Prepar-H2
Check-list

June 2011

Practicalities of running hydrogen fuel chains

Recommendations for hydrogen projects based on interviews with experienced staff in this fuel service. Emphasis on Project design, Administration and Financial issues
(Prepar-H2)

6/1/2011

This work would not have been realised without good cooperation with successful hydrogen field workers in 6 countries. Thank you very much for your time and valuable insight.

This document, intended as a supporting list of advice to those who are undertaking demonstration projects and further use of hydrogen as fuel was issued in June 2011 within the frames of the Prepar-H2 project.

Project full title: Preparing Socio and Economic Evaluations of Future H2 Lighthouse:

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The figures give insight into the various projects from which the information is extracted. They are all in the possession of Icelandic New Energy, the Municipality of Mantova, and Hydrogen Link. For further information contact: maria.maack@newenergy.is

Preface

This report is the outcome of the work in the Prepar-H2 project. The goal of the project was to create recommendations on socio and economic issues for future hydrogen lighthouse projects.

Large part of the work was to conduct interviews with key players (laymen) working in hydrogen demonstration projects, both national and EU (international). The focus was to interview the actual workers who are responsible for executing projects, managers, researchers, maintenance teams (both cars and infrastructure), drivers and any other type of persons involved in executing the projects.

The set up of the recommendations in this report is that the there is a heading in the table of contents and below each heading there are the actual recommendations of the project. These recommendations are supported by statements in the report and from other documents provide from the Prepar-H2 project.

This document should be used as a tool for which social and economic issues need to be addressed for any project s, new or ongoing. The results are based on hydrogen demonstration projects, national and EU, running in Iceland, Norway, Denmark, Germany and Italy.

It should be noted that in most cases in the research the same issues have been raised for any new type of power-train or fuel and from the study it is evident that more work is needed where many different power-trains and (new) fuels are compared. Also a drastic need is for education and information flow to the (currently "confused" public.

Themes:

Introduction

Hydrogen as an energy carrier is a novelty that is entering the public market. Its introduction may not be facile, because it is not necessarily cheaper or more convenient than fossil fuel, to which we have grown accustomed, but it may fit better in the environmental sense; something that is not readily tested on a financial market. Hydrogen can also be made with renewable energy close to customers and could therefore decrease fuel transport around the globe. The price of hydrogen may also be set by different rules than those that apply fossil fuels, which can be an advantage in an unstable geopolitical world.

The reasons for demonstrating new technology is that humans learn differently from own experience than from learning through other means. We learn by doing (see figure 1) and call it hands on experience.

Any fuel that enters the market will become integrated into people's everyday routines. Because the characteristics of hydrogen as an element and the fundamentally different nature of fuel cells as transport technology, demonstrations will be a way of testing, presenting and optimising all details of this fuel chain before it will be handed over to the public. It must be made safe, reliable, efficient and effective as a novelty.

The following summary serves to share some of the lessons that have been learned through former demonstrations in 6 countries during the years 2003 – 2011. The report brings together notes from people that have been responsible for running hydrogen equipment along the supply chain; from the production modules, through storage and dispensing equipment, persons that have ran and maintained vehicles of various types as well as project coordination in socio-technological demonstrations. The emphasis here is on human factors rather than the technology and on organisation rather than hardware. Findings and recommendation are based on specific hydrogen projects. We assume however, that the results are relevant also for a wider range of technology demonstration projects.

The topics run from project design, selecting partners to project management, communication, administration, security classification and reporting.

The authors wish that these notes can be of help to those who are starting to fit hydrogen into their routines. The document is easy to navigate. Use ***the table of content as a short helpful list of recommendations;*** a practical handbook to hydrogen demonstrations. Then notice the following format:

Themes are written in this colour and font

Recommendations or advice appear in this format

"Direct quotes that support the recommendations are presented in quotation marks." The meanings of statements that have been rephrased carry no quotation marks.

The respondents look both on their work in context with socio-economic issues, as well as internal issues that reflect thoughts on completion of the demonstration itself. Notice that sometimes quotations contradict each other. What has worked in one context does not automatically work in another.

The document is made up of themes that have an Inward focus which falls under preparation and project management issues as well as an outward focus that concerns outreach. Socio-economic issues and research on interactions with society are addressed in separate deliverables. This document is set up as short passages each with a heading that relates to the topics, recommendations and supporting examples from interviews as a shortlist of recommendations.

Future of hydrogen technology as seen by experienced staff

A few quotes from experienced workers on the future of Hydrogen:

"Only if we manage to produce H2 with zero-climate-effect, then I believe that H2 can be a fuel solution".

"Internal combustion engine hydrogen vehicles have to be improved".

"For market success the total cost of hydrogen transportation has to come down in line with conventional solutions. "

Respondents ranged from rather reserved to very positive. In average the beliefs are very much on the positive expectations for hydrogen in the transport sector.

Although problems are undesired, respondents think that enthusiasts are tolerant about a range of inconveniences.

