



DEFINING SOCIAL ACCEPTANCE OF CCS TECHNOLOGY

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Workshop 4: Risk governance and risk perceptions

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- The Task 1.3 of CCSP
- Public acceptance of CCS in Finland – Survey results
- Review of the key terms: acceptance – acceptability
 - of (new) technology
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The objective of the presentation

to review the recent literature regarding CCS technology and analyse how social acceptance is understood.

The questions:

- 1) How the terms social acceptance and acceptability are defined in the CCS literature?
- 2) Is there clear coherence among scholars or is it possible to identify various ways to understand social acceptance?



CCSP Task 1.3

Environment, Health, Safety and Sustainability questions

To understand factors and interactions influencing on public acceptability of CCS.

Literature review:

- map the latest theoretical approaches and lessons learned and
- apply the findings to the Finnish context

Public acceptability of CCS from the point of view of different Finnish actors:

- identify the key actors
- interview them
- map the spectrum of issues related to acceptability of CCS in the Finnish context



Research methods

Quantitative research methods:

- Public opinion surveys
(e.g. Miller et al. 2007; Energia-asenteet 2009; Special Eurobarometer 2011)
- Stakeholder surveys
(e.g. ACCSEPT Report 2007; Shackley et al. 2009; Johnsson et al. 2010)

Qualitative research methods:

- (In-depth) interviews
(e.g. Wallquist et al. 2009; Hansson & Bryngelsson 2009)
- Focus groups
(e.g. Oltra et al. 2010)
- Case studies
(e.g. Heiskanen 2006; Desbarats et al. 2010)



Limits of surveys in relation to CCS

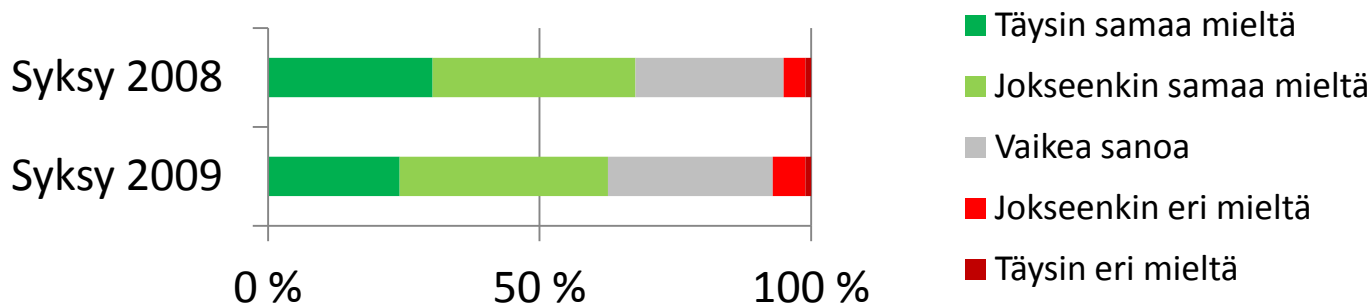
Traditional public surveys not very suited to examine public opinions about CCS

- public awareness and knowledge of CCS has consistently been found to be low,
- opinions reported mainly of people who know little or nothing about the issue,
- such opinions referred to as "pseudo opinions" or "non-attitudes" are very unstable and hardly useful for the use of policymaking (Terwel et al. 2011).



Public acceptance of CCS in Finland (1)

Kuvio 24. ”Koska maailman energiasta tuotetaan valtaosa fossiilisilla polttoaineilla vielä vuosikymmeniä, kaikkein kiireellisintä olisi kehittää järjestelmät hiilidioksidin talteenottamiseksi ja varastoinniseksi” (%).



