



HYACINTH

HYdrogen Acceptance IN Transition pHase

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Brussels, 21-22 November

PROJECT OVERVIEW



Project Information

Call topic	SP1-JTI-FCH.2013.5.3 Social acceptance of FCH technologies throughout Europe
Grant agreement number	621228
Application area (FP7) or Pillar (Horizon 2020)	Cross-cutting
Start date	01/09/2014
End date	28/02/2017
Total budget (€)	999,383
FCH JU contribution (€)	661,584
Other contribution (€, source)	None
Stage of implementation	86% project months elapsed vs total project duration, at date of November 1, 2016
Partners	Fraunhofer-ISI; NORSTAT; Aberdeen City Council; University of Sunderland; University of Leeds; I+F; RCVT; CIEMAT; CIDAUT; CNH2.

Impressions after driving a FCEV



<https://www.youtube.com/watch?v=OJHyXGWxCzg>

The poster features a background image of a white hydrogen fuel cell vehicle (FCEV) with people around it. The Hyacinth logo is in the top left. The event title "WHEC2016 Drive and Ride Event" is centered. A "PARTNERS" section is enclosed in a dashed box, listing various organizations. At the bottom, there is a funding acknowledgment from FCH JU and the event dates.

Hyacinth

Hydrogen Acceptance in the Transition Phase - HYACINTH

WHEC2016

Drive and Ride Event

PARTNERS

- UNIVERSITY OF LEEDS
- University of Sunderland
- Cleantech
- ABERDEEN CITY COUNCIL
- Razvojni center za vodikove tehnologije
- cidaut
- Fraunhofer ISI
- NORSTAT
- iplus|F
- H Hidrógeno

This Project has received funding from the Fuel Cells and Hydrogen Joint Undertaking (FCH-JU) under grant agreement N° 621228)*.

June 13th to 15th 2016

FCH JU Hyacinth Project: Impressions after driving a hydrogen fuelled car

PROJECT SUMMARY



- **MAIN AIMS:** to gain a deeper understanding of the social acceptance of hydrogen technologies across Europe.
- Identify and understand awareness and acceptance of hydrogen energy and FCH technology and perceive potential benefits in the general public and at selected stakeholders.
- Identify the main drivers of social awareness and acceptance of FCH technologies in order to provide recommendations.
- Support stakeholders by providing a social acceptance research toolbox.

HYdrogen ACceptance IN the Transition pHase Hyacinth

The main objective of HYACINTH project is to gain a deeper understanding of the social acceptance of hydrogen and fuel cell (HFC) technologies across Europe.

The social acceptance is widely recognized as a key dimension in the sustainable implementation of HFC technologies.

HYACINTH aims to:

- Identify and understand awareness and acceptance of hydrogen energy and HFC technologies,
- Identify the main drivers of social awareness and acceptance of HFC technologies, and
- Support stakeholders with a social acceptance management toolbox.

The HYACINTH project:
Runs from September 2014 to February 2017 and the data collection is made in seven European countries with different level of support and implementation of HFC technologies: Belgium, France, Germany, Norway, Slovenia, Spain and United Kingdom.

The project will focus on the specific transition phase of market implementation, between demonstration and market. Combining specific qualitative and quantitative methods and samples of 7,000 surveys of European citizens and about 400 selected stakeholders.

This project has received funding from the Fuel Cells and Hydrogen Joint Undertaking (FCH-JU) under grant agreement N° 621228

Logos: H2 Hidrogeno, iplusif, ARBELEN, Fraunhofer, Citeam, cidaut, FCH, NORSTAT, UNIVERSITY OF LEEDS, University of Sunderland

PROJECT PROGRESS/ACTIONS - PUBLIC SURVEY

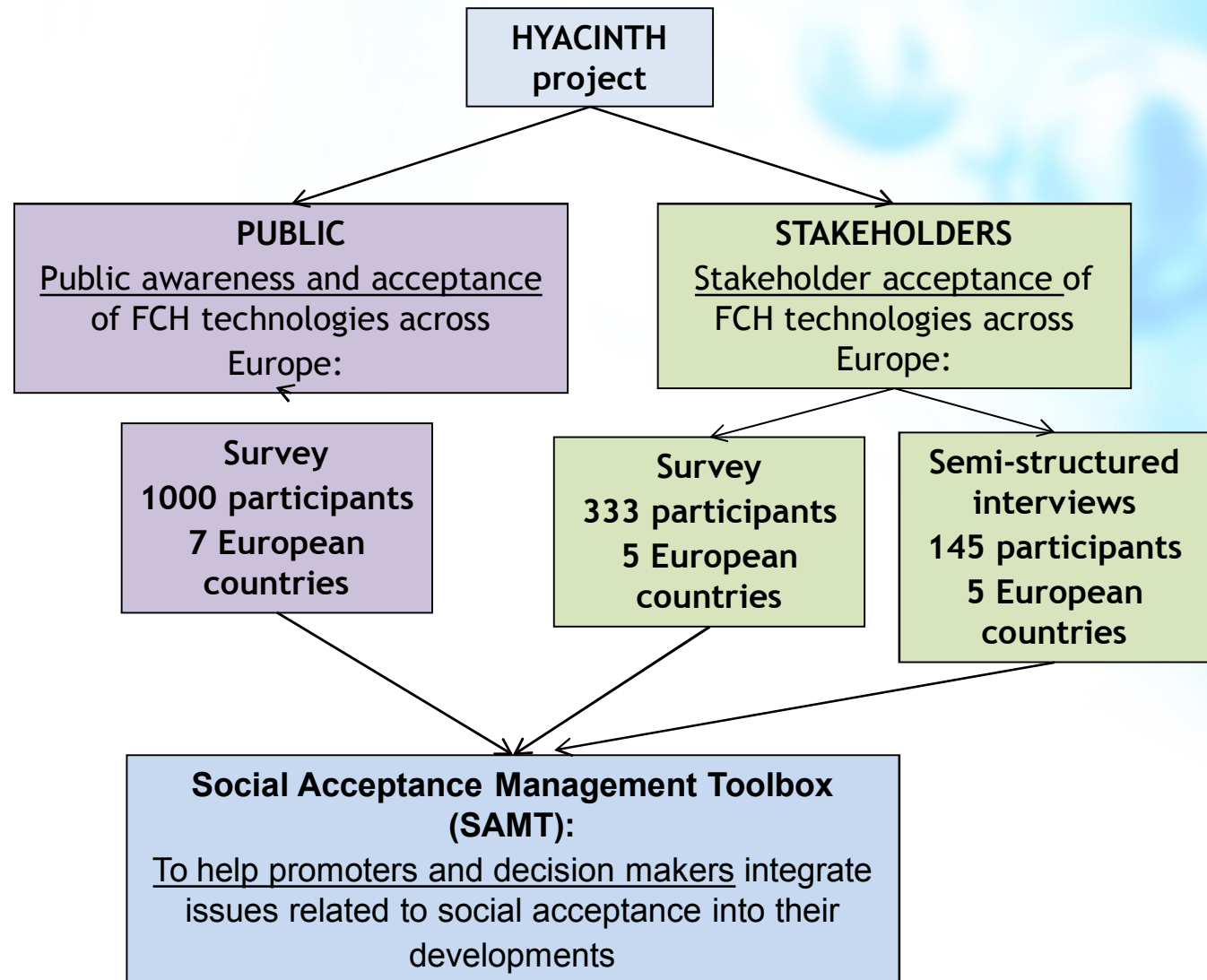


Studies:

