

Global and local: secure and affordable energy



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Global and local: secure and affordable energy

Energy is a commodity traded in global markets. Lack of access to affordable energy sources, disruptions in energy flows, high import dependency and wild fluctuations in prices are all seen as potential weaknesses, impacting the economy and, consequently, the economic and social wellbeing of the communities affected. Can boosting the renewable energy capacity across Europe and the world change the rules of global energy politics? How does the EU's Energy Union contribute?

A reliable and affordable supply of energy is essential for our quality of life. Many of the goods and services we use every day entail using energy – a home-cooked meal, a pleasant ambient temperature at home, hot showers, television and radio programmes, delivery of parcels bought online, flights, a bus ride, a phone call, medical interventions, etc. A disruption in the energy supply can bring many activities to a total standstill.

The European Union (EU) currently imports a little over half of its inland energy consumption, while a smaller fraction of the energy produced in the EU is exported. Despite their decreasing share in the overall energy mix and the overall decline in their use, fossil fuels continue to be by far the main source of energy, meeting approximately three quarters of energy consumption in the EU in 2015. Moreover, the EU's dependence on fossil fuel imports has increased. In 2005, 2 tonnes of fossil fuels were imported for each tonne produced in the EU and, in 2015, the EU imported 3 tonnes of fossil fuels for each tonne produced.

Russia and Norway are the two largest crude oil and natural gas exporters to the EU. In 2015, Russia supplied 29 % of crude oil imports and 37 % of natural gas imports, followed by Norway with 12 % for crude oil and 32 % for natural gas. Between 2004 and 2015, Russia also became a key exporter of solid fuels, such as coal and lignite, and supplied 29 % of imports in 2015, followed by Colombia and the United States.

The dependency rate on energy imports varies significantly among EU Member States. Denmark and Estonia meet their energy needs almost entirely from national production, while Malta, Luxembourg and Cyprus import almost all their energy. Import dependency, be it for a Member State or the EU as a whole, could constitute an economic and geopolitical risk. If international energy flows stop, the impacts could extend well beyond the exporting and the importing countries.

If the flow stops

Like many other resources, oil and natural gas are traded commodities sold on international markets. Fluctuations in the price can be seen every day as responses to market signals, political statements or even pure market speculation. In the last seven decades, crude oil prices varied from below USD 20 to over USD 150 per barrel ([1]). Some of these fluctuations consisted of major price shocks triggered by political turbulence in oil producing regions, shortages of supply in global markets due to limited production capacity or disruptions in energy trading.


Ukraine is not only an importer but also a major energy transit country, transporting gas produced in Russia and the Central Asian republics to eastern and south-eastern Europe. On 1 January 2009, following a pricing dispute, Russia halted natural gas flows to Ukraine. Within days, Bulgaria, Greece, Hungary, Poland, Romania and Turkey reported drops in pipeline pressure. Key industrial plants halted production in Bulgaria, while Slovakia declared a state of emergency. Homes could not be heated during the particularly cold winter of 2009.

By controlling the amounts of energy available in global markets, large producers can also influence prices. For example, following the Yom Kippur war in the Middle East in 1973-1974, crude oil prices went up from USD 20 to over USD 50 ([2]) in a matter of weeks. This "first oil crisis" was triggered by, among other things, a decision by a number of oil exporting countries to increase oil export prices by 70 % and to block exports to certain countries. The impacts on the global economy were felt immediately.

Given the magnitude of the potential socio-economic impacts, governments often see high import dependency on key resources (e.g. oil, gas and electricity in some cases) and dependency on a limited number of providers as a vulnerability. To this end, many countries have put in place measures to address disruptions by increasing their energy storage capacity or diversifying their sources. Some countries have made additional investments in renewable energy generation within their territories. Others have connected their countries to transboundary energy networks and electricity grids. Similarly, energy consumption patterns and behaviours have changed in some countries. Some communities have had to go back to burning wood for heating homes, which, in turn, has affected local air quality. In other countries, such as Denmark, the shortage of petrol in the 1970s induced the public to cycle more and the public authorities to facilitate this by building extensive bicycle paths.

Global energy demand to grow

Import dependency is not the only risk linked to the supply of energy. Energy poverty, defined as not having access to sufficient amounts of energy at affordable prices, is another. It might be due to not being connected to main energy grids. Large production facilities, providing jobs to local communities, often rely on access to an uninterrupted energy supply and to transport networks.

Global energy consumption is expected to grow in the coming decades. In its  World energy outlook 2016 report, the International Energy Agency (IEA) considers that there will be a 30 % increase in global energy demand by 2040 and anticipates an increase in consumption of all modern fuels. The fastest growth is expected in renewable energy. Oil consumption is also expected to grow but at a slower rate than that of natural gas, while coal consumption is expected to cease, despite its rapid expansion in recent years. The IEA also points out that in 2040 hundreds of millions of people across the world will still not have electricity at home or will have to rely on biomass to cook food. The IEA growth scenario also reflects a geographical shift in energy demand towards industrialising and urbanising countries in Asia, Africa and South America.

