INVEST MALAYSIA 2021

THE CAPITAL MARKET CONVERSATION

REBUILDING A SUSTAINABLE ECONOMY

SERIES 4: RENEWABLE ENERGY - DECARBONISING MALAYSIA

23 NOVEMBER 2021

INTRODUCTION

Climate change is one of the greatest challenges of our time. As nations around the world rewire their processes and lean on a greater use of renewable energy to mitigate impacts, investors may have one of the biggest roles to play.

At the recent United Nations Climate Change Conference of the Parties, or COP 26, the Malaysian government noted that to fully implement the Paris Agreement on Climate Change additional financing, technology transfer and capacity building will be required by developing countries. This stands true for the continued progress in this area for Malaysia, and for ASEAN in general.

For Malaysia, a nation that's been blessed with sources of renewable energy such as solar, hydro and biomass, these are the areas that have seen an immense growth in the various relevant technologies and skills.

Furthermore, as Malaysia is considered the gateway to ASEAN, this is a prime opportunity to develop solutions that can quickly scale within the domestic market and serve as a springboard into larger regional markets. What begins here, has the potential to grow everywhere.

RE-POWERING A NATION: TOWARDS A SUSTAINABLE FUTURE

Vision, commitments & the greater goals of the nation.

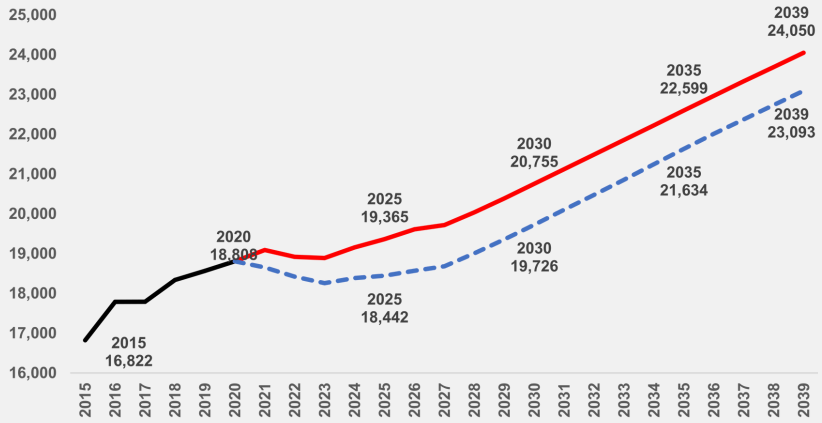
Every vision needs a clear roadmap and a foundational base of policies designed to boost as well as steer progress toward its stated goals.

With newer technologies such as renewable energy, it will require creative and agile thinking to make the best use of currently available as well as emerging technologies, to collaborate widely and to drive an efficient buildup of skills. Renewable energy is far from being a 'plug and play' component even in modern, advanced economies.

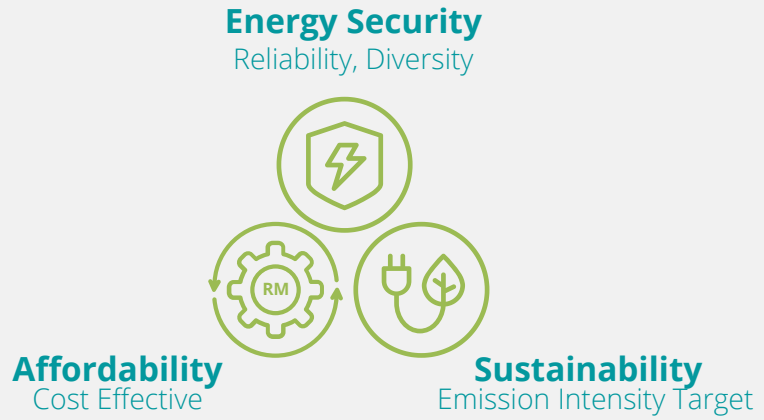
All nations have a unique set of needs as well as opportunities. Understanding this is key to being able to drive a coherent sense of progress toward the greater goals of the Malaysian nation – as a modern, sustainable economy that is equitable, and able to provide for all its citizens.

In this section, we look at a snapshot of Malaysia's advantages, commitments and pledges made at COP 26 as well as the policies that anchor these ambitions.