Respondents are worried about the missing fuel infrastructure. The "egg and hen" problem must be solved". Their suggestions are for example:

> Using the hydrogen vehicle in a restricted area may be an option to raise the demand for hydrogen at single stations.
>
> One should not go for the mass marked, but geographically limited segments; Islands seem to be well suited because they are well defined in geographic terms.
>
> Perhaps there are more hurdles ahead and still some problems with the hydrogen technology. After all hydrogen transport it has been announced several times in the past as being ready while manufactures currently offer H2 vehicles only in a few years time.

Amongst the workers there are some that believe that battery cars become the 'final winner' but have not tried such vehicles.

Project design

Make a detailed project plan and stick to it. Amendments must be known to the whole consortium.

"Everything was fine until the main investor withdrew from the project, and the project manager retired from his job at the same time. Then the project "died". Nobody takes responsibility anymore."

Test equipment in the easiest and cheapest way before putting it into real time service. Do not launch project with untested system solutions (reappearing warning).

"..it was extremely difficult to synchronize technical modifications of system with scheduled trips of the vehicle and service on call!"

"- the delays in real time tests had repercussions unto the end of the project, we should have put all modules together for a lab tests"

"A fixed test period (for example two years) would have been more suitable than a fixed launch date."

Political commitment should be secured

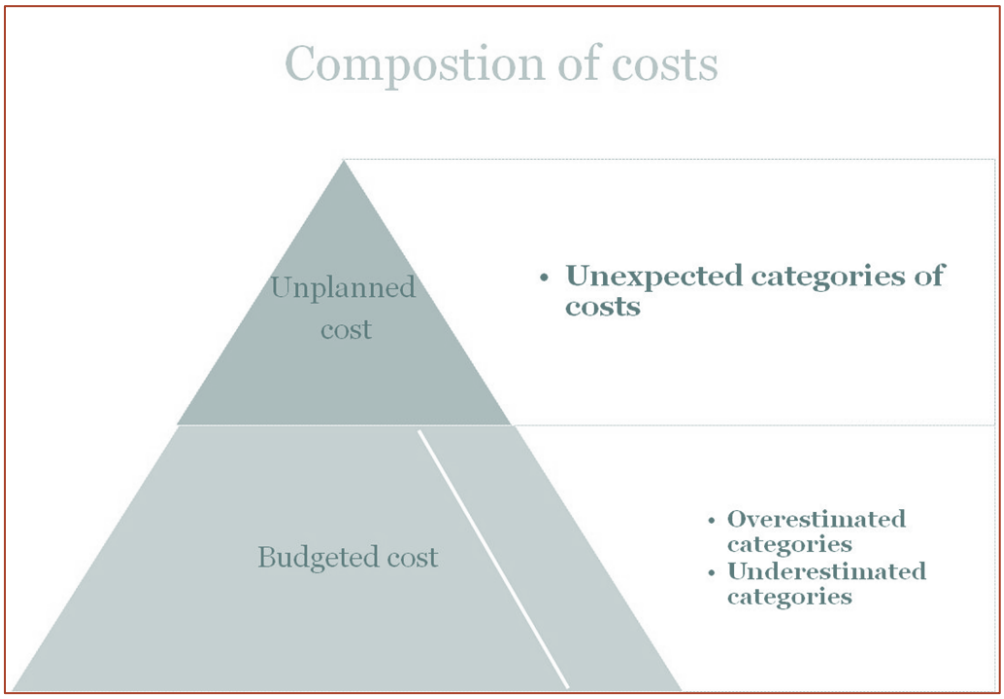
"Political decisions and arrangements took much longer time than anticipated."

In your project plan remember to consider a plan B and weigh risks. Find replies to questions: What if...

"Domino effect comes up when key partners don't perform. Also, the partners did not always understand their role in cases such as this."

Planning the Budget

The PM / steering group needs to have a realistic view on the project. If the budged is foreseeable too small, the PM has to show the courage to cut the project short and stop or provide extra funding.



Failures and delays create costs that can override the budget.

"Solutions to unforeseen technical problems lead to extra costs. You need a flexible budget for unproved technology"

Keep the tasks of SMEs within a low economic risk zone! They are specifically vulnerable to unexpected cost and EU-bureaucracy.

"Technological complexity must be reflected in the budget. In our project all the work was lost because there was no money left when a few extra elements were needed to adjust the technology,

.. go on with demonstration projects but with less bureaucracy and spend more on equipment such as cars/busses. Administrative amount in EU projects is so high, that partners quit project. Another reason to quit has been payment delays from the EC. You must know the amount of the financial support before the project start.

