SIXTH FRAMEWORK PROGRAMME
PRIORITY
FP6-2004-Energy-3, SUSTDEV-1.2.8

Proposal / Contract no. 518351

Project Acronym: CREATE ACCEPTANCE

Project Full Title: Cultural influences on Renewable Energy Acceptance and Tools for the development of communication strategies to promotE ACCEPTANCE among key actor groups

SPECIFIC TARGETED RESEARCH OR INNOVATION PROJECT

Deliverable 3.1, 3.2 and 4
WP2 Draft report:
Factors influencing the societal acceptance of new energy technologies: Meta-analysis of recent European projects

Due date of deliverable: month 19

Start date of project: Feb. 1, 2006

Organisation name of lead contractor for these deliverables: NCRC

Date of preparation: Jan. 31, 2007

Duration: 24 months

Revision: Draft 1

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)
Dissemination Level PU

EXECUTIVE SUMMARY

Introducing the project Create Acceptance

This summary provides results of research that has been conducted as part of the EU-funded project Create Acceptance. Create Acceptance is supported by the European Commission under its Sixth Framework Programme (Project no. 518351). This report describes the results of the activities carried out for the first work package "WP2", which was coordinated by NCRC-Finland. Create Acceptance is coordinated by ECN (the Netherlands), and involves research institutes in Italy (CNR/CERIS), Finland (NCRC), Spain (EcoInstitut), Germany (OEKO), United Kingdom (SURF), France (IAE), Iceland (INE), Hungary (MAKK), Poland (IEO) and South Africa (UCT). More details about the Create Acceptance project can be found at http://www.createacceptance.net.

Often, successful adoption and diffusion of innovations is assumed to be merely an issue of securing the techno-economic dimension. In practice, many technological projects are facing severe resistance from various stakeholders. Aligning the views of these stakeholders and finding an agreed common view on the innovation lies at the heart of good management practices for successful technology development. Successfully diffusing innovations relies on creating the societal acceptance of the technology.

The project Create Acceptance contributes to facilitating the implementation of new and emerging sustainable energy technologies by assessing optimal conditions for the implementation of these new technologies in terms of socio-economic aspects, consumer preferences and citizen needs. The objectives of this project are to increase the competitiveness of RES (Renewable Energy Sources) and RUE (Rational Use of Energy) technologies by developing a tool that can measure, promote and improve social acceptance of these technologies.

Introduction and aim of Work Package 2

Public opinion surveys show widespread support for using renewable energy sources and increasing energy efficiency. Yet new energy technologies often fail to make the transition from research to deployment successfully, and demonstration and early deployment projects can even provoke social controversies. This indicates that our understanding of the non-technical forces shaping the application of new energy technologies, particularly at the local and regional level, is still underdeveloped.

The aim of Work Package 2 has been to make an analysis of the historical and recent acceptance of new energy technologies (energy efficiency and geothermal energy, bioenergy, wind and ocean energy, solar energy, hydrogen and CO2 capture and storage) in the different regions in Europe (Nordic countries, West Europe, Central Europe, and South Europe) and South Africa in order to identify determinants of success and failure. A special focus has been placed on hydrogen, CO_2 capture and storage, biomass, solar and wind energy technologies. The work conducted in WP2 has two major audiences:

1. It provides input for further work within Create Acceptance on the development and testing of a multistakeholder tool for assessing and promoting societal acceptance.
2. It has developed a compendium of best practices for managing social acceptability in the field of new energy technology, based on lessons learned from both good and bad practices in different parts of Europe. This compendium is further framed in an extensive analysis of the conditions for new energy projects in EU Member States.

The present report includes the following deliverables of Work Package 2: D2.1 Database of region profiles, D2.2 Assessing region specific attitude and D2.3 Assessing indicators of success. The present version is a Draft Report, and will be complemented with three more case studies, including the research on South Africa; the final version of the report will be published at the end of 2007.

