GLOBAL TRACKING FRAMEWORK REGIONAL REPORT 2022

POLICY BRIEF

The ECE region continues to progress on key indicators for sustainable development goal 7. The results on energy access, clean cooking fuels, energy efficiency, and renewable energy have not changed significantly since previous reports. The region has achieved 100% access to modern energy services and clean cooking fuels. In both cases there are remote communities whose access does not register in the reported statistics and that require attention. Notably distributed renewable generation, small scale storage, and microgrids are opportunities for these communities. With respect to energy efficiency indicators, the region shows better results than the global indicators, but there nevertheless remain significant opportunities for improvement. With respect to renewable energy, the western reaches of the ECE region have seen a lot of investment in renewable energy technology, but in the eastern reaches there has been more limited activity. Issues relate to end-use tariffs, market design, and investment policy.

As of 2019, the ECE region accounted for 43% of world gross domestic product (GDP) and 38 percent of its total energy supply (TES). Both have grown significantly at global and regional levels. The ECE's pace of energy intensity improvement has accelerated and has outpaced global indicators.

Looking at the sustainability challenge from a purely climate perspective, in 1990 the energy mix in the region was 80% fossil. More recently, following major efforts on renewables and on energy efficiency, the energy mix in the region has been reported at 82% fossil. Despite efforts made the results are retrograde and the region is not delivering on its objectives and commitments.

In 2022 the big development for the energy sector in the region has been the invasion of Ukraine by the Russian Federation and the consequences of the war for energy prices and energy security. Importers' reply to this forced energy crisis has been in part diversification of gas supplies with a search for alternatives to Russian gas, but it also has been in part a search for energy independence, which has translated into a reversion to existing infrastructure based on coal. That shift will show up in the statistics in a couple of years with degradations in technical efficiency and emissions. An optimistic view of the situation is that the conflict will engender a pivot away from Russian oil, gas, and coal, but that begs the question of how such a pivot will affect energy balances and energy trade. Energy security and energy resilience now are top of the agenda. The climate agenda has not been forgotten, nor has the sustainable development agenda, but security is the current priority.

The most important opportunity for addressing security, climate, and quality of life quickly and at scale is in the built environment. Improvements in this area are an imperative given the opportunity it represents. A second area of attention is in methane management – done properly it is possible to address accumulating concentrations of methane in the atmosphere while provide economic energy and contributing to a just transition. Achieving carbon neutrality will require a pragmatic approach on policy and technology choices, and there is likely to be closer attention to and investment in carbon capture and storage, high efficiency/low emissions fossil technology, nuclear energy, and renewable gases including hydrogen. There are calls for a real price on carbon (greenhouse gases) that would change the economic equilibrium in energy markets if managed properly. In the current price environment discussions about carbon pricing and subsidies remain difficult.

In conclusion, while the statistics show good results for energy access, they also show the region is falling short on the other targets of SDG7 as well as on the broader role that energy must play in the quest for a sustainable future. Tools are at hand for major steps forward. It is expected that the statistics about the current period will show deterioration as they are collected and reported in the coming years, but thereafter rapid shifts are possible.

