



GHGT-13 SUMMARY

John Gale

GHG TCP

71st WPF

15-16th December 2016

Paris, France

Conference Framing



- Paris Agreement now ratified, committing ourselves to achieving to temperature target of below 2⁰C.
- CCS identified as a key mitigation technology option by the UNFCCC to get to 2⁰C.
- CCS will be more important in a below 2⁰C world
- Negative emission technology like BioCCS will also be critical post 2030
- COP22 underway to start the drive for more stringent mitigation action by countries
- Important for conference to demonstrate that CCS is ready to be implemented at the scale needed



GHGT-13 Statistics



991 Delegates from 38 Countries



341 Oral Presentations



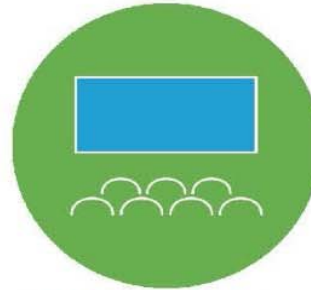
3 Keynote Speakers
6 Technical Plenaries



12 Themes
108 Sub-Themes



128 Reviewers



71 Technical Sessions



7 Panel Discussions



470 Posters



1043 Abstracts
Received



16 Side Events

Story of GHGT13 by Tweets @ <https://storify.com/ukccsrc/ghgt-13>

Opening Plenary Lectures



- Launch of “20 Years of CCS” - Kamel Ben Naceur, IEA
- “CCS the Time is Now” - Trude Sundset, CEO Gassnova
 - Outlined plans for three FEED studies for CCS on industrial units (incinerator, cement, fertiliser plant)
 - Offshore storage and transport using ships
 - Operational by 2020
- Climate Change: Too late for 2°C? - Prof Thomas Stocker, University of Bern
 - Warming is unequivocal
 - The CO2 budget will be exhausted by about 2035.
 - By 2035, the 2°C target will be lost.
 - We need a new industrial revolution with decarbonisation and sustainability at its core, CCS one of a number of key technologies

All presentations at: <http://www.ghgt.info/ghgt-13/ghgt-13-programme/item/plenary-sessions-4>

Demonstration Projects



Key Points

- Boundary Dam and Quest Projects operating for over one year both captured 1Mt CO₂ to date
- Sleipner now injecting for 20 years – 19Mt CO₂ stored
- Boundary Dam, Sleipner and Quest both had strong government support
- Boundary Dam and Kemper Projects both use coal which has predictable long term costs
- Quest, Sleipner and Tomakomai projects are injecting into saline aquifers (onshore and offshore)
- Boundary Dam and Kemper Projects business models based on sale of products (CO₂-EOR, ash & sulphur)
- Jubail Industrial City, CCUS project sells CO₂ for EOR and uses CO₂ to produce methanol and urea

Demonstration Projects

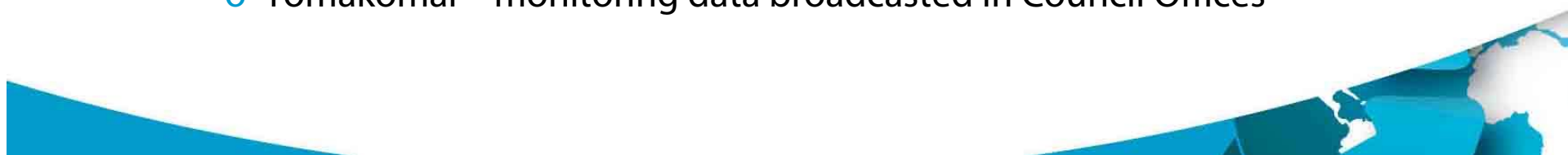


Capture Equipment

- Quest – equipment manufactured off site and assembled as modules on site
 - Cansolv capture process
- Boundary Dam – Cansolv CO₂ and SO₂ scrubbers assembled on site
- Kemper – Selexol unit built to cost, manufactured offsite and transported by road
- Jubail Industrial City, Linde capture technology
 - First capture unit on an ethylene glycol plant – 500, 000Mt CO₂ pa

Public communication

- Quest, Kemper, Boundary Dam and Tomakomai projects have active public communication/engagement programmes
 - Tomakomai – monitoring data broadcasted in Council Offices





