

Business Opportunities for CCUS in the Baltics

25-26 September 2018

Tallinn, Estonia



Day 1 – Tuesday 25 September 2018

12:00-13:00	BASRECCS' General Assembly
13:00-13:30	Registration and refreshments
13:30-14:10	<p>Opening session</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Ingvild Ombudstvedt, Lawyer MNA, Senior Client Engagement Lead, Global CCS Institute • Per Arne Nilsson, Consultant, Panaware ab & Coordinator for the BASRECCS Network • Johan Vetlesen, Deputy Director General, Ministry of Petroleum and Energy, Norway & Member of the Nordic Committee of Senior Officials for Energy Policy • Welcome address by City of Tallinn representative
14:10-15:20	<p>The value of CCUS</p> <p><i>CCUS will be necessary to reduce emissions and ensure energy security. How can the deployment of CCUS be accelerated in the Baltics region? What role will CCUS play in climate mitigation and what is its value?</i></p> <p>Chair: Johan Vetlesen, Deputy Director General, Ministry of Petroleum and Energy, Norway & Member of the Nordic Committee of Senior Officials for Energy Policy</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Bruno Gerrits, Senior Client Engagement Lead, Global CCS Institute – <i>The Global Status of CCS</i> • Lamberto Eldering, Principal Business Developer Low Carbon Solutions, Equinor – <i>Large-Scale Hydrogen Solutions</i> • Roy Vardheim, Director/Chairman of the Board of Technology Centre Mongstad – <i>Current situation of policies and projects in Norway</i>
15:20-15:50	Break - posters and refreshments

<p>15:50-17:00</p>	<p>Decarbonising the Baltic Sea Region <i>What do Baltic States need to successfully meet their emission reduction targets by 2030? How can emitters become a part of the solution?</i></p> <p>Chair: Jens Skov-Spilling, Senior Adviser, Business, Energy & Regional Development, Nordic Council of Ministers</p> <p>Panel discussion <i>What are the current challenges and opportunities for the industry in addressing climate change and reducing CO₂ emissions?</i></p> <p>Speakers:</p> <ul style="list-style-type: none"> • Kevin Johnsen, Adviser, Nordic Energy Research and BENTE – <i>Energy decarbonisation in the Baltic States</i> • Per Brevik, Director Sustainability and Alternative Fuels, HeidelbergCement Northern Europe • Jannicke Gerner Bjerkås, CCS Director, Fortum Oslo Varme
<p>17:00-17:50</p>	<p>Financing and incentivizing CCUS in the Baltic Region <i>R&D and demonstration projects will help accelerate the deployment of CCUS in the region. What existing and new funding sources are available for CCUS-related activities?</i></p> <p>Chair: Per Arne Nilsson, Consultant, Panaware ab & Coordinator for the BASRECCS Network</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Dr. Ragnhild Rønneberg, Special Advisor, The Research Council of Norway and Coordinator of ACT (Accelerating CCS Technologies) - <i>ACT a tool for deployment of CCS in Europe and beyond</i> • Maria Velkova, Policy Advisor, European Commission - <i>EU support for development and deployment of CCUS</i>
<p>17:50-18:00</p>	<p>Closing remarks</p>
<p>18:00-20:00</p>	<p>Evening reception</p>

