Renewable Energy Policies in Southeast Asia - Power

IRENA-ACE Renewable Energy Policy Support Workshop
21 November 2018

Rising energy demand to sustain development in Southeast Asia

GDP reached **USD 2.5 trillion in 2016** – triple what it was in 2005

- Estimated to reach **USD 3.5 trillion in 2020** and USD **5.4 trillion in 2030**

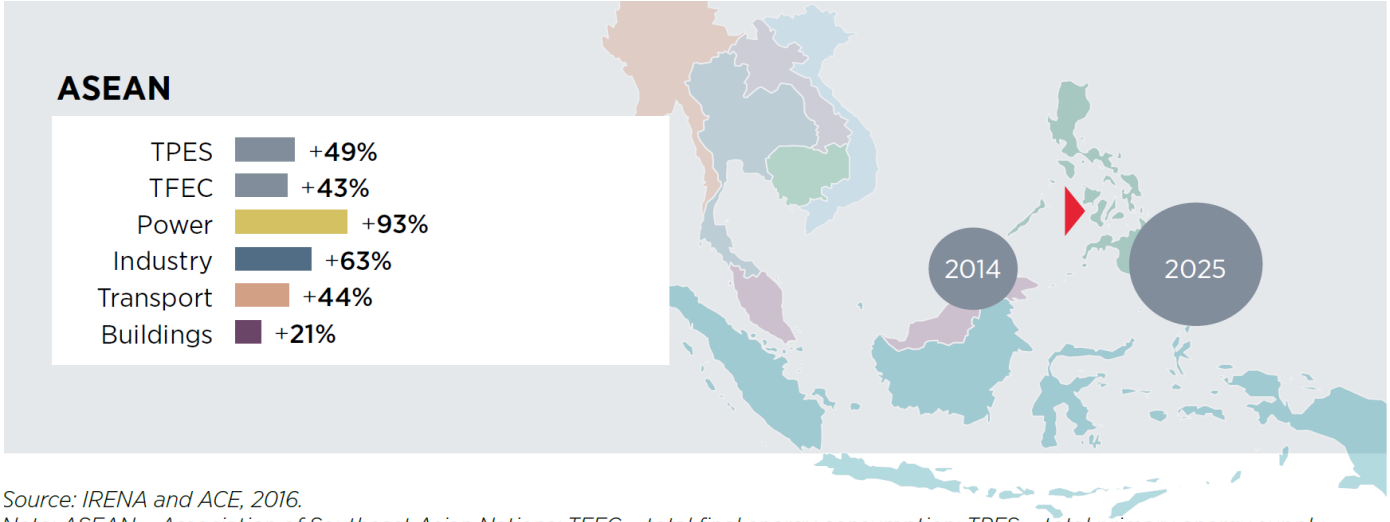
Economies undergoing structural transformations, rising share of **industry** and **services** in GDP

- Important differences within the region between countries

Poverty rate has fallen from **47% in 1990** to **14% in 2015**

- **Population** expected to increase by **25% by 2050**
- **Urbanisation** rate likely to increase **from 48% to 64% in 2050**

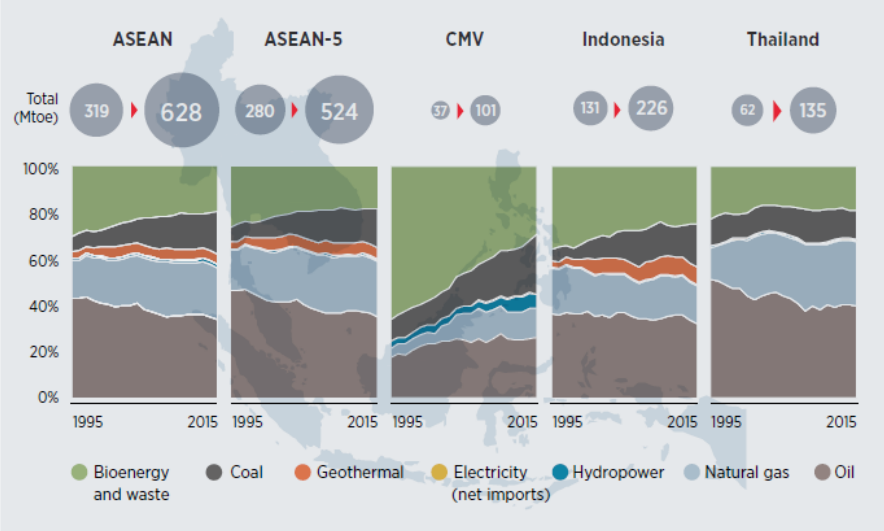
Expected increase in energy demand between 2014 and 2025 (over **4% per year**)



Source: IRENA and ACE, 2016.
Note: ASEAN = Association of Southeast Asian Nations; TFEC = total final energy consumption; TPES = total primary energy supply.

