







Annex 1

BASREC CCS INITIATIVE - Activities catalogue


European Projects linked to the region




<p>ECCSEL http://www.sintef.no/Projectweb/ECCSEL/</p> 	<p>ECCSEL, short for European Carbon dioxide Capture and Storage Laboratory Infrastructure, was proposed by NTNU and SINTEF on behalf of the Norwegian Government, and put on the official European Strategy Forum on Research Infrastructures (ESFRI) updated Roadmap in 2008 as the only new entrant within the energy theme.</p> <p>ECCSEL will be operational by 2013 as a strong and coordinated pan-European distributed Research Infrastructure (RI) within CCS.</p> <p>The mission is to form a European network of Centres to build and operate new CCS R&D infrastructures. The ECCSEL laboratories will provide an integrated foundation for the experimental research needed to bring forward improved CCS-technologies. ECCSEL will help to maintain Europe at the CCS forefront, increase the attractiveness of the European Research Area and optimize the value of the Community financial support.</p>	
	<p>The main objective of the BIGCCS Centre is to contribute to the ambitious targets in the Climate agreement in the Norwegian parliament in February 2008. Hence, provide additionality through promoting CCS. The BIGCCS Centre will enable sustainable power generation from fossil fuels based on cost-effective CO₂ capture, and safe transport and underground storage of CO₂. This will be achieved by building expertise and closing critical knowledge gaps of the CO₂ chain, and developing novel technologies in an extensive collaborative research effort. 400 mNOK 2009 - 2016</p>	<p>Centre Director: Mona Jacobsen Mølnevik Mona.J.Molnevik@sintef.no +47 9300 8868</p>
	<p>The SUCCESS centre addresses several important areas for CO₂ storage in the subsurface: storage performance, sealing properties, injection, monitoring and consequences for the marine environment. The “CO₂-School” is in addition a major educational program. The centre will try to bridge gaps from details to concepts and applications, from small to large scale, and to transfer data and knowledge between many related fields.</p>	<p>Centre Manager Mr. Arvid Nøttvedt President and CEO, Christian Michelsen Research Tel +47 480 48 694</p>

 <p>http://www.co2mustang.eu/</p>	<p>The MUSTANG consortium team will be reinforced by the Scientific, Industrial and Regulatory Advisory Board (SIRAB). The SIRAB includes:</p> <p>Scientific advisors</p> <p>Experts from leading institutions in the field of CO₂ storage will act as scientific advisors and their main role will be to participate to the consortium discussion and review of the deliverables that are relevant to their field of expertise.</p>	<p>Program Manager: Professor Auli Niemi Uppsala University auli.niemi@geo.uu.se +46 701 67 92 33</p>
<p>CGS</p> <p>http://www.cgseurope.net/</p> 	<p>The CO₂ Geological Storage (CGS) part of the CCS chain deserves special attention because of its site-specific and delicate nature (wide range of scientific aspects, regulations still being developed, necessity to guarantee safety and efficiency over at least 1000 years, not yet fully proven, local acceptance issues, etc.). In this context, a three-year Coordination Action, CGS Europe, was launched on 1st November 2010, financed by the EC FP7 programme.</p>	<p>Contact: Isabelle Czernichowski-Lauriol, CGS Europe Coordinator and CO₂GeoNet President, BRGM, France</p>
<p>NORDICCS</p> <p>http://www.sintef.no/nordiccs</p> 	<p>The main objective of NORDICCS is to boost the deployment of carbon capture and storage (CCS) in the Nordic countries by creating durable networks, boost innovation, and develop joint actions and processes to increase industry-driven innovation within CCS. The purpose is to demonstrate how this can contribute to the Nordic portfolio of climate change mitigation options and enable the Nordic countries to join forces to become pioneers in a large scale implementation of CCS.</p> <p>NORDICCS is a virtual CCS networking platform aiming for increased CCS deployment in the five Nordic countries. Operating under the Top-level Research Initiative (TRI), NORDICCS is the Nordic CCS platform involving the major CCS stakeholders in the five Nordic countries. NORDICCS is financed by Nordic Innovation and the partners themselves, and has a planned operation of five years.</p>	<p>Contact: Dr Nils A. Røkke Email: Nils.A.Rokke@sintef.no</p>


BASREC Countries**Denmark**


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	No current research on CCS reported.	

