

Energy transition in Southeast Asia

June 2022



Southeast Asia's energy sector overview

Southeast Asia's energy demand is expected to increase by 60% by 2040. There is an urgent need to diversify its energy sourcing and supply, in order to cater to the growing demand. This makes the region's transition to a cleaner and more energy efficient future a key imperative.



723m

Estimated population by 2030, making Southeast Asia the 3rd largest in terms of population globally



4.5%

Expected GDP growth per annum (2021 - 2025) as the Southeast Asia's economy recovers well from 2020's sharp contraction



4th

Largest global economy in the world by 2050 overtaking EU and Japan



US\$2tr

Infrastructure investment opportunities required by 2030 to maintain the economic growth



60%

Expected growth in overall energy demand between now and 2040.



* Source: ASEAN Energy Outlook, The ASEAN Post, US-ASEAN Business Council

Southeast Asia's energy sector overview

As Southeast Asia countries face a depleting energy reserve with exponential growth in energy demand ...



Net importer of energy - To meet its growing energy demand, ASEAN continues to import over 40% of its primary energy supply



Increasing concerns on regional energy security as the indigenous fossil fuels resources are rapidly depleting



Need for **diversification of its energy supply** to expand the energy system

Renewable energy is expected to be a solution to meeting the energy demand



Trend towards clean energy - Pressure on phasing out fossil fuels driven by the region's sustainability agenda

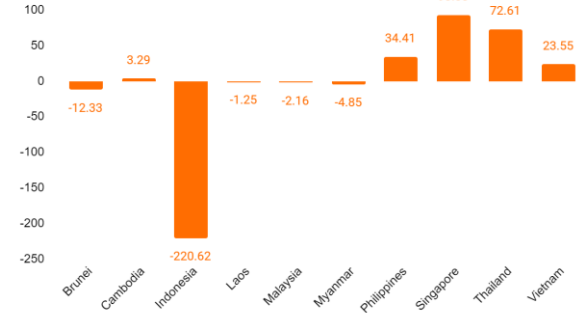


Declining cost of renewable energy - In particular, cost of solar PV and onshore wind has decreased significantly in recent years. This will help drive prices closer to conventional generation technologies and grid parity

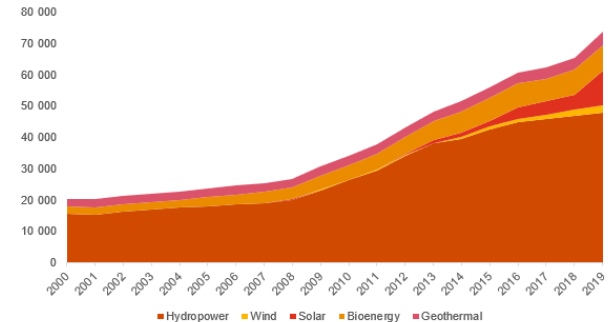
* Source: IEA, ASEAN Energy Outlook

PwC Is ASEAN ready for the energy transition?

Net energy imports (Mtoe)



ASEAN renewable energy capacity (MW)



ASEAN renewable energy initiatives

2 major ASEAN-wide initiatives were developed to facilitate the energy transition in the region



ASEAN Plan of Action on Energy Cooperation Phase II: 2021 - 2025

- “Accelerating Energy Transition and Strengthening Energy Resilience through Greater Innovation and Cooperation”
- Set out to explore more ambitious targets to **enhance energy security and sustainability** in line with the objectives of the global energy transition, Sustainable Development Goals (SDG) and Paris Agreement

