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Science for Clean Energy

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Competitive low-carbon energy

D2.2 Mid Project Report on Ethical Conduct

WP 2 – Ethical Oversight

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Key word list

Ethical Risks, Ethical Oversight, Risk Mitigation Strategies

Definitions and acronyms

Acronyms	Definitions
CCSU	Carbon capture and storage and utilization
EGS	Enhanced Geothermal Systems
ESAB	External Science Advisory Board
EAB	Ethics Advisory Board
LCA	Life cycle analysis
S4CE	Science 4 Clean Energy
WP	Work Package

1. Introduction

The consortium Science 4 Clean Energy (S4CE) has the ambition to develop and implement new and unique technologies beyond the state of the art for sensing and monitoring, to assess the environmental footprint of geo-energy sub-surface operations in EU and to extract the added value of a multi-sensor approach in managing sub-surface operations. The innovations that are considered as part of this consortium include new instruments development, implementation of new models, testing of new protocols for characterization of rock samples.

The practical applications that are considered within the consortium include various sub-surface geo-energy applications, which include carbon capture and storage and utilization (CCSU), enhanced geothermal energy production (EGS), hydrocarbons processing and unconventional hydrocarbons production. These technologies attract vast public attention, and they present several risks. It is expected that progress in the consortium could both have high impact, and also generate significant public attention.

S4CE has the goal of delivering the unbiased and independent assessment of the environmental footprint related to geo-energy sub-surface operations. As such, S4CE will have as primary impact the assistance to policy making in relation to CCS, EGS and the development of unconventional hydrocarbons. During this project many data will be obtained. To be useful for policy makers, these data will have to be consolidated and made easy to digest. For this purpose, S4CE will develop/implement bespoke risk-assessment protocols.

The European Commission recognizes that public concern regarding sub-surface operations will persist as long as legal uncertainty and a lack of transparency remain, especially regarding unconventional hydrocarbon production. S4CE acknowledges that the public, both near and far from sub-surface operation sites, is ultimately affected by geo-energy applications. S4CE will address public concerns and will maintain active dialogue with all stakeholders.

1.1 General context

The general goals of the consortium, listed above, stem from the fundamental nature of the proposed research and development plan proposed to the European Commission and supported by Horizon 2020. It is understood that significant commercial interest is related to the research activities proposed by the S4CE consortium.

As a consequence, it is recognized that there might be a potential conflict of interest between scientific integrity, commercial interest, and public discussions. It is necessary to ensure that the reports, deliverables, public dissemination events and scientific publications from the consortium adhere to the highest ethical standards.

To ensure that such ethical standards are upheld, S4CE has designed Work Package 2: Ethical Oversight. Work Package 2 will provide recommendations to mitigate ethical risks.

The main tasks of this Work Package are:

Task 2.1 – Dual and Misuse Use

The consortium will develop instruments and deploy them to measure induced micro-seismicity, gas emissions, and transport of fluids in the sub-surface. This WP will suggest strategies to prevent the use of this information and methods along goals that are not consistent with the consortium's objectives.

Task 2.2 – Non-EU Countries

The research success of the proposed activities depends on the collaboration with research sites in Iceland and Switzerland, and potentially USA and Canada. This WP has the task of ensuring that the research practices implemented by our partners in these countries will be consistent with the EU norms and regulations.

Task 2.3 – Defensive/Offensive Use and Sensational Interpretation

Because of the significant emphasis on the environmental impact of sub-surface operations, it can be tempting for researchers to achieve short-lived fame by providing sensational interpretation of research results, as well as to pursue fast research results implementing un-ethical methods and procedures. This WP will recommend strategies to prevent such events from happening and for S4CE to maintain a balanced and independent role in recommending policy changes based on the independent assessment of the environmental risks associated with sub-surface geo-energy operations in Europe.

1.2 Deliverable objectives

The objective of Deliverable D2.1 was to summarize the possible ethical risks that could be faced by the S4CE consortium, to describe the methodological approach that was put in place to ensure that the consortium adheres to the highest standards of ethics, and to present the composition of the Ethics Advisory Board. In this Deliverable D2.2, progresses are summarized. D2.2 includes in particular implementation of Tasks 2.1 and 2.2 and plans to raise awareness among researchers involved in the S4CE project on the defensive/offensive use and sensational interpretation making the core of Task 2.3. This latter will benefit from the recruitment by IPGP of Michèle Barbier, PhD, who is an ethic expert with ample experience with H2020 requirements.

