

Topic Background¹

In the face of global climate change resulting in large part from the burning of fossil fuels, switching the global energy supply to more renewable sources is critical.

The share of renewables in meeting global energy demand is expected to grow by one-fifth in the next five years to reach 12.4% in 2023. Renewables will have the fastest growth in the electricity sector, providing almost 30% of power demand in 2023, up from 24% in 2017. During this period, renewables are forecast to meet more than 70% of global electricity generation growth, led by solar PV and followed by wind, hydropower, and bioenergy. Hydropower remains the largest renewable source, meeting 16% of global electricity demand by 2023, followed by wind (6%), solar PV (4%), and bioenergy (3%).

While growing more slowly than the power sector, the heat sector – which includes heating for buildings or industry – will account for the biggest overall share of renewables in meeting energy demand in 2023. Renewable heat consumption is expected to increase by 20% over the forecast period to reach a share of 12% of the heating sector demand by 2023. However, a modest increase in the share of renewable heat is foreseen, as robust growth in total heat demand is expected to result from continuous economic and population growth.

Renewables in transport have the lowest contribution of all three sectors, with their share growing only minimally from 3.4% in 2017 to 3.8% in 2023. Although they expand by almost one-fifth over the forecast period, renewables cover only a small portion of all energy demand in transport because of ongoing petroleum product consumption. Renewables in transport mostly comes from biofuels, and although renewable electricity consumption in road (such as electric cars, two- and- three wheelers, and buses) and rail transport modes increases 65% over the forecast period, this is from a low base.

Brazil has the greenest energy mix, and China leads absolute growth. Of the world's largest energy consumers, Brazil employs the highest share of renewables by far – almost 45% of total final energy consumption in 2023. Bioenergy consumption in transport and industry is significant, and hydropower dominates the electricity sector. Meanwhile, because of policies to decarbonise all sectors and reduce harmful local air pollution, China leads global growth in absolute terms during the forecast period, surpassing the European Union to become the largest consumer of renewable energy. In the European Union, greater use of renewables is spurred by binding renewable energy targets for 2020 and 2030 as well as implementing country-level policies and improved energy efficiency. Despite policy uncertainty, the United States remains the second-largest growth market for renewables. The growth in solar photovoltaics is helping to bridge the electrification gap in developing Asia and sub-Saharan Africa.

To meet long-term climate and other sustainability goals, renewable energy development in the heat, electricity and transport sectors must accelerate. Should progress continue at the pace currently forecast, the share of renewables in final energy consumption would be roughly 18% by 2040 – significantly below the IEA Sustainable Development Scenario's benchmark of 28%.

¹ Birol, F. (2018). Renewables 2018.

Robust sustainability frameworks are key to bioenergy growth. Only bioenergy that reduces lifecycle GHG emissions while avoiding unacceptable social, environmental and economic impacts has a future role in decarbonising the energy system. Robust sustainability governance and enforcement must therefore be a central pillar of any bioenergy support policy.

Past and Current Actions²

The global shift towards renewable energy has been facilitated by various international treaties. The Kyoto Protocol was adopted as the first addition to the United Nations Framework Convention on Climate Change (UNFCCC), an international treaty that committed its signatories to develop national programs to reduce their emissions of greenhouse gases. The program is notable for only requiring developed countries to reduce their emissions. One element of the Kyoto Protocol was called the Clean Development Mechanism (CDM), which encouraged developed countries to invest in technology and infrastructure in less-developed countries, where there were often significant opportunities to reduce emissions. Under the CDM, the investing country could claim the effective reduction in emissions as a credit toward meeting its obligations under the protocol. An example would be an investment in a clean-burning natural gas power plant to replace a proposed coal-fired plant. In general, though, the Kyoto Protocol was not seen as a success, due to its focus solely on developed nations and the noticeable absence of China and the United States, the two largest emitters of greenhouse gasses in the world, from the protocol.

In 2015, the passage of the Paris Climate Agreement marked a shift in the global dialogue around climate change and emissions. It was a global but nonbinding agreement to limit the increase of the world's average temperature to no more than 2 °C (3.6 °F) above preindustrial levels while at the same time striving to keep this increase to 1.5 °C (2.7 °F) above preindustrial levels. The landmark accord, signed by all 196 signatories of the UNFCCC, effectively replaced the Kyoto Protocol. It also mandated a progress review every five years and the development of a fund containing \$100 billion by 2020—which would be replenished annually—to help developing countries adopt non-greenhouse-gas-producing technologies.

