SMARTH2 - mobilizing social support for hydrogen in Iceland

Maria Maack is a project manager at Icelandic New Energy, where she works together the general manager of the company and another project manager at promoting hydrogen in Iceland. She has applied ESTEEM as an 'in-house ESTEEM consultant' at Icelandic New Energy.

Maria wanted to develop a structured process for dealing with social and political issues in the hydrogen projects of INE, the hydrogen promoter in Iceland. She also wanted to develop the capacity of INE to communicate better with a wider group of stakeholders interested in hydrogen. Hydrogen is widely accepted in Iceland and people are proud of their hydrogen projects. In spite of news flashes on the company website and countless interviews with news agents from the international media, it was difficult for the public to form an accurate perception of the current status, and their expectations were higher than the company could deliver. Mobilizing social, political and economic support for a vigorous roll-out was thus a challenge.

This case study tells about how she used ESTEEM for these purposes. It is also an example of a case where the 'consultant' is part of the project management team.

Background: INE and SMARTH2

Icelandic New Energy (INE) is a company that promotes the use of hydrogen as a fuel in the transportation sector. INE is owned by the Icelandic holding company Vistorka (a cooperation platform made up of all the major powercompanies and research bodies as well as investment funds) and Daimler-Chrysler, Norsk Hydro and Shell Hydrogen. The company has been involved in developing the hydrogen economy in Iceland since 1999. INE works as an international project manager in demonstrations and research involving hydrogen applications for infrastructure, transportation and backup-power. These projects aim to facilitate Iceland's transition to an economy which is run purely on renewable, local energy sources.

By 2006, the company had run a number of successful pilot projects, including a trial with three hydrogen fuel cell buses and an electrolytic production and filling hydrogen station (ECTOS-project). Along with this initiative several social surveys and inquiries with the public had been made indicating a general interest and positive attitude towards the idea of using hydrogen as a local energy carrier. INE was interested in testing a tool that could help address social acceptability issues for highly innovative technology projects.

ESTEEM was used and developed in one of INE's projects called SMARTH2. SMARTH2 is a demonstration project for hydrogen fuelled vehicles and vessels. The project will test various types of hydrogen-fuelled company cars and other equipment that runs on hydrogen, including a hydrogen auxiliary power unit for a tour ship. The project also aims to demonstrate the operation infrastructure for compressed hydrogen and develop the distribution system, for example by organizing and running a small-scale hydrogen transport service.

Currently there are more than 20 organizations participating in the project. The main parties involved are providers of materials and technology (cars, other vehicle providers, fuel cell provider, storage tanks, operators and maintenance staff of the hydrogen station), the users of the vehicles, administrators and regulators, and different research institutes and universities involved in the derived sociological research. It is worth emphasizing that the project only reports technical outcomes to the equipment providers but the

research is made on the interface between technology and the human factor; the research is on the impacts on society.

The project is based on the vision that Iceland can in the future use hydrogen made with local renewable energy and water as a transport fuel. This will enable the country to cut its carbon dioxide emissions and replace imported fossil fuels with a locally made fuel. The tests are an important (international) learning phase in realizing the large-scale introduction of hydrogen, which will require the development of new equipment and the introduction of a partially new fuel delivery and production infrastructure. Still the projects depend on international manufacturers whereas car industry is not available in Iceland.

Applying ESTEEM

The SMARTH2 project started to use ESTEEM in April-May 2007. As always, this was a busy time for the SMARTH2 project: Its governmental funding had just been announced publicly after years of negotiations with the companies that would be test users of the hydrogen cars and the suppliers of cars and other equipment. But Maria wanted to get an organizational overview and find out if views that were reported from former surveys were unchanged and perhaps understand underlying expectations; what stakeholders think about hydrogen in Iceland and how they perceive the SMARTH2 project within the local energy context. She decided to first organize a small workshop in Reykjavik, to which the Create Acceptance team of researchers would be invited as external facilitators.

The ESTEEM process starts with **Step 1** 'Project history, context and actors'. In SMARTH2, the 'narrative' (substep 1.1) was based on material that was familiar to Maria and her colleagues, but identifying the 'defining moments' was useful for creating self-awareness within the project management and assessing the status of project, and who were involved in problem solving during the design phase. Moreover, the 'context analysis' (substep 1.2) and 'actors' table' (substep 1.3) proved useful to pinpoint who are the 'active participants' and their stakes concerning the project, this was linked to the work done for Step 2. The 'actors table' also helped INE to devote more attention to 'external' and 'peripheral' stakeholders in addition to the owners and customers of the project.