Research approach and design

A review of prior literature in the field revealed that the phenomenon of ‘social’ or ‘societal’ acceptance is poorly conceptualized. This makes it difficult to compare or accumulate findings from previous studies into a coherent picture of the societal acceptance of new energy technologies in Europe today. Some studies

measure 'public acceptance' in terms of public opinion surveys, others focus on acceptance by specific social groups.

In WP2, we have conceptualized societal acceptance in terms of the social networks that build up around concrete new energy applications, and the ways and extent to which alignment is achieved among the expectations of the project managers and stakeholders, and the resources and demands of the local context. The theoretical foundation of the study is the emerging research tradition of technological transitions. Pilot and demonstration projects are here understood as early encounters of the technology with societal stakeholders, and as such, as important forums for mutual social learning and the development of socially acceptable technological solutions.

In order to study recent and historical controversies and successful applications, a database was collected in the form of previous projects from different parts of Europe and dealing with the different technologies (Annex 1 of this report). This database consists of 22 project case studies (Table 1), and will be complemented with three more case studies by June 2007. Moreover, an overview report of the political, socio-economic and energy profiles of the covered regions, including an overview of general attitude towards the deployment of various new energy technologies in the respective regions has been compiled, which serves as a background and overall context for the case studies (Annexes 2-6 of this report).

Table 1. Overview of the cases in terms of technology and regional coverage.

	Energy conservation	**Biomass**	**Wind**	**Solar**	**Hydrogen**	**$C0_2$ capture and storage (CCS)**	**Other**
WEST EUROPE	Hannover social marketing for energy efficiency (Germany)	Crickdale Bioenergy Power Station (UK) Bracknell Biomass CHP Energy Centre (UK)	EOLE 2005 wind energy programme (France)		London CUTE hydrogen fuelling station (UK)	CRUST CO_2 capture & storage project (Netherlands)	
		Bioenergy Village Jühnde (Germany)			Berlin H_2ACCEPT bus trials (Germany)	Schwarze Pumpe CO_2 capture and storage project (Germany)	
NORTH EUROPE	Low energy housing (Finland)	Västerås Biogas Plant (Sweden) Lund Biogas Plant (Sweden)			ECTOS hydrogen project (Iceland)	Snohvit CO_2 capture & storage project, (Norway)	
EAST & CENTRAL EUROPE		Pannon Power biomass conversion (Hungary)	Suwalki region wind project (Poland)	Pommerania region solar energy project (Poland)			Podhale region geothermal project (Poland
SOUTH EUROPE	Trinitat Nova Ecocity energy efficiency (Spain)	Umbria local biomass projects (Italy)		Barcelona Solar Ordinance (Spain)			
				PV Accept solar project (Italy)			

The cases have been analysed using a five-step framework, developed by project partner SURF, focusing on (1) the visions articulated at early stages of the project and the social interests to which they referred; (2) the actors and expectations involved in the project; (3) the engagement of various publics in the project and the way in which expectations were negotiated; (4) the way the vision was translated into action; and (5) success

in terms of outcomes – i.e., the gap between visions and actualities – and in terms of processes – i.e., the extent to which different social interests were co-ordinated in the project.

A meta-analaysis of the cases has been conducted, allowing us to identify factors influencing societal acceptance that are (a) dependent on specific characteristics of various new energy technologies, (b) dependent on specific characteristics of the national and local context and (c) dependent on procedures for stakeholder participation and project management. On the basis of this analysis, we were thus able to provide recommendations for management procedures that promote the societal acceptance of new energy technologies.

All partners in the Create Acceptance project have participated in the data collection and analysis of the case studies. Moreover, the meta-analysis has also been supported by collaborative inquiry sessions based on preliminary analyses and structured questions. Thus, the project has been able to make use of the multidisciplinary competences present in the project group.

Interim results

One of the important observations of the WP2 research was that societal acceptance is shaped by historical and accumulated experiences of individual new energy projects. The social networks that mobilize around such projects can even extend to the regional and national level. Positive experiences gained at individual sites (in our cases, for example, in Spain and Germany) can expand to a broader regional level or even influence national policies. Likewise, local controversies can expand, as has occurred in the establishment of national-level advocacy organizations in the UK and France.

