

# Briefing

## What the new government should do to unlock industrial electrification

June 2024



### Summary

Industrial sites should be supported to explore electrification as the first choice route to decarbonisation. Electrification is more efficient and more widely available than carbon capture and storage (CCS) and clean hydrogen. CCS and hydrogen should only be used in circumstances where electrification is unsuitable, and where they are likely to be low cost and available locally as part of an industrial cluster.

UK industry's electricity costs are 24 per cent higher than the EU average. This, combined with long waiting times for grid connection upgrades, means that electrification is not appealing for many industrial sites.

The government conducted a call for evidence on electrification in autumn 2023. Momentum should be maintained, and the new government should quickly outline how it will support industry to electrify.

### Three options for decarbonising industry

Industrial activity in the UK is responsible for nearly a fifth of greenhouse gas emissions. This covers the production of iron and steel, chemicals including plastics, cement and concrete, ceramics, glass, paper, food and drinks.

Industrial emissions were once considered 'hard to abate', because of high temperatures required, and because some processes can release greenhouse gas emissions, even without the use of fossil fuels.

But there are now three solutions, widely considered as potential routes to reducing hard to abate emissions. These are carbon capture and storage (CCS), clean hydrogen and electrification, using clean electricity to provide heat instead of fossil fuels.

CCS and hydrogen have both had strong government support, with £1 billion per year promised to support CCS, and subsidy schemes that will pay for the cost premiums of using CCS or clean hydrogen. Government support for electrification is much less prominent. The British Industry Supercharger (at up to £400 million per year) will subsidise some electricity costs, but only for

sites which already consume a lot of electricity, not for those transitioning away from fossil fuel power.

## Benefits of electrification

The electrification of many industrial processes should be considered the safest, most economic (ie requiring the least financial support from the government), most efficient, most widely accessible choice. It minimises residual emissions and generates less air pollution, and it capitalises on the ongoing decarbonisation of the UK electricity system.

Electrification is suitable for most industrial processes that rely on natural gas to supply heat at low and moderate temperatures, up to 500°C. Industrial heat pumps can be extremely efficient at lower temperatures, and electric boilers and furnaces can be used to reach higher temperatures. In contrast, CCS and the production of clean hydrogen via electricity have unavoidable efficiency losses.

Electrification is likely to be available to most industrial sites, whereas it will not be easy to implement CCS and hydrogen outside the four planned CCS and hydrogen clusters. Our analysis of the UK chemical industry, for example, shows that 87 per cent of the energy consumption of the sector is for low temperature heat and drying, which are easily electrified.<sup>1</sup>

## Barriers and recommendations

The Climate Change Committee has highlighted industrial electrification as an area with a significant policy gap.<sup>2</sup> To be the first choice for industrial decarbonisation, the new government should address the following barriers to electrification:

### Electricity costs

The price of electricity for UK industrial consumers is consistently one of the highest in Europe. In 2022, industrial electricity in the UK cost 24 per cent more than the EU average.<sup>3</sup> This contrasts with CCS or hydrogen fuel switching, which are both expected to be subsidised by the government to match the price of gas.

**To bring down the cost of electricity for industrial consumers, the government could cut wholesale costs through government underwritten power purchase agreements (PPAs), a [Green Power Pool](#) or a contract for difference for electrification.**

## Grid connections

Although most industrial sites are connected to the electricity grid, most electrification projects are likely to involve upgrades to substations, or even reinforcement of transmission or distribution infrastructure.

Chronic underinvestment in grid upgrades and high levels of competition for new connections mean that some sites exploring electrification are being quoted lead times of five to ten years.

**While ongoing efforts to reform the connection queue system and release zombie projects will help, greater investment in grid upgrades is also needed.**

## Inertia and risk aversion

Most UK manufacturing activity has a long history, using well established assets, with businesses hesitant to switch to new technologies before they are thoroughly proven. Capital expenditure can be significant, new technologies can come with training burdens and the expectation of downtime for upgrading can be off-putting.

In addition, legacy solutions with significant emissions, like combined heat and power plants, still receive financial support.

**The government should support capital expenditure during the phase-in of electrification technologies, via an expanded Industrial Energy Transformation Fund.**

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### For more information, contact:

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## Endnotes

<sup>1</sup> Department for Energy Security and Net Zero, 2023, *Energy consumption in the UK 2023*. Green Alliance analysis of the end use energy consumption of the chemical industry from 2022 (standard industrial classifications 20 and 22).

<sup>2</sup> Climate Change Committee, June 2023, *Progress in reducing emissions, 2023 report to parliament*

<sup>3</sup> Department for Energy Security and Net Zero, 2023, *Energy prices international comparisons*. Average of the 2022 annual industrial electricity price in the UK relative to the EU27 for small, medium, large and very large users.