Malaysia energy demand projections: Normalisation in line with post-C19 recovery



Managing the energy Trilemma: Policies and planning criteria

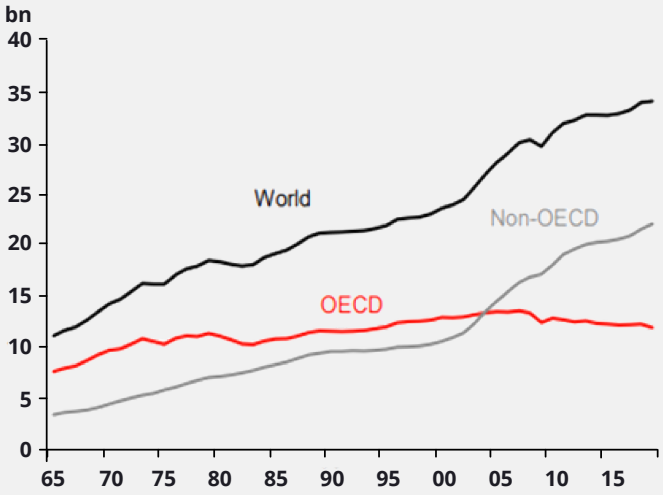


RE-POWERING A NATION: TOWARDS A SUSTAINABLE FUTURE

A quick snapshot: global progress, and how much is needed to close the gaps.

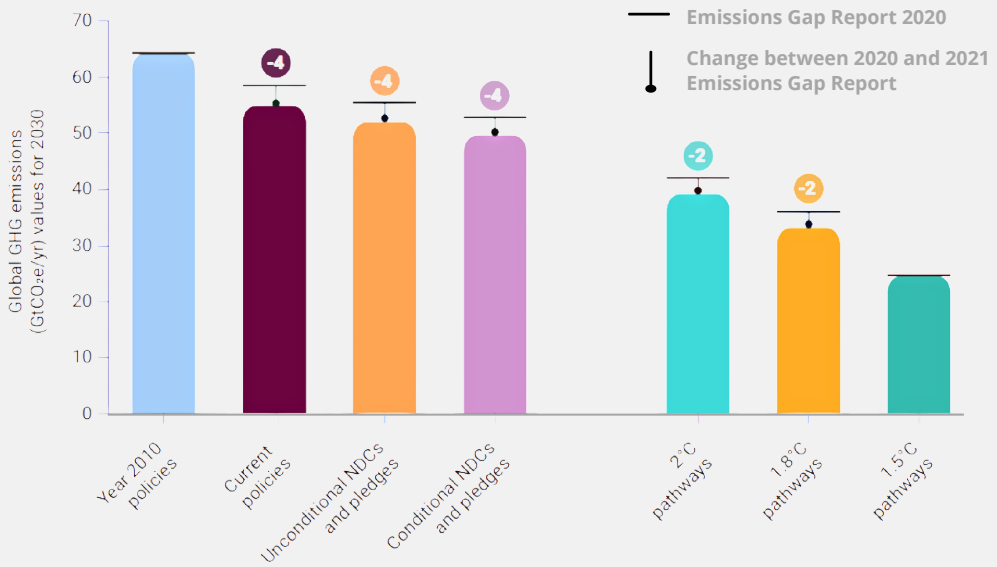
The overriding aim of COP26, Glasgow 2021: At the Paris Agreement of 2015, signatories were given five years to come up with climate plans that were consistent with keeping global warming to 1.5 degrees warming. Plans announced in the lead-up to Glasgow 2021 still point to ~2.7 degrees C warming. To keep 1.5 degrees C alive, sector-level policies over the next 5 years will need to exceed all of the energy transition support of the past 10 years. What is now required is a ~45% decline in GHG emissions by 2030 versus the current trajectory for 16% rise.

Carbon Dioxide Emissions (tonnes)



Source: BP, Macquarie, October 2021

Overview of changes in greenhouse gas emissions projections for 2030 for different scenarios



Source: UNEP Emissions Gap Report 2021 (Oct 2021)

RE-POWERING A NATION: TOWARDS A SUSTAINABLE FUTURE

Targets, policies & milestones: moving from ambition to achievement.

Malaysia's commitments & pledges to date, including those made at COP 26:

To slash greenhouse emissions intensity against GDP by 45% by 2030 from 2005 levels, to achieve net zero by 2050.

