



## Sustainable technologies to help the energy market

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### 1 What's the outlook for global energy demand?

There is a clear trend of increasing global energy demand. The two major agencies releasing energy scenarios, i.e. the OECD-International Energy Agency and the US Energy Information Administration (EIA) both illustrate it in their latest reports.

EIA projects that, absent significant changes in policy or technology, world energy consumption will grow by nearly 50% between 2020 and 2050. The International Energy Outlook 2021 (IEO2021) shows that strong economic growth, particularly in Asia, will drive global increases in energy consumption despite pandemic-related declines and long-term improvements in energy efficiency. If current policy and technology trends continue, global energy consumption and energy-related carbon dioxide emissions will increase through 2050 as a result of population and economic growth.

According to the IEO2021 Reference case, which projects future energy trends based on current laws and regulations, renewable energy consumption has the strongest growth among energy sources through 2050. In this scenario, liquid fuels remain the largest source of energy consumption, driven largely by the industrial and transportation

sectors. Renewables will be the primary source for new electricity generation, but natural gas, coal, and increasingly batteries will be used to help meet load and support grid reliability. EIA also projects electricity generation to almost double in developing non-OECD countries by 2050.

Falling technology costs and favorable laws and regulations mean that much of the new electricity generation will come from renewable energy sources, although natural gas, coal, and batteries will remain critical parts of the electric grid, backing up solar and wind resources.

What could happen if we plug in this future world the constraint of net zero emissions? A possible, still difficult, answer is proposed by the IEA, in its Net-Zero 2021 report. The path to net zero emissions is narrow, and immediate and massive deployment of all available clean and efficient energy technologies is needed. In the net-zero emissions pathway, the world economy in 2030 is some 40% larger than today but uses 7% less energy. A major worldwide push to increase energy efficiency is an essential part of these efforts, resulting in an annual rate of energy intensity improvements averaging 4% to 2030 – about three-times the average rate achieved over the last two decades. Electrification of transport and other usages is also an important driver





> of change that puts pressure on electricity demand.

Beyond the different figures and numbers associated to the 2050 scenarios, it seems to me of utmost importance to understand the conditions that make these roadmaps real. This is the role of policymakers, at the national and international level. The scenarios projected today always assume perfect coordination: either we have the business-as-usual scenario, or the sustainable one. Nevertheless, the path to 2050 is not unique, and will crucially depend on which policies will be put in place, how citizens and firms will be convinced about the changes required by the low-carbon transition and which technological advances will become available (and when).

## 2 Will power prices become more volatile?

The analysis of day-ahead electricity markets in several countries has shown that once renewables account for more than 20% of the generation mix, there is an increase in price volatility and that this latter increases in a non linear way when renewables take larger market shares. The further need to decarbonize energy production will increase electricity demand, as said before, and will require more and more renewables. At the same time, solutions to reduce volatility will progressively be deployed: large-scale batteries and power-to-gas. Also, smart grids help to absorb part of the volatility. However, there is no consensus at the moment about their availability at profitable conditions. This is an area where further efforts in terms of R&D on one side, and targeted subsidies on the other, are expected.

## 3 How will long-run investments be affected by increased participation of electric storage and price-responsive demand?

In the context of electrification of usages and, as a consequence, increase in electricity demand previously discussed, long-run investment incentives are key factors. Given that the introduction of renewables in the electricity mix is not going to stop, electricity storage is a useful tool to contain price volatility and then to make the price signal for investment more stable. Price-responsive demand is a more ambitious evolution, in my view. Of course, eliminating all forms of tariffs is a leverage of efficiency and will contribute to contain demand. Nevertheless, being confronted to real-time prices will affect consumers' vulnerability, especially the poorest. Therefore, the good balance has to be found between efficiency, which is the most important driver of long-term investment, and equity which is the new challenge to accelerate the transition. Of course, to foster investment in low carbon assets, other instruments such as capacity markets will continue to play a role.

## 4 What is your opinion on the cop26 agreement? Are the world electricity markets ready to embrace it?

Although progress has been made since the Paris Climate Agreement was signed, countries' commitments are still far from limiting warming to well below 2°C/targeting 1.5°C, and their implementation is even

more so. But COP 26 made both concrete and symbolic progress in focusing the multilateral process on the 1.5°C target specifically and keeping it 'alive' by calling on countries to come up with stronger plans next year, increasing pressure on fossil fuel transitions, strengthening multilateral rules under the Climate Convention (UNFCCC) and providing a platform for promising pilot initiatives for international cooperation. The 'catalyst' effect also worked, with the announcement of several coalitions and partnerships, as for instance on methane, deforestation, non-electric vehicles and transition in South Africa. However, COP 26 fell short of international solidarity, failing to compensate for the failure of developed countries to meet the long-standing and symbolic \$100 billion target for developing countries, in a context of exacerbated inequalities under the Covid-19.

In this landscape, two decisions are relevant for electricity markets. The Glasgow Climate Pact is the first COP decision to explicitly call for the phasing out of "inefficient" fossil fuel subsidies. Moreover, the rules overseeing international carbon markets under Articles 6.2, 6.4 and 6.8 are adopted, avoiding the pitfall of double counting. Even if characterizing what is an efficient subsidy does not seem easy, there is a signal that coal and gas electricity generation units becomes more "costly" than before. Instead of stressing the importance of subsidizing renewables, whose profitability progresses, now there is a discouraging effect on fossil fuels. This decision is crucial not necessarily for Europe, where the EU ETS and the different European Directives have already paved the way for decarbonizing electricity, but for many global economies where a carbon regulation does not exist or is weak. Also in this direction, the revision of international carbon accountancy is a step forward to set economic instruments to decrease emission from electricity production worldwide.

