

# We Strive

to mitigate climate change.

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**EEA and Norway Grants  
in the Czech Republic**

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**Programme CZ08**  
Carbon Capture  
and Storage – CCS  
aimed at mitigating  
climate change

Iceland  
Liechtenstein  
Norway grants



Norway grants



**Ministry of Finance  
of the Czech Republic**

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Ministry of the Environment  
of the Czech Republic

## EEA and Norway Grants 2009–2014

3 donor states

16 beneficiary states

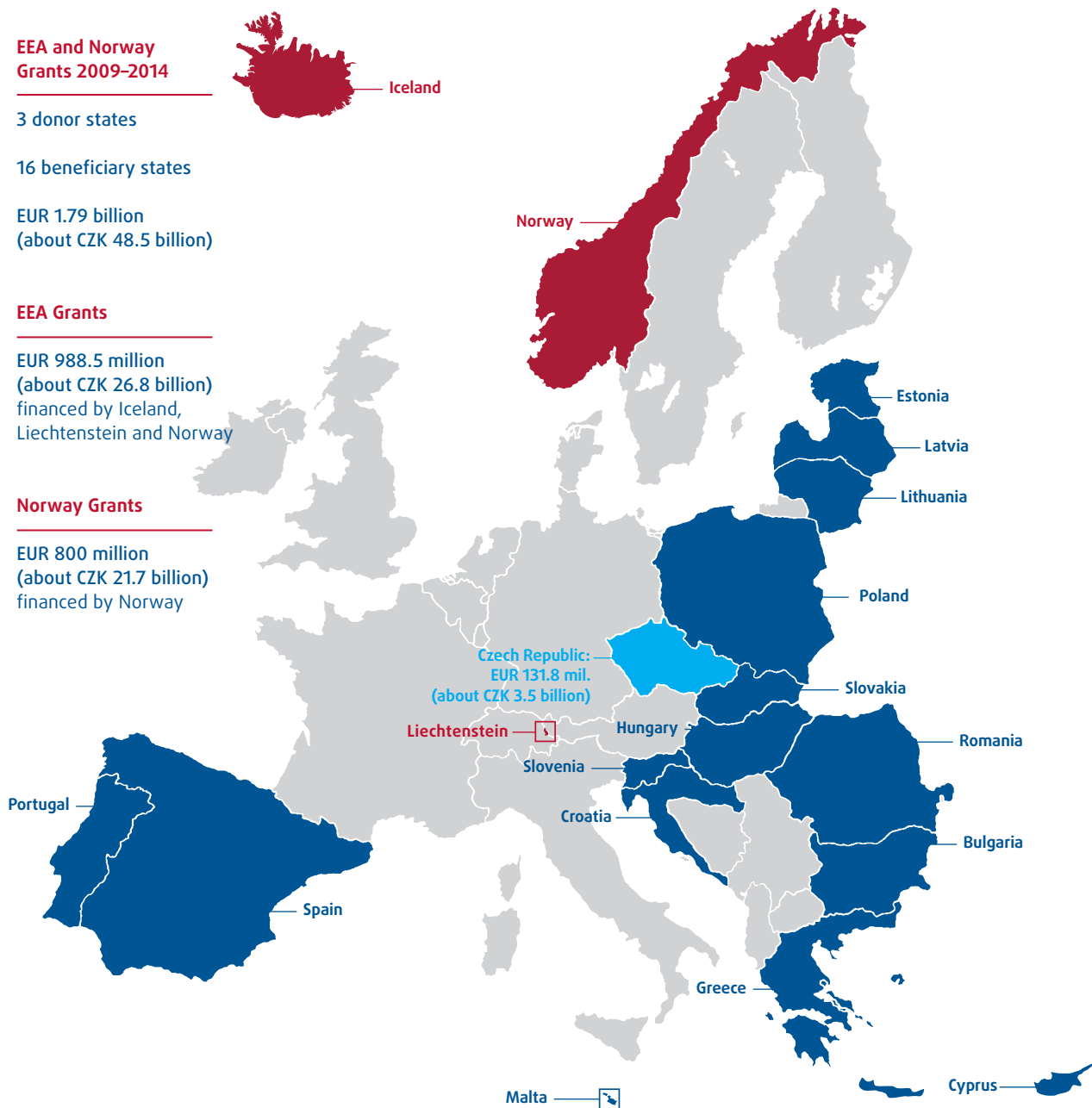
EUR 1.79 billion  
(about CZK 48.5 billion)

### EEA Grants

EUR 988.5 million  
(about CZK 26.8 billion)  
financed by Iceland,  
Liechtenstein and Norway

### Norway Grants

EUR 800 million  
(about CZK 21.7 billion)  
financed by Norway



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**The EEA and Norway Grants are Iceland, Liechtenstein and Norway's contribution to reducing economic and social disparities in the European Economic Area and to strengthening bilateral relations with 16 beneficiary countries in Central, Eastern and Southern Europe. The EEA and Norway Grants number among the sources of funding that emphasize sharing and exchange of experience between and among partners.**

In the 2009–2014 programming period the Czech Republic distributed approximately **EUR 131,8 million** into various areas. **The Carbon Capture and Storage (CCS), aimed at mitigating climate change, is one among them.**

# About the Programme

A large glacier with chunks of ice floating in the water. The glacier is a deep blue color, and the ice chunks are white and blue. The water is a light blue color.