"The project was too big for the budget. The investors were financially weak they could not take on extra expenditure and the execution was not successful. "

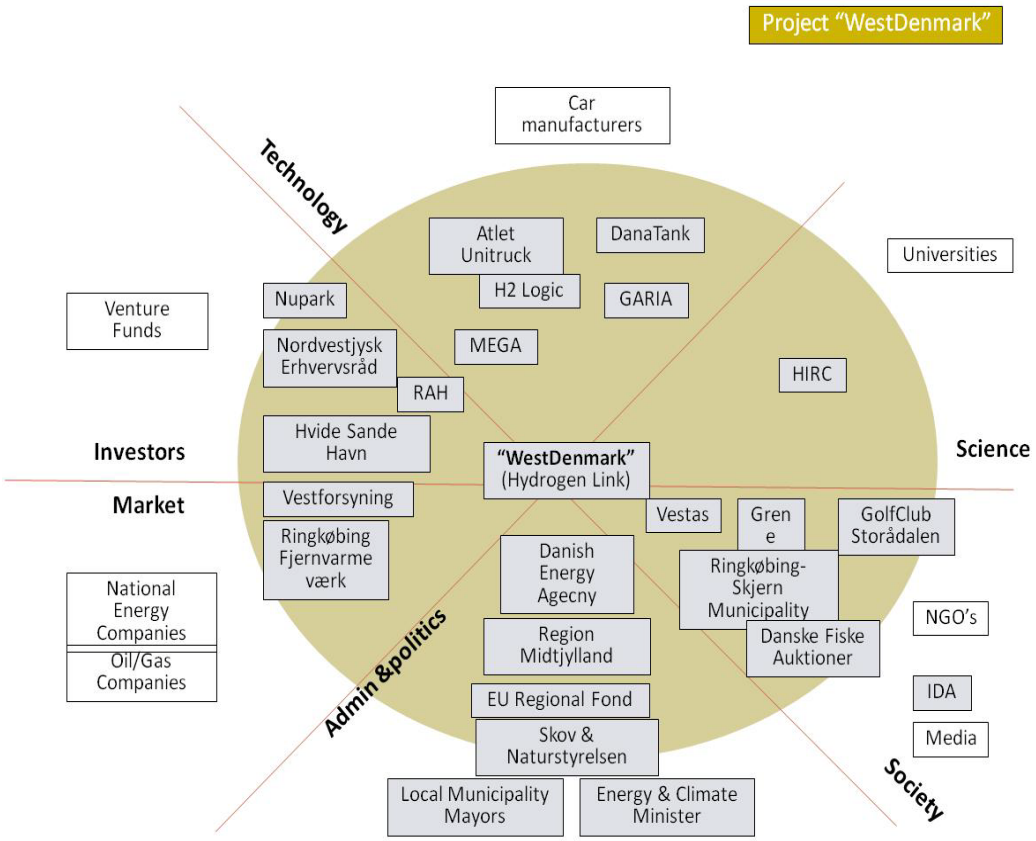
"The certification of the second project phase took a long time, and the financing and extension of labour-contracts rocked the boat. This situation is very hard to handle especially for SMEs.

It is important to have enough time to create the necessary contacts with manufacturers where modules are not readily available off the shelf. Several testers have made common bids to enhance their bargaining power.

Selection of Partners

Think about which players are important in the societal settings to run the modern fuel systems. Then select partners that will be important in the future commercial hydrogen fuel chain.

Try to incorporate a representative from all important sectors into your test for example the technological initiatives, science and research, politics and community administration, companies that are in related business on the market, investors and venture funds that have stakes in the future use of hydrogen. Overlooked potential partners may act against your project.



Constellation of sectors and participants in a hydrogen demonstration in Denmark. The project boundaries are indicated by the middle circle. Stakeholders that are considered important in future systems are indicated within sectors but outside the project. The ESTEEM project guides in stakeholder management calls such graphs sociograms.

Economic weakness of one partner can become the link that breaks the project chain. Partners that have communication problems can stop working in a coordinated manner. It is important for all to gain an overview. The project management must act to solve this; the project is at stake.

"You need political support to get the industry into the project"

"The restrictive guidelines for the drivers from the hydrogen producer discouraged potential drivers and reduced the driver group from 28 at the beginning to 13. "

As it turned out everybody needed to show commitment and disseminate information on various parts; the preparation phase should have included psychological motivation within the company because we work as a team. The team should have been involved from the onset especially those with hands on the equipment. And this takes time, long time".

"I saw this effort as a societal exercise not only a technical project. The project site is promoted as an image for a tourism destination and this demonstration is used in marketing the whole region. Therefore the municipality should have been more engaged. I was disappointed in the city's involvement. When we got the environmental prize of the year the city council called upon us to present the project to endless guests and local interest groups. In return we got nothing but lack of understanding from their institutes."

"Each link in the value chain is important and if it breaks, the whole project suffers.

Completion of project and continuity

"Start the project at a steady pace right from the beginning, delays in the beginning is loss for everyone. "

"I would like to have seen the technology used until the end of its lifetime. Stopping was interpreted as some kind of failure, but it was only the final date of the demonstration. "

"One partner did not fulfil his promises – perhaps because of low interest. This caused domino effect on the project and increased the stress on others that needed to take on more work and adapt to the situation. This was both costly and time consuming and the time laps lead to decreasing faith in the project as a whole.

Be ready to consider calling off a project and returning financial support rather than running into unsolvable questions with later repercussions.

Try to secure new funding if the continuation is important. Otherwise announce the outcomes according to the goals.

"Next time: Longer introduction phase and when the design has been approved, the budget and launch date should be re-estimated and then the whole team made ready for commitment. "

Consider how to deal with staff and hired workforce during dead time if you plan to go for a second project. The negotiations can take long time and SMEs can suffer particularly for waiting times.