Launch carbon pricing policy in phases, aiming for a 31% capacity for renewable energy by 2025 and 40% by 2035 in the national grid.

Malaysian government agrees to support the Global Pledge on Methane and the Glasgow Leaders' Declaration on Forests and Land Use.

100% procurement of non-internal combustion engines for government vehicles by 2030.

Keep 50% of the country's forests

Implement zero waste at landfills and increase recyling rate to 40% by 2025.

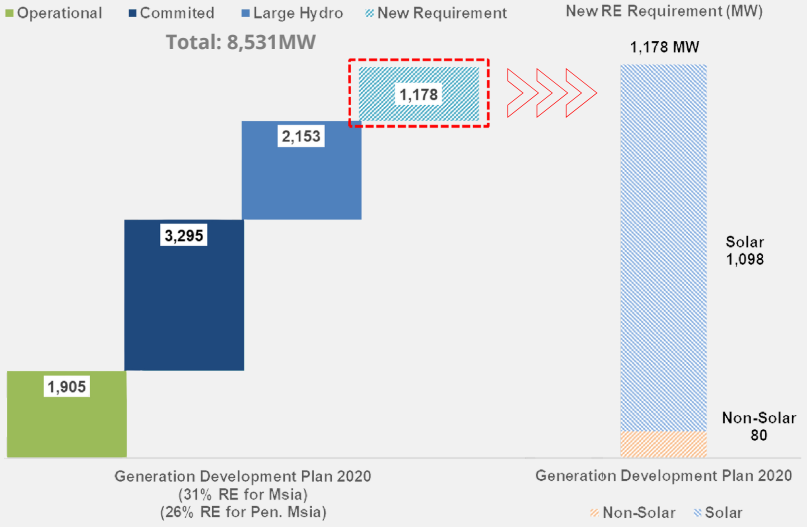
Develop a National Adaptation Plan to deal with the impact of climate change.

The list includes:

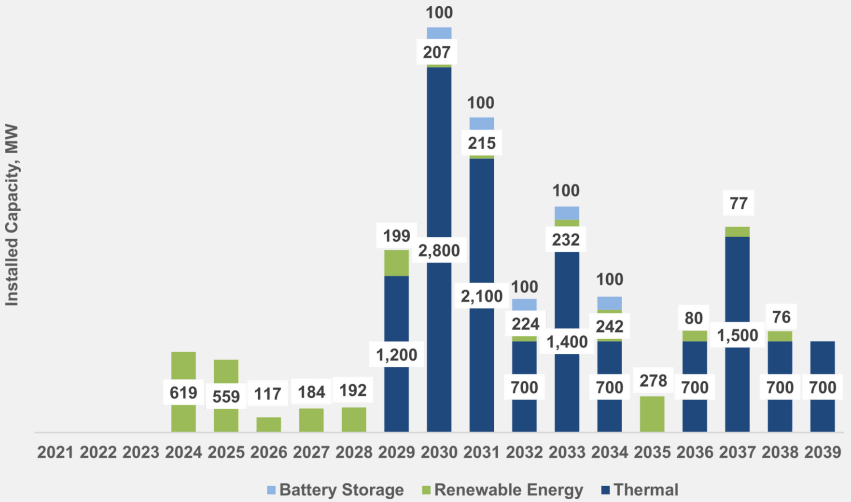
The Global Methane Pledge, signed by over 100 countries, which committed to reduce global methane emissions.

The Glasgow Leaders' Declaration on Forests and Land Use, where over 100 countries committed to halt deforestation by 2030.

New RE Requirement (2026-2035) to meet 40% RE Capacity Mix by 2035 (Peninsular Malaysia)



New Capacity Projection 2021-02039 (MW)



RE-POWERING A NATION: TOWARDS A SUSTAINABLE FUTURE

Targets, policies & milestones: moving from ambition to achievement.