The previous literature and statistics pointed to some regional, national and local differences in the uptake and acceptance of new energy technologies, including ones that are not fully explained by differences in natural endowments. These differences are not, however, due to inherent characteristics of different nationalities, or even fully explicable in terms of individual policy instruments. They are the result of a co-evolution of new technologies, their institutional contexts, and social action and meaning. One important component in this co-evolution is the way in which individual new technology projects *interact* with their local historical, cultural, institutional, social, economic, material and geographical context. Thus, societal acceptance is not necessarily an issue of accepting or rejecting a specific technology, but rather pertains to the way in which the technology is introduced in a new context. Important features influencing the process include the policy, economic, social, cultural and infrastructural conditions existing in different locations, as well as the timing of projects vis-à-vis changing framework conditions.

In terms of how projects are introduced, many of our findings confirm the observations made in previous empirical and review studies. Some management principles and procedures appear to be widely applicable to many kinds of new energy projects. Socially acceptable projects tend to (1) be locally embedded, (2) provide local benefits, (3) establish continuity with existing physical, social and cognitive structures and (4) apply good communication and participation procedures. Due to the geographical scope of the study and the range of technologies considered, we have also been able to identify some specific contextual factors and features of the different technologies that suggest specific priorities for project managers aiming to achieve societal acceptance.

In the report, we have outlined on the basis of our analysis central challenges that project managers encounter when attempting to introduce new energy technologies in a manner that promotes societal acceptance. These include the challenges of:

1. introducing appropriate projects in appropriate contexts
2. identifying critical issues and stakeholders for evolving technologies
3. reflecting on action at appropriate stages
4. interacting with the ‘right people’ in the ‘right way’
5. combining process success with outcome success

1. The challenge of introducing appropriate projects in appropriate contexts

Different country and local contexts set different conditions for the emergence of societal acceptance. We have identified a set of contextual features that project managers and partners should investigate before launching a project (Table 2). Recent data on some of these issues – pertaining to the national level - are provided in Annexes 2-6. It is important to note that such factors operate on both the national and the local level, and should be investigated separately for both levels.

Table 2. Factors pertaining to the national and local context influencing project success

Factors pertaining to the national and local context
Government policies
• Types of government policies on new energy technologies and related topics
• Stability of national policy
• Policy culture (consensus, negotiation, confrontation)
• Centralisation of national government
Socio-economic factors
• Availability and perception of natural resources
• Energy prices
• Technology and other input prices, costs
• Perception of foreign investment
• Importance of energy independence
• National competing technologies and industries
• Interest in employment opportunities and regional economic development
Cultural factors
• Trust in institutions
• Tradition of top-down vs. bottom-up initiatives
• Environmental awareness
• Historical experiences
• Attitudes to new technology
Geographic factors
• Climate
• Availability of suitable locations

Three kinds of managerial implications can be derived from these contextual factors. Firstly, they can be used to identify more or less suitable contexts for different projects. Secondly, they can be used to alert project managers to special features of the local context that need to be taken into account when designing and carrying out projects. Thirdly, policy makers can use them to develop an awareness of the suitability of different policy contexts for the deployment of new energy technologies. Even more importantly, project managers should make use of all opportunities to explore the context of their projects. Section 7.3 of the report indicates some of the ways in which previous projects have gained knowledge of their context, while at the same time developing relationships with their stakeholders.

2. The challenge of identifying critical issues and stakeholders for evolving technologies

Different technologies and different projects have different critical stakeholders and desirable outcomes in terms of societal acceptance. Table 3 presents some critical issues and success factors for different new energy technologies on the basis of *recent* experiences; with time, new issues may emerge to join them. It is important to note that the critical issues that we have identified are based on a limited set of cases and are highly site-specific. The issues identified are thus indicative of the range and variety of issues arising in connection with different technologies, rather than conclusive or exhaustive. Moreover, it is also important to understand the culturally and historically evolving nature of societal acceptance: some impacts and relationships only become evident in concrete applications of the technologies and in the kinds of social dynamics that they initiate. Hence, societal acceptance is an evolving and changing phenomenon because it does not relate only to the technology itself but to the economic and social networks that build up around it.

