



COP-21 and CCS

John Gale

General Manager, IEA Greenhouse Gas R&D
Programme

CLIMIT Summit

Emerging CO₂ Capture Technologies

Oslo, Norway

26th-27th January 2016

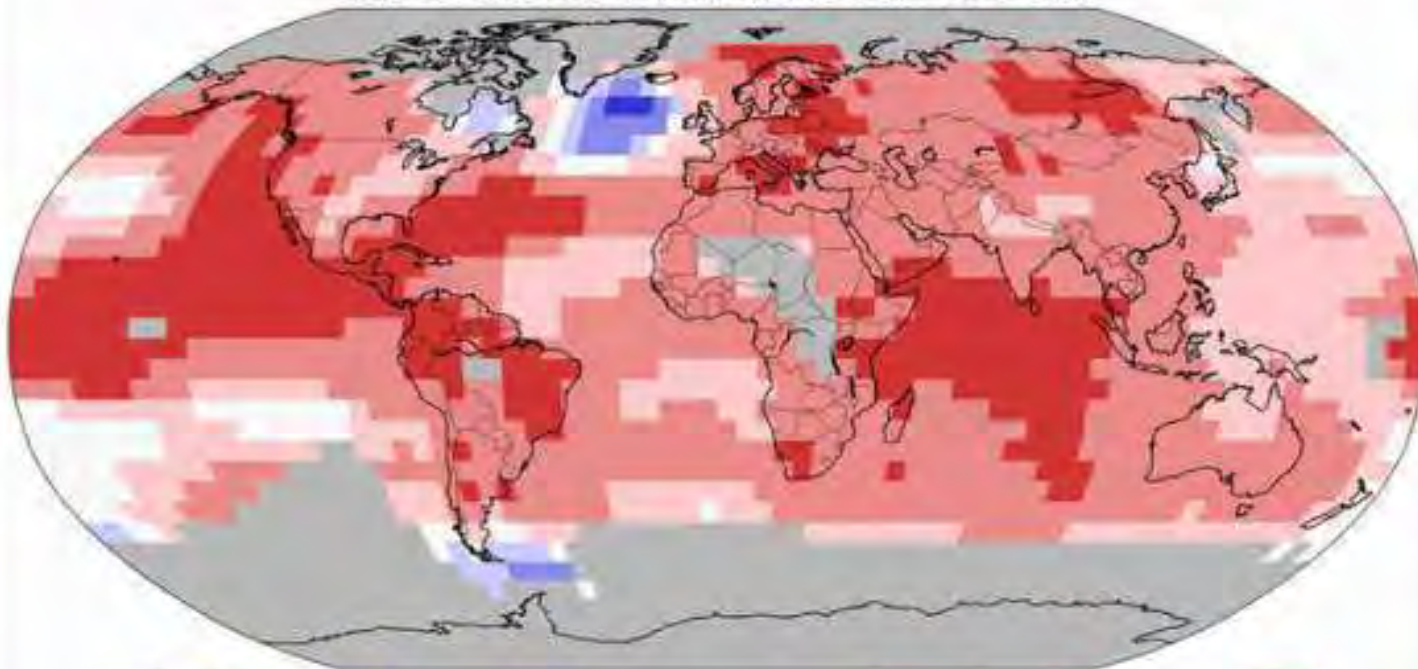
2015 Hottest Year on Record



Land & Ocean Temperature Percentiles Jan–Dec 2015

NOAA's National Centers for Environmental Information

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0




Record
Coldest


Much
Cooler than
Average


Cooler than
Average


Near
Average


Warmer than
