THE IMPORTANCE OF BUILDING EXPORT CAPACITY IN A NEW SCOTTISH CO2 TRANSPORT AND STORAGE INDUSTRY: ALLEVIATING DOMESTIC FUNDING PRESSURES AND SECURING GREEN GROWTH AND JOBS TRANSITION

Antonios Katris, Centre for Energy Policy, University of Strathclyde, Phone +44 141 548 5966. antonios.katris@strath.ac.uk
Karen Turner, Centre for Energy Policy, University of Strathclyde, Phone: +44 141 548 3198. karen.turner@strath.ac.uk
Oluwafisayo Alabi, Centre for Energy Policy, University of Strathclyde, Phone +44 141 548 5966. oluwafisayo.alabi@strath.ac.uk
Christian Calvillo, Centre for Energy Policy, University of Strathclyde, Phone +44 141 548 5966. christian.calvillo@strath.ac.uk
Jamie Stewart, Centre for Energy Policy, University of Strathclyde, Phone +44 141 548 5966. j.stewart@strath.ac.uk
Julia Race, Naval Architecture Ocean and Marine Engineering, University of Strathclyde, Phone +44 141 548 5709. julia.race@strath.ac.uk

Overview

Since 2019, the UK has legislated for a 2050 'net zero carbon' target for the greenhouse gas emissions generated within its territory. This target has driven the development and publication of a number of strategies, including the 'UK Industrial Decarbonisation' (BEIS, 2021), that focus on the need to facilitate the reduction of emissions generated by energy intensive industries, while sustaining the value-added and employment that said industries contribute. A number of industrial clusters across the UK had applied to be part of Phase-1 of the sequencing process by which CCS would be deployed in two industrial clusters by mid-2020s, receiving government support in the process. Turner et al (2021) have focussed on the transport and storage (T&S) element of a CCS system, developed to service primarily the Scottish cluster (one of the clusters considered as part of Phase-1 sequencing). They explored the economy-wide impacts, at the UK level, of introducing and operating a new industrial sector delivering T&S services at the Scottish cluster, including developing an initially oversized infrastructure. They have found that the operation of the T&S sector, even one servicing a single industrial cluster, has the potential to deliver wider economic growth and gains in areas of key policy interest such as employment.

With the underlying assumption being that the UK Government would step up to guarantee the operation of the sector by purchasing the T&S services, the potential outcomes depend on whether the government would seek to recover the T&S cost and in which way. Indeed, Turner et al (2021) find that the anticipated outcomes vary significantly when the government opts to internalise the T&S cost, and reflect it in its budget balance, compared to cases where the cost is passed either directly to taxpayers or to the polluting industries. However, the Scottish cluster has indicated the ambition to reach out to other UK clusters that do not have storage capacity and, crucially, export the storage services to industries beyond the UK. Here, we explore how an increased export demand for the services of a T&S sector, initially developed to service the Scottish cluster, can lead to changes in the anticipated outcomes associated with the operation of the T&S sector. We find that removing some of the burden of maintaining the sector's operation from the government can help mitigate the negative pressures introduced in areas of the UK economy, particularly in the cases where the government chooses to pass the T&S cost to other actors in the economy.

Methods

For this work we use the UKENVI computable general equilibrium (CGE) model for the UK, the same used by Turner et al (2021). The model is calibrated using a 2016 UK Social Accounting Matrix (SAM), which includes all the sectors in the UK economy, aggregated to 34 broader sectors. Among the sectors included in our model is a new sector providing T&S services and which is disaggregated from the existing 'Oil & Gas Extraction' (O&G) sector. The underlying assumption is that T&S in some ways resembles the reverse operation of O&G and therefore, O&G sector is a valid proxy to represent the supply chain structure of the new T&S sector. We use the same underlying assumptions as Turner et al (2021), in terms of the capital requirements necessary to enable the operation of T&S sector. However, we use an updated timeframe of when different components of the necessary capital need to be in place, matching the proposed operational timeline of the T&S element of the Scottish cluster. This has implications for the size of the investment required, as in any time period the investment must not only create additional capital but also cover the depreciation of the existing capital. Crucially, we assume that, eventually, 40% of the demand required to sustain and guarantee the operation of the sector is coming from abroad (export demand), with the remaining demand covered by the UK Government in the form of purchases from the T&S sector. We also consider how the government covers the cost of the T&S purchases, with a 'budget deficit' approach being the more straightforward case we examine, while we also simulate the cost being covered via a lump sum tax to the UK households (a 'households pay' approach) and a 'polluter pays' approach where the industries present in the Scottish cluster are taxed to cover the T&S costs, with the share allocated to each industry being linked to the volume of emissions they generate.