Table 3. Critical issues and success factors for different new energy technologies

	Key problems and uncertainties	Factors likely to promote success
Household energy efficiency	High public awareness and participation needed Existing public acceptance high but understanding low Individual investments; high transition and transaction costs Competing technologies	Financial incentives Information campaigns Support through social networks Potential to promise users autonomy from suppliers
Bioenergy	Siting issues Input logistics: managing economics and social and environmental impacts Variable level of public awareness and understanding in different regions	Respecting existing (regional) networks Integrating local information into project design Management of local benefits and drawbacks Potential to enhance local energy independence
Wind power	Siting issues Local costs and benefits and their equitable distribution Land-use intensity Diverging views on landscape preservation Concerns about health and environmental impacts	Adaptation to local context Management of local benefits and drawbacks Involving local residents in the process
Solar energy	Costs Difficulty of developing economies of scale Small-scale applications require significant user involvement Mistrust in technology as a reliable energy source Small-scale PV: gaps in grid connection rules and procedures Insufficient technical experience in installation firms	Possibility to link decision making to other (construction) decisions and specify or mandate simple technologies Demonstration investments at public institutions Potential to enhance local/personal energy independence Prosperous and fresh image
Hydrogen	Siting of distribution infrastructure Reputation of the operator or initiator Relations between expectations and current implementation scale Management of risks	Roots in fresh /clean technology Risk tolerance in context Shared investment Investment relevant to scale Sense of shared benefits
CO_2 capture and storage	Low public awareness and understanding NGO resistance on issues of principle Potential exposure to legislative requirements Immature technology: high investment, low income Perception that large companies are involved in order to improve image Storage and safety issues emerging	High interest in the research community Possibilities for shared investment and common ownership?
Geothermal energy	Risk and environmental impacts depend on local conditions and technology applied In space heating applications, investment competes with other energy sources and other investments	High public awareness Trust in companies and partners involved Positive impact on local air quality

3. The challenge of reflecting on action at appropriate stages

In the context of managing a new energy project, successful reflection on action can be translated into questions that need to be asked at different stages of the project. Table 4 presents a summary of the questions that our case study projects had to address pertaining to the societal acceptance of their projects. We suggest that if projects desire to create societal acceptance, they will start asking these kinds of questions early on, but continue monitoring their social impacts and stakeholder relations throughout the project, and develop a reflective approach to issues and new information arising in the course of action.

Table 4. Questions that can help projects to increase the likelihood of creating societal acceptance

Questions to be answered at the design stage	Questions to be answered during implementation
How does the project interact with the local context (or alternative contexts considered): • what kinds of external effects does it involve; does it require user adaptation? • in which ways might it benefit or harm the local context (physical, economic, social or symbolic) and how equitably are the benefits and risks distributed? • what synergies or competition may the project involve with other ongoing developments? • how does it relate to historical experiences and the existing competences of those present in the local context? Who are potential partners and stakeholders of the project on the local, national and international level: • whose resources could be important for the project: who might be important 'bridges', 'champions' or 'multipliers'? • who might the project influence and who might exert an influence in it? • how does the project relate to its stakeholders' interests and concerns? How will stakeholders be involved and their concerns addressed: • how will stakeholders be informed about the project and how will its vision be communicated? • how will information about stakeholder's concerns be collected? • how early can stakeholders be involved in the project and what aspects of the project design could they influence? • how will different stakeholders interests be represented? • how will stakeholder involvement be integrated in the time frame of the project?	How are communications managed on an ongoing basis: • how does the project keep 'in touch' with its stakeholders (formal and informal channels)? • do new stakeholders emerge as the project evolves? • how can stakeholders monitor the progress of the project and the unfolding of its impacts How is competence developed during the project? • in what ways can stakeholders interact with the project as it unfolds? • what competences are needed for making use of local resources and how do such competences develop? • is there evidence of mutual learning and adaptation? How does the project deal with issues that arise during the project: • issues of representation and division of responsibilities and powers? • resolving potential conflicts among different stakeholders' interests? • dividing attention between stakeholder management and other aspects of project management (technical, operational, market, financial, etc.) When and how should the project 'take stock' and reflect on achievements and remaining problems: • evaluation and milestones? • opportunities for modifying the project according to lessons learned?

