

Development of H₂ Safety Expert Groups and due diligence tools for public awareness and trust in hydrogen technologies and applications



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1 Executive summary

The present document will provide part of the framework necessary to conduct Work Package 3 (WP3), *Data Gathering and Mirror Groups*, and Work Package 4 (WP4), *Preparedness Mapping, Assessment, Recommendations*, activities. In particular, we will explain our methodology for organizing relevant information on stakeholders, a stakeholders' map, and details about the different info gathering tools that will be used. The FCH stakeholders model and dimensions of analysis (presented in Deliverable 2.1) will be used as methodological reference, which take into account the full range of Fuel Cell Hydrogen (FCH) application areas and the life cycle stages of each area, applying both health and environmental safety criteria. FCH stakeholders and regulatory factors have also been considered in the model.

More details on the different Tools for data gathering are given in this Document, as well as practical guidance to use them, with the aim of obtaining the best information from relevant sources (stakeholders, experts, literature, common practices, etc..) in an organized fashion. This will help the process of data gathering in WP3 and data analysis in WP4 and lead to strong and ground-based Recommendation in the final part of the project.

A Gantt Chart to achieve WP3 objectives with main activities and checkpoints is provided in **Annex 3.1**

Summary of "*Questionnaires for stakeholders*" is provided in the **Annex 3.2**.

A preliminary list of relevant stakeholders is provided in **Annex 3.3**.

2 Data collection process and tools

This chapter is dedicated to explain in details the process of Mirror Groups Organization and Data gathering that will be used during WP3 activities by the 5 partners responsible for each area of the H₂ value chain and in WP4 for analysis activities.

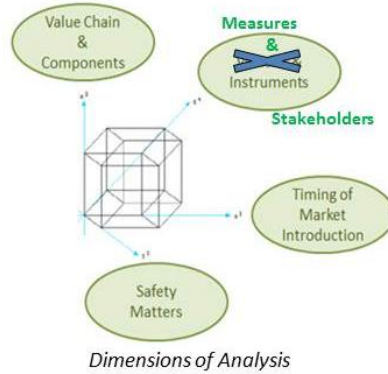
General methodological framework and Dimensions of Analysis presented in D2.1. will be used as reference.

The main steps are:

- Stakeholders list and categorisation: we will list and categorise all stakeholders, according to different areas of pertinence. i.e.: industry, research, policy makers, standards and safety Authorities, producers, distributors, consumers, regulators, incident responders, environmental protection agencies, etc..(see Section 2.1.1)
- Mirror Groups creation and mapping: Individual members of H₂TRUST will become mirrors of the above mentioned stakeholders, according to their field of experience, network of contacts, etc.. They will become subject matter experts on the needs, roles and interests of the stakeholders in the value chain, etc. The project's stakeholders will be mapped into the mirror groups (see Section 2.2).
- Gather info and data, using data gathering Tools, throughout WP3 (see Section 2.3).
- For each Component of the 5 main areas of the H₂ value chain, the responsible partner should identify main Safety Matters.
- For each Matter identify its relevance for stakeholders, based on the knowledge on them (through communication with mirror groups).
- Suggest potential measures & instruments to address the safety matter.
- Relevance and measures shall be given in relation to timing of market introduction of each component (5-10-20-50 years).
- Discuss and validate with relevant stakeholders and experts,
- Focus groups: brainstorming with selected group of most relevant expert in the field (see also Section 2.7 below)

Fig. 1 below summarize in a visual way this methodological approach

- For each **Component** identify main **Safety Matters**
- **For each Matter** identify its **relevance for stakeholders**, based on the knowledge on them (*through mirror groups*)
- Suggest potential **measures & instruments** to address the safety matter
- Relevance and measures given in relation to **timing of market introduction** of each component (5-10-20-50 years)
- Discuss and validate with relevant stakeholders and experts (incl. Decision makers)
- Focus groups



WP3



List of safety matters with relevant measures and their projection over time



ANALYSIS & RECOMMENDATIONS

WP4

Figure 1: Data Collection process and preliminary analysis

Figure 2 shows the general methodology used to elaborate a detailed analysis of the stakeholders' barriers, knowledge and needs, and the role of the Mirror groups.

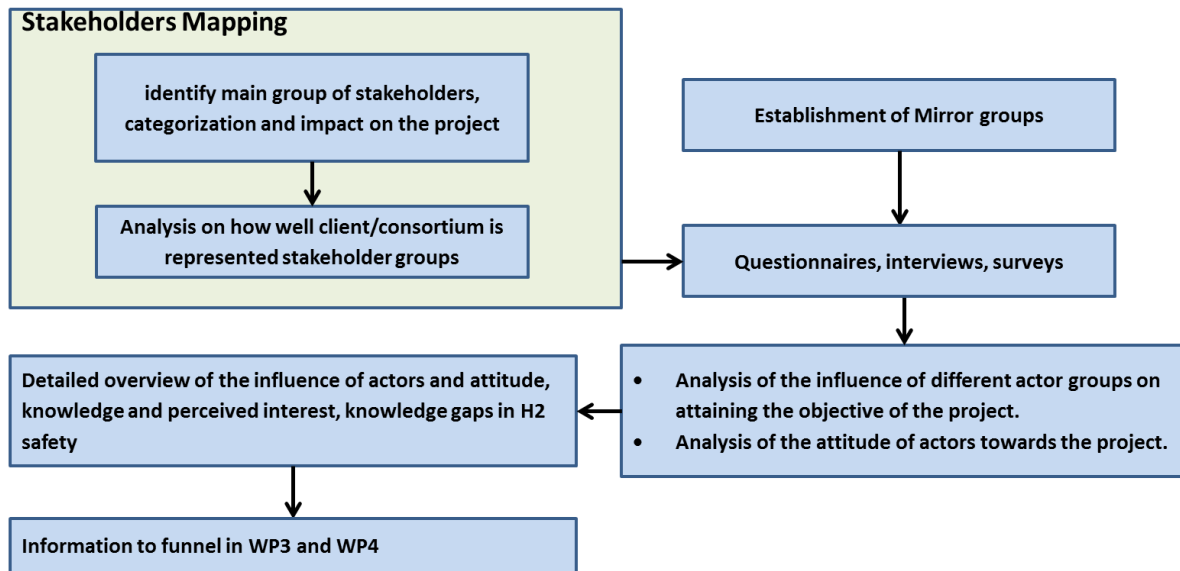


Figure 2 General methodology

Moreover mirror experts groups have been established, i.e. for each of the key industry groups identified in the Framework the team handling this task will create a corresponding internal entity (person or team). Such groups will target the previously identified stakeholders, will support the expansion of the stakeholder's list and will acquire a close

understanding of the stakeholders' current organisation, involvement, knowledge and perceptions of the FCH industry and the channels.

Together with the expert groups we have elaborated questionnaires and surveys to submit to the identified stakeholders, in order to analyse in depth the influence of the actors on the H2TRUST project and H2 safety, their attitude and interest towards the project activities. Interviews will also be conducted to the most 20 relevant stakeholders (5 per main application) by the mirror groups personnel. All information will be finally funnelled into WP3 and WP4.

2.1.1 Relevant stakeholders

A preliminary Table of relevant stakeholders has been elaborated and will be extended during the project (during WP3 and WP4 activities in particular). The following Table 1 shows an example of a list of all relevant stakeholders. The full Table is attached in *Annex 3.1 List of relevant stakeholders*.

Stakeholder			Typology	Sector of interest		Geographic Location			Contact Person			Impact on the project (Low=1, High=5)	Relevance to the project
Name	Dept	Website			Subcategory	City	Region	Country	Name	E-mail	Tel.		
AVL		www.avl.com	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Graz	Styria	AT	Helmut List	Helmut.List@avl.com	+43 31678	4	AVL is the world's largest independent company for the development of powertrain system
ISLENET, European Islands Network on Energy and Environment		www.islenet.net	SME	RCS	Regulations and certifications	Bruxelles	Bruxelles	BE	Panos Coroyannakis	panos@smilegov.eu	+32 27429368	4	ISLENET is a network of European Island Authorities which promotes sustainable and efficient energy and environmental management. It actively promotes the adoption of local energy saving strategies and renewable energy projects.

Table 1 Template of the stakeholders list

The Stakeholders are specifically categorised in terms of:

- Stakeholder name (department if a large organisation or institution) and website.
- Typology of the organisation, i.e. SME, large enterprise, Public/No-profit and academia.

- Sector of interest for what concerns the H2TRUST project, i.e. Energy sources, Hydrogen Generation, Storage&Distribution, Refuelling, Powergen & Consumption, Regulatory, codes and standards (RCS) organisations, and, in addition, other sector of interest like investment and dissemination, which are horizontally connected with all the others. Moreover we have further refined the main applications areas into sub-topics, in order to make data gathering and analysis more efficient. Figure 3 shows the aforementioned categorisation.
- Geographic Location: City, Region and Country.
- Contact person: name of a high-level profile (e.g. manager, CEO or senior researcher), e-mail and telephone number.
- Relevance and impact of the stakeholders on the H2TRUST outcomes. The relevance has been assigned by the partners and it will be later refined by the mirror groups during the data gathering (WP3). The evaluation of the impact of the stakeholders' expertise and activities on the H2TRUST outcomes will consist of "5 qualitative levels" of importance:
 - 1 - low impact: the size of the organisation, the network size is small and the organisation activities are partly related to H2 technologies and safety.
 - 2: the size of the organisation, the network size is small, but the activities are focused on H2 technologies and safety.
 - 3: the organisation has a medium to large network size and activities are partly focused on H2 technologies and H2 safety.
 - 4: the organisation has a medium to large network size and it is strongly involved in H2 related activities and H2 safety.
 - 5 – very high impact: the organisation has a large number is deeply focused on H2 related activities and on H2 safety, and its feedback will strongly contribute to the impact of the H2TRUST activities at the EU level.