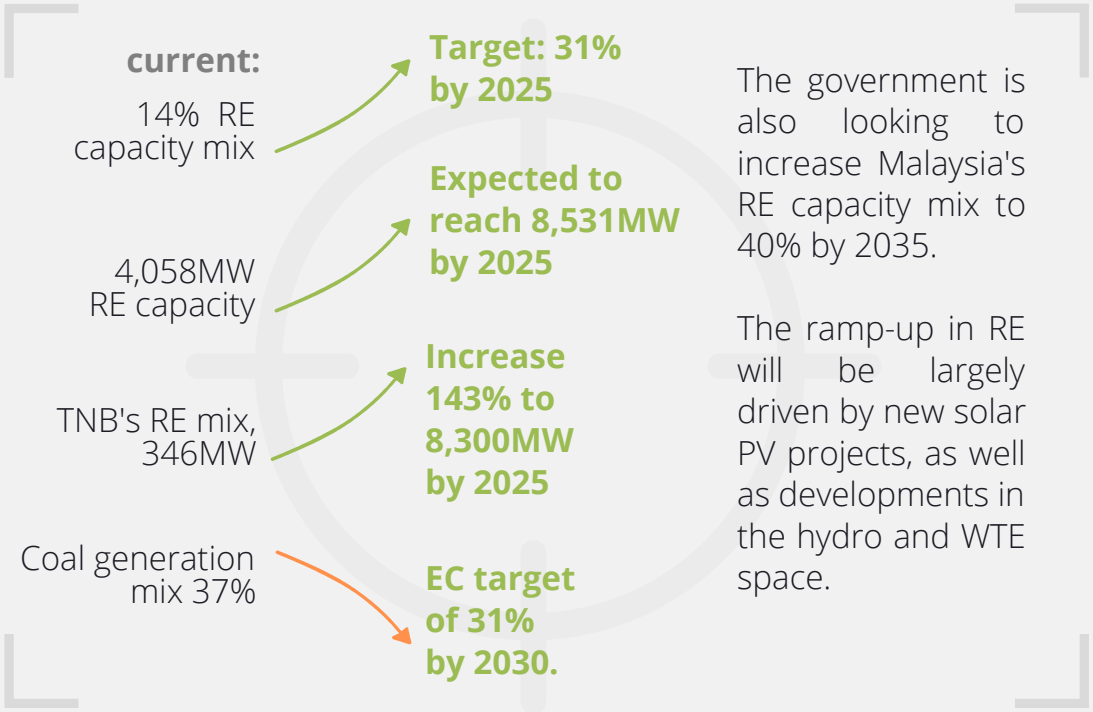
Update of factors driving Malaysia's growth in RE:

Carbon Neutrality by 2050:
The government has committed to achieve carbon neutrality by 2050. Announcement of new polices to realise this are expected soon.

Voluntary Carbon Market:
Implementation of carbon credit trading will be key to drive further ESG and RE-related investments among market participants.

Carbon tax implementation:
The government also plans to introduce a carbon tax which could spur more RE development.

Development strategy:
The government is expected to announce the full details of the Low-Carbon Long-Term Development Strategy study by end-2022.



The government is also looking to increase Malaysia's RE capacity mix to 40% by 2035.

The ramp-up in RE will be largely driven by new solar PV projects, as well as developments in the hydro and WTE space.

RE-POWERING A NATION: TOWARDS A SUSTAINABLE FUTURE

Growth drivers & incentives: building critical momentum.

Solar power

- Lower input and generation costs for solar panels.
- Improving demand and economies of scale has resulted in lower PV generation cost, making it comparable to generation cost of thermal plans.
- 2,457MW of LSS projects have been awarded since the program was first introduced in 2016.
- Latest LSS4 tender reference bidding price has halved to 24 sen/kWh from LSS1's 48 sen.
- 823GW of tenders awarded for LSS4 with bid price as low as 14.75 sen/kWh.
- Future LSS tenders are expected to contribute to the nation's RE targets.

Hydropower

- Malaysia's hydropower generation has a large potential for growth with a total generation potential of 22,000MW.
- Large hydropower capacity stands at 5,684MW. Peninsular Malaysia generates 38% of this total.

Tariffs

- The government introduced Feed-in-tariffs and Net Energy Metering schemes to allow independent RE producers to sell to the grid.
- Between 2018-2020, 514MW of FIT quota was awarded, more is expected in the future.
- 265MW of the latest NEM 3.0 500MW quota has been allocated.
- 'No new coal plants' commitment from Government.