Step 2 followed closely on the footsteps of Step 1. In this step, the visions of the project manager and those core stakeholders are articulated. The stakeholder visions were extracted by organizing a workshop (rather than through interviews as suggested to be the first choice in the ESTEEM manual, substep 2.5). In preparation for the workshop, the social network maps for 'PM present vision' and 'PM future vision' (substeps 2.2 and 2.3) were combined. They show that the SMARTH2 project is a complex project involving stakeholders in the fields of technology, science, society, policy/politics, market and partners/investors. Moreover, each category of stakeholders involves representatives from different societal groups (Figure 1).

The ESTEEM tool has been developed as part of the CreateAcceptance project financed within FP6-2004-Energy-3, SUSTDEV-1.2.8.

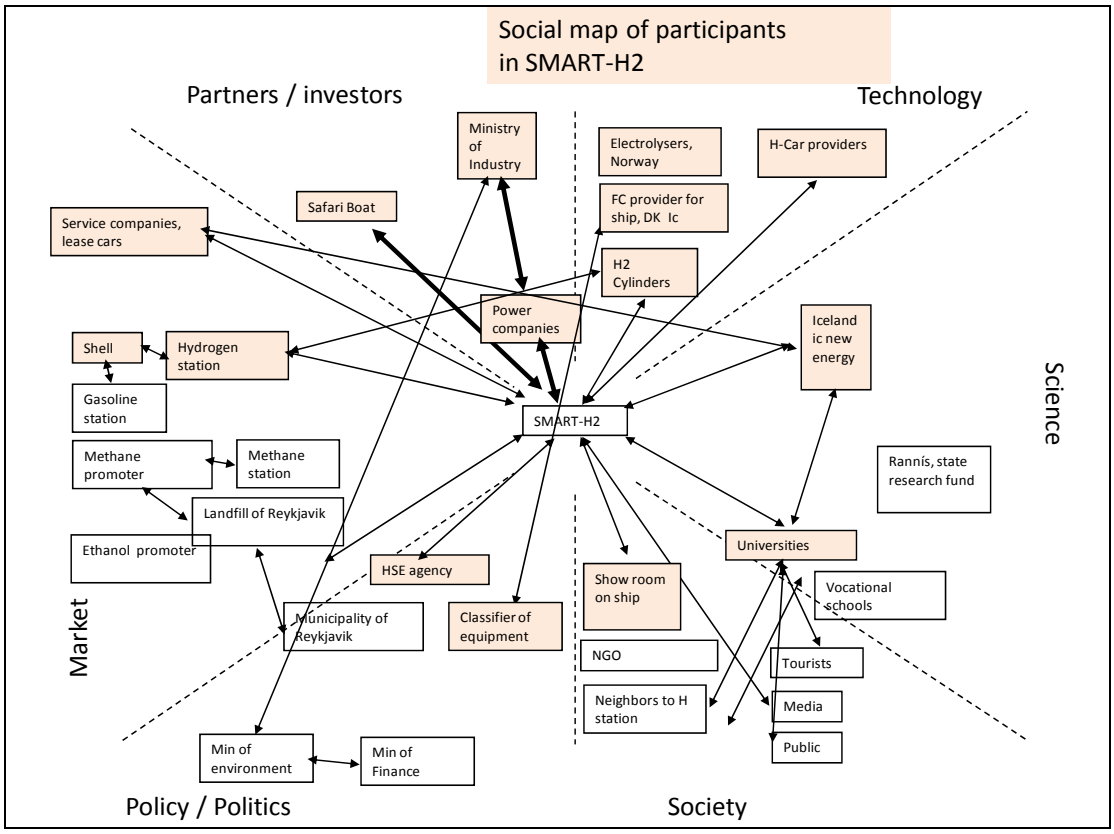

Figure 1. The PM vision social network map for the SMARTH2 demo project.