Average


Much
Warmer than
Average


Record
Warmest



Wed Jan 13 12:15:02 EST 2016



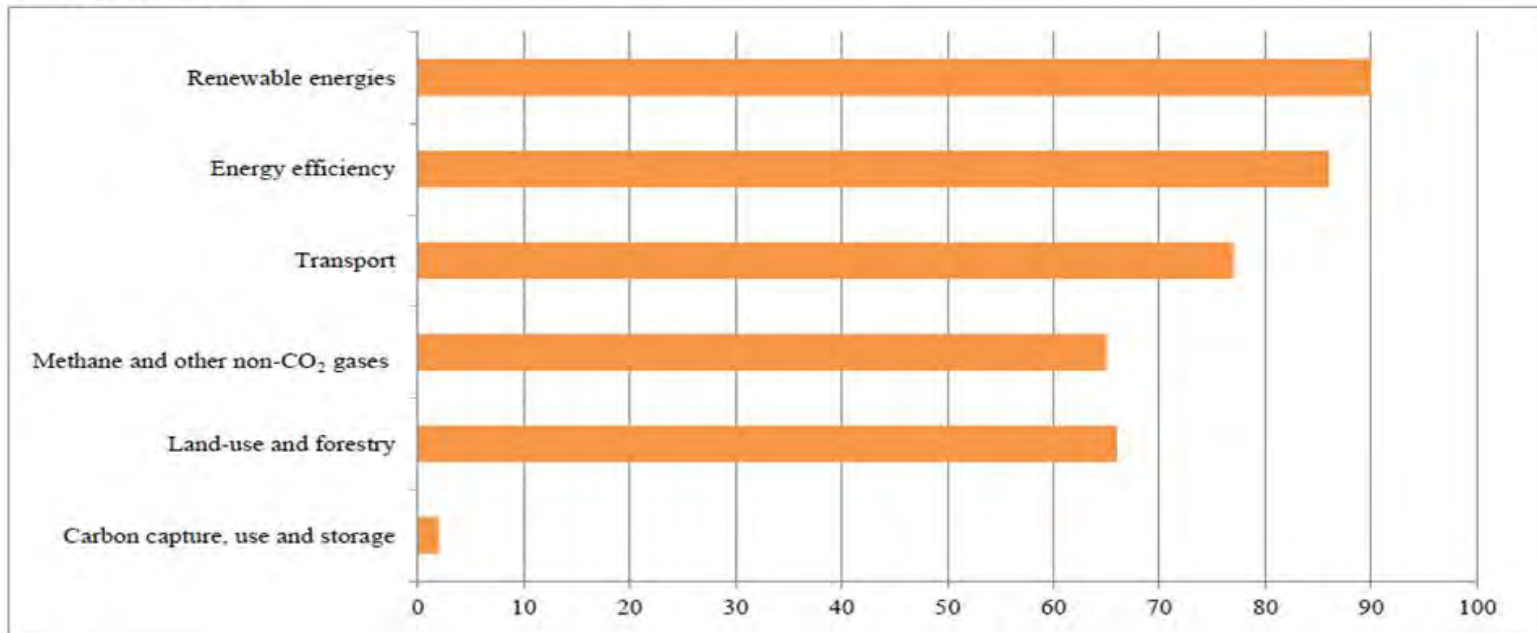
- Landmark agreement in Paris, November 2015
- Global agreement, 195 countries submitted **INDC's**
 - Cumulatively get us to 2.7°C
- Paris Agreement set **pathway for “below 2°C”**
 - **NGO's speculate on total phase out of fossil fuels**
- **INDC's to be reviewed in 2018**
- Updated every 5 years thereafter
 - Recognises stronger action will be needed in later years

