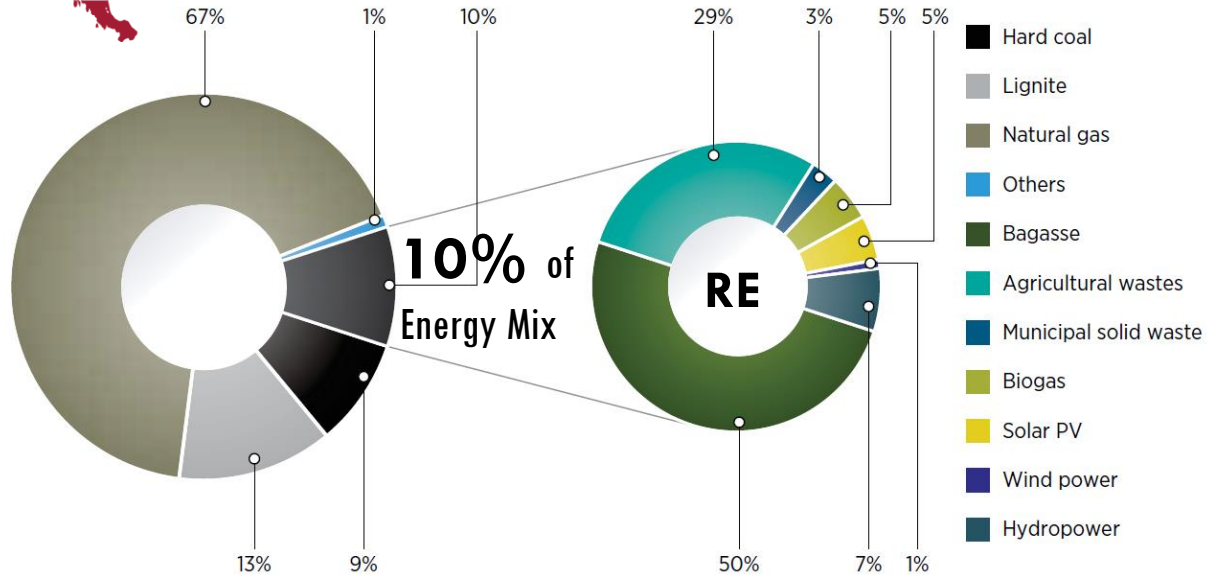
### Register as Market Participant

- Contestable consumers
- Capacity > 10 MWp
- Consumers will be treated as Energy Market Company, will be paid at the respective nodal price