The workshop was organized on May 15, 2007 in Reykjavik and researchers from the Create Acceptance team helped in planning and arranging the workshop. About 16 people were contacted and invited to participate in the workshop. Twelve of them eventually participated. INE concluded from the workshop that people find the topic interesting on the whole and want to participate by discussing and interacting. The informal atmosphere was dynamic and the participants gave INE positive feedback after the workshop. The following conclusions about the 'stakeholders' future visions' were drawn:

1. Visions of different stakeholders seem to be fairly well aligned.
   - All agree that alternative fuels (to oil) need to be found
   - All appear to be in favour of moving toward hydrogen as a transport fuel in Iceland
2. Stakeholders have questions about the timeline (when will it happen)
   - Stakeholders have doubts about the commitment of oil companies, car companies and the government whereas they seem invisible in the project
   - There are in particular concerns about the lack of H2 cars, technological maturity and questions about when and where they will appear (and can cars be made only for Iceland?)
3. Stakeholders are concerned about continuity
   - They want to know why ECTOS (the hydrogen bus project) 'was discontinued' (as they understand it) and why the H2 buses are no longer running (but the project mangers know that the test-driving project was simply finalised!)
   - Stakeholders wonder why hydrogen is not visible in their everyday life at the same time as Iceland is presented as the world's first hydrogen economy in the international media
4. Stakeholders want to see rapid progress
   - Managing expectations is crucial (what will happen by 2020 and how can stakeholders see that it is happening)
5. There is not much discussion of why moving to hydrogen would be good for the environment

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Step 3 'Identifying the conflicting issues' was useful for organizing the results of the workshop and establishing priorities. Maria found the 'issues rating graph' useful for communicating priorities and inspiring a search for solutions. As a result, continuity and local visibility were identified as having high urgency and priority, and these are the issues that SMARTH2 started working on right after Step 2.

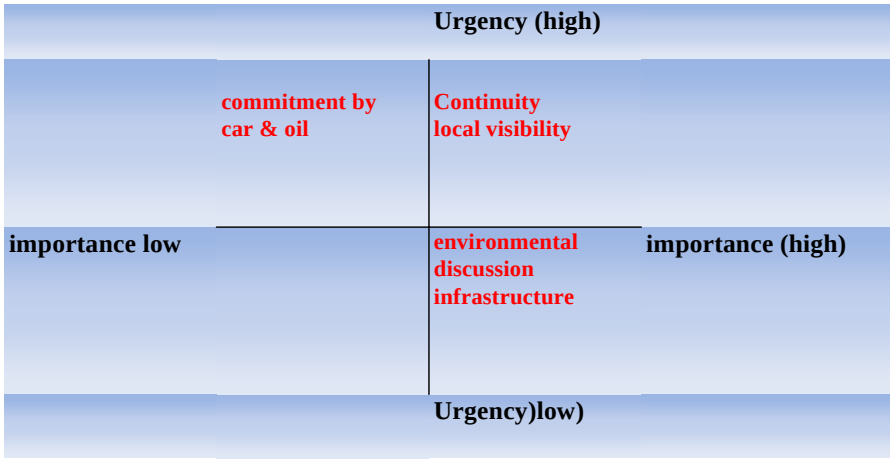

Figure 3. Example of the issues rating graph from Step 3 for the SMARTH2 demo project.

Step 4, 'Portfolio of options' focuses on identifying options to improve the social acceptability of the project. Because INE started solving the problems right after the workshop, the Step 4 tables were used in SMARTH2 to monitor which issues had already been solved and to follow the development of the issues and solutions in the time following the workshop (Figure 2). As can be seen, an exact rating of issues was sometimes difficult, but the table clearly serves to structure issues and solutions.

Issues	Description			
Issue 1	Concerns about continuity: what happened to ECTOS			
Issue 2	Lack of local visibility (administration, corporate, public)			
Issue 3	Lack of visible infrastructure			
Issue 4	Lack of visible commitment by car & oil companies			
Issue 5	Lack of environmental discussion in connection with fuels			
Issues	Urgency	Importance	Rank	Implemented Solutions
Issue 1 continuity	High	high	?	easy to solve (enhanced communications)
Issue 2 local visibility	Medium	high (in the long term)	?	will be tackled in October by a future scenario workshop
Issue 3 infrastructure	Medium	high (in the long term)		A new H2 station is now planned on the University lot
Issue 4 commitment by car & oil	Low	medium (in the long term)		Shell in Iceland has now taken over the hydrogen station till 2010.
Issue 5 environmental discussion	Low but rising	??		The head of the parliamentary committee came to discuss links between the H2 projects & environmental issues