INDC's

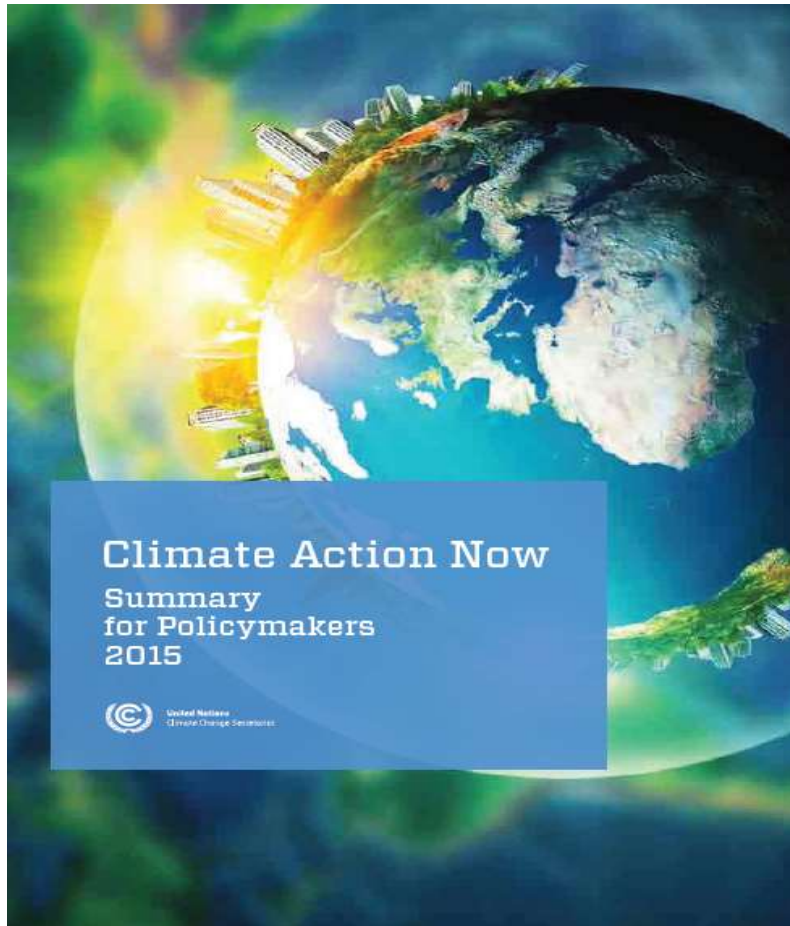


- Cover period up to 2020
 - Low hanging fruit

Priority areas for implementation highlighted in the intended nationally determined contributions



Climate Action Now, A Summary for Policy Makers 2015



<http://climateaction2020.unfccc.int/media/1173/21789-spm-unfccc-lowres.pdf>

- Key messages for policymakers;
- Brief overview of state of play of climate change;
- Actions to realize significant mitigation potential in the areas of:
 - Renewable energy,
 - Energy efficiency,
 - CCUS,
 - Non-CO₂ greenhouse gases (GHGs)
 - land use.
- International organisations that can help.
- Use the information so Parties can:
 - Increase their pre-2020 ambition,
 - Further reduce the emissions gap to limit global warming to 2°C,
 - Lay the foundation for post-2020 action.

CCUS in Climate Action Now



Priority thematic areas

**CARBON
CAPTURE, USE
AND STORAGE**

- Project financing
 - Boundary Dam 3
 - UK Competition
- Frameworks and Directives
 - EC Directive
 - Korean CCS Roadmap
- Carbon Pricing
 - Norway Carbon Tax
- Information Sources
 - CSLF
 - GCCSI
 - IEAGHG