# Thailand



High differentiation of Renewable Energy



Feed-in Premium or competitive FiT bidding



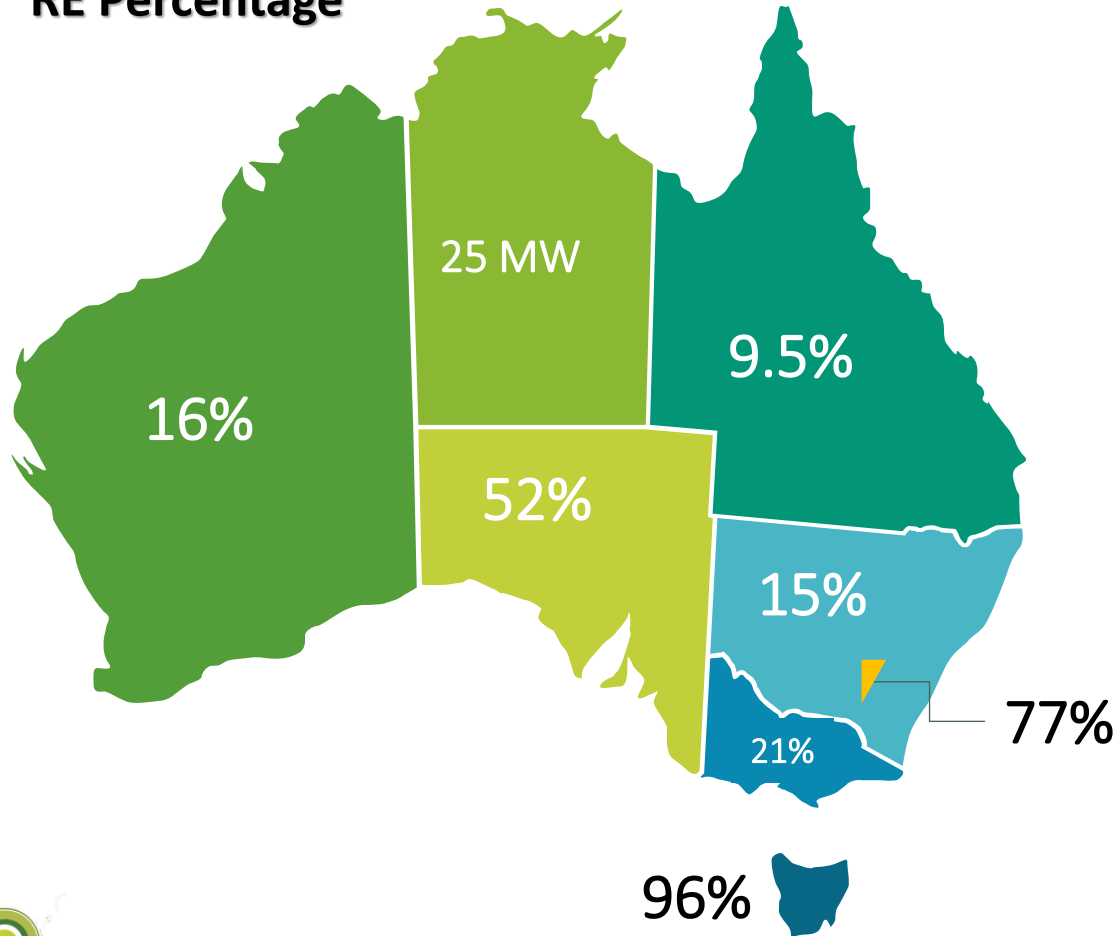
Tax Exemption for Renewable Energy project





# Australia

## RE Percentage



**21%**  
Average  
National RE



**100%**  
Investment  
Increase in 2018



**1 in 5**  
Household with  
Rooftop PV



**6 PV**  
Installed in  
Every minute

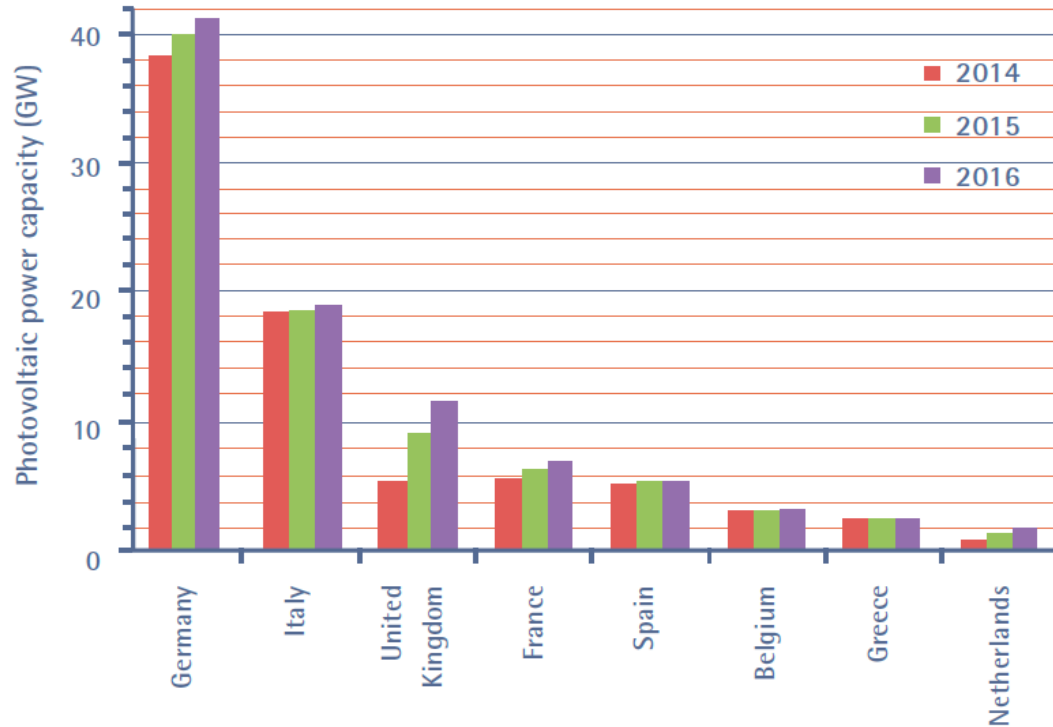
- Strong state government support in terms of long-term energy policy, financing scheme, and incentives given to the investors in RE
- However, no federal policy support (each state has its own power)





