

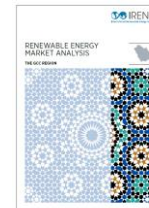
# Renewable Energy Policies in Southeast Asia

Renewable Energy Auctions: A New Paradigm for Asia  
ACEF, 8 June 2018

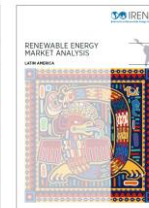


## RENEWABLE ENERGY MARKET ANALYSIS

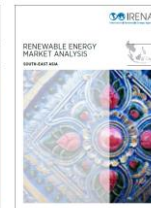
### SOUTHEAST ASIA



IRENA © 2015



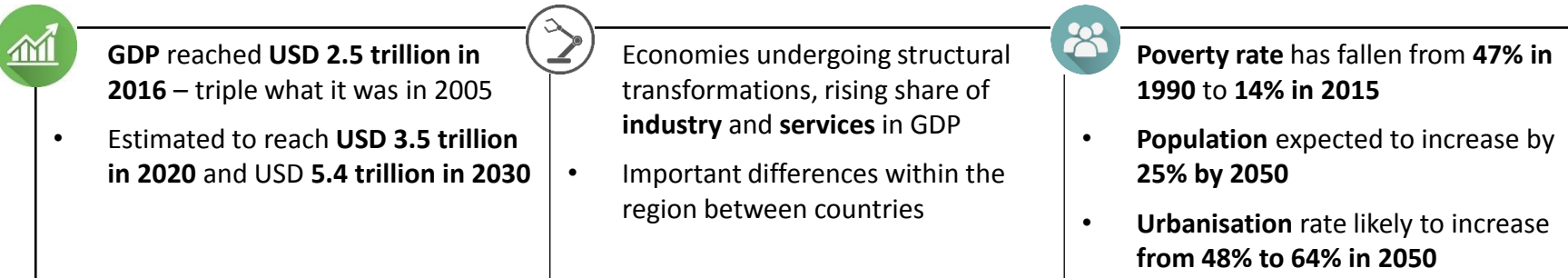
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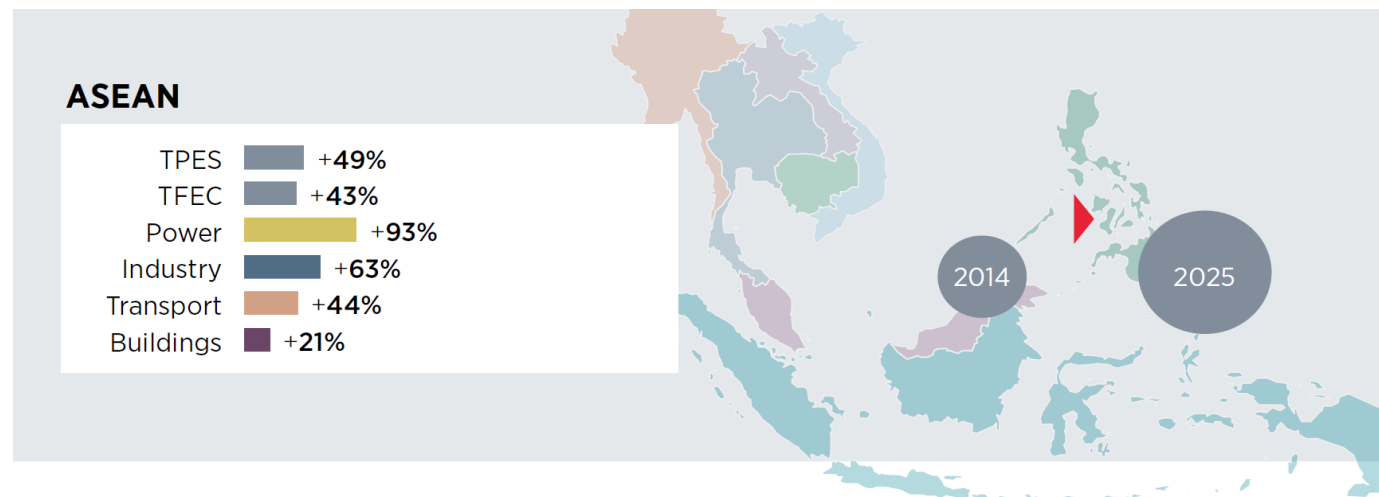
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# Rising energy demand to sustain development in Southeast Asia



Expected increase in energy demand between 2014 and 2025 (over **4% per year**)

