2018-IP18: CO_2GeoNet Annual Meeting 24th – 25th April, 2018, Venice

This year's two day annual CO_2GeoNet meeting in Venice covered an exciting range of topics and updates spanning the whole CCS and CCUS chain. Delegates were briefed on a number of new initiatives designed to take CCS and CCUS towards full-scale commercial development and stimulate renewed interest in Europe. Highlights included:

- ELEGANCY project - enabling a low-carbon economy via hydrogen and CCS
- BECCS - moving towards negative emissions
- Boundary Dam learnings
- The PORTHOS project in Rotterdam (recently covered in 2018-IP17)
- The Norwegian full-scale storage Smeaheia project
- ENOS project - New CO_2 storage pilot project opportunities in Europe (covered in a separate IP)
- CCS optimism in the USA: recent legislative initiatives
- Potential oilfield pilot and CCS development in Serbia
- The Illinois Industrial (IL-ICCS) project at Decatur
- The Tomakomai CCS Demonstration Project
- The TRUST project and its progress at the Heletz test site

Marcello Capra from the Italian Ministry of Economic Development opened proceedings by outlining his Government's strategic role for energy technologies. The policy emphasis is focused on a new national energy strategy that aligns with the COP 21 objectives. It will include: energy security and low carbon technologies; complete coal-fired power generation phase out by 2025; participation in ENOS, specifically a feasibility of CCS in cement manufacturing in Italy; and an announcement that Italy is to join Mission Innovation.

In his introduction the CO_2GeoNet President, Ton Wildenborg, stressed that the theme for the meeting was "Growing CCS for a sustainable future". He noted that Europe is missing demonstration plants and stressed that actions need to be bottom-up even at municipal and local citizen level.

The key note speaker, Jan Ros from the Netherlands Environmental Assessment Agency, presented a view of future CCS development in his country. He stressed that CCS is included in future energy systems. The Dutch climate change policy now includes a 49% emission reductions by 2030 from 1990 levels. Although the Netherlands contribution to the global CO_2 budget is only ~0.3% emitted from ~0.2% of the global population CCS is still an important option. There will be an increased contribution from renewable energy sources but this will become increasingly difficult to sustain especially in the reduction of CO_2 from industrial sources. Future options will include a combination of renewable energy and bioenergy combined with CCS (BECCS) and CCS. Jans drew attention to the dominance of fossil-fuels which cannot be replaced in time to meet policy targets. Other factors include the optimisation of land-use. For example PV offers higher efficiency compared to biomass, but biomass has a dual purpose. There is also a time delay with biomass in the context of the carbon cycle. Although CO_2 is absorbed from the atmosphere it can only offer limited emission reduction in the short-term. Jans emphasised how the "circular economy" is part of transition to a low-carbon world.

Despite CCS's faltering start in the Netherlands, with the rejection of an onshore storage project in 2010, there has been an acknowledgement at government level in 2017 that CCS is one of the most important options to reach ambitious reduction targets by 2030 especially in industry. 2018 saw the start of new negotiations for a new Dutch Climate agreement. Initiatives will include: CO_2 capture as

an option for big ships; cost efficient low carbon solutions for transport; participation in international agreements solutions; and more public/private collaboration.

At a pan European level Maria Velkova from the European Commission's DG Climate Action told delegates that as part of the EU's 200 low carbon economy Roadmap an 80% domestic reduction by 2050 is feasible.

The next mid-century strategy includes:

- EU research & industrial programmes with a budget of €695 M
- European Energy Recovery Programme (EERP)
- €1 B for 6 CCS projects
- Connecting Europe transboundary infrastructure
- A future Innovation Fund
- An increase in the EU ETS carbon price
- CCS storage Directive to ensure that there is a level playing field across the EU for environmentally safe geological storage of CO_2.
- A step up in research and innovation activities for CCS & CCUS.
- The development of a strategy for an Energy Technology Plan to stimulate initiatives between Member States.

The EU enabling policy for CCUS and CCS will include the development of CO_2 transport and storage clusters to reduce costs and stimulate industrial CCS. National climate and energy plans will be developed under the governance of the EU to help Member States identify their CCS needs and instigate better transition pathways to meet 2030 targets and subsequent progression towards 2050. The first call for a new EU Innovation Fund will be in 2020.

One of the notable themes to emerge from this meeting was the number of initiatives to develop CCUS and CCS on a large scale via producing hydrogen from natural gas and linked to CO_2 storage, and from the combination of bioenergy and CCS. The ELEGANCY project is a good example presented during the meeting. Its key aim is to enable the development of a low-carbon economy via hydrogen. There is a pilot plant underway as a first step to reduce the cost of hydrogen production from natural gas in a single step.

The ELEGANCY programme also includes a fault sealing integrity project at the Mont Terri Rock Lab in Switzerland. A new excavated niche is being built at the facility for experimental work that will inject CO_2 saturated brine into an existing fault which is then monitored for 8 – 10 months. Pre and post geomechanical measurements will be made and then compared with simulations.

Bioenergy combined with CCS (BECCS) was exemplified by a US delegate. The country has a number of BECCS projects that are either planned, or in the case of the Illinois Industrial CCS (IL-ICCS) project located at Decatur successfully injecting ~1M tonnes per year. The BECCS project portfolio ranges from annual injection rates of 0.02 – 2.5 M tonnes. Significantly, the US 45Q tax credits have been recently raised from $10/t to $35/ton for EOR and $20/t to $50/t for saline storage. These changes signal increased federal support for BECCS and may lead to accelerated development.

An update on the Boundary Dam coal-fired power plant operated by Sask Power has shown that CO_2 capture can be achieved at a rate of 120 – 140 tonnes of CO_2 per GWh generated. This compares with 400 tonnes per GWh for new natural gas power generation and 500 tonnes per GWh for coal-fired plant without capture. The presenter also commented that Boundary Dam could burn up to 30% biofuels without compromising boiler efficiency.

This CO_2GeoNet meeting included one of the most significant proposals for a full-chain CCS demonstration: the Norwegian Smeaheia project. Three large point sources of CO_2: the Klemetsrud waste incinerator; the Norcem Brevik cement plant; and the Yara's ammonia fertilizer plant at Porsgrunn, will transfer the captured CO_2 via ship to an offshore storage reservoir. This site is under development by Statoil in partnership with Shell and Total in the Smeaheia area 50 km from the coast but east of the Troll gas field. If viable and sanctioned by meeting the Norwegian Directorates and Norwegian Environment Agency criteria first storage could be achieved by 2025. There will be a presentation to Parliament on the 15th May, for a Parliament decision on 15th June on whether to progress to FEED studies for the project.

James Craig from IEAGHG presented the latest forward projections of the technology mix, based on IEA models, that will be necessary to achieve the IPPC's 2°C and 1.5°C scenarios. It is quite clear from these projections that CCS linked to industrial sources will need to be developed on a large scale by 2060 to stabilise CO_2 emissions.

The meeting concluded on an upbeat note with many positive messages emerging from recent initiatives in Europe and the continued progress towards industrial-scale operations in several locations across the US.

James Craig
11/05/2018