Lähde: Suomalaisten energia-asenteet 2009,
http://www.sci.fi/~yhdys/eas_09/eas_kuva-24.htm



Public acceptance of CCS in Finland (2)

Lähde:

SPECIAL EUROBAROMETER 364

**Public Awareness and Acceptance of CO₂ capture and storage
REPORT**

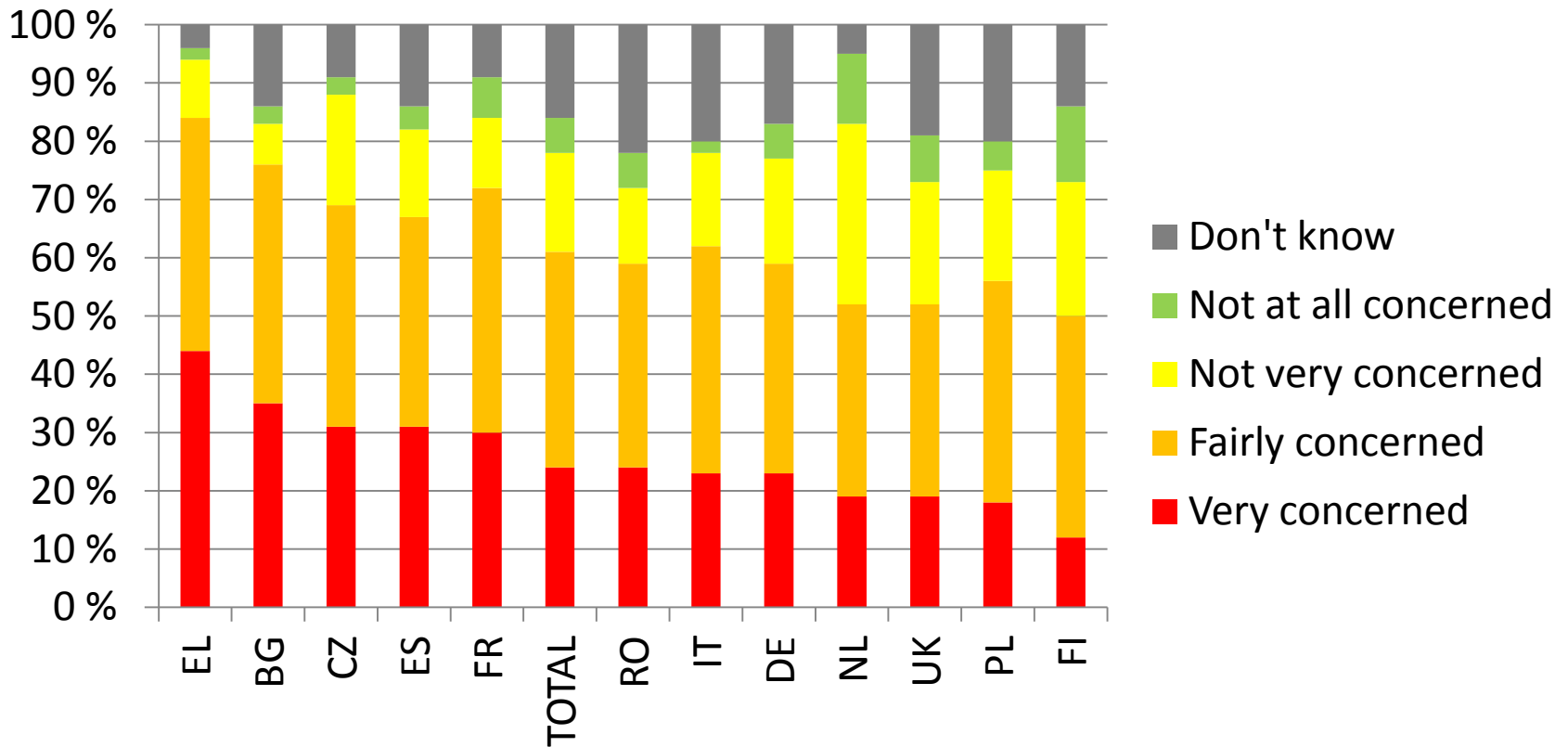
Fieldwork: February – March 2011

Publication: May 2011

http://ec.europa.eu/public_opinion/archives/ebs/ebs_364_en.pdf

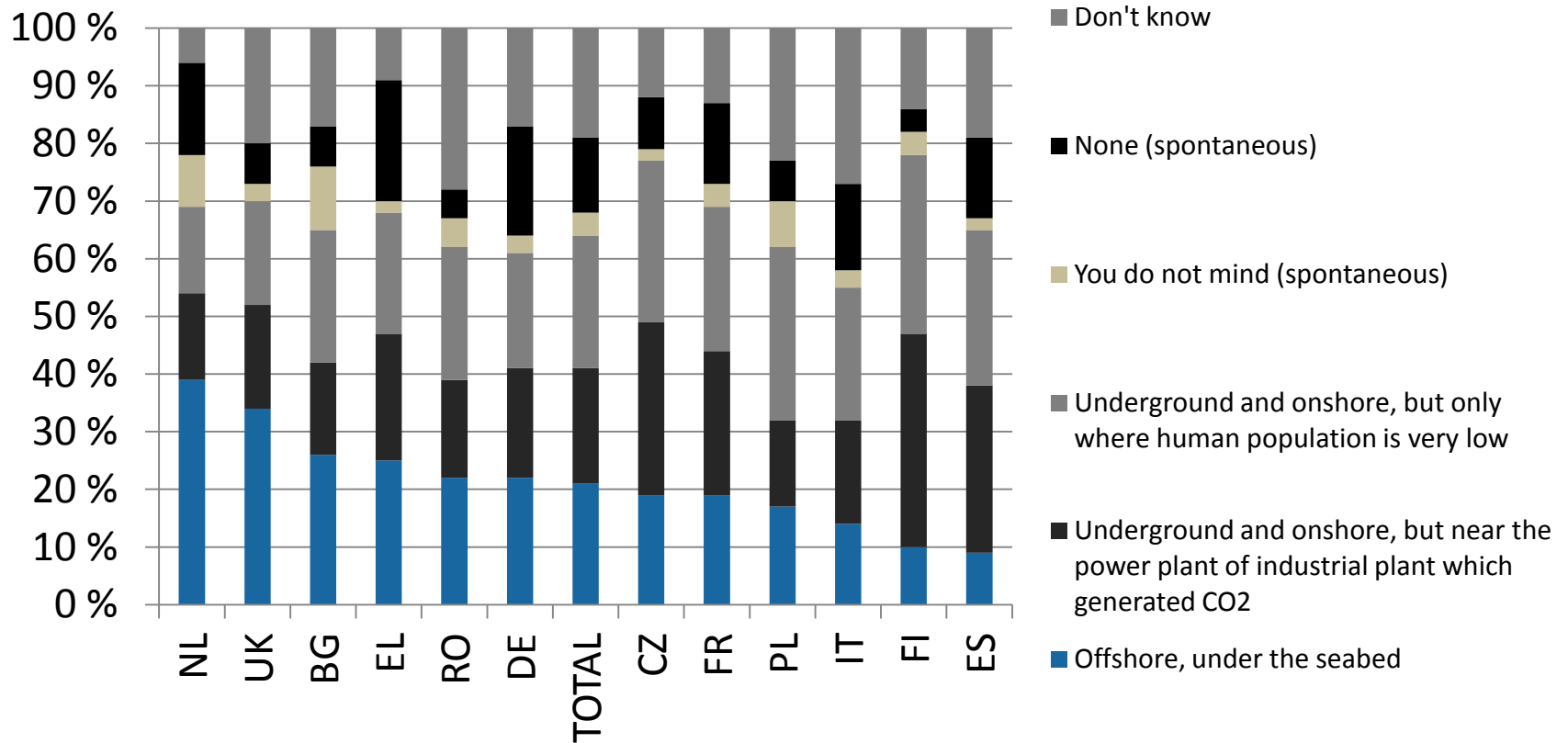


QE16. If a deep underground storage site for CO2 were to be located within 5 km of your home, do you think that you would be...? (Special Eurobarometer 364, p. 91)





QE18. For future use of CCS in the EU, which of the following options concerning the storage of CO2 would you prefer? (p. 104)





Terminology

- Public acceptance
- Public acceptability
- Public support
- Public perception
- Public engagement
- Risk analysis
- Risk communication

Terms often used interchangeably, but warrant closer look and refined definitions.

(Greenberg and Gauvreau 2010, Public Acceptance and Communications, slide 2)



Social acceptability

a condition that results from a judgmental process by which individuals (1) compare the perceived reality with its known alternatives; and (2) decide whether the “real” condition is superior, or sufficiently similar, to the most favorable alternative condition . . .

