TECHNICAL INSIGHTS

THE FUTURE OF ENERGY – RENEWABLE ENERGY

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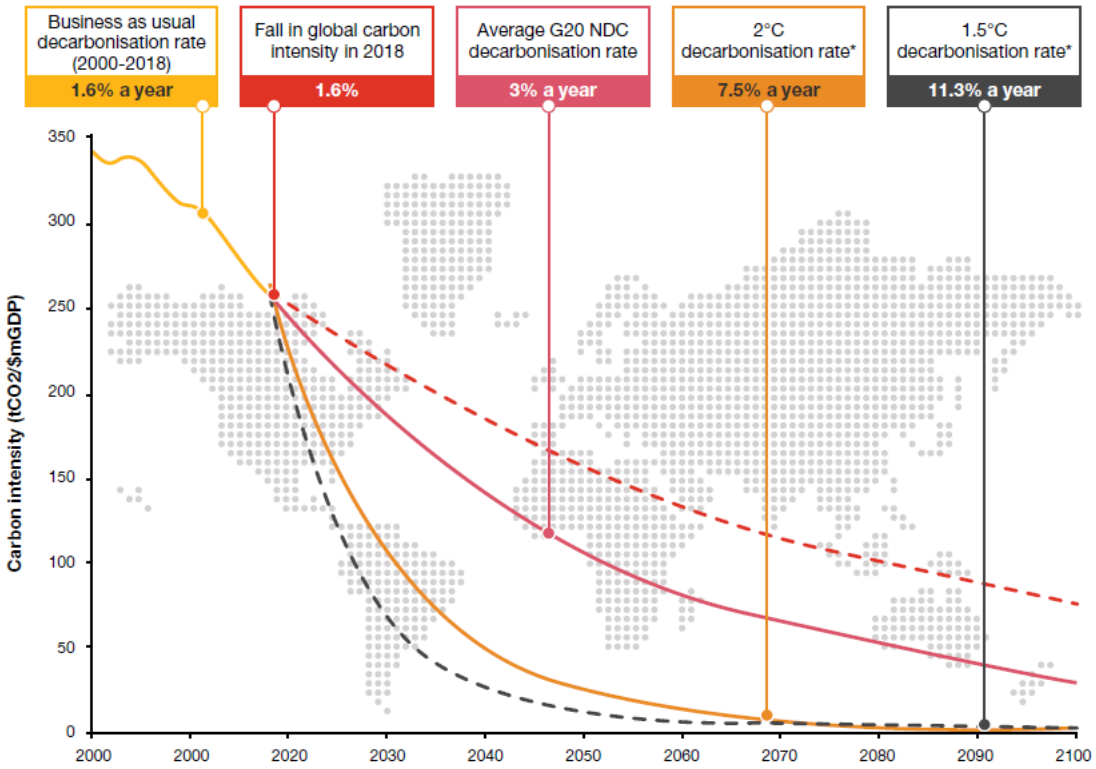
The growth of renewable energy resource is poised to accelerate this year, due to the emerging climate change issues and the push for environmental, social, and governance (ESG) considerations. It is also becoming increasingly crucial in an organisations' journey to reduce dependence on fossil fuels and foster sustainable low emission development. It can also help organisations achieve their net zero greenhouse gas emissions target. Renewable energy can be any form of energy which originates from non-depleting resources such as solar, biomass, biogas, mini-hydro and geothermal energy. In Malaysia, solar energy projects are the most widespread renewable energy resource because of the lower production cost of photovoltaic (PV) equipment and easier financing for green projects. These sources of energy are renewable on a regular basis and their renewal rates are relatively rapid over an indefinite period of time. In 2020, 581 solar energy projects amounting to RM987 million were approved by the Malaysian Investment Development Authority (MIDA), as well as 578 solar self-consumption projects amounting to RM633 million and 3 large-scale solar projects worth RM345 million in 2020. Other projects approved in 2020 include the use of mini-hydro, biogas, and biomass renewable energy, amounting to RM269 million in total.