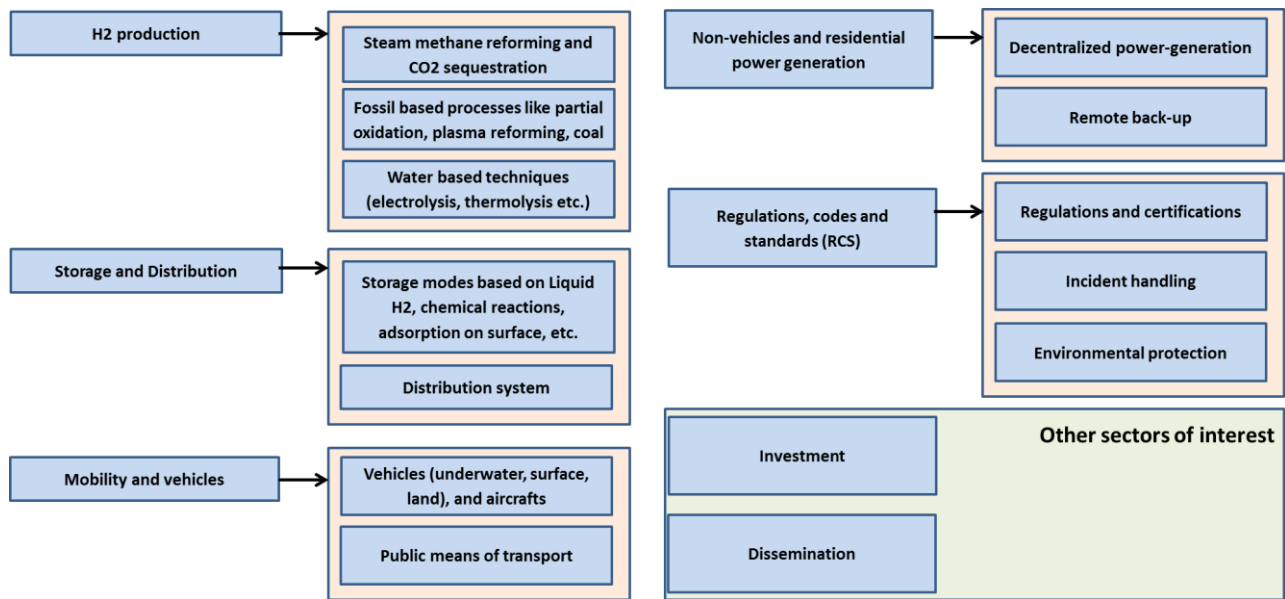


Figure 3: categorization of the H2 value chain

We already collected and categorised more than 200 stakeholders belonging to the aforementioned main applications and subtopics and relevance to the project. Such stakeholders will be targeted by the WP3 Task leaders in terms of questionnaires and interviews.

2.2 Mirror groups and stakeholders mapping

We have created five main mirror groups according to the chosen main application areas. Mirror groups include a wide representation of stakeholder groups similar to those European bodies represented on the H2TRUST board. Each mirror group will be led by a H2TRUST partner, who will focus on the specific main application area where he has relevant expertise:

- H2 Production will be led by AIRP. TUE will support AIRP regarding the stakeholders from the academic sector.
- Storage and Distribution will be led by MCPHY. Politecnico of Milan will support MCPHY regarding the stakeholders from the academic sector.
- Mobility and Vehicles will be led by SPPI. Politecnico di Milano will support SPPI regarding the stakeholders from the academic sector.
- Non-vehicles and residential power generation will be led by SOL. Politecnico of Milan will support SOL regarding the stakeholders from the academic sector.
- Regulators, 1st Responders, Consumers will be led by FAST/EHA.

MATGAS will work with the different teams in order to refine the process, provide clarifications and steer the work to assure the WP3 goals will be timely accomplished.

The mirror groups will support the collection of safety data in WP3 and help putting the basis for the preparedness mapping, assessment and recommendations in WP4. The mirror groups will have a complete view of the stakeholders environment and will interact with them in order to obtain relevant information. The intention is to create within H2TRUST an awareness of and empathy with FCH stakeholders.

Mirror Groups will be asked to validate the stakeholders list and the project stakeholders' relevance and impact also taking into consideration cross-cutting issues.

2.3 Data collection Tools

The data collection tools of the H2TRUST project are organised in six typologies (see also D2.1 for more details):

1. Questionnaires, surveys, checklists, i.e. collection of information from all hydrogen sector stakeholders.
2. Interviews with selected actors who are very relevant for the hydrogen and fuel cells sectors.
3. Document review, i.e. literature study (papers, technical magazines, other, etc..),
4. Observation, i.e. gathering and tracking of hydrogen related information (e.g. activities, events, news).
5. Focus groups, i.e. gathering of information from members, gauging of public perception.
6. Case studies, i.e. analysis of single individual groups.



Figure 4 Data collection methods

Table 2 below shows the key performance indicators (KPI) of the aforementioned data collection methods:

Data collection method	KPI
Questionnaires	200 questionnaires sent to stakeholders (40 x each of the 5 main areas)
Interviews	50 interviews realized, 10 x main application area.
Document review	At least 200 papers and documents will be analysed.
Observation	Tracking and gathering of information from at least 30 events and 200 news, blogs and source of information
Focus groups	Establishment of 5 focus groups and reports.
Case studies	Analysis of 20 case studies (4 per main area)

Table 2: Key Performance Indicators

In the following paragraphs we explain in details each of the data gathering tool:

2.4 Questionnaires

Following the categorization procedures and groupings of the previous sections, we proceeded in the elaboration of the questionnaires that will target all relevant stakeholders. The questionnaires have been elaborated in three sections:

- **Main questions** for all stakeholders, to get as much information as possible about the market, barriers, safety perception and solutions related to the H2 industry.
- **Specific questions** on safety and hydrogen technologies, according to the stakeholders' groups and subgroups. In particular the specific questions will follow the aforementioned stakeholders structure:
 - H2 production: safety issues and measures in the process of steam methane reforming (and CO2 sequestration) and other fossil based processes (partial oxidation, plasma reforming, coal) for hydrogen production as well as water based techniques of electrolysis, thermolysis, photocatalytic water splitting, sulfur-iodine cycle and biohydrogen.
 - Storage and Distribution: safety issues and measures in storage modes of: pressure gas cylinders (atmospheric pressure up to 800 bar), liquid hydrogen in cryogenic tanks (at 21 K), solid hydrogen storages..
 - Mobility and vehicles: safety issues related to industry processes and infrastructure around the area of private, commercial and heavy transport powered by FCH and gather the corresponding safety issues.
 - Non-vehicles and residential power generation: safety issue and extensive research into the state of FCH application for non-vehicle application especially on decentralized power-generation and remote back-up power systems, as a stationary storage mechanism for renewable energy and as part of smart grid systems.
 - Regulations, codes and standards: state of the art as far as regulation, environmental protection, certification, incident handling and consumer perceptions.
- **Supplementary questions:** questions beyond the scope of the safety assessment, in particular regarding: suggested actors and stakeholders for the data collection campaign, lack of funding, communication and knowledge issues, transfer of scientific results.

In Annex 3.2 are reported the questionnaires that will be sent to the aforementioned stakeholders categories. The questionnaires will be forwarded to the identified stakeholders (see Sections 2.1 and 2.2) and will be object of in-depth analyses in WP3.

Additional stakeholders will be searched and added by all H2TRUST in charge of data gathering. The stakeholders list will be therefore enlarged to represent as much as possible all main stakeholders pertaining to safety issues in the H2 sector.

At least 200 stakeholders will be mapped and contacted via on-line questionnaires or email (approx. 40 per Area). Feedbacks will be gathered in an organized fashion, common to all areas, so as to facilitate access to information and analysis activities in WP4.

2.5 Interviews

In order to fully exploit the process of gathering information, partners in charge of data gathering (in WP3) will select important stakeholders, i.e. stakeholders with high relevance to the project and high impact in terms of commercialised products, in order to fine tune the information already gathered in the questionnaires (i.e. to learn more about information provided in the questionnaires and collect more relevant information). The selected stakeholders will be contacted by the persons in charge, following an outline:

- Collect further details starting from the answers to the questionnaires.
- Regarding practices and hazards related to hydrogen technologies, what recommendations do the stakeholders have?
- Details about infrastructure, processes and applications.
- Feedback on current policies and enforcements.
- Recommendations on training of personnel and regulations.

The interviews will be conducted on the phone, or eventually in one-to-one meetings.

2.6 Document review and Observation

Relevant information will be collected from literature on hydrogen technologies, fuel cells and safety (books, magazines, books and other publications). The main identified journals and magazines are the following:

- Financial Times Energy
- Frontiers in Fuel Cells
- Fuel Cells.
- Fuel Cells Bulletin.

- Fuel Cell Systems.
- Journal of The Electrochemical Society.
- Journal of Fuel Cell Science and Technology.
- International Journal of Hydrogen Energy.
- Physical Review Letters.
- Proceedings of the Royal Society of London.
- Science.

The gathered information will be integrated into the WP3 and WP4 activities.

Moreover H2TRUST partners will collect and track information through questionnaires, interviews, reviews and documents, news and events regarding actual processes and strategies. Among the resources that will be tracked we have:

- Monitoring of conferences on hydrogen and fuel cells technologies like European Hydrogen Energy Conference, CHIC - A European Conference on Hydrogen Economy & Production, European Fuel Cell, European Fuel Cell Forum, EMPA, International Symposium on Solid Oxide Fuel Cells, Eurocity Conference, EuroFuelCell 2013, TRA2014.
- Publications from FP7 project on Energy, NMP and Environment topics related to hydrogen and fuel cells.
- Europe's Energy Portal, www.energy.eu
- European Energy Review, www.europeanenergyreview.eu
- European Hydrogen Association, www.h2euro.org
- FLEET Europe, www.fleeteurope.com
- Fuel Cell Today, <http://www.fuelcelltoday.com>
- Fuel Cells 2000, <http://www.fuelcells.org>
- GreenCar.com, <http://www.greencar.com>
- Hydrogen Fuel Cars Now, <http://www.hydrogencarsnow.com>
- National Fuel Cell Research Center, <http://www.nfcrc.uci.edu/2/default.aspx>
- U.S. Fuel Cell Council, <http://www.usfcc.com>
- HYSAFE, <http://www.hysafe.org/>

- IEA Hydrogen Safety, <http://www.ieahydrogensafety.com/>
- H2FC, <http://www.h2fc.eu/>

As for the Normative, the main sources to be monitored will be (as already detailed in D2.1)

- Fuel Cells and Hydrogen Joint Undertaking (FCH JU)
- ISO TC 197
- IEC TC 105
- EIHP2
- UN WP29
- NFPA
- Pressure equipment directive (97/23/EC)
- Transportable pressure equipment (99/39/EC)
- ATEX (94/9/EC)
- ATEX (99/92/EC)
- SEVESO II (96/82/EC)
- MACHINERY (98/37/EC)

The work of this task will be linked to the Literature study/discovery and the organization of H2TRUST document library as developed by MATGAS and EHA in Task 2.3

2.7 Focus groups

A focus group is a form of qualitative research in which a group of experts in the hydrogen and fuel cells sector are asked about their perceptions, opinions, beliefs, and attitudes towards hydrogen related products, services, concepts, ideas, and safety. Questions will be asked in a sort of interactive group setting where participants are free to talk with other group members. Brainstorming will be facilitated among experts, in order to validate the list of Safety issues/measures found in the first phase of the data gathering process, and to eventually come up with new issues and measures. The advantages are high depth of information, generation of ideas and wealth of information. Each WP3 Task leader will check the feasibility and eventually organize the focus group within its own operational conditions (network of stakeholders, resources, time, etc..).

As a matter of clarity, the Focus Groups represent the “discovery workshops with industry peers” mentioned in the DOW.