Day 2 – Wednesday 26 September 2018

08:00-08:30	Refreshments
08:30-09:40	<p>Storage of CO₂ – a key to a sustainable future <i>Local, regional and national surveys of underground storage have been undertaken in the Baltics region. A recent research was also done by BASRECCS as a CGS report. What should be the strategy for CCUS deployment in the Baltics region?</i></p> <p>Chair: Dr. Auli Niemi, Professor of Earth Sciences, Program for Air, Water and Landscape, Uppsala University</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Dr. Alla Shogenova, Senior Researcher, Tallinn University of Technology, Institute of Geology – <i>CGS Baltic seed project: drivers and barriers for CO₂ storage in the Baltic Sea Region</i> • Dr. Roman Berenblyum, Research Director, IRIS – <i>«Greening» CO₂ myth or reality?</i> • Gry Møl Mortensen, Senior Geologist, Geological Survey of Sweden – <i>Potential for CO₂ storage in the Swedish part of the Baltic Sea region</i>
09:40-10:55	<p>CO₂-EOR – combining energy production with CO₂ storage <i>CO₂-EOR has seen decades of commercial operations in the U.S. What is the potential in the Baltic region for this industry?</i></p> <p>Chair: Eva Halland, Project Director, Norwegian Petroleum Directorate</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Vello A. Kuuskraa, President, Advanced Resources International – <i>Integration of CO₂ storage with enhanced oil recovery: a global perspective</i> • Dr. Kazbulat Shogenov, Researcher, Institute of Geology, Tallinn University of Technology – <i>Cost-competitive and self-supporting geothermal energy, CO₂-EOR and CO₂ storage concept: case study of the E6 structure in the Baltic Sea</i> • Dr. Adam Wójcicki, Project Manager, Polish Geological Institute – <i>CO₂-EOR Studies in Poland</i>
10:55-11:20	Break - posters and refreshments

11:20-12:30	<p>Cities scaling up climate action <i>Cities are playing a more active role in tackling climate change. What is the value and opportunities for them in CCUS?</i></p> <p>Chair: Dr. Marko Maver, Project Manager, Bellona Europa</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Züleyxa Izmailova, Deputy Mayor, City of Tallinn • Esa Nikunen, Head of Environmental Affairs, City of Helsinki • Carl Ingar Hole, Special Advisor, City of Oslo
12:30-13:30	<p>Networking lunch & Poster Session: Emerging technologies and projects</p>
13:30-18:30	<p>BASRECCS-ENOS knowledge sharing workshop: <i>How to enable onshore CO₂ geological storage in the Baltic Sea Region</i></p>

SPEAKERS



Dr. Roman Berenblyum, Research Director, IRIS

Roman Berenblyum holds a PhD (2004) from Danish Technical University. Since 2006 Roman has worked in IRIS, currently leading a group on Improved Oil Recovery. He is focusing on fluid behavior and reservoir simulation related to IOR/EOR, carbon dioxide utilisation and storage. Roman is also representing IRIS in Executive Committee of CO₂Geonet. Roman has been involved in and coordinated multidisciplinary research and industry-oriented projects in Norway, Middle East, Latin America and Russia.



Jannicke Gerner Bjerkås, CCS Director, Fortum Oslo Varme

Jannicke Gerner Bjerkås (born 1972) is CCS Director in Fortum Oslo Varme, leading the carbon capture project at Klemetsrud waste-to-energy plant. She has various experience from managing positions within HR, Communications, Strategy, HSEQ and Crisis Management at Waste-to-Energy Agency and Klemetsrudanlegget AS, before starting in Fortum Oslo Varme in August 2017. Bjerkås is a former officer with 4 years of education from the Royal Norwegian Air Force Academy, and held different positions within airspace control and intelligence, recruiting and HR in the Air Force. She holds a Master of Management from BI Norwegian Business School.



Per Brevik, Director, Sustainability and Alternative Fuels, HeidelbergCement Northern Europe

Per Brevik joined Norcem in 1993 where he worked on alternative fuels. He is responsible for the carbon capture project at Norcem Brevik. Prior to this, Per worked at NHH, Ministry of internal affairs (Kommunaldept.) and the Bank of Norway. Per also spent several years at Aker. Per is involved in the Federation of Norwegian Industries' (Norsk Industri) work on CCS. He is also the chairman of the Climate change group. He also led the group that developed the recent Roadmap for the process industry. Per holds a Master's in Business administration from NHH.



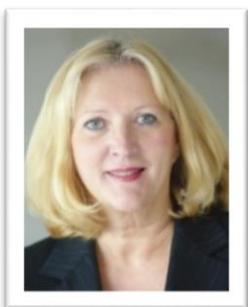
Lamberto Eldering, Business Developer for Low Carbon Solutions, Equinor

Lamberto Eldering is Business Developer for Low Carbon Solutions at Equinor. He has worked with CCS since 2009 primarily on business development and regulatory affairs. He spent three years in Belgium as an account manager for natural gas value chains and has ten years' experience in industrial energy systems in the Netherlands. He holds a Msc. in chemical engineering from State University of Groningen. Lamberto Eldering is a co-chair of the Network Policy and Economics of the European Zero Emissions Platform and co-chair of the Regulation and Policy Working Group of the Carbon Capture and Storage Association.