# Germany

## Highest Solar PV Installation in Europe



### Cumulative installed photovoltaic capacity in some EU countries

Taken from IEA PVPS Annual Report (IEA, 2018)



### Electricity Feed-in Act (CPI, 2011)

- Started in 1991
- Incentives from government to power generation companies of using green energy
- Loans at low interest rate for residential



### Renewable Energy Source Act (IEA, 2018)

- Started in 2011
- High FiT from small to medium scale of solar power generation (mainly residential)
- Auction for power generation companies



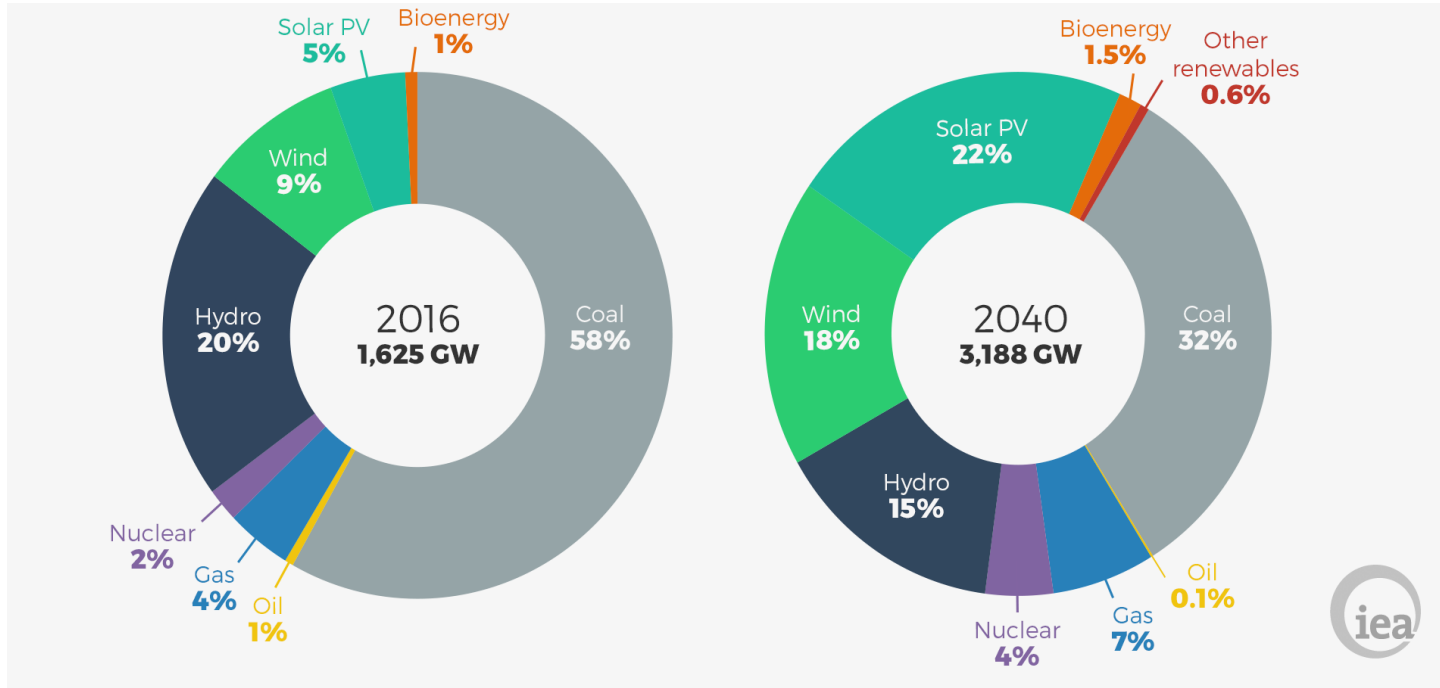
### R&D Fund (IEA, 2018)