ASEAN Power Grid



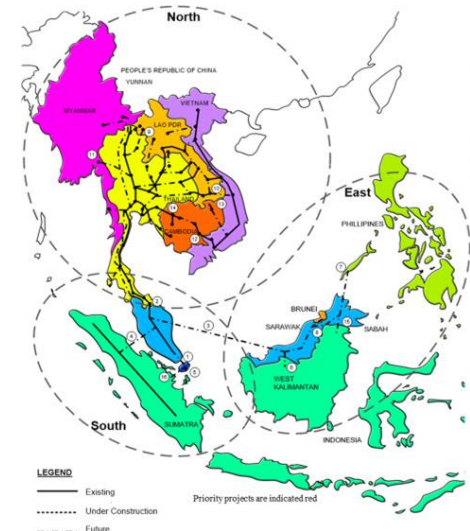
- Establish regional power grid infrastructure and transmission lines across ASEAN member states to **enhance cross border electricity trade in the region**
- **ASEAN Interconnection Masterplan Study (AIMS) III** - ongoing study expected to provide insights on how to **optimise regional cooperation on electricity and increase penetration of renewable energy**

23%

share of renewable energy in the **total primary energy supply** by 2025

35%

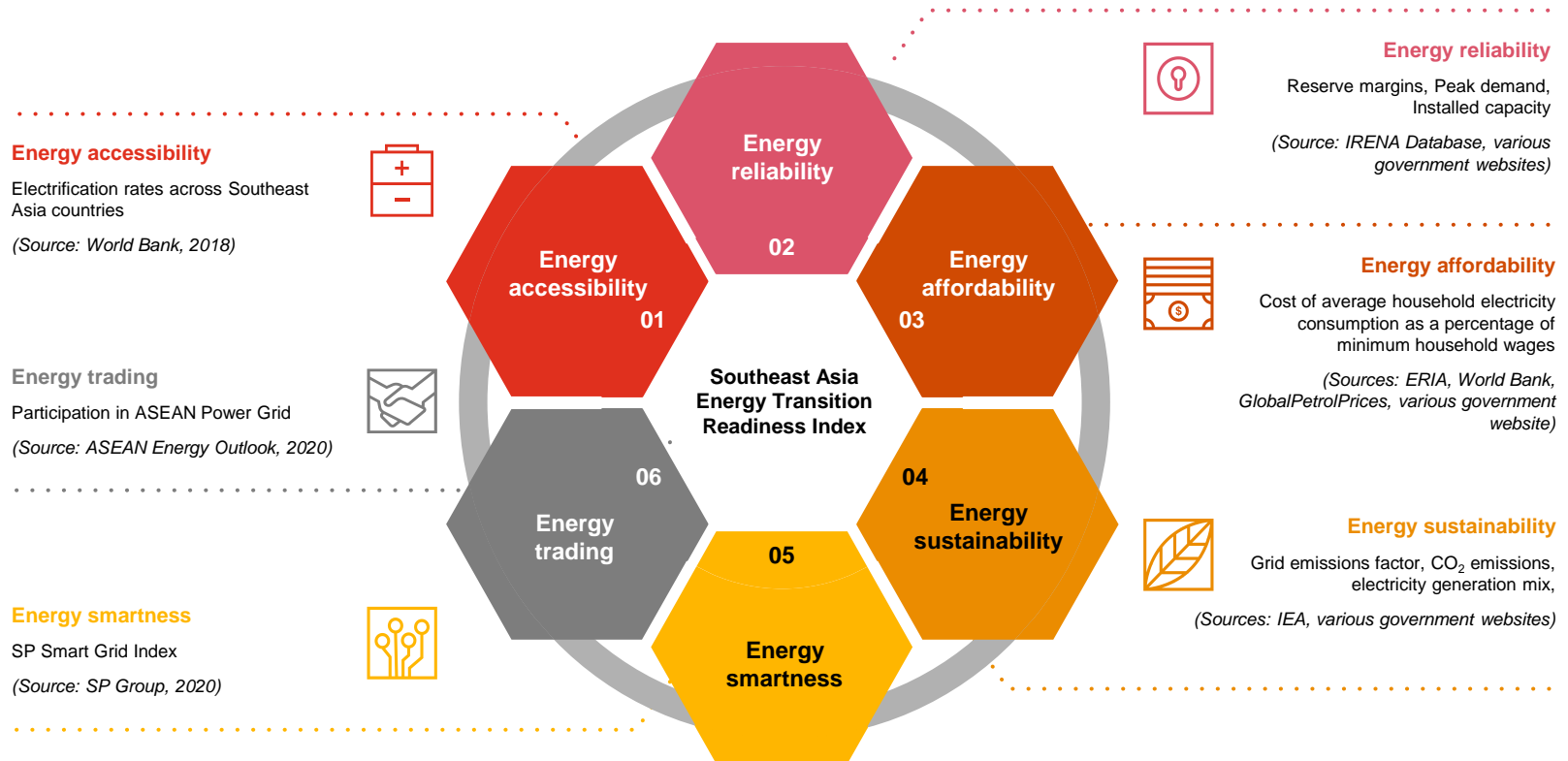
share of renewable energy in the **ASEAN installed power capacity** by 2025