Brunson also notes that, in the long run, it may be more useful to refer to this individual social-psychological process as leading to judgments of acceptability. He reasons that judgments are made at the individual level but evolve in response to a host of factors; e.g., a person’s evaluation is susceptible to the influence of others around him or her, which in turn also provides an impetus for group behaviors. Thus, the term “**social acceptability**” could be reserved for references to some aggregate form of public consent whereby judgments are shared and articulated by an identifiable and politically relevant segment of the citizenry. (Schindler et al. 2002, 4.)



Public *acceptability* and public *acceptance* (1)

- public acceptability
refers to people's willingness to consider the technology seriously
- public acceptance
the formal decision to implement the proposal

Wolfe et al.

A Framework for Analyzing Dialogues over the Acceptability of Controversial Technologies,

Science, Technology & Human Values (2002) 27(1), 134–159.



Public *acceptability* and public *acceptance* (2)

- For Wolfe et al. **acceptability deals with the extent which the technology conforms with social values and norms “sufficiently well to be placed on the table as a viable alternative to other technologies”.**
- A technology might be technically feasible but not meet the test of social acceptability; **acceptability is a continuum** not a dichotomy; and that **acceptability may change over time**, positively and negatively.
- ... it is evident that acceptability and acceptance are both value-laden terms with different dimensions, and have become politicized concepts. (Flynn 2007, 17.)



- The STAGE project identified broad and strongly-overlapping features that characterize the governance of science and technology in Europe:
- ... a tendency across Europe to view broad public deliberation and dialogue as a one-off hurdle to be cleared at a time judged appropriate by government or scientific institutions, often quite late in the decision-making process. (Irwin 2007, 33)



Conceptualizing social acceptance

Wüstenhagen et al. (2007) contribute to the clarity of understanding by distinguishing three dimensions of social acceptance:

- **Socio-political,**
 - the broadest, most general level
- **Community acceptance**
 - refers to the specific acceptance of siting decisions and renewable energy projects by local stakeholders, particularly residents and local authorities
- **Market acceptance**
 - in a wider understanding of market acceptance, the focus is not just on consumers, but also on investors
 - probably the most under-researched angle of this field



Three, sometimes interdependent categories of social acceptance Wüstenhagen et al. (2007, 2684)

| Socio-political acceptance | Community acceptance | Market acceptance |
|---|---|--|
| <ul style="list-style-type: none">• Of technologies and policies• By the public• By key stakeholders• By policy makers | <ul style="list-style-type: none">• Procedural justice• Distributional justice• Trust | <ul style="list-style-type: none">• Consumers• Investors• Intra-firm |



The socio-psychological determinants of relevance to understanding public acceptance of technologies

Gupta et al. (forthcoming in 2011)

Socio-psychological determinants of public acceptance of technologies: a review, *Public Understanding of Science XX*

- The focus of the review confined to social psychological approaches to understanding societal responses to technology
- The aim:
to present an overview of the socio-psychological determinants of relevance to understanding public acceptance of technologies by analyzing the literature in social psychology and risk perception
- The main research question:
to identify which socio-psychological determinants of public acceptance of technology have been studied in the social science literature in the field of social psychology and risk perception



Public rejection of technologies has frequently resulted in negative consequences for the commercialization of technologies.

- Unpredicted events and accidents affecting the public
- Resulted in fear and reluctance to adopt certain technologies,
- Resulted in consumer rejection of products of these technologies

... emphasize the importance of public acceptance in strategic development, application and commercialization of technologies.
(Gupta et al. 2011, 2.)



Ten controversial technologies studied

in total 292 papers, time scale between 1977 and 2008

- nuclear power,
- genetic modification,
- information and communication technology (ICT),
- pesticides
- genomics,
- cloning,
- mobile phones,
- hydrogen power,
- nanotechnology,
- radio frequency identification technology (RFID)

CCS not included



Public acceptance of technologies continues to be a focus of scholarly attention

- A steady rise in the number of publications and determinants investigated that are found to impact the acceptance (Gupta et al. 2011, 9)
- Most of the research carried out in North America and North-West Europe

“... research into public acceptance of new technologies has tended to occur post-commercialization when public concerns have begun to arise”. (Gupta et al. 2011, 9.)