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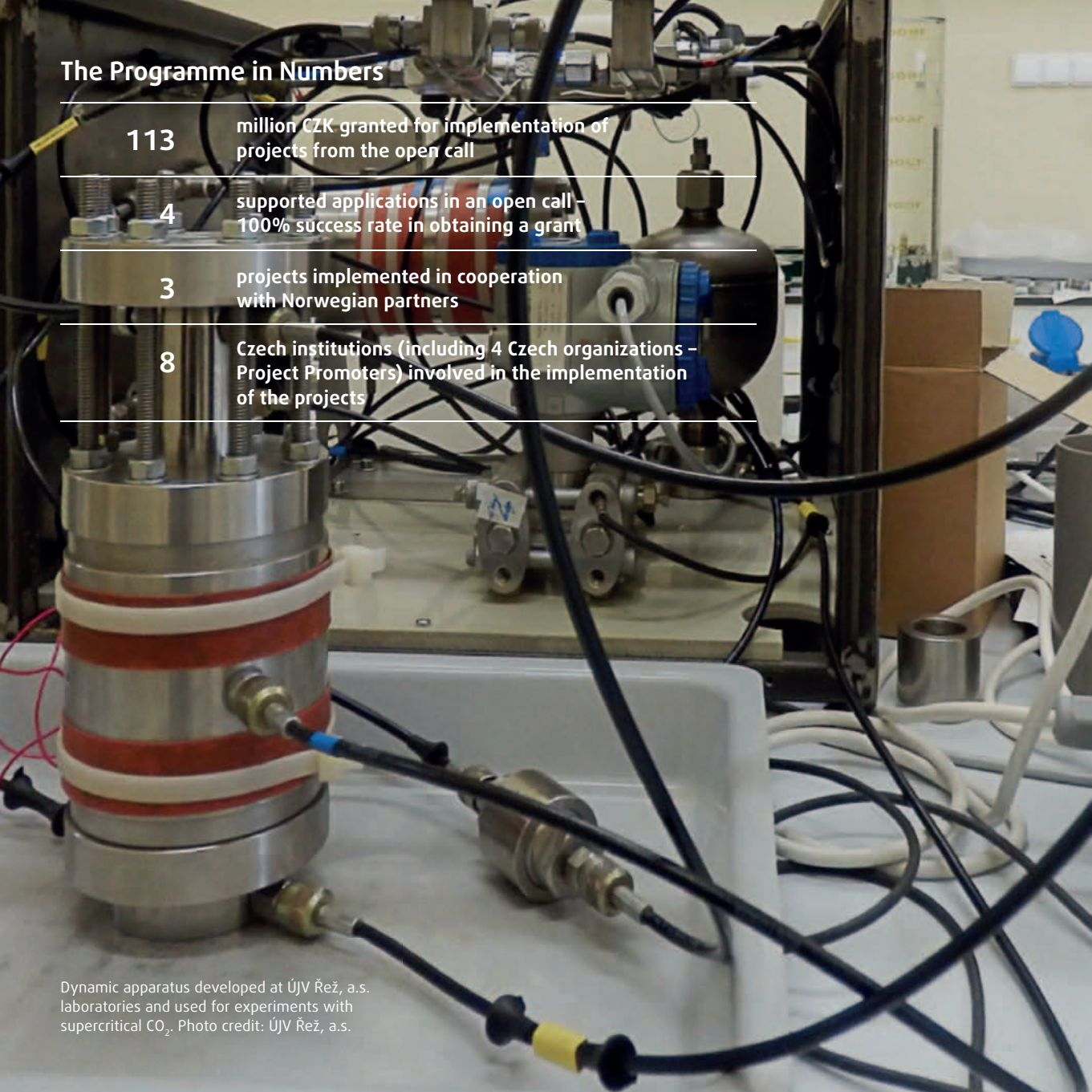
Climate is one of the crucial attributes of life on our planet. Our climate is affected by a number of short and long-term factors that humans may or may not be able to influence. One of the negative effects which people can greatly influence, and thus contribute to protecting the climate for the future generation, is the amount of greenhouse gases in the atmosphere.





Vanishing Wonders of Nature, Athabasca  
Glacier, Alberta, Canada - September 2015  
Photo credit: Monika Vitvarova

## The Programme in Numbers



113

million CZK granted for implementation of projects from the open call

4

supported applications in an open call – 100% success rate in obtaining a grant

3

projects implemented in cooperation with Norwegian partners

8

Czech institutions (including 4 Czech organizations – Project Promoters) involved in the implementation of the projects

Dynamic apparatus developed at ÚJV Řež, a.s. laboratories and used for experiments with supercritical CO<sub>2</sub>. Photo credit: ÚJV Řež, a.s.