* Source: ASEAN Centre for Energy, ASEAN Energy Outlook

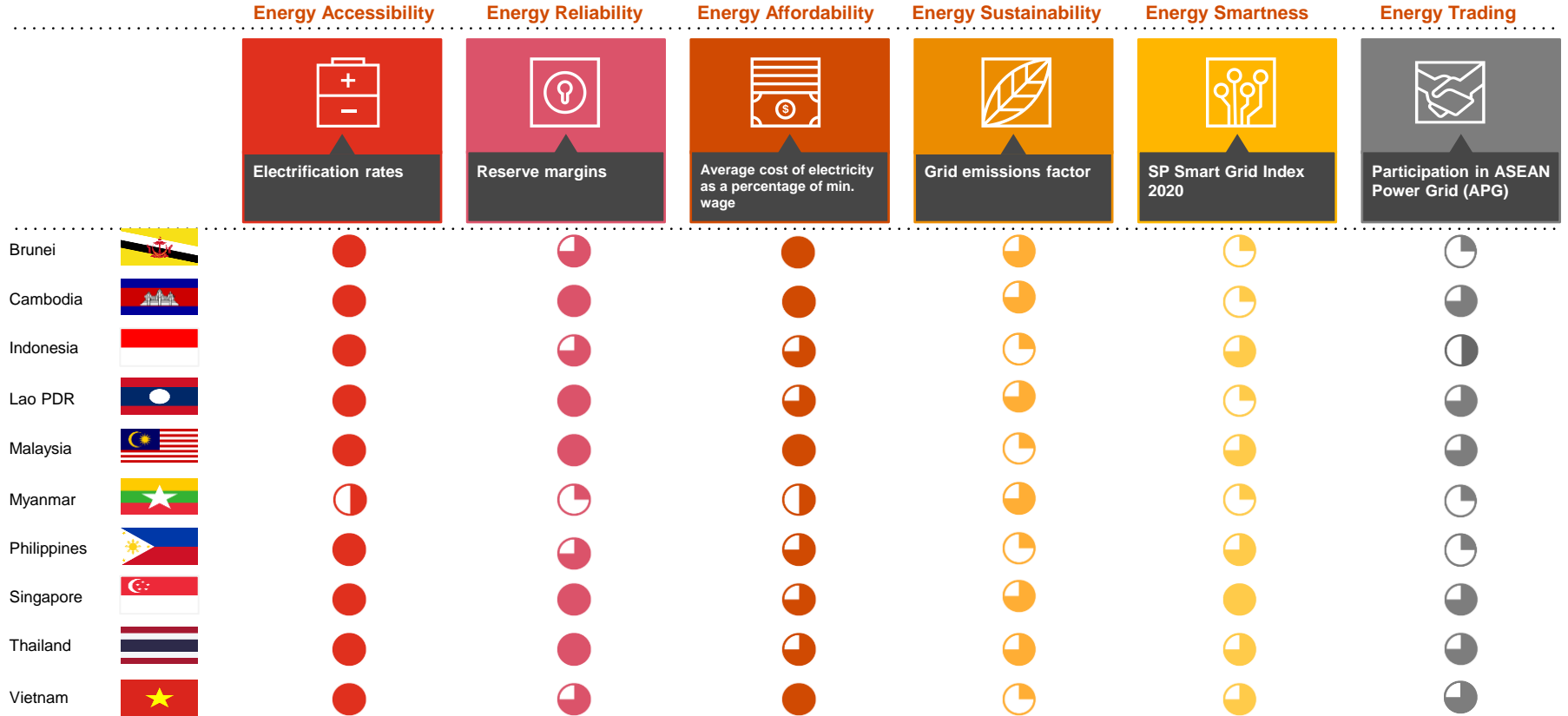
Southeast Asia Energy Transition Readiness Index