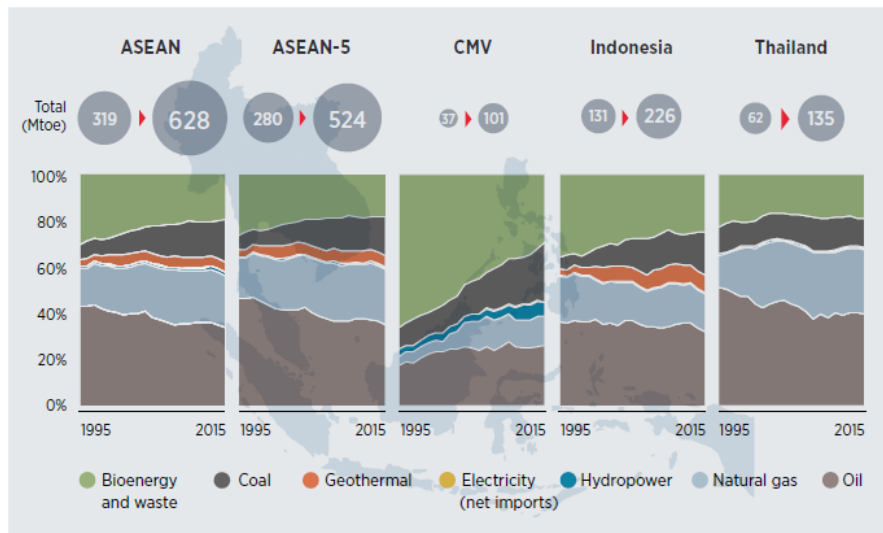


Source: IRENA and ACE, 2016.

Note: ASEAN = Association of Southeast Asian Nations; TFEC = total final energy consumption; TPES = total primary energy supply.

# Drivers for diversification of the energy mix in Southeast Asia - Environment

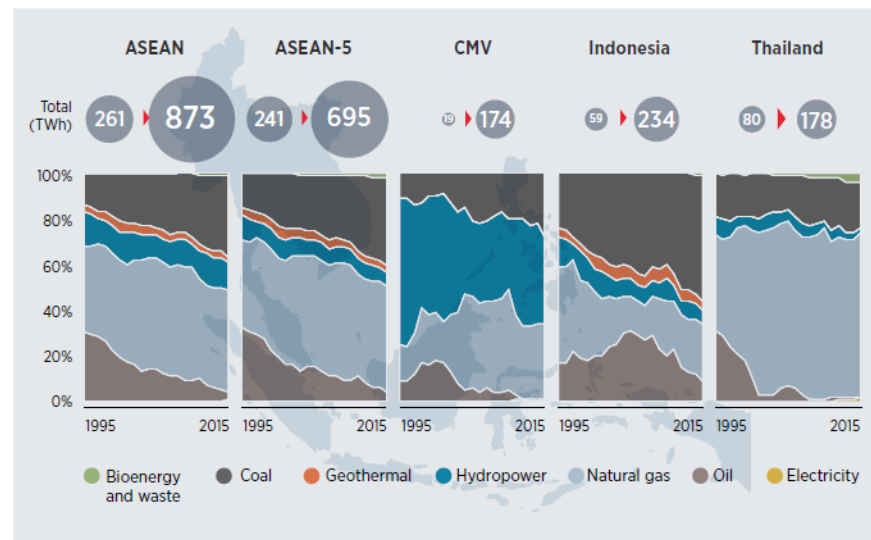
Total primary energy supply by energy source, 1995-2015



Source: Based on IEA, 2017c.

Note: The ASEAN figures do not include Lao PDR due to non-availability of data. ASEAN = Association of Southeast Asian Nations; CMV = Cambodia, Myanmar and Viet Nam. ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Electricity generation by energy source, 1995-2015



Source: Based on IEA, 2017c.

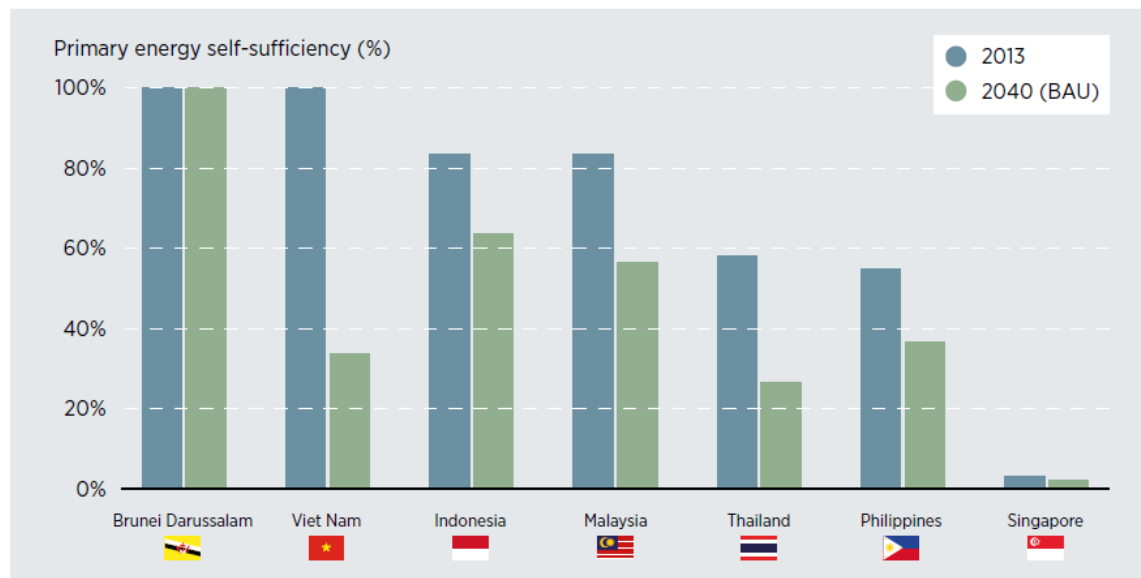
Note: The ASEAN figures do not include Lao PDR due to non-availability of data. CMV = Cambodia, Myanmar and Viet Nam. ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore and Thailand.