"..a negative attitude arose between the partners. Contact persons and companies behind them were not supportive and began to prevent unfolding of the project (to press for payments), instead of pushing towards the goal. "

Management style

The effort in Project Management (PM) should be in accordance with complexity; in small projects; too much administration can take more time than the project work. In large projects a tight management schedule pays off.

"In this project the management was very stringent organized because the project was huge. The Project Manager made the overall organisation and another person organized the financial things. Then there were 6 work packages with one leader each and a control circuit with one agent from each partner group on site. In such a big project with 31 partners you need this circuit for quick decisions. Additionally we had a quality management controller responsible for keeping the set time frame and controlling the quality of the deliverables. It is luxury to have such a position in a project, because it costs money and time, but it was worth it. The maximum delays in this project were 3 months which was trivial."

"The management structure was maybe a bit complex for such a small project. We had a bus group, an infrastructure group, another for cars, and then there were superior committees but no test equipment."

The project management took high effort with so many partners, also the business competitors worked together. Hierarchy and high effort made this possible.

Even when working in small groups all partners must be evenly informed of the overall plans and how the project develops. This can be called partners' alignment.

"Consider the distance / closeness of the project manager to the customers/clients. The end product performance should urge the PM to take correct measures and settle expectations at any time. "

"Top management, devoted to the project, should not have failed to motivate the whole staff. Larger effort should've been put down for meetings with the aim of involving ALL staff of the company from the first stages."

Expectation management

Goals of a project must be realistic. Start and End Date should be clear for each demonstration. Participants must all be on the same page when it comes to outcomes of projects. Correct misunderstanding and misinterpretation.

"Too high expectations far out of the budget frames resulted in disappointment. "

"The expectations about when hydrogen technology would be a realistic choice were unrealistic. Publications in this field are lacking so we did not have good insight."

"During very technical projects it is a question in which detail the public needs answers -dissemination to the public can be tricky. First we give the public too high expectations in our messages but if there are no expectations then people start asking why we are funding such work! "

"It is very important that projects do not overestimate the potential of new technical solutions (too high expectations). This project was more or less to take a step into the next phase of hydrogen technology demonstration and that was achieved. Therefore resources were well spent."

"The project and hydrogen in general, have suffered a senseless initial optimism. The real achievements were considered failures rather than normal beginner's hiccups."

Always keep to facts in your dissemination and prevent overexcitement and unrealistic expectations that cannot be fulfilled.

"We participated to strengthen our image on the market and support our environmental policy, but it should've been made clearer that the technical performance was perhaps not secured. We are still interested in using clean energy technology."

"This was not THE future solution but a first step in a long walk. We had hopes for silent technology that would add value to customers. But the operators were not motivated for test technology. "

"I experienced disappointment towards the immaturity of the technology. The public should have no expectations - because they don't have any insight."

Interest in the project is not secured. Initiate it somehow.

"We had high expectations that the project would contribute to our mass- manufacturing process, but the technology appeared to be further away than expected. The public expected that the H2 bus project was just the first one in a line towards replacing all buses in the near future. After the demonstration time the buses were parked. But the public somehow interpreted this as failure of the technology"

"You can have high ambitions, but should be flexible if they are not obtainable."

"I was sceptical in the beginning towards the technology and had low expectations towards public reactions. But project goals were reached. It gave a 50% CO2 reduction and we raised the awareness."

Remember to notice satellite benefits that are not stated in technical goals.

"My expectations were met, but most processes took longer time and required a larger effort than expected."

"Also, perhaps we should have informed the public better about the project. People's acceptability has a lot to do with information."

Believe only in own expectations.

Road transport with hydrogen cars is technically mature now but it wasn't when we started.

"High expectations and ambitions is a good thing, otherwise nobody would invest in the projects and it is very important that local companies join in. Competition (between companies and technologies) is also an advantage."

"Demonstration projects are carried out to find when new technology reaches market - maturity Hydrogen was too much hyped at the beginning but demo-projects have met set goals and kick-started fast development hydrogen transport."

"Many things that have been stated in the last years have no connection to real life and are not correct. This means actually that the public is getting incorrect information and creates in their mind totally incorrect expectations. This can be difficult to change later."

Keeping up commitment

Enthusiastic persons / leaders are needed in all projects: Foster and praise those who show commitment.

"A lot of media attention at the opening of the station, after that it was silent. This led to many participants losing some of their enthusiasm. But what could they have done? It was no longer hot news."

Participants need training and perhaps new motivation at times of failures.

The partners are forced to meet two times a year. But we haven't received any test busses yet. So I don't know why we attend meetings. In my opinion: It is a bit over structured.

Communication within the project is essential in order to engage all partners. Emails are good; phone calls are better, in person meetings best.

"We put a lot of work in meetings with the staff; we deployed crisis management to overcome negative attitudes. In respect to loss of time, it was mostly the wait for certification and permission to use the technology – we managed convince the staff delays were a disappointing. The project hatched too late in the project-time frame. "

"We got reports and orders but we did not have the opportunity to ask questions and discuss issue."

Users, such as drivers and operators must have competence and motivation and know how to get good performance out of the hydrogen module. Train them!