1. **Public** awareness and acceptance of FCH technologies across Europe.
2. **Stakeholder** acceptance of FCH technologies across Europe

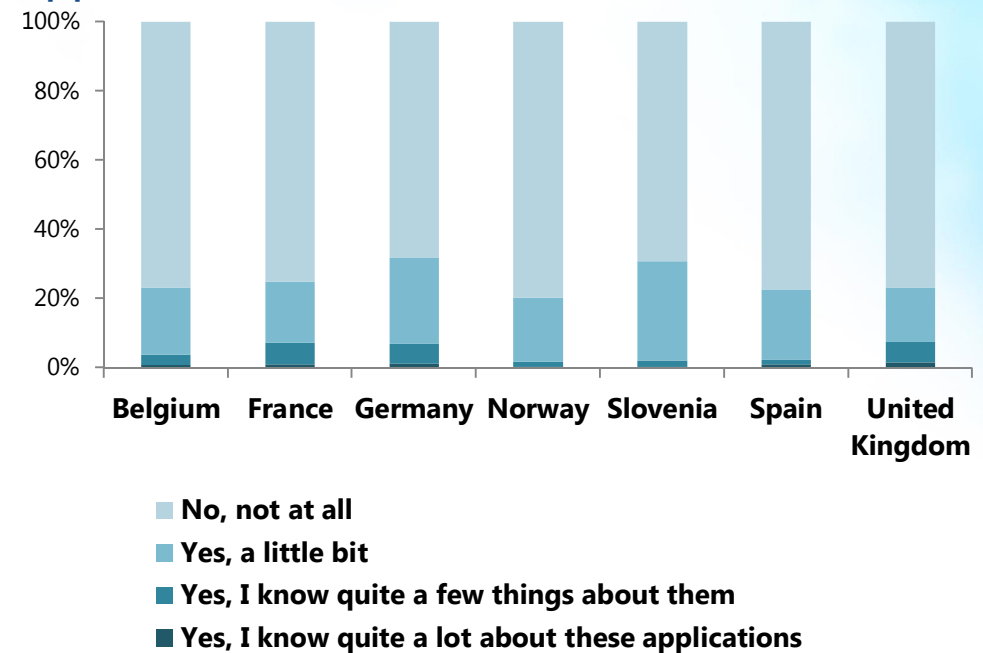
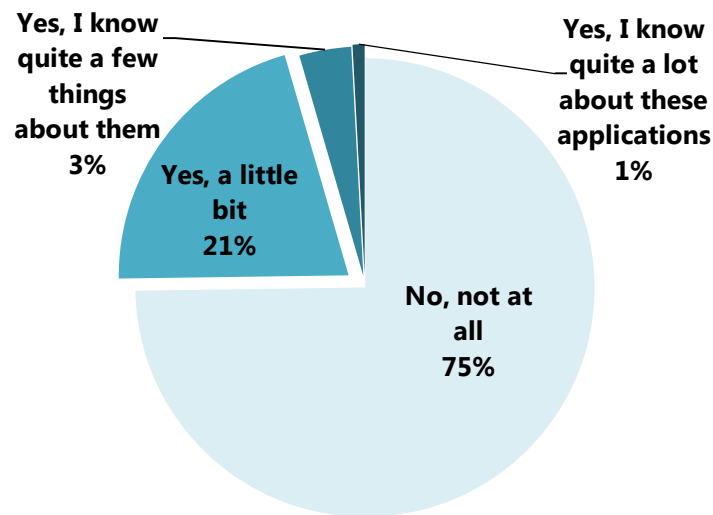
Studied applications:

1. Hydrogen fuel cell stationary residential applications
2. Hydrogen fuel cell transport applications and related infrastructures

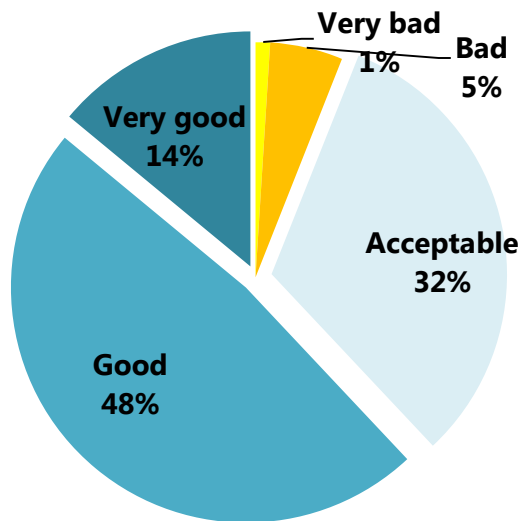


Awareness of residential hydrogen fuel cells

The level of public awareness about home HFCs is very low in the seven studied populations. **Only around 25% of respondents report having heard about residential fuel cell micro-CHP** (this is 15 percentage points lower than the level of awareness of HFCs in general). And less than 5% consider themselves knowledgeable about this application.



