

Factors influencing the societal acceptance of new, renewable and energy efficiency technologies:

Meta-analysis of recent European projects

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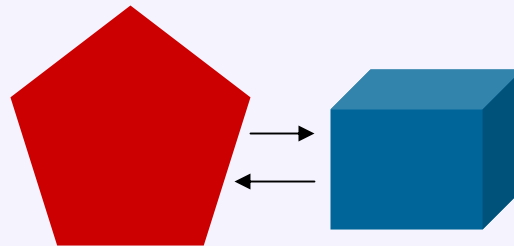
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Aim of the paper

- To identify factors that influence the level of societal acceptance and techno-economic successfulness
 - of **various kinds of energy** projects that aim to mitigate climate change (renewable energy, energy efficiency, new technologies)
 - in various geographic, institutional and cultural **contexts**.



societal acceptance as
mutual alignment
between technology and
context

- To address the challenge of introducing technologies in new contexts
 - but also discuss the generative potential of technology transfer in giving rise to **innovative solutions**



The dataset: 25 projects

Create
Acceptance

	Energy conservation	Biomass	Wind energy	Solar	Hydrogen	CO ₂ capture and storage (CCS)	Other
WEST EUROPE	Hannover social marketing for energy efficiency (Germany)	Crickdale biomass power plant (UK) Bracknell Biomass CHP Energy Centre, (UK)	EOLE 2005 (France)		CUTE London fuelling station (UK)	CRUST project (Netherlands)	'Blue Energy' (North Sea region)
		Bioenergy Village Jühnde (Germany)			H ₂ ACCEPT Berlin bus trials (Germany)	Vattenfall pilot, Schwarze Pumpe (Germany)	
NORTH EUROPE	Low energy housing (Finland)	Västerås biogas plant (Sweden) Lund biogas plant (Sweden)			ECTOS project (Iceland)	Snøhvit CCS at LNG plant, Hammerfest (Norway)	
EAST & CENTRAL EUROPE		Conversion from coal to biomass (Hungary)	Suwalki region wind project (Poland)	Pommerania region solar energy project (Poland)			Podhale region geothermal project (Poland)
			Szeleró Vép wind project (Hungary)				
SOUTH EUROPE	Trinitat Nova's Ecocity(Spain)	Umbria local biomass projects (Italy)		Barcelona solar thermal ordinance (Spain)			
				PV Accept (Italy)			
DEVELOPING COUNTRY CONTEXT				Solar water heaters and PV panels (South Africa)			



Overview of the projects

- in terms of 2 types of successfulness

Create
Acceptance

Other stakeholders' perspectives		'societal acceptance'	
Project manager's		largely successful	mixed or uncertain
largely successful	Bioenergy Village Jühnde Västerås Biogas project Pannon Power biomass Pommerania solar project Barcelona Solar Ordinance PV Accept solar project ECTOS hydrogen project CRUST CO ₂ capture & storage	Hannover energy efficiency Berlin H2Accept hydrogen bus EOLE 2005 wind energy London CUTE hydrogen fuelling station	
mixed or uncertain	Suwalki wind energy Szelero Vep Solar Water Heaters	Low-energy housing, Finland Trinitat Nova energy-efficiency Snohvit CO ₂ capture & storage Podhale region geothermal Solar Home Systems	
largely unsuccessful		Bracknell Biomass CHP Energy Centre Blue Energy Netherlands	Lund Biogas project Umbria local bioenergy (early projects) Crickdale Bioenergy Power Station



Meta-analysis approach

Separate analysis of:

(a) Technology-specific factors

- different issues for different technologies siting issues, public understanding, distribution of costs and benefits

(b) Context-specific factors

- political & policy, socio–economic, cultural, geographic

(c) Process factors: stakeholder involvement & project management

- what were the visions of the project?
- what actors & expectations got involved?
- how were expectations negotiated and aligned?
- how did the visions and expectations change?



Results & implications

- ❖ Successful projects are not 'dropped' into a context, but 'reinvented' locally

Key challenges for project managers:

1. Identifying critical issues and stakeholders for evolving technologies
2. Introducing appropriate projects in appropriate contexts
3. Interacting with the 'right people' in the 'right way' and 'at the right time'
4. Reflecting on action at appropriate stages
5. Combining societal acceptance with techno-economic success

- will be used as input for developing a management tool

Implications for policy makers...



(1) *Identifying critical issues and stakeholders for evolving technologies*

Create
Acceptance

- requirements for user involvement and the need for user adaptation
- economic, social and technical integration of the project
- siting issues and impact on the local economy, social structure and health, safety and the environment
- broader policy debates, issues of principle and overall public perception

	Key problems and uncertainties
Household energy efficiency	High public awareness and participation needed; Existing public acceptance high but understanding low; Small-scale investments: high transition and transaction costs; Competing technologies
Solar energy	Costs; Difficulty of developing economies of scale; Importance of user involvement and user perceptions; Lack of trust in reliability and quality; Insufficient technical experience in installation firms; Problems in access to grid connections
Bioenergy	Siting issues; Management of the economics and social and environmental impacts of input logistics; Variable level of public awareness and understanding in different regions; Concerns about environmental and other local impacts
Wind power	Siting issues; Land-use intensity; Local costs and benefits and their equitable distribution; Diverging views of landscape preservation; Concerns about environmental and other local impacts, Problems in access to grid connections
Hydrogen	Managing public expectations; Management of risks; Siting of distribution infrastructure
CO ₂ capture and storage	Low public awareness and understanding; Immature technology; Perception that companies are involved in order to improve image; NGO resistance on issues of principle; Storage and safety issues emerging?