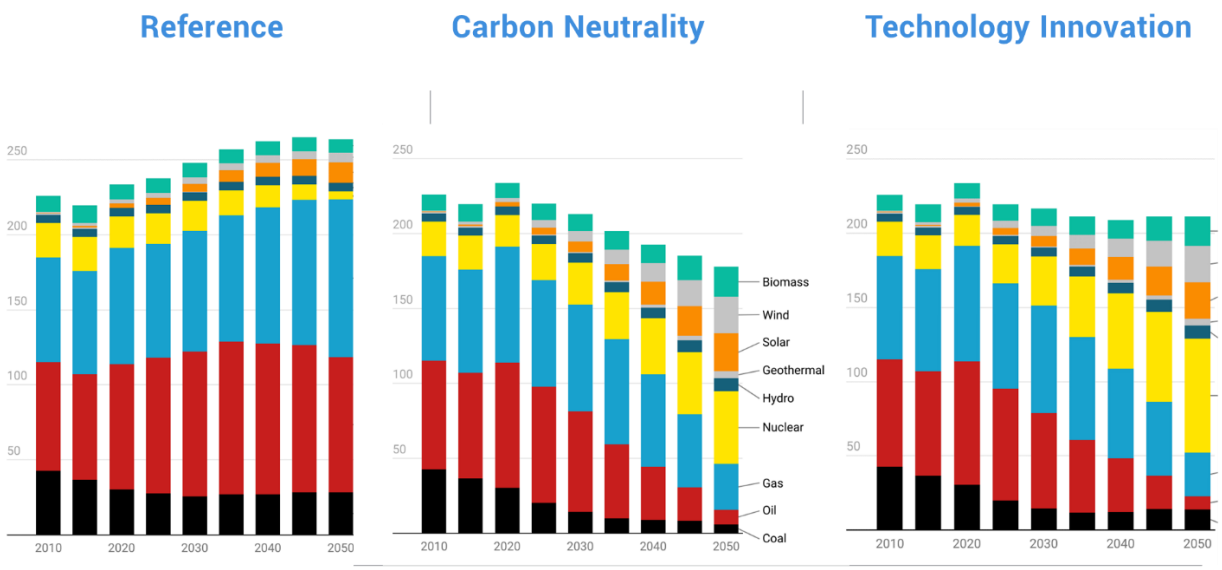
Technology Interplay

National actions and international climate targets set in the Paris Agreement and at COP26 are falling short on limiting global warming to 1.5 – 2°C. It is possible to design and implement a carbon neutral energy system through: i) accelerated phase-out of conventional fossil fuels; ii) accelerated deployment of renewable energy and nuclear power; and iii) innovation in low and zero-carbon technologies (including carbon capture, use and storage, hydrogen and next generation nuclear power). The region must transfer technology effectively, expand needed institutional capacity to support technology deployment, and engage all stakeholders to secure and affordable and carbon neutral energy system. Actions to secure the technology needed to achieve carbon neutrality include raising awareness about the merits of an all-of-the-above approach to low and zero-carbon technologies, developing policy frameworks that enable attainment of carbon neutrality, providing the financial resources for investment, and addressing the social and cultural issues surrounding energy transitions.

Analysis of the energy mix to deliver carbon neutrality is summarized in Figure 1. A reference case that does not meet stated targets describes business as usual including countries' current commitments and current (pre-invasion) price environments. The carbon neutrality case involves major efforts on the demand side and accelerated deployment of existing low or no-carbon energy sources, and the technology innovation case represents major progress on hydrogen, advanced fossil technology, and next generation nuclear technology (small modular reactors).