**Programme**

CZ08 – Carbon Capture and Storage – CCS aimed at climate change mitigation

**Programme Areas**

Carbon Capture and Storage – CCS

**Eligible applicants**

Public subjects, private subjects, NGOs, associations of municipalities, scientific research institutions

**Duration**

Projects were implemented in 2015–2017.

Combustion of fossil fuels increases the amount of carbon dioxide – CO<sub>2</sub>, the most important greenhouse gas in the atmosphere. The emissions increase the otherwise desirable greenhouse effect and play a major role in the ongoing climate change on the Earth. Carbon dioxide capture and storage (CCS) is nowadays a generally recognized method of reducing the greenhouse gas emissions and mitigating climate change. Its principle consists in capturing carbon dioxide at large stationary emission sources, such as thermal power plants, steel works, cement factories, refineries or natural gas treatment plants, and in its subsequent transport to a storage site where CO<sub>2</sub> is safely and permanently stored in suitable geological structures.

The Ministry of Finance was the Programme Operator, the Ministry of the Environment of the Czech Republic was acting as the Programme Partner, responsible particularly for the focus and expert content of the Programme.

The programme CZ08 implemented in the Czech Republic helped support 3 specific research projects and, through a fourth project focused on knowledge and experience sharing in the field and on communicating the issue to both the expert community and the general public, contributed to a general awareness raising of the matter.

In addition, the programme was significantly conducive to mutual bilateral cooperation between the Czech and Norwegian entities – project partners, as well as to a broader experience exchange at international level.



# Supported projects 2015-2017








Czech-Norwegian discussion during site visit to the locality of the future CO<sub>2</sub> storage site, based on the geological map of the area. Photo credit: Vít Hladík, ČGS



## The Project in Numbers



- 2 Czech bodies and 1 Norwegian partner involved in implementation of the project
- 4 CO<sub>2</sub> separation technologies analyzed within the project (Rectisol wash unit, membrane separation, cryogenic technology, carbonate loop-based technology)
- 8 publications (6 partial technical reports and 2 articles in a reviewed periodical)
- 7 presentations of results at specialized conferences (4x in the Czech Republic and 3x abroad); of which 1 presentation received a prize for the best presentation at international CO<sub>2</sub> Summit II: Technologies and Opportunities – U.S.
- 1 authorized software for impact assessment of integrating CCS (pre-combustion type) into a coal power unit in the conditions of the Czech Republic, running in MS Excel software environment
- 4 field trips to technological plants in the Czech Republic and in Norway
- 3 conferences/workshops (2 in the Czech Republic, 1 in Norway)
- 1 study visit of the CTU at the Norway partner SINTEF ER

Study visit of representatives of the Czech-Norway-Pilot CCS project (SINTEF ER, CTU in Prague) to IGCC power plant Vřesová – November 2015.  
Photo credit: Monika Vitvarová

Project Promoter  
**Czech Technical University  
in Prague (Czech Republic)**

Grant  
**CZK 22,165,413**

Partners  
**SINTEF ER (NO)**

**ÚJV Řež, a. s.  
(Czech Republic)**

## **Study of CCS Pilot Technologies for Coal Fired Power Plants in the Czech Republic**

The project aimed at conducting a comprehensive technical and economic study assessing the impact of integrating the selected CO<sub>2</sub> separation technologies (so-called CCS) in a coal fired integrated gasification combined cycle power plant (IGCC) in the conditions of the Czech Republic. Attention was paid, in particular, to the pre-combustion technology which is one of the three generally considered CCS technologies.

Vřesová power plant is within Europe a unique type of energy source that provided very valuable practical information about its design and operation that were used in modeling of power generation unit using the CCS technology. As far as its design is concerned, the unit was projected with alternative use of three methods for CO<sub>2</sub> separation from the process gas (based on Rectisol technology, membrane separation and cryogenic technology). The economic evaluation of the proposed technological options was carried out in such a manner so as to allow a comprehensive comparison with other modeled options for the integration of CCS technologies based on post-combustion technology (evaluated in previous research, ammonia wash unit, carbonate loop-based technology – so-called Ca-Looping) and oxy-fuel.

The solution included also an assessment of various options for transport of the captured CO<sub>2</sub> to the selected locations of underground storage sites. As a unique part, this study included a proposal and a technical and economic evaluation of the possibility of transporting the separated CO<sub>2</sub> in liquid phase using an existing railway network.

**Project website:**  
<http://czech-norway-pilotccs.cz/en>



“The Pilot CCS has been a great opportunity to combine Norwegian expertise on CCS and Czech expertise on power generation to study opportunities for deployment of CCS in the Vřesová power plant. This rare opportunity allowed the evaluation of the implementation of cost-efficient CCS technologies on one of the very few IGCC power plants in Europe based on actual characteristics of the plant. Finally, this project allowed us to create a long lasting cooperation between major actors in power generation with CCS in Norway and the Czech Republic.”