The Focus Groups will be organized in presence or via remote communication (telephone conference), according to location and possibilities of involved representatives.

For what it concerns task 3.5, a specific Focus Group will be organized by EHA with relevant policy makers, to obtain their feedback on the lists of safety issues produced as part of WP3 activities. Policy Makers will be asked to comment the lists and rank safety issues, according to their level of knowledge and perception of H2 safety issues (see also Annex 3 for more details).

2.8 Case studies

A case study is a descriptive, exploratory or explanatory analysis of a person, group or event. The aim is to gain quantitative evidence and benefits from the development of theoretical propositions on best practices in H2 safety and models. We will analyse 20 case studies (4 for each main application area) from selected stakeholders according to their relevance to H2TRUST in order to extensively describe and analyse best practices, and fully understand stakeholders experience and strategies.

The information will be matched with the information collected by questionnaires and interviews. The information will be gathered in WP3.

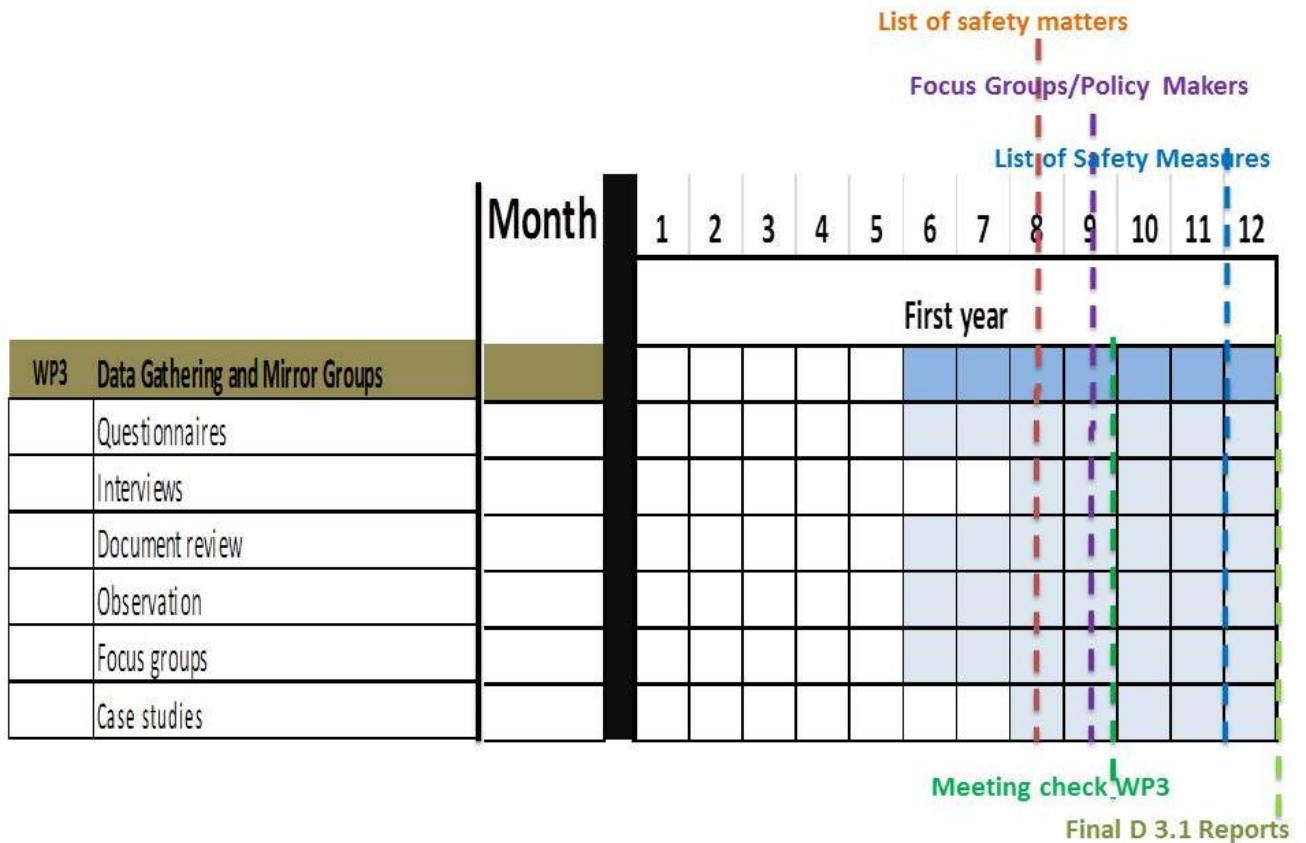
Case studies could include *best practises* or otherwise *worst practises*, underlining what has (or hasn't) worked in terms of handling and managing a safety issue that happened in real situations.

The most relevant case studies will be brought to the attention of partners, experts and stakeholders, as a basis of discussion. They will also form part of the communication and dissemination material associated to H2TRUST.

3 Annexes

3.1 Gantt Chart to achieve WP3 objectives

The following Table shows the timing expected for conducting the WP3 activities.



In particular:

- **Questionnaires** will be submitted to the identified stakeholders (see Deliverable 2.4) from month 6 (M6).
- Relevant **documents reviews**, observation and tracking activities and the creation of focus groups, will be conducted from M6.
- **Interviews** will be conducted from M8 after having analysed a first round of answers to the questionnaires submitted at M6, which will be worthy to be further analysed
- **Case studies** will be analysed starting from M8, after having analysed the questionnaires and interviews.
- A **first list of safety matters** and relevant data gathered will be prepared for each area. by half Jan-Feb 2014, and commented inside Mirror Groups.

- The above-mentioned lists will be discussed by each WP3 task leader in the **Focus Groups** (Month of Feb 2014), where a brainstorming session will allow to prioritize issues and eventually change/integrate the lists. As for Task 3.5, a specific Focus Group will be organized by EHA with relevant policy makers, to obtain their feedback. Policy Makers will be asked to comment the lists and rank safety issues, according to their level of knowledge and perception of H2 safety issues.
- A **mid-term check meeting** will be held in the month of February by all H2TRUST to comment main results and advances in data gathering and other WP3 activities.
- Mirror Groups will comment the lists of safety issues for each area, underlining the relevance of stakeholders and will produce a **list of relevant safety measures and instruments** with practical ways to address each of the safety issues identified (by April 2014)
- Report of all activities done in WP3 (for each area) will form the final version of **D3.1** (May 2014), which will include all data gathered, tools used, lists of safety issues and related measures&instruments, main results and KPIs met.

Each WP3 Task Leader and supporting partners (e.g. POLIMI and TuE) will start working on their specific activities from 15.11, and are expected to regularly update the coordinator (every 2 weeks starting from 15.11, i.e. on 30.11.13, 15.12.13, 15.01.14 etc.).

3.2 Questionnaires

In the following sections we will provide details regarding the questionnaires the will be sent to the relevant stakeholders.

3.2.1 Introductory part

The introductory part will consist of few lines of text explaining the purpose of the project, the aim of the questionnaire and its importance:

Dear Mr./Madam,

We are carrying out a European research project on safety related to the Hydrogen production, storage and utilisation called H2TRUST. (<http://h2trust.eu/>) The aim of H2TRUST project is to develop an easily accessible knowledge base on H2 safety, a re-usable validated H2 due diligence safety and risk assessment tool, and recommendations for immediate H2 deployment.

Within H2TRUST project, we are conducting a survey regarding expectations, needs, issues related to H2 safety. Your comments are highly important for our analyses, and ultimately for all H2 actors and the EU authorities. The questionnaire will be treated with anonymity, confidentiality and will not be used for other purpose.

Thank you in advance for your cooperation.

The H2TRUST Team

3.2.2 Main questions

1. In what sector, or sectors, are you mainly interested in relation to the hydrogen technologies and fuel cells safety matters (H2 Production, Storage and Distribution, Mobility and Vehicles, Non-vehicles and residential power generation, Regulations, Codes and Standards RCS).
2. Could you provide an estimate of the hydrogen/fuel cells market related to your specific sector in Europe and globally (competitors, market share)?
3. How do you think the H2 safety is perceived among your suppliers?
4. How do you think the H2 safety is perceived among your customer?
5. How do you think the H2 safety is perceived among your own workers?

6. How do you think the H2 safety is perceived among your subcontracted workers, which work in this issue?

7. How do you think the H2 safety is perceived among your neighbour, where are installed your hydrogen facilities?

3.2.3 Specific questions

3.2.3.1 H2 production

Topic: **Safety issues and measures in the process of steam methane reforming (and CO2 sequestration) and other fossil based processes (partial oxidation, plasma reforming, coal) for hydrogen production as well as water based techniques.**

1. What sub-category best identifies your interests? i) Steam methane reforming and CO2 sequestration; ii) Fossil based processes like partial oxidation, plasma reforming, coal; iii) Water based techniques (electrolysis, thermolysis etc.).

2. What are the decision making criteria within your organisation when introducing new processes, products or services related to hydrogen production?

3. What order of importance does your company give to the following hazards?

Hazards related to hydrogen	Unimportant				Very Important	Do not know
Ignition when mixed with oxygen	1	2	3	4	5	0
Propensity to leak and flow	1	2	3	4	5	0
Ability to embrittle certain materials	1	2	3	4	5	0
Invisible flame	1	2	3	4	5	0
Very cold in liquid form (-253oC)	1	2	3	4	5	0
Highly pressurised (70 Mpa)	1	2	3	4	5	0
Asphyxiant	1	2	3	4	5	0
Hazards linked to H2 colourless/odourless nature	1	2	3	4	5	0

4. What risks, hazards related to hydrogen mostly affect your organisation and clients and what are the consequences you face?

5. What are the main barriers to the introduction of new H2 production plants, in particular considering H2 safety?

6. Are there any solutions to overcome these barriers?

7. What are the main H₂ production safety issues faced by your organisation?
8. What solutions and measures were adopted by your organisation and how are they effective?
9. What are your needs in relation of the H₂ production safety?
10. How the aforementioned measures are perceived by your academic collaborators, customers and suppliers?
11. How the H₂ production safety and your measures are perceived by workers/employees/collaborators in your organisation?
12. How do you think H₂ production safety is perceived by EU citizens and citizens in your region?
13. Are you aware of promising technologies that might reduce safety issues in your sector?
14. Are you aware of promising practices that reduce or might reduce safety issues in your sector?

3.2.3.2 Storage and distribution

Topic: **Safety issues and measures in storage modes of: high pressure gas cylinders (up to 800 bar), liquid hydrogen in cryogenic tanks (at 21 K), solid hydrogen storage.**

1. What sub-category best identifies your interests? i) Storage modes based on Liquid H₂, gas pressure H₂, solid hydrogen.; ii) Distribution system.
2. What are the decision making criteria within your organisation when introducing new processes, products or services related to hydrogen storage and distribution, What order of importance does your company give to the following hazards?