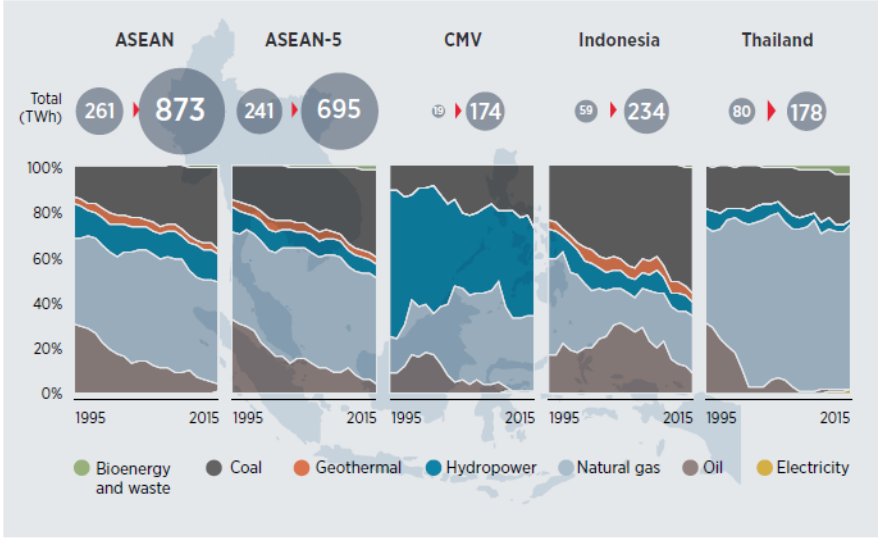
Drivers for diversification of the energy mix in Southeast Asia - Environment

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



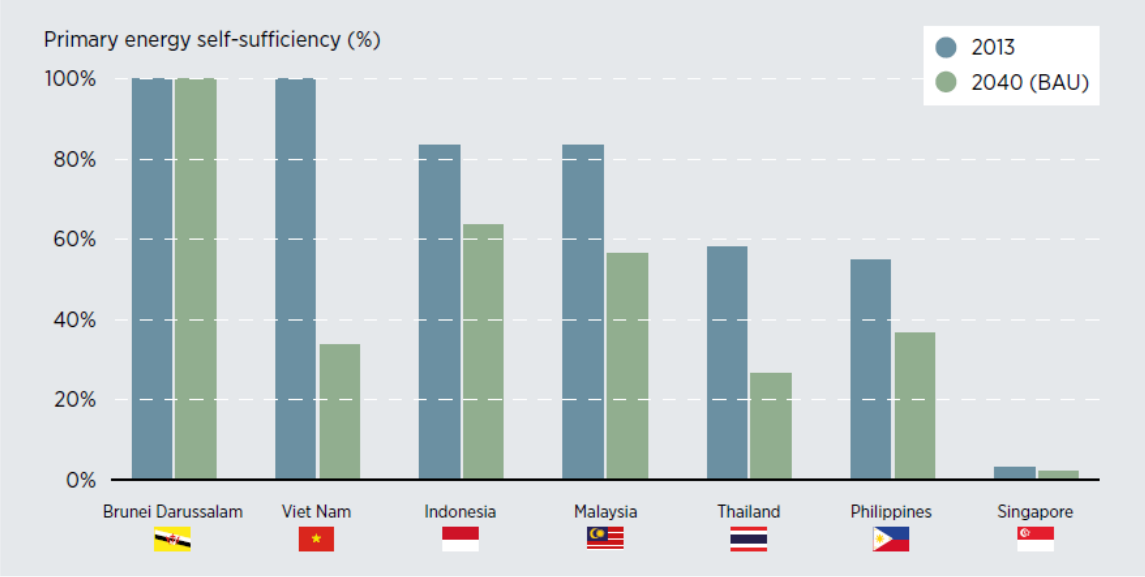
Source: Based on IEA, 2017c.
Note: The ASEAN figures do not include Lao PDR due to non-availability of data. CMV = Cambodia, Myanmar and Viet Nam. ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore and Thailand.