## Human health and environmental Degradation

- **Emissions** from energy could rise by **61%** in the region by 2025, driven mainly by coal-fired electricity production followed by the industry and transport sectors.
- ASEAN Member States have made commitments to reduce their emissions as part of COP 21 climate process
- Need to improve air quality

# Drivers for diversification of the energy mix in Southeast Asia - Security

Primary energy from domestic resources, as share of total, 2013 and 2040



Source: NBR, 2016 based on APEC Energy Demand and Supply Outlook; and IEA, Key World Energy Statistics 2015.

Note: BAU = business as usual.

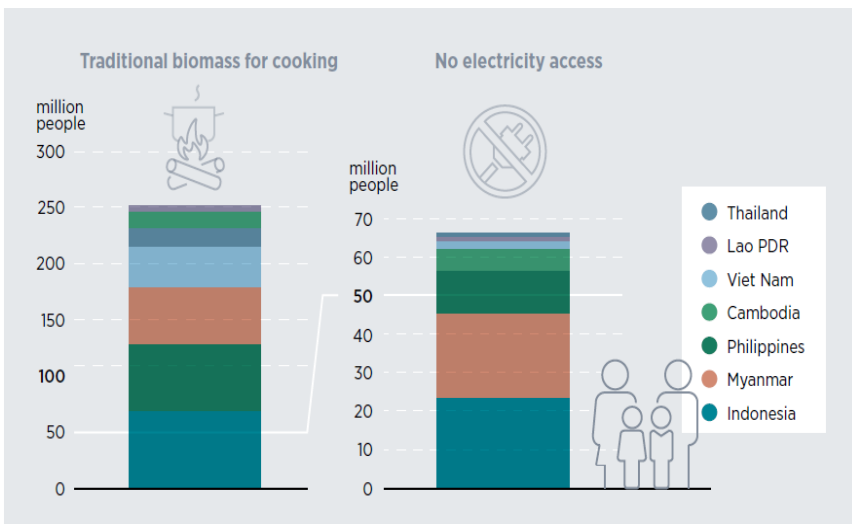
**Energy security** - with rising domestic energy demand and decreasing domestic resources, the self-sufficiency is expected to decline over the next decades.

# Drivers for renewable energy deployment in Southeast Asia - Benefits

Renewables, coupled with energy efficiency, offer a viable option to expand energy access and also realise socio-economic benefits.

## Energy access

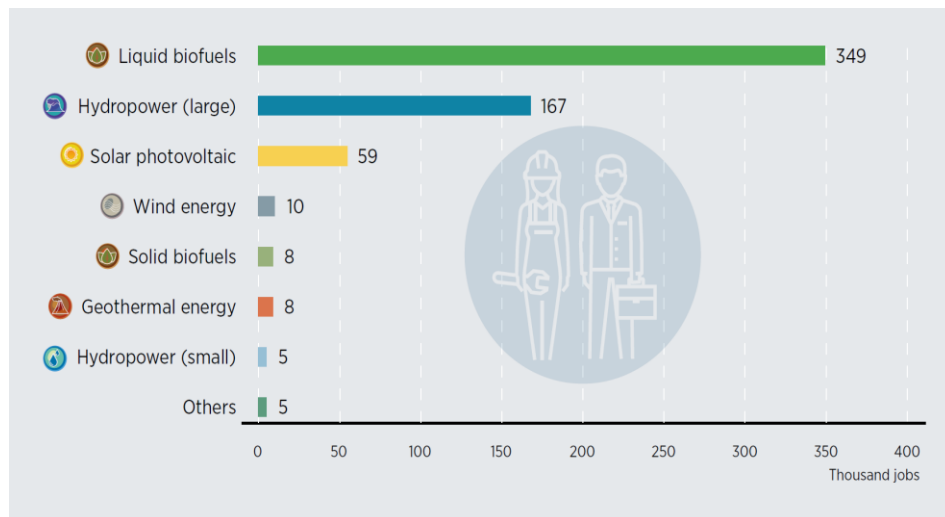
Number of people using traditional biomass for cooking and without access to electricity, 2016



Source: Based on IEA, n.d.

## Socio-economic benefits

Renewable energy jobs estimated at 611 000 in 2016



- Scaling-up renewables would have a positive impact on the region's GDP (up to **+0.03% by 2030**)
- Could increase direct and indirect employment in the sector to **2.2 million by 2030**