"Everyone is talking about "all the operational problems at the station". I think these problems were generated by users' low competence. The dispenser was not used correctly. Also, I don't think it was a good idea to staff the filling station with ordinary petrol station employees, they do not have enough competence."

"There were many technical challenges with the cars, but that should have been expected, they were only demonstration cars. Companies who are leasing the cars should have a plan for the use of their cars. For example: one car was used by a single employee, who knew how to take care of it and knew the car's limitations. This car has been working well all the time. However, the other three were used by many different people, nobody took responsibility. There have been many problems with these cars, and today they are hardly used. "

Advice: limit the number of users per car in a demonstration. This is easier to manage and users will communicate with each other as an interest group and feel more responsible.

"We saw that the project was sensitive to the persons that were involved. When we tried to organize meetings, it had to fit with everyone's calendar. Partners should have back-up contact persons."

Information and communication in projects

Provide several communication channels, regular meetings, and quick channels for emergencies at least. Internal communication helps to solve and settle problems and avoid mismatches.

"In our project the communication structure was too formal with the fixed dates two times a year- why not on demand?. We mostly communicated with the infrastructure partners and the organization partner who was responsible for the project communication."

"It was good to have short communication ways for infrastructure problems and other emergency situations."

Variations in communication are good. Communicate with all staff within a partnering organisation. Also those who will not be directly involved.

"There should be a conjoined meeting place for all the field staff and even mix these with people in similar jobs outside the project. This would mean effortless knowledge spread within the project and perhaps to peers."

"The more I work with researchers and academics the more I appreciate communicating with the hands on – lads. I try to visit them once in a while and then later I pick up in interviews what they mention in informal conversations. "

"The project plan was unknown to most of the partners in the beginning. The contract should've been more informative with all partners' tasks lined up with better specified roles within the time frame and milestones set out for all partners and followed up."

To secure important feedback, PM should meet end users frequently. Consider well his position in the project setting; can the manager be positioned close to communication hubs?

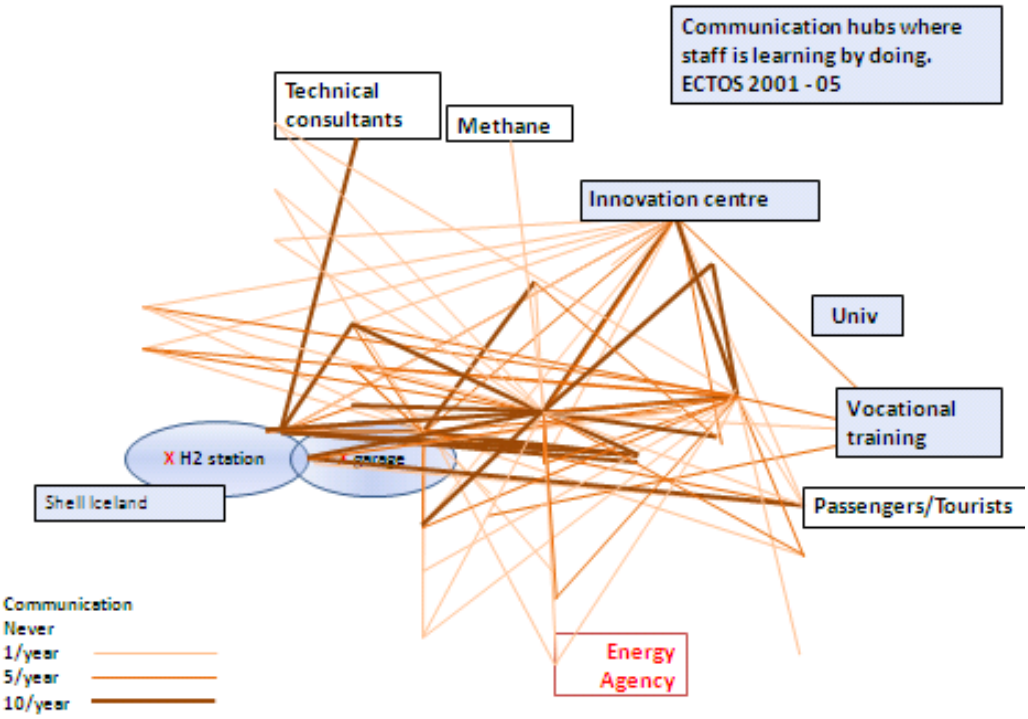
"More feedback would have been good, in particular to and from vehicle end-users. Networking was good; however internal information sharing should have been better. "

"I would like to have seen an overview of driven km and performance alongside similar info on diesel buses. "

"Communication structure depends on the project coordinator and the structure needn't be too extensive. Direct, clear communication, via the shortest channel must be possible. "

"When there are technical problems, I take the car to the garage. The technicians have to call the company who made the cars. It seems to me that delays in this phase are due to difficult communication between the two parties. "

For me as a researcher it is not enough to use only verbal communication even though key people state that they prefer that. It is easy to forget messages. I use emails that I can refer to in phone conversations.