**Simon Roussanaly**, SINTEF ER

“For us, our participation in the project opened the possibility of further developing our knowledge base about the applications of CCS technologies in the energy sector and discovering new solutions that have not yet been thoroughly explored. I see a great value in establishing close cooperation with the Norwegian project partner whose experience and high expert level of knowledge, particularly in the field of process modelling, were a very suitable complement to the team of Czech scientists. A number of joint results and the established professional and personal relationships are a promise of continuation and expansion of our cooperation.”

**Mr. Tomáš Dlouhý**, Faculty of Mechanical Engineering  
at the Czech Technical University in Prague

“For the project team of ÚJV Řež, a. s., the project was of great benefit thanks to its focus on the CO<sub>2</sub> issue, which allowed us to build on the knowledge obtained during other completed projects that dealt with other CO<sub>2</sub> capture methods. The possibility to establish contacts with the Norwegian partner was also an important asset for the project team of ÚJV Řež, a. s. Thanks to our participation in the projects and the results obtained, we acquired comprehensive knowledge about the technologies that can be potentially used to capture CO<sub>2</sub> from power generation plants.”

**Mr. Lukáš Pilař**, ÚJV Řež, a. s.

➔  
Field trip of participants of an initial project conference to Vřesová power plant – April 2015. Photo credit: Ladislav Veselý



#### Description of the grant recipient:

**Czech Technical University in Prague, Faculty of Mechanical Engineering** – is a state-owned university carrying out educational, study, scientific, research, development and other creative activities for which it provides the necessary background. As a participant to the project on part of the University, the Energy Institute focuses on technical and technological solutions for power generation plants and on the environmental friendliness and economy of their operation.

#### Description of partners:

**ÚJV Řež, a. s.** – numbers among the cutting-edge research facilities in energy and industry. Other services provided focus, in particular, on design and engineering activities, supporting safe and efficient operation of nuclear and conventional power plants, fuel cycle chemistry and comprehensive services for radioactive and other specific waste management.

**SINTEF** – is the largest independent research organization in Scandinavia. It is composed of an extensive structure of multidisciplinary research institutes with international expertise in technologies, medicine and social sciences.



## The Project in Numbers



7

bodies involved in project implementation  
(6 Czech institutions and 1 Norwegian partner)

134

researchers involved in project execution

54

wells drilled in the past in the area of interest  
providing input data for geological modelling

1

3D geological model of storage site with 15 geological  
boundaries and 4 main faults

70,000

tons of carbon dioxide planned to be stored in  
the geological structure under exploration within  
the basic pilot site scenario

1,000,000

tons of carbon dioxide can be stored in the explored  
storage site if its maximum capacity is used,  
based on the dynamic modelling results

3

study visits of Czech researchers to Norway

2

short educational courses prepared by  
the Norwegian partner

40

lectures by project promoter and his partners given  
at both international and national specialized  
conferences and workshops (including 11 posters)

3

awareness-raising videos explaining the importance  
and principles of the CCS technology prepared in Czech  
version and made available online



**Project Promoter**  
**Czech Geological Survey**  
**(Czech Republic)**

**Grant**  
**CZK 61,321,782**

**Partners**  
**International Research**  
**Institute of Stavanger –**  
**IRIS (Norway)**

**VŠB – Technical University**  
**of Ostrava (Czech Republic)**

**ÚJV Řež, a.s.,**  
**Husinec – Řež**  
**(Czech Republic)**

**Miligal, s.r.o., Brno**  
**(Czech Republic)**

**Masaryk University –**  
**Institute of Physics**  
**of the Earth, Brno**  
**(Czech Republic)**

**Research Centre**  
**Řež, Husinec – Řež**  
**(Czech Republic)**

## **Preparation of a Research Pilot Project on CO<sub>2</sub> Geological Storage in the Czech Republic (REPP-CO2)**

The main aim of the project was to shift the Technology Readiness Level of geological storage of carbon dioxide, the end component of the CCS technological chain, in the Czech conditions towards its verification in the form of a pilot project carried out at a selected geological structure. This geological structure – the LBr-1 depleted hydrocarbon field – was positively assessed in detail as a potential CO<sub>2</sub> storage site. The available data were used to build a three-dimensional geological model of the storage complex, which was subsequently used for dynamic modelling of the storage reservoir and simulation of CO<sub>2</sub> injection into the storage site using various scenarios. The risks associated with CO<sub>2</sub> storage in the selected structure were assessed in detail and a monitoring plan for the storage site was prepared. Also, various scenarios were developed for the follow-up activities aiming at implementation of the pilot CO<sub>2</sub> storage project in the explored locality, including its economic evaluation.

Another important objective of the project was to raise awareness and level of knowledge of the CCS technology and geological storage of CO<sub>2</sub> among both the expert community and the general public. A number of targeted activities focused on publicity, dissemination of information about the project and its results, as well as awareness-raising events were carried out in order to achieve this objective.

