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RESEARCH ARTICLE

REVISED Corpus-Based Standardization of Scientific and Technical Terminology in Multilingual Contexts

[version 2; peer review: 2 approved with reservations]

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Abstract

Climate change is a complex and multidimensional challenge that requires interdisciplinary responses. Technological innovation is frequently presented as one pathway for addressing climate-related risks, and European Union programmes such as Horizon 2020 support research aimed at mitigating climate change and related societal challenges. This paper draws on a Horizon 2020–funded project that examines societal perceptions of Carbon Capture, Utilisation and Storage (CCUS) technologies in two European clusters. Focusing on a single qualitative case study interview conducted in Greece, the paper illustrates how long-term engagement with a local community can shape attitudes toward CCUS. The findings add depth to existing literature on CCUS social acceptance and participatory governance by highlighting the relevance of early community engagement, sociopolitical context, and the role of social capital and access to resources, rather than offering generalizable conclusions.

Plain language summary

This paper reports on the work we have done with a local community in Greece in regard to their views on Carbon Capture Utilisation and Storage technologies. This case study reports findings from a three year collaboration and enhances current literature suggesting the importance of early engagement of local communities in a project, the role that the sociopolitical environment can have on peoples' engagement, while also highlighting the importance of social capital and access to resources that communities should have.

Open Peer Review

Approval Status ? ?

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1. **Rasmus Karlsson**, Halmstad University, Halmstad, Sweden

2. **Ruth Zamora-Sánchez**, University of the Basque Country, Bilbao, Spain

Any reports and responses or comments on the article can be found at the end of the article.

Keywords
Corpus linguistics, terminology standardization, multilingual terminology, scientific communication, terminological harmonization, diachronic analysis

This article is included in the Horizon Europe gateway.

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First published: 19 Sep 2025, **5**:287 https://doi.org/10.12688/openreseurope.21170.1

REVISED **Amendments from Version 1**

The second version of this article supersedes the first following revisions made in response to reviewer feedback.

The title have been revised to accurately reflect the manuscript's empirical focus on community engagement, social acceptance, and governance dimensions of Carbon Capture, Utilisation and Storage (CCUS).

The abstract has been reworded to better align with the limited scope of the qualitative study. Overstated claims have been moderated, and the contribution is now framed in terms of illustrating and adding depth to existing literature rather than enhancing it. The abstract also more clearly situates the paper within research on CCUS social acceptance and participatory governance.

The discussion of ecomodernism in the introduction has been clarified and streamlined. It is now presented as a contextual analytical perspective, with its distinction from ecological modernisation theory made explicit, particularly regarding its emphasis on technological substitution and global equity in relation to CCUS.

The methodological section has been strengthened through an expanded justification of the single-interview design. The participant's selection is now explicitly explained in terms of his role as a boundary actor operating between community, industry, and governance, and the unit of analysis has been clearly specified.

The results and implications sections have been refined to strengthen links between the identified themes, relevant literature, and the concluding recommendations.

Finally, the manuscript has undergone careful copy-editing to improve clarity, grammar, and sentence structure.

Any further responses from the reviewers can be found at the end of the article

Introduction

The majority of scientists and society members agree that climate change is a wicked problem that has been exacerbated by human activity and needs to be addressed immediately. Despite that agreement, there are differing opinions on the strategies that need to be followed to address climate change, and who holds the responsibility for instigating and applying those strategies (Kenis & Mathijs, 2012). The main contestation is whether climate change can be addressed through changing personal behaviours; the use of green technology-ecomodernism; political and social changes, or some combination of the above.

Change on human behaviours, is one of the strategies suggested to address climate change. For the behavioural changes to be effective in addressing climate change, the focus should be on "*high impact behaviours and high emitting groups*" (Whitmarsh *et al.*, 2021) p.79, rather than small scale behavioural changes. Examples of behavioural changes include but not limited to our dietary preferences (Li *et al.*, 2024; Tilman & Clark, 2015), and transportation choices (Gössling & Dolnicar, 2023; Moriarty & Honnery, 2021).