(2) Introducing appropriate projects in appropriate contexts

Need to consider:

- Political and policy conditions
 - e.g., planning procedures
- Socio-economic conditions
 - e.g., regional development
- Cultural conditions
 - e.g., historical experience with different technologies, trust in institutions
- Geographic conditions
 - e.g., suitable locations
- Timing vis-à-vis conditions

Managerial implications:

- identify more or less suitable project-context combinations
- identify special features, e.g., opportunities to integrate with the local economy, appropriate institutions to partner with, appropriate procedures to involve various stakeholders
- take into account that the implementation of the project will affect the context > assess impacts proactively

(3) Interacting with the 'right people' in the 'right way' and 'at the right time'

'right people':

- partners who bring resources and support the project, enable the project to interact with its external environment
- and stakeholders who are influenced by or can influence the project

'right way' and 'right time':

- depends on the concerns, issues and people involved

- engaging partners from different constituencies, **identifying** stakeholders & their networks
- starting early and continuously, articulating concerns, mutual learning, ensuring clarity of purpose and division of power and responsibilities
- formal structures + face-to-face interaction and 'keeping in touch'
>> **project managers need to involve themselves**

(4) Reflecting on action at appropriate stages

Design stage

How does the project interact with the local context?

- external effects, user adaptation?
- local benefit/harm?
- synergies/competition?
- historical experiences?

Who are potential partners and stakeholders (local, national & international)?

- ‘bridges, champions, multipliers’?
- who is influenced/exerts an influence?
- stakeholders’ interests & concerns

How will stakeholders be involved and their concerns addressed:

- informing about the project
- collecting information about context
- how early & deeply can stakeholders be involved
- how will different interests be represented?
- time-frame?

Implementation stage

How are communications managed on an ongoing basis?

- formal/informal channels?
- new stakeholders?
- how can stakeholders monitor the project & its impacts?

How is competence developed during the project?

- local competence development?
- mutual learning and adaptation?

How does the project deal with issues arising during the project?

- representation & division of responsibilities?
- conflict resolution?
- dividing attention & balancing issues?

Taking stock and reflecting?

- evaluation and milestones
- opportunities to modify project / context?



(5) Combining societal acceptance with techno-economic success

- Societal acceptance is likely to *contribute* to successful outcomes, but it is not always necessary or sufficient
- Project managers face the challenge of dividing their attention among factors promoting societal acceptance and techno-economic success:

•Community relations
•Articulating visions and expectations
•Managing change
•Interaction and learning
•Ongoing dialogue with stakeholders



•Technical & infrastructure issues (e.g. grid access)
•Operational issues (e.g. contractors)
•Market issues (e.g. competition)
•Financial issues (investors, policy instruments)

- Should not be separate activities, but synergistic

The tension between project & context is also a source innovation

- Visions pertaining to new technologies change in response to different local circumstances, expectations and negotiation processess = 'local reinvention'
- Successful demonstration and early deployment projects are important for for user learning and for the evolution of supportive institutions and cultural practices
- Provide 'models' and lessons that others can (and do) learn from
- Example: two projects providing different 'templates' of how biogas technology can be linked to local feedstocks, different kinds of usages and users, and different kinds of cultural meanings

Two different applications of biogas technology

- Jühnde: village in Lower Saxony with 750 inhabitants
 - Local energy independency, participation, ownership
 - Biogas plant + 700 kW CHP plant + 500 kW woodchip burner + district heating system
 - Feedstock: manure + silaged plants
 - Use: electricity & heat for the entire village
- Västerås: city in mid-Sweden with 100 000 inhabitants
 - Co-operation between town & nearby farmers, ongoing change in waste mgmt
 - Biogas plant + reformulation plant producing vehicle fuel equivalent to 15 000 MWh + fuelling station
 - Feedstock: urban waste + silaged plants
 - Use: urban transport





Implications for policy makers

- Societal acceptance is a “public good”
 - experiences from earlier projects influence the societal acceptance of later projects & experiences also spread beyond the local context
 - successful process of development co-creates supportive institutions and cultural practices
 - unsuccessful processes co-create broader institutionalised resistance
- Policy makers have an important role
 - Process of joint learning and the development of know-how with stakeholders & local politicians creates a high level of confidence
- Public policy should support project managers in cultivating an interactive approach to the local contexts:
 - Stakeholder interaction and local reinvention **is not merely as a way to solve local problems** of societal acceptance...
 - but **also as a way to find new innovative solutions** that promote the socio-technical evolution of new, sustainable energy technologies.