Creating markets for industrial decarbonisation

UCL-BEIS roundtable, July 2020

Introduction

In July 2020, UCL convened a roundtable of experts from across the UK to provide advice to policymakers on how a market could be created for low carbon industrial products. Academics were invited to advise on the challenges that could be tackled by market creating measures and the policy levers available to Government in this context. This event forms part of a wider evidence gathering exercise that the Department for Business, Energy and Industrial Strategy (BEIS) are undertaking to inform the development of the long-term Industrial Decarbonisation Strategy due to be published in Spring 2021.

The UK is one of the first major economies in the world to legislate for a net-zero target. Business and industry accounts for 25% of UK emissions. Decarbonising this vital part of the UK economy requires a combination of approaches including: more efficient industrial processes, switching to low carbon energy sources or carriers (e.g. hydrogen, electricity), carbon capture, usage and storage (CCUS), and improvements to the way in which commercial and industrial buildings are constructed, refurbished and operated. The low carbon transformation can put the UK on the cutting edge of global industry. It will help the UK's manufacturing regions to become centres for low carbon goods production, enhancing their long-term competitiveness and regenerating industrial areas.

While support is being put in place for decarbonising technologies such as CCUS, a supporting policy framework will be needed to achieve net zero by 2050. This includes policies to create demand for low carbon industrial products. Demand for low carbon industrial products must be generated as part of de-risking investments in decarbonisation for businesses. However, there remains a lack of evidence around how markets have been created in the past in similar circumstances (e.g. renewable energy, electric/hybrid vehicles), the variety of policy options that have been used previously and their degree of success.

Challenges for market creation

There is a clear need for further incentives to develop decarbonised markets for industrial products in the UK. At present, primary industry sectors invest less that 1% of turnover into research and development, in comparison to other sectors for example pharmaceuticals which invests around 10%, pointing to a lack of demand for innovation in the sector.

Demand pull is weak

Consumer or downstream demand for low-carbon industrial products remains weak. Although evidence shows that the cost in comparison the cost of the final product is low, it is difficult to demonstrate upside potential and consumer trust is low. For example, there are companies

making building aggregates from waste CO_2, and one of their challenges is to convince customers in a very conservative sector that a new or innovative product is as good as the one they're used to.

These sectors also **lack real product differentiation**. People will pay more for an iPhone or a particular drug, but different types of steel don't have this level of consumer demand. Furthermore, in the business-to-business market, many **companies do not have the purchasing power to differentiate** low-carbon product in a commodity market. Government purchasing power however allows it to procure with conditions, which would enable market creation for low-carbon product differentiation.

Data transparency

A lack of data transparency also remains a challenge in decarbonising industrial products. There is little data on variability of daily as well as annual emissions from primary producers, and across the value chain. Combined with a lack of pressure to report emissions, this limits incentives to innovate or develop low carbon markets for these products. In addition, it can be difficult to identify where carbon leakage occurs within the long supply chains which characterise the sector. Data across the supply chain is opaque and difficult to obtain, making system analysis of the sector difficult.

Policy levers

Government is encouraged to consider a wide range of mechanisms when developing policies to help stimulate new markets for decarbonised industrial products. While high level market-wide incentives such as generic carbon prices could stimulate the market, this may not lead to market-wide innovation. Government is therefore advised to pursue targeted measures to create market pull. Furthermore, Government should ensure that, either the end consumer or the producer is targeted in its policy design, rather than targeting the middle of the supply chain.

Tax and regulation: A powerful lever that government can use is taxation. A **tax on material consumption** above a set benchmark could be very powerful but is often opposed because consumption taxes are seen as less desirable than production charges. However, there is clear precedent eg similar taxes on petrol and alcohol. The long and complicated supply chains typical of the industrial sector may make financial incentives difficult to implement.

Standards: The application of standards might be a more favoured approach, which can be deployed through the procurement function and can be manipulated to accelerate decarbonisation throughout the entire supply chain. Government would be in a position to set such standards through application of procurement rules, allowing influencing the behaviour of a network of buyers. Standards, for example on the footprint of goods produced, would be relatively low-cost to implement and quick to deploy. Such measures would be highly dependent on availability of, and access to, data on carbon content across products, and the supply chain. This information is currently missing or opaque, and the systems analysis to gather it has not yet been substantially implemented in the sector.