As part of the project, the Czech-Norwegian cooperation in the research on CO<sub>2</sub> geological storage was reinforced, including transfer of knowledge and experience from the Norwegian partner to the Czech institutions and the related expert capacity building of the Czech partners.

**Project website:**  
<http://www.geology.cz/repp-co2/english>

“REPP-CO2 was an excellent project which allowed us to apply our expertise to the exciting and challenging LBr-1 field in the Czech Republic. It also allowed us to learn from our Czech counterparts and created fantastic possibilities for collaboration and knowledge exchange. We have organized several joint events, published a number of joint scientific papers and are continuing to work on LBr-1 together with CGS in the H2020 ENOS (ENabling On-shore CO<sub>2</sub> Storage in Europe) project. We are looking forward to an opportunity to continue our collaboration in the next round of Norway Grants!”

**Roman Berenblyum**, Research Director – Improved Oil Recovery, IRIS

“The possibility to cooperate in the REPP-CO2 project was invaluable for our institution. Thanks to the project, we were able to conduct a range of interesting laboratory tests which would be very difficult for us to carry out under other circumstances. The results we achieved, e.g. in the research of oil displacement using CO<sub>2</sub>, received a positive response from the Norwegian partner IRIS. New partnerships were established as part of all the research activities we carried out and, where appropriate, the possibilities of cooperation across the involved scientific and research institutions were expanded.”

**Martin Klempa**, VŠB – Technical University of Ostrava

“The project was highly beneficial for Miligal, s.r.o. as a small enterprise. It allowed us to get acquainted, in more detail, with the aspects of CO<sub>2</sub> capture and storage on a global scale, to study, in a greater depth, the lessons learnt and experience gained abroad, and cooperate with reputable institutions on research and evaluation of the pilot site in the Czech Republic. The financial contribution provided for the acquisition of a new advanced digital gravimeter and the possibility of its practical employment in field measurements carried out as part of the REPP-CO2 project were also of essential importance for our company.”

**Jiří Sedlák**, manager Miligal, s. r. o.

#### Description of the grant recipient:

**Czech Geological Survey** is a state-owned allowance organization acting under supervision of the Ministry of the Environment. It is a leading Czech research institution in geological sciences. One of its main thematic research priorities is research of geo-energy, including geological storage of CO<sub>2</sub>. In this field, Czech Geological Survey has been a long-term national leader with a number of successfully implemented national and international projects and studies.

#### Description of partners:

**International Research Institute of Stavanger (IRIS)** is an independent research institute focusing on applied research in natural, technical and social sciences. The target areas include improved oil recovery, digital drilling and environmental monitoring. With a basis in experience, competence and laboratories developed for petroleum reservoir characterization and improved oil recovery, IRIS is actively involved in research on CO<sub>2</sub> utilisation and storage.

**VŠB – Technical University of Ostrava, Institute of Clean Technologies for Mining and Utilization of Raw Materials for Energy Use** deals with, on a comprehensive basis, the utilization of the Earth's crust to secure the energy demands related to sustainable development of the society. It also focuses on issues related to mining and utilization of energy resources.

**ÚJV Řež, a.s.**, is a joint-stock company providing a wide range of services, particularly applied research, engineering and design activities in nuclear, conventional and sustainable energy. Since 2006, it has also been dealing with the issue of CO<sub>2</sub> capture and storage.

**Miligal, s.r.o.** is a private company focusing on regional geophysical research and exploration activities in the territory of the Czech Republic. The results of its work contribute to better utilization of mineral resources, to building of alternative renewable energy sources, and are applied in hydrogeology, environmental monitoring and within exploration of suitable structure for waste repositories. Miligal cooperates with the Czech Geological Survey, universities and the Czech Academy of Sciences.

**Institute of Physics of the Earth** is a branch of the Masaryk University which specializes in the monitoring and research of seismic activity at local, Central European and global levels. The results of its research represent, among other, important parameters to assess the seismic risks in the Czech Republic.

**Research Centre Řež** deals with research, development and innovation in the energy sector, especially in nuclear energy. The company has been involved in many research and development programmes, including research of the new generation of nuclear reactors, strengthening the material and technical basis of nuclear energy research in the Czech Republic.





## The Project in Numbers

3

Czech organizations participating in the implementation of the project

60

researchers involved in the project

4

designs and assembled experimental installations for high temperature CO<sub>2</sub> sorption for corrosion testing of structural materials

2

mathematical models of the high temperature carbonate loop process

1

documentation for the construction of a pilot installation for the research of high temperature CO<sub>2</sub> sorption using carbonate loop in pilot conditions

12

tested samples from the most important mining locations in the Czech Republic

1

database of industrial sources in the territory of the Czech Republic emitting high volumes of CO<sub>2</sub> in the air

1

environmental impact and benefit assessment of CO<sub>2</sub> sorption using carbonate loop based on LCA method

2

public workshops

Experimental equipment on high temperature CO<sub>2</sub> sorption.  
Photo credit: Marek Staf

Project Promoter  
**University of Chemistry  
and Technology in Prague  
(Czech Republic)**