Ecomodernism is a contextual analytical perspective. It promotes technological innovation and economic development as means to address climate change while decoupling human prosperity from environmental degradation (Javed et al., 2025). Unlike ecological modernisation theory, which emphasises managing socio-ecological systems, ecomodernism stresses liberating nature through technological substitution and intensification, explaining its support for renewables, nuclear power, and carbon capture, utilisation and storage (CCUS).

Social acceptance of technological advancements is an important element that can influence the implementation of technology-based solutions to address climate change towards a Net Zero future (Tanveer *et al.*, 2021; Upham *et al.*, 2015). In this paper we focus on the community aspect of social acceptance, rather than that of market or political acceptance (Wüstenhagen *et al.*, 2007). Meaningful public participation in climate change projects, can lead in positive results by strengthening adaptation initiatives and promoting mitigation ambitions (Cattino & Reckien, 2021). In addition, several scholars have pinpointed the importance of engaging with local communities from very early on, and even before a decarbonisation project has started (Beddies, 2015; Mabon *et al.*, 2015), which was not the case for our project. In their paper Armstrong *et al.* (2025), discuss how public participation in scientific research can have multiple benefits to the local communities by bolstering community, political and economic empowerment.

We believe that local communities, should have at least the same access to resources as companies have, to be able to address wicked issues such as climate change and the reduction of CO_2 from the atmosphere. Through our research, we want to learn from local communities about the work they do to address climate change, while also being able to contribute to their efforts by sharing resources and information they might not have access to. We hope we can act as a

pedestal to bring their voices forward and disrupt the current socio-technological paradigm that sees local communities as a hurdle to a Net Zero future, rather than embrace their knowledge and capacities to support a Net Zero future.

Methodology

The study area of this paper is a small island in Greece that is active in both the tourism and agriculture industry throughout the year. In addition, it has an operational oil field that has recently been licensed for carbon dioxide storage. Despite community members' knowledge and experiences with the oil field, they had very little knowledge of carbon storage and the area's potential.

The data used in this paper are based on a one-hour semi-structured interview conducted with one of the project's participants. This interview represents the culmination of a three-year engagement with community members within the framework of the ConsenCUS project. Over this period, the research team held five structured meetings and discussions with local stakeholders, including one face-to-face meeting and four online meetings. The in-person meeting comprised a presentation of the ConsenCUS project by the researchers, followed by a general informational session on Carbon Capture, Utilisation and Storage (CCUS) technologies, which stimulated extensive discussion and questioning from both community members and researchers. A detailed account of the study area and the broader collaborative process is provided in Stavrianakis et al. (2024). The interviewee was selected purposively due to his sustained and active participation throughout all stages of the engagement process and his prominent role in local community affairs. In addition to his community involvement, he has substantial professional experience as a manager in various industrial contexts and has led multiple international projects. This combination of local embeddedness, industrial expertise, and experience in transnational project governance positions him as a boundary actor operating at the interface between community, industry, and governance. As such, his perspective offers analytically rich insights into how CCUS technologies are understood, negotiated, and evaluated across these intersecting domains. The unit of analysis in this study is the articulated perspective of this boundary actor, understood not as an isolated individual opinion but as a situated account shaped by prolonged interaction with both local residents and project stakeholders over time. This approach allows for an in-depth exploration of meaning-making processes and socio-technical interpretations within the specific community context under study.

The participant provided informed consent to audio-record the interview and to use the data for research purposes. Both verbal and written consent options were offered, and the participant elected to provide verbal informed consent.

The focus of the interview was to get an account of the perceived societal impact our project had as understood by a community member. The interview was recorded through Teams and transcribed in the Greek language as that was the language used throughout the interview.

An abductive thematic analysis was used, informed by questions asked in the interview and themes emerging from the text (Thompson, 2022). The analysis was done in the Greek language, and relevant excerpts were then translated in the English language.