CCUS Events at COP21



COP 21 CCS-related events/Exhibit Booths

 Official COP21 Side Event/Exhibit Booth

Date	Event	Organisation
1 December	Carbon Capture and Storage (CCS): Achievements and Opportunities for Developing Country Involvement 15:00-16:00, Observer area 18	IEA/IFRE/University of Texas at Austin/ES&U/Universities
2 December	CO2 Capture and Storage: a proven and safe technology vital for completing the climate change mitigation portfolio (in French only) 13:15-14:45, Climate Generations Area (room 10), Le Bourget	CO2GeoNet/French Club CO2/GCCSI/IEA
4 December	Technology as an Answer to Climate Change 13:00-14:15, GCC Pavilion	Gulf Cooperation Council
4 December	HOW THE UNFCCC ARCHITECTURE CAN HELP MOBILISE INTERNATIONAL RESOURCES TO SUPPORT CCS 16:30-18:00, IETA-WBCSD Business Hub, Hall 3 (Room Paris)	GCCSI
6 December	Reception	GCCSI
7 December	Bio-CCS: Why the IPCC says we need it 09:00 - 11:00, Bellona/CICERO pavilion, Hall 3	Bellona
7 December	CCS high-level discussion 14:00-18:00, IEA offices	IEA
8 December	From extraction to injection: North Sea CO2 storage and the CCS business case 09:00 - 11:00, Bellona/CICERO pavilion, Hall 3	Bellona
8 December	INNOVATE AND PIONEER TOWARDS A LOW CARBON FUTURE: EXPECT MORE FROM THE CHEMISTRY (Panelists will debate low-carbon technologies including Carbon Capture and Utilisation) 10:00 - 12:30 IETA-WBCSD Business Hub, Hall 3 (Room Marrakech)	IETA
8 December	FINANCING THE DEMONSTRATION AND DEPLOYMENT OF CCS IN DEVELOPING COUNTRIES 12:30-14:00, IETA-WBCSD Business Hub, Hall 3 (Room Paris)	GCCSI
9 December	Industrial clusters and CCS: Delivering climate actions with growth 09:00 - 11:00, Bellona/CICERO pavilion, Hall 3	Bellona
9 December	Global storage mapping 11:45-13:15, IETA-WBCSD Business Hub, Hall 3	GCCSI
10 December	Bio-CCS: The lowest hanging fruit to carbon negative solutions 09:00 - 11:00, Bellona/CICERO pavilion, Hall 3	Bellona
10 December	The role of CCS (Carbon dioxide Capture and Storage) in mitigating climate change 10:15-11:00, EU Pavilion	CO2GeoNet/EERA/EuroGeoSurveys/GCCSI
10 December	Hitting 2C means: Investing in renewables, a storage revolution, energy efficiency and CCS 11:30-13:00, Observer area 18/19	Imperial College/Tanaka/Geological Engineering/CCSI/The Future Fund
11 December	COULD CCS TECHNOLOGIES CONTRIBUTE TO DELIVERING THE AIMS OF THE UNFCCC? 17.30 - 19.00, Climate Generations Area, Le Bourget	GCCSI

IEAGHG et al Side-event



Carbon Capture and Storage (CCS): Achievements and Opportunities for Developing Country Involvement, 1st December 2015



Tim Dixon, IEAGHG

Mike Marsh, President Saskpower

Philip Ringrose, Statoil

Ton Wildenborg, CO2GeoNet

Jukka Uosukainen, CTCN

Katherine Romanak, University of Texas

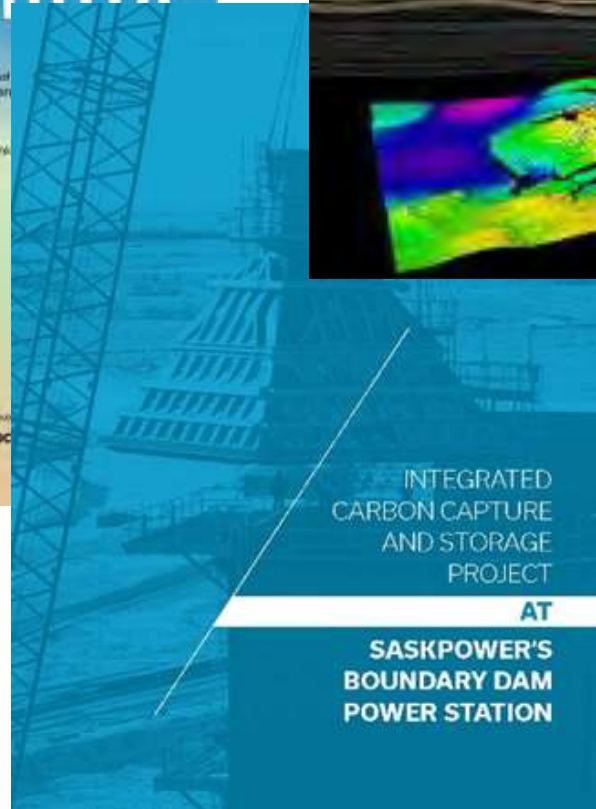
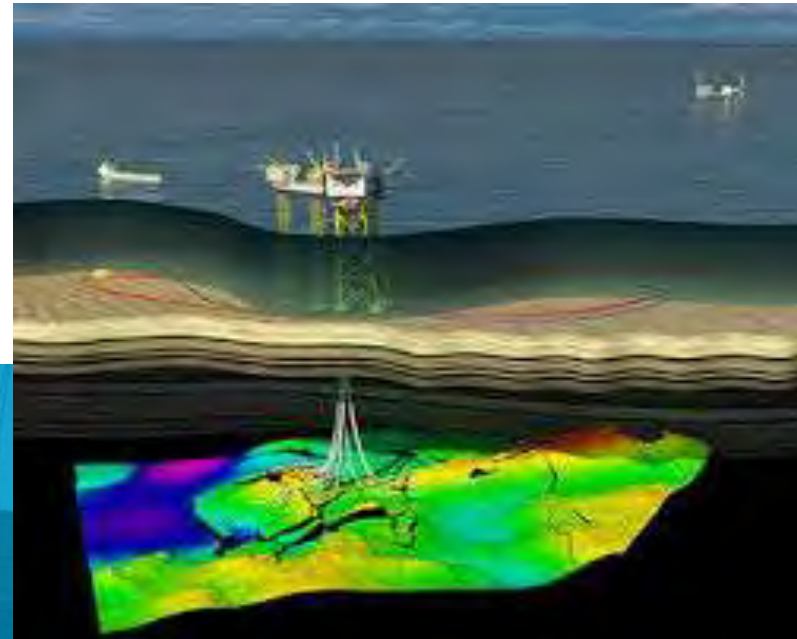
Brad Wall, Premier of Saskatchewan

