



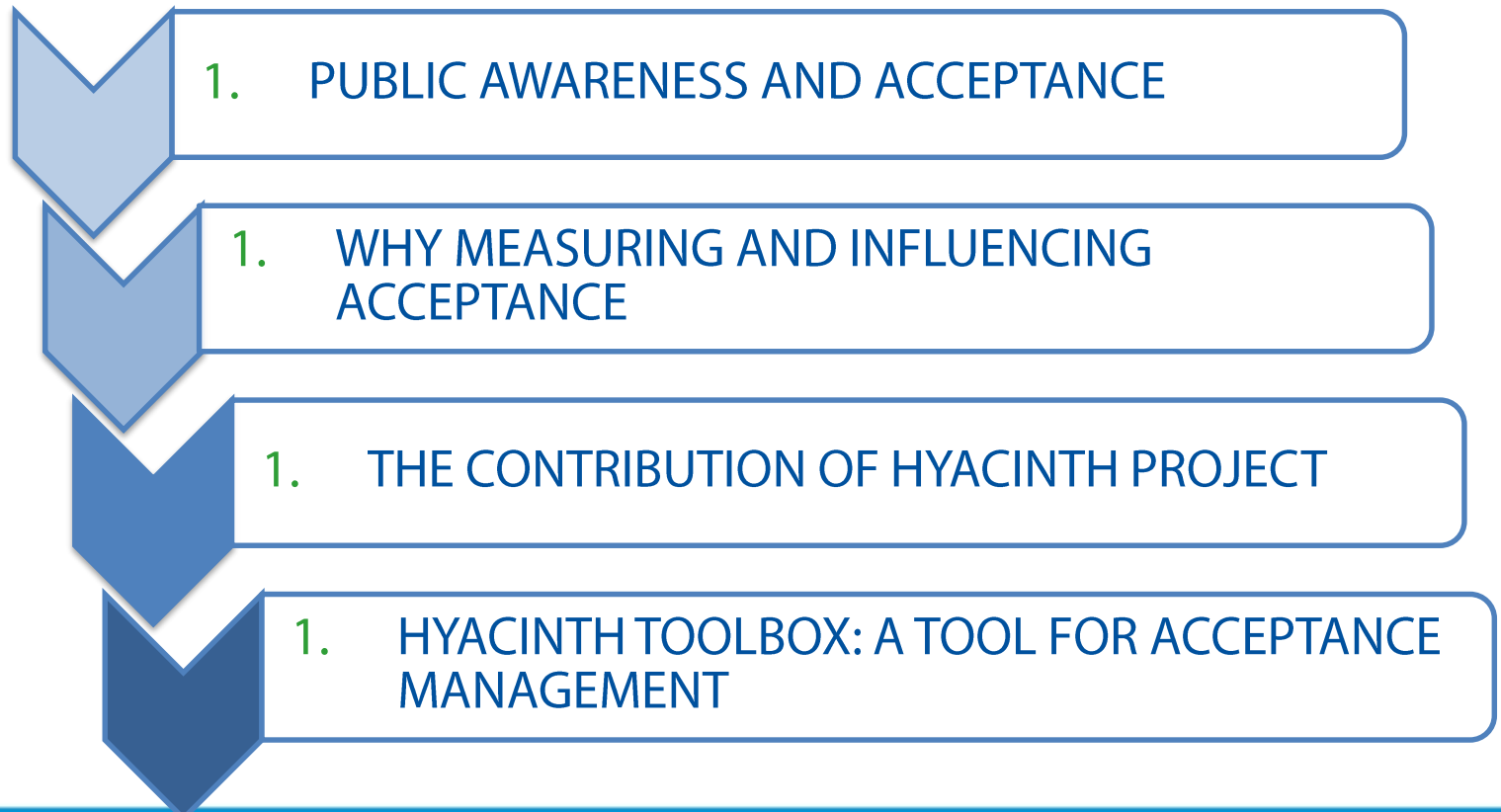
# Analysis of the general public and stakeholder awareness and acceptance on hydrogen technologies