Informed evaluation/global attitude of home HFCs



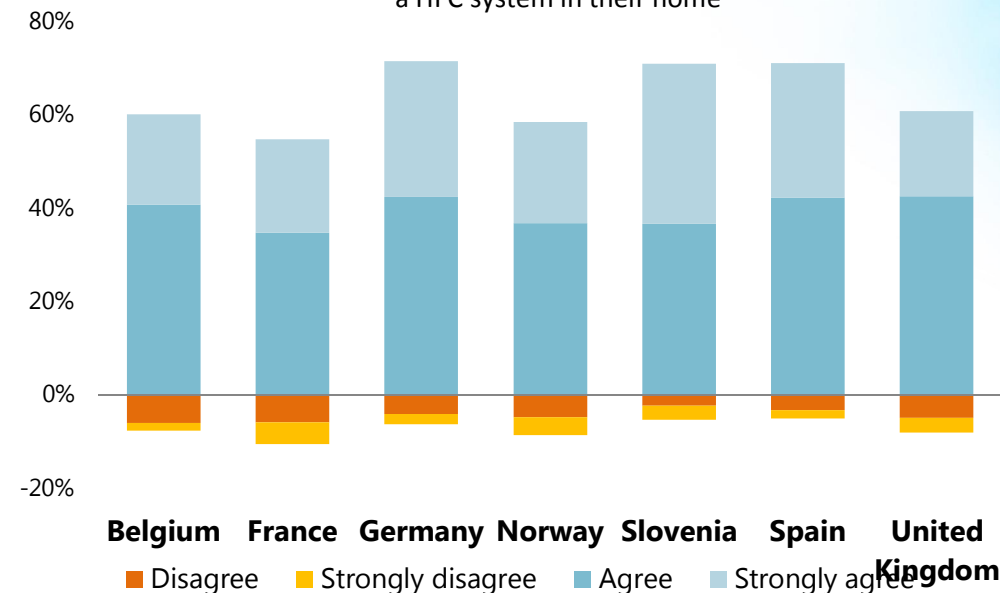
In all the countries surveyed we find that **the majority of the population rates the technology as a good option** (percentages range from 40% and 53%), followed by those who rate it as acceptable (from 27% to 36%)

Acceptance of home HFCs

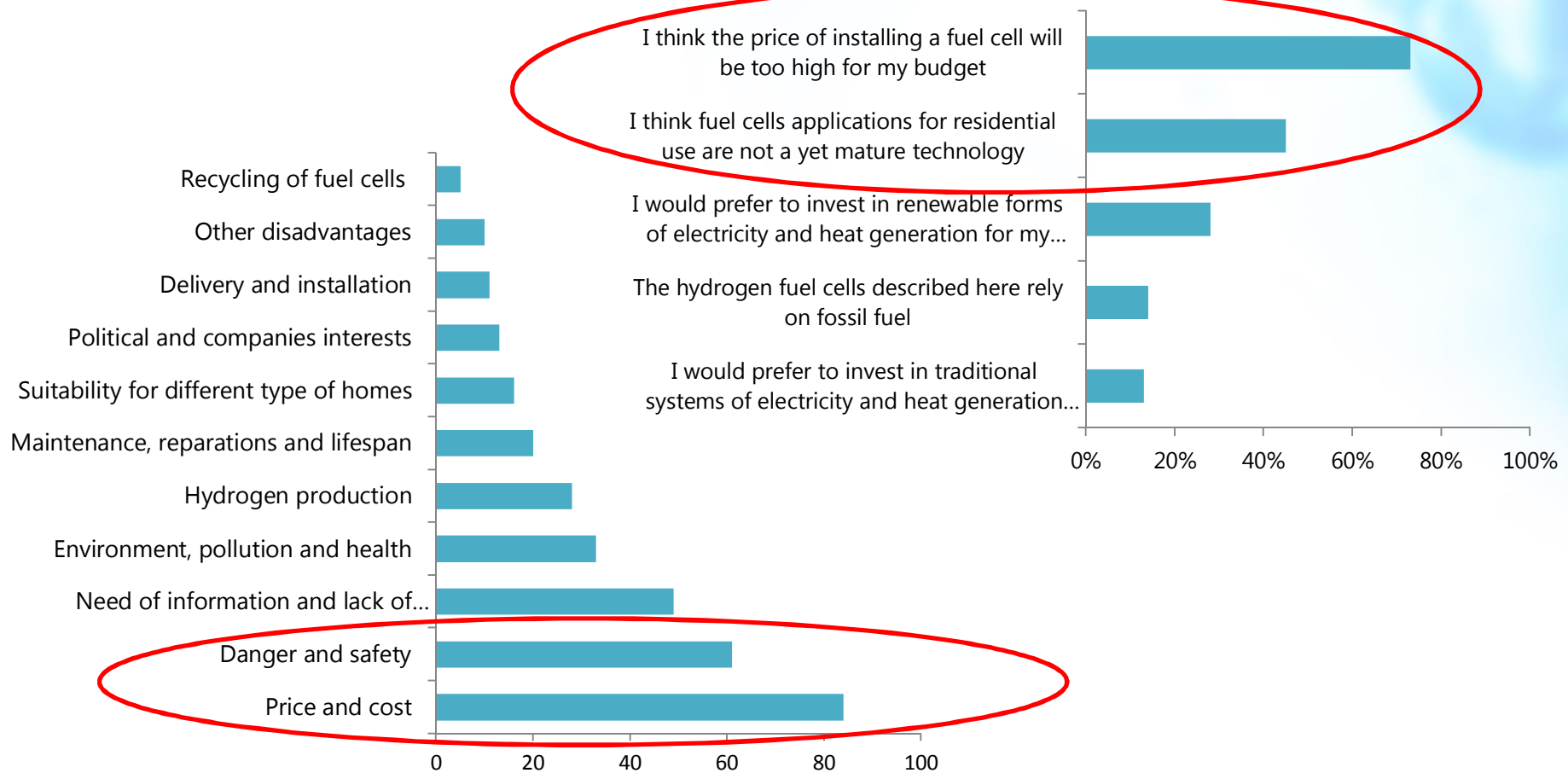
The study shows: “I would be happy to have an hydrogen fuel cell unit in my home in future”. **Around 6 out of 10 would be happy to have a residential HFC unit at home** (2 out of 10 would be very happy), 3 out of 10 are undecided about this and less than 1 out of 10 would not be happy about it at all.

100%

Figure: % of respondents in the total sample that would like to have a HFC system in their home