To help better assess the energy transition readiness, we have created the Southeast Asia Energy Transition readiness index



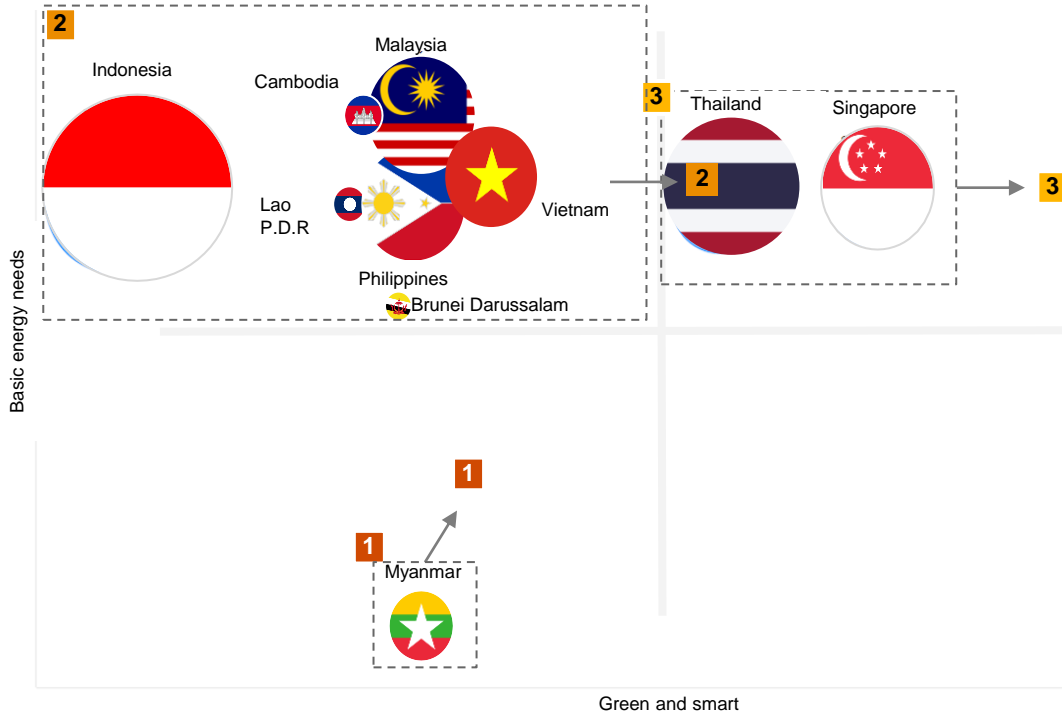
ASEAN Readiness Index

Scale:  Developing  In Progress  Established  Mature



Country positioning

Southeast Asia is doing well in terms of meeting the basic needs of its people; more can be done in terms of sustainability and smartness



We have identified three sub-groups of countries based on their position.

Group 1 – Meeting basic energy need requirement

For Myanmar, it is observed that there is an urgent need to meet the basic energy needs of people. The country should focus on improving electrification and reserve margins.