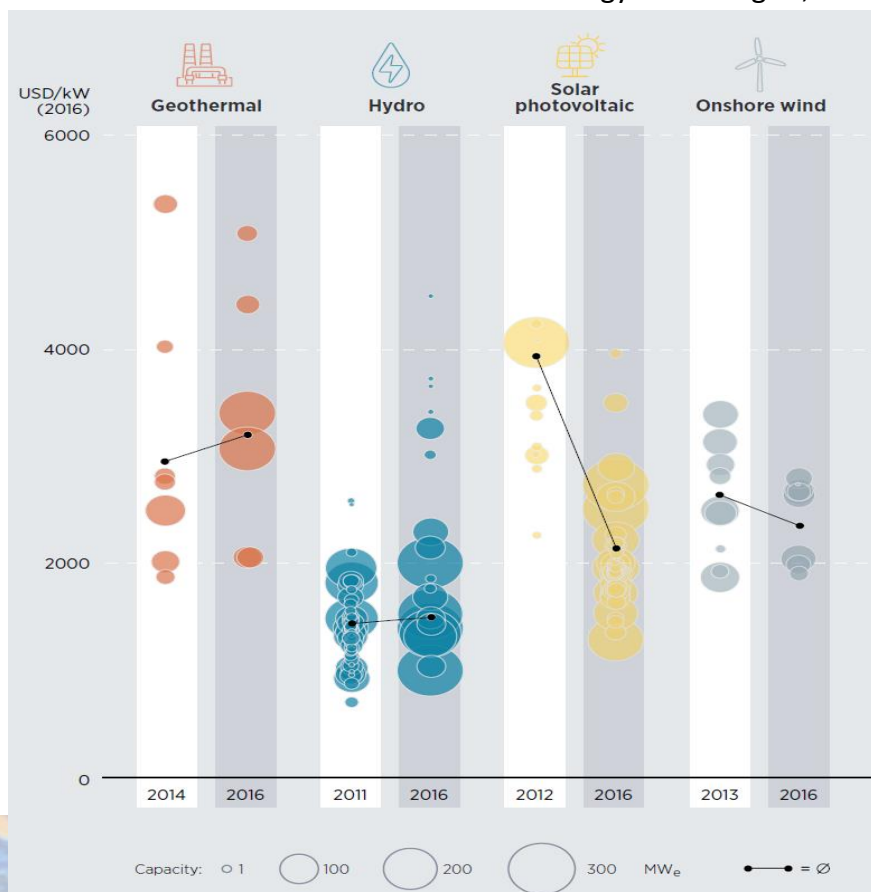


# Drivers for renewable energy deployment in Southeast Asia - costs

Electricity from hydro, geothermal and bioenergy in range of fossil-fuel costs. Solar PV and wind seeing rapid reductions.