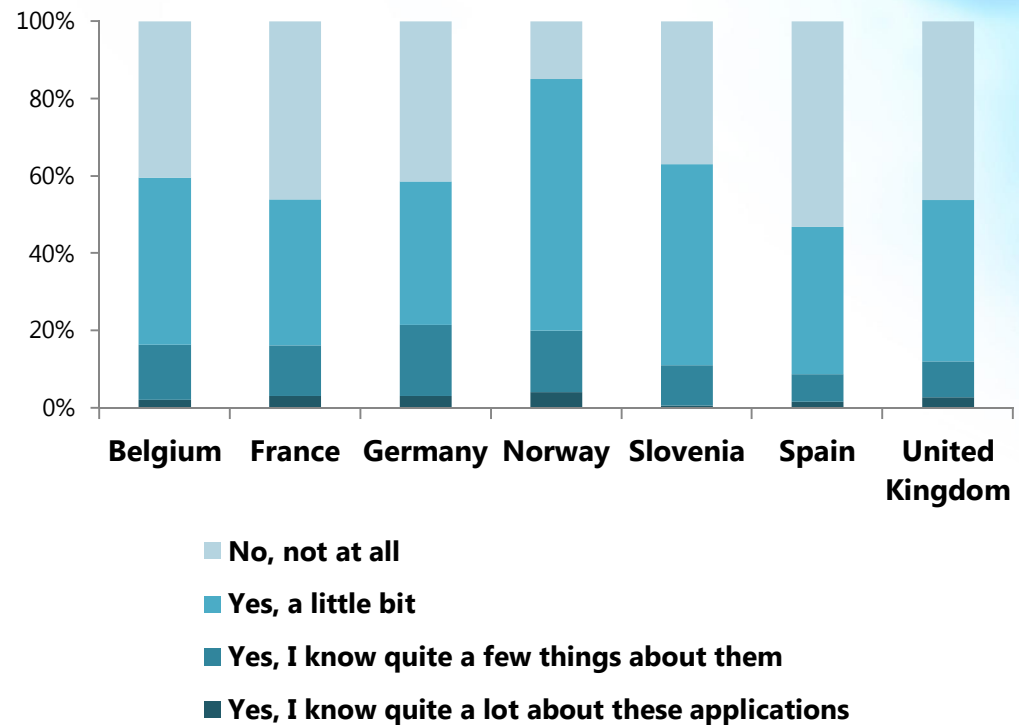
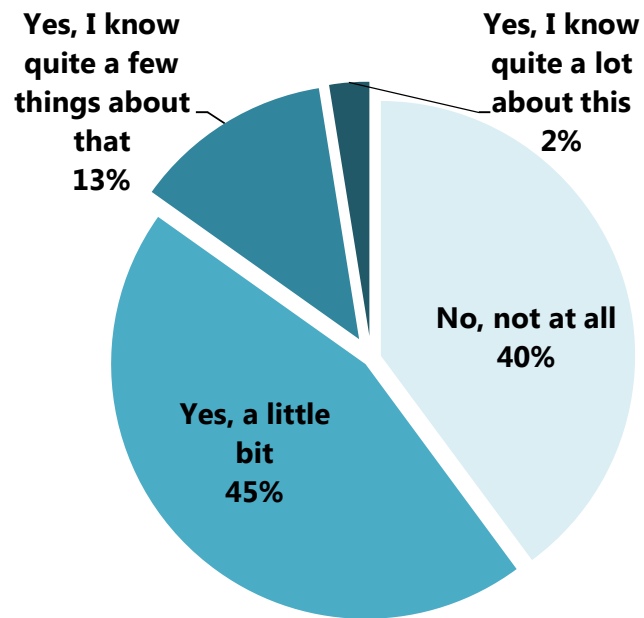


Respondents' reasons for not willing to buy a home HFC

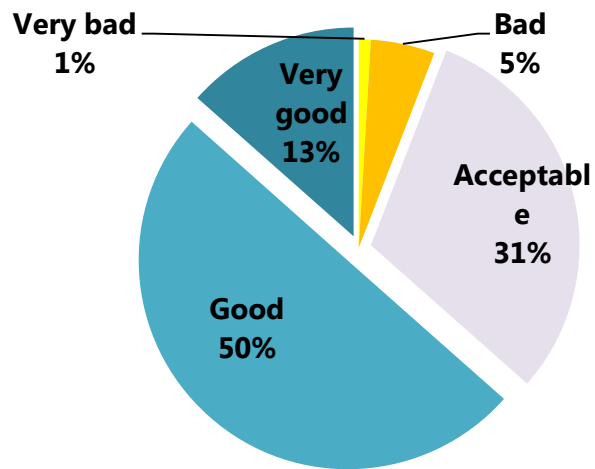


Awareness of FCEVs

Awareness is significantly higher for FCEV relative to residential fuel cell micro-CHP. **Around 45% of respondents have heard a little bit about FCEV** and even a 15% reports knowing a few things about fuel cell cars.



Informed evaluation/ global attitude of FCEV

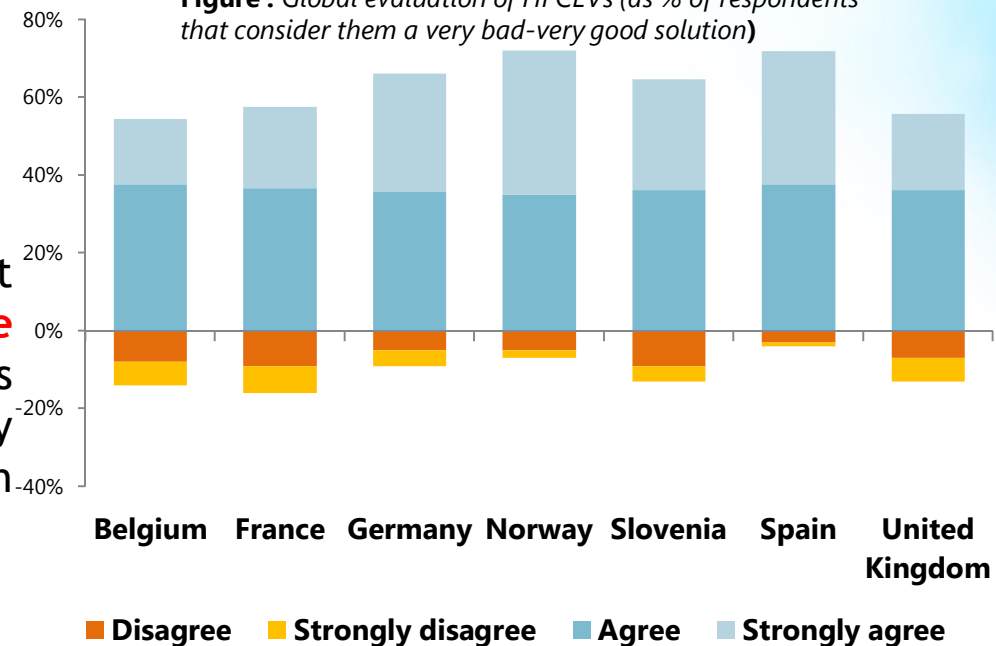


In all the countries surveyed we find that **the majority of the population rates the technology as a good option** (percentages vary between 44% and 56%), followed by those who rate it as acceptable (between 23% and 37%).

Acceptance of FCEVs

The majority of participants in the seven studied populations would be happy to have a hydrogen fuel cell car in the future (keeping all else equal). **More than 60% in the full sample would like to buy a HFC electric car in the future.** Around 30% of respondents are undecided about it; and around 10% are not willing to have a hydrogen fuel cell car in the future.