Grant  
**CZK 20,219,265**

Partners  
**ÚJV Řež, a. s.  
(Czech Republic)**

**Czech Technical  
University in Prague  
(Czech Republic)**

## **Research of High Temperature CO<sub>2</sub> Sorption from Flue Gas Using Carbonate Loop (HITECARLO)**

The project was focused on CO<sub>2</sub> removal from flue gas using calcium based sorbents at high temperatures. It seems to be an advanced flue gas decarbonization technology, which is currently being developed at several top-class research institutes around the world. The project research team was composed of staff of the Faculty of Environmental Protection Technology of the University of Chemistry and Technology Prague, Faculty of Mechanical Engineering at CTU in Prague and ÚJV Řež, a.s.

Three unique experimental apparatus for monitoring the process of high-temperature sorption of CO<sub>2</sub> into calcium sorbents were constructed, which have been used for tests of calcium sorbents from different sites in the Czech Republic. Adsorption capacity of each sorbent for CO<sub>2</sub> and their decrease in repeated cycles due to the deactivation of the sorbent were estimated. Another laboratory apparatus was built to monitor the process of material-corrosion in the process of high-temperature carbonate loop, on that were tested selected construction materials in different environments. The behavior of materials in different types of environments was evaluated by using of appropriate analytical methods.

The velocity constants for the reaction of CO<sub>2</sub> with sorbent and degradation rate constant resulting from the calcination of limestone in the process have been determined from the experimental data. The parameters were used in a mathematical model of the process of high-temperature carbonate loop 250 kWth output that was built at CTU in Prague. ÚJV Řež, a.s. developed a simpler mathematical model of high-temperature carbonate loop, which was subsequently used to design a small pilot device using high-temperature carbonate loop technology with an output of 40 kWth. Project documentation for the manufacture of this device has been prepared.

**Project website:**  
<http://hitecarlo.vscht.cz/?jazyk=en>

“The HITECARLO project allowed us to start research in a new area – high temperature CO<sub>2</sub> sorption from gases. This issue follows up on the research of low temperature CO<sub>2</sub> sorption from gases, which has been successfully dealt with by the main promoter’s facility for many years. The results of the HITECARLO project helped us to receive additional EU funds in order to continue in the research under the Coalbypro project. Students showed a great interest in participation in the relevant research activities.”

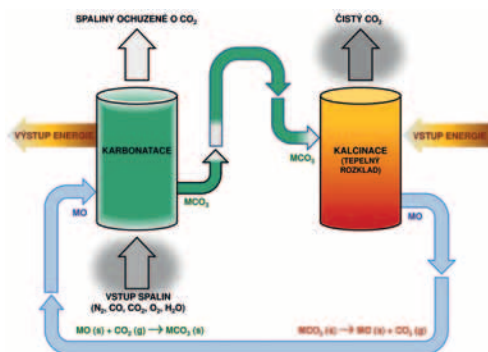
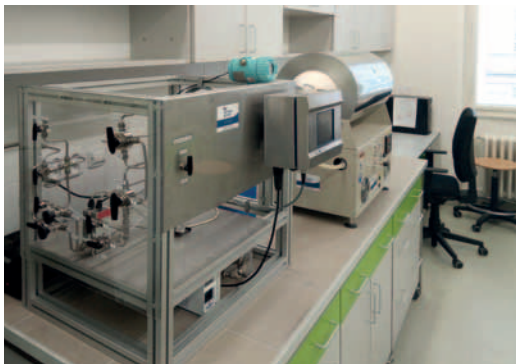
**Mr. Karel Ciahotný**, Project Promoter, University of Chemistry and Technology Prague

“The project was beneficial based on its focus on the perspective method of CO<sub>2</sub> capture – the carbonate loop or, more specifically, the high temperature sorption – with which we have only had marginal experience so far. As part of the project, the promoter team of ÚJV Řež, a. s. developed a mathematical model of the carbonator to optimize its operation and prepared an engineering design of the carbonate loop testing installation. Negotiations with other entities were already initiated in order to implement the designed installation and commence experimental research in this area.”

**Jiří Štefanica**, ÚJV Řež, a. s.

“The project significantly expanded the scope of CCS research which the Czech Technical University – Energy Institute deals with in a long term. The Czech Technical University (CTU) participated in this project by developing a numeric model and the subsequent conceptual design of a pilot carbonate loop unit for the future implementation of this unit in the CTU laboratories. The unit is now prepared for implementation in terms of concept and rating. The results and knowledge developed during the project were already used and will later be used in the preparation of other research projects aimed at further developing CCS research and in preparing the employment of this technology in the Czech practice.”