The main purpose of these global agreements has been to spur innovation and policies at the national and regional level. Many nations and regional blocs have developed policies of their own to promote renewable energy development and use. Countries across the world have set targets to increase renewable energy production, notably in large polluters like the European Union, China, and India, tied to specific plans for implementation. Part of this effort has been to map and assess the potential for renewable energy; different strategies work for different regions, be it wind, solar, biofuel, geothermal, etc. Kazakhstan and Australia have both implemented notable programs assessing their renewable energy capacity. Governments have used codes and standards to mandate increases in energy efficiency. Another key role of governments is in providing the infrastructure to support renewables, like electric car charging stations, and updating the electric grid. France has mandated that regions plan for the

² Kyoto Protocol. (2018). In *Encyclopedia Britannica*.

International Energy Agency. (2018). *20 Renewable Energy Policy Recommendations*. International Energy Agency.

connection of renewables to the electric grid and has provided financial support for these efforts. Many nations have implemented carbon taxes, like Sweden, or at least cut fossil fuel subsidies, like Indonesia. The African Development Bank provides debt financing for small-scale renewable projects across the continent.

The United Nations plays an important role in supporting the work of regions and countries. Agencies like the IEA put out tracking reports that identify global progress towards renewable energy goals and pick out best practices and examples for others to follow. The UN can also aid in promoting infrastructure development and innovation in less developed nations. Nine of the IEA's Technology Collaboration Programmes focus on renewable energy and bring together government and industry experts from around the world.

Possible Actions³

There are many different policy strategies for increasing use of renewable energy. The setting of targets, by public and private sector, has been a key driver of the expansion of renewable energy in many countries. Targets have often been specifically focused on renewables, for example by requiring a certain share of renewables to be achieved or by setting specific technology deployment targets. Furthermore, targets for CO₂ reduction or fossil-fuel phase out can also drive renewables. Targets can feed into strategies and action plans that facilitate the development of renewable energy resources. These plans should involve the collection and distribution of relevant data to help improve plans and monitor progress.

Renewable energies provide benefits that are not necessarily priced in by the market such as reduced air pollution or greater energy security through using local resources. At the same time, some renewables find it hard to compete against fossil fuel alternatives due to greater up-front costs than fossil-fuel incumbents. In some countries, fossil fuel subsidies distort the market and there may be a lack of transparency about how energy prices are set (e.g. what subsidies or charges are included). Countries can instead seek to phase out fossil fuel subsidies and develop a system of carbon pricing to internalize those costs that are not currently considered. Financial support may be particularly needed at the early stages of deployment of renewable energy in a country, since the costs of initial deployment tend to be higher due to the absence of local supply chains, and a regulatory framework that may not be optimised. Furthermore, investment is often seen as riskier, pushing up financing costs.

While many renewables have become mainstream, there are still some technologies that are further from market and a number of technological challenges remain. Even for established technologies, the scope for innovation continues and there is a need to adapt technologies to local circumstances. Research and development activities are also an important way to build up national expertise and competence. Governments can facilitate greater linking between the heating, cooling, and transportation sectors, including electrification, which, when coupled with more renewable electricity generation, greatly reduces their contribution to carbon emissions.

³ International Energy Agency. (2018). *20 Renewable Energy Policy Recommendations*. International Energy Agency.

Another key issue is the daily and seasonal variability of many renewable energy strategies. Governments should work to make grids more flexible and use innovative strategies to allow for this variability. In general, governments have an important role in integrating renewable energy into the existing grid, both in minimizing costs and providing physical infrastructure. Some countries in the developing world and emerging economies have seen little renewables development despite good potential, with the cost of financing of renewables projects as a major barrier. Even where resource and market conditions are favourable to renewable electricity deployment, a number of non-economic barriers can prevent rapid progress. These include barriers such as difficulties in obtaining planning consent or skills shortages. Some are technology or location-specific and policy measures are needed to create an enabling environment.

In some countries, local public opposition to certain renewables schemes has been a barrier to the expansion of renewables. Best practice ways to build public support for renewables include promoting community involvement and even ownership in renewables, as well as assuring that renewable energy remains affordable for all.

Purpose of the Committee⁴

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA carries out a comprehensive programme of energy cooperation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports.

The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

⁴ International Energy Agency. (2017). *Renewables 2017* (Executive Summary). International Energy Agency.

Further Research

Guiding Questions

- What are the main sources of energy for your country? How many of them are renewable?
- What programs has your country initiated to move it towards renewable energy?
- What are the major barriers that exist toward the further adoption of renewable energy? Are they financial? Political? Cultural?

Research Sources

- IEA reports:
 - <https://drive.google.com/drive/folders/11SAn9VE3AhWBFsXsjSyGiet2kinTsnYO>
 - <https://drive.google.com/drive/folders/11SAn9VE3AhWBFsXsjSyGiet2kinTsnYO>
 - <https://drive.google.com/file/d/139VewOvRMaiVjRFUIAGzi8gGEk0ZyUI5/view?usp=sharing>
- International Renewable Energy Agency: <http://www.irena.org/>
 - IRENA Country Profiles: <http://resourceirena.irena.org/gateway/#>
- Sustainable Energy for All resources: <https://www.seforall.org/organizational-resources>

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