## Cost competitiveness

Investment costs of selected renewable energy technologies, 2016

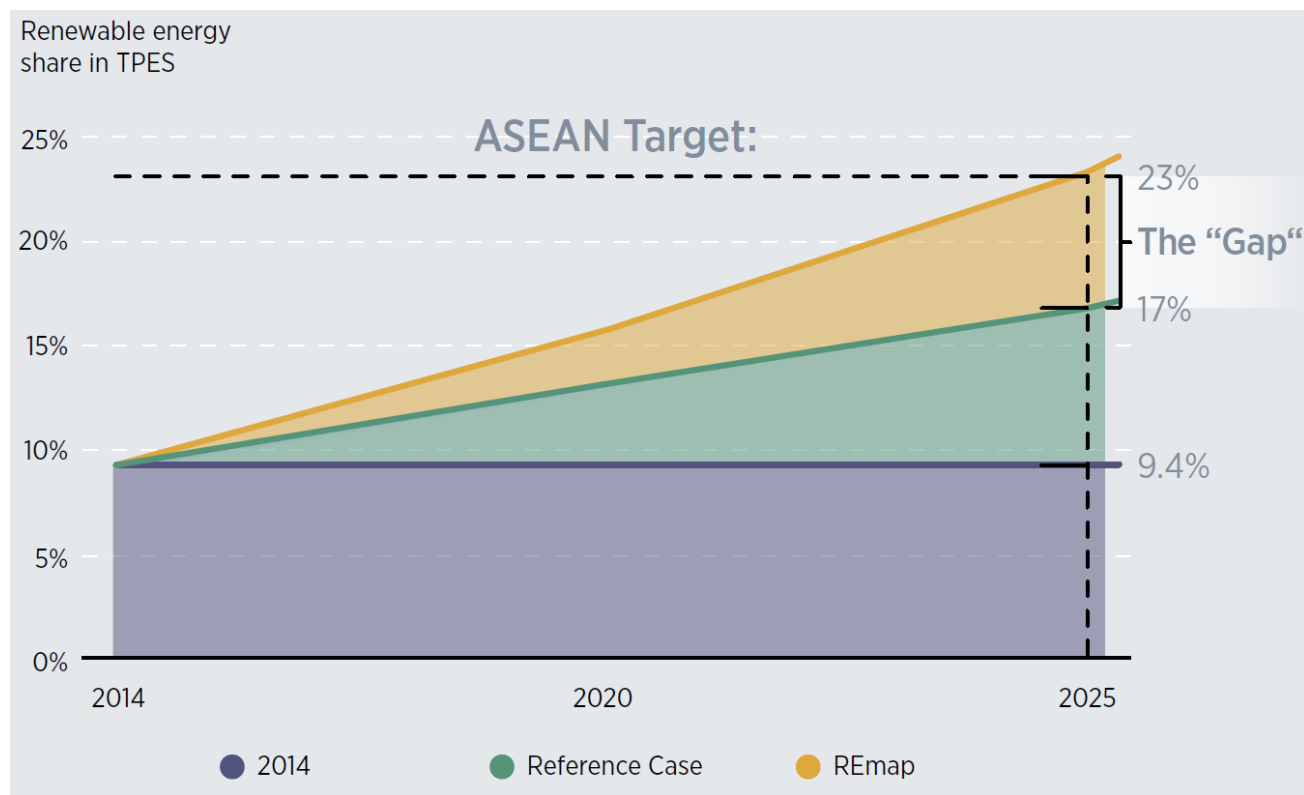


- **Solar PV** most significant cost reduction - **45% decline in four years**, in line with the global average
- **Onshore wind** also decreased – an **11% difference** also in line with the global average
- **Geothermal** only technology that has seen a **slight increase** in weighted average investment costs - **8%** most likely because of the **quality of sites** being developed in 2014 and 2016
- **Hydro** costs virtually **stayed the same** from 2011 to 2016
- **Bioenergy** projects capital costs **vary significantly depending on size and location**. Cost for 53 projects commissioned between 2010 and 2016 ranged between USD 900/kW and USD 2 433/kW with a weighted average of USD 1 660/kW.



# Growing renewable energy deployment but not reaching target

**Based on current plans and policies, the share of renewables in TPES would increase to just under 17% by 2025**



23%











Share of renewable energy in TPES by 2025

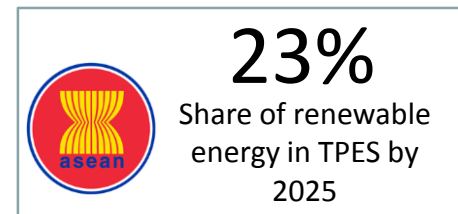
- According to plans, gap of 6% in TPES

Source: IRENA and ACE, 2016

# Overview of renewable energy policies in Southeast Asia



		National policy						Fiscal incentives						Grid access			Regulatory instruments				Others		
		Renewable energy target	Renewable energy law/strategy	Solar heating law/programme	Solar power law/programme	Wind power law/programme	Geothermal law/programme	Biofuels law/programme	Vat exemption	Income tax exemption	Import/export fiscal benefit	Carbon tax	Accelerated depreciation	Other fiscal benefits	Priority/dedicated transmission	Grid access	Preferential dispatch	Guaranteed offtake via feed-in tariff or auctions	Quota (e.g. renewable portfolio standards)	Renewable energy certificate system	Net metering	Renewable energy in rural access programmes	Local content requirements for equipment
	Brunei Darussalam																	*	*	*	*		
	Cambodia																	*					
	Indonesia																						
	Lao PDR																	*		C			
	Malaysia																			C			
	Myanmar																						
	Philippines																						
	Singapore																						
	Thailand																						
	Viet Nam																			C			



- All countries have set renewable energy targets and have adopted some form of policy to meet them
- Fiscal incentives are widely spread
- Geothermal and biofuel laws
- Priority transmission, grid access and preferred dispatch
- Feed-in policies main instrument for solar power

Source: based on ACE, 2016b.

\* = under planning

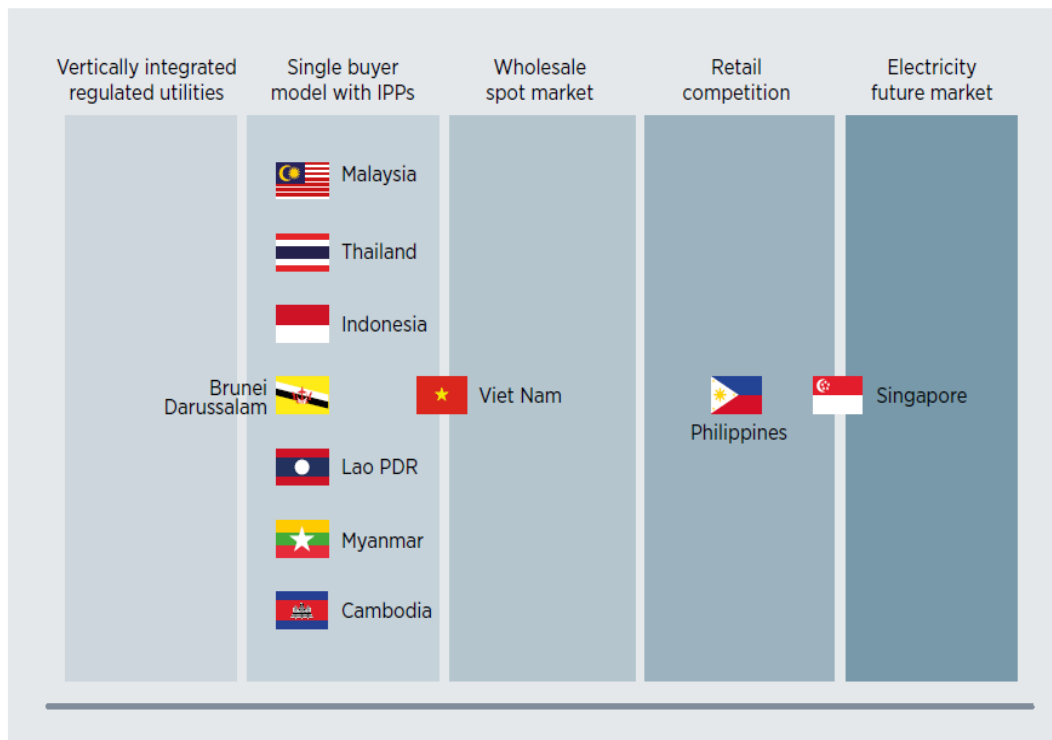
C = under Clean Development Mechanism (CDM)





