IEAGHG Information Paper 2018-IP38; IEA-CCC webinar: The Outlook for CCS in the coal sector"

Toby Lockwood, from IEA- Clean Coal Centre, presented yesterday a webinar titled "The outlook for CCS in the coal sector". His presentation showed, in a very comprehensive format, the actual status of coal-CCS around the world, its contribution to the IEA climate change scenarios, and its potential integration in different regions in the coming years.

Coal plants contribute as approximately one third of the global CO_2 emissions today and will decline very little in 2040, even if new plants are built. Toby showed the slow progress on CCS since 2012, presenting the 18 large, full-chain projects operating, and 3 under construction. Fortunately, medium and longer-term plans in US, UK, Australia and Norway are increasing the hope on a wider future deployment. From the existing ones, most of the projects use the CO_2 for EOR and only 5 active projects use dedicated saline aquifer storage of CO_2, with the oil and gas sector leading the way.

In 2008-2010, we saw a significant funding for CCS projects, perhaps the absence of mechanisms for revenue, higher costs than initially planned, and longer project phases that ended in significant delays, amongst other reasons, stopped few projects. There is a political uncertainty to make a stable business case, perhaps there are potential policy drivers, such as CO_2 pricing (as applied in EU, China parts of USA, Canada, and Norway), CO_2 intensity cap (as in UK, Canada or China), guaranteed power price (as in UK) or port-folio standard.

As we are aware, CCS presents several challenges. Specifically, in the coal power sector, those are linked to the CO_2 avoidance cost (absence of a business case), the need to create partnerships with oil and gas industry to manage storage operations (commercial risk), and uncertainty of CO_2 price in ETS. Those challenges can be finally reflected in the final power price for consumers. However, with the recent advances presented by the International CCS Knowledge centre (see IEAGHG 2018-IP36, Update on the Shand Power Station CCS Feasibility study by the International CCS Knowledge Centre), we have observed a significant reduction on CO_2 capture costs (67% reduction in capital cost and 73% reduction in O&M costs) due to the integration of learnings from Boundary Damn in the Shand power plant, together with a more optimized configuration and a better integration. In parallel, the Petra Nova project was commissioned in 2017, fulfilling schedule and initial budget, and with an interesting modular design. To note that those three projects use chemical absorption as carbon capture systems.

As mentioned in the past, the location is a key parameter in the implementation of carbon capture systems. In this regard, Toby analysed USA, Europe, China and Australia, summarizing the differences, the current scenarios and the projection in the coming years. In USA, the recent 45Q tax credit can have a significant impact in the coming years, as predicted by the DOE. Europe stopped in the last years several projects in the power sector. However, the interest is focused now in industrial clusters, transport and storage infrastructures, and hydrogen. Moreover, BECCS seems to be integrated in the European plans. China was identified as a convenient location for coal-CCS in our recent report (IEAGHG 2018-04, Effects of Plant Location on the Costs of CO_2 Capture). China can have a great potential for retrofitting existing coal plants and there are several projects started and on its way. Australia has extensive research base and experience with large projects and storage pilots, with the Hydrogen Energy Supply Chain project and CTSCo (based also in chemical absorption) leading the progress.

As final summary, there is a great potential for CCS to decarbonize the coal power sector, with demonstration experience proving the technical viability and recent advances showing important cost reductions. BECCS and hydrogen could benefit from the CCS experience, while industries and gas could become more important in Europe. It is recommended to implement clusters of industrial facilities and separate the transport and storage business from the capture to reduce risk and complexity.

For more information, we highly recommend this webinar, which you can watch in: https://www.iea-coal.org/webinars/

As further information, you can find the IEA-CCC report "Reducing China's coal power emissions with CCUS retrofits" https://www.iea-coal.org/reducing-chinas-coal-power-emissions-with-ccus-retrofits/ leaded by Toby Lockwood, in addition to other reports Toby and the rest of the IEAC-CCC team has delivered (https://www.iea-coal.org).

The update from the International CCS Knowledge Centre can be found in: https://ccsknowledge.com/

One of the outputs from this presentation is the clear leadership of chemical absorption on large-scale projects. It is expected that this technology will still be leading the future CCS due to its readiness and the urgency of implementing CCS. Emerging technologies could struggle to compete, perhaps those will be still in the vast array of CCS options and with the potential of becoming more important in the coming years. In connection with that, we will be delivering soon our updates "Further assessment of emerging technologies and their potential to reduce costs" and "Review of Fuel Cell Technologies with CO_2 Capture", prepared by CSIRO and DOOSAN UK respectively.

Mónica García
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