



How vulnerable is European manufacturing to gas supply conditions? A regional approach

22 July 2022

Key messages

- Whilst Russia's war against Ukraine has caused suffering and destruction to the Ukrainian population and economy, it has also caused global economic disruptions not least to the market for natural gas. In Europe gas prices rose by 170% between February 2022 and July 2022, and efforts are being made to quickly reduce dependence on supply from Russia.
- And even if the impacts differ across countries, they also differ within countries. With new analysis, we can identify which regional economies are most exposed to rising gas prices on the basis of their dependency on gas intensive sectors as, for example, chemicals or basic metals. Based on OECD calculations we find that the employment shares of the most gas-intensive manufacturing sectors are largest in some regions in Central Europe and Northern Italy, as well as in certain regions in Sweden and Finland.
- Policy makers should consider closely the array of options for adjustments within these sectors and regions. There may be a need to, for example, spatially target investments in upgrading manufacturing in line with the transition to net zero carbon to support economically weaker regions with particularly gas dependent manufacturing sectors.
- While safeguarding short-term energy security, policymakers should resist the temptation to revert to more emission-intensive alternatives, to ensure their action is aligned with the vital long-term need to transition to a Net Zero Emissions economy by 2050.

Background and key issues

The war in Ukraine has accelerated the rise in natural gas prices, especially in Europe. Natural gas prices have risen from 18.8 EUR/MWh in January 2021 to 66.4 EUR/MWh on 23 February 2022, the day before Russia's large-scale aggression against Ukraine started, to 180 EUR/MWh by 8 July 2022.¹ This increase of 857% relative to January 2021 and 170% relative to February 2022 took place against a background where since the start of the war European countries have aimed to reduce their energy imports from Russia whilst Russia increasingly has used gas supplies as a political tool.

For five European countries, Russia has provided more than 50% of the total energy supply, and between 50% and 25% for another 9 countries in 2019.² Natural gas is used widely in electricity production and in manufacturing. Reducing this dependence will require finding alternative supplies, switching energy sources and changing production processes. Each of these options will require investment and time to realise, and may come at financial costs beyond the short term.

What are the impacts?

European regions with sectors that use natural gas intensively are likely to be affected more strongly during this transition. Firms can take a number of steps to mitigate the impact on profitability, including by improving energy efficiency, passing on higher input prices to their customers, and transitioning to alternative energy sources. Nevertheless, most of these measures are likely to come at a cost – at least in the short term – with impacts concentrated in regions where manufacturing is relatively specialised in gas intensive sectors.

The use of gas per employee is particularly high in the manufacturing of coke and refined petroleum products, chemicals and chemical products, basic metals, paper and paper products and non-metallic minerals.³ The combined employment share of these five most gas-intensive sectors – which varies widely across European regions – functions as an indicator of the regional concentration of gas intensive manufacturing in a region. Whilst they do not allow to assess employment implications from price rises or supply disruptions, the economies of regions with a concentration of gas intensive manufacturing are likely to be more exposed to such shocks. Additionally, firms and sectors may see cost increases through rising electricity prices – in particular when a large share of electricity is generated from natural gas.

Across Europe, the highest employment shares in gas-intensive sectors are concentrated in Central European countries, notably Poland, the Czech Republic, Slovakia, Austria and Slovenia, as well as in Sweden, Finland and Northern Italy (Figure 1). The concentration of these sectors in certain regions points to the need for policies that are targeted and tailored to the local context of these places.

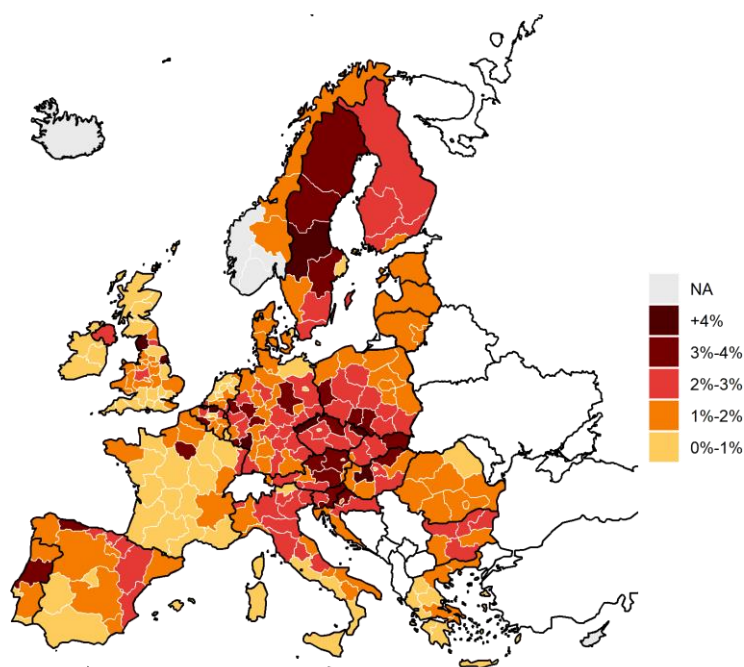
¹ Prices for Natural Gas EU Dutch TTF from Trading Economics.