IEAGHG et al Side Event Outcomes

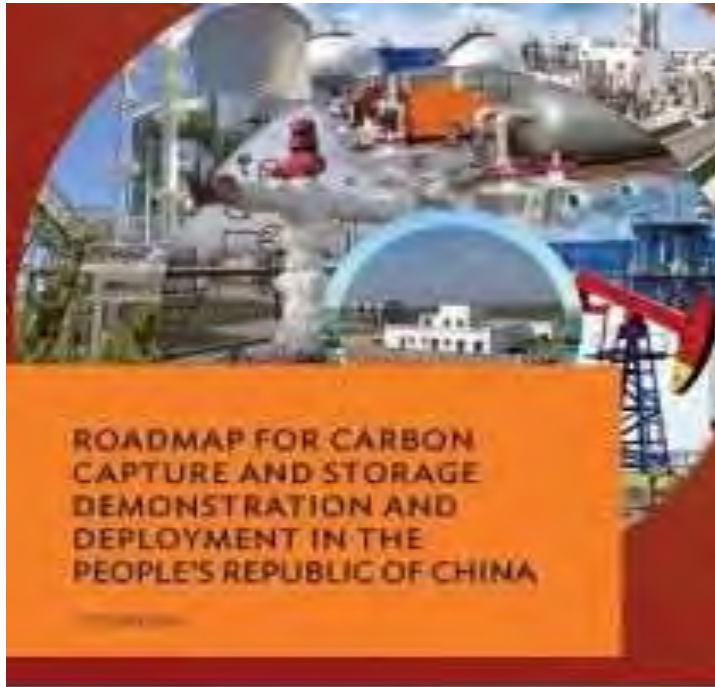


- 200 attendees
- Messages:
 - Philip Ringrose, Statoil, 19 years of Sleipner
 - Mike Marsh, CEO, SaskPower Boundary Dam 3 and hopes to capture 800 kt CO₂ in 2016.
 - Ton Wildenborg, CO2GeoNet, CO₂ storage projects in Europe
- Reported at: www.ieaghg.org & <http://www.iisd.ca/climate/cop21/enbots/1dec.html#event-6>
- Generated a lot of discussion and attendance at **booth in “Blue Zone”**

Messaging at COP21



Associated Activities



ASIAN DEVELOPMENT BANK



<http://www.adb.org/sites/default/files/publication/175347/roadmap-ccs-prc.pdf>



http://www.engonetwork.org/eng_o_perspectives_on_ccs_digital_version.pdf

COP21 Summary



- CCS was profiled quite highly at COP21 as a mitigation option
- **INDC's reflect early action – don't include CCUS significantly**
- **Move now to "below 2⁰C" will require increased mitigation activity after 2018**
- CCS could then start to play role
- Inherent conflict – **NGO's see new goal as option to phase out fossil fuels ("coal")**
- CCS seen as coal option – need new narrative, gas and bio important
- CCS will become key for industry to mitigate CO₂

What now?