# Overview of renewable energy policies in Southeast Asia

## Structure of electricity markets in Southeast Asia



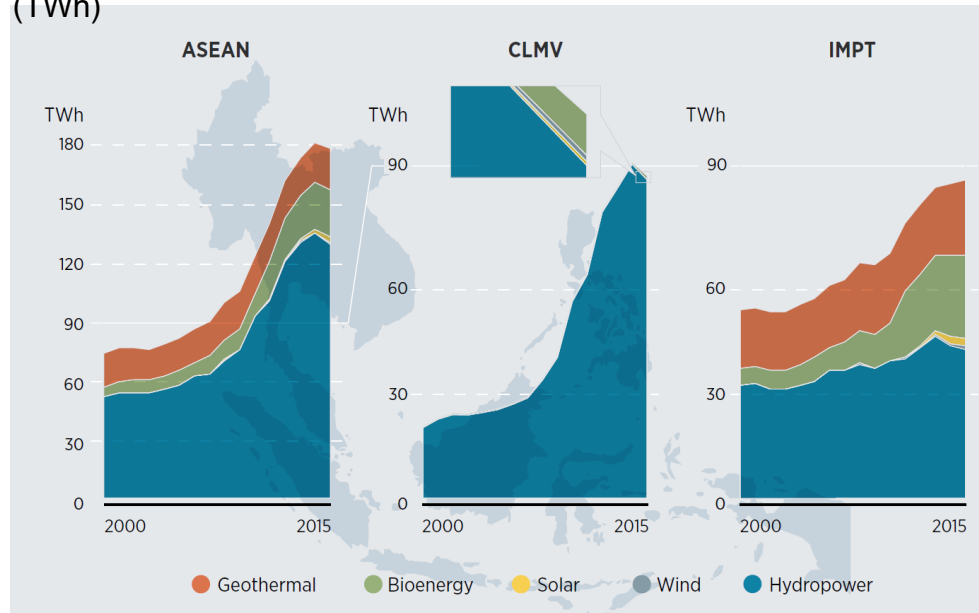
Source: Based on KPMG, 2015.

- Single-buyer model with IPPs is most prevalent
- In several countries, national and state utility companies monopolise their respective jurisdictions and act as sole offtakers for IPPs
- IPPs contribute more than half of aggregate installed capacities in the ASEAN-5
- In Vietnam, as of 2016, power generators can sell electricity to the only buyer, Viet Nam Electricity
- Singapore and the Philippines operate liberalized retail electricity markets. Electricity tariffs are market driven and among the highest in the world.
- In other countries, tariffs are regulated and controlled by the government
- Tariffs, in particular residential, in Brunei Darussalam, Lao PDR, Myanmar and Thailand are among the lowest in the region

# Growing renewable energy deployment in the power sector

**Renewable energy sources accounted for 17% of the region's electricity generation in 2015**

Renewable electricity generation in Southeast Asia, 2000–2015 (TWh)



- Large hydropower comprised the majority share, although share in total capacity is decreasing
- Non-hydro renewables growing, with capacity more than doubling in a decade. Solar PV and wind still a small share of the mix
- Electricity trade growing with infrastructure development
- Bioenergy use for heat/cogeneration in industry. Share of renewables in transport small, primarily liquid biofuels.

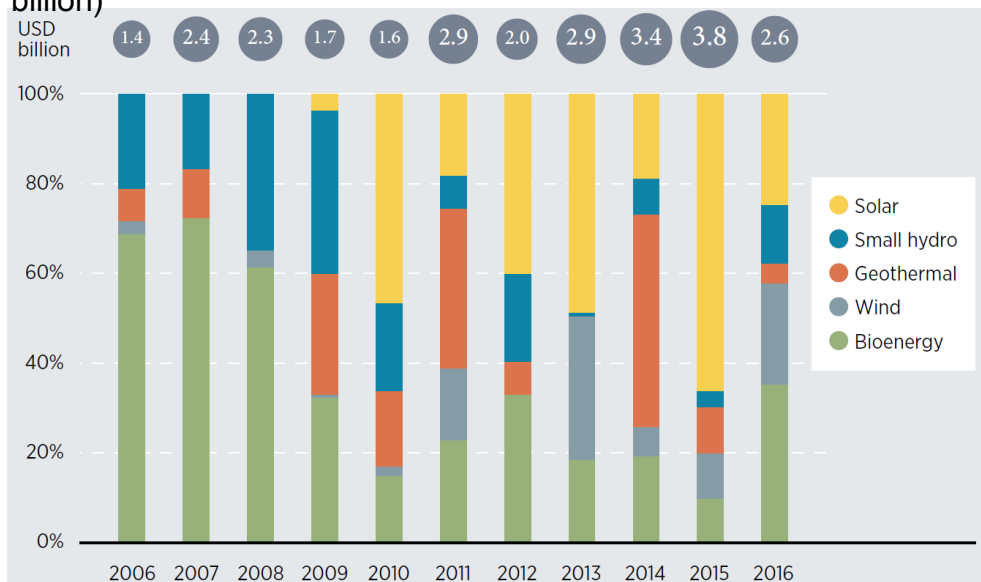


# Bridging the gap through enabling policy and investment frameworks

**Between 2006 and 2016, over USD 27 billion has been invested in the (non-large hydro) renewable power sector**

- The capital mix and the variety of financing institutions has evolved. Changing role for development finance with greater private sector investment
- A focus on project readiness and attractiveness, improving access to capital at the local level, and mitigating investment risks needed