Incentives

- Green Technology Financing Scheme (GTFS), Green Investment Tax Allowance (GITA) and Green Income Tax Exemption (GITE) have been extended to 2023.
- The government's Green Technology Financing Scheme 2.0 (GTFS 2.0) offers 2% p.a. interest/profit rate subsidy for the first 7 years & 60% government guarantee of green component cost of financial institutions.

INVESTMENTS IN RENEWABLE ENERGY: OPPORTUNITIES & CHALLENGES

The ever-widening scope of renewable energy; in an era where consumers can also be producers.

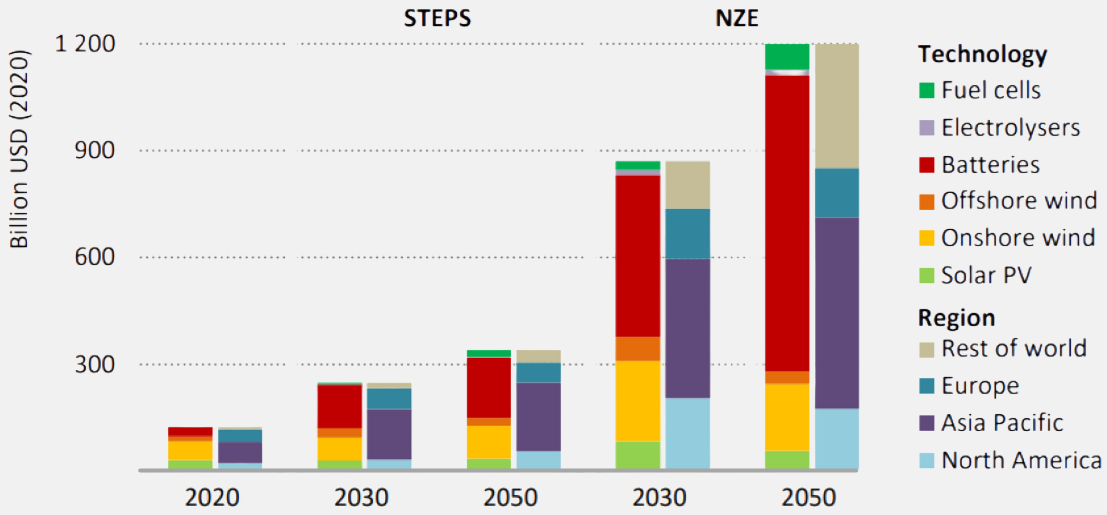
Renewable energy is a field that is wider than most. While it involves some components that are familiar to all, such as solar power or hydropower, it also involves many other emerging technologies and new business models.

There is an ever-widening range of tools that are involved, such as the internet of things, battery technologies, artificial intelligence, big data and blockchain technologies just to name a few. With energy generation from renewable sources, recent years have seen consumers being given the ability to become power producers and even feed the grid.

This decentralisation has driven new business models that allow new paradigm shifts such as peer-to-peer energy trading amongst others. The scope for investment keeps growing as technology evolves and offers ways to distribute and manage this complex grid of producers and consumers; who are all in their own way contributing to a cleaner future.

The challenge is finding the sweet spot where demand for power is balanced by its cost and the greater energy security of the nation – 'keeping the lights on' not just for homes or EVs, but large-scale industrial users for whom large amounts of power is a basic necessity.

IEA estimates: Explosive growth in clean energy technologies over the next decade (NZE) will lead to a clean energy market worth a cumulative US$27 trillion by 2050



Net Zero Emissions by 2050 Scenario (NZE)
Stated Policies Scenario (STEPS)
Announced Pledges Scenario (APS)