Estonia




		National CCS-contact person: Ms Katre Kets Climate and Radiation Department Estonian Ministry of the Environment +372 62 60 754 katre.kets@envir.ee
	No current research on CCS reported.	

Finland

		National CCS-contact person: Mr Hannu Lipponen Senior Adviser Energy Department Ministry of Employment and the Economy Phone +358 29 506 3606 Mobile +358 50 460 2304 hannu.lipponen@tem.fi
CCSP http://www.cleen.fi/en/ccsp	CCSP (Carbon Capture and Storage) program is an industry-lead Finnish R&D program (2011-2015), focused on developing CCS-related technologies and	Contact: Sebastian Teir


	<p>concepts. A further objective is to create a strong scientific basis for the development of CCS components, concepts and frameworks, and to establish strong international networks that enable active international CCS co-operation. Work packages:</p> <ul style="list-style-type: none"> CCS related regulation, legislation and EHSS questions CCS concept studies Capture of CO₂ including advanced technologies Processing and logistics of captured CO₂ Storage of CO₂ <p>Five year program 2011-2015, volume 3 m€/year</p>	<p>VTT Technical Research Centre of Finland Email: sebastian.teir@vtt.fi Phone: +358 404 878 117</p>
<p>Foster Wheeler Energia Oy, Finland</p>	<p>OXYFUEL CFB development and demonstration. FEW has developed oxyfuel technology and also constructed an oxyfuel combustion demonstration plant in Spain. The demonstration project, FEXI BURN CFB, was part of an EC funded project coordinated by VTT. The demonstration oxyfuel CFB plant capacity is 30 MWth. The plant can be operated in xyfuel mode or as a conventional air blown CFB boiler.</p>	<p>Contact: Email: Phone:</p>

Germany


		<p>National CCS-contact person: Mr Wolfdieter Böhler Head of Division International Energy Policy; External Energy Policy Federal Ministry of Economics and Technology Phone +49 30 18 615 - 73 65 wolfdieter.boehler@bmwi.bund.de</p>
	<p>COORETEC is an initiative by the Federal Ministry of Economics and Technology (BMWi) for the development of a power plant fired by fossil fuels with prospects for the future. The abbreviation COORETEC stands for CO₂ reduction technologies for fossil-fired power plants. Under this heading, two strategic approaches are taken in joint projects involving industry and research:</p> <ul style="list-style-type: none"> Technologies for improving power plant efficiency Technologies for the separation and transport of CO₂ with the aim of safe long-term storage in geological formations. <p>With this focus, COORETEC is integrated into the German Federal Government's 5th Energy Research Programme on "Innovation and New Energy Technologies". The aim is to promote the transition to a reliable, economic and environmentally safe energy supply. COORETEC thus makes a significant contribution towards implementing the Federal Government's energy and climate policies. Five work packages:</p> <ul style="list-style-type: none"> Gas Combined Cycle Power Plants WG1: Gas Combined Cycle Power Plants WG2: Steam Power Plants and Post-combustion Capture WG3: IGCC with Pre-combustion Capture WG4: Oxyfuel WG5: CO₂ Storage 	<p>Contact: Dr.-Ing. Hermann Stelzer Forschungszentrum Jülich GmbH Projektträger Jülich (PtJ) Energietechnologie 52425 Jülich Telefon: 02461 61 8810 E-Mail: h.stelzer@fz-juelich.de</p>
	<p>The GEOTECHNOLOGIEN operational structure is build up by a network of trans disciplinary research joint ventures. 13 major Key Research Themes address future social and economic needs and demands. Next to the</p>	<p>Contact: Dr. Ute Münch Head of the co-ordination office</p>