Figure 3. Excerpt from the Step 4 table for the SMARTH2 demo project

Step 5, 'Getting to shake hands', consists of organizing a workshop for stakeholders. The most urgent issue, and most problematic was to get all stakeholders to the future scenario workshop, including opponents and those who influence the general discourse in society. This event can be interpreted as a demand from the

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public through INE to make the governmental policy on hydrogen more visible in the local context. Also to encourage a broad discussion on all types of alternative fuels in the local context. This has many conflicting issues that need to be at least discussed at the same level: hydrogen versus other types of fuel, fuel security, governmental support without suppressing private initiatives, research policy, financial policy, taxation policy, current energy infrastructure, agriculture and energy use etc. The issues were so many, so broad and so close to the core activities of Icelandic New Energy that Maria decided to ask the University to step in and conduct this stakeholder workshop and act as a go-between for the government, the company and all those who may have stakes in a new fuel economy in the Icelandic context. Maria on the other hand mobilized the ministry of Industry, the oil companies, those interested in local and global economy development and others that had appeared on the original map of actors within the SMARTH2. The ESTEEM Workshop cookbook was introduced to the University as a framework for the next actions. Four students and two department chefs were engaged since the goal became to outline a frame that could give rise to research projects on all types of new fuels and energy carriers for the Icelandic society.

As an 'informative dossier', three papers were sent to the participants: Statistics from world energy outlooks, Icelandic energy statistics, clips from international media on all fuel types, the local fuel forecast and policy recommendations from the governmental bodies. Also references were made to websites, Icelandic and international to help people to find varied yet up to date reading material as preparations. Participants were contacted three times: Once called for inviting each one and preparation was demanded by sending out a short quiz to participants and ask them to prepare the mind by sending the facilitator a short 'news-column' on fuel written in the future: 2030, - the last drops of oil imported. It is about how the trend has been during the last 10 years of implementing a local fuel economy and thereby decreasing CO2 emissions by 40%. The news should recount what has happened recently in the area.

As an outcome of the workshop, the participants agreed on the following:

- That more comparative research is needed in all fields
- That technical development has not reached the final stages but may have by 2030
- That Icelandic resources should be partially used to cover energy for transport
- That fuel security should be included in research as well as emissions and effects on the local and international environment.
- That a few fuel types and selections would still be in use by 2030 and that oil had not run out by that time
- That in the long run, the Icelandic economy would gain by a shift to new fuels
- That environmental impacts and social impacts do have a role in selecting which fuel system fits our future but that the economic rules would prevail in the upcoming times.
- The role of politicians is to facilitate equal opportunities on market, not to select one type of technology over the others.
- That Icelandic 'Know-how' could benefit by early moves in this sector of energy but mostly in the Hydrogen sector. In that case hydrogen projects are beneficial in a similar manner as was the case for Geothermal energy applications since the 1980s.

The participants did not agree on the following issues:

- Which technology would become THE winner
- Whether actions to cut CO2 are needed right now
- If Iceland should head its own way and test some types rather than other types of fuel, unrelated to what other nations are doing.
- Whether international moves are more important than local tests

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After the workshop the outcomes are compiled in reports drawing up the major foresights in fuel composition for the Icelandic situation by 2030. Each fuel type or matrix of fuel is then designed shortly into a student masters project and analysed for feasibility. These suggested projects are then sent to the participants and those who are interested in a particular section invited to assist or give comments on those.

Step 6, 'Recommendations for action'
After the workshop, Maria sat down to think about the next steps. First, she listed the main results from the workshop in terms of acceptability of the different options suggested. She also made a list of the new options that emerged from the workshop. For planning where to take it from there, she started out by filling in the 'acceptance and feasibility table' (Table 1).