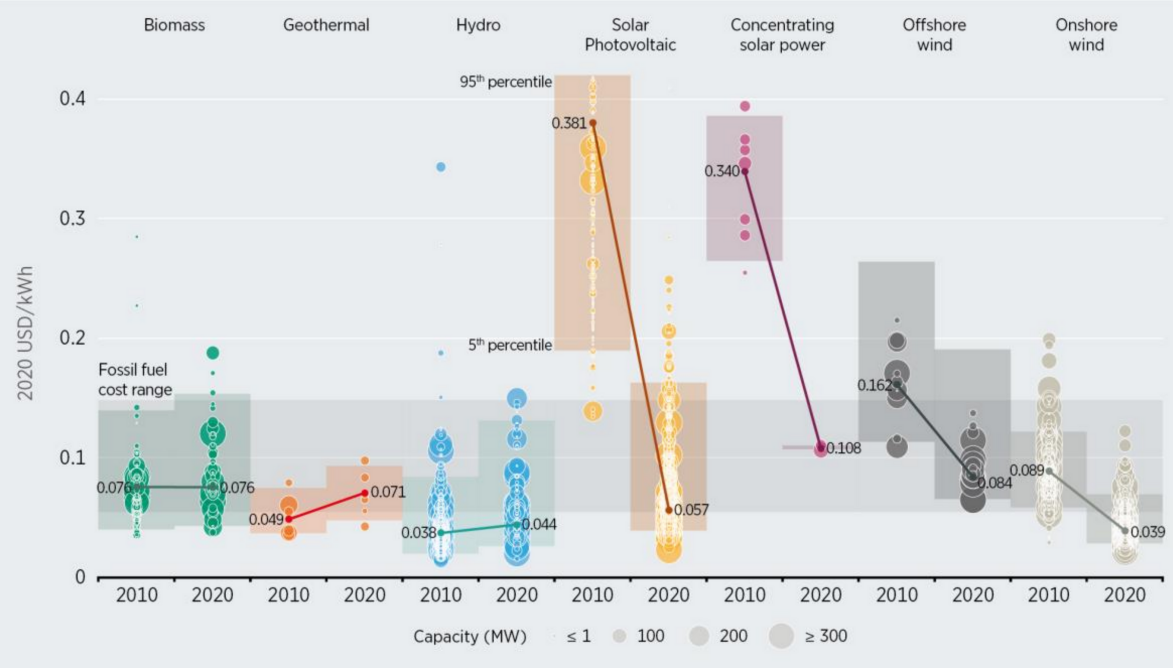
Source: IEA, Macquarie Research, Nov 2021

INVESTMENTS IN RENEWABLE ENERGY: OPPORTUNITIES & CHALLENGES

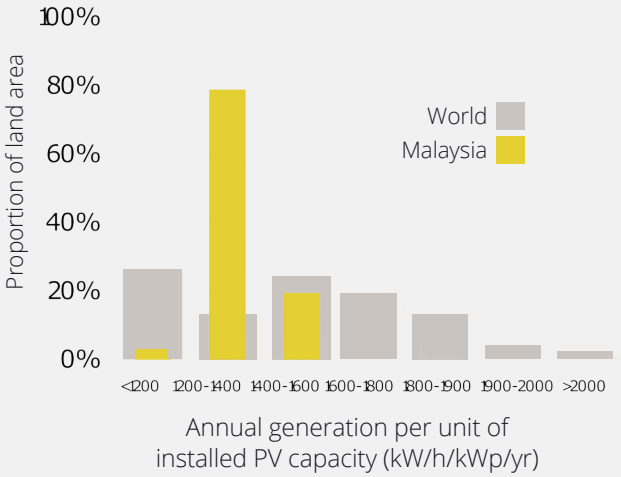
Costs, competitiveness & potential: The opportunity to replace fossil fuels.

Costs are one of the key factors holding RE back. But recent progress in technology and production (including the sourcing of raw materials while keeping to ESG standards) has seen a shift in the adoption of these opportunities all over the world.

Costs for newly commissioned RE plants have plummeted



Distribution of solar potential



Biomass potential: Net primary production

Source: IRENA, Sep-21, IRENA statistics, plus data from the following sources: UN SDG Database (original sources: WHO; World Bank; IEA; IRENA; and UNSD); UN World Population Prospects; UNSD Energy Balances; UN COMTRADE; World Bank World Development Indicators; EDGAR; REN21 Global Status Report; IEA-IRENA Joint Policies and Measures Database; IRENA Global Atlas; and World Bank Global Solar Atlas and Global Wind Atlas.