Figure 1

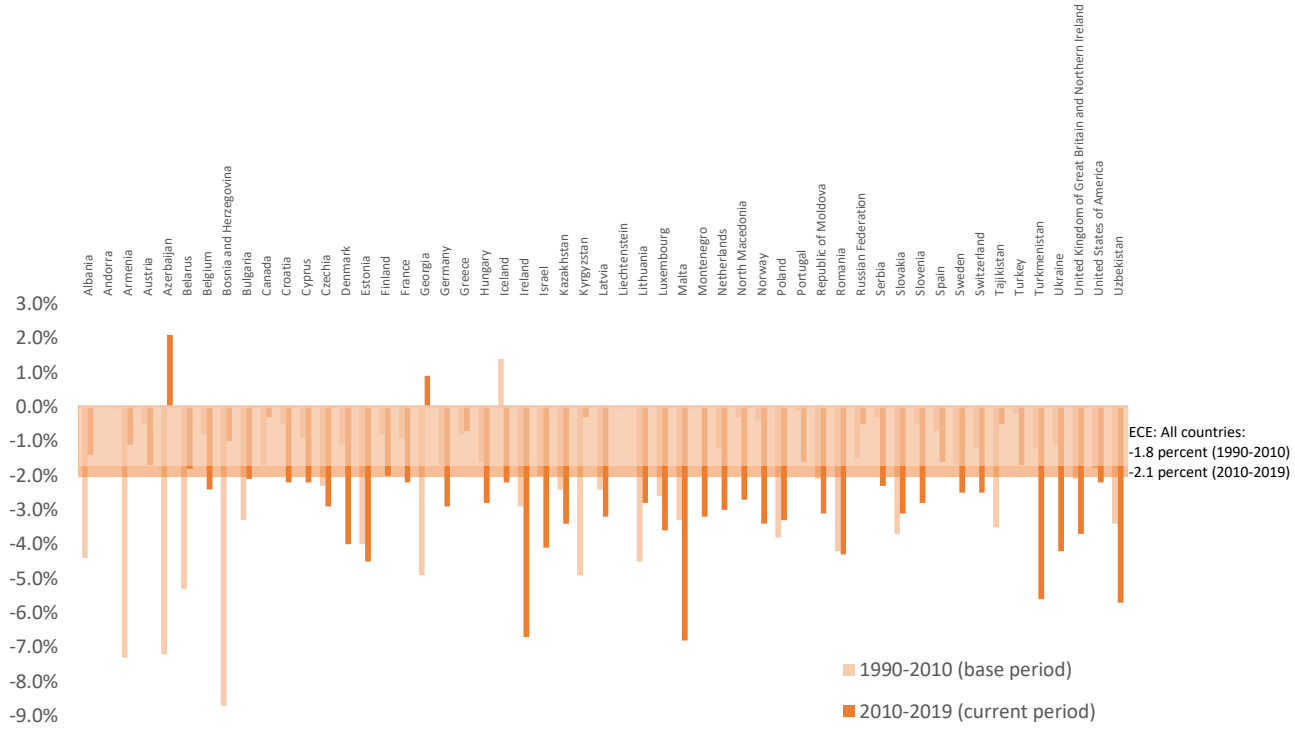
Primary Energy Supply in ECE Region



ENERGY EFFICIENCY

In 2019, the ECE region accounted for 43 percent of world gross domestic product (GDP) and 38 percent of total energy supply (TES). Both figures reflect a decline from the 1990 shares (from 62 and 61 percent, respectively) though both GDP and TES have grown significantly in the intervening years. The pace of improvement in energy intensity accelerated from 2010 to 2019 compared to the period from 1990 to 2010 and outpaced the global rate of improvement. Individual ECE members States' contributions towards the regional performance on energy intensity indicator are illustrated in Figure 2.

Figure 2
ECE members States' energy intensity development
1990-2010 and 2010-2019



Source: ECE, based on data provided by custodian agencies to Regional Commissions, April 2022

In the ECE region, energy intensity declined by 42 percent by 3.04 MJ per 2017 USD, from 7.16 to 4.12 MJ per 2017 USD, over the period of 1990–2019. TES and GDP growth in the region have decoupled. From 1990 to 2019, GDP of the ECE region grew 78 per cent, while TES increased by only 2 percent.

Possibilities exist to improve energy efficiency in production, transmission, distribution, and consumption of energy and, to the extent they prove operationally, technically, and economically feasible, should be given priority before investing in energy supply. Attention also should be turned to digital solutions to improve energy efficiency.

Figure 3

High-performance buildings and quality of life

Source: A Commitment Trifecta https://unece.org/sites/default/files/2021-08/UNECE%20A%20Commitment%20Trifecta.pdf

UNECE is deploying a vision of building performance that recognizes buildings and communities of buildings as complex systems (Figure 3) through its principles-based Framework Guidelines for Energy Efficiency Standards in Buildings.[1]

Buildings are central to meeting SDG7. They are complex systems embedded in energy, communication, water, and mobility networks. They consume over 70 percent of the electric power generated, 40 percent of primary energy, and are responsible for 40 percent of carbon dioxide emissions from the energy services they require. They also are where people spend most of their time. Renewable energy technology alone cannot meet buildings' energy requirements. Managing the energy performance of buildings will accelerate the sustainable energy transition by improving the efficiency with which buildings' energy services are provided.