Bruno Gerrits, Senior Client Engagement Lead, Global CCS Institute

Bruno Gerrits recently joined the Global CCS Institute Brussels office as Senior Client Engagement Lead for EMEA. This is essentially a combination of business development and account management for the Institute's members. He joined from Australia where'd he got involved in carbon emissions trading after working with market-based trading platforms for various financial asset classes. This then led to experiences in carbon credit certification, carbon accounting and related software. Bruno was born in Belgium and holds a business degree from Loughborough University (UK).



Eva Halland, Project Director, Norwegian Petroleum Directorate

Eva Halland has held various positions within the Norwegian Petroleum Directorate (NPD), and has been a member of the management team for 17 years. Her responsibilities have included petroleum exploration, field development, field production, regulations and HSE. Her present position is as Project Director for the Norwegian CO₂ Storage Atlas and CO₂ storage projects in Norway and for FORCE, a co-operating forum for improved oil and gas recovery and improved exploration between 43 oil companies and authorities in Norway. She is vice chair of the Climit board, member of the North Sea Basin Task Force and member of the bilateral CCS co-operation between Norway and USA. She is the leader of the Norwegian "CO₂ Storage Forum". She was

the Norwegian project leader for the UK-Norway ministerial CCS project “One North Sea”. She was appointed member of the selection panel and project advisor for the appraisal of UK CO₂ storage sites. Eva is a member of the South African Pilot CO₂ Storage Project International Advisory Committee and a board member of NORSAR. She is educated geologist from the University of Bergen, Norway.



Carl Ingar Hole, Senior Advisor, City of Oslo

Carl Ingar Hole is a senior advisor for the City of Oslo, Department of Business Development and Public Ownership, where he works with the companies and municipal undertakings owned by the City. Oslo is actively using its ownership in the companies and municipal undertakings to reach its climate goals, and Hole is involved in several projects such as the CCS project at Klemetsrudanlegget (Fortum Oslo Varme AS), zero-emission construction sites, and a zero-emission strategy for the Port of Oslo.



Züleyxa Izmailova, Deputy Mayor, City of Tallinn

Züleyxa Izmailova started out her journey as an environmental activist by participating in protest marches and public meetings. She then decided to take an official stance on environmental and political issues by joining the Estonian Greens. Soon after Züleyxa was elected as the head of the party. Currently, she is the first-ever Green Party member to hold office in Tallinn City Government, where she is advocating a more inclusive, responsible and sustainable policy-making process.



Kevin Johnsen, Adviser, Nordic Energy Research and BENTE

Kevin Johnsen works as an adviser at Nordic Energy Research. For the past two years he has been involved in the creation of the study Baltic Energy Technology Scenarios 2018 – a scenario-based energy system analysis that explores the changes in the Baltic countries’ energy systems. What would be required for the Baltic countries to meet their climate and energy targets in 2030, and what development would lead the Baltics towards a 2°C pathway?



Vello A. Kuuskraa, President, Advanced Resources International, Inc

Mr. Vello A. Kuuskraa, President of Advanced Resources International, Inc, has over 40 years of experience with assessments and extraction of natural resources. He is an internationally recognized expert on the technologies of unconventional gas and enhanced oil recovery and their adaptation for CO₂ sequestration. He serves as the Chairman of the Advisory Board for the Carbon Capture Project, a major industry/government partnership involving BP, Chevron and Petrobras. Mr. Kuuskraa has been a two-time SPE Distinguished Lecturer on the topic of Integrating Enhanced Oil Recovery and CO₂ Sequestration.