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 – Energy 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.

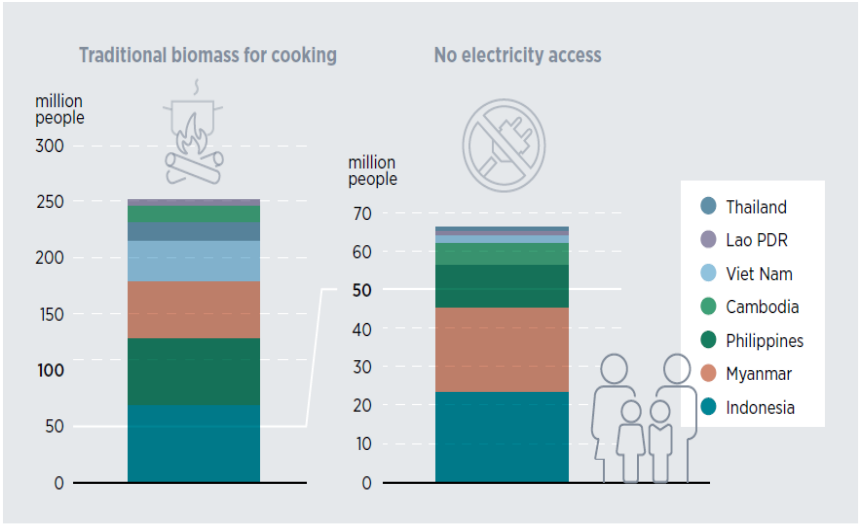
Energy security - with rising domestic energy demand and decreasing domestic resources, the self-sufficiency is expected to decline over the next decades.

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

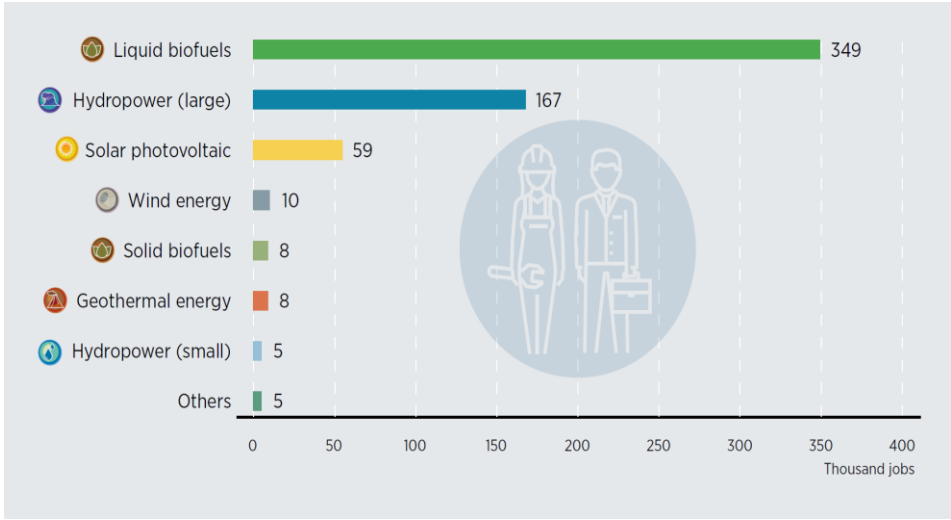
Number of people using traditional biomass for cooking and without access to electricity, 2016



Source: Based on IEA, n.d.