- Funded by Ministry for Economic Affairs and Energy (BMWi) and Federal Ministry of Education and Research (BMBF)





# China



**Target energy mix of China in 2040**  
Taken from World Energy Outlook: China (IEA, 2017)



## Golden Sun Program

- Incentives from government to commercial and residential to install solar panel
- Started in 2009



## Poverty Alleviation Program

- Funding 3 million poor families to build at least 5 kWp of solar panel for each family.
- Each family can earn at least CNY 3000 each year by selling electricity

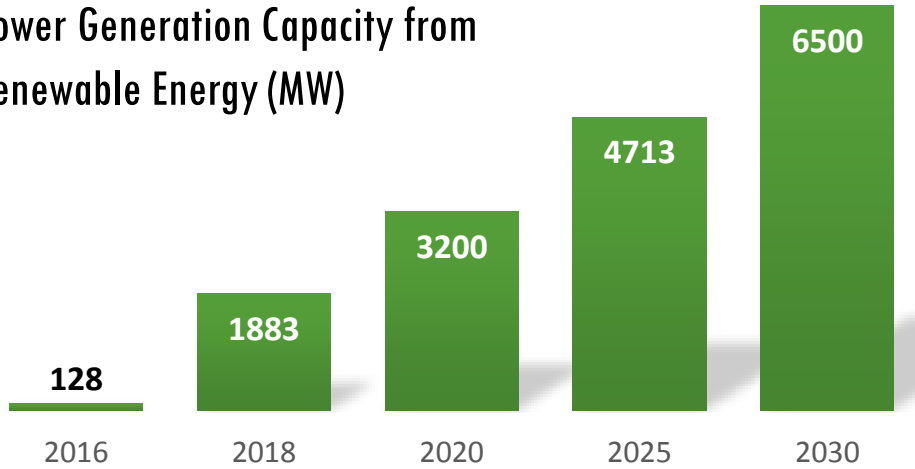




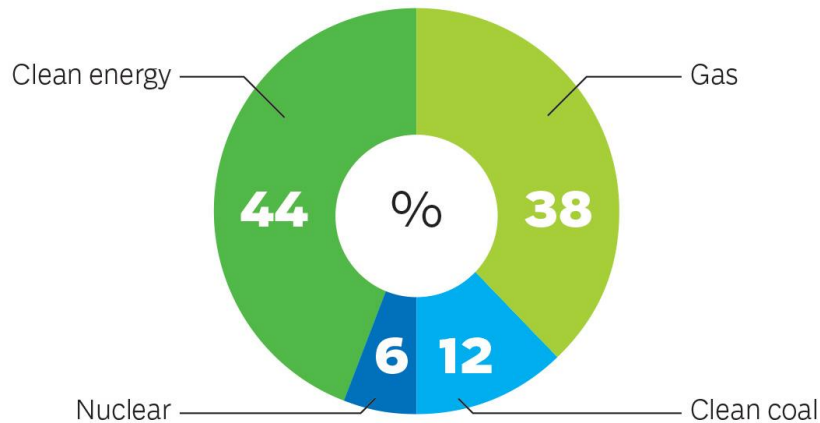


# UAE

## Power Generation Capacity from Renewable Energy (MW)



## UAE National Energy Plan 2050



**Lowest Solar Price**  
(without subsidy)

**2.42**  
USD cent/kWh



**25 years contract period**  
allowing more time to pay-off initial investment



**Cost Sharing**  
Between project developer and utility company (government)



**R&D and Mass Production**  
Reduce cost of material

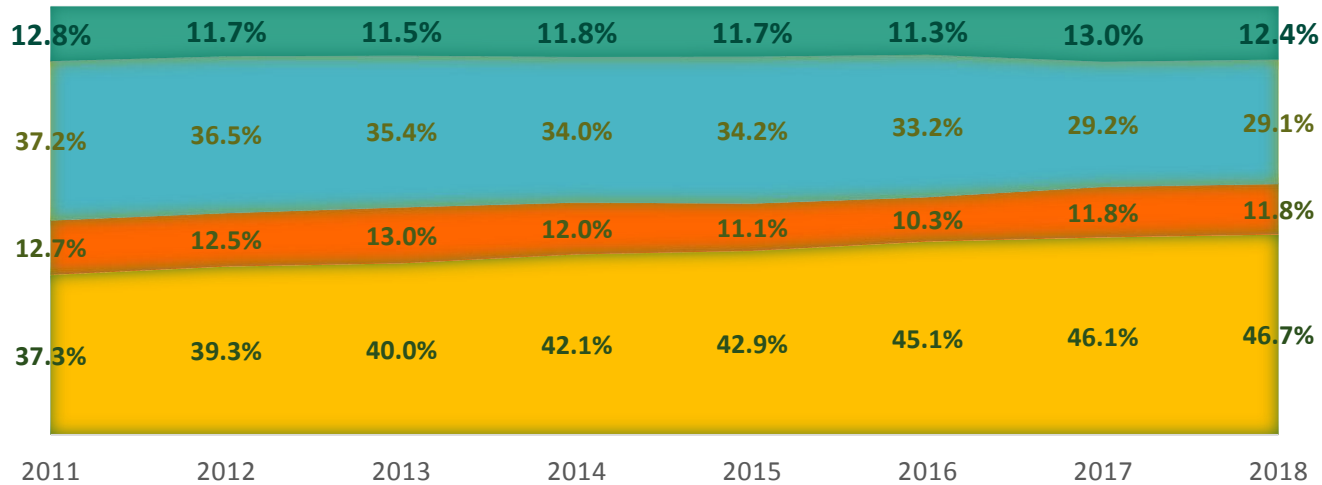
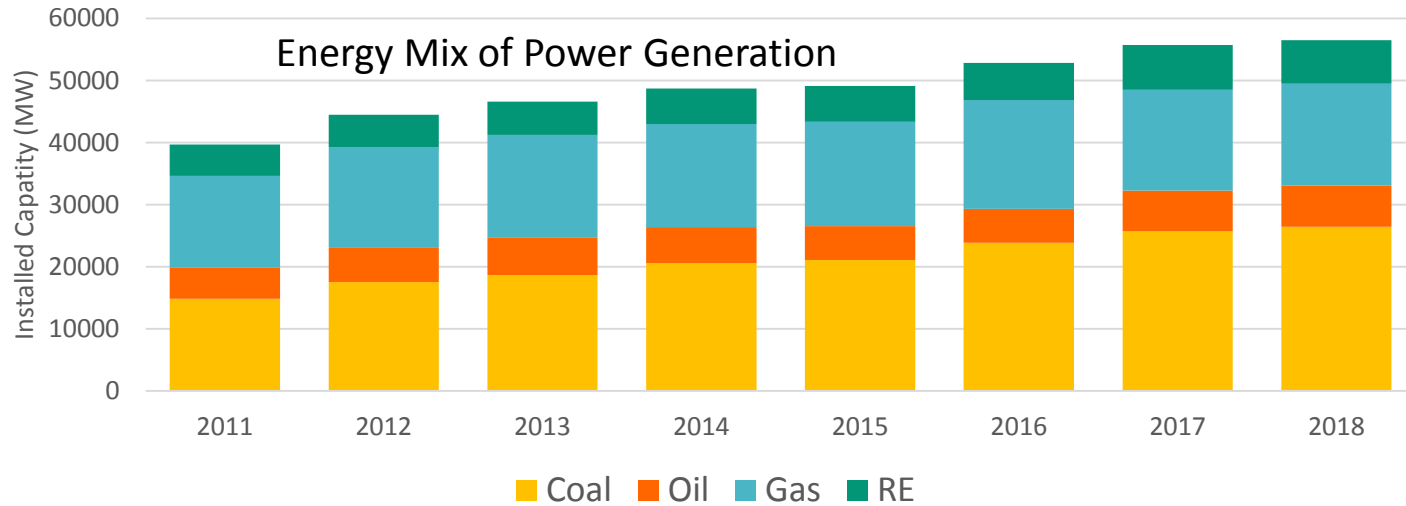