Communication between the partners can be mapped. Where communication is vivid people are sharing experience. When partners are asked to indicate on a list of names who they contacted concerning a project it is evident that the knowledge not only accumulates within the project management

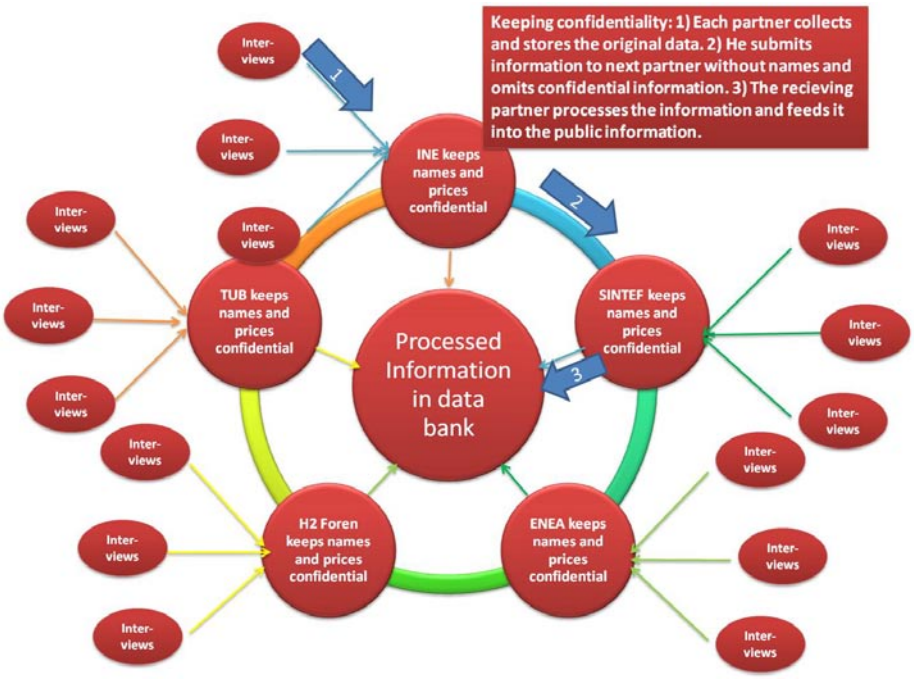
Try to use IT as much as possible for registration, users tend to note data the first day and then lose interest.

"Prompting users for information before filling vehicles at H2 station has proved to be helpful. Asking various drivers to fill out paper forms has not been successful."

It should be clear from the beginning of a project that there should be a difference in how to handle public information and then restricted due to competitive reasons. Clear rules on information exchange and property rights help to prevent problems. "

"Another problem is that a lot of the information is protected as the companies want to protect their know-how. "

"In terms of access to outcomes before projects are finished, public access should be allowed if the reports are any way finalised and meant for public dissemination. Open access to information of prior projects can lead to more effective work and output. "



Sensitive information can be filtered out within a consortium. When each partner receives the data, names and personalized data is omitted and then it is sent to the next partner for processing. After processing the information is fed into reports.

"Much more should be published about demonstrations in peer reviewed journals. Of course the industry must be consulted but reports from demonstrations are not taken seriously as to reflect results in a correct and accurate manner. It surely is tricky to disseminate information when industrial partners want to hold back information and media hypes up either super bad or super-good news."

Outreach and dealing with media

For the public media messages are often the starting point for asking questions; so have correct replies ready.

"Media was active and enthusiastic in the beginning, especially the local paper. Now they do not pay attention anymore, and frankly I think we should be glad, because it would not be good PR to show the world that public

"The quality of communication was very good, involving thousands of people (students, youth, etc.), but maybe a little too local (the project was well known in the city but not in the national context)."

It is not surprising that large companies train specific spokes- persons to talk to media. But as an interviewee you have the right to know where the news will appear the main issues of intended discussions. Be aware of reporters' last words and correct false statements. Correcting things at a later occasion is rather useless.

"Politicians and neighbours are the most important target groups for communication. "

"Media presence and PR work is very important for such projects. Our project had a central PR-department who knew what's important. That demands good backup with financial means and personnel. "

International media sometimes shows more interest than your local media. Use this to go get through the back door to your local audience!

"In our situation more attention is on the messenger than the news. Who is telling the story makes them discard or pick up on facts. And that is also true for different professors."

Information should be given in context with the technology that is in general use, rather than competing new technologies.

"The general local attitude has been negative towards hydrogen, perhaps because of new options pressed in the media. The local people did not even come to experience the technology we were presenting. "

"Media is now more positive towards hydrogen than before – mainly because battery cars have not delivered according to (hyped) expectations. Media operate as they do – the best is to work and deliver and stay in dialogue. Dialogue is the only way.

"We had to face the e-mobility hype in media. We communicated this in an open way. This kind of handling was successful".

"The best way we communicate to interest groups is through presentations that people pay for. Somehow the discussions are better and our practical experience is taken seriously."

"Media tends to focus on a silver bullet, which has been difficult to handle, as we don't see hydrogen as the only solution. It is also difficult to compare different technologies, and makes more problematic. We need simple parameters to both explain and compare technologies such as vehicle price, fuel price, fuel consumption, availability etc."

