UNIVERSITY of STRATHCLYDE
CENTRE FOR ENERGY POLICY

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Project Brief

Investigating wider economy impacts of Net Zero industry development - Scotlands Net Zero Infrastructure Project (SNZI)

Project Purpose

- To understand and respond to the wider economy consequences of Net Zero infrastructure development at scale (starting with CCS), and the corresponding value that projects such as Acorn can bring in terms of sustained net benefits at local, regional and national levels as society transitions to meeting mid-century Net Zero ambitions.

Project Summary

- Scotland's Net Zero Infrastructure Project (SNZI), led by Pale Blue Dot Energy, sets out how decarbonisation of the Scottish Industrial Cluster can be enabled, as well as supporting the decarbonisation of other UK and international industrial clusters.

- It will allow progress to be accelerated around Acorn CCS, a carbon capture and storage (CCS) project aimed at overcoming the high capital costs of CCS deployment, establishing the Acorn Hydrogen plant by 2025 and catalysing clean growth in the region more broadly.

- Crucially, the inclusion of the Centre for Energy Policy's (CEP) wider economy focus in SNZI will enable progress on Acorn CCS to include full consideration of the role that the project can play in developing a large-scale CO2 management sector in servicing both domestic decarbonisation and a potential new export service in the Scottish and wider UK economy.

- CEP, based at the University of Strathclyde, has a critical role to play and brings vital expertise and experience in understanding the gross and net societal costs of initiatives such as Acorn, and in building consensus around, and acceptance of, their value within a CO2 Transport and Storage (T&S) sector, potentially within a wider emerging CO2 management industry, that could bring net benefits at local, regional and national levels.

- CEP's involvement will ensure better understanding of the potential economy-wide consequences of different decarbonisation options, and specifically the potential role of a project like Acorn CCS within new industry development in the UK economy. This will enable action to effect consequences so that economically, socially and politically feasible outcomes can be identified around which traction can build with policy decision makers in key government departments such as Business, Energy and Industrial Strategy (BEIS), HM Treasury and the devolved Scottish Government.

> "CEP's involvement will ensure that the economy wide impacts of different decarbonisation options are both understood and gain traction with policy decision makers"

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1. Project objectives

Collaborating and coordinating across the SNZI project, the CEP team will build on existing work and relationships with key stakeholders including the Department for Business, Energy and Industrial Strategy (BEIS), Scottish Government and INEOS, as well as funders such as the Children's Investment Fund Foundation (CIFF) and the Bellona Foundation. It has four main objectives:

1. Conceptualise a CO2 Management Industry initially built around a CO2 Transport and Storage (T&S) industry, and the role and impact for the SNZI project in developing this industry in Scotland through the build out of the Acorn CCS project and Acorn Hydrogen.

2. Understand how a T&S industry would interact with the wider economy, including supply chain requirements, cost/resource use implications for users and new industry/market scenarios in servicing internal UK and overseas markets.

3. Use the evidence developed to develop political economy focussed policy narratives around the T&S industry proposition, and support the building consensus across stakeholders including UK Government, Scottish Government, local government, industry, workers and consumers around understanding of how net benefits may be realised.

4. Work with project partners and policy users to investigate and enable the potential uptake of the refined UK/Scottish CGE models (and underlying refined national input-output accounts) that incorporate specification of an evolving/potential T&S industry.

2. Emerging findings - Economic impacts of CO2 transport and storage infrastructure development to enable new industry activity

- Supporting the evolution of new national and international industries that deliver CO2 Transport and Storage services to industrial clusters, and other emissions intensive sectors (such as thermal power generation) could deliver a range of key outcomes. These include enabling the deep decarbonisation and sustained contribution of current emissions-intensive industries, while also playing a key role in safeguarding jobs, earning power, GDP and the role of infrastructure currently associated with the current Oil and Gas industry and related supply chain activities.

- Our research[1,2] has demonstrated that in previous years, the UK Oil and Gas industry has supported up to ten indirect supply chain jobs per direct industry jobs across key regions of the UK (for example, the North East of Scotland), and in numerous sectors, including relatively high wage areas such as the service sectors that provide financial and professional services. Our initial economy wide research on the development of a UK T&S industry suggests that such strong employment 'multipliers' could be replicated almost immediately as T&S capacity comes on line in the mid-2020s, if existing Oil and Gas supply chains can indeed relatively easily evolve as required to support sequestration of CO2, and assuming wage pressures across the economy are not triggered by the introduction of new T&S capacity and activity.

