



CO₂QUEST

2ND INTERNATIONAL FORUM ON RECENT DEVELOPMENTS OF CCS IMPLEMENTATION

LEADING THE WAY TO A LOW-CARBON FUTURE

16TH - 17TH DECEMBER, 2015

ATHENS, GREECE



ST. GEORGE LYCABETTUS HOTEL

DELEGATE PACK



WELCOME

Dear Esteemed Participants and Attendees,

As leaders of the co-organising EC FP7 projects, CO₂QUEST and IMPACTS, we would like to thank you for participating in the 2ND INTERNATIONAL FORUM ON RECENT DEVELOPMENTS OF CCS IMPLEMENTATION workshop.

The Forum brings together several European and International CCS communities. It provides a platform for world-leading researchers to share advances made in the development of safe and economically viable CCS technologies, and for key industry representatives to offer perspectives on CCS deployment. The event will deliver an invaluable opportunity for all participants to exchange experience and knowledge, and we hope that this will lead to the generation of new research ideas and successful future collaborations.

For this event, authors were invited to submit abstracts on all aspects of the CCS value-chain. Selected authors will be asked to write full papers that will appear in a Special Issue of the International Journal of Green House Gas Control.

Over the next two days, you will receive oral and poster presentations on the topics of Transport and Safety, Process Optimisation and Techno-economic Considerations, Thermophysical Properties and Storage. We look forward to hearing from our plenary speakers (Dr. Achim Hilgenstock, Mr. Michael Drescher, Mr. Russell Cooper and Dr. Greeshma Gadikota) and we thank them for contributing to this event. Profiles of our honoured speakers can be found on the following couple of pages.

We hope that you enjoy attending the technical sessions, and we encourage you to ask questions to promote fruitful conversation.

Prof. Haroun Mahgerefteh
CO₂QUEST FP7 Project Coordinator
<http://www.co2quest.eu/>

Dr. Nils Røkke
IMPACTS FP7 Chairman of the Executive
Board
<http://sintef.no/impacts>

ORGANISING COMMITTEE

Co-chair: Prof. Michael Fairweather (University of Leeds, UK)

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ACKNOWLEDGEMENTS

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Abstracts submitted to this event by members of these projects acknowledge the above funding.

The organising and scientific committees would like to acknowledge and thank the IEAGHG for the associated International Journal of Greenhouse Gas Control Special Issue that will be published in 2017.

INTRODUCING THE KEYNOTE SPEAKERS

DR. ACHIM HILGENSTOCK (HILGENSTOCK CONSULTING, GERMANY)

Dr. Achim Hilgenstock has more than 15 years' project planning and execution experience in the pipeline business. Under his leadership, over 500km of high pressure gas pipelines have been planned and constructed. Recent positions held include Head of Pipeline Projects and Vice President Technical Cooperation at E.ON Ruhrgas and Head of Gas Technology and Trading Support at E.ON Technologies.

Drawing from this experience, he is now the Managing Director of Hilgenstock Consulting that provides services across planning & analysis, consultancy & support and coaching & training.

He is currently a convenor for the ISO/TC 265/WG 2 CO₂-Transport and the of DVGW expert group CCS, and is the national representative of DIN for CO₂ transport.

He completed his doctoral thesis at the University Karlsruhe in 1990.

Website: <http://en.hilgenstock-consulting.de/>

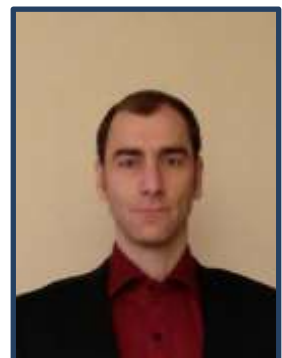


MR. MICHAEL DRESCHER (STATOIL R&D, NORWAY)

Mr. Michael Drescher is currently a Principal Researcher CO₂ transport at Statoil ASA. His areas of expertise include CO₂ transport and CCS, project management, HSE & HAZOP, simulation and laboratory testing of refrigeration processes, and small scale liquefaction of natural gas and LNG storage.

Before working for Statoil, Mr. Drescher was a Research Scientist at SINTEF Energy Research, Norway.

In 2004, he completed a Bachelor of Engineering in Mechanical Engineering at the Norwegian University of Science and Technology (NTNU), Norway, and in 2006 he was awarded a Master of Science in Energy, Process and Flow Engineering from the University of Applied Sciences Karlsruhe.