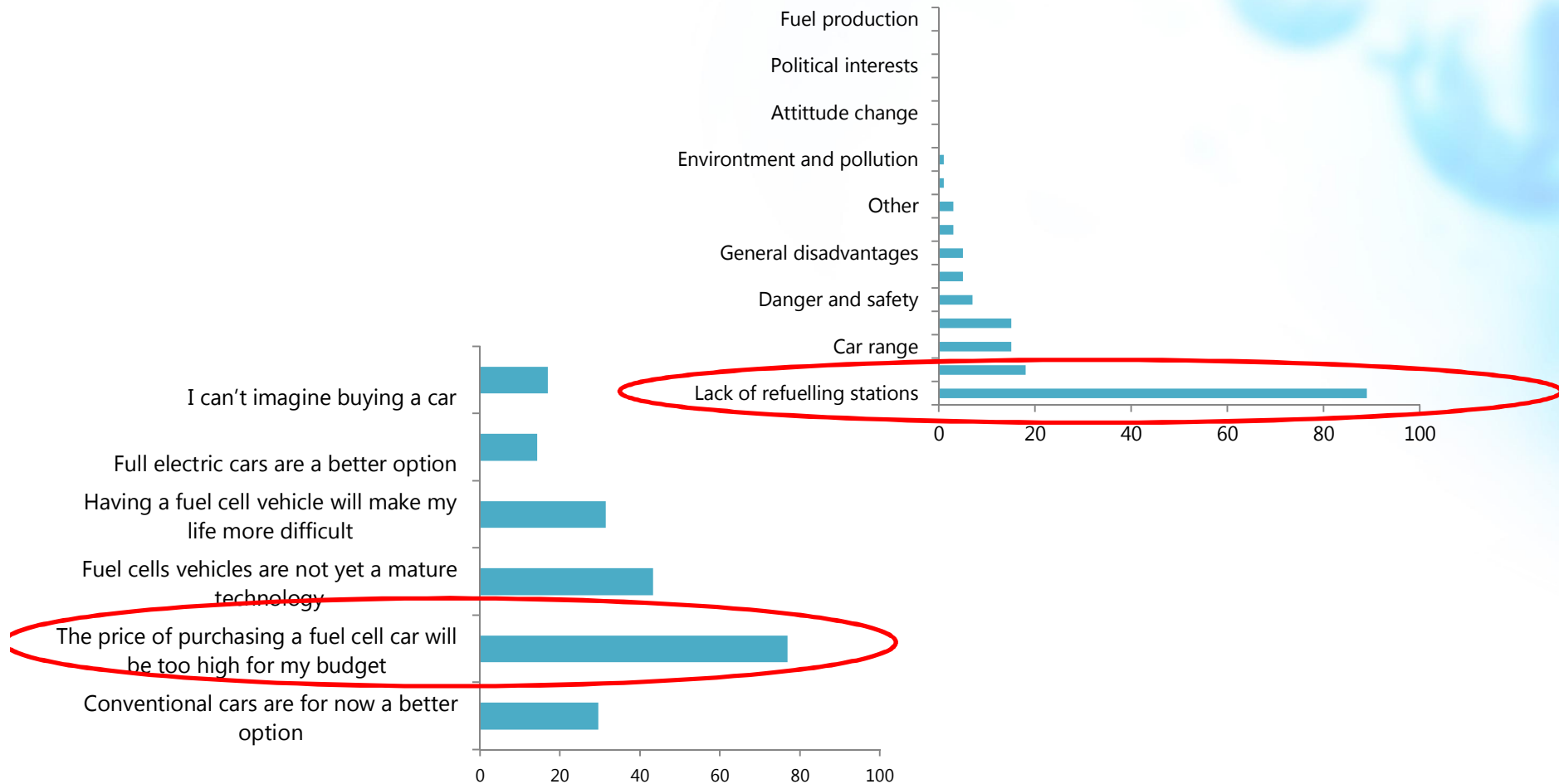
Figure . Global evaluation of HFCEVs (as % of respondents that consider them a very bad-very good solution)



