Cement industry wakes up to CCS, but storage remains key

The cement industry has a big problem that is inseparable from the core product they produce and market - substantial CO2 emissions inherent to the production process of cement, says Bellona Europa.

At present cement production is responsible for 5% of global emissions. If the cement industry fails to drastically reduce this figure then this industry and its "wonder" material cannot have a role in our future society.

To make matters starker for the cement industry, the production of cement cannot be simply cleaned up with the use of renewable energy or efficiency improvements. This is because the majority (60%) of the industry's CO2 emissions do not originate from energy use but from the very manufacture of cement from limestone.

In very simple terms, clinker, a major constituent of cement is manufactured by breaking down limestone into calcium and CO2. The calcium is subsequently used and the CO2 dumped into the atmosphere. If the cement industry wishes to stay in the cement business then a way must be found to capture and store this CO2.

For this reason Bellona was happy to attend the European Cement Research Academy's (ECRA) first conference on CO2 capture and reuse in the cement industry. The speakers reviewed various existing technologies to capture CO2 from cement facilities and the use of this CO2 as a feedstock in the production of synthetic natural gas, methanol, aggregates and plastics.

The use of CO2 as a feedstock has the potential to encourage the deployment of some CO2 capture facilities at cement plants. Bellona agrees that CO2 should be used where possible given the products produced provide sufficient and lasting reductions in CO2 emissions.

However, the simple recycling of CO2 into products, such as synthetic natural gas, that is quickly released into the atmosphere will not be sufficient in achieving our CO2 reduction goals. Indeed, the huge quantities of CO2 produced by the cement industry, will for practical and commercial reasons, preclude the vast majority from being used in generating products. The lion's share of the CO2 captured will need to be permanently stored in geological storage sites.

Taking the production of CO2-based polymers presented by Dr Prokofyeva of Bayer technology serves as an example. A commercial-scale production facility envisioned by the manufacturer will use in the range of 4,000 tonnes of CO2 in their product manufacture each year. Putting this into perspective, an average scale cement plant produces approximately one million tonnes of CO2 per year. The result is that a commercial-scale CO2-polymer factory will use 0.4 % of the CO2 generated from a cement facility.

Jeroen Schuppers of the European Commission reaffirmed this point; making clear to the audience that although CO2 use maybe of interest in developing value chains, it is not practical nor an environmentally effective substitute for CO2 storage.

Bellona agrees that CO2 should be used where possible to produce useful and climate friendly products. However, these products must generate true reductions in CO2 emissions and be more than simple CO2 recycling which is then rereleased into the atmosphere in a short period.

The scale of CO2 generated by the cement industry will certainly preclude the vast majority of CO2 captured from being used as a feedstock in such products. Thus it is critical that the focus be kept on developing and deploying CO2 transport infrastructure and storage facilities.

More information

Read Bellona's recently published report entitled "Scaling the CO2 storage industry: A study and a tool" which measures the feasibility, requirements and bottlenecks of the CO2 storage industry in Europe to 2050.

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