	<p>geosciences disciplines engineering sciences and neighbouring natural sciences are participating in more than 120 joint research projects. By close interaction of publicly financed research and privately supported cooperation, more than 44 Universities, 31 research institutions and more than 50 industry partners are engaged within GEOTECHNOLOGIEN. The program's key research areas include different geo-scientific topics. 33 interdisciplinary joint projects related to the key research area "Technologies for Sustainable Storage of Carbon Dioxide in Geological Formations" have been supported since 2005 with an allocated budget of 30 Mio €. The third funding phase of this key research area started in mid 2011. The current projects deal with the long-term safety of geological storage sites and cover the following thematic complexes:</p> <ul style="list-style-type: none"> - Ground water/brine (projects: <ul style="list-style-type: none"> BRINE – Carbon Dioxide-storage in Eastern Brandenburg: implications for geothermal potential and concept for an early warning system for salt water intrusions into groundwater CO2BRIM – Multi-stage and regional-scale characterisation of potential CO2 storage formations with particular focus on brine migration - Migration, tracer and biology projects: <ul style="list-style-type: none"> PROTECT – Prediction of deformation to ensure Carbon traps CO2IsoLabel – Carbon and oxygen isotopes under extreme conditions – laboratory evaluations for CO2 storage monitoring CO2BioPerm – Influence of bio-geochemical CO2 transformation processes on long-term permeability changes in storage and cap rock formations as well as in borehole concrete); - Monitoring concepts, innovative sensors, risk analysis projects: <ul style="list-style-type: none"> CO2SENSOR - Development of a high-resolution CO2 sensor MONACO - Monitoring concepts for the geological storage of CO2 based on a hierarchical monitoring approach CO2RINA - Integrated risk analysis for geological CO2 storage. <p>In addition, development of and research related to the pilot site in Ketzin has been supported by 10.5 Mio € so far. Research related to Ketzin is supported further on (project CO2MAN – Carbon dioxide reservoir management).</p>	<p>Phone +49 (0)331 288 1079 Mobile +49 (0)174 15 12 057 E-Mail: muench@geotechnologien.de</p>
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Iceland

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	No current research on CCS reported.	




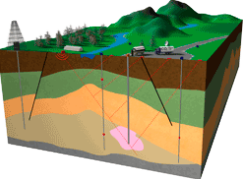
Latvia




		National CCS-contact person: Mr Dainis Dravnieks Senior Official Energy Department Ministry of Economics Tel. +371 6 7013128 Mobile + 371 2 9265516 dainis.dravnieks@em.gov.lv
	No current research on CCS reported.	

Lithuania

		National CCS-contact person: Mr. Jonas Satkūnas Deputy director Lithuanian Geological Survey Under the Ministry of Environment Phone: +370 5 233 2482 E-mail: jonas.satkunas@lgt.lt
	Lithuania's National Program of Geological Exploration for the period of 2011-2015, named "Explorations of bowel's spatial, renewable and unconventional resources, has a target to gather data on geological characteristics of possible carbon dioxide storage facilities. Another target is to assess the suitability of a potential CCS facility for Lithuania. In 2011, the Lithuanian Geological Survey started a project aimed at summarizing and analysing gathered data from Lithuania's western region, as well as from oil exploration wells. The project will end on 31 st of January, 2014.	Contact: Gintare Andriuskeviciene Email: gintare.andriuskeviciene@lgt.lt Phone: +370 8 676 09814