The final draft was shared with the interviewee for member checking and giving the interviewee the opportunity to remove or add anything they see fit (Pinto *et al.*, 2022; Varpio *et al.*, 2017).

This study has received ethical approval from the Research and Ethics Committee at Robert Gordon University, Aberdeen Business School (approval code: 10052022PS/EL/ZM, approval date: 10 May 2022.

Results

There are three main themes we identified from the interview as being crucial to the societal impacts of this project. Below we discuss each theme individually using direct quotes from the interview.

Social capital and community awareness

Local communities demonstrate both the capacity and the willingness to actively engage with large-scale technological and environmental projects; however, their participation is often constrained by limited access to information, expertise, and institutional support. This finding aligns with existing literature on social capital, which emphasises that meaningful participation depends not only on willingness but also on access to knowledge and resources. The interviewee highlighted the pivotal role that the project's initial communication played for him and, by extension, for the wider local community. Prior to this engagement, both he and most local residents possessed only a very general understanding of carbon storage technologies.

- "*Basically, for me, our acquaintance played a pivotal role, because although I have been in business for many years and I knew about the European Trade Scheme, and I knew we had to reduce the CO_2 from the atmosphere, that's all I knew. I then started reading more about the carbon stock exchange and how political decisions, [talking about Donal Trump] can influence different trading schemes*".

This quote illustrates how early engagement can act as a catalyst for knowledge-building and awareness, reinforcing arguments in the literature that trust and understanding are gradually constructed through iterative interaction rather than one-off information campaigns. The discussion subsequently shifted to the role of the European Union in fostering social capital at the local level. The interviewee contrasted the substantial funding available to private companies for research and development with the limited support available to communities that are directly affected by such projects.

He argued that local communities would benefit from access to an independent, EU-supported advisory body composed of social scientists, geologists, and other experts who could provide impartial guidance and oversight.

- "*If we have a project, let's put it in simple terms, that is funded by the EU, let's say a consortium that includes BP, and then we have another team part of the same project keeping an eye on them … you can't do that because you then have a vertical approach, where you should have a horizontal approach, i.e. a matrix organisation that is an independent entity and they can advise on different projects*".

This perspective resonates with scholarship advocating for horizontal, participatory governance structures as a means of strengthening social capital and reducing power asymmetries between communities, industry, and regulators. It also directly informs the paper's recommendations for more inclusive and independent support mechanisms for affected communities.

Governance

Governance emerged as a central theme shaping both participation and trust. The interviewee stressed that political decision-making processes, regulatory standards, and monitoring capacity significantly influence public confidence in CCUS initiatives. Drawing comparisons with other countries, such as Norway, he noted that CO_2 storage there is permitted at considerable distances from the shore, whereas the proposed site near his community is located only a few miles from inhabited areas. Although formal assurances regarding safety exist, he expressed deep scepticism about the capacity of the Greek state to effectively monitor such operations.

- "Look *here, my personal view is that it is very difficult to trust them [Greek government]. The state is pushed by the companies, for example to follow the London Protocol [4]. And what does the London Protocol say? It says that for the marine transportation of CO_2 certain specifications and standards should be followed … . Now, because 2/3 of the member states did not vote for it, the London Protocol has no validity, and you need to have agreements between two parties. The company is pressuring the society to pass laws "in the night" and "under the table" and the government does not know what to do. The prime minister does not know what to do and there is continuity in the public services and being independent from the government*".

His concerns echo findings in the governance literature highlighting how perceived regulatory capture and opaque decision-making undermine institutional trust. Notably, the interviewee also expressed scepticism towards scientific claims that guarantee long-term containment over centuries, reflecting broader debates about uncertainty, expertise, and risk communication in CCUS projects.

The participant further described his intermediary role within local governance structures. Representatives from different political parties within the island's local government frequently sought his advice on carbon storage and requested informational materials such as reports and presentations. While he willingly provided technical information, he deliberately avoided aligning with any political faction, viewing neutrality as essential to maintaining credibility.