PROJECT PROGRESS/ACTIONS - PUBLIC SURVEY



Respondents' reasons for not willing to buy a FCEV

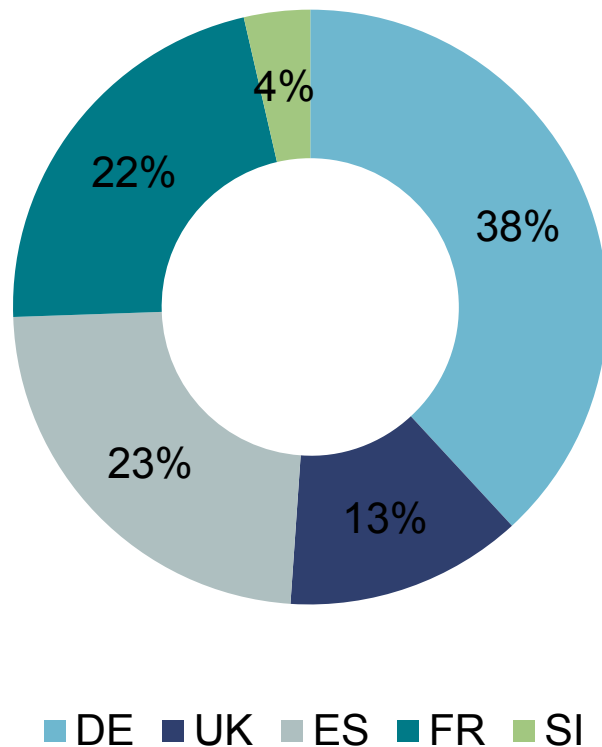


PROJECT PROGRESS/ACTIONS - **STAKEHOLDER SURVEY**



SAMPLE

Participants by country



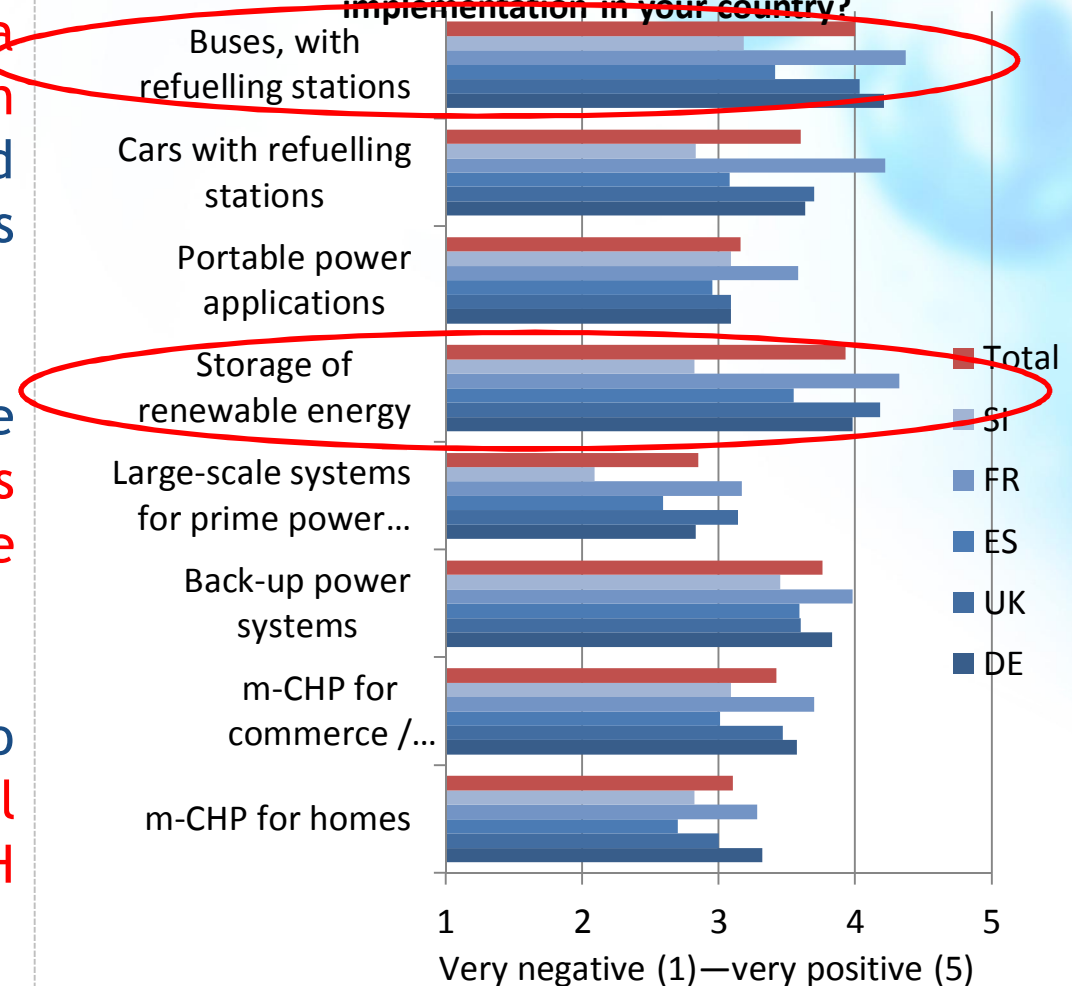
- Heterogeneous affiliations:
 - Around **33% from private companies**
 - Around 15% from public and government organisations, education and other non-profit
- Plenty of experience:
 - **>25% have 11+ years of work experience**
 - >21% 5-10 years of experience
- Different fields of expertise:
 - **>50% work in research**
 - 30% on H2 production
 - 25% in systems integration

PROJECT PROGRESS/ACTIONS - STAKEHOLDER SURVEY



- 88 % think that HFC are a good or a very good solution for energy and environmental challenges (no country differences).
- Most positive future expectations about H2-buses and H2 as a means of storage for renewable energy.
- Respondents are in favour to further governmental support for FCH technologies.

What are your expectations regarding the medium-term (5-10 years) market implementation in your country?



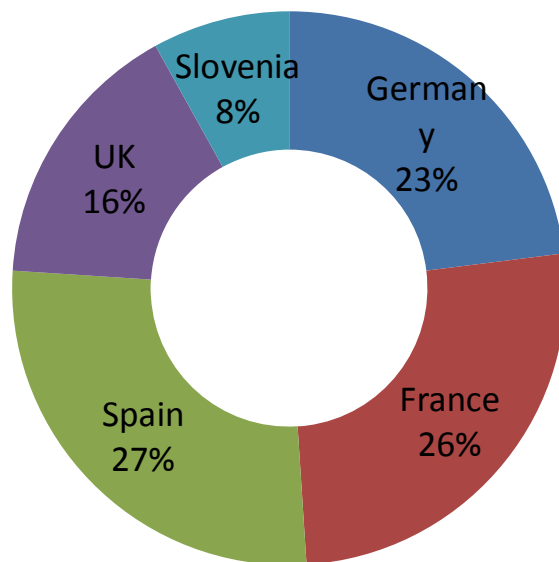
- Factors influencing ratings of future market deployment
- For **stationary applications**:
 - Competition of renewable electricity and heat technologies
 - Implementation of air quality regulations
 - Development of business models for H2 distribution infrastructure
- For **FCEVs**:
 - Competition from alternative technologies
 - Competition from full electric cars as well as CNG / LNG cars
 - Perceived attitudes of professionals from the same sector and from actors from the automotive sector

PROJECT PROGRESS/ACTIONS - **STAKEHOLDER INTERVIEW**

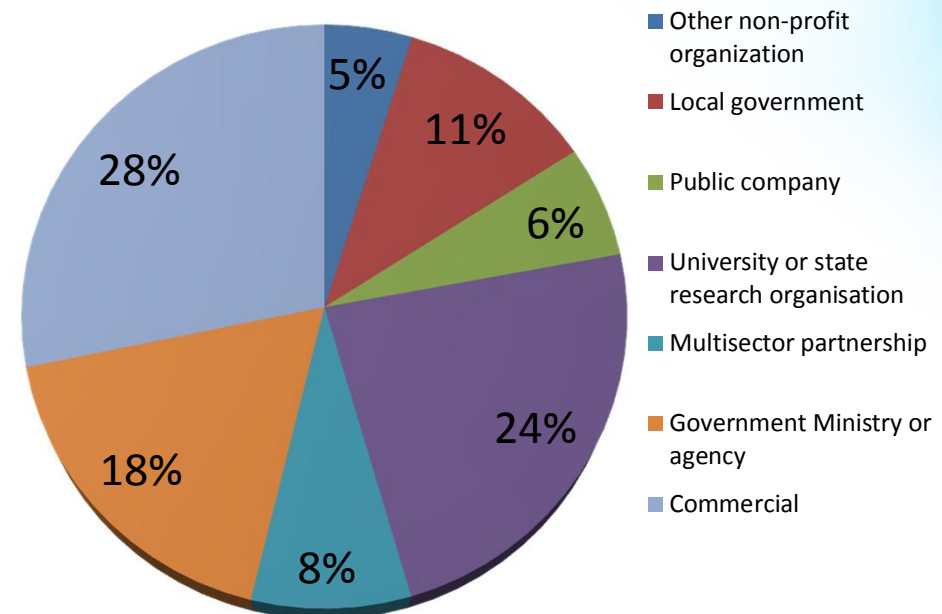


- **Semi-structured interviews** between November 2015 and June 2016
- **Population: selected stakeholders in 5 countries**
- **Implementation: telephone or face-to-face interviews, recorded and summary transcripts**