Socio-economic benefits

Renewable energy jobs estimated at 611 000 in 2016



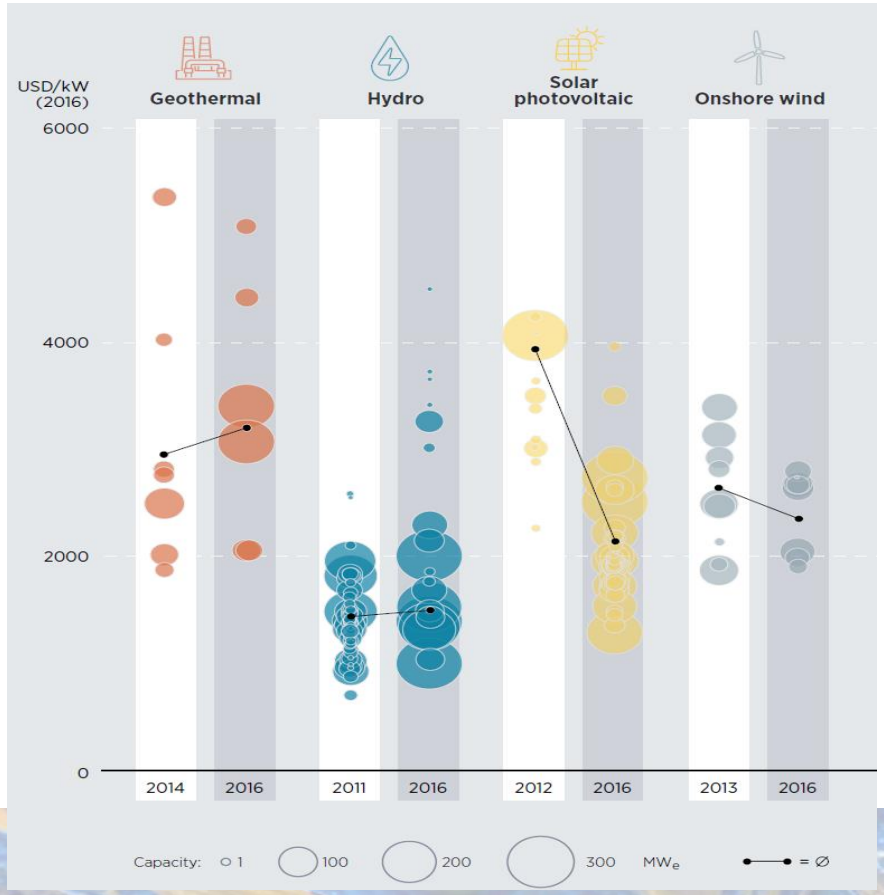
- Scaling-up renewables would have a positive impact on the region's GDP (up to +**0.03% by 2030**)
- Could increase direct and indirect employment in the sector **to 2.2 million by 2030**

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

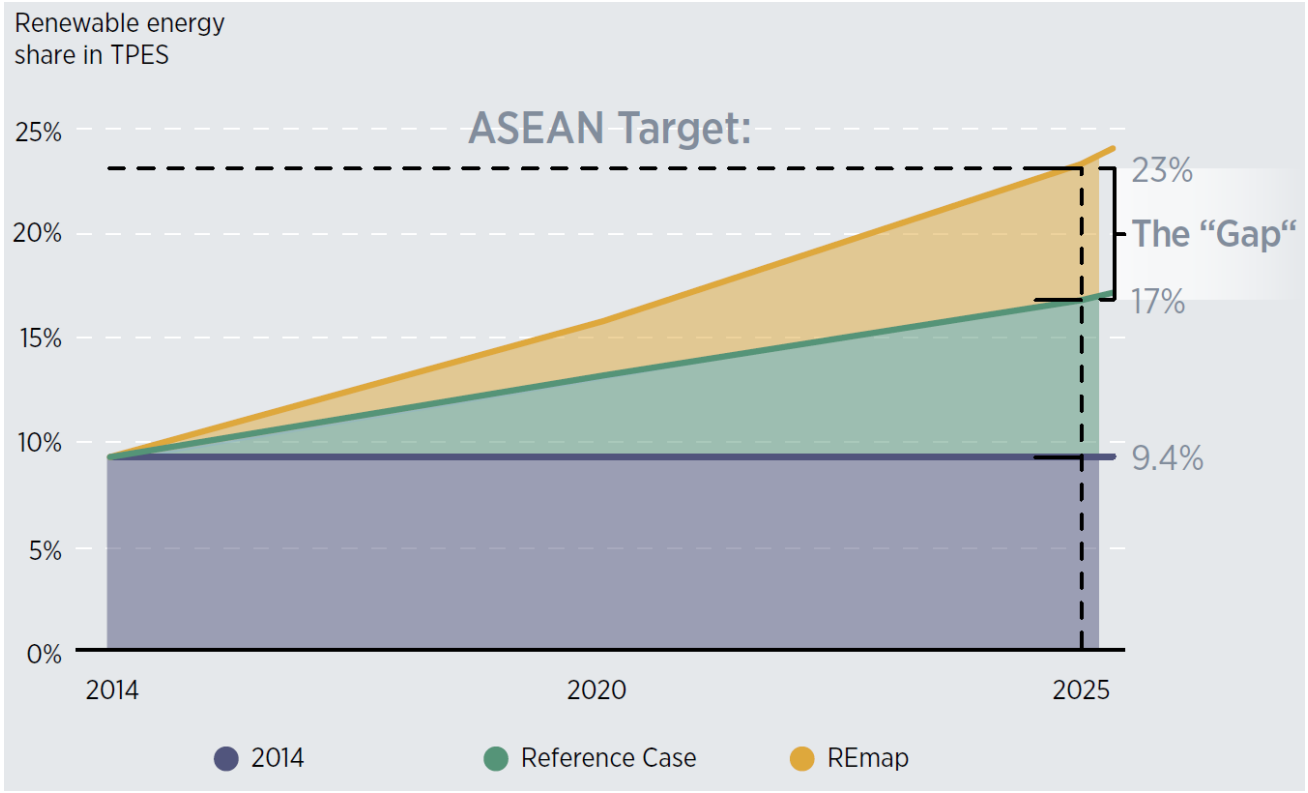
Investment costs of selected renewable energy technologies, 2016