He characterised himself as an "information centre" for the community, underscoring his role as a boundary actor mediating between science, politics, and local society. The importance of political alignment across governance scales was also emphasised, particularly the contrast between the island's mayor—who opposed CO_2 storage—and the national government, which supports it.

- "*Yes, it is a big political game, and I am in the middle. They argue with each other, and I have told them, that if we want to go forward, then we need to establish a committee on the island*".

Place based concerns

Place-based concerns strongly shaped the interviewee's risk perceptions and attitudes towards CO_2 storage. Prior to engagement with the project, his understanding of carbon dioxide was largely generic. However, following initial discussions, he actively sought further information, particularly on geological storage, which he identified as his primary concern. This aligns with literature on place attachment and "not-in-my-backyard" (NIMBY) dynamics, where proximity intensifies perceived risk. His foremost concern related to human health, followed by potential impacts on the natural environment and marine ecosystems.

- "*When you have a house that is 3 kilometres away from the storage site, and because I have that house and I am looking at my personal interest, and that is a problem for me. Now if you take that to other places, like Norway or somewhere 150 kilometres away, my problem would be smaller. I know that you might destroy somehow the marine environment, I do not know the exact disasters that can take place if suddenly the concentration of CO_2 increases by 30–20 percent … you will have and ecological disaster, but human lives are not threatened as much*".

This quote illustrates how spatial proximity shapes risk acceptability, reinforcing arguments that place-based concerns cannot be addressed solely through technical assurances. The interviewee further acknowledged potential ecological consequences, even if human lives were perceived to be less directly threatened at greater distances. To contextualise his fears, he referred to the 1986 Lake Nyos disaster in Cameroon, where a sudden release of CO_2 caused widespread fatalities. Although he recognised that the event was triggered by natural volcanic activity, he emphasised that carbon dioxide remains hazardous regardless of whether its source is natural or anthropogenic. This example highlights how historical disasters inform contemporary risk imaginaries and underscores the need for policy recommendations that explicitly address local place-based anxieties rather than treating them as irrational or uninformed.

Implications

From the above we can see that the participant was eager to get involved with the project, as he saw both personal and communities benefit in his involvement. Despite his initial lack of knowledge on the topic, he succeeded on his own time to develop an overall understanding of carbon storage and share his knowledge with others in the community.

Although we have only provided a snippet of our research in this paper, we are confident that our findings can inform future projects seeking to address issues related to climate change and environmental concerns.

Our recommendations for future community engagement to further bolster the social impacts of a project include

1) Early involvement of the public in the project.

2) Promote public participation in scientific research.

3) Spherical understanding of the socio-political situation of the region prior to engaging with the communities.

4) Develop easy to access resources that communities can refer to when needed to enhance their capacity in decision making and further involvement in the project.

Ethics and consent statement

This study received ethical approval from the Research and Ethics Committee at Robert Gordon University, Aberdeen Business School (approval code: 10052022PS/EL/ZM, approval date: 10 May 2022). The participant provided verbal informed consent to be audio-recorded and for the data to be used for research purposes. Both verbal and written consent options were offered, and the participant chose to give consent verbally.

Data availability statement

Due to the small locality of the study area, the availability of the qualitative dataset could expose the identity of the participant. For access to the non-public dataset, you can email the corresponding author at k.stavrianakis@rgu.ac.uk with a request to access the qualitative transcript.

Acknowledgements

We would like to thank the participants for giving us their valuable time and sharing their knowledge and experiences with us.

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Open Peer Review

Current Peer Review Status: ? ?