Looking for alternatives

The growth in energy demand mobilises countries and energy companies alike to explore alternative sources. These may consist of exploring oil and gas reserves in areas and regions that until recently have been largely untouched or unexploited, such as the Arctic or tar sands in Canada. They may also involve new technologies (e.g. those used in shale oil and gas exploitation) to extract known reserves that were not previously reachable and profitable. The decrease in oil production in the Middle East might be offset by an increase in shale oil production in the United States. Exploration and extraction can cause pollution, oil spills and other environmental damage, not only at the site but also along the transport routes.

Similarly, the prospective growth in energy demand might stimulate investments in clean renewable energy. China, one of the fastest growing economies in the world, has met its growing energy needs largely by investing in large dams and coal-fuelled power plants. In January 2017, however, China's National Energy Administration announced the cancellation of plans for over 100 coal-fired power plants. These cancellations come on top of those announced in 2016, which were for power plants already under construction. Growing public concerns over poor air quality and a quicker-than-expected uptake of renewables appear to have facilitated the decision to move away from coal. This type of decision will not only result in improvements in air quality but also contribute to the efforts to limit climate change.

Tapping into renewable energy potential

When addressing the issue of a secure, uninterrupted supply of affordable energy, the questions are how much energy is available and where is it available from. Relying on local and renewable energy sources might be the best option in terms of both environmental impacts and import dependency. In addition, energy efficiency – broadly defined as getting more out of the fuel at hand – is vital.

Energy production capacity varies from one region and country to another. Depending on their location, natural resources, topography and available technologies, countries and regions can optimise their energy sources. Some countries might have a higher solar power generation potential, whereas others might rely more on wind, hydropower, tidal energy or local biomass.

A combination of several sources is one of the keys to ensuring a steady supply of energy until it is possible to store and transport clean renewable energy in sufficient quantities, allowing it to be used at a later time and at any location. Energy security concerns can induce even countries that export energy to invest in local renewable energy sources.

If current extraction rates are maintained, known conventional fossil fuel reserves will be depleted within decades. The demand for energy will remain even after these reserves are depleted. Given this, there are two basic approaches to determining how the future demand for energy can be met. In the first approach, energy producers might opt to explore and exploit other forms of fossil fuels, such as tar sands or shale gas, or might expand their activities to new regions that have been relatively unexploited until now. The second approach might entail meeting the future demand by using only renewables, replacing the existing infrastructure and leaving fossil fuel reserves intact in the ground.

Some countries, including the United States, have opted for exploiting shale oil and tar sands, while others, including some coal- and oil-dependent countries, such as Saudi Arabia and China, have recently expressed interest in and commitment to renewables. Saudi Arabia – the largest crude oil producer and exporter in the world – is predisposed equally to solar and wind energy. In fact, as part of its renewable energy push, in February 2017, Saudi Arabia announced investments of USD 50 billion by 2023 to build a 700 megawatt solar and wind power generation capacity.

Planning for long-term benefits

The choice of fuel type, however, is not always determined by topography, markets or global demand. Such choices might be based on jobs and, ultimately, the economic wellbeing of the communities concerned. The economy of some countries and regions may be heavily dependent on a locally abundant type of fossil fuel, such as coal or oil. Diversifying the energy mix and moving towards renewables might affect the local economy and, more concretely, might imply a loss of jobs. Given this, a successful transition often requires an understanding of the social context and offering alternative employment opportunities to the local workforce.

In this context, export dependency can be as much of a weakness as import dependency. What if your country has invested and continues to invest in an energy source without a future? What if the economy depends heavily on energy exports but buyers prefer cleaner alternatives? Diversifying energy sources and investing in renewable energy are equally relevant and essential for a country's economic future.

Better connected energy networks and markets within the EU can actually help to boost diversity in energy sources and facilitate access to cleaner energy, while ensuring a reliable supply. They can even serve, to some extent, as a buffer to global energy shocks and severe price fluctuations. A more decentralised power generation capacity (e.g. solar panels installed on roofs feeding the electricity grid) and a better management of demand and supply (e.g. through smart meters) could also help. The EU's Energy Union strategy aims to address, among others, these core issues, such as energy security and energy efficiency, and give consumers a more prominent role in a fully integrated energy market to ensure a regular supply of climate-friendly energy at affordable prices for all energy users.

([1]) West Texas Intermediate in 2015 real prices.

([2]) West Texas Intermediate in 2015 real prices.

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EEA Signals 2009 - Key environmental issues facing Europe
[<https://www.eea.europa.eu/publications/signals-2009>]

See also

Signals 2017 ¶ Shaping the future of energy in Europe: Clean, smart and renewable
[<https://www.eea.europa.eu/signals/signals-2017-index>]

Temporal coverage

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