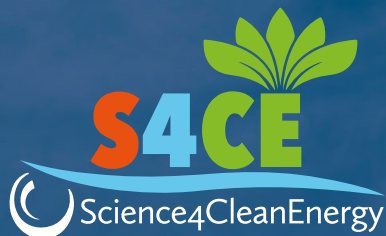


Science For Clean Energy



<http://science4cleanenergy.eu>

Why is the project important?

Engineering sub-surface geo-energy operations is essential for our society. Operations such as carbon sequestration and geothermal energy can be seen as necessary to reduce the carbon footprint of our expanding society, while the production of hydrocarbons is needed to secure our standards of living until renewable energy sources are available in sufficient amount.

Sub-surface geo-energy operations, however, carry intrinsic environmental risks. Quantifying the possible risks, identifying best practice procedures, implementing mitigation strategies and, when necessary, remediation methods is required for the responsible implementation of such operations.

What is the project about?

S4CE is a 10M EUR project implemented by a multi-disciplinary consortium of world-leading academics, research laboratories, SMEs and industries.

The project includes fundamental studies of fluid transport and reactivity, development of new instruments for the detection and quantification of emissions, analysis and modelling of micro-seismic events, and testing of cement casings.

S4CE deploys cutting-edge instrumentation in three existing* field sites:

- the CarbFix site in Iceland;
- a deep drilling/deep geothermal operation in Cornwall (UK)
- and a 4450 m gas-water bearing well in St. Gallen (Switzerland).

S4CE will maintain a transparent dialogue with all stakeholders, including the public at large, and share best-practice procedures between North America and Europe.

* Drilling operation/realization of wells at the Cornwall site planned for 2018/2019

International Collaborations

S4CE builds on existing international collaborations:

Deep Carbon Observatory (DCO, <https://deepcarbon.net>)

The DCO, funded in 2009 by the Alfred P. Sloan Foundation, enabled one-of-a-kind instruments (e.g., a combination of gas-source mass spectrometers and multiple-collector inductively coupled plasma-source mass spectrometer) able to differentiate biogenic and thermogenic methane, and innovative tools for extracting micro-organisms from deep in the sub-surface (PUSH50).

Energy and Geoscience Institute (EGI, www.egi.utah.edu)

EGI is the world's largest university-based global consortium for industry cost-shared upstream research. EGI has produced over 800 applied technology reports and geoscience research solutions. Technical competences of EGI include, but are not limited to shale characterization, interpretation of seismic data, geomechanics, petroleum engineering, and fluid inclusions.

Marcellus Subsurface Energy and Environmental Laboratory (MSEEL, <http://mseel.org>)

MSEEL, funded by the U.S. Department of Energy/National Energy Technology Laboratory has the objective of *'providing a long-term field site to develop and validate new knowledge and technology to improve recovery efficiency and minimise environmental implications of unconventional resource development'*.



What is the foreseen impact of the project?

S4CE will develop new technologies to detect gas leaks, new tracers to follow fluid migration in the sub-surface and to identify the source of sub-surface fluids, as well as new sensors for assessing the integrity of cements used in sub-surface geo-energy operations.

S4CE seeks to implement innovative technologies within the field sites to monitor, manage and mitigate environmental risks.

S4CE will develop software and models to predict, control and ultimately reduce the environmental risks associated with the sub-surface geo-energy operations considered by the consortium partners. The models developed encompass multiple length and time scales, from atoms to the environment at large.

Ultimately, S4CE seeks to provide a scientific workflow for informing policymakers and the wide public. S4CE will organise a series of outreach events that include public presentations, presentations at scientific meetings and conferences, publication of journal articles and of dissemination material, as well as best-practice recommendations.

**Check out our website for more information
and up-to-date events:**

<http://science4cleanenergy.eu>



Consortium

The S4CE consortium includes 22 partners, representing ten academic institutions, three subsurface industry energy operators (one of which is a SME), seven industrial partners (SME's/industries), and three major research institutes, across nine countries.



Partners

University College London (UCL) – **UK**, Université Lyon 1 Claude Bernard (UCBL) – **France**, Haelixa LLC (Haelixa) – **Switzerland**, Geothermal Engineering Ltd (GEL) – **UK**, TWI Ltd (TWI) – **UK**, Imperial College of Science Technology and Medicine (Imperial) – **UK**, MIRICO Ltd – **UK**, geomecon GmbH – **Germany**, University of Eastern Finland – **Finland**, Université de Bretagne Occidentale (UBO) – **France**, Stadt St. Gallen (St. Gallen) – **Switzerland**, Software for Chemistry & Materials B.V. – **Netherlands**, Orkuveita Eykjavíkur SF (OR) – **Iceland**, HASKOLI ISLANDS (UI) – **Iceland**, Institut de Physique du Globe de Paris (IPGP) – **France**, Association Pour la Recherche et le Développement des Methodes et Processus Industriels (ARMINES) – **France**, Eidgenoessische Technische Hochschule (ETH Zürich) – **Switzerland**, Eni S.p.A. (Eni) – **Italy**, Università degli Studi di Salerno (UNISA) – **Italy**, GeoThermal Engineering GmbH (GeoT) – **Germany**, Università degli Studi di Napoli “Federico II” (UNINA) – **Italy**, Q-con GmbH (Q-CON) – **Germany**, Instytut Geofizyki Polskiej Akademii Nauk (IG PAS) – **Poland**



Université Claude Bernard
ifc Lyon 1



Haelixa

Imperial College
London

MIRICO

GEL
Heat and Power from the Earth
GEOTHERMAL ENGINEERING LTD.



UNIVERSITY OF
EASTERN FINLAND

geomecon
GmbH

UBO
Université de Bretagne Occidentale

sgsw
St.Galler Stadtwerke



SCM
Software for
Chemistry &
Materials

OR
Orkuveita
Reykjavíkur



ARMINES



ETH zürich



Institute of Geophysics
Polish Academy of Sciences

GeoThermal
ENGINEERING

Q-con
GmbH
Geothermal
reservoir
engineering

UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 764810.

This flyer reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.