Group 2 – Improving the quality of energy supply

Most countries in Southeast Asia falls within the second group. Most member states have achieved the basic energy needs for its people. However, more can be done in terms of making the future energy mix cleaner and smarter.

Group 3 – Driving innovation and energy excellence

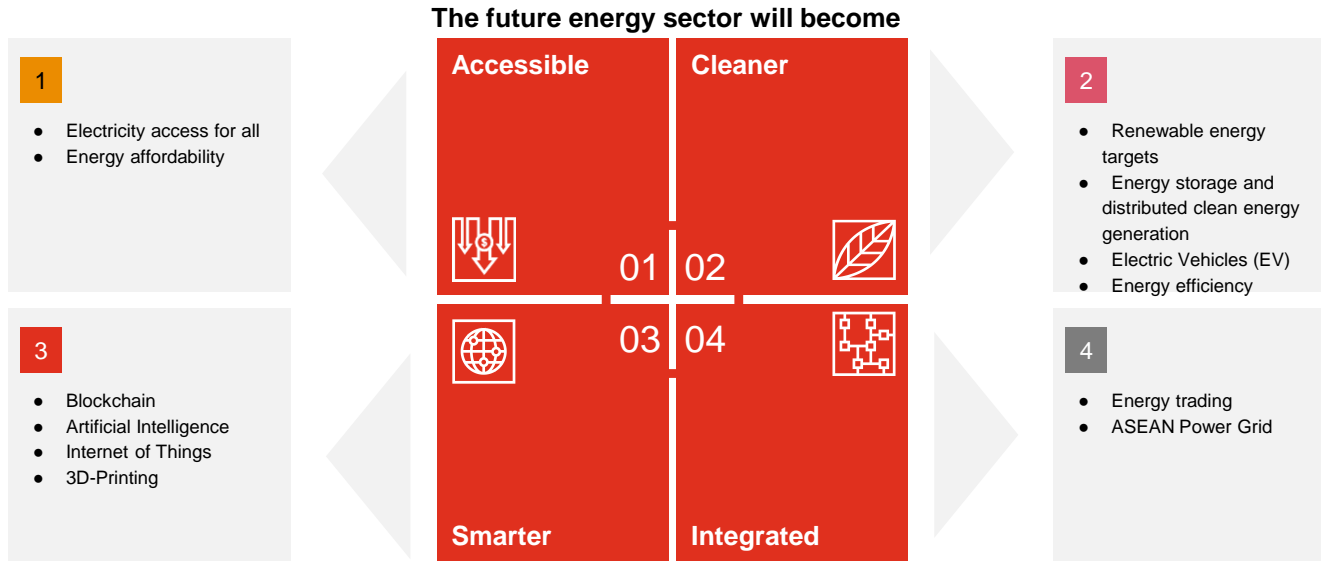
The third group consists of countries such as Thailand and Singapore. Both countries have achieved basic energy needs, while achieving some success in their pursuit of making energy cleaner and smarter. However, more developments such as increasing renewable share, higher penetration of EV, growing distributed solar generation in the power sector are expected in the near future.

Structure of report

Key areas of focus for the ASEAN energy transition



ASEAN energy sector overview




Electricity access for all

ASEAN's progress towards 100% electrification by 2030

Key trends within the region

- Between 2000 and 2016, **more than 170 million people** gained access to electricity across the region - **total electrification rate rose from 62% to 90%** during the same period (IEA, 2017a).
- More developed economies (e.g.: **Brunei Darussalam, Malaysia, Singapore and Thailand**) have already achieved **universal or near-universal electrification**
- However, **more than 65 million people** continue to remain without access to electricity, primarily in **Cambodia, Indonesia, Myanmar and the Philippines** (IEA, 2017a)