MR. RUSSELL COOPER (NATIONAL GRID, UK)

Mr. Russell Cooper is the technical lead for Carbon Capture and Storage within National Grid and has 25 years' experience in various planning and asset management roles in National Grid.

Mr. Cooper leads both the onshore and offshore developments for the Humber transport and storage scheme. This development of a network solution and large offshore aquifer storage is capable of receiving large quantities of Carbon Dioxide (CO₂) from multiple emitters including the Don Valley and White Rose projects.



Mr. Cooper is heavily involved in developing research associated with transportation of Carbon Dioxide. He is a board member of the UKCCS Research Council. Mr. Cooper has also led the development of in-house National Grid research, intended to deliver the safe design of high pressure Carbon Dioxide pipelines.

Mr. Cooper was National Grids technical lead for the DECC-1 Front End Engineering and Design (FEED) study conducted on the Longannet power station CCS project, which proved the reuse of existing pipeline assets for CO₂ transportation.

DR. GREESHMA GADIKOTA (COLUMBIA UNIVERSITY, USA)

Dr. Greeshma Gadikota is a postdoctoral research scientist in the Department of Chemical Engineering and the Department of Earth and Environmental Engineering at Columbia University in New York. She is also the technical coordinator for the Research Coordination Network in Carbon Capture, Utilization, and Storage (RCN-CCUS) supported by the National Science Foundation. Dr. Gadikota received her PhD in Chemical Engineering from Columbia University in 2014. Her research interests include multi-scale reaction kinetics, mechanisms, and characterization of natural and engineered materials for sustainable energy extraction and carbon storage.



AGENDA

WEDNESDAY, 16 DECEMBER, 2015		
08:00	REGISTRATION/WELCOME COFFEE	Faidra / Parthenon rooms
08:30	Opening: Welcome and Introduction Dr. Nils Røkke (SINTEF, Norway) & Prof. Michael Fairweather (University of Leeds, UK)	Hedra meeting room
08:40	Plenary Lecture 1: Status of International Standardisation on CO ₂ Transportation Dr. Achim Hilgenstock (Hilgenstock Consulting, Germany) Chair: Dr. Marit Mazzetti (SINTEF, Norway)	
Session 1: Transport & Safety Chair: Dr. Marit Mazzetti (SINTEF, Norway)		
09:20	An Overview of the CO ₂ QUEST Project Haroun Mahgerefteh (UCL, UK)	
09:30	Design and Application of a Large-scale Experimental Pipeline for Studying the Release and Dispersion Characteristics of CO ₂ in Different Phase States Xingqing Yan (DUT, China)	
09:50	High Pressure CO ₂ CCS Pipelines: Comparing Dispersion Models with Multiple Experimental Datasets Chris Wareing (University of Leeds, UK)	
10:10	On Simulation of Dynamic Brittle Fracture of CO ₂ Pipeline Using Coupled Fluid–structure Modelling Approach Reza Hojjati-Talemi (OCAS, Belgium)	
10:30	Predicting the Atmospheric Dispersion of Carbon Dioxide from A Buried Ruptured Pipeline Jennifer Wen (University of Warwick, UK)	
10:50	COFFEE BREAK	Faidra / Parthenon rooms
Session 2: Transport & Safety Chair: Prof. Haroun Mahgerefteh (UCL, UK)		Hedra meeting room
11:10	Techno-economic Analysis of Gas Purification for CO ₂ Transport in Pipeline Networks and Injection for Storage Evgenia Mechleri (Imperial College London, UK)	
11:30	Impact of Impurities in CO ₂ Streams on Compression Strategies for Carbon Capture and Sequestration Sergey Martynov (UCL, UK)	
11:50	Computationally Efficient Simulation of Two-phase Flows of CO ₂ Mixtures Solomon Brown (UCL, UK)	Faidra / Parthenon rooms
12:10	LUNCH	
12:50	Plenary Lecture 2: CO ₂ Transport and Safety - An Industrial Perspective Mr. Michael Drescher (Statoil R&D, Norway) Chair: Dr. Evgenia Mechleri (Imperial College London, UK)	Hedra meeting room

