

SCCS Briefing

The role of CCS in a just transition

Why does Scotland need a just transition?

As the world moves towards a low-carbon future, it is inevitable that our economy will change. Some industries will experience rising costs, others falling demand; still more will emerge that do not yet exist in Scotland.

There will be winners and losers and the purpose of a just transition is to ensure that the costs and benefits are shared fairly. This can only be done by planning ahead and investing in the things we need to meet our climate change ambitions while providing fair work.

A just transition is about planning the move to a low-carbon future – to make sure that it happens in a fair way. It is about having a pathway from where we are now to where we want to be and recognising that we need to work with the infrastructure and skills we already have as well as developing new ones.

What are the certainties?

If the world is serious about meeting the climate ambition of the UNFCCC Paris Agreement, then we can take the following as fact:

- The oil and gas industry, and industries with high greenhouse gas emissions, will not be able to continue business as usual.

We have already seen from the collapse of Scottish Coal that the decline of an industry can be sudden and catastrophic¹ – for jobs and the environment. Part of the rationale for targeted work on a just transition is to avoid this happening again.

A just transition needs to be part of an industrial strategy that:

- Identifies the industries and sectors that will become less viable as carbon prices rise, or as greenhouse gas emissions become otherwise constrained;
- Identifies the industries and sectors that will emerge and grow in a low-carbon economy, and;
- Takes a planned approach to ensure that jobs and skills from the former can be transferred to the latter.

¹ Other examples in the UK include steel, textiles, car manufacturing and shipbuilding – the loss of these industries is found to have forced skilled workers to accept lower wages or unemployment. See the IPPR report *Risk or Reward? Securing a just transition in the north of England* for more analysis. https://www.ippr.org/files/2018-10/1539965019_energy-skills-october18.pdf

The role of carbon capture and storage

Carbon capture and storage (CCS) is a suite of technologies that can help to decarbonise industry by isolating and permanently storing carbon dioxide (CO₂) from industrial processes before it can enter the atmosphere. It can be used in conjunction with steam methane reforming to produce low-carbon hydrogen, which can decarbonise heat and transport. Once CO₂ transport and storage infrastructure is in place, “negative emissions” will be possible using CO₂ removal technologies, such as bioenergy with CCS and direct air capture.

The IPCC and the Committee on Climate Change are clear that CCS will be vital for meeting emissions targets at lowest cost². As well as being a crucial climate mitigation technology, CCS has the potential to help retain existing jobs and create new ones.

CCS is part of a just transition

CCS has a role to play in retaining jobs across Scotland, and in creating new jobs for a low-carbon economy. It provides a feasible and viable pathway to enable our existing industry and infrastructure to be part of a just transition as we take urgent action to tackle climate change.

CCS enables industry to keep producing, retaining jobs that would otherwise be lost if production was transferred overseas or shut down altogether

Around 185,000 people are employed in manufacturing in Scotland – 7% of the working population.³ Manufacturing in Scotland includes cement, polymers, chemicals, paper and board mills, glass-making and food and drink, as well as the midstream oil and gas industry – such as refining and gas processing.

These sectors have high CO₂ emissions, either due to a high demand for heat, which is met with fossil fuels, or because they generate CO₂ as an unavoidable part of their industrial process, or a combination of both.

CCS can capture the CO₂ from these industries before it reaches the atmosphere: this means that all of these industries can carry on employing people, while significantly reducing their emissions (typically by 90%, although higher rates are possible).

In some cases, electricity could replace fossil fuels to provide the heat but the amount required would be impractical⁴. Alternatively, the process could be completely redesigned to avoid the production of CO₂ though this may not even be possible. The most likely alternative would be to cease production in Scotland, with a consequent loss of jobs and tax revenue, and no change to global CO₂ emissions if we still consume the product though imports.

² http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf . <https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf>

³ <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/regionbusinessregisterandemploymentsurveybrestable3>

⁴ SCCS work in progress

CCS enables North Sea oil and gas to continue to be used for heat and transport

Heat and transport are two sectors where fossil fuels are burned directly – in gas boilers and vehicle engines – with CO₂ emitted where the fuel is used. It would be very impractical to capture the CO₂ from these millions of dispersed sources, so there is a need to phase out the use of fossil fuels in these applications.

One option is to use hydrogen instead, which emits no CO₂ when it burns. Hydrogen can be produced in bulk from methane – natural gas – with CO₂ as a by-product, which can easily be captured and stored. Studies suggest that hydrogen could be used for heating in existing domestic boilers, meaning that there would be less disruption to householders than if they were to replace their gas systems with electric heating⁵. Current gas engineering skills and jobs could be transferred from natural gas to hydrogen without significant need for retraining.

CCS could directly replace offshore oil and gas jobs as North Sea production winds down

CO₂ transport and storage could be compared to the oil and gas industry, but in reverse. Instead of pumping oil and gas from rocks over a thousand metres below the seabed and transporting it by pipeline to onshore industrial sites, CO₂ is carried by pipeline from industry to offshore sites, where it is injected into the same types of rock for secure storage.

Because the processes are so similar, CCS will need the same kind of skills and experience as the offshore oil and gas industry, making it a relatively easy transition for workers. Around 28,300 people in Scotland are employed in the oil and gas industry, with a further 35,000 employed in the supply chain⁶.

CCS supports the construction industry by providing low-carbon cement and steel

Around 5% of working people in Scotland (141,000) are employed in construction. This industry relies on high-carbon products, such as cement and steel, which have unavoidable CO₂ emissions from calcination and iron reduction, respectively. This means that, even if the heat needed to manufacture these products could come from electricity or hydrogen, the process itself would still produce high levels of CO₂⁷. Without CCS, these products will be hard to manufacture within a low-carbon economy. As well as the impact on construction costs and jobs, there would be knock-on effects for housebuilding.

CCS makes best use of existing assets

The Just Transition Commission is rightly expected to focus on employment and fair work issues around a just transition. However, it is also worth considering the investment that has already been made in plants and infrastructure in Scotland, and how we can maximise the

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/699685/Hydrogen_Appliances-For_Publication-14-02-2018-PDF.pdf

⁶ Based on information supplied by email by Scottish Development International, referencing <https://oilandgasuk.cld.bz/Workforce-Report-2018/6/>

⁷ In cement manufacture, around 40% of emissions are from the heat use, and around 60% are from the chemical process [https://www.euractiv.com/section/energy/news/swiss-researchers-chart-path-to-zero-emission-cement/?ct=t\(CCSA_Daily_Bulletin_Tuesday_25_April_2014_25_2017_\)](https://www.euractiv.com/section/energy/news/swiss-researchers-chart-path-to-zero-emission-cement/?ct=t(CCSA_Daily_Bulletin_Tuesday_25_April_2014_25_2017_))

economic return from that. Much of the investment in infrastructure came from public money, so protecting economic return from it is protecting the value of our own tax contributions.

Following circular economy principles, gas pipelines can be re-used for CO₂ transport – extending their life, deferring the need for decommissioning and the associated emissions, and reducing the capital cost associated with developing CCS.

Four key actions for the Just Transition Commission

- Consider the current role and impact of all high-emitting industries in Scotland and understand the jobs and infrastructure that are associated with them.
- Understand where these industries can use CCS technology to operate in a low-carbon way.
- Understand the potential for CCS to make use of the skills, infrastructure and experience from the oil and gas industry.
- Understand the role of hydrogen in Scotland's energy future, and the skills that will be needed for that.

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(Photo courtesy of Dr Leslie Mabon)