Rural electrification targets, programmes and regulations

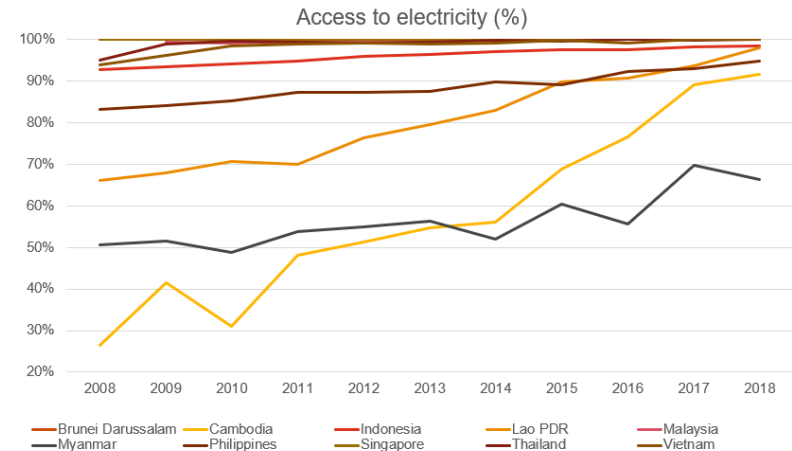
	Targets	Initiatives
	<ul style="list-style-type: none"> • Access to electricity in all villages by 2020 • Access to quality grid electricity among at least 70% of households by 2030 	Power to the Poor (P2P) Programme
	<ul style="list-style-type: none"> • Universal electricity access by 2020 	Rural electrification regulation
	<ul style="list-style-type: none"> • Universal electrification by 2030 	World Bank National Electrification Programme and 2014 Electricity Law
	<ul style="list-style-type: none"> • Universal electrification by 2022 	Philippine Development Plan 2017–22

* Source: ASEAN Energy Outlook, IRENA, UN Sustainable Development Goals, World Bank

United Nations' Sustainable Development Goal 7.1



- Aims to ensure universal access to affordable, reliable and modern energy services by 2030
- Most, if not all, AMS expect to achieve a 100% electrification rate by 2030.



Trends towards cleaner energy within the region

Key areas of focus for the ASEAN energy transition

1 No coal future

- Moratorium on development of new coal power plants
- Regulations for renewable energy
- Restrictions on coal financing
- Use of technology to reduce externalities of coal



3 Onshore/Offshore wind

- Indonesia, Philippines, Thailand and Vietnam have rich wind resources
- Countries have established targets (e.g.: Vietnam targets to achieve 6GW capacity of wind energy by 2030)



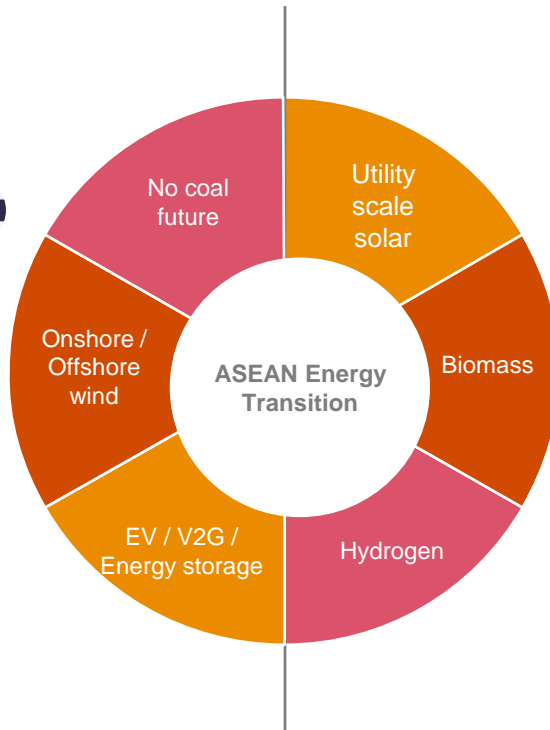
5 Electric vehicles (EVs) / Vehicle-to-grid (V2G) / Energy storage

- Thailand is positioning itself to the EV hub for ASEAN
- Singapore is pioneering energy storage in the region - Woodlands substation, Keppel O&M floating storage
- Governments have established ambitious EV and energy storage targets



* Source: REN21

PwC Is ASEAN ready for the energy transition?