Investment in renewable energy in the power sector by technology, 2006-16 (USD billion)



Source: Based on BNEF investment data

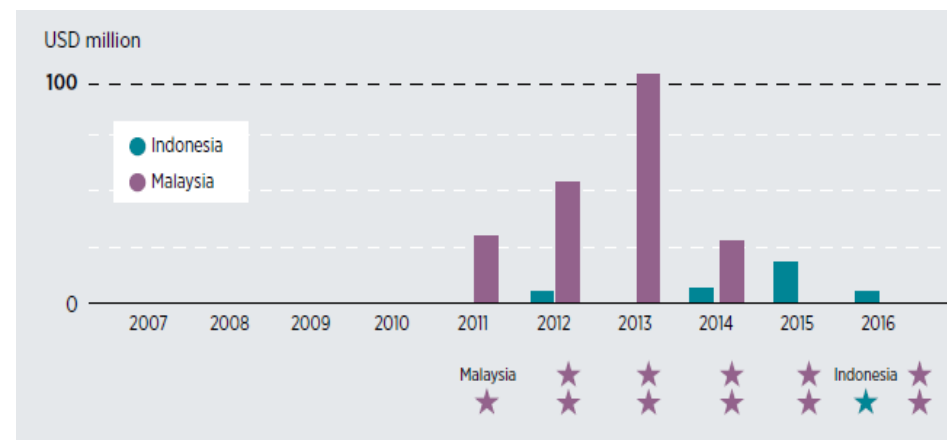
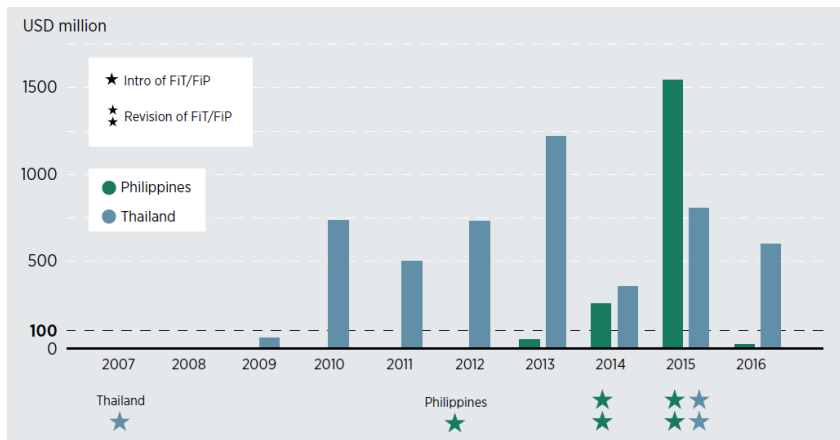


# Bridging the gap through enabling policy and investment frameworks – FIT/FIP

## Strong correlation between policy and regulatory environment and investment flows

- Most countries have introduced feed-in tariffs. New mechanisms, such as the auctions, are being introduced
- Adaptations need to be well-managed to minimise uncertainty.