Norway

	<p>Norway has a large number (around 100) of on-going R&D projects in the field of CCS, most of which are organized and funded under the CLIMIT research program. Therefore, in the following, only six projects are named and then, for the CLIMIT portfolio, interested readers are kindly directed to the CLIMIT website, www.climit.no where complete and updated project information is available.</p>	<p>National CCS-contact person: Ms Charlotte Elvsaas Advisor Climate, Industry and Technology Department Norwegian Ministry of Petroleum and Energy Phone (direct): +47 22 24 67 88 ce@oed.dep.no</p>
<p>Technology Centre Mongstad</p> 	<p>CO₂ Technology Centre Mongstad (TCM) has taken the initiative to form an international test centre network for carbon capture test facilities around the world to share knowledge to accelerate the commercialisation of technology. The key aims of the CCS Test Centre Network are to share knowledge of technological developments, construction and operational experience, establish performance indicators, and promote technology standardization.</p>	<p>Program Manager:</p>
<p>Longyearbyen CO₂ Lab</p>	<p>CO₂ storage field lab. Research projects and pilots in parallel. Includes characterization of a reservoir, with storage capacity and caprock characterised. Validation of monitoring technologies. 8 mill Euro from CLIMIT 2007-2014</p>	<p>Program Manager:</p>
	<p>CO₂ capture test facility in the cement industry at Brevik, Norway. The aim is to evaluate four different capture technologies. Further, the project includes a small scale test centre for CO₂ capture from cement flue gases and gives the basis for qualification of CO₂ capture technologies. Evaluation of full scale capture should be performed. 9 mill Euro from CLIMIT 2013-2017</p>	<p>Project Manager: Per Brevik Email: per.brevik@heidelbergcement.com Phone: +47 (909) 70 017</p>
	<p>CO₂ Field Lab The main objective of the CO₂ Field Lab project is to assure and increase carbon storage safety by obtaining valuable knowledge about monitoring of CO₂ migration in geological formations. This will enable detection of possible CO₂ leakage at the earliest possible stage. This tri-national project partnership between Norway, France and the United Kingdom has already obtained the Eurogia+ label for its efforts. The project aims to develop and set standards for monitoring CO₂ storage. 94 mNOK 2009 - 2013</p>	<p>Project manager: Maria Barrio Hernandez mobile phone: +47 995 34 665 maria.barrio@sintef.no</p>

 <p>ZEROCO2.NO</p>	<p>The Longyearbyen CO₂ lab is managed by the university centre in Svalbard (UNIS). The vision is to make Longyearbyen CO₂ neutral by capturing and storing the CO₂ from the local coal fired power plant. This has the potential of turning Longyearbyen into a show case site that takes care of the emissions through the whole CO₂ chain. The project has established knowledge about available storage sites by several tests carried out from 2007 -2010.</p>	
 <p>SINTEF NTNU - Trondheim Norwegian University of Science and Technology</p>	<p>SOLVit - is an eight-year research and development program with the the aim of generating more cost effective technology for CO₂-capture, funded by Gassnova and the Norwegian industrial company Aker Clean Carbon - who is also coordinator. The core of the SOLVit program concerns chemical processes that can capture CO₂ from the process industry and emissions from coal and gas powered power stations. 317 mNOK 2009 - 2016</p>	<p>Contact: Dr Nils Røkke SINTEF</p>
 <p>CLIMIT Budget: 22 mEUR p a 2013 - 2020</p>	<p>CO₂-CAPTURE Projects supported by CLIMIT will contribute to closing knowledge gaps within CO₂ capture and to stimulating development of new innovative projects that create more cost- and energy efficient solutions.</p> <p>CO₂-TRANSPORT Projects supported by CLIMIT will contribute to increased operational reliability and reduced costs associated with design and operation of CO₂ transport systems.</p> <p>CO₂-STORAGE Projects supported by CLIMIT will contribute to the safe and cost efficient implementation of CO₂ storage in accordance with regulatory requirements and international agreements.</p>	<p>Contact: Head of CLIMIT secretariat Klaus Schöffel, Vice President Technology and Competence Gassnova SF Tel: + 47 913 42 329</p>