**Jan Hrdlička**, Czech Technical University in Prague



ⓘ  
Equipment for tests of high temperature corrosion of structural materials samples.  
Photo credit: Marek Staf

Ⓢ  
Scheme of high temperature carbonate loop. Photo credit: Marek Staf

#### Description of the grant recipient:

##### University of Chemistry and Technology in Prague

The University of Chemistry and Technology in Prague is the most important research technology university in the Czech Republic, with a strong international reputation in education, science and research in all fields of chemistry, chemical and fuel material technologies, environmental protection technologies and foodstuff technologies. Its research activities focus on basic and applied research and custom-made research carried out for industrial companies. The University of Chemistry and Technology in Prague has ample experience with the commercialization of research results. It owns a number of patents and utility designs, many of which were implemented on an industrial scale.

#### Description of partners:

##### ÚJV Řež, a. s.

ÚJV Řež, a. s. is a major technological engineering and research organization that contributes to the development of the sustainable energy sector, while respecting its environmental dimensions in the conditions of the Czech Republic. It focuses, in particular, on research and technological engineering services in the power industry which support long-term cost-efficient, ecological, safe and reliable operation of production plants operated by ČEZ, a. s., as well as other entities in the energy sector.

##### Czech Technical University in Prague

The Czech Technical University in Prague, as the largest technical university in the Czech Republic, or its Faculty of Mechanical Engineering, to be more precise, focuses on tertiary education as well as on science and research in technical fields. The scientific research and creative technical activities are carried out as part of specific research, by solving projects financed from departmental resources, from grant agency resources, funds as well as international programmes, or by solving tasks under direct cooperation with the Czech Academy of Sciences, research institutes and the industry.





# The Project in Numbers

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- 1 Norwegian project partner
  - 2 types of educational specialized exhibitions on the CCS issue (Mobile Exhibition v. Exhibition in the VIDA! science centre)
  - 93 lectures for secondary/primary schools
  - 17 information workshops for public administration bodies and forums for the public
  - 5 thematic workshops and field trips on CCS
  - 1 teaching CCS laboratory set up at the Faculty of Science of the Masaryk University
  - 1 block subject on CCS for the Masaryk University Students
  - 1 competition for secondary schools
- 

Vernissage of a traveling exhibition  
at the Observatory and planetarium  
Brno, April 16, 2015. Photo credit:  
Ema Wiesnerová

Project Promoter  
**Masaryk University,  
Brno (Czech Republic)**

Grant  
**CZK 9,516,393**

Partner  
**Norges Teknisk-  
Naturvitenskapelige  
Universitet / NTNU  
(NO)**

## **Carbon Capture & Storage – Sharing Knowledge and Experience**

The project was aimed at presenting, to both the general public and the expert community, the carbon dioxide capture and storage technology (CCS – Carbon Capture & Storage) in its generality and links to the global climate problems, and to reproduce experience with this technology from countries that have already introduced the CCS technology in practice.

The project implementation team was composed of experts on the issue coming from both the Faculty of Science (specialized technical terms of CCS) and the Faculty of Social Studies of the Masaryk University (economic and communication aspects of CCS). The science-oriented part of the team collected relevant data of natural scientific and technical nature related to CCS technologies, building – in particular – on the lessons learnt about practical CO<sub>2</sub> storage in Norway and the United States of America, and summarized also the ongoing activities in this field within the Czech Republic. The social science-oriented part of the team dealt with the methods of communicating this information to the public in order to enable the society to develop, based on the relevant data, a realistic idea about the risks and potential of CO<sub>2</sub> storage in geosphere and, thus, make the society ready to initiate a possible discussion about the employment of these technologies in the Czech Republic.

The project followed up on the priorities for scientific and research activities of the Masaryk University (MU) and its two faculties, the Faculty of Science and the Faculty of Social Studies, and opened possibilities for their further development and, where appropriate, establishing expert links. In the project, the promoter team benefited from the experience gained, from projects with similar focus, such from the project on “Energy infrastructure and its impact on energy security” financed by the MU Grant Agency.

**Project website:**  
<http://shake.sci.muni.cz/en>



### Description of the grant recipient:

The main project promoters within the **Masaryk University** were **Department of Geological Sciences of the Faculty of Science of the MU** and **Department of International Relations and European Studies of the Faculty of Social Studies of the MU**.

For many years, the **Institute of Geological Sciences** has been dealing with a wide range of geological, geochemical, hydrogeological and environmental disciplines. It covers the field of geodynamic development of the Earth and the development of life from the Paleozoic era up to the present, the processes of formation of igneous and metamorphic rocks and their minerals, geochemical development of the environment affected by human activities, hydrogeology, geoarchaeology and landscape development in the Quaternary Period.

The **Department of International Relations and European Studies** focuses, in the long term, on social aspects of energy, energy security, influence of energy on international relations, how regulation affects the use of energy in the society, or how energy infrastructure is accepted at the local level.

### Description of partners:

**NTNU**, Norwegian University of Science and Technology in Trondheim, is mainly responsible for tertiary education in science and technology in Norway and is a leading educational institution for engineers.