Table 1: Acceptance and Feasibility table

1	2	3	4	5	6
Key issue	Alternative solutions	Acceptance (stakeholder response)	Type of action (s) required	Feasibility: capacity for action of the project manager	Note: reason for capacity for action classification
Key issue 1 continuity	enhanced communications Cooperation and support for spinoffs	has been tested before the workshop: high acceptance	Help to merge stakeholders in all fuel types	1 (high)	continuity has been secured but this needs to be communicated more clearly
Key issue 2 local visibility	to be explored in the workshop	Broader cooperation needed with other fuel types and tests	Show cooperation rather than incongruence	1-2	INE can influence visibility but depends on interest by others as well
Issue 3 infrastructure	New hydrogen station set up	has been tested before the workshop	Will be explained and user phase shown to public	2 (requires co-operation)	Co-operation with Norsk Hydro and University
Issue 4 commitment by car and oil companies	Shell hydrogen station secured	has been tested before the workshop	Invited to second workshop	2 (requires co-operation)	Co-operation with Shell
Issue 5 lack of environmental discussion & political commitment	Full-scale impact assessment of fuel options (economic, social, environmental)	Stakeholders agree that environmental and social impacts have a role, but economic rules predominant	Student projects defined to follow up on stakeholders' suggestions on all types of fuel	2-3 (requires co-operation)	This issue is expected to turn out successfully as the University steps in as the main actor for impact assessment of fuels
	Involvement of political stakeholders	No agreement on which technology will be THE winner No agreement on whether actions to cut CO_2 are needed now	Continued discussion and monitoring of the political agenda	2-3 (requires co-operation)	Not totally within the power of the PM
New Issue 6: Should Iceland head its own way and focus on hydrogen?	Either develop own fuels policy or follow what other countries are doing	No agreement	Continued discussion and monitoring of the political agenda Depends partly on success of SMARTH2	2-3 (requires co-operation)	Not totally within the power of the PM
New Issue 7: Are international moves more important than local tests	Focus on international actions rather than local tests – or Focus on both because they are interdependent	No agreement	Continue discussion Monitor agenda Show value of local tests for international recognition	2-3	Not totally within the power of the PM

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For further discussion with others on the project management team, Maria also sorted out the options and actions in the Capacity for Action table (Table 2). This table shows which actions INE can take right away, and unilaterally. It also shows which actions INE needs to take in collaboration with other actors, such as the ministries. Finally, it points out issues that cannot really be influenced by INE. Even though they are not feasible courses for action by INE, they are things that INE needs to monitor and try to influence in the course of time.

Table 2: Capacity for Action Table

Type 1 actions Activities that can be done today	Type 2 actions: Activities that can only be undertaken in co-operation with others	Type 3 actions: External dynamics that are relevant, but cannot be controlled: Monitoring is crucial
Enhanced communications Co-operation and support for spin-offs	Focus on cooperation with other fuel types and tests Display user phase of hydrogen station, provide information for public Continued co-operation with car and oil companies Student project on total impact assessment for all fuels	Environmental discussion and perceived need to cut CO_2 emissions Political support and lack of agreement on which technology will be the winner Will Iceland develop its own fuels policy or follow the lead of other countries? What is the relation between international moves and local tests? Can SMARTH2 show the relevance of local tests for international recognition? (important to keep international partners on board)

Using these tables, Maria drew up for INE a short-term action plan, a collaboration plan and a long-term capacity building and monitoring plan. Moreover, the workshop helped her to update INE's communication plan and include there the new actions that need to be communicated to the stakeholders.

Benefits gained from the ESTEEM tool

The SMARTH2 project has not been controversial in Iceland - in contrast, stakeholders have great expectations concerning the materialization of the 'hydrogen economy'. But, like everywhere, there are differences of interest and understanding among different stakeholders. The most obvious ones are between the different parties financing the project and governing the institutional environment of the project. In this case, society has accepted and expects more commitment from the government and municipalities. ESTEEM has been helpful for INE to mobilize social support for the SMARTH2 project and to get new stakeholders to start talking to each other and formulate a common vision.

As a result of the ESTEEM process, INE has become more responsive to stakeholders and more aware of the communication needs existing in society. It seems that better understanding has developed in the 2-3 months following the workshop not the least in the importance of cooperation (in society) and joint efforts to realize the vision. INE intends to communicate more strategically and interactively in the future. One example is participation in a recent conference which dealt with all fuels. Because of the ESTEEM workshop, INE is now communicating in a different way, making it more accessible and making stakeholders more empowered. The interest groups involved in the project are now broader.

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INE has active and direct relationships with stakeholders, and these are already largely managed by Maria Maack (as a manager in several projects at INE). She has had the responsibility and initiative in communications and coordinating data collections and analysis. The horizontal communications have been supported and reinforced by the ESTEEM process. Thus, it seems quite natural that if the 'consultant' is someone from within the project managing organization, a person with good contacts to outside stakeholders is a good candidate for using the ESTEEM tool.

The ESTEEM tool has been used to broaden, integrate and facilitate the rooting of the hydrogen fuel project in the Icelandic society. It must be described as a major support for creating social discourse and hopefully a fuel matrix that in the end will be accepted.

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