The capability to meet the challenge exists today and there is significant potential for improvement. Achieving high performance could improve energy efficiency, eliminate emissions and enhance quality of life globally. Considering these components and their role throughout the whole value chain from design to decommissioning brings perspectives of how industry that produces materials and equipment and perfecting construction techniques can deliver on quality of life.

Many technologies and solutions to achieve higher energy performance of residential, commercial, and industrial buildings throughout their lifecycle (construction, occupancy, or retrofitting) exist and many are enabled by digitalization. Digitalization could reduce energy use by as much as 10 per cent globally by 2040 if applied throughout buildings' value chain and life cycle. Achieving that potential would require having a customer-centric energy economy with an intent to achieve carbon neutrality and a skilled workforce.

RENEWABLE ENERGY

The ECE region increased the share of renewable energy in the mix progressively over the tracking period. The share in TFEC in the ECE region doubled from 1990 to 2019 from 5.8% to 12.8%. In terms of investments, the eastern reaches of the ECE region lag global trends and have even declined over the past five to six years. Barriers to investment persist though there could be growth in the future given government plans to attract more investors. Renewable energy infrastructure is limited in the Caucasus, Central Asia, East and South-East Europe.

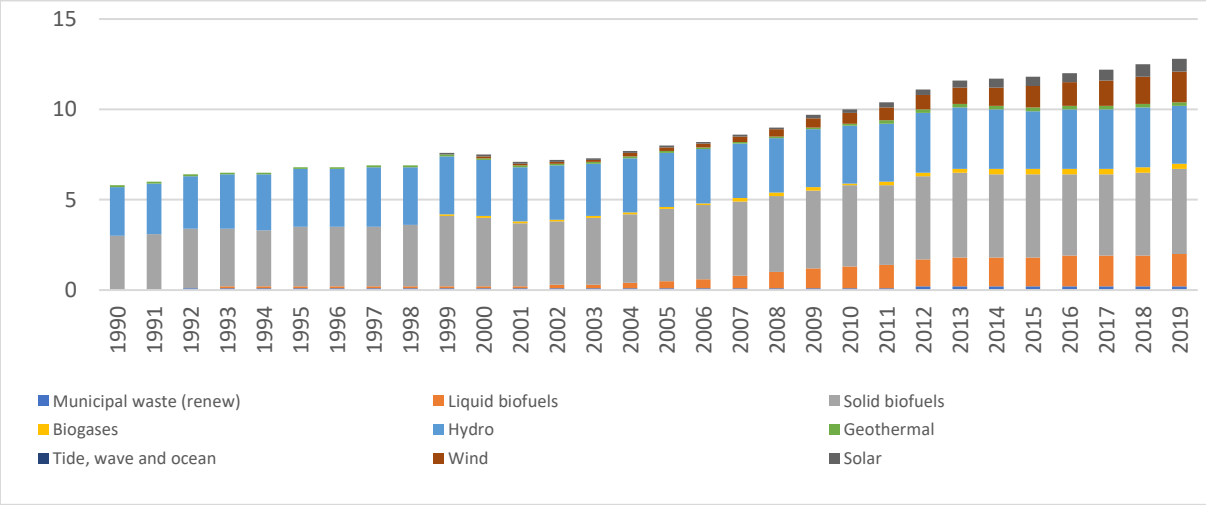
Renewable technology deployed in the ECE region includes: hydro, solid biofuels, wind, solar, liquid biofuels, biogases, geothermal, tide, wave and marine, and municipal waste (Figure 4). As seen in Figure

[1] See: https://unece.org/documents/2020/12/updated-framework-guidelines-energy-efficiency-standards-buildings

5, the overall level of TFEC in the ECE region varied over the period 1990-2019. In 2018, TFEC was higher than in any other year over the period 1990-2018 while in 2019, the ECE region witnessed a remarkable decrease in TFEC because of the COVID-19 pandemic. While TFEC increased slightly from 1998 to 2018, its distribution among electricity consumption, transport and heat has shown a consistent trend in an increasing use of renewable energy for transport sector, in particular in the last two decades. The current conflict in Ukraine and the resulting energy crisis in the ECE region may be the start of a negative trend.