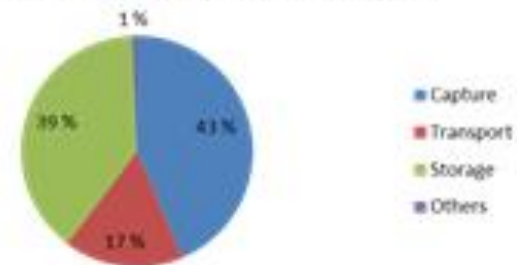
CLIMIT Technology area

- CLIMIT R&D:
 - Close to equal funding for capture and storage

- CLIMIT Demo
 - Capture receives most funding

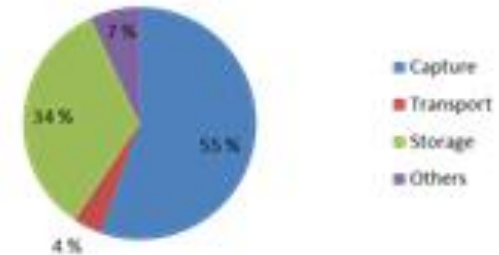
CLIMIT R&D: Technology area

Ongoing projects 2012, allocated funding







CLIMIT Demo: Technology area


Ongoing projects 2012, allocated funding










Poland

		<p>National CCS-contact person: Ms Aneta Ciszewska Senior Expert Energy Department Ministry of Economy Phone +48 22 693 57 48 Aneta.Ciszewska@mg.gov.pl</p>
	<p>Projects concerning CCS in the R&D program “Advanced Technologies for Energy Generation”: This program refers to the European Union 3x20% targets and consists of 4 main blocks: (i) Improving energy efficiency of power generation, (ii) coal gasification, (iii) oxy-combustion of coal and (iv) renewable energy generation in distributed systems. The program supports the development of highly efficient technologies for coal combustion and gasification, as well as the creation of fuel, heat and electricity from biomass and waste products, within the framework of four research objectives. The government-funded program runs from 2010 to 2015 and is managed by the National Centre for Research and Development (NCBiR). It has a budget of €72 million. Additional funds are allocated by industrial partners from Poland’s power sector.</p>	<p>Contact: Gerard Lipinski - Programme Coordinator e-mail: Gerard.Lipinski@ncbr.gov.pl</p>
	<p>Geological assessment of the Cambrian reservoir in the Polish Baltic Sea offshore sector. The project is aiming at establishing the possibilities to store CO₂ from the northern parts of Poland under the Baltic Sea bed in the Cambrian sandstone. Funded by Polish Ministry of Environment. 0,9 mEUR, 2014 - 2016</p>	<p>Contact: Adam Wojcicki Polish Geological Institute Email: adam.wojcicki@pgi.gov.pl Phone: +48 607 701 446</p>
	<p>Capture technology research, with the objective to assess a feasibility of capture of CO₂ from flue gas of existing power plants of Tauron. Two projects implemented by Tauron in cooperation with IChPW and the Technical University of Czestochowa. Specifically, a pilot chemical absorption and a mobile adsorption capture unit have been constructed and tested (cooperation with two research partners, funding by National Centre of Research and Development). These projects are part of the NCBiR program above. Budget approximately m€18 , period 2010-2015</p>	<p>Contact: Janusz Tchórz Tauron Wytwarzanie S.A. Email: Janusz.Tchorz@tauron-wytwarzanie.pl Phone: +48 32 744 2530</p>

Russia

		National CCS-contact person: Ms Natalia Nozdrina Ministry of Energy Russia NozdrinaNI@minenergo.gov.ru
	No current research on CCS reported.	

Sweden

		National CCS-contact person: Mr Kenneth Möllersten Tillväxtavdelningen Energimyndigheten Tel. +46 (0)16 544 20 94 Kenneth.mollersten@energimyndigheten.se
 	SwedSTORECO ₂ has as a primary goal to conduct research and methodological development on CO ₂ storage in Swedish sedimentary bedrock. The aim is to build up national competence in the technology of geological storage with emphasis on characterization and evaluation of deep aquifers and their cap rock. Results from the SwedSTORECO ₂ project will be used to determine if it is possible to store CO ₂ in deep aquifers in the southern Baltic Sea.	Program Manager: Professor Chris Juhlin Uppsala University Department of Earth Sciences Villavagen 16, SE-75236 Uppsala, Sweden christopher.juhlin@geo.uu.se +46 70 425 0183
Bastor2   	Bastor2, in collaboration with CCSP (Finland) takes a broad approach to map the opportunities for CO ₂ storage under the Baltic Sea bed. Based on geological information from four countries the storage potential should be assessed. In addition, environmental risk, societal, legal/fiscal and transport aspects are studied. 2012 - 2014	Project Manager: Per Arne Nilsson <i>panaware ab</i> email: pan@panaware.se phone: +46 733 969040
	Carbon capture technologies: Oxyfuel combustion Chemical Looping Capture Process	Professor Filip Johnsson Email: filip.johnsson@chalmers.se Phone: +46 31 772 14 49 Professor Anders Lyngfelt Chalmers