Hazards related to hydrogen	Unimportant					Very Important	Do not know
Ignition when mixed with oxygen	1	2	3	4	5	0	
Propensity to leak and flow	1	2	3	4	5	0	
Ability to embrittle certain materials	1	2	3	4	5	0	
Invisible flame	1	2	3	4	5	0	
Very cold in liquid form (-253oC)	1	2	3	4	5	0	
Highly pressurised (70 Mpa)	1	2	3	4	5	0	
Asphyxiant	1	2	3	4	5	0	
Hazards linked to H ₂ colourless/odourless	1	2	3	4	5	0	

nature

3. What risks, hazards related to hydrogen mostly affect your organisation and clients and what are the consequences you face?
4. What are the main barriers to the introduction of new H2 storage and distribution systems, in particular considering H2 safety?
5. Are there any solutions to overcome these barriers?
6. What are the main H2 storage/distribution safety issues faced by your organisation and clients?
7. What solutions and measures were adopted by your organisation and how are they effective?
8. What are your needs in relation of the H2 storage/distribution safety?
9. How the aforementioned measures are perceived by academic collaborators, customers and suppliers?
10. How the H2 storage/distribution safety and your measures are perceived by workers/employees/collaborators/neighbours in your organisation?
11. How do you think H2 storage/distribution safety is perceived by EU citizens and citizens in your region?
12. Are you aware of promising technologies that might reduce safety issues in your sector?
13. Are you aware of promising practices that reduce or might reduce safety issues in your sector?

3.2.3.3 Mobility and vehicles

Topic: **Safety issues related to industry processes and infrastructure around the area of private, commercial and heavy transport powered by FCH and gather the corresponding safety issues.**

1. What sub-category best identifies your interests? i) Vehicles (underwater, surface, land), and aircrafts; ii) Public means of transport.
2. What are the decision making criteria within your organisation when introducing new processes and products related to hydrogen and fuel cells in vehicles?
3. What order of importance does your company give to the following hazards?

Hazards related to hydrogen	Unimportant				Very Important	Do not know
	1	2	3	4	5	0
Ignition when mixed with oxygen	1	2	3	4	5	0
Propensity to leak and flow	1	2	3	4	5	0
Ability to embrittle certain materials	1	2	3	4	5	0
Invisible flame	1	2	3	4	5	0
Very cold in liquid form (-253oC)	1	2	3	4	5	0
Highly pressurised (70 Mpa)	1	2	3	4	5	0
Asphyxiant	1	2	3	4	5	0
Hazards linked to H2 colourless/odourless nature	1	2	3	4	5	0

4. What risks, hazards related to hydrogen mostly affect your organisation and clients and what are the consequences you face?
5. What are the main barriers to the introduction of new vehicles fuelled by hydrogen (fully or in part), in particular considering H2 safety?
6. Are there any solutions to overcome these barriers?
7. What are the main mobility and vehicle hydrogen related safety issues faced by your organisation and clients? Are there specific issues related to large scale transportation and handling?
8. What solutions and measures were adopted by your organisation and how are they effective?
9. What are your needs in relation to hydrogen safety in the 'mobility and vehicles' sector?
10. How the aforementioned measures are perceived by your academic collaborators, customers and suppliers?
11. How the vehicles assembly and H2 safety and your measures are perceived by workers/employees/collaborators in your organisation?
12. How do you think H2 safety in vehicles and means of transport is perceived by EU citizens and citizens in your region?
13. Are you aware of promising technologies that might reduce safety issues in your sector?
14. Are you aware of promising practices that reduce or might reduce safety issues in your sector?

3.2.3.4 Non-vehicles and residential power generation

Topic: **Safety issue and extensive research into the state of FCH application for non-vehicle application especially on decentralized power-generation and remote back-up power systems, as a stationary storage mechanism for renewable energy and as part of smart grid systems.**

1. What sub-category best identifies your interests? i) Decentralized power-generation; ii) Remote back-up.
2. What are the decision making criteria within your organisation when introducing new processes and products related to hydrogen and fuel cells?
3. What order of importance does your company give to the following hazards?

Hazards related to hydrogen	Unimportant				Very Important	Do not know
Ignition when mixed with oxygen	1	2	3	4	5	0
Propensity to leak and flow	1	2	3	4	5	0
Ability to embrittle certain materials	1	2	3	4	5	0
Invisible flame	1	2	3	4	5	0
Very cold in liquid form (-253oC)	1	2	3	4	5	0
Highly pressurised (70 Mpa)	1	2	3	4	5	0
Asphyxiant	1	2	3	4	5	0
Hazards linked to H2 colourless/odourless nature	1	2	3	4	5	0

4. What risks, hazards related to hydrogen mostly affect your organisation and clients and what are the consequences you face?
5. What are the main barriers to the introduction of new non-vehicles and residential power generation products, in particular considering H2 safety?
6. Are there any solutions to overcome these barriers?
7. What are the main mobility and vehicle hydrogen related safety issues faced by your organisation and clients?
8. What solutions and measures were adopted by your organisation and how are they effective?
9. What are your needs in relation to hydrogen safety in the 'mobility and vehicles' sector?

10. How the aforementioned measures are perceived by your academic collaborators, customers and suppliers?
11. How the vehicles assembly and H2 safety and your measures are perceived by workers/employees/collaborators in your organisation?
12. How do you think H2 safety in vehicles and means of transport is perceived by EU citizens and citizens in your region?
13. Are you aware of promising technologies that might reduce safety issues in your sector?
14. Are you aware of promising practices that reduce or might reduce safety issues in your sector?

3.2.3.5 Regulations, codes and standards (RCS)

Topic: **State of the art as far as regulation, environmental protection, certification, incident handling and consumer perceptions.**

1. What sub-category best identifies your interests? i) Regulations and certifications; ii) Incident handling; iii) Environmental protection.
2. What are the decision making criteria within your organisation when elaborating or recommending regulations, codes and standards related to hydrogen and fuel cells?
3. What is the state-of-the-art in regulations/environmental protection, certification and incident handling?
4. What are the main barriers to the introduction of new standards and codes, in particular considering H2 safety?
5. Are there any solutions to overcome these barriers?
6. What are the main hydrogen related safety issues (including present standards and codes) faced by your organisation and clients?
7. What are your needs in relation to hydrogen safety in the RCS sector?
8. How do you think H2 safety is perceived by EU citizens and citizens in your region?
9. Are you aware of new and innovative regulations, standards and codes that might reduce safety issues for each of the following sectors?
 - a. H2 production
 - b. Storage and Distribution
 - c. Mobility and vehicles

- d. Non-vehicles and residential power generation
- e. Regulations, codes and standards (RCS)

10. Are you aware of H2 and Fuel Cells? If yes, what your opinion on the handling and safety of H2?
11. Do you know some H2 applications?
12. (Policy Makers): Do you have the impression you are well informed on H2 or you need more information?
13. (Policy Makers): do you have the impression that H2 safety matters are properly handled?

3.2.4 Supplementary questions

Questions beyond the scope of the hydrogen safety assessment.

1. What aspects do you think should be improved regarding H2 safety (incl. regional, national and EU aspects)?
2. What recommendations on hydrogen safety do you have for the EU institutions (incl. regional and national aspects)?
3. Do you have any H2 related actors and stakeholders that you wish to suggest for the present interview?
4. Do you think is there any lack of funding in relation to the development of hydrogen and fuel cells technologies, and H2 safety. Please, justify.
5. Do you think the hydrogen stakeholders are not efficiently connected to technology transfer centres and hydrogen clusters/platforms? Please, justify.

3.3 List of relevant stakeholders

Stakeholder	Name	Dept.	Website	Typology	Sector of interest	Subcategory	Geographic Location			Contact Person			Impact on the project (Low=1, High=5)	Relevance to the project
							City	Region	Country	Name	E-mail	Tel.		
AVL			www.avl.com	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Graz	Styria	AT	Helmut List	Helmut.List@avl.com	+43 316787 100	4	AVL is the world's largest independent company for the development of powertrain system
ISLENET, European Islands Network on Energy and Environment			www.islenet.net	SME	RCS	Regulations and certifications	Bruxelles	Bruxelles	BE	Panos Coroyannakis	panos@smilegov.eu	+32 274293 68	4	ISLENET is a network of European Island Authorities which promotes sustainable and efficient energy and environmental management. It actively promotes the adoption of local energy saving strategies and renewable energy projects.

Flemish Hydrogen and Fuel Cell Association	www.vswb.be	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Turnhout	Flemish Region	BE	Adwin Martens	adwin.martens@waterstofnet.eu	+32 14 71 11 34	4	VSWB association has the mission to promote the introduction and application of fuel cell and hydrogen technology in various application areas and support.
Bulgarian Hydrogen Society	bgh2society.org/en	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Sofia	Sofia	BG	prof. Alexander Krumov Popov	popov@bgh2society.org	+359 888650 925	4	BHS supports "Hydrogen Technologies"
Czech Hydrogen Technology Platform	www.hytep.cz	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Prague	Prague	CZ	Martin Fišer	fiser@unitedhydrogen.cz	+420 266173 573 / +420 222242 118	5	The mission of the Platform is to support the development of hydrogen technologies and the introduction of the hydrogen economy in the country.
Danish Partnership for Hydrogen and Fuel Cells	www.hydrogen.net.dk	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Fredriksberg	Capital Region of Denmark	DK	Aksel Mortensgaard	akmo@hydrogenet.dk	+45 392020 03	4	The Danish Partnership for Hydrogen and Fuel Cells promotes hydrogen and fuel cells in Denmark and creating a platform for international

													cooperation between Denmark and other countries.
Daintherm Power		dantherm-power.com	Large Enterprise	Non-vehicles and residential power generation	Remote back-up	Hobro	North Denmark	DK	Jesper Thomsen	jt@dantherm.com	+45 88435502	5	Dantherm Power develops clean energy backup power systems, utilizing Ballard Power Systems' proton exchange membrane (PEM) fuel cell technology for telecom suppliers including Motorola and Ericsson
H2 Logic		www.h2logic.com	SME	Non-vehicles and residential power generation	Remote back-up	Herning	Central Denmark	DK	Jacob Krogsgaard	jk@h2logic.com	+45 96275600	5	The ambition of H2 Logic is to act as a preferred supplier of H2Station® for international oil, energy and gas companies, and supplier of H2Drive® for global material handling vehicle manufacturers.