International Development

The quest for a clean energy economy is a given in most countries as a result of the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement which demands for decarbonisation and the reduction of dependence on fossil fuels. The United States of America, European Union, United Kingdom and Japan have committed to net zero emissions by 2050. China, Russia and Saudi Arabia have also set a target to achieve net zero emissions by 2060. In Malaysia, the Government has committed to reduce its greenhouse gas emission intensity of Gross Domestic Product by 45 percent by 2030 and achieve a carbon neutral nation by 2050. The next few years will likely promise new growth paths for the renewable energy resource industry. Organisations will likely explore the emerging opportunities against a supportive backdrop to combat climate change. The following chart highlights the current trajectory of the G20 nations in decarbonisation underpinning the Paris Agreement:

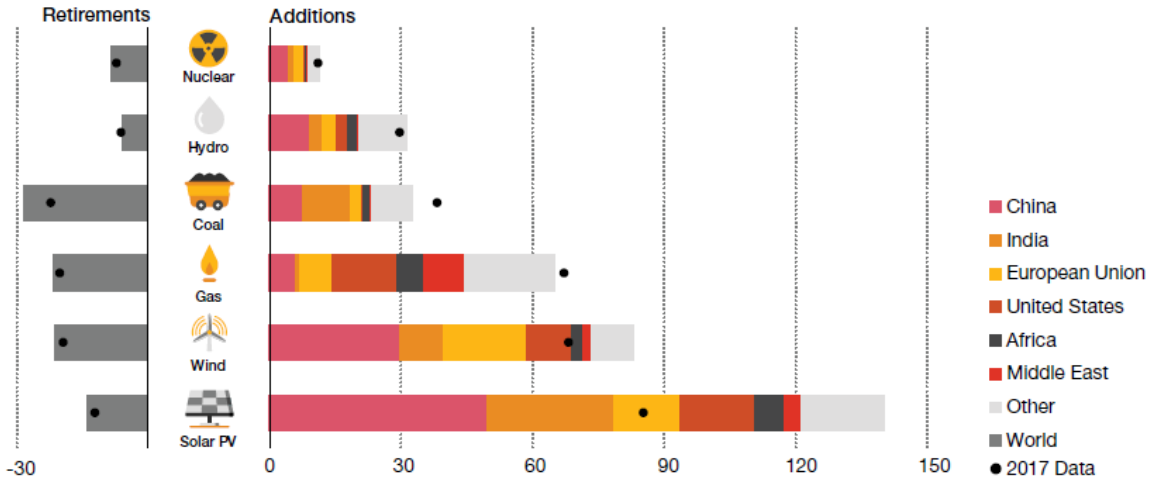


19 PwC, The Low Carbon Economy Index 2019, October 2019

In 2018, the world invested about US$300 billion in renewable energy resources - more than 2.4 times the amount spent on fossil fuels. Many have commenced focusing on enabling power systems and expanding networks around the world. Enabling power systems include investments on digitalising and securing power grids and on managing renewable energy resources.

The following chart *'Global Annual Average Capacity Additions and Retirements by Technology from 2019-2040'* is extracted from the International Energy Agency report. It shows that the majority of capacity additions will be formed by non-fossil fuels over the next two decades.

Global annual average capacity additions and retirements by technology 2019-2040



Source: PwC analysis based on IEA, World Energy Outlook 2019 (Stated Policies Scenario)

The following chart *'Major Global Economies' Energy Policy Summary'* is also extracted from the International Energy Agency report. It shows that most are having challenges for coal. Though the investments in nuclear energy are relatively small compared to renewable energy and gas, nuclear has its support from major capital markets.

Major global economies' energy policy summary

				Impact on outlook by source			
Region	Policy	Authority	Release date	Renewables	Nuclear	Gas	Coal
China	13th Electricity Development Five-Year Plan (to 2020)	NEA	December 2016	↑	↑	↑	↓
India	Draft National Electricity Plan (to 2022)	CEA	December 2016	↑	↑	↑	↓
Korea	Proposed energy pillars (to 2025)	New admin.	2017	↑	↓	↑	↓
France	Announced energy policy (to 2025)	New admin.	2017	↑	↓	–	↓
European Union	No new coal power plants post-2020	26 of 28 countries	2017	–	–	↑	↓
Indonesia	PLN electricity supply business plan (2017-2026)	PLN	March 2017	↑	↑	↑	↓
Canada	Phase out traditional coal-fired power plants by 2030	New admin.	November 2016	↑	–	↑	↓
United States[22]	Removal of Clean Power Plan (to 2030)	New admin.	2017	↓	–	↓	↑

Note: NEA = National Energy Administration in China; CEA = Central Electricity Authority in India; admin. = administration; PLN = Perusahaan Listrik Negara, the state electricity company in Indonesia.