Mr. Kuuskraa is a 2001 recipient of the Ellis Island Medal of Honor that recognizes individuals for exceptional professional and patriotic contributions by America's diverse cultural ancestry. Mr. Kuuskraa was born in Iisaku, Estonia. He currently serves on the Board of Directors for Research Partnership to Secure Energy for America (RPSEA), on the National Petroleum Council, on the National Coal Council and on the University of Wyoming Energy Resources Council. Mr. Kuuskraa holds a M.B.A., Highest Distinction from The Wharton Graduate School and a B.S., Applied Mathematics/ Economics; from the North Carolina State University.



Dr. Marko Maver, Project Manager, Bellona Europa

Dr. Marko Maver is the Project Manager at Bellona Europa, currently working on three EU-funded projects involving the preservation of legacy infrastructure and industrial CCS cluster development in Europe. After completing his PhD in governance and regulation of CO₂ storage in Europe from the University of Sheffield in the UK, he has worked for a number of years in financial fraud investigation at a big four consultancy firm in Slovenia, focusing on the energy sector.



Gry Møl Mortensen, Senior Geologist, Geological Survey of Sweden

Gry Møl Mortensen is a senior geologist at the Geological Survey of Sweden (SGU). Gry has been working on CO₂ storage since 2013. She is also a project manager at the SGU in the Nordic CO₂-project "NORDICCS".



Dr. Auli Niemi, Professor of Earth Sciences, Program for Air, Water and Landscape, Uppsala University

Auli Niemi is Professor in Groundwater Modeling at Department of Earth Sciences at Uppsala University, Sweden, leading the geohydrology research. Her earlier positions include e.g. Research Professor at Technical Research Centre of Finland, Visiting Professor at Royal Institute of Technology, Stockholm and Research Associate at Lawrence Berkeley National Laboratory, USA. Her research involves modeling and characterization of flow and transport in porous and fractured media, with applications ranging from energy challenges to environmental protection. In recent years her research had a strong focus on processes related to geological storage of CO₂, where she was the coordinator of the large-scale integrating EU FP7 project MUSTANG aimed for developing methodologies for site characterization, monitoring and modeling of saline aquifers for CO₂ geological storage. She was Work Package leader in several recent EU FP7 projects on CO₂ geological storage (PANACEA, TRUST, CO2QUEST) and participated in several projects in the Baltic Sea region. She is one of the main developers of the Heletz pilot CO₂ injection site.



Esa Nikunen, General Director of the Environmental Services, City of Helsinki

Esa Nikunen is the General Director of the Environmental Services of Helsinki City. His work involves Environment Protection, Environmental Health, and Food & Veterinary Safety. Esa worked previously as a Director in the Finnish Safety and Chemicals Agency where he was responsible for Chemicals Control. Before he worked 20 years in different leading roles in the Finnish Environment Institute. Esa is a limnologist by training and he has a long career dealing with hazardous chemicals and the environment. He lives part of the year in the archipelago of Gulf of Finland. Believing that the cities play a major role in saving the world, Esa wants to keep

Helsinki in the frontline in solving environmental problems.



Per Arne Nilsson, Consultant, Panaware ab & Coordinator for the BASRECCS Network

Per Arne brings extensive, international leadership experience from senior positions in telecommunications, energy, chemical and shipping companies and from more than ten years as management consultant and coach. Swedish by origin he has lived and worked in the Middle East, South East Asia and in Europe. As consultant he combines strong performance focus with a drive to build client capabilities through his personal, empathetic approach. Per Arne graduated as an International Economist and works in Swedish (Scandinavian), English, German and French. His Gestalt training in Sweden and with the US Gestalt International Study Centre (GISC) has qualified him in coaching and earned him an international organization development certification.

His Gestalt training in Sweden and with the US Gestalt International Study Centre (GISC) has qualified him in coaching and earned him an international organization development certification.

Per Arne's industrial background creates a backdrop for his current consultancy as management and organization consultant. During more than ten years he explored the opportunities for development of Carbon Capture and Storage. He pioneered the development of models for cost estimation of transport solutions for CCS and co-authored the report from Zero Emissions Platform, *"The Costs of CO₂ Capture, Transport and Storage"*, where he was the coordinator and lead for the work on transport cost estimation. Based in Stockholm, he has been instrumental in the forming and execution of a series of research activities under the joint headline *"Bastor"*, Baltic Storage of CO₂.



