ENERGY EDGE

ENERGY EDGE POLICY BRIEF

# CARBON CAPTURE AND STORAGE: STILL NOT CRAZY AFTER ALL THESE YEARS?

When Energy Edge began putting out policy briefings in mid-2009, low-GHG emissions energy inhabited a different future. Experts at the time might be forgiven for their focus on developing carbon capture systems for high emissions fossil plant. A search of terms such as “clean coal” and “carbon capture and storage” in Google Trends reveals peaks in interest around that time that have since died down significantly.

Since the turn of the decade, however, the prospects for “clean coal” have been eclipsed by the demise of a number of carbon capture pilot projects and a relatively sudden availability of cheap and abundant natural gas. Meanwhile, renewable resources such as solar power that had seemed to face intractable barriers in the form of high levelized costs and incompatibility between output and load demand curves are now not only growing rapidly but are beginning to elbow out the competition in many markets. In 2009, carbon capture and storage had seemed to plausibly be the easier technological fix that would become economically viable through inevitable scaling; this has instead precisely what has happened for solar and wind power.

While granting that some players involved in the production of obsoleted resources will suffer, the universal energy goal for this century is rightly the decarbonization of production with a minimum of net economic dislocation (or, more optimistically, maximized net profit). As such, the current trends in renewables technological and market development are to be welcomed. However, most scenarios see the gap between clean capacity and demand up to and beyond mid-century, leading the IEA and others to conclude that CCS will still be required to remove nearly 100 billion tonnes of carbon dioxide emitted during this time[i].

If, contrary to these reports, CCS-compatible fossil fuel is off the table, the gap will be filled using one of a number of combinations of generating capacity. Nuclear power is one pathway that, given memories of the 2011 disaster in Japan and continuing cost overruns, seems least likely to successfully scale under current circumstances. Natural gas, which is cleaner, easier to modulate in terms of plant design, and currently cheaper than coal would appear a likelier prospect. However, as suggested in a previous policy briefing,[ii] there is a risk in building up the generating fleet from units that are individually more efficient but still not sufficiently negligible in terms of emissions; eventually, the law of large numbers takes over and you are back somewhere near square one in terms of aggregate greenhouse emissions.

Probably the least desirable scenario—and, unfortunately, a highly likely one—is that a significant amount of antiquated plant will just “hang on.” This is seen in many of the longer-industrialized nations, in which it is not uncommon for seventy- or eighty-year-old coal plants, their fixed costs having been paid off long ago, to continue operation under the grandfathering of regulatory controls. Of course, by 2050 much of the now state-of-the art coal plant in the developing world will fall into this category, and the same types of decisions as to whether to decommission or pay off operating costs will have to be made. In this context, it is regrettable that carbon capture and storage has failed to take off commercially.

We will of course have a clearer view of how the generation mix is evolving toward the 2050 watershed by 2030, which is also around the time that most scenarios see an obligation for emissions to begin falling (steeply) to meet containable climate change goals. The problem, as always, is that decisions that are made now will not be unmakeable at that point.

At this point in history, the default decision-making rule is "the market decides," and, on the surface, it's hard to argue with that logic just now—globally, emissions remain stagnant even though economic activity is increased, thanks in part to ever-cheaper renewables but also coal remaining stuck at the low end of the merit order despite negligible carbon prices. However, this is just a trend, and under nearly all scenarios steeper cuts must start soon if a "soft-landing" pathway to a sustainable future climate is to be realistic.

The question remains as to whether, in the future state of the market, we will look back and realize that intervention at this point in history would have been easier. If CCS is to fill foreseen shortfalls, it would behoove us to decide what is to be done, now.

Potentially, we could intervene either in the market, for instance by subsidizing carbon capture infrastructure beyond the demonstration plant level and at the network (pipeline) scale that is needed to bring levelized costs down, or technologically, by focusing research and development attention and funds into the design of a robust, if not market-ready, format for rapid rollout beyond the next decade or so in the form of a "CCS Manhattan project."

Although CCS remains a constant (if background) topic of discussion, it appears to us that without the context provided above, the discussion remains in a rut.

In this light, developments such as the UK government's cancellation of its CCS Competition and the concurrent cuts to CCS funding proposed by the Trump administration in the US are definite steps backwards, and we would implore national and transnational governments and institutions to strongly reconsider rescissions such as these. Meanwhile, further funding to fast-track high-risk but potentially high-reward "silver bullet" technologies such as so-called "basalt CCS",[iii] as well as the development of frameworks to enhance cooperation with vulnerable but innovation-rich countries such as China and India, would represent examples of steps forward.

Neither the full-spectrum, government-instigated infrastructure buildup nor the big-investment R&D approaches outlined above are strategically easy, and both fail against the current logic of letting the market decide. However, there are times at which dead-hand logic must cede to informed opinion and live decision making. Is deciding the fate of carbon capture and storage an example of this?

*The Energy Edge team has expertise covering all aspects of energy markets and regulation, and we can help you ask and answer questions regarding strategic solutions for actors in the sector. Please contact Linus Adler for a preliminary chat or to set up a consultation discussion.*

[i] For some of the better publicized reports, see, for example, *20 years of Carbon Capture and Storage: Accelerating future deployment*, International Energy Agency (2016) and "Key indicators to track current progress and future ambition of the Paris Agreement" by Peters et al. in *Nature* (2017)

[ii] See Energy Edge Policy Briefing Oct 2014: "The Efficiency Trap and other CCS Quandaries"

[iii] Refer, for example, to the recent trials in Iceland in which captured CO2 was safely mineralized within two years: "Rapid carbon mineralization for permanent disposal of anthropogenic carbon dioxide emissions" (2016) http://science.sciencemag.org/content/352/6291/1312