Malaysia Landscape

In 2021, the Ministry of Energy and Natural Resources of Malaysia (KeTSA) set a target to reach 31% of renewable energy share in the national installed capacity mix by 2025. This target supports Malaysia's global climate commitment is to reduce its economy-wide carbon intensity (against GDP) by 45% in 2030 compared to the 2005 level. Realisation of the Government's vision is important in supporting the nation to achieve its Nationally Determined Contribution (NDC) targets. The Malaysia Renewable Energy Roadmap (MyRER) was commissioned to support further decarbonisation in the electricity sector in Malaysia through the 2035 milestone. This is expected to drive a reduction in greenhouse gas emissions in the power sector to support Malaysia in meeting its NDC 2030 target of 45% reduction in greenhouse gas emission intensity per unit of GDP in 2030 compared to the 2005 level, and a further reduction of 60% in 2035. *(Source: MyRER – Renewable Energy Malaysia (seda.gov.my))*

Utilisation of Renewable Energy Resource Data

Professional accountants as trusted advisers to businesses they work with and for, are expected to be cognisant of the emerging issues and available options to achieve organisations' objectives to reduce dependence on fossil fuels and foster sustainable low-emission development. For an organisation to transit to the use of clean energy, i.e. reduce dependence on fossil fuels and greenhouse gas emissions, the utilisation of the relevant data, such as high-quality renewable energy resource, is essential to help organisations prioritise resources, improve resilience and eliminate dependence on fossil fuels. Decisions that are driven by data generally help organisations achieve effective implementation of renewable energy resource investments. In addition, such data as inputs into their decision-making processes help organisations improve the outcome of their decisions in the following areas:

- **Setting Renewable Energy Resource Targets**

  By establishing the renewable energy resource targets, it helps organisations provide alerts to investors on the quantitative goals for the capacity of renewable energy resources. In addition, these targets can be established taking into consideration the availability and quality of renewable energy resources, the financing and policy environment that affects the alignment with sustainable development goals. Data that includes information about objects, events or phenomena on the surface of the earth is important to support the assessment that brings together renewable energy resources, and geographic, economic and other considerations for the purpose of data-driven renewable energy resource target-setting.

- **Making Informed Investments**

  Data is critically important in helping investors make informed renewable energy resource investment decisions. When investors consider renewable energy resource projects, they rely on data to evaluate risks and returns on investment. Other users can utilise renewable energy resource data to identify approaches to encourage project development and investment with a focus on specific interconnections. Ultimately, high-quality data, especially when produced by an independent entity, can encourage scaled-up renewable energy resource investments. Such data is useful to investors for making informed investment decisions.

- **Formulating Strategic Plans**

  To eliminate the dependence on fossil fuels and foster sustainable low-emission development, many have considered the use of renewable energy resources for their electricity supply. Solar and wind energy are more variable than conventional electricity sources - achieving these targets may involve changes to a number of areas such as re-strategising plans, and making changes to systems and operations. Investment in renewable energy resource projects demonstrates the organisation's commitment towards clean energy economy which enables our country to meet low-emission development. The utilisation of renewable energy resources is critical in ensuring power systems operate economically and reliably. In view of rapidly changing prices of renewable energy technology, it is important that these plans are frequently updated to produce lower costs.

Data Considerations

Data is essential in helping organisations make informed and robust renewable energy resource decisions. This data includes renewable energy resource data and related data such as political boundaries, roads, infrastructure and land use. In addition, the understanding of variable renewable energy resources such as solar, wind, ocean, and some hydropower generation technologies are also important because the amount of resources available varies over time. Renewable energy resource data provides information on the availability and intensity of sun, wind, geothermal, hydro, wave, tidal, and biomass energy at a given geographic location. The availability of this renewable energy resource differs in respect of location; and for variable renewable energy resources in respect of time. The below narrates information pertaining to various variable renewable energy resource data.