H2 Logic		www.h2logic.com	SME	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Herning	Central Denmark	DK	Jacob Krogsgaard	jk@h2logic.com	+45 962756 00	5	The ambition of H2 Logic is to act as a preferred supplier of H2Station® for international oil, energy and gas companies, and supplier of H2Drive® for global material handling vehicle manufacturers.
Technical University of Denmark	Department of Energy Conversion and Storage	www.kemi.dtu.dk	Academia /Research Centre	Storage& Distribution	Storage modes based on Liquid H2, chemical reactions, adsorption on surface, etc.	Lyngby	Capital Region	DK	Dr. Niels J. Bjerrum	njb@kemi.dtu.dk	+45 452523 07	4	Main fields of interest: PEM fuel cells, new membranes, hydrogen storage, Inorganic chemistry, electrochemistry, materials chemistry.
Fuel Cell Finland Industry Group		www2.teknologiateollisuus.fi	Enterprise (SME or Large)	Regulatory, codes and standards (RCS) organisations	Regulations and certifications	Helsinki	Uusimaa	FI	Ikäheimo Pauliina	Pauliina.Ikaheimo@teknologiateollisuus.fi	+358 407425 167	5	The mission of the Federation of Finnish Technology Industries is to ensure that the Finnish technology industry has the preconditions for success in the global marketplace.

Convion		convion.fi	SME	Non-vehicles and residential power generation	Decentralized power-generation	Espoo	Uusimaa	FI	Erkko Fontell	erkko.fontell@convion.fi	+358 103287 370	5	Convion Ltd. is a leading fuel cell system integrator committed to commercializing solid oxide fuel cell systems in range of 50–300kW for distributed power generation
Elcogen		www.elcogen.com/	SME	Non-vehicles and residential power generation	Decentralized power-generation	Espoo	Uusimaa	FI	Matti Noponen	matti.noponen@elcogen.com	+358 407329 696	5	Elcogen is a manufacturer and developer of high-performance anode-supported Intermediate Temperature Solid Oxide Fuel Cells (IT-SOFC) and SOFC stacks based on proprietary materials and technological solutions.
IFP Energies Nouvelles		www.ifpenouvelles.com	Academia /Research Centre	Hydrogen Production	Steam methane reforming and CO2 sequestration	Rueil - Malmaison	Île-de-France	FR	Stéphane Prendki	stephane.prendki@ifpenouvelles.fr	+33 147526 660	5	IFP Energies nouvelles (IFPEN) is a public-sector research and training center. It has an international scope, covering the fields of energy,

													transport and the environment.
Association Française de l'Hydrogène		www.afhypac.org	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Paris		FR	Claude Derive	info@afhypac.org	+33 153590 211	5	Its purpose is to promote technologies for hydrogen production from its use, and fuel cells.
Alstom		www.alstom.com/	Large Enterprise	Non-vehicles and residential power generation	Remote back-up	Levallois-Perret	Île-de-France	FR	Patrick Kron	patrick.kron@alstom.com	+ 33 141492 000	5	Alstom is a global leader in the world of power generation, power transmission and rail infrastructure and sets the benchmark for innovative and environmentally friendly technologies.
CETH2		ceth.fr/	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	VILLE BON-SURYVETTE	Île-de-France	FR	Pascal Pewinski	pascal.pewinski@ceth.fr	+33 674997 002	5	With more than 10 years expertise in the management of hydrogen systems, and a strong concern about sustainable development, CETH2 develops, manufactures and sells innovative CO2 free on site hydrogen

													generation solutions for industrial and energy applications
Commissariat à l'Energie Atomique (CEA)		www.cea.fr	Public Entity, Governmental/Non-profit	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Paris	Île-de-France	FR	Jean-Marc Agator	jean-marc.agator@cea.fr	+33 164501 000	5	CEA is a French government-funded technological research organisation. A prominent player in the European Research Area
Commissariat à l'Energie Atomique (CEA)		www.cea.fr	Public Entity, Governmental/Non-profit	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Paris	Île-de-France	FR	Jean-Marc Agator	jean-marc.agator@cea.fr	+33 164501 000	4	CEA is a French government-funded technological research organisation. A prominent player in the European Research Area
Conseil Régional Nord Pas de Calais		www.nordpasdecalais.fr	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Calais	Nord-Pas de Calais	FR	Cathy Buquet	c.buquet@nordpasdecalais.fr	+33 328828 282	4	Support to the development of the local highly innovative industry, also focusing on hydrogen technologies.

Conseil Régional Nord Pas de Calais	www.nordpasdecalais.fr	Public Entity, Governan- tional/N o-profit	RCS	Environment al protection	Calais	Nord- Pas de Calais	FR	Cathy Buquet	c.buquet@nordpasdecalais.fr	+33 328828 282	2	Support to the development of the local highly innovative industry, also focusing on hydrogen technologies.
Daimler	www.daimler.com	Large Enterpris e	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Kirch- heim /Tec- k- Nabe rn	Baden- Württ ember g	DE	Dr. Jörg Wind	joerg.wind@daimler.com	+49 702189 4614	2	With its divisions Mercedes-Benz Cars, Daimler Trucks, Mercedes- Benz Vans, Daimler Buses and Daimler Financial Services, the Daimler Group is one of the biggest producers of premium cars and the world's biggest manufacturer of commercial vehicles with a global reach.

Daimler		www.daimler.com	Large Enterprise	Storage & Distribution	Remote back-up	Kirchheim / Technik-Nabe rn	Baden-Württemberg	DE	Dr. Jörg Wind	joerg.wind@daimler.com	+49 702189 4614	5	With its divisions Mercedes-Benz Cars, Daimler Trucks, Mercedes-Benz Vans, Daimler Buses and Daimler Financial Services, the Daimler Group is one of the biggest producers of premium cars and the world's biggest manufacturer of commercial vehicles with a global reach.
Max-Planck Institute	Research on Collective Goods	www.coll.mpg.de	Academia / Research Centre	RCS	Regulations and certifications	Wuppertal	North Rhine-Westphalia	DE	Prof. Raimund Bleischwitz	raimund.bleischwitz@wupperinst.org	+49 202249 2256	5	Research focus: resource productivity, governance, comparative institutional analysis, European Union, the hydrogen economy.

Planet Gbr		www.planet-energie.de	SME	Storage & Distribution	Distribution system	Oldenburg	Lower Saxony	DE	Dr. Robert Steinberger-Wilckens	rst@planet-energie.de	+49 441850 51	5	<p>PLANET provides engineering and consulting services:</p> <p>i) for the efficient supply and use of energy; ii) for employing hydrogen as an energy carrier and for fuel cell technology.</p> <p>It is one of our key competences to combine research and development work with implementing innovative concepts in everyday operation.</p>
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Planet Gbr		www.planet-energie.de	SME	RCS	Regulations and certifications	Oldenburg	Lower Saxony	DE	Dr. Robert Steinberger-Wilckens	rst@planet-energie.de	+49 441850 51	4	<p>PLANET provides engineering and consulting services:</p> <p>i) for the efficient supply and use of energy; ii) for employing hydrogen as an energy carrier and for fuel cell technology.</p> <p>It is one of our key competences to combine research and development work with implementing innovative concepts in everyday operation.</p>
IKA		www.ika.rwth-aachen.de/	Academia /Research Centre	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Aachen	North Rhine-Westphalia	DE	Prof. Dr.-Ing. Lutz Eckstein	eckstein@ika.rwth-aachen.de	+49 241802 5601 / +49 241802 5603	4	Expertise in Motor Vehicles, electrical and drive systems

Hydrogen and Fuel Cell Network Nordrhein-Westfalen (NRW)	www.fuelcell-nrw.de	SME	Regulatory, codes and standards (RCS) organisations	Regulations and certifications	Düsseldorf	North Rhine-Westphalia	DE	Dr. Thomas Kattenstein	kattenstein@EnergieAgentur.NRW.de	+49 211866 4215	4	Position North Rhine-Westphalia as an internationally recognized location for the fuel cell and hydrogen technology. Support the development of the fuel cell and of adapted system components accompanied by a targeted basic research Introduction of the fuel cell into early markets as bridges for the mass market Support the establishment of a ready-to-market and sustainable hydrogen energy economy
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AGÖF (Association of ecologically oriented research and engineering institutions)		agoef.de	SME	RCS	Environmental protection	Springe-Eldagsen	Lower Saxony	DE	Dr. Robert Steinberger-Wilckens	rst@planet-energie.de	+49 441850 51	5	It is an association of independent consulting and service company who cooperate pollution measurements in the interior, interior analysis, environmental product testing, health and environment friendly building concepts and efficient energy systems
International partnership for Hydrogen and fuel cells in the Economy (IPHE)		www.iphe.net	SME	RCS	Regulations and certifications	Berlin	Berlin	DE	Dr. Klaus Bonhoff	klaus.bonhoff@now-gmbh.de secretariat@iphe.net	+49 202586 1394	3	IPHE serves as a mechanism to organize and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies.

German Hydrogen Association		www.dwv-info.de	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Berlin	Berlin	DE	Johannes Toepler	h2@dwv-info.de	+49 303982 099460	5	The German Hydrogen and Fuel Cell Association (DWV) promotes and prepares the general introduction of hydrogen as an energy carrier in the economy. It supports research and development to contribute to a solution of the future energy problems and the protection of the foundations of our existence.
German Hydrogen and Fuel Cell Association - DWV		www.dwv-info.de	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Berlin	Berlin	DE	Dr. Johannes Toepler	h2@dwv-info.de	+49 303982 099460	4	The German Hydrogen and Fuel Cell Association (DWV) promotes and prepares the general introduction of hydrogen as an energy carrier in the economy. It supports research and development to contribute to a solution of the

													future energy problems and the protection of the foundations of our existence.
OPEL		www.opel.com	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Rüsselsheim	Rhein-Main	DE	Ulrich Eberle	ulrich.eberle@de.opel.com	+49 614277 4805	5	Opel is one of Europe's largest automakers. Headquartered in Rüsselsheim, the company has 11 plants and four development and test centers in seven European countries. Opel employs around 37,000 people in Europe.
BMW		www.bmwgroup.com	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Munich	Bayern	DE	Norbert Reithofer	norbert.reithofer@bmw.de	+49 893822 5358	5	BMW or BMW AG, is a leading German automobile, motorcycle and engine manufacturing company

Ceramic fuel cells ltd.		www.cfcl.com.au	SME	Non-vehicles and residential power generation	Decentralized power-generation	Heinberg	North Rhine-Westphalia	DE	Frank Obernitz	frank.obernitz@cfcl.com.au	+49 245215 3766	5	Ceramic Fuel Cells is a world leader in developing and commercialising Solid Oxide Fuel Cell (SOFC) technology to generate efficient, low-emission electricity from widely available natural gas and renewable fuels.
E-ON		www.eon-uk.com	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Düsseldorf	Lower Saxony	DE	Johannes Teyssen	johannes.teyssen@eon.com	+49 211457 9331	5	One of the UK's leading power and gas companies - generating electricity, and retailing power and gas - and we're part of the E.ON group, one of the world's largest investor-owned power and gas companies.