The Deans of the Faculty of Science and the Faculty of Social Sciences are starting their exhibition in VIDA! Science centre. Photo credit: Kateřina Zachovalová



Discussion with public (Příbram, 25. 1. 2016). Photo credit: Martin Knížek



Block subject on CCS (Brno, 17. 3. 2016). Photo credit: Martin Kopecký



**NTNU – Trondheim**  
Norwegian University of  
Science and Technology



## Promotion of bilateral cooperation

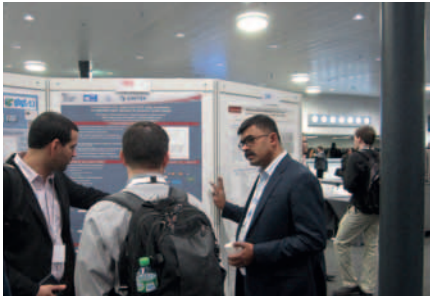
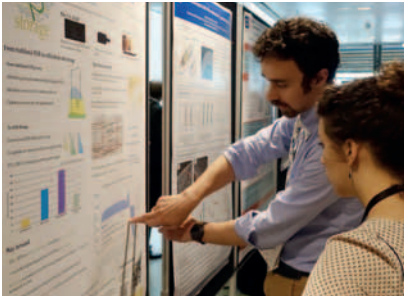
Promotion of bilateral cooperation was already made possible within the project budgets where 3 out of the 4 projects had a Norwegian partner involved in the implementation. This cooperation consisted, in particular, in joint execution of specific research activities within the projects, including project meetings, bilateral workshops, seminars, expert field trips, as well as participation at international conferences in the Czech Republic, the Europe and the USA.

In addition, the CZ08 programme (similarly to other programmes) included the Fund for Bilateral Relations at Programme Level. The allocation of CZK 5.1 million was used to support additional activities within the projects receiving support, which targeted, predominantly, further development of bilateral and international cooperation and, at the same time, promotion of results achieved by the CZ08 programme projects.

That project representatives actively participated in major international conferences, three of which were associated with bilateral workshops.

These included for instance:

- **8<sup>th</sup> Trondheim Conference on CO<sub>2</sub> Capture, Transport and Storage (TCCS-8)** in Trondheim (Norway), June 2015
- **International Pittsburgh Coal Conference** in Pittsburgh (USA), October 2015
- **13<sup>th</sup> Conference on Greenhouse Gas Control Technologies (GHGT-13)** and a Polish-Czech-Norwegian workshop on **“Cooperation between forerunner and follower countries in CCS research: The example of Norway and the Czech Republic”** in Lausanne (Switzerland), November 2016.
- **9<sup>th</sup> Trondheim Conference on CO<sub>2</sub> Capture, Transport and Storage (TCCS-9)** and a meeting in Trondheim (Norway), June 2017



REPP-CO2 project results explained at the GHGT-13 conference in Lausanne.  
Photo credit: Vít Hladík

Presentation of project outputs Study of CCS pilot technologies for coal fired power plants in the Czech Republic at the GHGT-13 conference – S. Roussanly and R. Anantharaman (SINTEF ER).  
Photo credit: Václav Novotný

The enhancement of cooperation was also supported through short-term placements of CTU researchers to SINTEF ER in Trondheim where they worked jointly on solving a specific partial task in cooperation with SINTEF mentor/consultant, including the possibility to use the technological background of both Norway institutions.

Czech Geological Survey together with IRIS presented their project and its results at the **78<sup>th</sup> Annual Conference of EAGE (European Association of Geoscientists & Engineers)** which took place in Vienna in June 2016, as well as at **CO<sub>2</sub> GeoNet Open Forum** (May 2016) in Venice where they, in addition, organized an associated half-day workshop which focused on presenting and discussing the REPP-CO2 results and on reinforcing cooperation with other ongoing and upcoming pilot projects on CO<sub>2</sub> storage in Europe. The Czech Technical University in cooperation with SINTEF ER prepared also a draft project (grant application) for the potential future cooperation under the newly established EU Innovation Fund, which follows up on the NER300 programme or under other support schemes in the EU (e.g. Horizon 2020).

Two of three bilateral meeting were supported and attended by the Programme Operator (Ministry of Finance) and the Programme Partner (Ministry of the Environment of the Czech Republic). The active cooperation of the Norway Research Council must be also highlighted.

Information about the projects was also published in international technical journals, such as Energy Procedia, Environmental Earth Sciences, Przegląd geologiczny, etc.



Vanishing Wonders of Nature, Athabasca  
Glacier, Alberta, Canada - September 2015.  
Photo credit: Monika Vitvarova



# Paperwork that really works!

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**4** projects and more than 20 other bilateral initiatives

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in an amount of  
more than CZK

**118** mil. implemented between 2015–2017

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## Contacts

**Ministry of Finance of the Czech Republic** – Programme Operator  
[czp@mfcz.cz](mailto:czp@mfcz.cz)

**Ministry of the Environment** – Programme Partner  
[www.mzp.cz](http://www.mzp.cz)

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**Frontpage picture:** Lower Antelope Canon,  
Arizona, USA. Photo credit: Václav Novotný

[www.eeagrants.cz/en](http://www.eeagrants.cz/en)  
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