**Different Financing Scheme for RE**  
Large loans at low interest

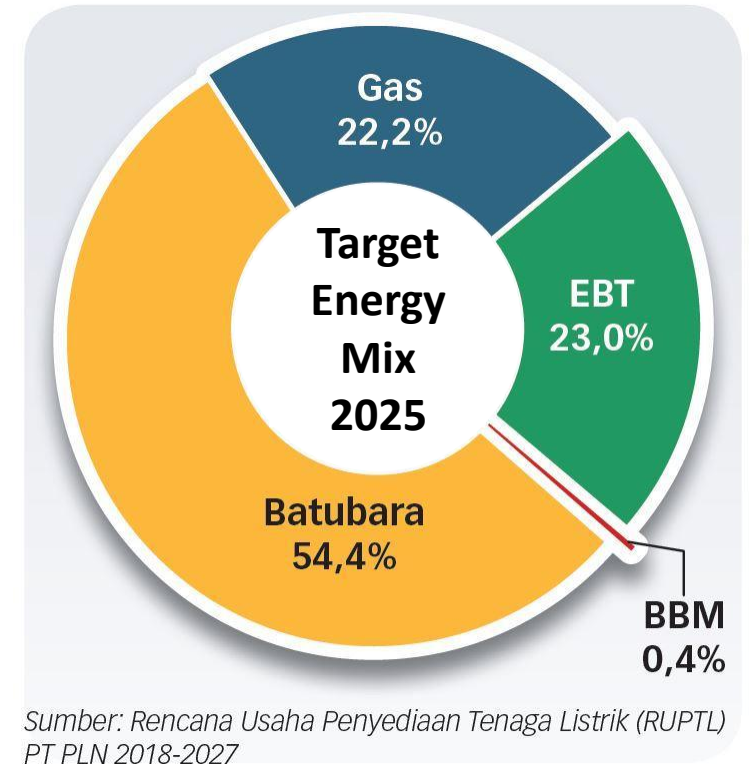




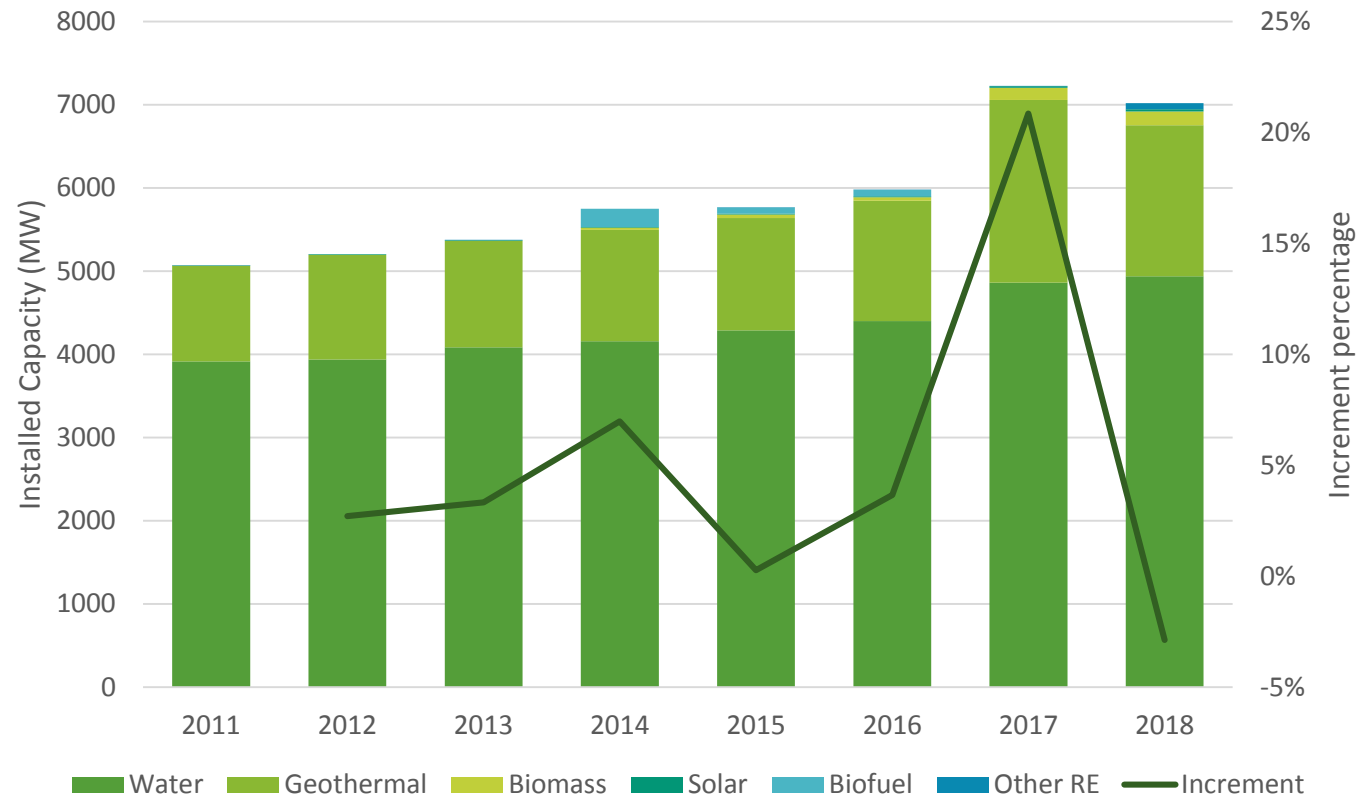
# Current Situation of RE in Indonesia



Source: RUPTL PT PLN 2019-2028



# Current Situation of RE in Indonesia



Source: RUPTL PT PLN 2019-2028



High cost, low return  
Need different financing scheme



Change in Regulation  
No government support



# Opportunity & Challenge



Abundance of potential energy source, but not yet exploited



Energy demand is increasing along with economic development



Government support plays very important role of developing RE, can be in the form of:

- Energy policies (Singapore, Australia)
- FiT or Feed-in Premium (Thailand, Germany)
- Incentives (China)
- Tax Exemption (Thailand)
- Cooperation (UAE)



Different financing strategy and support is needed for long term investment

ENERGY SOURCE	POTENTIAL
Hydro	94.3 GW
Geothermal	28.5 GW
Bioenergy	32.6 GW
Solar Energy	207.8 GWp
Wind Energy	60.6 GW
Ocean Energy	17.9 GW



# Thank You

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