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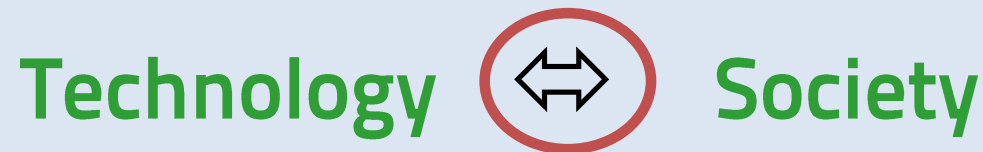
# Analysis of the general public and stakeholder awareness and acceptance on hydrogen technologies



## 1. PUBLIC AWARENESS AND ACCEPTANCE

### Public awareness:

Are attitudes, behaviours, opinions and activities that comprise the **relations** between the general public or lay society as a whole to scientific knowledge.



How are these attitudes, behaviours, opinions and activities towards new products, new applications, and to a new technology?

⇒ **Public acceptance?**

## 1. PUBLIC AWARENESS AND ACCEPTANCE

### Public acceptance: Objective

Deep social research are providing insight into the state of public and stakeholder acceptance (including socio-political and market actors), and about relevant factors affecting those levels of awareness and acceptance: socio-political, community and market acceptance.

Research will focus in **understanding influencing factors** to the acceptance process during the different phases.

**The aim is to achieve a better knowledge that helps to optimize the management of technology transition.**

- **PUBLIC AWARENESS AND ACCEPTANCE**

## Public acceptance: Questions

To understand the acceptance process' implications:

- **What** has to be accepted? Idea, technology, project, system set up...
- **Who has to accept?** Core project (project manager, employees), project environment (regional partners, administration, politics, neighborhood, research groups), general public, interest groups and media...
- **What** level of acceptance is needed? Tolerance (neutral/ "wait and see"), sympathize (passive acceptance), support (active acceptance)
- **When** is acceptance needed? Project (initial, planning, implementation phase), transition phase, daily life

- **PUBLIC AWARENESS AND ACCEPTANCE**

## Public acceptance: Considerations

- Awareness and acceptance **could vary along the different phases** of an implementation process.

Implementation process



- **They could also influence factors and relevant actors.**
- It is important **to identify what level of acceptance is needed and when.**
- So far research has shown that a **supportive acceptance will be necessary in a transition phase of technologies and the strategies to a market.**



- **PUBLIC AWARENESS AND ACCEPTANCE**

## Public acceptance: Objective

Deep social research are providing insight into the state of public and stakeholder acceptance (including socio-political and market actors), and about relevant factors affecting those levels of awareness and acceptance.

Social acceptance of new technologies could be conceptualized as a three dimension issue, including socio-political, community and market acceptance (Wüstenhagen, Wolsink & Bürer, 2007).

Research will focus **in understanding influencing factors** to the acceptance process during the different phases.

## • WHY MEASURING AND INFLUENCING ACCEPTANCE

### Why measuring acceptance?:

- It is a **key consideration** for any attempts to deploy and extent new technologies, infrastructure, products and services.
- Because: no feedback
  - No “images”
  - No experience
  - No widespread “real” applications
- Is a **two way relationship:**
  - Technology => Society
  - Society => Technology**

- **WHY MEASURING AND INFLUENCING ACCEPTANCE**

## Why measuring acceptance?: Hydrogen

There is increasing realization amongst policy makers and industry that public acceptance is a key consideration for any attempts to deploy and extend hydrogen technologies and infrastructures in Europe (EC, 2006).

The document *"Fuel Cell and Hydrogen technologies in Europe: Financial and technology outlook on the European sector ambition 2014- 2020"* by the NEW-IG considers the

**development of a good understanding of the conditions of societal acceptance as an essential element to support the establishment of these conditions in Europe.**



- **WHY MEASURING AND INFLUENCING ACCEPTANCE**

## Why measuring acceptance?: Hydrogen

Call SP1-JTI-FCH.2013.5.3: Social acceptance of FCH technologies throughout Europe.