- **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

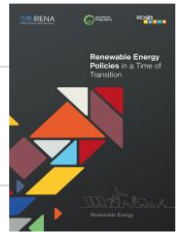


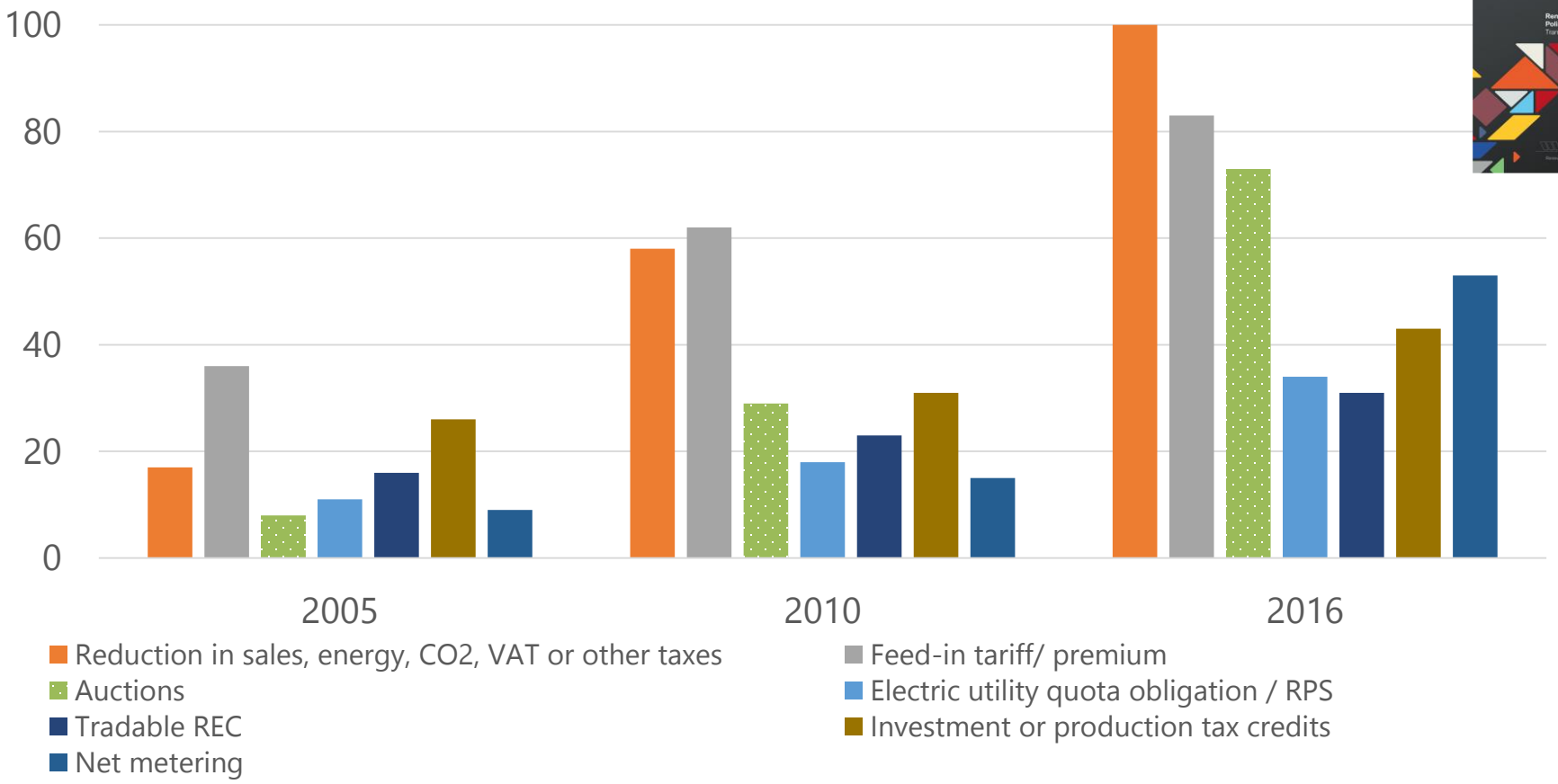
Source: IRENA and ACE, 2016

23%
Share of renewable energy in TPES by 2025

- According to plans, gap of 6% in TPES

Global trends in renewable energy policies, 2005 - 2016





Overview of renewable energy policies in Southeast Asia

IRENA
International Renewable Energy Agency

	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	■		