Results

Looking at outcomes of the more straightforward scenario we examine, where the government opts to internalise the T&S cost rather than passing it to other parts of the economy, we see that the operation of a T&S sector to service the Scottish cluster can deliver economy-wide benefits. When 40% of the demand of the sector is covered by exports, we find that 0.016% (£286million) GDP gains are possible by 2040, along with a 0.009% or 2,631 full-time equivalent (FTE) increase in employment. The GDP and employment gains are supported by the operation of the sector itself, and the activity along its supply chain, but also by an increase of household consumption of £315million (0.027%). Although these outcomes are positive, they are slightly eroded compared to the case where the government covers 100% of the T&S demand, as exports across all sectors, including T&S, are inversely related to prices and responding to relative changes between the domestic price of goods and services and the unchanged external price. As a result, where there is greater T&S reliance on exports, there is a slight erosion of the total output of the sector as the price of its output increases with higher demand. However, apart from the small differences in the economy-wide impacts, the main impact of increased T&S export demand is the reduced government T&S spending requirements, reflected on the government budget balance; a £144million deficit as opposed to £293million deficit in the absence of substantial export demand.

By extension, the reduced T&S government purchases mean that the cost that needs to be recovered is also smaller. In the 'households pay' case, this is translated to a smaller lump sum tax being introduced and thus a smaller restriction in household income. The implication is that the increased export demand allows a greater retention of the GDP and employment gains enabled by the operation of the T&S sector, compared to the case where there is no export demand. However, despite the positive implications in a number of variables of policy interest, the greater GDP gains retention is also accompanied with a slightly higher increase in the economy-wide prices (reflected in the CPI), with negative effect on the total exports and implications on the wider cost of living.

The most significant impact of the increased export demand though is observed when we consider the 'polluters pay' case. Turner et al (2021) show that when the cost of T&S services is passed to the industries present at the Scottish cluster (which are the potential users of the T&S system), these industries are negatively affected as they need to increase their prices to meet the additional costs, reducing their competitiveness both domestically and abroad. The negative impacts are spilled over the entire UK economy, leading to GDP and employment losses, as well as government budget deficits despite the government recovering the T&S cost. With a 40% T&S export demand we observe that the negative GDP impacts of a 'polluters pay' approach are completely offset, while the employment losses and the government budget deficit are significantly mitigated. However, it is key to highlight that even though the GDP losses are completely offset, this does not reflect broader gains across all UK sectors. In fact, the T&S sector is the only one with significant gains, followed by small scale gains in a limited number of sectors in its supply chain. For the vast majority of UK sectors, even with 40% T&S export demand, there are output, and therefore value-added and employment, losses, albeit of a smaller magnitude compared to the case where there were no T&S exports.

Conclusions

Our analyses have highlighted that exports have a significant role to play in the operation and sustainability of a CCS T&S sector. The can contribute towards ensuring that sufficient levels of demand are in place to utilise the capital that needs to be introduced, while limiting the purchases that need to be made by the government. The key implication is that this limits the cost passed to other parts of the economy, should the government opt to pass the cost, and therefore facilitate better economy-wide outcomes. However, it is important to examine the impact of exports in each cost recovery case in isolation as there are significant differences on which parts of the economy are benefited by the increased export demand and what is the driver behind said benefits. Furthermore, the analysis here is focussing on a single cluster with the potential and the plan to export its T&S services. Other UK clusters, for a multitude of reasons, may not be in the same position, meaning that it is essential to make a proper expansion of the analyses here to a broader UK context, if credible conclusions are to be made.

References

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