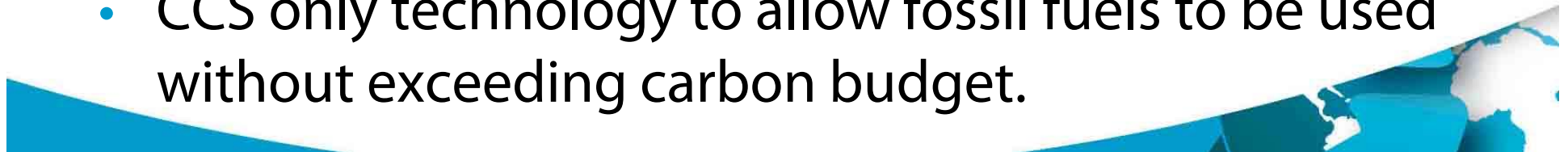
New tools and data sets

- Scaling up Carbon Capture Pilots
 - Scale up of capture technologies is important to demonstrate lack of risk to investors
 - Testing at 10tpd scale at Mostad is expensive
 - New computational and simulation tools developed by USDOE will be used to assist scale
- Data sharing opportunities launched see:
- <http://www.ieaghg.org/publications/blog/119-meetings-and-conferences>
 - Geoscience Australia and the CO2CRC released their data from their Ginninderra Controlled Release Facility
 - The CO2 Storage Data Consortium (CSDC) is a new international collaboration for sharing reference datasets from CO2 storage projects in deep saline formations

Summary of key learnings



- Capture
 - Cansolv technology new industry benchmark for technology comparison
 - Several 2nd/3rd generation amine based technologies have advanced to pilot plant testing
 - 3rd generation alternative solvents showing promise to further improve energy and cost performance of amine systems
- CCS Value
 - Modeling of CCS integration into power systems clearly shows the value of flexible CCs technology
- CCS reduces air pollution as well as CO₂ emissions
 - “Double whammy”
- CCS only technology to allow fossil fuels to be used without exceeding carbon budget.



Summary of Key Learnings



- Storage
 - Significant advances in the understanding and quantification of CO₂ trapping mechanisms presented
 - Leakage should be effectively zero in the vast majority of projects; where leakage happens, it is likely to be episodic (e.g. well blow-out) and detectable
 - The benefits of 20 years of experience and investment in CO₂ storage is paying huge dividends in the advancement of knowledge and capacity to implement CCS at scale
- Transport
 - More focus on ship transport to start off CCS
 - Public or public/private investment needed



Hot Topics

CO₂ Use/Utilisation



- Subject of “lively” Panel Discussion
- General consensus – utilisation is **NOT ALWAYS** mitigation
 - CO₂-EOR is the leading form of CO₂ utilisation and has the potential to store permanently some CO₂, it is a mitigation option
 - Chemical products (methanol and urea) do not permanently store CO₂ and therefore are not mitigation options
 - Some CO₂ based polymers could conceivably last for 50-100 years but that is still not long enough as a mitigation option.
 - Mineralisation is a niche opportunity at very best it is CO₂ neutral only
- Expecting large amounts of free renewable energy to be available to convert industrial CO₂ to chemicals is improbable.
- CCU can contribute to new infrastructure
 - Capture plant on new industrial processes
 - Waste incinerator, Saga City Japan (10tpd CO₂ unit, Toshiba amine technology)
 - Ethylene Glycol plant, Saudi Arabia
 - Not likely to lead to extensive pipeline network in Europe

Hot Topics



BioCCS and Negative Emission Technologies

- Discussion panel co-hosted by Bellona
- General Consensus/Policy messages:
 - BioCCS combines the use of sustainably sourced biomass with the permanent storage of CO₂
 - BioCCS, allows for the net decrease of CO₂ in the atmosphere
 - BioCCS is a key negative emission technology
 - Negative emission technologies will be essential to meet the post Paris below 2°C temperature target

More details at:

<http://bellona.org/news/ccs/2016-11-bellona-co-hosts-bio-ccs-workshop-in-lausanne>



Driving CCS in a <math><2^{\circ}\text{C}</math>



Closing Panel – moderator John Gale (IEAGHG)

- J-F Gagne (IEA), Tim Bertels (OGCI), Jonas Helseth (EU ZEP), Jarad Daniels (USDOE),

Outcomes/Key messages

- Incentives needed to drive projects
- Infrastructure needed to transport/store CO₂
- Innovation needed to drive down costs
- Industry needed to develop storage potential
- Information needs to be better framed

Get this right we can drive Implementation

More information



- On GHGT-13 @www.ghgt.org
- Blogs from GHGT-13 @www.ieaghg.org
- Summary report to be published in new year
- On-line Proceedings to be published in Feb 2017