Source: based on ACE, 2016b.
* = under planning
C = under Clean Development Mechanism (CDM)

23%
Share of renewable energy in TPES by 2025

- 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

Overview of renewable energy policies in Southeast Asia - Power

Structure of electricity markets in Southeast Asia

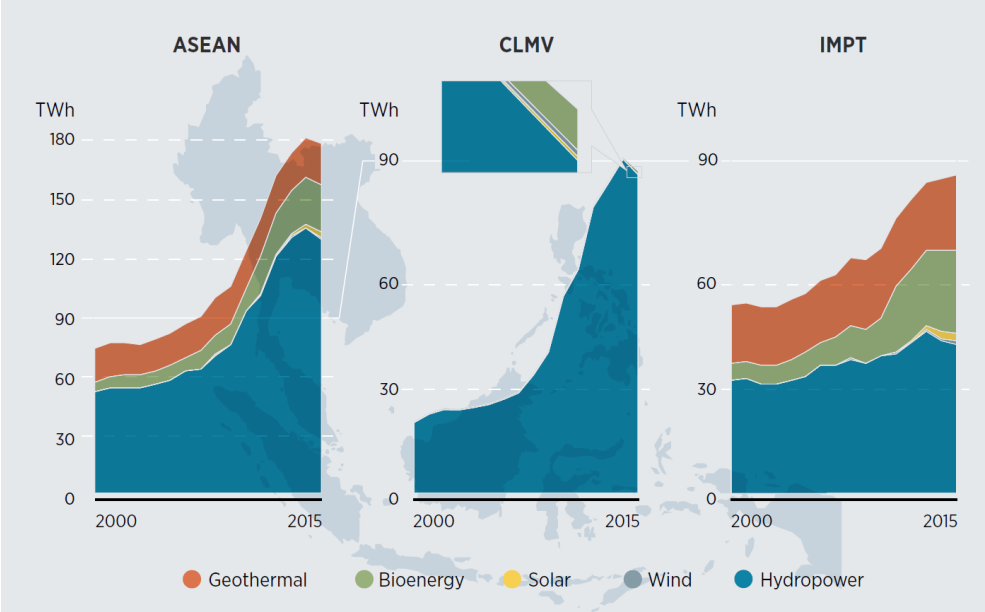
Source: Based on KPMG, 2015.

- 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)