- However, there are several challenges involved in developing a CO2 T&S industry - including the upfront investment involved in developing infrastructure-intensive capacity at scale and issues around incentivising demand to utilise this capacity – that will require innovative public policy solutions. Our initial SNZI research suggests that where Government can play a role in guaranteeing utilisation of T&S capacity created in Scotland – until such a time as capture industry demand emerges and becomes economically viable – this could induce the required investment in capacity and an industry roll-out that could relatively quickly deliver at least marginal gains in most sectors of the economy, and a boost in UK GDP of up to 0.03% per annum within 5 years of full deployment. Indeed, we estimate that, in this time frame, increased annual government income associated with the wider economy expansion triggered by the introduction of Scottish T&S industry capacity built around the Acorn project could be equivalent to just under half the amount required to ensure sufficient industry revenue to maintain the invested capacity.

- The 'CCUS Business Models' consultation and documentation produced by BEIS identifies the challenge of closing such a 'revenue gap' created by at least initial under-utilisation of infrastructure-intensive capacity for T&S activity. Our initial research shows that forcing future capture industries to pay for transport and storage service delivery, where competitors do not bear similar costs, could trigger a process of off-shoring of activity and wider economy contraction that could potentially entirely negate jobs 'multiplier' and GDP gains generated by the new industry, and reduce revenues to the public purse. Relying on a taxpayer contingency could sustain some of these gains, but with a redistribution of costs such that the 'who pays' challenge would extend to those sectors that service household consumption, with associated implications for jobs, earning power and tax revenues elsewhere in the economy.

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- Thus, innovative public policy solutions, potentially involving public 'green finance' solutions, possibly combined with exploring opportunities to develop the export base of the new T&S industry - as even a transitory means of utilising capacity and alleviating demands on UK finances – should be explored. Indeed, development of such solutions in a CCS context would doubtless deliver more generic learnings for enabling large scale 'net zero' capacity creation of this kind.

3. Emerging findings - Economic impacts of applying carbon capture - with an example from the Scottish chemicals industry

- The challenge of paying for CO2 transport and storage in a way that does not reduce the competitiveness of currently emissions-intensive industries in the UK's regional clusters is mirrored by that of enabling carbon capture in the first place, particularly where the UK is a first/early move in deploying CCS and/or where competitors do not reflect similar costs in market prices. The introduction of carbon capture in regional manufacturing clusters within nations must be carefully planned to avoid competitiveness loss at current production locations, thereby simply risking off-shoring/relocation of investment, GDP, job and carbon emissions involved in producing many products essential to everyday life and to the wider net zero transition.

- For example, introducing and supporting carbon capture in the UK's regional industrial clusters may be key to safeguarding the sustained contribution of industries like chemicals and associated regional and national supply chains through the delivery of the UK's industrial decarbonisation strategy and industrial clusters mission, and the transition of the wider economy to net zero.

- Our research[3,4], has shown that energy intensive industries like Scottish and wider UK chemicals currently support up to four indirect supply chain jobs for every direct industry employee, and higher than national average wages through upstream supply chain linkages to the Scottish/UK energy, service and construction industries.

- Downstream linkages are also key, for example, with chemical industry outputs being crucial in enabling the wider energy transition (for example, through insulation cables and other materials used in electrified activities) and in products that are essential to our everyday lives, including most toiletries (including the hand gels people have become increasingly reliant on in recent times) and in pharmaceuticals (including the seals for Covid19 vaccine vials that material –polypropylene -made at Grangemouth in Scotland). Competitiveness of UK manufacturing is thus crucial, particularly in complex global supply chain contexts, if domestic players are to continue to play some important roles, and if 'carbon poverty' associated with such essentials is to be avoided.

- However, our research[5], focussed on the case of introducing carbon capture in the Scottish Chemical industry, has shown that in the absence of effective policy support, uptake of carbon capture (involving additional equipment requirements to produce the same output) in the Scottish Chemicals industry alone could lead to off-shoring of 11.5% of the sector's employment within 10 years, and a consequent contraction in the nation's average wage and labour productivity levels, and Scottish GDP contracting by up to 0.17% per annum.

- On the other hand, our current research for wider UK sector and economy (supported by the Bellona Foundation with funding from the Children's Investment Fund Foundation) is demonstrating that if the UK can use an early mover advantage to develop comparative advantage in deploying and operating capture technology, the outcome could change such that domestic industry could in fact move back to a growth position with wider economy costs hugely reduced.

4. Next steps

- Our next steps involve fulfilling the objectives set out above and will build upon some of the exploratory results noted here. In particular, we will be consulting with project partners and other knowledgable stakeholders to more fully and accurately conceptualise a CO2 management industry in Scotland. This input will be invaluable in further developing our economy wide model.

- We will use emerging results reported here to inform further investigation and subsequent consultation of how a T&S industry would interact with the wider economy.

- Using the growing evidence base, we will develop effective policy narratives around which consensus in the stakeholder communitiy can be built.

- Our aim is to work with project partners and policymakers throughout the project period to build useful methods and insight that can be used in an applied policy context. If you would like to engage on our part of the SNZI project, please get in touch.

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