Ingvild Ombudstvedt, Lawyer MNA, Senior Client Engagement Lead, Client Engagement team, Global CCS Institute

Ingvild is an economist and certified Norwegian lawyer. Her expertise is CCS/CCU/CCUS and petroleum law, both in Norway and internationally. Ingvild has extensive experience providing legal advice and assessments, developing regulatory framework and assisting in contract negotiations, public procurement and mergers and acquisitions. Since 2014, she has been involved in the ISO project "ISO TC265 – Carbon Dioxide capture, transport and storage", where the objective is to negotiate and produce international standards for CCS and CO₂-EOR. She is

further an active member of BASRECCS, Baltic Sea Regional Expert CCS network, an initiative which is currently led by her in collaboration with representatives from Sweden and Finland.

She has previously worked for Arntzen de Besche law firm in Oslo (2011-2016) and in 2016 she held the position as Senior Advisor Policy and Regulatory for the Institute in Brussels. Now, Ingvild is back in Oslo, and is currently accountable for managing the Institute members and clients in the Nordic and Baltic region.



Dr. Ragnhild Rønneberg, Special Advisor, The Research Council of Norway and Coordinator of ACT (Accelerating CCS Technologies)

Ragnhild Rønneberg is the coordinator of ACT (the ERANET Cofund program under Horizon 2020) and holds a position as special advisor at the Research Council of Norway. She has a PhD in Biochemistry (1985) and has had a long career in Norwegian pharma and bio industry before entering the position as director for industry-driven programs at RCN in 2001. Since 2010 she has been managing international climate and environmental projects, infrastructure projects. Since 2014, she leads the establishment of ACT and has been managing the program from that time. She also

has substantial experience with R&D programs for the Nordic Areas/Arctic and has coordinated the work with a new strategy from RCN on RD&I for this region.



Dr. Kazbulat Shogenov, Researcher, Department of Geology, Tallinn University of Technology,

In 2015, Kazbulat Shogenov defended his PhD in the field of CO₂ Geological Storage and Petrophysical and Seismic numerical modelling in Estonia at Tallinn University of Technology (TUT). Since 2008, he has been working as a researcher at the Institute of Geology at TUT (now Department of Geology). Prior to this, he was working as an engineer in 2005-2008 (TUT). Kazbulat has attended several scientific projects related to CCS since 2006 (e.g. CO₂NET EAST, EU GEOCAPACITY, CGS EUROPE, CO₂STOP, CGS Baltic, ESTMAP, ENOS, CLEANKER). He is also

responsible for 3D geological and seismic modelling, CO₂-EOR, GIS databases, laboratory measurements, etc.



Jens Skov-Spilling, Senior Adviser, Business, Energy & Regional Development, Nordic Council of Ministers

Jens Skov-Spilling works to facilitate Nordic energy co-operation in the fields of electricity market, renewable energy, energy efficiency, energy-related transport and energy research. He is also supporting Jorma Ollila in conducting a strategic review of Nordic energy co-operation (www.norden.org/strongertomorrow). He has in-depth knowledge of oil and gas activities in the Danish part of the North Sea. He is a member of the inter-ministerial committee conducting an overhaul of conditions for hydrocarbon recovery in the North Sea. He is also a member of the

steering committee developing a Strategy for the future of oil & gas activities in Denmark. Skov-Spilling has thorough experience with regional cooperation, through Common Market of Eastern and Southern Africa (COMESA) and the Inter-Regional Coordination Committee (IRCC), as well as with private sector development programmes and poverty reduction budget support missions and programmes in Zambia.