2 Utility scale solar

- All countries have established targets for solar PV (e.g.: Vietnam has established target of 12GW capacity of solar energy by 2030)



4 Biomass

- Most countries have abundant natural resources (rice, sugarcane) to provide feedstock for bioenergy projects



6 Hydrogen

- ASEAN Plan of Action for Energy Cooperation Phase II
- Pilot developments in Singapore
- Challenges for hydrogen adoption



Digital disruptions within the energy sector

The future of smart energy with emerging technologies such as Blockchain, AI, IoT and 3D-Printing



Blockchain

Artificial Intelligence (AI)

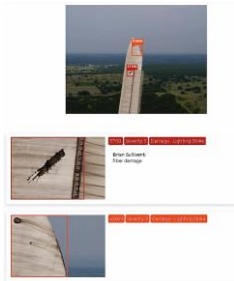
Internet of Things (IoT)

3D-Printing

UAV Applications

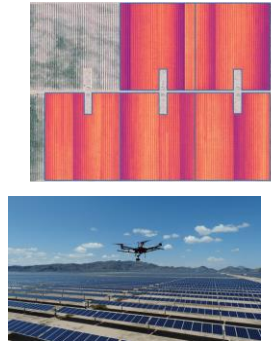
1

**Inspection
maintenance**



2

**Aerial
photography /
filming**



3

**Maintenance
of power lines**

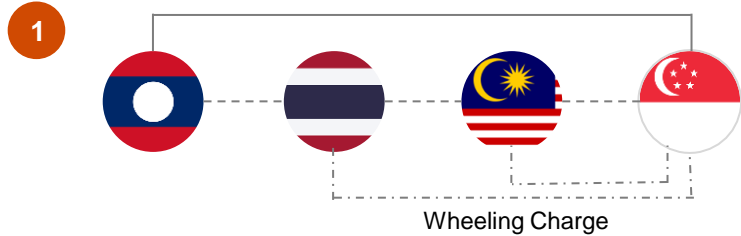


* Source: IFC, ScienceDirect

PwC Is ASEAN ready for the energy transition?

ASEAN Power Grid (APG)

Case study: Electricity trading in Singapore



Lao PDR-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP)

- **First multilateral electricity trade initiative within ASEAN** - The countries has announced their commitment to initiate up to 100 MW of cross-border power trade from Lao PDR to Singapore via Thailand and Malaysia using existing interconnections from 2022 to 2023



Singapore to import additional 100 MW of electricity from Malaysia

- **Singapore have high reserve margins** - installed capacity is significantly higher than peak demand
- Despite “**ample spare capacity**”, Singapore has announced a trial of importing additional electricity from Malaysia

- **Trial of a broader power integration initiative** - paving the way for a regional electricity market in the future
- **Advance sustainability agenda** - tap on regional power grids for access to clean energy and drive sustainability goals

* Source: ASEAN Energy Outlook, EUI

PwC Is ASEAN ready for the energy transition?

Thank you

pwc.com/sustainability

© 2022 PwC. All rights reserved. Not for further distribution without the permission of PwC. "PwC" refers to the network of member firms of PricewaterhouseCoopers International Limited (PwCIL), or, as the context requires, individual member firms of the PwC network. Each member firm is a separate legal entity and does not act as agent of PwCIL or any other member firm. PwCIL does not provide any services to clients. PwCIL is not responsible or liable for the acts or omissions of any of its member firms nor can it control the exercise of their professional judgment or bind them in any way. No member firm is responsible or liable for the acts or omissions of any other member firm nor can it control the exercise of another member firm's professional judgment or bind another member firm or PwCIL in any way.