2. Summary of activities and research findings

The S4CE consortium has put in place a process for approving each and all publications or public presentation of the results achieved within the S4CE consortium. Each publication (entire manuscript for peer-reviewed journal publications or abstract for conference presentations) is shared among the General Assembly members. Comments and recommendations are shared and incorporated in the revised publication before it is submitted externally. This is intended to minimise the risks associated with:

1. Possible exaggeration of the implications of the results, which could grab public attention but also miss-inform the public;
2. Use of proprietary data that are not ready for public dissemination;
3. Defective interpretation of data;
4. Selective interpretation of scientific data.

Transparent dialogue with the public has been secured. Internal monitoring procedures have been put in place to identify and reduce ethical risks within the S4CE consortium. S4CE seeks to prevent dual and misuse of the results achieved by the consortium, to prevent the sensational presentation of the results or their use in defensive/offensive applications. Because the R&D activities conducted involve non-EU Countries, S4CE monitors that the highest ethical standards are implemented in each R&D activity conducted by consortium partners. The monthly Work Package Leaders teleconferences allow maintaining careful supervision on all activities.

Task 2.1: S4CE partners are developing instruments and technologies to measure induced micro-seismicity, emissions, and transport of fluids in the sub-surface, among other activities. During this first period, IPGP and UCL reviewed the proposed activities, and suggested strategies to prevent the use of the methods that are being developed, as well as the information S4CE partners generate, to deliver goals other than those consistent with the consortium's objectives. So far, the R&D activities conducted within the consortium have been considered not prone to dual use or misuse.

Task 2.2: During the first period, S4CE partners conducted research in non-EU countries such as Switzerland and Iceland. Our supervision suggests that the highest ethical standard have been applied during these research and development activities, consistent with those required by the EC.

Task 2.3: The whole S4CE consortium, and UCL and IPGP in particular have maintained close supervision on the R&D activities conducted within the consortium, on the deliverables submitted to the EC (which are in general public), as well as on abstracts for public presentations and on articles submitted for publication. It has been ensured that the results have not been sensationalised, which could be tempting given the public attention on environmental aspects of geo-energy sub-surface operations. Every effort has been made to ensure that no defensive or offensive use could be made of the S4CE results.

In support of Work Package 2, S4CE has established the Ethics Advisory Board (EAB), who review scientific and engineering progress achieved by the S4CE consortium, oversees the results and the publications from the S4CE consortium and ensures that the activities conducted within the consortium adhere to the highest level of standards. The EAB composition was presented in Deliverable D2.1 and a representative (Alwyn Hart, UK Environment Agency, alwyn.hart@environment-agency.gov.uk) was present at the S4CE 1st Annual Consortium Meeting that was held in Reykjavik, Iceland in September 2018. Dr Hart joined the Advisory Board to provide feedbacks on WP2. In particular, it was underlined that WP suffered at that time from similar communications shortcomings as the other WPs and that more people should be involved. While Tasks 2.1 and 2.2, as well as the associated methodological approaches, and the risk mitigation strategies were well developed during the first period of the project, the EAB emphasized that the topics covered in the project may rise concerns related to research integrity and conflicts of interest perceived or real. In particular, the work described could be construed as “enabling”, that is as supportive/permissive of sometimes controversial industries. As participating institutions have ethics reviews and check lists, it was assumed that all WPs and S4CE overall have been subject to these reviews but it was underlined that WP2 might usefully remind everyone of these obligations, and codes of conduct from, e.g., relevant learned societies or FP7 and H2020 materials on “responsible research” meant for projects such as s4CE as well. WP2 has indeed an opportunity for a “good news” item and to lead the rest of the project viz “clean” energy systems. While there is potential for environmental harm from waste, spills, etc., S4CE can contribute to understanding and mitigating these risks. Overall, WP2 would benefit from contributions from the ethics review board and professional/informed advice on best-practices protocols, and legal obligations.