Fuel Cells Energy Solutions	www.fc-es.de/	SME	Non-vehicles and residential power generation	Decentralized power-generation	Dresden	Saxony	DE	Chip Bottone	cbottone@fce.com	+49 351255 37390	5	FuelCell Energy Solutions manufactures, sells, installs, and services stationary fuel cell power plants that efficiently and economically generate electricity and usable high quality heat suitable for making steam.
Hydrogenics GmbH	www.hydrogenics.com	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Gladbeck	North Rhine-Westphalia	DE	Dr.-Ing. Bernd Pitschak	bpitschak@hydrogenics.com	+49 020439 44130	5	Hydrogenics has over 60 years of experience designing, manufacturing, building and installing industrial and commercial Hydrogen Systems around the globe.
Hydrogenics GmbH	www.hydrogenics.com	SME	Storage & Distribution	Decentralized power-generation	Gladbeck	North Rhine-Westphalia	DE	Dr.-Ing. Bernd Pitschak	bpitschak@hydrogenics.com	+49 020439 44130	5	Hydrogenics has over 60 years of experience designing, manufacturing, building and installing industrial and commercial Hydrogen Systems

													around the globe.
Hydrogen ics GmbH		www.hydrogenics.com	SME	RCS	Regulations and certifications	Gladbeck	North Rhine-Westphalia	DE	Dr.-Ing. Bernd Pitschak	bpitschak@hydrogenics.com	+49 020439 44130	5	Hydrogenics has over 60 years of experience designing, manufacturing, building and installing industrial and commercial Hydrogen Systems around the globe.
HYUNDAI		www.hyundai.de	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Neckarsulm	Baden-Württemberg	DE	Oliver Lajara	olajara@hyundai-europe.com	+49 692714 72321	4	It is a South Korean multinational automaker. The company employs about 75,000 people worldwide. Hyundai vehicles are sold in 193 countries.
iGas Engineering	Business Unit iGas	www.igas-engineering.de	Enterprise (SME or Large)	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Solingen	North Rhine-Westphalia	DE	Karl-Heinz Lentz	kh.lentz@erwand.de	+33 179360 282	4	iGas offers the full spectrum of process on the subject of gas from the gas source to the consumer in production, in the test field or in the laboratory. When it comes to the rules, feeding, measuring, mixing or analyzing

													technical and medical gases as well as pure or natural gas, iGas offers the right solution.
Fraunhofer Institute for Ceramic Technologies and Systems - IKTS	IKTS	www.ikts.fraunhofer.de/en.html	Academia /Research Centre	Non-vehicles and residential power generation	Decentralized power-generation	Dresden	Saxony	DE	Prof. Alexander Michaelis	Alexander.Michaelis@ikts.fraunhofer.de	+49 351255 37512	5	The Fraunhofer Institute for Ceramic Technologies and Systems IKTS, situated in Dresden and Hermsdorf, covers the complete field of advanced ceramics, from basic research to applications.

German-Energy-Agency (dena)	www.dena.de/en/	Public Entity, Governmental/Non-profit	Storage & Distribution	Distribution system	Berlin	Berlin	DE	Jörg Polzer	polzer@dena.de	+49 307261 65681	4	The Deutsche Energie-Agentur GmbH (dena) - the German Energy Agency - is the centre of expertise for energy efficiency, renewable energy sources and intelligent energy systems. dena's mission is to generate economic growth and maintain prosperity with ever lower energy inputs. If this is to be achieved, energy must be generated and used in both a national and international context as efficiently, safely and economically as possible with the least possible impact on climate.
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Ludwig-Bölkow-Systemtechnik GmbH	www.lbst.de/	SME	RCS	Environmental protection	Ottobrunn	Bayern	DE	Ulrich Bünger	coordinator@hylights.eu	+49 896081 100	3	<ul style="list-style-type: none"> . Over two decades of continuous expertise - Life cycle and carbon footprint analysis - Energy and climate protection strategies for communities . Interdisciplinary team . Bridging policy, economy, and technology . Global and long term perspective
Ludwig-Bölkow-Systemtechnik GmbH	www.lbst.de/	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Ottobrunn	Bayern	DE	Ulrich Bünger	coordinator@hylights.eu	+49 896081 100	3	<ul style="list-style-type: none"> . Over two decades of continuous expertise - Life cycle and carbon footprint analysis - Energy and climate protection strategies for communities . Interdisciplinary team . Bridging policy, economy, and technology . Global and long

													term perspective
EBZ GmbH		www.as-t.de/index.php	SME	Non-vehicles and residential power generation		Dresden	Saxony	DE	Michael Gansera	michael.gansera@ebz-dresden.de	+49 351479 390	3	EBZ, Fuel Cell Development and Distribution, is your competent partner in the high temperature fuel cell sector.
Centre for Renewable Energy Sources - CRES		www.cres.gr/	Academia /Research Centre	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Pikermi Attiki	East Attica	GR	Ioannis Agapitidis	pdg@cres.gr	+30 210 660322 1	4	The Centre for Renewable Energy Sources and Saving (CRES) is the Greek national entity for the promotion of renewable energy sources, rational use of energy and energy conservation.
Advent		www.advent-energy.com	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Athens	Athens	GR	Gregoriou Vasilis	gregoriou@iceht.forth.gr	+30 210637 8820	4	Advent Technologies is an international technology company that develops new materials and systems for energy applications based on its proprietary technology.

Institute of Chemical Eng. Sciences - FORCE/ICE-HT	www.iceht.forth.gr	Academia /Research Centre	Storage& Distribution	Decentralized power-generation	Patras	Achaia	GR	Gregoriou Vasilis	gregoriou@iceht.forth.gr	+30 261096 5205	5	The Institute of Chemical Engineering Sciences (ICE-HT) runs ca 35 RTD projects in cooperation with numerous industrial enterprises, universities and research institutes from Greece, as well as from other EU-member countries, USA, Japan, etc.
Hungarian Hydrogen Association	www.emet.hu	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Budapest	Central Hungary	HU	Váncza József	met@emet-online.hu	+36 120179 37	5	Members energetics dealing with professionals who work on hydrogen technologies.

ISLENSKA NYORKA - INE	www.newenergy.is/	SME	Non-vehicles and residential power generation	Remote back-up	Orku garður	Greater Reykjavík Area	IS	Jón Björn Skúlason	skulason@newenergy.is	+354 5880310	3	The company was formed in 1999 following a declaration from the Government of Iceland declaring to explore the possibility of exchanging from a fossil fuel paradigm in transport to utilising hydrogen. The company was formed as a public private partnership with key players from Iceland (current shareholders) and Daimler AG, Shell International (Shell Hydrogen) and Norsk Hydro (later Statoil).
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ISLENSKA NYORKA - INE	www.newenergy.is/	SME	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Orku garður	Greater Reykjavík Area	IS	Jón Björn Skúlason	skulason@newenergy.is	+354 588031 0	4	The company was formed in 1999 following a declaration from the Government of Iceland declaring to explore the possibility of exchanging from a fossil fuel paradigm in transport to utilising hydrogen. The company was formed as a public private partnership with key players from Iceland (current shareholders) and Daimler AG, Shell International (Shell Hydrogen) and Norsk Hydro (later Statoil).
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ISLENSKA NYORKA - INE	www.newenergy.is/	SME	Non-vehicles and residential power generation	Decentralized power-generation	Orku garður	Greater Reykjavik Area	IS	Jón Björn Skúlason	skulason@newenergy.is	+354 5880310	4	The company was formed in 1999 following a declaration from the Government of Iceland declaring to explore the possibility of exchanging from a fossil fuel paradigm in transport to utilising hydrogen. The company was formed as a public private partnership with key players from Iceland (current shareholders) and Daimler AG, Shell International (Shell Hydrogen) and Norsk Hydro (later Statoil).
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ENI Italy	www.eni.it	Large Enterprise	Hydrogen Production	Steam methane reforming and CO2 sequestration	Rome	Lazio	IT	Salvatore Meli	smeli@enitecnologie.eni.it	0039 025204 6831	4	We are a major integrated energy company, committed to growth in the activities of finding, producing, transporting, transforming and marketing oil and gas. Eni men and women have a passion for challenges, continuous improvement, excellence and particularly value people, the environment and integrity.
Italian Hydrogen and Fuel Cell Association	www.h2it.org	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Milan	Lombardy	IT	Marieke Reijalt	marieke@h2it.org	+39 340791 4751	5	The Italian Association for Hydrogen and Fuel Cells focuses on the Hydrogen Taskforce Italy and stimulate the creation of an infrastructure for the use of hydrogen.

Electro Power Systems SpA (EPS)		www.electropowersystems.com/	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Torino	Piemonte	IT	Ilaria Rosso	ilaria.rosso@electropowersystems.com	+39 011225 8223	4	Electro Power Systems SpA (EPS) is a recognized innovator and market leader for hydrogen-based fuel cell back up and energy storage solutions.
ENEL		www.enel.com	Large Enterprise	Hydrogen Production	Steam methane reforming and CO2 sequestration	Rome	Lazio	IT	Fulvio Conti	Fulvio.conti@enel.com	+39 068509 1	5	Enel is a multinational group based in Italy, a leading integrated player in the power and gas markets of Europe and Latin America, operating in 40 countries across 4 continents overseeing power generation from over 98 GW of net installed capacity and distributing electricity and gas through a network spanning around 1.9 million km

Environment Park		www.envipark.com/	SME	RCS	Regulations and certifications	Torino	Piemonte	IT	Davide Damosso	davide.damosso@envipark.com	+39 011225 7111	4	the role of the Environment Park is to stimulate and raise the demand for innovation by promoting project initiatives involving academia Piedmont, research centers, technological parks and innovation clusters.
H2 Nitidor		www.h2nitidor.it	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Codogno	Lombardy	IT	Matteo Dragoni	matteo.dragoni@h2nitidor.com	+39 037743 5192	4	H2Nitidor is a company with years of experience in designing and manufacturing high pressure electrolyzers. We are a team of experts, committed to the excellence and innovation on hydrogen technologies.