Rationale: Success in market introduction of FCH technologies will partly depend on the social acceptance of hydrogen by final customers. To date, there is little evidence of the social awareness of FCH technologies in

Europe and the socio-scientific research dealing with the social impacts caused by the introduction of hydrogen and fuel cell technologies has been limited... **Complementary studies are therefore needed to identify current gaps and bottlenecks for raising the demand from potential users of FCH technologies.**

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: Hydrogen Acceptance IN the Transition pHase**

**HYACINTH** aims to gain a deeper understanding of the social acceptance of hydrogen technologies across Europe as well as to develop a communication and management toolbox to be used in ongoing and future activities aiming at introducing hydrogen into mobility, stationary, and energy or backup power supply systems.



- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH**

It is **the supportive acceptance of all people involved** in the process of this transition phase (industrial and regional stakeholders, general public) **that will decide, if the technology reaches market or not** – they will have to buy, test and optimize technologies, develop strategies and collaborate in order to bring fuel cell and hydrogen to market.

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: objectives**

- **Identify and understand awareness and acceptance** of hydrogen energy and FCH technology and perceived 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.**

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: partners**

- **Centro Nacional del Hidrógeno (Spain)**
- **IplusF France Sarl (France)**
- **Spilett New Technologies GmbH (Germany)**
- **Aberdeen City Council (U.K.)**
- **CIEMAT – CISOT (Spain)**
- **Fundación CIDAUT (Spain)**
- **RCVT (Slovenia)**
- **ODC Services GmbH (Germany)**
- **HYER (Belgium)**
- **HFC\_Cooperative (U.K.)**

## HYACINTH: state of the art

Past research -> two findings:

1. Public attitudes towards hydrogen technology **vary across populations and time, influenced by a complex set of factors.**
2. Gathering reliable data on the public attitudes towards hydrogen technologies requires **careful conceptual and methodological considerations.**

## HYACINTH: state of the art

Past research -> three challenges:

1. There is **limited evidence of** how the public **might react under** real-life conditions, requiring people to **estimate future attitudes** based upon a set of criteria presented to them (technology concepts or demonstration project designs). **Predefined criteria might influence the results.**

Therefore, the levels of acceptance found in previous research are thus quite theoretical and only of limited validity.

## • THE CONTRIBUTION OF HYACINTH PROJECT

### HYACINTH: state of the art

Past research -> three challenges:

2. Research has focused on acceptance assuming a market situation and competitiveness . Only few of the studies investigated **when technology maturity increases, cost decreases and infrastructure will have to be built up.**

*The research of acceptance in the transition phase has to differentiate between technology performance and operational, organizational or economic challenges in the transition phase.*

- THE CONTRIBUTION OF HYACINTH PROJECT

## HYACINTH: state of the art

Past research -> three challenges:

3. **Knowing the state of awareness and acceptance allows** to estimate the current need for information or engagement. **Understanding acceptance** is key to successfully embedding innovations into the societal context and to make use of the technology potential.

*Research on acceptance has to acknowledge its process character and identify means to understand and manage the acceptance process.*

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## HYACINTH: Who?

- **General public:** citizens who influence political processes and budgets and future customers and users.
- **Stakeholders:** industry, municipalities, administration/politics, public authorities, media, research organizations and interest groups responsible for defining strategies of the transition period.



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## **HYACINTH: When?**

**Transition phase:** between demonstration and commercialization. When technology maturity increases, cost decreases and infrastructure will have to build up.

In this phase every region, project and technology implementation experiences particular strategies in a specific context.

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## **HYACINTH: What? Where?**

Up to 7 regions with former and on-going projects and also regions without hydrogen “history” in 3 areas of applications:

- **Transport:** Germany, U.K., Norway, Spain, France
- **Stationary power supply/ storage:** Germany, Spain, Slovenia, France
- **Applications in material handling and special markets:** France, Spain, Norway



- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: What? Where?**

The following funded projects will be addressed:

- **Transport:** CHIC, HyTEC, HyVLOCity, HyTransit, SWARM, HYCHAIN-MINITRANS, CUTE
- **Stationary power supply/ storage:** Ene.field, HyUnder
- **Material Handling:** HyLift, HyLiftEurope, SHEL

In addition, projects as CleanEnergyPartnership, CALLUX, or UKH2 Mobility will also be considered becoming interview regions.