“... a shift ... from *post hoc* studies to a more proactive effort to identify public opinions and values prior to commercialization”. (Gupta et al. 2011, 9)

- the examination of “society–technology” interactions
- research into non-controversial technologies



The models used to predict public acceptance getting more complex

... models ... increased in complexity, by adding, rather than replacing determinants, 31 determinants

- “Classical” determinants:

risk perception, benefit perception, trust, knowledge, attitude, negative impact, individual differences

- “New” determinants:

heuristics, concern, risk assessment, positive impact, positive value

- Perceived risk

- found to be most frequently investigated determinant

- cited more often than perceived benefits

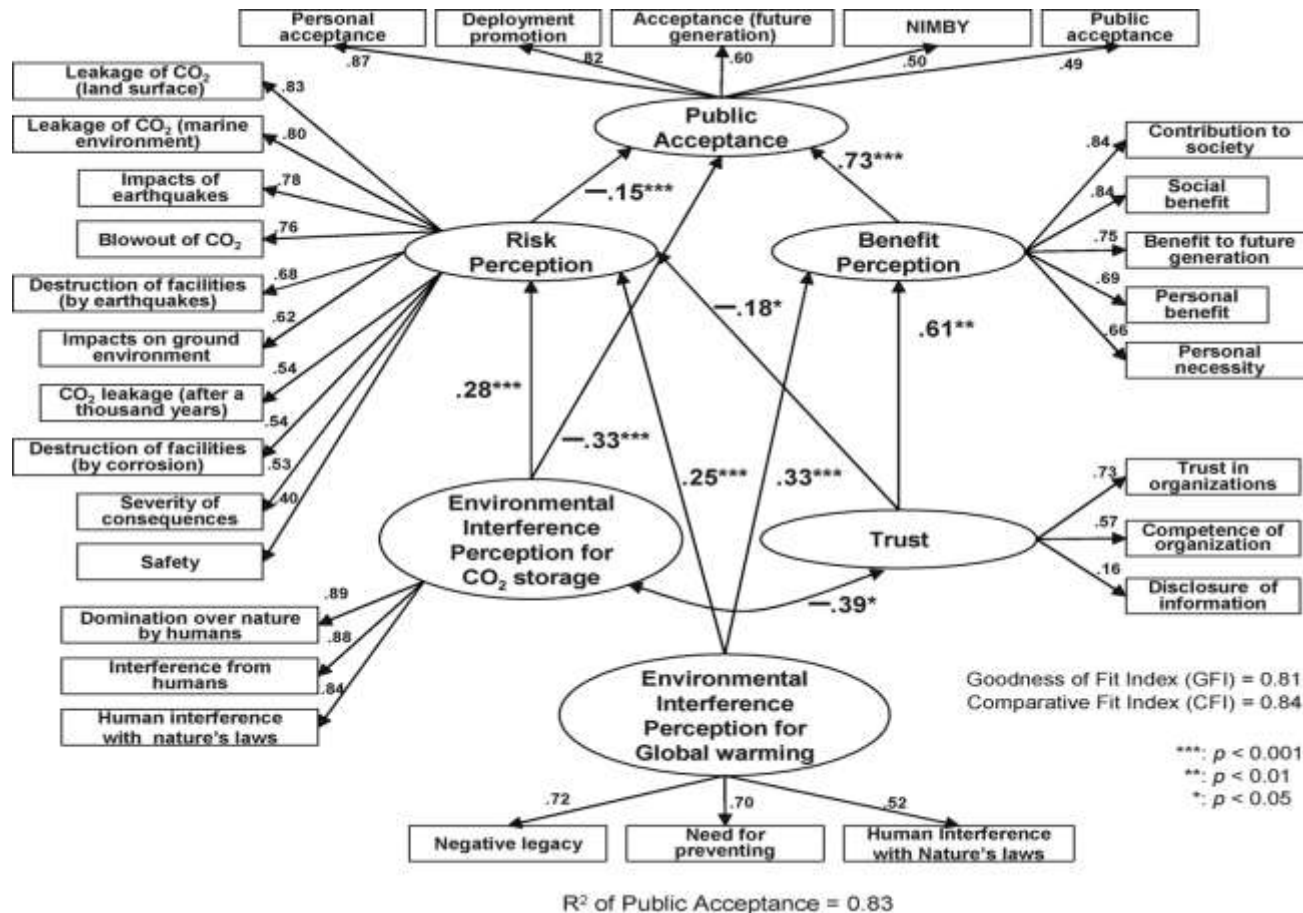
(Gupta et al. 2011, 5, 7–8, 10.)