HYSYTEC H		www.hysytech.com	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Torino	Piemonte	IT	Massimo Antonini	massimiliano.antonini@hysytech.com	+39 011397 0273	5	Hysytech is a private company founded in 2003. Today it is a pioneer company in the field of process engineering. In particular, Hysytech main activities regard the design and construction of plants for chemical processes or energy production. We offer our clients innovative winning strategies for optimizing the energy balances of industrial processes improving the sustainability of their business.
FERA		www.ferarasrl.it/	SME	Non- vehicles and residential power generation	Remote back-up	Milano	Lombardy	IT	Francesco Gardin	info@ferasrl.it	+39 262690 471	3	Since 2012, FERA develops and supplies solar collectors tailormade for the production of thermal energy

													(FERA TH, TH COOLING FERA) and electrical (FERA FP)
Univ. of Padova	Dept. of Management and Engineering	www.unipd.it/en	Accademia /Research Centre	Non-vehicles and residential power generation	Decentralized power-generation	Vicenza	Veneto	IT	Prof. Giuseppe Chitarin	chitarin@gest.unipd.it	+39 044499 8721	2	Fusion for Energy Electromagnetic systems for metal processing
ENEA		www.enea.it	Accademia /Research Centre	Hydrogen Production	Steam methane reforming and CO2 sequestration	Rome	Lazio	IT	Dr. Giuseppe Girardi	girardi@casaccia.enea.it	+39 063048 3364	2	EA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development
ENEA		www.enea.it	Accademia /Research Centre	Hydrogen Production	Fossil based processes like partial oxidation, plasma reforming, coal	Rome	Lazio	IT	Dr. Giuseppe Girardi	girardi@casaccia.enea.it	+39 063048 3364	5	EA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development

ENEA		www.enea.it	Academia /Research Centre	Non-vehicles and residential power generation	Decentralized power-generation	Rome	Lazio	IT	Dr. Giuseppe Girardi	girardi@casaccia.enea.it	+39 063048 3364	5	EA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development
Latvian Hydrogen Association		www.h2lv.eu	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Riga	Riga	LV	Aivars Starikovs	aivars@h2lv.eu	+371 292429 95	5	Latvian Hydrogen Association was developed to help development of Hydrogen economics in Latvia
Lithuanian Energy Institute		www.lei.lt	Academia /Research Centre	RCS	Regulations and certifications	Kaunas	Kaunas	LT	Ramutė Grikštaitė	ramute@mail.lei.lt	+370 374019 33	3	Development of energy economy planning methods, investigation of safety and reliability of the power plants, their impact on the environment, efficient energy consumption and the renewable energy sources.

Mertens European Investment Bank		www.eib.org/	Investor	Investment		Luxembourg	Luxembourg	LU	Dario Scannapieco	d.scannapieco@eib.org	+352 43791	3	The EIB is the European Union's bank. We are the only bank owned by and representing the interests of the European Union Member States. We work closely with other EU institutions to implement EU policy.
JRC	Institute for Energy	iet.jrc.ec.europa.eu	Academia /Research Centre	RCS	Regulations and certifications	Alkmaar	North Holland	NL	Stathis Peteves	stathis.peteves@jrc.nl	+31 224565 245	5	The Institute for Energy and Transport (IET) provides scientific and technical support on energy issues to policy makers of the European Union (EU). Special emphasis is given to the security of energy supply and to more sustainable, safer and cleaner energy production and use for the future.

JRC	Institute for Energy	iet.jrc.e c.europa.eu	Academia /Research Centre	Non-vehicles and residential power generation	Decentralized power-generation	Alkmaar	North Holland	NL	Stathis Peteves	stathis.peteves@jrc.nl	+31 224565 245	5	The Institute for Energy and Transport (IET) provides scientific and technical support on energy issues to policy makers of the European Union (EU). Special emphasis is given to the security of energy supply and to more sustainable, safer and cleaner energy production and use for the future.
JRC	Institute for Energy	iet.jrc.e c.europa.eu	Academia /Research Centre	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Alkmaar	North Holland	NL	Stathis Peteves	stathis.peteves@jrc.nl	+31 224565 245	5	The Institute for Energy and Transport (IET) provides scientific and technical support on energy issues to policy makers of the European Union (EU). Special emphasis is given to the security of energy supply and to more sustainable, safer

													and cleaner energy production and use for the future.
Dutch Hydrogen and Fuel Cell Association		www.waterstofvereniging.nl	Enterprise (SME or Large)	RCS	Regulations and certifications	Amersfoort	Utrecht	NL	Ellart de Wit	ellart.de.wit@hygear.nl	+31 651452 034	5	The aim of the merger is to have all hydrogen activities. Contact This is both the Dutch government and the European Union is a major advantage. In the NWBA are both producers of hydrogen as the complete hydrogen industries, from generators to gas station.

Shell Hydrogen B.V.		www.shell.com/hydrogen	Large Enterprise	Non-vehicles and residential power generation	Remote back-up	The Hague	South Holland	NL	Axel Pommerenke	axel.pomm eraenke@shell.com	+31 703779 111	5	It participates in partnerships that explore the development of a hydrogen market and help reduce costs. As a world leading company in the oil&gas sector, a shift towards hydrogen related technologies will be an important factor.
AkzoNobel	Akzo Nobel Polymer Chemicals B.V.	www.akzonobel.com	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Amersfoort	Utrecht	NL	Dick van Beelen	dick.vanbeelen@akzonobel.com	+31 334676 370	5	AkzoNobel is a leading global paints and coatings company and a major producer of specialty chemicals.
Hygear		hygear.nl	SME	Hydrogen Production	Steam methane reforming and CO2 sequestration	Arnhem	Gelderland	NL	Ellart de Wit	ellart.de.wit@hygear.nl	+31 889494 300	3	HyGear is a clean tech company, specialized in the downscaling of chemical processes. Hygear's lead product is a family of on-site hydrogen generators based

													on steam reforming, which can be installed at the (industrial) end users' sites.
Hygear		hygear.nl	SME	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Arnhem	Gelderland	NL	Ellart de Wit	ellart.de.wit@hygear.nl	+31 889494 300	5	HyGear is a clean tech company, specialized in the downscaling of chemical processes. Hygear's lead product is a family of on-site hydrogen generators based on steam reforming, which can be installed at the (industrial) end users' sites.
HyET		www.hyet.nl	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Arnhem	Gelderland	NL	Wiebrand Kout	Wiebrand.Kout@HyET.nl	+31 263623 944	5	HyET (Hydrogen Efficiency Technologies) develops cutting edge hydrogen technology for industrial and automotive

													applications.
HyET		www.hyet.nl	SME	Non-vehicles and residential power generation	Decentralized power-generation	Arnhem	Gelderland	NL	Wiebrand Kout	Wiebrand.Kout@HyET.nl	+31 263623 944	5	HyET (Hydrogen Efficiency Technologies) develops cutting edge hydrogen technology for industrial and automotive applications.
Norwegian Hydrogen Forum		www.hydrogen.no	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Kjeller	Akershus	NO	Helle B. Mostad	helle.brit.mostad@hydro.com	+47 971798 21	5	The Hydrogen Council is an expert panel, elected by the Ministry of Petroleum and Energy and the Norwegian Ministry of Transport and Communication. The Council consists of representatives from industry, research, education and organizations, and acts as an advisory board to the

													Ministries in matters related to hydrogen.
Norwegian Hydrogen Forum		www.hydrogen.no	Public Entity, Governmental/Non-profit	RCS	Environmental protection	Kjeller	Akershus	NO	Helle B. Mostad	helle.brit.mostad@hydro.com	+47 97179821	5	The Hydrogen Council is an expert panel, elected by the Ministry of Petroleum and Energy and the Norwegian Ministry of Transport and Communication. The Council consists of representatives from industry, research, education and organizations, and acts as an advisory board to the Ministries in matters related to

													hydrogen.
Polish Hydrogen Association		www.hydrogen.edu.pl	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Cieszyn	Cieszyn	PL	prof. Janina Molenda	hydrogen@agh.edu.pl	+48 126172 522	5	Polish Hydrogen And Fuel Cell Association currently has 159 regular members (including 42 professors), 2 honorary members and 11 supporting members. The Association cooperates with many domestic and foreign institutions.
Portuguese Hydrogen Association		www.ap2h2.pt	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Torres Vedras	Centro	PT	Joao Luis Toste de Azevedo	toste@ist.utl.pt	+351 261910 180	5	Association for the promotion of hydrogen technologies

LNEG-National Laboratory for Energy and Geology	www.esia.eu	Academia /Research Centre	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Lisbon	Lisboa e Vale do Tejo	PT	Dr. Carmen M. Rangel	ali@fsec.ucf.edu	+351 210924 664	4	European Sustainable Energy Innovation Alliance, is an association of cross-sector organisations leading the field of sustainable energy systems, from energy provision to energy consumption in research, teaching and innovation
LNEG-National Laboratory for Energy and Geology	www.esia.eu	Academia /Research Centre	Storage& Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Lisbon	Lisboa e Vale do Tejo	PT	Dr. Carmen M. Rangel	ali@fsec.ucf.edu	+351 210924 664	5	European Sustainable Energy Innovation Alliance, is an association of cross-sector organisations leading the field of sustainable energy systems, from energy provision to energy consumption in research, teaching and innovation

Macedonian Association for Hydrogen		www.tmf.ukim.edu.mk/MAH2	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Skopje	Skopje Region	Rep. Of Macedonia	Svetimir Hadži Jordanov	shj@ian.tmf.ukim.edu.mk	+389 23064392	5	Macedonian Association for Hydrogen MAH2 is a non-profit, independent, non-governmental formation.
Polytechnic University of Bucharest	Department of Physics	www.upb.ro/en/	Academia /Research Centre	RCS	Regulations and certifications	Bucharest	Bucharest	RO	Prof. Laurentiu Fara	laurf@nare.renerg.pub.ro	+40 14104542	5	Main fields of interest: Solar energy conversion (solar thermal and PV) & thermal storage; Synergetics; Renewable energy policies and environmental issues
Slovenian Hydrogen Association – DCHT and CoE LCT		www.conot.si www.dcht.eu	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Ljubljana	Ljubljana	SK	prof. Dr. Miran Gaberšček	direktor@conot.si	+386 14760414	5	Program Center of Excellence CoE LCT is funded under the priority axis 1 Competitiveness and research excellence and priorities 1.1 Improvement of competitiveness and research excellence in the framework of the Operational Programme for

													Strengthening Regional Development Potentials 2007-2013.
NTDA Energia		www.ntdaenergia.com	SME	Non-vehicles and residential power generation	Decentralized power-generation	Valencia	Valencia	ES	Marta González-Eguizabál	mmonter@ntdaenergia.com	+34 961318 036	4	NTDA Energia engages in the development and deployment of hydrogen and fuel cell technologies in Spain.
Spanish Hydrogen Association -AeH2		www.aeh2.org	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Sevilla	Andalucía	ES	Miguel Angel Jiménez-Velasco Mazarío	abengoa@abengoa.com	+34 954937 000	4	The main objective of the Spanish Hydrogen Association (AeH2) is to promote the development of hydrogen technologies as an energy vector and promote their use in industrial and commercial

													applications.
Albengoa		www.abengoa.com	Large Enterprise	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Sevilla	Andalucía	ES	Miguel Angel Jiménez-Velasco Mazarío	abengoa@abengoa.com	+34 954937 000	5	Abengoa applies innovative technology solutions for sustainability in the energy and environment sectors, generating electricity from renewable resources, converting biomass into biofuels and producing drinking water from sea water.