"We used all channels to get our message out; TV, articles, interviews, open house days at the fleet operators place, information in schools and kindergarten. "

Close contact to selected journalist is a benefit as these can give further details and better insight to the project than e.g. sending out a general press release.

"In international projects a collective communication strategy is good, but every partner needs enough freedom to choose the right way for the local communication. Make sure to plan events early enough."

"I think it is preposterous when newsagents don't know anything about this technology and write whatever.

I use blog and follow international networks on hydrogen applications, commenting from my own real experience."

"Public programs should include support to various networks, magazines, websites etc. that can handle effective dissemination to a broader audience."

Involve people in project events directly and locally. Follow up on those who actually show interest and allow to them help you.

"The project had a high media profile in the beginning, and the PR strategy was successful. The opening of the station was especially successful. But it is difficult to keep this "news" warm over time. I think it is easier to have media interested in cars than filling stations – so it is important to catch opportunities when new cars are introduced and hand them over at the station. "

"News agents pose endlessly questions that I find too basic and repeat the last news that they heard on a competitive channel. And then they use exclamations out of proportion in their headings and often write differently from what I told them in interviews! Very rarely do they bother to get background information. The exception has been the BBC. "

Often a person calls in stating or asking for utopian non-facts. They claim to have heard or seen something somewhere. This misunderstanding serves only to feed on disappointment. Therefore I try to serve media as well as I can and provide only accurate data.

"I strategically used elderly people to participate in test drives; they had time and interest and disseminated their adventures to their grandchildren. These contacted us with further questions."

Delays and unexpected cost

When dealing with unproved technological modules, be prepared that manufacturing is more costly than service or research. Financial backup for the building and pre-testing phase of equipment must be appropriate. Have risks - solution plans ready before launching the project and preferably have a flexible schedule that follows the readiness of the modules and core systems.

"Technical errors affected daily programs and have lead to delays and then to lower mileage in the demonstration. Should there be added to the demonstration time because of this dead time?"

Certification of hydrogen systems is not an everyday task for permit offices. Account for long approval time. Good blueprints for procedures of safety classification are starting to accumulate.

It took time to get the technical approval for the cars, and it became time-critical; we just made it before the launch."

The security demands were raised in the certification procedures. The demands changed between the first design phase and the final design phase causing higher costs and more delays than we could have planned for.

Advice: limit the number of users per car. And be realistic about the amount of technical problems while using pre-commercial modules.

There was also a tax issue: using a car paid by your employer is a taxable benefit. The result was that nobody wanted to use the cars. And when the cars were not used regularly there were more technical problems... It is still like this!

The time table was very ambitious. We had problems with providing cars. We had been unrealistic about how difficult it is to provide fuel cell cars. They had to realize that ambitions were too high, especially they did not manage to get any fuel cell car. But they were rational and chose a solution that cost less.

There were many problems with the station as well as the cars. The communication between the retail station and the supplier was complicated, partly because the employees at the station had not enough competence, and for each problem, the station had to close. I saw this from a customer's perspective, and it was frustrating.

Problem solving approaches

Get your local service staff well trained and certified as hydrogen technology servants. Even though experts are transported from the manufacturer, the time spent in waiting can be devastating to the project and nobody is learning anything in the meantime.

What is registered is stronger evidence than just a recount of what happened.

When failures show up, well recorded data is extremely valuable. Work according to the strict protocol and quality management (ISO 9001) was the only reliable thing when solving difficult problems.

Try to keep communication lines open and indicate to relevant parties well before a problem becomes a show stopper. It is helpful if all players have good insight into each other's responsibilities and how it becomes necessary prevent problems and react to them in your own position, - and not the least on the financial side.

Field servants found solutions that became applicable in later design and the operation worked more smoothly. Find solutions to problems and suggest them to superiors and manufacturers. If you solved it correctly then trust builds up and eventually your skills are trusted and your approach becomes valuable for the project and the technical supplier. Sometimes the simplest solution that costs nothing works best.

"Internal communication, or chats with the other posts along the hydrogen fuel chain helps solve problems and avoid mismatches"

If all major players are well informed reactions can often be inserted well prior to real crisis.

"Time plan was exceeded. Delays required updating of time plans and postponement of events and milestones."

Success can be put thus: flexibility, team work, sharing experience, driving mileage reached.

"Our project was a success with a good project team where everybody contributed. In particular, we made a very detailed project plan, to ensure that all important aspects were taken care of. The plan turned out to be good and we followed it in detail. It was not based on experiences from other H2 projects, only on ordinary recommendations from project management handbooks."

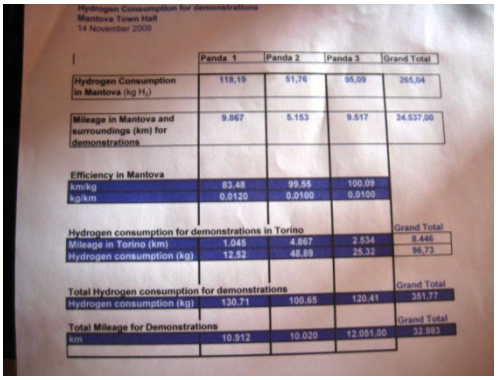
"The cars we got did not work very well, probably because users did not understand they had to pay special attention instead of treating them as conventional cars.