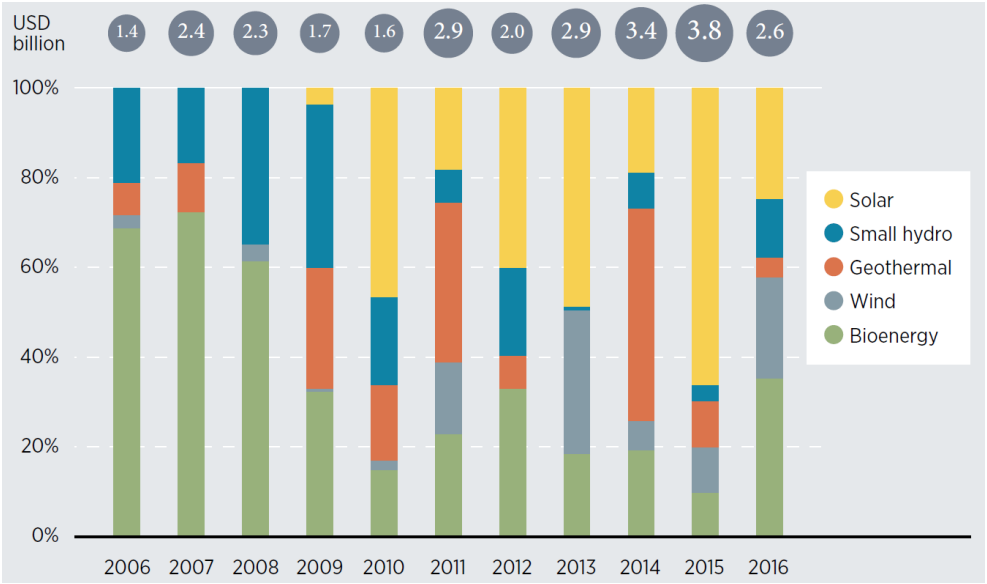
- Large hydropower comprised the majority share, although share in total capacity is decreasing
- Non-hydro renewables growing, with capacity more than doubling in a decade. Solar PV and wind still a small share of the mix
- Electricity trade growing with infrastructure development
- Bioenergy use for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



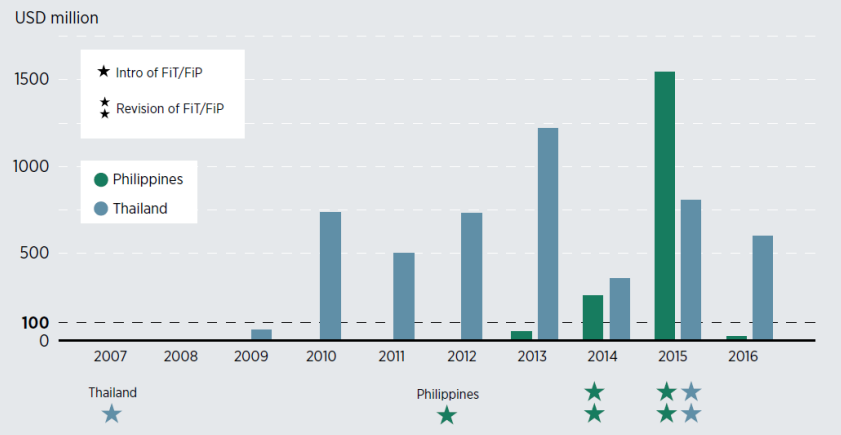
Source: Based on BNEF investment data

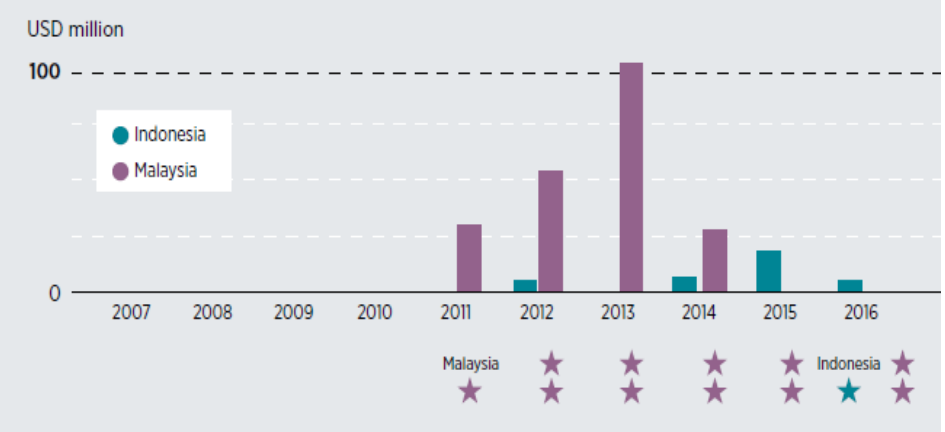
Bridging the gap through enabling policy and investment frameworks – FIT/FIP