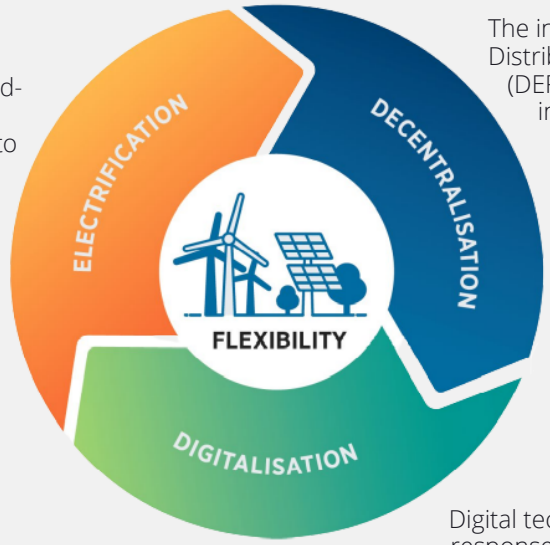
INVESTMENTS IN RENEWABLE ENERGY: OPPORTUNITIES & CHALLENGES

RE involves a wide range of emerging technologies, and new-economy skills.

Much has been shared about Malaysia's Digital Transformation and the 4th Industrial Revolution. These are a part of a capable foundation that provides for the transition towards renewable energy which requires new technologies, data transmission capabilities as well as the skills to design, build and manage the systems that will lead the nation toward a zero carbon future.

Three trends propelling power systems transition

Electrification of end-use sectors: an emerging solution to maintain value and avoid curtailment of VRE and help decarbonise other sectors.



The increasing deployment of Distributed Energy Resources (DERs) turns the consumers into an active participant, fostering demand-side management.

Digital technologies enable faster response, better management of assets, connecting devices, collecting data, monitoring and control.

Source: IRENA (2019), Innovation landscape for a renewable-powered future: Solutions to integrate variable renewables

Deploying renewables increases power sector complexity and the need for flexibility: New tools are required to optimise the system.

{ Internet of things }

DATA-GENERATION:
Vast amounts of granular data captured with a network of smart devices that have sensors and can act upon changing conditions.

{ Artificial Intelligence }

DECISION-MAKING: Automated data analysis, learning and decision making done by software and smart devices.

{ Blockchain }

TRANSACTIONS:
Open and secure management of data and automatisation of contract execution via smart contracts.

Source: IRENA (2019) Blockchain: Innovation Landscape Brief

INVESTMENTS IN RENEWABLE ENERGY: OPPORTUNITIES & CHALLENGES

The potential landscape for Malaysia's RE-powered future: Emerging innovations for RE integration

Enabling technologies

- Utility-scale batteries
- Behind-the-meter batteries
- Electric-vehicle smart charging
- Renewable power-to-heat
- Renewable power-to-hydrogen
- Internet of things
- Artificial intelligence and big data
- Blockchain
- Renewable mini-grids
- Supergrids
- Flexibility in conventional power plants

Business Models

- Aggregators
- Peer-to-peer electricity trading
- Energy as a service
- Community-ownership models
- Pay-as-you-go models

Market Design

- Increasing time & space granularity in electricity markets
- Innovative ancillary services
- Re-designing capacity markets
- Regional markets
- Time-of-use tariffs
- Market integration of distributed energy resources
- Net billing schemes

System operation

- Future role of distribution system operators
- Co-operation between transmission and distribution system operators
- Advanced forecasting of variable renewable power generation
- Innovative operation of pumped hydropower storage
- Virtual power lines
- Dynamic line rating

Source: IRENA (2019), Innovation landscape for a renewable-powered future: Solutions to integrate variable renewables

INVESTMENTS IN RENEWABLE ENERGY: OPPORTUNITIES & CHALLENGES

The global events & trends that conspire to shift the goalposts and raise the hurdles.

Impact

Energy demand & supply, acute challenges:
While OECD emissions have declined, global emissions have continued to increase driven by EM activity.

China's emissions are expected to peak by 2030 with a target of a 65% reduction in emissions intensity by 2030 (vs. 2005) and net zero by 2060. Current power-rationing dynamics are a sign of the government's commitment to those goals.

Developed countries need to lead investment into new low-carbon technology and transition plans need to factor in fossil-fuel redundancy capacity. Accelerating demand for EV batteries is driving a scramble to secure supply for stronger-than-expected demand for electric vehicles.

Concentration concerns:

A recent spate of 'in-sourcing' of batteries by auto OEMs, mostly through partnerships.

Possible significant supply shortages in nickel and lithium, driving a scarcity premium.

Outlook

Post COP26: Continued momentum towards decarbonisation. Recent energy supply challenges indicate that the path will continue to be bumpy.