Interviewee percentage by country



Interviewee percentage by affiliation



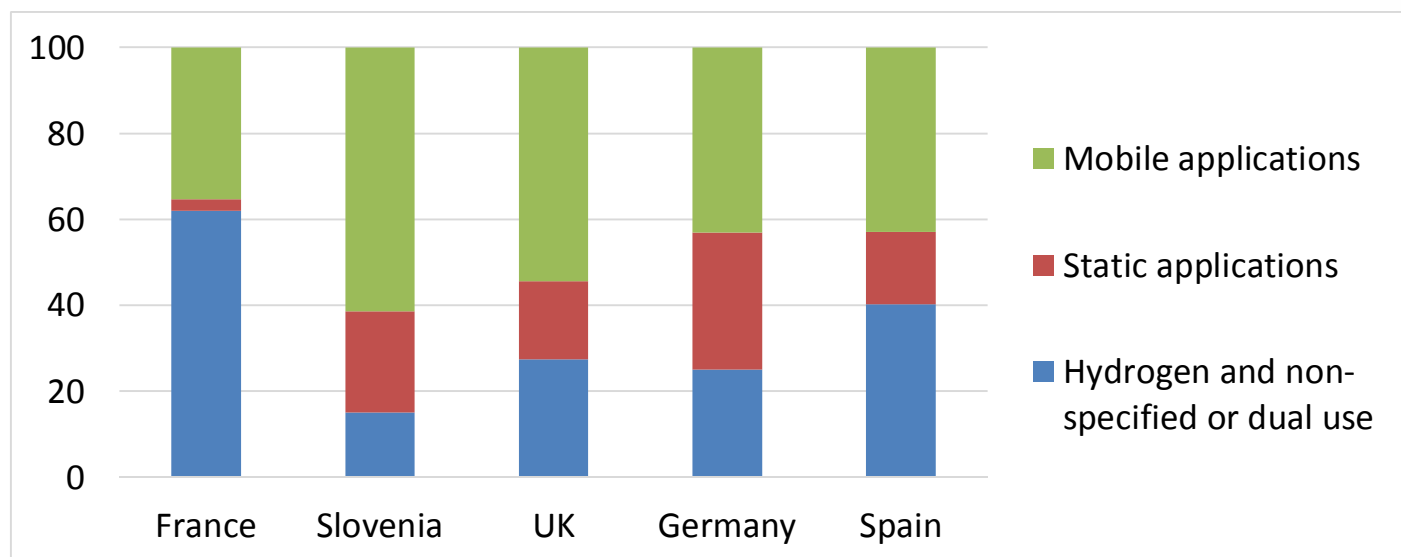
PROJECT PROGRESS/ACTIONS - **STAKEHOLDER INTERVIEW**



■ Applications of HFCs discussed in the

Technology application	Percentage of comments, all interviewees
Static applications	16
Mobile applications	44
Hydrogen and non-specified or dual use	40

■ Percentage of comments, by application, by country



PROJECT PROGRESS/ACTIONS - **STAKEHOLDER INTERVIEW**



▪ Perceptions of hydrogen supply and use

Strengths:

- **Environmental performance of hydrogen** (despite the scepticism of the inefficiency of combining multiple conversion processes)
- Versatility: **energy storage vector for renewable energy supply** (per se and in relation to electrical grid balancing)

Weaknesses:

- Cost
- Limited awareness among regulators and government
- Inadequate or excessive regulation
- Competition from alternative technologies
- Lack of commercial support and lack of markets
- Immaturity and durability
- General lack of infrastructure
- Perceived safety issues

Key expectations (mixed):

- Positive view: market development expected by many in the relatively near term (albeit with national differences and specificities).
- Uncertain future for hydrogen and a high degree of conditionality on government policy support.

Recommendations:

- **More government and political support is required**
- **Need to inform and engage stakeholders**
- **Additional R&D to reduce costs**

PROJECT PROGRESS/ACTIONS - **STAKEHOLDER** **INTERVIEW**



▪ Perceptions of static applications

Strengths:

- H2FCs for portable power (could also be bracketed with the potential for uninterruptible power)
- **Integration with existing infrastructure** (UK respondents only)
- Efficiency of fuel cells (reducing the pressure on the electrical network)
- **The capacity to offer domestic and non-domestic CHP, power and heat, including high power.**

Weaknesses

- Cost & Investment costs
- Complexity of the system and its components
- Perceived and 'actual' safety
- Competition from alternative technologies
- The challenge of finding commercial partners

Key expectations (mixed):

- Expectations expressing a positive inevitability for the technology
- Uninterruptible supply systems as one such niche (German respondents only)
- Stationary uses being more likely than mobile uses (UK respondents only)
- Hydrogen being used as a storage medium as key to the take-up of static applications (UK respondents only)

Recommendations:

- **Government support**
- **Regulatory support particularly relating to issues of safety**

PROJECT PROGRESS/ACTIONS - **STAKEHOLDER INTERVIEW**



▪ Perceptions of mobile applications

Strengths:

- Operational performance: long range, **short refill times**, high torque, strong performance generally and relative to alternatives
- **Ease integration with existing infrastructure**
- **Suitability for specific fleets**

Weaknesses:

- **Financial cost**
- Perceived competition with other technologies
- Lack of infrastructure
- Limited awareness and support by regulators and government
- Inadequate or excessive regulations, codes or standards
- Safety

Expectations:

- **Specific vehicle fleets being the first to use H2FC technology**
- Niche uses first or only
- **Tighter emissions standards driving H2FC use**
- Battery electric vehicle (BEV) with H2FC being the most likely option
- **Transport corridors being first to support H2FCs**

Recommendations:

- **Governmental, political and regulatory support**
- **R&D to support cost reductions**
- **Commercial partner support**
- **More communication and engagement generally, including of publics**
- **Investment in refuelling infrastructure**

PROJECT PROGRESS/ACTIONS - SOCIAL ACCEPTANCE MANAGEMENT TOOLBOX - SAMT



Hydrogen Technology Acceptance Tool

[Home](#)

Welcome to the HYACINTH - Social Acceptance Management Toolbox (SAMT) for hydrogen and fuel cell technologies (HFC). This project has received funding from the Fuel Cells and Hydrogen Joint Undertaking (FCH-JU) under grant agreement No. 621228.