Session 3: Process Optimisation and Techno-economic Considerations Chair: Dr. Evgenia Mechleri (Imperial College London, UK)		Hedra meeting room
13:30	Highlights of the IMPACTS Project – Ambition, Scope and Main Findings Marit Mazzetti (SINTEF, Norway)	
13:50	IMPACTS Recommendations for Safe and Efficient Handling of CO ₂ with Impurities Amy Brunsvold (SINTEF, Norway)	
14:10	The IMPACTS Toolbox for the Design and Operation of CCS Systems Filip Neele (TNO, The Netherlands)	
14:30	Techno-economic Evaluation on the Effects of Impurities for Conditioning and Transport of CO ₂ by Pipeline Geir Skaugen (SINTEF, Norway)	
14:50	Impacts of Impurities on CO ₂ Transport and Storage Heike Ruetters (BGR, Germany)	
15:10	Techno-Economic Analysis of CO ₂ Quality Impact on CCS Chains Charles Eickhoff (Progressive Energy Ltd., UK)	
15:30	COFFEE BREAK	Faidra / Parthenon rooms
Session 4: Process Optimisation and Techno-economic Considerations Chair: Dr. Halvor Lund (SINTEF, Norway)		Hedra meeting room
15:50	Operational Flexibility of CO ₂ Transport and Storage James Craig (IEAGHG, UK)	
16:10	The Multi-period Optimisation of Full CCS Chain for Flexible Operation: From a Gas-fired Power Station to Injection/Storage Evgenia Mechleri (Imperial College London, UK)	
16:30	CO ₂ Purity from Different Carbon Capture Applications and Associated Cost and Performance Richard Porter (UCL, UK)	
16:50	Assessment of CO ₂ Enhanced Oil Recovery Projects through Process Modelling Adekola Lawal (Process Systems Enterprise Ltd., UK)	
17:10	Quantification of the Water-Carbon-Energy Nexus for Carbon Negative Electricity Generation Mathilde Fajardy (Imperial College London, UK)	
17:30	CLOSE	

COCKTAIL DINNER

20:00 – 22:00: Cocktail dinner at the *Grande Balcon*

THURSDAY, 17 DECEMBER, 2015

08:00	REGISTRATION/WELCOME COFFEE	Faidra / Parthenon rooms
08:30	Plenary Lecture 3: Fracture Propagation in a CO₂ Pipeline – An Operator’s Perspective Russell Cooper (National Grid, UK) Chair: Dr. Amy Brunsvold (SINTEF, Norway)	Hedra meeting room
Session 5: Thermophysical Properties Chair: Dr. Amy Brunsvold (SINTEF, Norway)		
09:10	Thermodynamic Properties of a CO ₂ -rich Mixture CO ₂ +CH ₃ OH in Conditions of Interest for CCS Technology and Other Applications Sofía Blanco (UNIZAR, Spain)	
09:30	Experimental Speed of Sound in CO ₂ -rich Mixtures with Methanol. Extrapolation to Pure CO ₂ Javier Fernández López (UNIZAR, Spain)	
09:50	Investigation of Models for Prediction of Viscosity Properties for CO ₂ Mixtures Jacob Stang (SINTEF, Norway)	
10:10	Modeling of CO ₂ Solubility in Single and Mixed Electrolyte Solutions Using Statistical Associating Fluid Theory Ioannis Economou (Texas A&M University, Qatar)	
10:30	Development of a Novel Experimental Apparatus for Hydrate Equilibrium Measurements Panagiotis Kastanidis (NCSR Demokritos, Greece)	
10:50	COFFEE BREAK	Faidra / Parthenon rooms
Session 6: Thermophysical Properties Chair: Prof. Ioannis Economou (Texas A&M University, Qatar)		Hedra meeting room
11:10	Ionic Liquids for CO ₂ Capture using Molecular Simulation: Bulk and Permeability Properties Niki Vergadou (NCSR Demokritos, Greece)	
11:30	Simulation of Two-Phase Flow of CO ₂ Mixtures: Comparing Cubic and Reference Equations of State Halvor Lund (SINTEF, Norway)	
11:50	Iolicap Project Results George Romanos (NCSR Demokritos, Greece)	
12:10	Vapour-liquid Equilibrium Data for the Carbon Dioxide and Oxygen (CO ₂ +O ₂) System at 6 Isotherms Between the Freezing Point and Critical Temperature of CO ₂ Jacob Stang (SINTEF, Norway)	
12:30	Experimental Work at RUB and Tsinghua and a New Model Describing Thermodynamic Properties of CO ₂ -rich Mixtures Roland Span (Ruhr-Universität Bochum, Germany)	
12:50	Modeling Solid–Fluid Equilibria with Application to CO ₂ Mixtures Ilias Nikolaidis (NCSR Demokritos, Greece)	
13:10	LUNCH	Faidra / Parthenon rooms