Tokushige et al.

Public perceptions on the acceptance of geological storage of carbon dioxide and information influencing the acceptance

Int. J. of Greenhouse Gas Control I (2007), p.107





Huijts et al.

Social acceptance of carbon dioxide storage

Energy Policy 35 (2007) 2780–2789

The study in this article focuses on the social acceptance of carbon dioxide storage...

(...)The aim of this article is to analyze public judgments of the acceptability of CCS, in particular how these evolve and get shaped in the social context comprising of the professionally involved actors, and how opinion formation of lay citizens and that of professionally involved actors interact. (p. 2781)

Social acceptance is not just a matter of individual feelings and perceived risks and benefits, but predominantly is a social process. Actors influence each other through various types of interaction. Public acceptance may depend on the views and information rendered available, often through the media, from professionally involved actors, such as the government and NGOs. Obviously, it may be difficult for lay men to understand, select and process this information well and to form balanced personal views on the technology. As a consequence people will have to rely on others. This is where trust becomes important. (p. 2781)



van Alphen et al.

Societal acceptance of carbon capture and storage technologies
Energy Policy 35 (2007) 4368–4380

The aim of this paper is to gain insight into the societal acceptance of CCS in the Netherlands, and to analyze whether and how this can influence further development and implementation of this technology.

Societal acceptance is widely recognized as an important factor influencing the successful development and diffusion of new technologies

Societal acceptance of CCS includes the response of both the lay public and stakeholders. We define stakeholders as agents with a professional interest in CCS. Hence, stakeholders can include industry, non-governmental organizations (NGOs), governments and research institutions. The issues concerning CCS are quite different for the lay public compared to the stakeholders. One of the reasons for this is that the latter nearly always have a defined agenda or set of preferred policy objectives in mind when evaluating CCS, whereas the lay public does not have an a priori viewpoint



Shackley et al.

The acceptability of CO₂ capture and storage (CCS) in Europe: An assessment of the the key deterring factors

Part 2. The social acceptability of CCS and the wider impacts and repercussions of its implementation

Int. J. of Greenhouse Gas Control 3 (2009) 344–356

[W]e turn our attention to the social and political acceptability of CCS and to the wider repercussions of its deployment. With respect to social acceptability, we distinguish between ‘stakeholders’ – who have a professional and/or work-related interest in CCS – and the ‘public’ who do not have such an interest.

In summary, the eventual acceptance of CCS as part of a portfolio of options is likely to depend on the awareness and perceptions of CCS as well as upon the perceived urgency and challenges of addressing climate change more broadly. (...) Public and stakeholder perceptions of CCS will therefore be affected by the level of concern over energy security, climate change and electricity prices, as well as how it is perceived in relation to other generation technologies. (Shackley et al. 2009, 355)



Sala and Oltra

Experts' attitudes towards CCS technologies in Spain

Int. J. of Greenhouse Gas Control 5 (2011) 1339–1345

Together with technical and economic aspects, social and political barriers may influence the implementation of CCS in Spain. Social acceptance is widely recognized as an important factor influencing successful development of new technologies (OECD, 2003).

... the aim of this article is to obtain a comprehensive view of experts' perceptions on CCS development in Spain, in order to gain some insight into the socio-political acceptance of this technology. The study is based on an online questionnaire administered to a sample of experts participating in various CCS projects and involved in the Spanish Technological Platform of CO₂.



Some remarks

- Acceptability a continuum / a process, may change over time
- The difference between acceptability and acceptance
- Diverse definitions of acceptance
 - socio-political
 - societal
 - social
 - public
 - stakeholder
 - market
 - investor
 - consumer
 - community / local
- Growing number of determinants
- Models getting more complex