Field servants solutions are important – they can help to improve later designs (don't forget to listen to them)

"We had to face technical problems with the fuel stations, primary the compression technology, but the reformer was also disappointing. We expected to be able to produce cheap hydrogen, but the problems lead to extra costs (more investment)."Meetings with all staff proved to be helpful, people showed more understanding and flexibility and helped out in solving problems.

Interviewees' remarks and requests on bureaucracy

When comparing national projects to the EC it seems easier to keep on time schedules in the national funding schemes. It is frustrating when all deadlines are met on behalf of the project that deadlines are not kept on the other side.


Hydrogen Consumption for demonstrations
Mantova Town Hall
14 November 2009

	Panda 1	Panda 2	Panda 3	Grand Total
Hydrogen Consumption in Mantova (kg H_2)	118,19	51,76	95,09	265,04
Mileage in Mantova and surroundings (km) for demonstrations	9.867	5.153	9.517	24.537,00
Efficiency in Mantova				
km/kg	83,48	99,55	100,09	
kg/km	0,0120	0,0100	0,0100	

Hydrogen consumption for demonstrations in Torino				Grand Total
Mileage in Torino (km)	1.045	4.867	2.534	8.446
Hydrogen consumption (kg)	12,52	48,89	25,32	86,73

Total Hydrogen consumption for demonstrations				Grand Total
Hydrogen consumption (kg)	130,71	100,65	120,41	351,77

Total Mileage for Demonstrations				Grand Total
km	10.912	10.020	12.051,00	32.983

"The project is now finished but we are still waiting for the last payment by the EC; that is not nice. This is the reason why we focus now on national projects, the financial matters are better organized".

Interviewee's request: Make sure to provide a not too extensive financing and reporting structure

"Short tabular fill in forms without much text is an easy and efficient way of reporting"

Prevent delays due to bureaucratic issues. We need simple, efficient, quick and reliable financial structures. Transaction of financial support must be on time.

It is difficult to predict and handle cash flow (in EU projects) and securing the last financing.

One pre-financing and one finish payment would be OK. Quarterly payment is also quite quick.

One central payment office within a project is a good easy financing structure. Decentralised self organised bill account is also ok.

I think 1,5 years late payments is TOO late. Why are partners that have met all requirements punished for counterparts that do not obey? It is also extremely unhelpful when financial officers are not in agreement with how to handle issues and give misleading info on different occasions. A whole budget year is on the line.

Administration is sometimes seen so costly as to amount to all paid working hours. - Should full payment for equipment (against invoice) be a tentative solution, while working hours are not reimbursed? Man - hours on a project often override limits. These should be reported as to show the real effort.

Reports have the risk of ending on the shelf, without being known or read. Main effort should be on showing the technology to people and let them experience it. Also it is important to highlight the public sponsors in projects, as this helps the political motivation and embracement for further projects.

Application takes time when it is filled in for the first time!!

SME´s are specifically vulnerable for EC funded project as they have little flexibility, payments are late (which can ruin a company) and bureaucracy is very high.

There is certainly a reason for the various demands for information in EC-reporting systems, - when things go wrong these papers are valuable support.

When an SME with staff of 5 persons has a secondary audit, 50% of the man power is involved for weeks in only providing demanded information. Normal operation is at stand still during this time. If the auditor were to pay for all the added work perhaps such demands would be better received.

Questions and statements from public

Keep the messages simple until you are asked otherwise. But be prepared to get both positive and negative nuanced statements and simple and complicated questions.

Where does the hydrogen come from?

What does the litre of hydrogen cost?

How does hydrogen work?

Why you are still using hydrogen when it is so inefficient?

How does Hydrogen compare with other new technologies?

What is best?

So now that hydrogen has broken the promise of being the fuel of the future. Which fuel will then be the winner?

Why are we making such big investment when the operation is not currently feasible?

Disseminate information to peers along the fuel chain: Engineers to engineers; mechanics to mechanics; students to students. This way it does not sound patronizing.

Why are you still working in hydrogen when everything in the future will be battery driven?

In our context the messenger is more important than the news. Show good example and inform with facts.

Remarks that regard prices

The public in the Nordic countries is accustomed to high prices of vehicles; they can also make hydrogen from renewable energy. Such conditions are well suited for market introduction of hydrogen vehicles.

Interviews with end users reveal that they are more interested in technology than environment. Only ***o***ne respondent states to be willing to buy or lease a H2 vehicle and carry the risks about reliability and service life.

Concerning the early market, the purchase price is apparently not an issue for the respondents probably that the cars were leased by the companies.

For mass market success, our respondents state that the price of the vehicle or the prices of the vehicle together with the fuel are the most important factors for selecting a vehicle.

The second and third most important factors (after price) for mass market success are the range and the convenience of refuelling infrastructure. The range of the cars has to be improved so that they can be used for longer trips for example in weekends. However respondents are likely to accept that the hydrogen infrastructure is much leaner than the petrol station network. Several respondents indicate that 5-6 filling stations within a city of 200.000 inhabitants would be a reasonable level.