Dr. Alla Shogenova, Senior Researcher and Leader of the CO₂ storage group at the Department of Geology, Tallinn University of Technology

Dr. Alla Shogenova is a senior researcher and a leader of the CO₂ storage group at the Department of Geology, Tallinn University of Technology. She was a leader of Estonian research group in EU FP6-7 projects (EU GEOCAPACITY, CO₂NetEast, CGS Europe, CO₂Stop and ESTMAP) and CGS Baltic project supported by EUSBSR Seed money facility. Dr. Shogenova is an author and reviewer of research publications, editor of the newsletters and associated editor of BGTA journal. Dr. Shogenova is a supervisor of Master and Ph.D. students in CCUS. In 2013 she was a visiting Professor in CCS at Faculty of Geology, University of Warsaw supported by EU Project Modern University. Dr. Shogenova represents Estonia in the ENeRG and CO₂GeoNet networks. In the Horizon 2020 projects she is a leader of CCUS work package in the CLEANKER (cement industry) and leads/participate in several ENOS project tasks.



Roy Vardheim, Director and Chairman, Technology Centre Mongstad

Roy Vardheim is Director of Gassnova's owner follow-up department for Technology Centre Mongstad (TCM), as well as Chairman of TCM. He took up his post in 2017, having previously been the CEO of TCM. He is also the Chairman of the Grenland Port Authority. Vardheim has extensive experience of top level management from a number of companies. He has, amongst others, previously been CEO of Norske Skog Saugbrug AS and Borealis Scandinavia. He also has international experience in the executive management, including roles at Borouge in the Middle East and BIS in Scandinavia. Vardheim holds a Master of Science degree in Chemical Engineering from the Norwegian Institute of Technology (now known as the Norwegian University of Science and Technology).



Maria Velkova, Policy Officer, European Commission

Maria Velkova is a policy officer working for the European Commission since 2008. In her current position she is part of the team Finance for Innovation in DG Climate Action. She coordinates the NER 300 programme supporting large-scale demonstration of low-carbon technologies. She also coordinates the policy and regulatory work on carbon capture, utilisation and storage. She has worked previously on regulation on GHG emissions from fuels and in supporting research and innovation of renewable energy technologies.

Before joining the European Commission, Maria Velkova worked in the areas of enterprise policy, renewable energy and energy efficiency in the Bulgarian public administration. She has Masters' degrees in Environmental Change and Management from the Oxford University and European Economic Studies from the College of Europe in Bruges. Her Bachelor's degree is in European Business Administration from the University of National and World Economy, Sofia and University of Hull, UK.



Johan Vetlesen, Deputy Director General, Norwegian Ministry of Petroleum and Energy

Johan Vetlesen is Deputy Director General in the Norwegian Ministry of Petroleum and Energy. He has had various positions in the Ministry and has currently the responsibility for EU/EEA and Nordic energy matters in the Ministry. He is part of the managing staff of the Ministry of Petroleum and Energy. He is working on EU/European Economic Area (EEA) issues and responsible for the coordination of these matters in the Ministry of Petroleum and Energy. This work includes the assessment of all major legislative acts going through the decision-making process in the EU and the EEA. The importance and volume of new legislation has increased in the past year with the developing of EU energy union policies. Vetlesen is also in charge of the Nordic energy cooperation through the Nordic Council of Ministers. He is in this competence representing the Nordic Energy Committee of Senior Officials in this event. Nordic cooperation in the energy technology and innovation fields within the Nordic energy cooperation has many benefits and gives added value to the various national strategies. It is also an objective for Nordic energy cooperation to include the experts of the Baltic states. This event is a very good example of this.



Dr. Adam Wójcicki, Project Manager, Polish Geological Institute

Adam Wójcicki, Ph.D., Eng., geophysicist, has been involved in CCS activities supported by the EU FP6 since 2004 (CASTOR, EU GeoCapacity, CO2NetEast). Since 2008 working at PGI-NRI, in projects and activities on CO₂ geological storage, hydrocarbons and geothermal. He coordinated the national programme "Assessment of formations and structures for safe CO₂ geological storage, including monitoring plans". Dr. Wójcicki also provided expertise and studies to stakeholders interested/involved in CCS activities in Poland, including the Polish pilot injection project and demos. He was also involved in CCS networking activities supported by the EU FP7 (CGS Europe, ECCSEL PP & PP2). He is a member of ENeRG network and involved in activities of CO2NET, ENeRG, EGS GEEG, CO2GeoNet, BASREC CCS and EERA JP CCS.