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



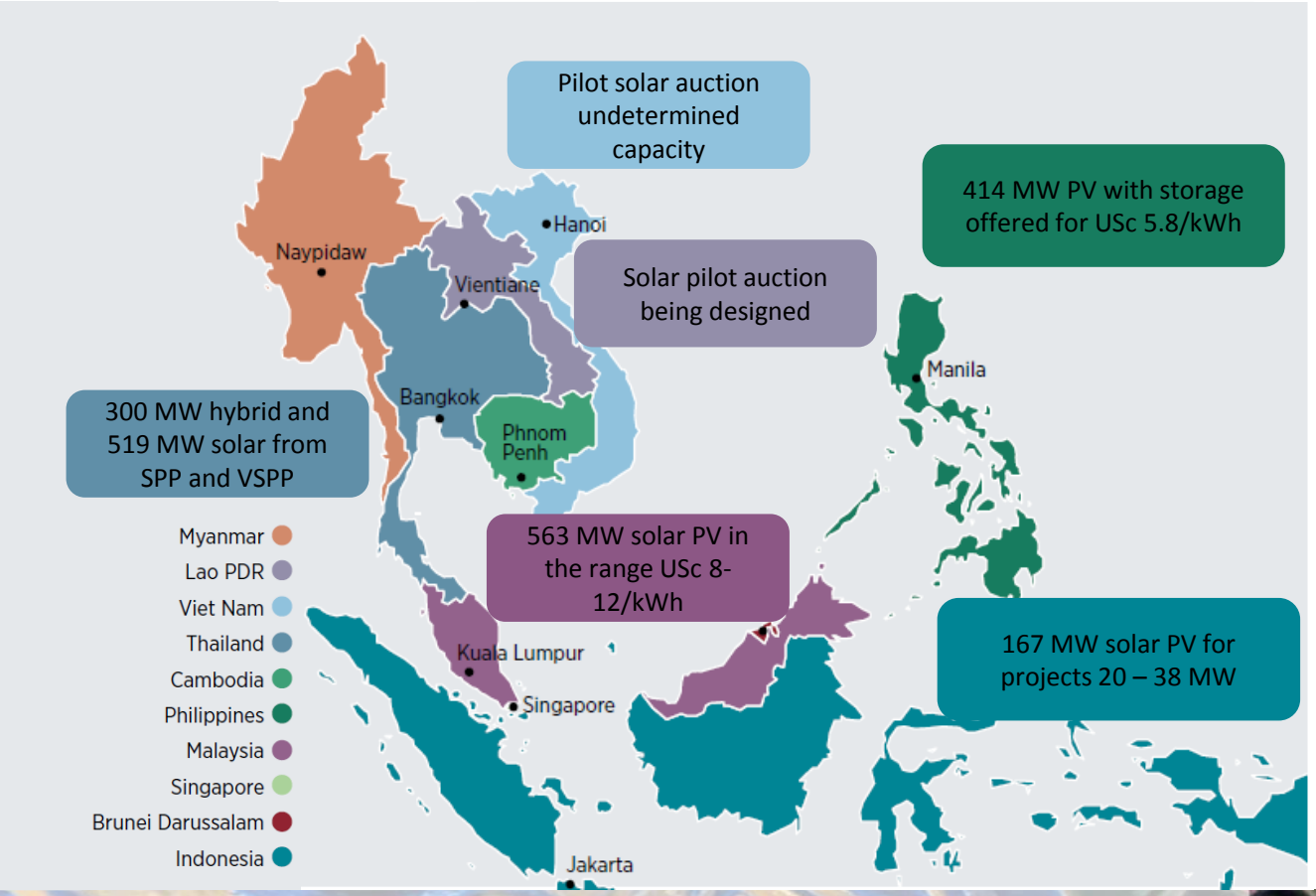


Source: Based on BNEF investment data

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%.

Livelihood case studies: Approaches and benefits

Myanmar:
Micro-hydro and biomass gasifier (REAM), Solar mini-grid (Mandalay Yoma), Solar home systems (Pact)

Cambodia:
Solar for drinking water supply (1001 Fountaines)

Biogas digestor programme for heat and electricity (EnDev/GIZ/SNV, MARD)

Philippines:
Hybrid solar PV for island applications and local economy (USAID)

Indonesia:
Wonder Women Program (Kopernik)
Suba Iconic Island initiative (Hivos)

Deployment approaches

- Private sector led model
- Cooperative & joint initiatives
- Public private partnership
- Social entrepre-neurship

Benefits

- Household needs and clean water
- Productive uses
- Sustainable tourism
- Gender equality & inclusion

The way forward

IRENA
International Renewable Energy Agency

- 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!