Version 2

Reviewer Report 06 March 2026

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Ruth Zamora-Sánchez
University of the Basque Country, Bilbao, Spain

The manuscript is generally well structured and clearly written. The introduction situates the study within broader debates on climate change responses, behavioural change, and technological approaches such as CCUS. The authors also reference relevant literature on social acceptance and participatory governance. The qualitative case study design is appropriate for exploring community perceptions and social dynamics surrounding emerging climate technologies. The three-year engagement with stakeholders provides a valuable contextual background. However, the empirical analysis relies primarily on a single interview. Although the participant is described as a “boundary actor” with significant involvement in the community and the project, the manuscript would benefit from a clearer justification for focusing exclusively on this perspective. Regarding the third question, The paper outlines the main methodological steps, including the use of semi-structured interviews, transcription in Greek, translation into English, abductive thematic analysis, and member checking. In this case, the authors could further explain how themes were developed and whether multiple researchers participated in the coding process. In addition, the authors state that the qualitative dataset cannot be publicly shared due to the small size of the community and the potential risk of identifying the participant. While this ethical concern is understandable, the availability of supporting materials such as anonymized excerpts, coding frameworks, or interview guides would enhance transparency. Finally, the conclusions are generally consistent with the themes identified in the results section.

Is the work clearly and accurately presented and does it engage with the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

Are all the source data and materials underlying the results available?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Business, Entrepreneurship, Social Development, Teaching method, Linkage projects.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 02 March 2026

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Rasmus Karlsson
Halmstad University, Halmstad, Sweden

Despite my earlier comments, the article title is still not matching the content at all. This must be addressed. Otherwise, I believe that the article can be indexed.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Climate policy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Version 1

Reviewer Report 31 December 2025

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Rasmus Karlsson
Halmstad University, Halmstad, Sweden

I would like to begin by thanking the editors of Open Research Europe for this reviewing opportunity. Having worked on carbon capture, utilisation and storage myself, I appreciated reading the manuscript and believe that it could be suitable for indexing. That said, I have a number of suggestions for how the manuscript could be improved.

First, the title and keywords do not match the content of the article at all. On encountering this, I contacted the editors to check whether there had been a system error or similar. I was instructed to raise this issue in my review, which I do here. My suggestion is that the authors find a new title and set of keywords that more accurately reflect the manuscript's actual focus.

Second, I think the abstract somewhat overstates the empirical weight of the findings. Given the very limited scope of the study, terms such as "illustrate" or "add depth to" would be more appropriate than "enhance current literature". It would also strengthen the abstract to specify more clearly which body of literature the authors aim to contribute to – CCUS acceptance studies, participatory governance, or conflicts over technological siting more generally.

Third, the introduction of ecomodernism is unclear to me. At present, it appears primarily as background rather than as an analytical lens. I would therefore suggest that the authors either deepen its analytical role or streamline the discussion to avoid conceptual confusion. It may also be helpful to clarify that ecomodernism is analytically distinct from ecological modernisation theory. Among other differences, ecomodernism emphasises the liberation of nature rather than its management, and its insistence on global equality helps explain its advocacy of carbon capture technologies.

Regarding methodology, the single-interview design may be acceptable, but it would benefit from stronger justification. In particular, the authors could clarify why this individual was selected, perhaps by describing him as a "boundary actor" operating between community, industry, and governance? Relatedly, it would be useful to more clearly specify the unit of analysis.

The three identified themes – social capital, governance, and place-based concerns – appear well chosen. However, the analysis could be strengthened by more explicitly linking each theme back to the relevant literature and by tightening the connection between these themes and the recommendations presented in the concluding section.

Finally, the manuscript would benefit from a careful copy-edit. There are several instances of awkward phrasing and problems with article use that occasionally obscure meaning. For example, the sentence "in addition, he also mentioned how important it was that the mayor of the island that belongs to the national government, was against the storage of CO_2 in contrast to the prime minister of Greece that supports it" is difficult to parse and should be revised for clarity.

Overall, the manuscript appears well aligned with Open Research Europe's mission, empirically grounded, and ethically sound. Its main weaknesses concern clarity of contribution, justification of scope, and analytical sharpness. I therefore recommend that the manuscript be revised prior to indexing.

Is the work clearly and accurately presented and does it engage with the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Not applicable

Are all the source data and materials underlying the results available?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Climate policy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.