- Wind Energy
  Wind energy is generated from wind and is transformed into useful electrical or mechanical energy. Today's wind machines use blades that are rotated by the wind's kinetic energy. The blades are connected to a drive shaft that turns an electric generator to produce electricity. Wind energy data is measurable and can be modelled. The data indicates wind speeds and wind direction at different heights off the ground. Hub height refers to the height of the hub of a wind turbine. Typical hub heights are 30 m, 60 m, 80 m, 100 m, and more commonly, 120 m.

- Solar Energy
  Solar technologies leverage directly on the power of the sun and use the sun's energy to produce heat, light and power. Solar energy data is measurable and can be modelled. This data is typically showed as direct normal irradiance, diffuse horizontal irradiance, and global horizontal irradiance, or a subset of these three types of solar energy data.

- Geothermal Energy
  Geothermal energy is generated from thermal energy, normally happening in deep reservoirs of hot fluids within the earth's crust. Unlike other types of renewable energy, geothermal energy is regarded as a mineral resource and upstream geothermal activities are essential to commence a geothermal power project. Geothermal resource data are normally divided into two types: hydrothermal resource data and enhanced geothermal systems resource data. Hydrothermal resources mean hot water reservoirs

beneath the earth's surface that are usually utilised to produce electricity. Enhanced geothermal resources refer to locations where the temperature under the earth's surface is hot but natural reservoirs do not exist.

- Hydropower Energy
  Hydropower energy is normally generated from the energy of dammed water. This water is harnessed to make a water turbine produce electricity. Hydropower energy data might include the location of rivers, average or seasonal flow, hydraulic head and the location of dams.

- Biomass Energy
  Biomass energy generally refers to a non-fossilised biodegradable organic material. This data shows the amount of biomass resource available by geographical area, and may be composed of many types of biomass feedstocks. The amount of energy contained within these feedstocks and the density of these feedstocks represent the biomass resource.

- Ocean Energy
  Ocean energy is generated from ocean or tidal current, or wave energy. The electricity conversion of both tidal and wave energy usually involves mechanical devices. A dam is normally utilised to convert tidal energy into electricity by forcing the water through turbines and activating a generator. At the same time, wave energy utilises mechanical power to transfer to a working fluid - water or air, which then drives a generator. Ocean energy includes tidal stream, ocean current, ocean thermal gradients and wave energy. Tidal stream data includes tidal current velocity and flow rate. Ocean current data includes ocean current velocity and power density at daily to annual average resolutions. Ocean thermal gradient data utilises the temperature differential between warmer surface water and colder water at depth to generate electricity. Wave energy data includes wave height, energy period, direction and power density.

In addition to renewable energy resource data, weather data, land use and ownership data, population data and infrastructure data are also important in helping organisations make informed renewable energy decisions, as this data can be measured along with the above-mentioned variable renewable energy resource data. This data is critical to enabling renewable energy resource decisions and addressing obstacles to achieve clean energy deployment. In addition, data-driven decisions help organisations make markets transparent and fair so as to achieve a clean energy economy.

Professional Accountants having a Role in Enabling Climate Action

Professional accountants can take the driver's seat to help organisations contribute to sustainable agendas, including the reduction of dependence on fossil fuels and fostering sustainable low emissions development to combat climate change. Through education and measurement of businesses' sustainability agendas, accountants can help organisations drive "going green".

Today, many business leaders may still think of sustainability as a "nice to have" rather than an integral part of their business activities. In fact, sustainability is an element that can impact the operations of businesses such as supply chains that could affect business continuity. The

business risks posed by climate change is a reason for businesses to embark on a sustainability journey. New actions to combat climate change that are needed rests on supporting small and medium enterprises and transitioning entire supply chains. Many large organisations are expected to commence their efforts and strategies in maintaining their edge in the market, including taking steps to reduce carbon emissions through various initiatives and approaches. It is important that organisations engage with their supply chain partners and work with them collectively to reduce their greenhouse gas emissions.

By encouraging business leaders to embrace the United Nation's Sustainable Development Goals, accountants can navigate the way for business leaders who are committed to turning sustainability into action. Professional accountants should educate and provide direction to support businesses and cultivate a virtuous cycle of sustainable change.