13:50	Plenary Lecture 4: CCS Developments in North America Dr. Greeshma Gadikota (University of Columbia, USA) Chair: Dr. Filip Neele (TNO, The Netherlands)	Hedra meeting room
Session 7: Storage Chair: Dr. Filip Neele (TNO, The Netherlands)		
14:30	Reactive Transport Simulations of an Impure CO ₂ Flue Gas Injection into a Saline Aquifer on a 2D Reservoir Scale Dorothee Rebscher (BGR, Germany)	
14:50	Analysing the Effect of Impurities in the CO ₂ Stream Injected on Fractured Carbonates Miguel Angel Delgado (CIUDEN, Spain)	
15:10	Effect of SO ₂ Co-injection on CO ₂ Storage Marielle Koenen (TNO, The Netherlands)	
15:30	Comparison of Different Numerical and Modelling Approaches for Implementing SO ₂ as a CO ₂ Flue Gas Impurity in Geochemical Simulations in Saline Sandstone Aquifers Dorothee Rebscher (BGR, Germany)	
15:50	Thanks and End of Conference Haroun Mahgerefteh (UCL, UK)	
16:00	CLOSE	

The following posters will be presented throughout the event:

POSTERS
Potentiodynamic Anodic Polarisation for the Corrosion Study of Stainless Steel 304 and Ion in Aqueous Amine Solvents Paraskevi Gkanavara (Imperial College London, UK)
An Analytical Model for Blowdown of Pressurised CO ₂ Pipelines Wentian Zheng (UCL, UK)
TREND – A Software Package Providing Thermophysical Properties for the CCS community Stefan Herrig (Ruhr-Universität Bochum, Germany)
CO ₂ Capture and Purification Technology with Selective Removal of NO _x and SO ₂ Shaoyun Chen (DUT, China)
Simulation of Transient Flow in CCS Pipelines with Intermediate Storage Nor Daud (UCL, UK)
Investigating the Corrosion and Surface Passivation of Carbon Steel in Amine Blends Louis Yu (Imperial College London, UK)
Choice of Benchmark CCS Chains for Illustrating CO ₂ Quality Issues Charles Eickhoff (Progressive Energy Ltd., UK)
The European CCS Laboratory Infrastructure ECCSEL Paris Klimantos (NTNU, NO)

THE BOOK OF ABSTRACTS CAN BE DOWNLOADED

FROM: <http://goo.gl/sMknAX>

ATTENDEE LIST

First Name	Second Name	Affiliation
Michael	Bilio	Health and Safety Executive
Sofía	Blanco	University of Zaragoza
Christian	Britrz	Alstom
Solomon	Brown	University College London
Amy	Brunsvold	SINTEF Energy Research
Kyra	Campbell	Imperial College London
Shaoyun	Chen	Dalian University of Technology
Russell	Cooper	National Grid
James	Craig	IEAGHG
Nor	Daud	University College London
Jose Carlos	De Dios	CIUDEN
Miguel Angel	Delgado	CIUDEN
Michael	Drescher	Statoil ASA
Ioannis	Economou	NCSR "Demokritos"
Charles	Eickhoff	Progressive Energy Ltd.
Michael	Fairweather	University of Leeds
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Javier	Fernández López	University of Zaragoza
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An	Hilmo	SINTEF Energy Research
Reza	Hojjati Talemi	ArcelorMittal Global R&D Gent
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Marielle	Koenen	TNO
Adekola	Lawal	Process Systems Enterprise Ltd.
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Sergey	Martynov	University College London
Marit	Mazzetti	SINTEF Energy Research
Evgenia	Mechleri	Imperial College London
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Nils	Røkke	SINTEF Energy Research
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Simon	Roussanaly	SINTEF Energy Research
Heike	Rütters	Federal Institute for Geosciences and Natural Resources
Geir	Skaugen	SINTEF Energy Research
Ingrid	Snustad	SINTEF Energy Research
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Jennifer	Wen	University of Warwick
Xingging	Yan	Dalian University of Technology



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



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