Case study: There are comparable examples from the business-to-consumer markets. For example the "**top-runner program" in Japan**. The programme applied to consumer products (eg air conditioners, washing machines, fridges) and uses the best performing product to define the minimum market standard in X years' time. The number of years before the standard takes effect is negotiated with trade associations, but the minimum standard itself is not. The programme therefore allows companies to make investments based on long term predictability of the market environment.

Influence and reward: government should also look to **"soft" rather than "hard" power** to reward and spotlight those companies that are doing well and send pressure for innovation up the supply chain. Examples include Government using its procurement power to reward companies meeting certain criteria, or using incentives or a certification scheme to reward high performers. Government can also identify and remedy **non-financial pain-points** and bottlenecks.

Case Study: in the USA bottlenecks around permits for CCS storage wells was identified as one of the biggest challenges in decarbonising industrial products. Government intervention to simplify and speed up the process will increase uptake and reduce costs for companies.

Borders and trade: The topics of supply chains and their complexity are also relevant to **border and trade questions**. Government may consider identifying concern in *how* a product is made, as well as *where* it is made, creating a level playing field for products at the point of consumption. This is a grey area in World Trade Organisation rules but it doesn't conflict with trade principles as long as it is non-discriminatory.

Stimulating markets: Governments should also be aware of the rhetoric that exists in this space and to make sure that it is not mis-applying analogies. **Avoiding "picking winners"** is symptomatic of this in the UK. In the green transition there are areas that we know today that we need, so of course we want low carbon construction materials. That is unavoidably a winner and it should be backed by policy. Government can be in a position to drive forward competition and market creation by backing low carbon products and seeding self-reinforcement of product popularity in the wider market.

Industrial clusters and opportunity zones: The creation of consortia, regional systems and industrial clusters has been shown to increase the uptake of low-carbon innovation. Clustering can provide a pre-existing supply chain, for example Tesla's decision to locate Chinese production in Shanghai, already a major car manufacturing region. Clustering is not enough in itself: it's also important for regional government to have a stake in this success, and to identify areas with existing systems and supply chains and support with regulation, favourable tax and planning. Central government should give local government scope to invest and get involved in industrial policy at the regional level and with a focus on the most applicable industrial sector for that particular region. Policies should be carefully considered to avoid blanket rules or guidelines that are not applicable to regional contexts.

Local planning and the planning system could also be an important lever in the development of decarbonised industrial clusters or zones. Government should consider the network effects associated with groups of companies or towns and cities making coordinated changes that force the supply chain to innovate. However, consideration should be given to the regional and global nature of the sector, and if local approaches will be effective given that many products from a particular area will be sold in other areas in the UK and abroad.

Case Study: There are existing examples of industrial clusters being developed in the UK. The **Solent Cluster** includes a large number of small emitters, SMEs and their products, who are looking to understand how they can work to support decarbonisation. The **North West Cluster** is also developing innovations and a benchmark of products. Other industrial clusters across the UK, including chemical industry clusters in Humber, Teeside and Grangemouth, would also provide valuable case study examples. However, clusters are currently being put in direct competition with each other for funding, rather than building on individual successes as a wider network.

Case study: The **water framework directive** provides an analogy of how policies can be most effect at different scales. The directive has been applied most effectively at a catchment rather than

regional or national level. The same principle could be applied to the development of local low-carbon industrial clusters, where decarbonisation targets are set to regional and sectoral specifications.

Further reading

Nemet, G. F., V. Zipperer, and M. Kraus, 2018: **The valley of death, the technology pork barrel, and public support for large demonstration projects**. Energy Policy, https://doi.org/10.1016/j.enpol.2018.04.008.

Grubb, M., Forthcoming: **Induced innovation in energy technologies and systems:** a review of evidence and potential implications for CO_2 mitigation. IPCC

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