Figure 4

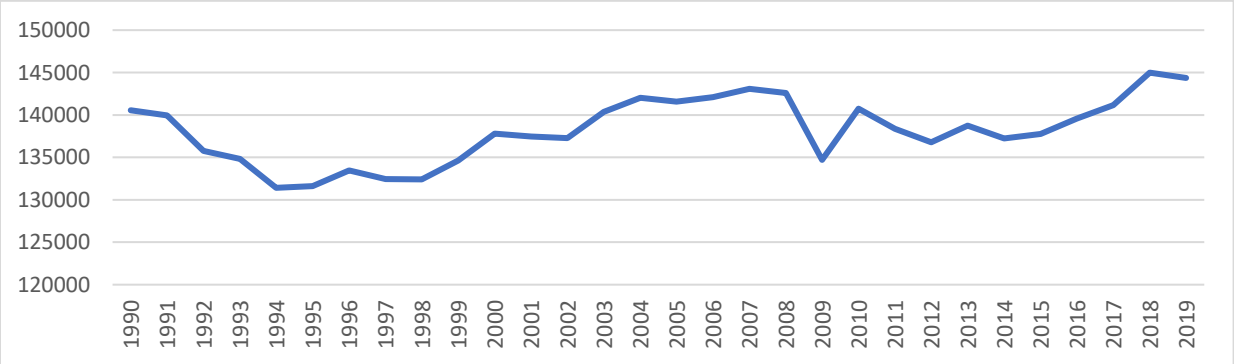
Renewable energy share in total final energy consumption (%) in the ECE region by technology



Source: IEA, World Energy Balances (2021); UN Statistics Division, Energy Balanced (2021)

Figure 5

Total final energy consumption in the ECE region, 1990-2018 (PJ)



Source: IEA, World Energy Balances (2021); UN Statistics Division, Energy Balanced (2021)

National renewable energy development strategies and capacity building activities would provide useful frameworks for accelerating deployment of renewable energy. In most countries, the lack of adequate enabling policy, legislative and institutional frameworks to attract foreign and domestic investments to the power and energy sectors have been major obstacles. Social resistance and lack of technical local capacity and data on renewable energy potential in several countries could be addressed through public

outreach and awareness. Network congestion issues and a lack of grid capacity also can be barriers, and technical standards for renewable energy integration need to be defined. Countries should gradually shift from the subsidized approach to market-based approach for renewable energy procurement to ensure long-term financial sustainability of the support scheme. Policies on the use of renewables in sectors other than power (namely, heating/cooling and transport) should be strengthened. Business models and enabling technologies (such as batteries, smart energy systems, digitalization, and electric vehicles) could be deployed to enable the integration of renewables and reduce costs of renewables.

Recommendations

Bold action in three areas will deliver concrete, near-term outcomes and, longer-term, achieve the 2030 Agenda for Sustainable Development and the Paris Agreement: achieve superior performance in buildings, address growing concentrations of methane in the atmosphere, and modernize resource management. Longer-term, fundamental shifts in the energy system will require sustained action in three areas: 1) achieving carbon neutrality through improving energy efficiency and productivity, shifting to low or no carbon primary energy sources, controlling greenhouse (GHG) emissions, removing CO2 directly from the air, deploying smart technology for systemic decarbonisation, and managing carbon sinks; 2) removing social and cultural barriers to an energy transition through industrial modernisation to address short-term political drivers, notably employment in coal mining regions, that impede real action on energy for sustainable development, including climate change; and 3) enable the hydrogen ecosystem of the future with coordinated action on national, subregional, and regional levels to establish the full industrial ecosystem of policy and infrastructure to enable an ecosystem of electrons and molecules that contributes to decarbonization.