Investment in solar PV in selected countries driven by FIT

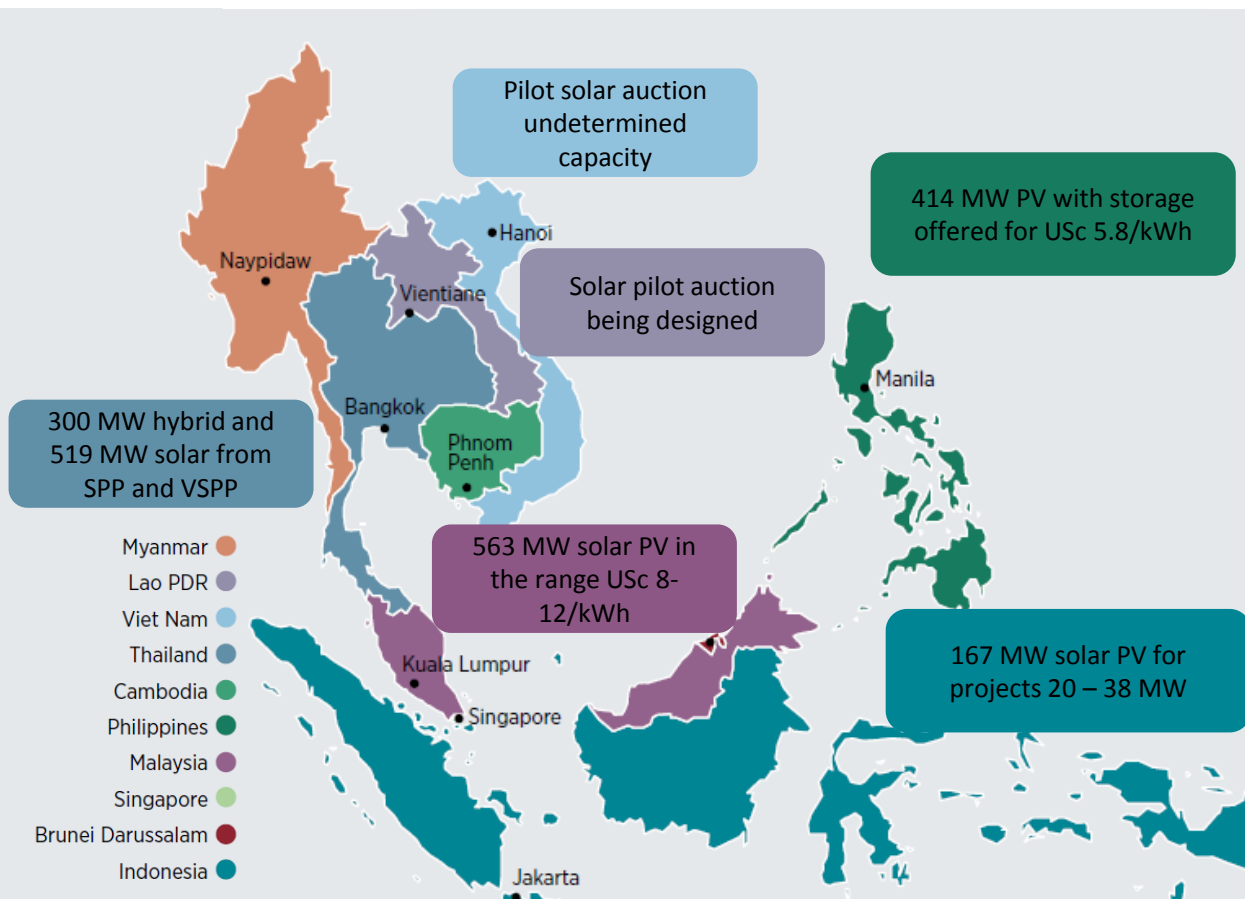


Source: Based on BNEF investment data

# Bridging the gap through enabling policy and investment frameworks – Auctions

Some countries in the region have moved from an administratively set to a competitively set tariff

## Solar PV auctions in Southeast Asia



- Vietnam and Lao PDR in the process of designing pilot auctions
- Thailand auctioning firm capacity (hybrid with agricultural waste)
- Malaysia first round oversubscribed
- Indonesia first round used ceiling price 85% of current cost of production
- Philippines awarded hybrid firm capacity for USc 5.8/kWh, competing with natural gas, and offering potential to reduce electricity rates by up to 30%.





# Bridging the gap through enabling policy and investment frameworks – Industry

## Many efforts to develop a local solar industry



Malaysia aims to be the second-largest producer of PV modules by 2020. In 2015, third-largest exporter, contributing to 12% of total global shipments with almost 51 MW:

- Malaysia's National Renewable Energy Policy and Action Plan coordinating education, training, finance, etc.
- FiT provided additional USc 1/kWh for the use of locally manufactured or assembled PV modules and additional USc 1/kWh for the use of locally manufactured or assembled solar inverters.
- Auction capped foreign participation at 49%.

Indonesian FiT provided additional tariffs for ensuring a minimum local content of 43.8%.







# Bridging the gap through enabling policy and investment frameworks in end-use sectors

**Comprehensive frameworks also needed for end-use sectors. Deployment policies represent part of a broader mix of policies.**

## Transport

Policies for sustainable transport in Southeast Asia

	Biofuels blending policy mandate	Fuel economy standards or vehicle efficiency incentives	Electric Vehicle (EV) target	Fiscal incentive or tax exemption for EVs	Sustainable public transport strategy or incentive
Brunei					
Cambodia					
Indonesia	X	X	X	X	X
Lao PDR	X				X
Malaysia	X	X	X		X
Myanmar					
Philippines	X		X	X	X
Singapore		X		X	X
Thailand	X	X	X	X	X
Viet Nam	X	X		X	X

Sources: CNN, 2017; FT Confidential Research, 2017; LTA (n.d.);

## Heating and cooling

With additional targets and supporting policy structures, Southeast Asian countries could better position themselves to take advantage of efficient, cost-effective renewable technologies for heating, cooling and cooking

- Financial incentives, tax exemptions or purchase guarantees for bioenergy process heat generation, the co-generation of power and heat, and solar thermal options for relatively low-temperature industrial processes.
- Tax exemptions or other incentives can help promote solar water heating
- Robust policy frameworks to support clean cooking are needed, as nearly 40% of the population still relies on inefficient fuel wood and charcoal for cooking.



## The way forward

Recognising the role for renewable energy  
in the energy agenda

Establishing an enabling policy and  
regulatory framework

Focusing on renewable energy deployment  
across all end-use sectors

Catalysing investments in the renewable  
energy sector

Building institutional and human capacities

Planning for higher shares of variable  
renewable energy

Supporting decentralised  
renewable energy for livelihood impact

Leveraging cooperation to accelerate  
renewable energy towards SDGs





**Thank you!**