

# Member State's Energy Dependence:

## An Indicator-Based Assessment

Over recent years, EU economies have been exposed to energy price increases leading to adverse effects on consumers and industries. Some economies have also been confronted with disruptions to gas supply, affecting gas-dependent industrial activities and households. Arguably, the EU economy will continue to be exposed to risks related to energy prices, including potential oil shocks or gas shortages. The economic and financial crisis and the more recent diplomatic crisis in Ukraine call for a strengthening of the energy security of supply for Member States in order to maintain economic competitiveness and ensure a stable and affordable supply of energy sources.

The main objective of this report is to assess the recent development regarding Member States energy dependence and their potential vulnerability to energy price hikes and supply shortages. In order to assess it, a set of energy dependence indicators (EDI) was designed last year<sup>1</sup> and the present study looks at the evolution of these indicators over the recent years. In addition the report develops further two specific dimensions: the diversification of energy imports and energy efficiency.

### ENERGY DEPENDENCE IN EU MEMBER STATES

Regarding the security of energy supply, in 2012, total primary energy dependence for the whole of the EU stabilises at roughly half of the EU's energy needs and between 2008 and 2012, a clearly declining trend can be observed for the vast majority of the Member States. This appears to be due in part to the drop in energy consumption due to the crisis and in part to the rapid development of domestic renewable energy sources. The importance of oil and natural gas in the energy mix of the whole EU has decreased between 2008 and 2012 while at the same nuclear increased slightly and solid fuels remained constant. Renewables registered the biggest increase in share going from 8% to 11% of gross inland energy consumption.

The European Union remains heavily dependent on import for its energy supply and this is apparent in the persistently negative energy trade balance which in 2013 amounted to 3.1% of EU GDP up from 2.1% of 2009. As far as Member States are concerned the total energy trade deficit increased across the board between 2009 and 2013. The greatest energy trade deficits can be found in Malta Bulgaria, Cyprus Hungary and Lithuania. Denmark is the only EU Member State to have a positive energy trade balance. The main determinant of such trade deficit is the deficit for oil products which has shown an uninterrupted upward trend over the past ten years and it reached 2.1% of EU GDP in 2013. The gas trade balance is negative for all Member States except Denmark where in 2013 it equalled 0.1% of GDP and except in Finland and Romania it increased in all Member States between 2009 and 2013.

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<sup>1</sup> Member State's Energy Dependence: An Indicator-Based Assessment, Occasional Paper, 145/April 2013.

Three dimensions of energy dependence are considered for this analysis: (1) security of energy supply, (2) energy and carbon intensity, and (3) contribution of energy products to trade. The performance of each of the 28 Member States is analysed and compared along each of these three dimensions.

## DIVERSIFICATION OF IMPORT SOURCES IN MEMBER STATES

One of the main ways to reduce the vulnerability of Member States from energy supply shocks is to reduce the excessive reliance on a single supplier in order to benefit from competition and from reduced risks related to asymmetric events affecting only one supplier. However, while trading with partners within the Economic European Area (EEA) may present additional benefits in the form of stronger market integration, trading outside of it may imply the risk of increased reliance on the market power of one exporter that may in turn impact on trade and diplomatic relations. For this reason the share of imports from non-EEA countries is also assessed.

As far as gas is concerned, the EU increased the diversification of its import sources from EEA and non EEA countries, but only very marginally reduced its import dependence. Some Member States are still highly reliant on a single supplier outside the EEA, e.g. Bulgaria, Estonia, Finland, Lithuania, Slovakia and Latvia import their gas needs from Russia.

The situation is more contrasted for solid fuel. The concentration of import sources and the import from non-EEA countries both grew markedly while import dependence increased albeit only slightly. The evolution of the solid fuels consumption will have to be monitored closely as there are indications of their growing importance especially in some large Member States. The availability of cheap American coal can be observed in the fast increasing share of imports coming from the US. This evolution has had negative impacts on the diversification of import sources and will also affect the carbon performances of Member States which may in the future face higher costs.

By contrast, the evolution of the indicators related to petroleum products provides with a more stable picture. The diversification of import sources slightly improved while the import dependence deteriorated. At Member States level the tendency has been towards a generalised decrease of the importance of petroleum products in the energy mix. At the same time however some traditionally oil producing countries are registering a fast decline in their crude oil output which will imply a growing import dependence for them and a potentially higher reliance on other import sources for their neighbouring Member States.

## ENERGY EFFICIENCY DEVELOPMENT

The second chapter of this report focuses on the energy efficiency developments over the past decades. One way to reduce the vulnerability of a country to price shock is to reduce its energy intensity. Low energy intensity means low energy use per unit of GDP, which implies that the economy is less influenced by changes in energy prices. However, energy intensity evolution may not only indicate improvements in energy savings, but also structural changes in the economy. For this reason, the chapter disentangles the energy efficiency effect from the restructuring effect. It also analyses the main drivers behind energy intensity developments.

Over the past decades, the energy intensity of EU economies has improved, in line with the Europe 2020 strategy. The improvement has been, however, achieved in various ways across the EU-28. For instance, in most new Member States it has been very much dependent on a sectoral reallocation in the economy at large, but also within the manufacturing sector. Moreover, the improvement of energy intensity is not spread evenly across sectors but depends to a large extent on the performance of manufacturing. Other sectors, such as transport and services, seem to have ample space to increase their contribution to energy savings.

The analysis of the drivers suggests that energy efficiency improvements are mostly driven by economic wealth, but also by investments and innovation. "Green" innovation can push the technological frontier and plays a critical role in boosting energy efficiency in goods and services. At the same time, the role of energy prices as a signal to invest in clean technologies or to reduce energy consumption has to be acknowledged and calls for the use of market-based instruments.

## COUNTRY FICHES

This cross-country analysis is complemented by 10 country fiches which complete the list of country fiches that was published with the first report. These Member States are Austria, Belgium, Germany, Denmark, Finland, France, the Netherlands, Spain, Sweden and the United Kingdom.