- Need to maintain a high profile for CCS in coming years
 - The work has just started!!!!
- Need more messaging on successes;
 - Demonstration projects,
 - Capture Test Centres,
 - Storage assessments,
 - Underpinning research.
- Need more action on:
 - Pipeline networks/hubs and clusters
 - Facilitating industry deployment
 - Barrier breaking on BioCCS

New projects in 2015



**Quest, Shell Canada
H₂ Refining**

**Lula, Petrobras,
Brazil
Offshore gas
separation and
CO₂-EOR**



Bio Ethanol Based CCS Projects



Decatur CCS project

- 1 Mt CO₂ captured and stored in a deep saline aquifer
- Alstom amine based capture technology
- Now in non operational mode

Industrial CCS Project

- Includes initial CCS project
- Total of 3.6mT/y CO₂ captured
- CO₂ injected into a deep saline aquifer from June 2015
- Uses Amine based capture technology

Important CCS Projects - Power Sector



Kemper County, USA



- Novel IGCC Technology
- 524 MW lignite fired – new build
- 65% of total emissions captured
- Due on stream late 2016

NRG Parish, USA



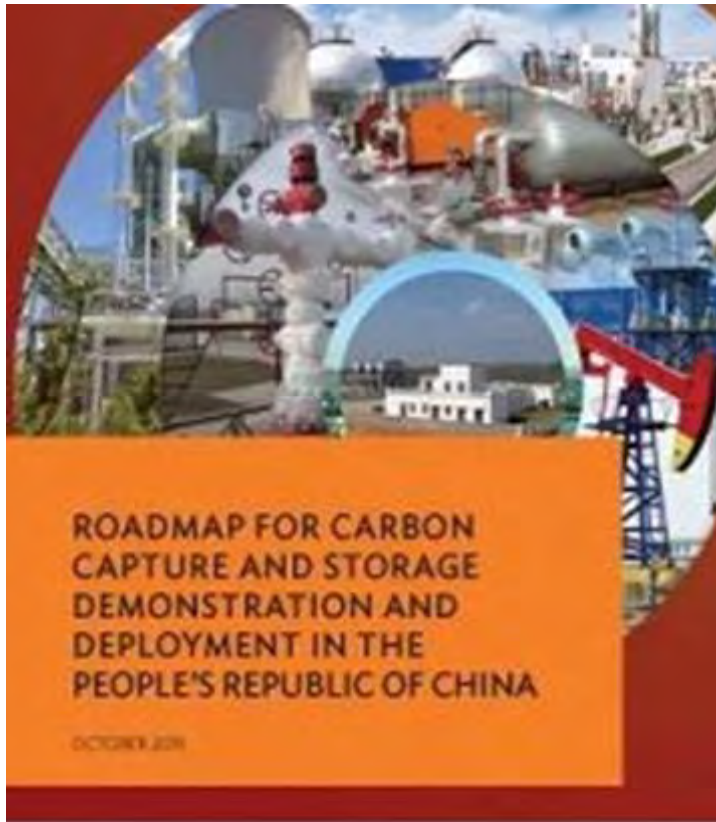
- Refit of existing coal fired unit
- Operational in late 2016
- MHI amine based PCC technology
- 250 MW slip stream
- 90% capture
- CO₂ sold for EOR



Key New Developments (1)

- Norway
 - Assessing 3 industry CCS projects
 - Offshore Assessments
- Gulf States
 - Uthmaniyah CO₂-EOR Demonstration Project, Saudi Aramco
 - Source Gas processing – 0.8Mt/y
 - The Abu Dhabi CCS Project
 - CO₂ capture capacity of 0.8 Mtpa,
 - **the world's first iron and steel project**
 - » Precombustion CO₂ capture

Key New Developments(2)



- Chinese Government and ADB Road Map
- Deployment in power sector after 2030
 - R&D to reduce capture costs
- Early deployment in industry with CO₂-EOR
 - Fertiliser/Methanol/Chemical industries
 - High pressure coal gasification
 - High pressure high conc. CO₂

Call for abstracts opened 1st September 2015
Deadline for submission 10th February 2016
Registration opens 6th April 2016
Draft technical programme 1st June 2016
Early bird registration closes 13th July 2016



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Swiss Federal Office of Energy SFOE



www.ghgt.info

LAUSANNE, SWITZERLAND, NOVEMBER 14-18, 2016