Albengoa		www.albengoa.com	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Sevilla	Andalucía	ES	Miguel Angel Jiménez-Velasco Mazarío	albengoa@albengoa.com	+34 954937 000	5	Albengoa applies innovative technology solutions for sustainability in the energy and environment sectors, generating electricity from renewable resources, converting biomass into biofuels and producing drinking water from sea water.
Hynergreen		www.hynergreen.com	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Sevilla	Andalucía	ES	África Castro	afrika.castro@hynergreen.abengoa.com	+34 954937 180	5	Hynergreen is an Albengoa subsidiary to organize and develop activities and projects connected with electricity production utilizing different fuel cell technologies, as well as the production of hydrogen from renewable sources

IBERDROLA		www.iberdrola.es	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Bilbao	Basque	ES	Jose Ignacio Sanchez Galan	pre.ib@iberdrola.es	+34 917842 931	5	THE WORLD LEADER IN WIND POWER. ONE OF THE TOP ELECTRIC UTILITIES IN THE WORLD. SPAIN'S NUMBER ONE ENERGY GROUP
Energy Agency of Andalusia		www.agenciaandaluzadelaenergia.es	Public Entity, Governmental/Non-profit	Non-vehicles and residential power generation	Decentralized power-generation	Sevilla	Andalusia	ES	Elias Atienza	elias.atienza@corporaciontecnologica.com	+34 954786 335	4	The world leader in wind power. One of the top electric utilities in the world. Spain's number one energy group
Foundation for the Development of New Hydrogen Technologies in Aragon		www.hidrogenoaragon.org/en	Public Entity, Governmental/Non-profit	RCS	Regulations and certifications	Huesca	Aragon	ES	Luis-Carlos Correas-Uson	lcorreas@hidrogenoaragon.org	+34 974215 258	5	The mission of the Foundation is to carry out the organization, management and execution of a wide range of actions with the purpose of generating, storing and transporting hydrogen, for its use in fuel cells, in transport applications or for the generation of distributed energy.

Foundation for the Development of New Hydrogen Technologies in Aragon	www.hidrogeneroaragon.org/en	Public Entity, Governmental/Non-profit	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Huesca	Aragon	ES	Luis-Carlos Correas-Uson	lcorreas@hidrogenoaragon.org	+34 974215 258	5	The mission of the Foundation is to carry out the organization, management and execution of a wide range of actions with the purpose of generating, storing and transporting hydrogen, for its use in fuel cells, in transport applications or for the generation of distributed energy.
Foundation for the Development of New Hydrogen Technologies in Aragon	www.hidrogeneroaragon.org/en	Public Entity, Governmental/Non-profit	Mobility and vehicles		Huesca	Aragon	ES	Luis-Carlos Correas-Uson	lcorreas@hidrogenoaragon.org	+34 974215 258	5	The mission of the Foundation is to carry out the organization, management and execution of a wide range of actions with the purpose of generating, storing and transporting hydrogen, for its use in fuel cells, in transport applications or for the generation of distributed energy.

Hydrogen Sweden	www.vatgas.se	Public Entity, Governmental/Non-profit	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Göteborg	Västra Götaland	SE	Bjorn Arronson	bjorn.aronson@vatgas.se	+46 3343773	5	Hydrogen Sweden is a partnership that works to facilitate the introduction of hydrogen and fuel cells in the society. Members and funding comes from businesses, institutions, municipalities, regions, national authorities and associations.
Hydrogen Sweden	www.vatgas.se	Public Entity, Governmental/Non-profit	Non-vehicles and residential power generation	Remote back-up	Göteborg	Västra Götaland	SE	Bjorn Arronson	bjorn.aronson@vatgas.se	+46 3343773	5	Hydrogen Sweden is a partnership that works to facilitate the introduction of hydrogen and fuel cells in the society. Members and funding comes from businesses, institutions, municipalities, regions, national authorities and associations.

Hydrogen Sweden	www.vatgas.se	Public Entity, Governmental/Non-profit	Storage & Distribution	Storage modes based on Liquid H ₂ , chemical reactions, adsorption on surface, etc.	Göteborg	Västra Götaland	SE	Bjorn Arronson	bjorn.aronsson@vatgas.se	+46 3343773	4	Hydrogen Sweden is a partnership that works to facilitate the introduction of hydrogen and fuel cells in the society. Members and funding comes from businesses, institutions, municipalities, regions, national authorities and associations.
Swiss Federal Office of Energy - SFOE	www.hydropole.ch	Public Entity, Governmental/Non-profit	Hydrogen Production		Bern	Bern	CH	Dr. Stefan Oberholzer	stefan.oberholzer@bfe.admin.ch	+41 313258920	4	The Swiss Hydrogen Association HYDROPOLE is the national network for hydrogen-related matters in Switzerland. HYDROPOLE is a knowledge and information cluster focused on all aspects of past, present and future use of hydrogen.

Swiss Federal Office of Energy - SFOE	www.hydropole.ch	Public Entity, Governmental/Non-profit	Storage & Distribution		Bern	Bern	CH	Dr. Stefan Oberholzer	stefan.oberholzer@bfe.admin.ch	+41 313258 920	4	The Swiss Hydrogen Association HYDROPOLE is the national network for hydrogen-related matters in Switzerland. HYDROPOLE is a knowledge and information cluster focused on all aspects of past, present and future use of hydrogen.
European Fuel Cell Forum - EFCF	www.efcf.com/	Enterprise (SME or Large)	Dissemination		Luzern	Lucern	CH	Prof. Frano Barbir	fbarbir@fesb.hr	+41 445865 644	5	The EUROPEAN FUEL CELL FORUM was founded in 1994 by Ulf Bossel for the promotion of the innovative technology by technical and scientific conferences, by relevant literature and by unbiased information of the media. On an early base many highly successful conferences have been organized.

GAZ-LAB Ltd.		www.gaz-lab.com	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Nilüfer	Marmara	TR	Barkin Arikut	barkin@gaz-lab.com	+90 532709 2429	4	GAZ-LAB Gas Technologies Ltd. is a high tech firm focused on oxygen, nitrogen, hydrogen, carbon dioxide, ozone and other gases. We research, develop, generate projects, apply and, consult the industrial applications of such gases. We have a well experienced team with strong r&d functions.
Ricardo		www.ricardo.com	Large Enterprise	Non-vehicles and residential power generation	Decentralized power-generation	Shorham-by-Sea	West Sussex	UK	Nick Owen	nick.owen@ricardo.com	+44 127345 5611	5	Ricardo is a leading global provider of product innovation, engineering solutions, clean technology and strategic consulting.

Ricardo		www.ricardo.com	Large Enterprise	Non-vehicles and residential power generation	Remote back-up	Shorham-by-Sea	West Sussex	UK	Nick Owen	nick.owen@ricardo.com	+44 127345 5611	5	Ricardo is a leading global provider of product innovation, engineering solutions, clean technology and strategic consulting.
University of Glamorgan	Hydrogen Research Unit	serc.research.southwales.ac.uk	Academia /Research Centre	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Pontypridd	Wales	UK	Dr Giuliano Premier	gcpremier@glam.ac.uk	+44 144348 2333	5	interest: energy from renewables and the hydrogen economy, biological fuels
Fuel Cells Applications	Centre for Process Innovation	www.uk-cpi.com/	SME	Non-vehicles and residential power generation	Decentralized power-generation	Wilton	England	UK	Graham Hillier	Graham.Hillier@uk-cpi.com	+44 164245 5340	5	The Centre for Process Innovation uses applied knowledge in science and engineering combined with state of the art facilities to enable our clients to develop, prove, prototype and scale up the next generation of products and processes.

UK Hydrogen Association		www.ukhfca.co.uk	Public Entity, Governmental/Non-profit	Hydrogen Production		Aldwinchile	Northamptonshire	UK	Mohammad Ahsan	mahsan@acieu.net	+44 203141 0606	5	The UK Hydrogen and Fuel Cell Association acts on behalf of its members to accelerate the commercialization of fuel cell and hydrogen energy technologies. We provide a respected and authoritative point of contact and a clear, informed and up-to-date view on research, development and demonstration priorities for Government, other funding agencies and opinion formers.
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UK Hydrogen Association	www.ukhfca.co.uk	Public Entity, Governmental/Non-profit	Storage & Distribution		Aldwinchley	Northamptonshire	UK	Mohammad Ahsan	mahsan@acieu.net	+44 203141 0606	5	The UK Hydrogen and Fuel Cell Association acts on behalf of its members to accelerate the commercialization of fuel cell and hydrogen energy technologies. We provide a respected and authoritative point of contact and a clear, informed and up-to-date view on research, development and demonstration priorities for Government, other funding agencies and opinion formers.
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UK Hydrogen Association	www.ukhfca.co.uk	Public Entity, Governmental/Non-profit	Non-vehicles and residential power generation		Aldwinchile	Northamptonshire	UK	Mohammad Ahsan	mahsan@acieu.net	+44 203141 0606	5	The UK Hydrogen and Fuel Cell Association acts on behalf of its members to accelerate the commercialization of fuel cell and hydrogen energy technologies. We provide a respected and authoritative point of contact and a clear, informed and up-to-date view on research, development and demonstration priorities for Government, other funding agencies and opinion formers.
ITM Power	www.itmpower.com	SME	Hydrogen Production	Water based techniques (electrolysis, thermolysis etc.)	Sheffield	Yorkshire and the Humber	UK	Stephen Jones	sj@itmpower.com	+44 114263 7636	5	ITM Power designs and manufactures hydrogen energy systems for energy storage and clean fuel production.

Adelan Ltd		www.adelan.co.uk/	SME	Non-vehicles and residential power generation	Decentralized power-generation	Birmingham	West Midlands	UK	Prof K Kendall	k.kendall@bham.ac.uk	+44 075149 20566	5	Adelan aims to: <ul style="list-style-type: none"> - commercialise a UK innovation through product development - promote new businesses/local job creation in the supply chain - stimulate economic benefit for the UK and EU
AFC Energy		www.afcenergy.com	SME	Non-vehicles and residential power generation	Decentralized power-generation	Cranleigh	Surrey	UK	Dr. Gene Lewis	glewis@afcenergy.com	+44 148327 6726	4	AFC Energy is now the world's leading developer of low-cost alkaline fuel cell technology. Focused on large-scale industrial applications, the technology is fully-scalable to provide clean electricity on-demand.
University of Birmingham	School of Chemical Engineering	www.birmingham.ac.uk	Academia /Research Centre	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Birmingham	West Midlands	UK	Prof K Kendall	k.kendall@bham.ac.uk	+44 121 414 2739	5	interests: hydrogen filling station, refuelling

QinetiQ		www.qinetiq.com	Large Enterprise	Mobility and vehicles	Vehicles (underwater, surface, land), and aircrafts	Farnborough	Hampshire	UK	Dr Simon B. Dodd	sbdodd@qinetiq.com	+44 125239 2846	4	experts in defence, aerospace and security. They work with customers to help maximise their energy efficiency, secure affordable energy sources, reduce their environmental impact and seize the commercial opportunities presented by the greening of the economy.
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