² The five countries are Lithuania, Hungary, Slovakia, the Netherlands and Finland. The next nine countries are Austria, Greece, Poland, Latvia, Belgium, Germany, Italy, Czech Republic and Türkiye. See OECD (2022), *OECD Economic Outlook, Interim Report March 2022: Economic and Social Impacts and Policy Implications of the War in Ukraine*, OECD Publishing, Paris, <https://doi.org/10.1787/4181d61b-en>, Figure 10.

³ OECD (2022) *Impact of the war in Ukraine on OECD Regions: Managing socio-economic challenges and building a more resilient future*, OECD Regional Policy Paper, forthcoming.

Figure 1. Employment shares of the most gas-intensive manufacturing sectors are largest in regions of Central Europe, Northern Italy, Sweden and Finland

Employment share of the five most gas intensive sectors, % of regional employment, TL2, 2019



Note: The combined regional employment share of the five sectors with the largest use of natural gas, including the share of natural gas that is used in electricity, Coke and refined petroleum products, chemicals and chemical products, basic metals, paper and paper products, and non-metallic minerals. Territorial Level 2, TL2, represent large regions, and are largely consistent with Eurostat NUTS Level 2 regions. Source: OECD calculations based on Eurostat tables env_ac_pegasu, sbs_r_nuts06_r2, and nama_10r_3empers, all 2019. IEA, Electricity generation by source, 2019 and OECD Statistics, Regional Economy, Regional Employment by Industry

What is the outlook?

Industries can adjust to high natural gas prices in three main ways: Firms may choose to absorb the higher costs, increase output prices, or lower their dependence on natural gas by increasing efficiency or changing energy sources. Price changes are likely to take less time than changes in natural gas suppliers and production processes, and some countries will be better able to help their industry switch energy sources or suppliers than others. Production may also shift to locations where gas prices may rise less (e.g. perhaps outside of Europe where gas supply chains differ), resulting in job losses and potentially higher global emissions. In addition, linkages of energy intensive sectors with other manufacturing and services sectors are likely to lead to negative spill-overs beyond the energy intensive sectors themselves.⁴

⁴ Other input-output spill-overs (e.g. from gas intensive sectors to other sectors) are not further accounted for in this note. A general equilibrium estimate from the Russia's war in Ukraine, at the country level, is provided in OECD (2022), *OECD Economic Outlook, Interim Report March 2022: Economic and Social Impacts and Policy Implications of the War in Ukraine*, OECD Publishing, Paris, <https://doi.org/10.1787/4181d61b-en>.

The response from firms and policy makers needs to both ensure energy security and be aligned with Net Zero Emissions by 2050 objectives. The average natural gas intensity of European regions considered in this note masks the large variation in fossil fuel intensity of production that exists within companies of the same sector. This variation suggests a strong potential for many regions to increase production efficiencies of their companies. Such an increase will help more easily adjust to higher gas prices, reduce the dependency on natural gas, and facilitate the net-zero transition. More generally, while there can be short-term trade-offs between energy security and the net-zero transition, coal is not a viable solution. The long-term road to both energy security and Net Zero Emissions is through renewable energies. In 2020, the IEA assessed that low carbon technologies, on average, had already become cost-competitive with electricity generation based on fossil fuels.⁵ While case and region specific circumstances ultimately affect which energy sources are most economical, at current elevated gas prices, renewable energy is unquestionably much more price competitive.

What are the key considerations for policy makers?

Gas prices have significantly increased as a result of Russia's war against Ukraine and are likely to remain elevated in the medium term as European countries increasingly switch to other gas suppliers. In such a situation it will be important to:

- Support regions that are specialised in energy intensive sectors in order to help them adjust, while requiring them to find suitable long-term solutions that fit their local contexts. Specific support measures could include promotion of energy efficiency, investment in alternative energy sources, or training and re-employment for displaced workers.
- Commit to excluding coal as an alternative energy source in order to remain in line with the vital need to transition to a Net Zero Emissions economy by 2050.
- Support manufacturing upgrading, in particular in economically weak regions, in order to bring up the energy efficiency of less efficient companies to that of sectoral best practice.

Further reading

This note is an application of OECD work looking at industrial transition in European regions presented in “*Regional industrial transitions to net climate neutrality: Identifying most affected sectors*” and “*Regional Industrial Transitions to Climate Neutrality: Identifying vulnerable regions*”, OECD, forthcoming.

Regional variation in gas based electricity generation is presented in OECD (2020), *OECD Regions and Cities at a Glance 2020*, OECD Publishing, Paris, <https://doi.org/10.1787/959d5ba0-en> and updated figures will be available in the forthcoming 2022 edition.

A more detailed exposition of the calculations underlying this note can be found in “*Impact of the war in Ukraine on OECD Regions: Managing socio-economic challenges and building a more resilient future*”, OECD Regional Policy Paper, forthcoming.

⁵ IEA (2020), Projected Costs of Generating Electricity 2020, IEA, Paris <https://www.iea.org/reports/projected-costs-of-generating-electricity-2020>.

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