

Decarbonising emissions is difficult, but not impossible, says new review

July 6 2018, by Caroline Brogan

A new Imperial review suggests more work is needed to tackle emissions in easier sectors and the difficult.

The new research by Imperial College London and the University of California, Irvine, suggests that though many areas are difficult to decarbonise, solutions using current technology exist for the majority.

But just over a quarter of emissions from fossil fuels and industry are significantly more difficult to decarbonise than the rest – and emissions from these sectors are growing. In light of this the authors say more focussed research and development may be required to bring down costs.

Co-author Professor Paul Fennell, of Imperial's Department of Chemical Engineering, explains that some emissions may require more effort to bring down than others. He argues we should also focus on, but not limit ourselves to, providing clean, low-cost energy and new fuels, as well as using carbon capture to allow future air travel, cement and steel, and trucks to operate.

The researchers warn also that the proportion of emissions from a small number of relatively difficult to decarbonise sectors could rise sharply as more parts of the world are developed.

Caroline Brogan spoke to Professor Fennell about the work.

Why are some sectors easier to decarbonise than others?

Most of the world's carbon emissions could be addressed relatively simply. For example, light vehicles like cars can be electrified, and many emissions from power generation can be avoided by switching to renewable sources.

However, there are some emissions which are much more difficult to prevent – for example, the cement industry releases CO₂ as an intrinsic part of the cement-producing process. The same is also true of steel and iron production.

Can you explain a bit more about your work?

Thirty experts, each bringing a particular type of expertise, got together to look at ways to attack the last few, very hard to eliminate, sources of carbon, such as air travel, cement, iron, steel and highly-reliable power generation. These difficult sources are currently responsible for 27 per cent of emissions from fossil fuels and industry.

Using our combined expertise we came up with and published some realisations – and some solutions – for decarbonisation.

What are the three main suggestions made in the report?

Our report suggests potential priorities for future long-term research.

Firstly, there is no point in looking at the hardest sectors to decarbonise if we don't first focus on decarbonising the easier sectors. It was interesting during our talks to see that there were solutions available for

even the hardest problems, but that we are collectively not tackling some of the easier ones.

Secondly, a continued focus on new ideas for how to decarbonise the difficult last quarter of direct carbon emissions. We need to start serious research, development and deployment of these now if we're to obtain overall zero emissions by the end of the century.

And thirdly, industries should work together to tackle emissions. Current processes have been developed in many cases in isolation, with little emphasis on energy requirements and less still on CO₂. What is necessary is nothing short of a new industrial revolution – making more with less, and with fewer [carbon emissions](#).

What else did you find?

Our report found that a vast amount of carbon-free electricity is crucial for us to decarbonise many of the most hard to decarbonise sectors.

We also need to proactively develop CO₂ management systems such as carbon capture and storage, where excess carbon from industry is stored underground to prevent it building up in the atmosphere.

What the take home message you'd like people to have?

It is important to note that we are not talking here about decarbonising the 75 per cent of emissions for which there are relatively easy solutions – these need to be tackled immediately, and in no way should the intractability of just over a quarter of the emissions be used to justify slow-peddling on the rest.

Provided by Imperial College London

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