The points raised by the EAB relates to WP2, Task 3, and a reflection has been initiated to improve its implementation in addition to workflows already in place at partner institutions to handle scientific publications as well as proprietary data and outcomes related to the work of Ph.D. students and post-docs. Notably, plans were developed to raise awareness among researchers involved in the S4CE project on research integrity including the defensive/offensive use and sensational interpretation making the core of Task 2.3. As a consequence, partner IPG as the host of the WP2 leader has recruited Michèle Barbier, PhD, an ethic expert H2020:

Michèle Barbier (www.sciencethics.org)
- Ethics Expert H2020, European Commission
- Executive Director, Institut de Science et Ethique,
- Scientific officer, CIESM, the Mediterranean Science Commission
MBarbier@sciencethics.org

With the aim to have all the partners involved and properly answer ethical questions in a collaborative way, round tables will be organized at the S4CE 2d Annual Consortium Meeting, which will be held in Italy in September 2019. One full day is required to include a presentation from Dr Barbier as an introduction of the work that has to be done, as well as round tables for few hours to discuss specific questions. At the end, a restitution is expected from all the working groups. At least 2 representatives of each partner are expected to actively participate, including Ph.D. students or post-docs hired in the project, and a permanent researcher or WP leader. Based on these discussions Dr Barbier will led the writing of a publication with all the participants as coauthors. This publication will be the final deliverable of WP2. It will include recommendations on the best ethical practices in the scientific problematics S4CE is tackling with and how raising awareness of researchers on these questions. As an illustration, Dr Barbier has led similar workshops for ocean observation. Marine scientific understanding is fundamental to managing human activities that affect this environment, and ocean observations have a particularly important role in enhancing the knowledge base of our oceans. In that field, as in the S4CE domains, scientists have to act in an ethical way and apply all the fundamental principles. She delivered with marine scientists an article highlighting the core values applicable to ocean observation, which can then be improved and adopted as part of geo-ethics and the stewardship of the Earth system:

Ethical recommendations for ocean observation
Michèle Barbier et al., *Adv. Geosci.*, 45, 343-361, 2018
<https://doi.org/10.5194/adgeo-45-343-2018>

Dr Barbier will be introduced to the S4CE partners during the mid-term review meeting planned in May in London. She will also provide her support to the EAB to ensure that the EU standards of ethical conduct are upheld both within the EU, and outside when the research results will be employed by S4CE. In particular, S4CE is a consortium that includes many nations, within the EU but also beyond. Sub-surface geo-energy operations are critical for maintaining and expanding the standards of living in the modern western society. As such, much is at stake and depends on the independent assessment of the environmental impact of the various technologies, which will be enabled by S4CE. With the Ethics Advisory Board she has the task to provide recommendation to ensure these important outcomes are achieved, to ensure that the results are transparent, and also that the innovations are deployed correctly and that the outcomes of the research are correctly interpreted and communicated to all stakeholders.

EAB – Ethics Advisory Board

Chairperson: Dr Ian Davey, UK Environment Agency

Composition:

Name	Email
Davey, Ian	ian.davey@environment-agency.gov.uk
Helga Bardadottir (Iceland)	helga.bardadottir@uar.is

The Chairperson of the Ethics Advisory Board is Dr Ian Davey, of the UK Environment Agency. Dr Helga Bardadottir is from Iceland. She is the Head of Division at the Department of Oceans, Water and Climate at the Ministry for the Environment and Natural Resources in Iceland. Both Dr Bardadottir and Dr Davey confirmed their commitment to the S4CE consortium.

3. Conclusions and future steps

In addition to the risk assessment that has been performed with respect to ethical oversight of the research and development activities proposed within the S4CE consortium and to the mitigation strategies that have been put in place, an ethic expert H2020 has been hired to support the Ethics Advisory Board that has been established formerly and apply recommendation from it within the project. In particular, a collaborative ethic event is planned during the S4CE 2d Annual Consortium Meeting that will be held in Italy in September 2019 and from which we expect a publication highlighting the core values applicable to subsurface sciences, which can then be improved and adopted as part of geo-ethics and the stewardship of the Earth system.

A procedure to vet all publications from the consortium has been put in place and has been successfully implemented.