RENEWABLE ENERGY & ESG: LESSONS FROM ASSET OWNERS & INDUSTRY LEADERS

ESG investing, a revolution for fund managers & strategic asset management.

Transitioning to a greener future is already a complex task for a corporation of any size. The complexities compound for large investors who must now attempt to foresee the impact or implications on valuations.

Trends in ESG investing around the world are constantly evolving, matching the pace of the technologies that allow corporations to achieve a greater positive impact on the environment, as well as create more widespread social gains.

It is quite clear that renewable energy can be a key contributor to any corporation's ESG attractiveness as it easily delivers on benefits to the environment and removes itself from some of the pressing social and health issues that plague older sources of energy such as coal mining.

Besides meeting the trend of ESG investing, playing a major role in mitigating and hopefully solving the issue of climate change is a reward that is well worth the challenge.

Three key challenges:

Keeping up with ESG Regulatory Changes: As a standard definition of "environmental," "social," and "governance" is defined by regulators, it brings a fresh wave of regulations & compliance requirements to meet.

Setting Internal ESG Investing Standards & Goals: Creating the ability to meet demands that may differ across regions as well as evolve, while balancing ESG credentials with the management of factors, such as credit risk, cost reduction and consolidation.

Getting Reliable Data: Access to accurate, reliable and relevant ESG data: a challenge when information takes on many forms and requires an assortment of sources that must be continually updated.

Source: European Institute of Management and Finance

RENEWABLE ENERGY & ESG: LESSONS FROM ASSET OWNERS & INDUSTRY LEADERS

KWAP: A journey in ESG investing, a joint effort with the companies it invests in.

2009 Key focus: Governance.

2012 Introduced voting guidelines with a focus on listed portfolio equities

2016 Introduced its own internal ESG rating (first institutional fund in Malaysia to do so), and established a responsible investment team.

2018 First Malaysian pension fund to be a signatory to the United Nations-supported Principles of Responsible Investment (PRI). Now part of PRI's global network of policymakers, working to further improve corporate governance and build a sustainable financial system for responsible investment.

2021 Introduced new criteria under environmental and social pillars of ESG.

- Has been investing in green tech companies in a drive to protect the environment, an ESG commitment.
- Aims to further enhance ESG integration by adopting climate-related investment beliefs and integrating climate change into its decision-making process.
- Collaborated with the World Wide Fund for Nature (WWF) to host the inaugural KWAP Inspire: Environmental Conference which attracted 456 delegates as well as 22 international speakers. It is a platform which helps create awareness of environmental sustainability amongst the investment and business communities.
- Includes social responsibility towards employees and immediate community as part of ESG evaluation.
- Is constantly refining its investment strategies to be agile and proactive to build portfolio resilience against current market volatility.
- Intensified the integration of ESG practices into all investment decision-making processes.
- Has set a target of a fully ESG-compliant portfolio.
- Is backed by the strong belief that investing in companies with good ESG practices contributes to delivering sustainable risk-adjusted returns, which enhances shareholder value over the long term.
- Does not follow a one-size-fits-all exclusion basis in its interpretation of ESG.
- Assists and encourages listed entities to embark on reporting that is in accordance with the best practices available.
- Aims to assist companies to move towards expectations progressively to build attractiveness amongst a global audience of investors.

RENEWABLE ENERGY & ESG: LESSONS FROM ASSET OWNERS & INDUSTRY LEADERS

Staying ahead of the curve: Key actions for ESG development.

While the world shifts toward ESG considerations, especially amongst the younger members of the population, the planned development of ESG qualities takes on a critical role; it should span vertically throughout all organisations - from the composition of boardrooms and the decisions they make, all the way across to the employee level - even at entry-level positions.

There is a third force at play: not only are the companies and their investors watching the 'ESG needle', consumers are now becoming one of the largest driving forces that are compelling more and more companies to push themselves harder so as to remain within the consumer consideration set.

Credibility and consistency of approach

Reporting to investors

Repositioning of the organisation

The next level of ESG: Integration at a product level

Tackling the ESG data challenge

Developing strong ESG Risk Management frameworks

Internal & External Education: From employees to the investment community

Source: PWC: 2022 The Growth Opportunity of the Century

REBUILDING A SUSTAINABLE ECONOMY