4. The challenge of interacting with the 'right people' in the 'right way'

In this context, 'right people' refers to partners that bring resources and support the project but also enable the project to interact with its external environment, and to the stakeholders who are influenced by or can influence the project. The case study projects show that there are no *a priori* reasons for any stakeholder group to represent any other group (i.e., e.g., no obvious reasons for municipal decision makers or NGOs to have the same expectations as local residents). This challenge requires that project managers identify the stakeholders, issues and concerns in the project context (for example, the extent and types of external effects resulting from the project; the potential user adaptation required; and the potential links of the project to broader policy debates).

The 'right way' of interacting ensues from the kinds of concerns, issues and people involved. Examples of better and worse practices in the cases indicate some generic issues: starting early and continuously, the importance of articulating concerns, mutual learning, and the need to ensure clarity of purpose and division of power and responsibilities. Formal structures usually facilitate the process and make it more transparent, empowering and credible, but should be complemented with face-to-face interaction and 'keeping in touch'. Project managers should not only involve stakeholders, but also involve themselves.

5. The challenge of combining process success with outcome success

Taken together, and considered against the historical background, the cases highlight the importance of successful processes – i.e., societal acceptance - for the future of individual projects, and for the future of other similar projects that will follow them, i.e., societal acceptance also has a 'public good' aspect. This is one reason for policy makers and institution-builders to support such efforts, also beyond their immediate impact on outcomes.

Ideally, projects should be successful both in terms of (techno-economic) outcomes and in terms of processes (i.e., societal acceptance). The projects analysed in the case studies show that this is possible, and socially acceptable processes also tend to contribute to successful techno-economic outcomes. Yet in order to achieve successful outcomes, project managers need to consider other aspects of the project, as well, including technological, operational, market and financial issues. Project managers thus face the challenge of dividing their attention among these different management tasks and balancing between the potentially conflicting demands of different stakeholders.

Contribution of the report to the Create Acceptance project

Work Package 2 contributes to the following stage of the Create Acceptance project, Work Package 3, which aims to develop a multi-stakeholder tool for managing new energy projects, in four different ways:

- First, the report provides confirmation of the need to revise the original Socrobust tool, as identified already in the WP1 report (Jolivet et al. 2006). Societal acceptance is indeed one factor that can influence the successful introduction of new energy technologies, and hence project managers need to take into account a broader range of factors than proposed in the original Socrobust tool. One of the fundamental issues raised by this report is that project managers should not only consider how the project can *change its context*, but also how the project can *adapt to its context*.
- Second, the report has identified specific opportunities and threats that relate to the societal acceptance of new energy technologies under the conditions presented by different local and national contexts. This has also allowed us to identify factors that are likely to promote project success, and which are thus desirable features to include in new energy projects where possible.
- Third, the case studies in Annex 1 can serve as 'learning histories' for project managers to explore potential issues that arise in different contexts and in connection with different technologies and project designs.
- Fourth, the report has initiated the task of structuring the issues related to managing societal acceptance by identifying different types of stakeholders and their roles, decisions influencing societal acceptance made at different stages of the project, managerial tasks and questions to be answered in connection with societal acceptance, and potential conflicts that can arise with other managerial tasks. This work will continue in WP3 of the Create Acceptance project.
- Fifth, the report and its underlying analysis have also produced recommendations for how societal acceptance should be understood and investigated in the work of WP3. The methodological approach developed in WP2 demonstrated the importance of the analysis being framed within a systemic, multi-level technological transitions framework. The novelty that the five-step methodological approach developed here adds is that it provides a basis to research the relationship*s* between societal acceptance, technology development and local contexts.