The SAMT has been designed to provide practical advice to developers and/or sponsors of HFC technologies that they now intend to progress from a completed demonstration project or phase to full market acceptance and wide public adoption. This so called transition phase is often difficult to navigate and this tool contains information regarding the knowledge of and attitude to HFCs from 7000 members of the public throughout the EU and over 250 industrial and governmental stakeholders. This information is designed to help the developer to understand the concerns of the public who will be the target market for any proposed technologies and will, where appropriate offer advice from key players in the industry.

First you
results a

<https://hyacinth.sunderland.ac.uk>

After the

The results will be presented according to the key themes in the Technology Acceptance Framework (Ref). Areas of concern will be highlighted in RED and, where the relevant information and research exists, text will be provided which could explain how to improve acceptance levels in these areas.

[Get started »](#)

Hyacinth Project Partners

DISSEMINATION ACTIVITIES



Public deliverables

- 13 deliverables finished (10 public), 7 deliverables in progress:
- **D. 5.1 Report on results of the stakeholder survey.**
- **D. 5.2 Integrated report on general findings on public acceptance.**

Conferences/Workshops

- 2 webinars and 8 workshops planned to be organised by the project.
- >20 conference and seminars in which the project is participating.
- 4 Drive&Ride events (WHEC2016 and Aberdeen).

Publications:

- Working in 3 academic papers.
- Press releases in 5 countries (UK, DE, SP, FR, SL).
- Newsletters in 4 countries (UK, DE, SP, FR).
- Digital mailing (300 stakeholders).

Social media:    

Website:

<http://hyacinthproject.eu>

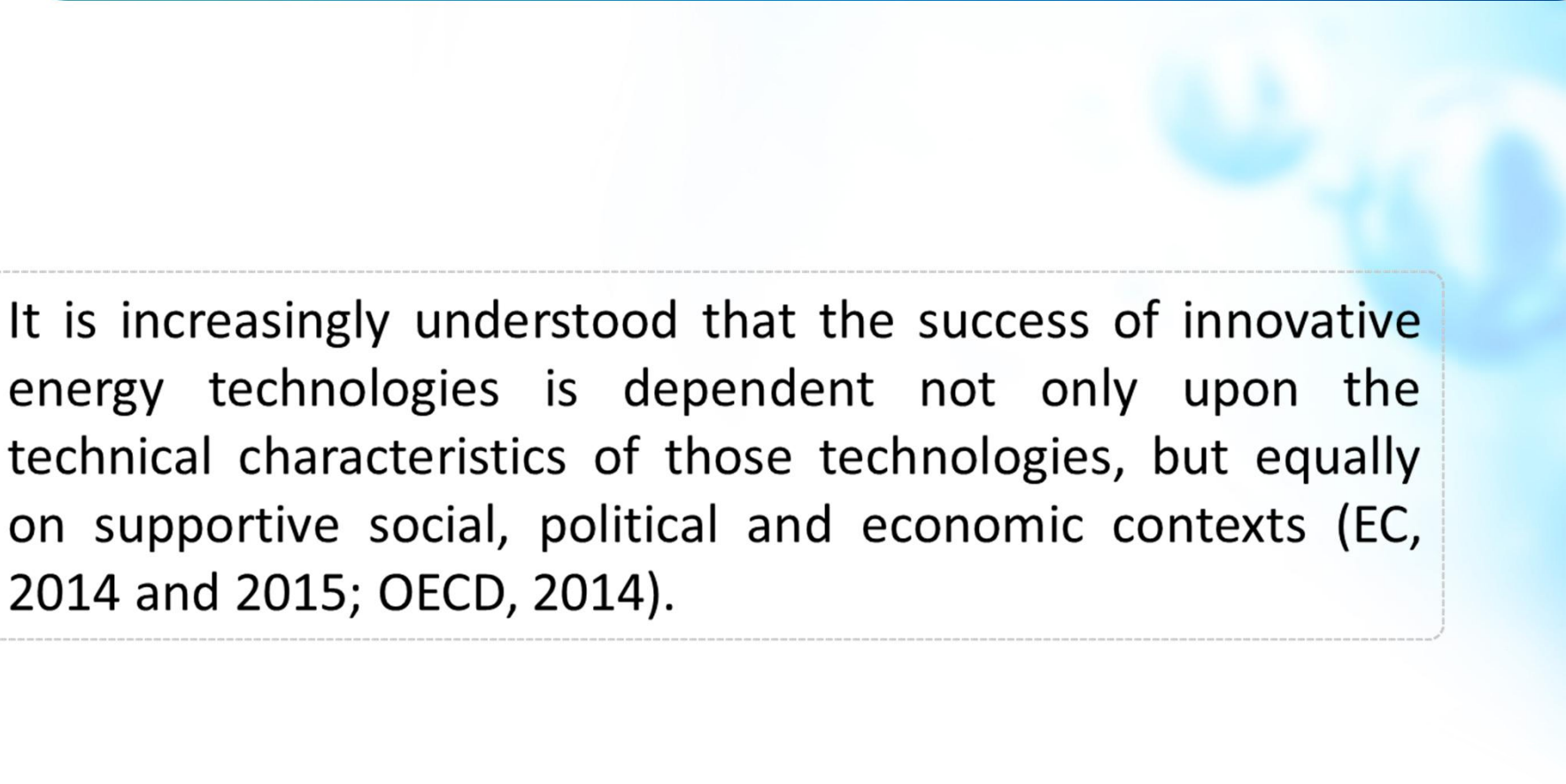

Close contact with National and International Sector Associations.

Identify more than 10 projects to establish project alliances.

CONCLUSIONS



- Less than half of the population in the seven countries is aware of the existence of hydrogen and fuel cell technologies in the context of energy production.
 - Public awareness is significantly lower for residential applications and higher for hydrogen fuel cell vehicles.
 - The majority of the population in the seven studied countries have a positive initial attitude towards HFC technologies. The label associated to hydrogen and fuel cells seems to invoke positive feelings and thoughts among respondents.
-
- Variation across countries: associated with differing levels of government investment in R&D programmes.
 - R&D stakeholders have a strong positive appraisal of HFC technologies, but with limitations:
 - **cost and limited regulatory**, political and commercial support;
 - **competition from other technologies** and inter-related obstacles.
 - Stakeholders view: medium to long term rather than near term.
 - HFC technologies view: realistic niche potential in the shorter term
 - uninterruptible power, auxiliary power and high power demand such as fork lifts and heavy goods vehicles.



It is increasingly understood that the success of innovative energy technologies is dependent not only upon the technical characteristics of those technologies, but equally on supportive social, political and economic contexts (EC, 2014 and 2015; OECD, 2014).

Thank You!



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