



## Policy Briefing

### Introduction

The UK has set some of the most ambitious emission reduction targets, not only in Europe, but internationally. While targets can easily be set, reaching net zero emissions by 2050, as is now fixed in UK law, will require big changes in the way we produce energy, manufacture products and heat our homes and businesses. If targets are to be met, tough policy decisions will need to be taken by Government to decide which sectors will contribute the most to reducing emissions and when that should take place. Importantly they will also need to decide who pays and predict where societal and economic benefits may be realised.

As the UK transitions out of the European Union and trade deals are negotiated, there is real uncertainty as to whether the UK will continue to be bound by EU 'state aid' rules, fall under WTO rules, or develop its own domestic framework of 'subsidy control'. This will have a significant effect on the way the UK designs and finances its policies and frameworks to get to Net Zero over the next vital decades. In principle, subsidies to support decarbonisation action should not be problematic under EU or WTO rules, which allow environmental problems (a type of market failure) to be addressed. In practice, things may be more complex as issues around, for example, competing industry activities come into play.

At the [Centre for Energy Policy](#) at the University of Strathclyde, we use economy-wide scenario simulation models to investigate the potential economic and social impacts of climate change policies on different sectors. Our objective is to aid Government and other decision makers to understand the impact that climate related decisions will have on jobs, tax take, GDP and ultimately prosperity.

### Industrial decarbonisation – an example from the Scottish Chemicals Industry

Take Scotland's chemicals Industry as an example of how climate change policies can interact with domestic priorities. Anyone who has travelled between Scotland's two largest cities on the newly electrified trainline will know that Scotland has an internationally significant chemicals industry. The Scottish Government's involvement in supporting the chemicals workforce over the last decade also gives you an indication of just how economically important they see the industry to be. Reducing emissions from energy intensive industries like the production of essential chemicals at Grangemouth, whilst retaining a skilled and diverse workforce, will be huge challenge.

One way to reduce emissions from chemicals production in line with Net Zero targets is to add carbon capture and storage (CCS) to the manufacturing process - either through the adaptation of existing facilities or by constructing new ones. While technically feasible, retrofitting existing industrial installations with CO<sub>2</sub> capture machinery can come with significant associated costs for some sectors. Adding additional costs to a process that does not increase the production rate

or product value reduces what is known as 'capital efficiency'.

When capital efficiency contracts, the only way to protect profitability is for industry to increase the price of the product it sells. Without regulatory or policy action to protect industry competitiveness, i.e. State aid, this will reduce the relative competitiveness of the Scottish Chemicals industry compared to competitors in other countries who may continue to manufacture with unabated emissions, or may receive State or EU-level support for installing CCS.

### Modelling economy wide impacts of decarbonisation activity

In our scenario simulations for the Scottish Chemicals industry, in which CCS is added to the manufacturing process, initially with no state subsidy, we investigate a worst case scenario of up to a 50% contraction in capital efficiency. In practice, the costs of carbon capture may be lower for many sectors, but this may not always be the case and so we ensure that scenario analysis is robust to even the most costly applications of the

technology. We balance this with a more optimistic setting where firms and workers do not choose to leave Scotland as pressure on competitiveness and unemployment rise. But the impacts are still substantial. If product costs rise to mitigate the reduction in capital efficiency, the resulting contraction in export demand could trigger what ultimately becomes a lasting contraction in GDP of between £175m and £200m per annum. This would be associated with a sustained negative impact on the public budget of up to £41m per annum.

Importantly, this could also have a major impact on jobs and earnings. Our models show that such measures could result in a 10% reduction of Chemicals industry jobs in Scotland with the risk of 600 people being made redundant. Our scenario simulations also suggest that up to a further 750 additional jobs across the Scottish economy would be at risk in the Chemical industry supply chain or as a result of reduced household spending as the economy contracts. We also considered scenarios where workers may leave the Scottish economy as unemployment rises and wages fall. There the wider economy job loss could almost double from 750 to almost 1470 full-time jobs (accompanying a bigger sustained GDP loss and associated impacts on public budgets and incomes across the economy).

The magnitude of these numbers sets in context the importance of government having the ability to use subsidy or state aid to support industries on the journey to net zero, particularly where there remains no common international regulation on emission reduction for energy intensive industries.

Next, we considered scenarios where Government is able to subsidise the costs of applying CCS to the Scottish Chemical industry to the extent that industry does not have to bear a difference in operating cost. This could be (albeit loosely) compared to the aim of the '[Contract for Difference](#)' (CfD) mechanism that has been

## Notes

This research is in its early stages and the scenarios we discuss are only 2 of a number that will be explored. Future analysis will focus on widening scenarios to a UK context.

This policy brief is based around written evidence to the UK House of Lords EU Internal Market Sub-Committee, March 2020 by Professor Karen Turner, Dr Julia Race and Dr Antonios Katris, Centre for Energy Policy, School of Government and Public Policy, University of Strathclyde. Contact [karen.turner@strath.ac.uk](mailto:karen.turner@strath.ac.uk).

<https://committees.parliament.uk/work/55/level-playing-field-and-state-aid/publications/written-evidence/>

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developed to support low carbon electricity generation in the UK.

Whilst the CfD mechanism in the power sector is funded by consumer levies, in our scenario the additional costs are fully socialised through adjusting income tax paid by households. Other mechanisms for socialising costs could be used of course, including levies on consumers or purchasers of the chemical products or through the use of the future UK carbon price system. The approach we adopt is motivated by the fact that [our research](#) on other policy actions, particularly energy efficiency, suggests that other Net Zero actions could deliver offsetting gains to households when the income tax system is used. This is not something we explore in detail in this analysis.

The results of this analysis show that the economy is still likely to contract, but here the nature of the contraction is different, with a smaller sustained GDP loss of between £125m and £130m per annum over the longer term. On the other hand, the total jobs loss could be greater, with up to 2,500 jobs at risk. However, any jobs losses in the high value-added/high wage Chemicals industry would be limited, with the concentration of job losses in the sectors dependent (directly and indirectly) on household spending.

## Conclusion

Our analysis sets out the challenge that the government will face as investment in decarbonisation technologies creates new costs for industries to bear. It demonstrates how government has an opportunity to use its leadership position on climate change to support international market creation for low carbon products and seek to mitigate the risks of competitiveness loss as a result of climate policy. If the UK is to deliver its commitment to decarbonisation, a strong framework for supporting and sustaining prosperous industry will be essential to meeting Net Zero targets without 'offshoring' both emissions and jobs.