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## **HYACINTH: Theoretical background**

Analysis on the state of acceptance of FCH technologies have been extensively done. Deep analyses on the public and stakeholders acceptance, identifying and understanding the dynamics of the process as well as the factors influencing expectations and attitudes, are rare.

**The HYACINTH will continue the research work on acceptance started in the FCH-JU funded project “CHIC–Clean Hydrogen in European Cities” project (2010-2017).**

- THE CONTRIBUTION OF HYACINTH PROJECT

## HYACINTH: Theoretical background

The CHIC approach shed light on the reservations/concerns of different stakeholders and provided the necessary background information for a comprehensive analysis from a social perspective.

Fuel cell buses and hydrogen infrastructure with 185 qualitative interviews in 5 regions in 4 European countries (Germany, Italy, Switzerland, Norway) showed **a general positive attitude and lack of relevant opposition.**

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: Theoretical background**

### **Other CHIC conclusions:**

- **Regional stakeholders play an important role** in getting the system run and keeping it running.
- The **acceptance changes with time** and
- Acceptance **can actively be influenced** by managing the implementation process.

## HYACINTH: Methodology

### 4 approaches: 3 from CHIC

1. Characteristics approach: *“people decide for bundles of characteristics, not for products”*.
2. ESTEEM toolbox: *“Enhancing social acceptance of sustainability projects by managing the implementation process”*
3. 7(+)-Parameter approach: *“Combine findings from change management, decision making and other disciplines for an integrated research perspective”*

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: Methodology**

### **4 approaches: and a new one**

4. The motivation approach: supportive acceptance with 3 motivation factors to change influences:
  - People want the product (convinced)
  - People want the image (feel responsible)
  - People are forced/motivated to use the product (accept disadvantages though trade off)

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## **HYACINTH: Methodology**

- Analysis of the visibility of hydrogen energy and FCH technologies in society (desktop research and expert interviews)
- Interviews on awareness of FCH technologies in the general public (qualitative interviews)
- Interviews on acceptance of hydrogen energy in the general public (qualitative and quantitative interviews).
- Interviews on hydrogen energy and FCH technology acceptance at selected stakeholders.

## • THE CONTRIBUTION OF HYACINTH PROJECT

### HYACINTH: Methodology

- Interviews with up to 7,000 European citizens and up to 455 selected stakeholders.
- The interviews will be partly quantitative (measuring) and partly qualitative (understanding) interviews.

	General public	Stakeholders
Quantitative Interviews	7,000	280
Qualitative Interviews	-	175

Duration of the project: 24 months

- **THE CONTRIBUTION OF HYACINTH PROJECT**

## **HYACINTH: Results**

**General public interviews:** understand the causative drivers behind the different levels of acceptance and attitudes.

**Stakeholders and experts interviews:** understand hurdles and bottlenecks that might influence the acceptance process and understand the motivation and expectations to keep and increase acceptance of people responsible of the technology implementation.

- **HYACINTH TOOLBOX: A TOOL FOR ACCEPTANCE MANAGEMENT**

## **HYACINTH toolbox:**

The management toolbox will provide the **necessary methodologies and background information** to set up, run and evaluate FCH demonstration projects and market analysis and preparation in the transition phase.

As the management of the acceptance process requires an in-depth inside and understanding of the underlying factors influencing acceptance, the toolbox will comprise of particular information.

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- **HYACINTH TOOLBOX: A TOOL FOR ACCEPTANCE MANAGEMENT**

## **HYACINTH toolbox: information**

- **Level of awareness:** “technological controversies reflect disagreement over basic political and social choices rather than fears”.
- **Level of acceptance:** a methodology to easily identify the level of acceptance of stakeholders.
- **Relevance of acceptance:** to know when what level of acceptance is needed by whom.
- **Assessment on the effectiveness of policy support mechanisms.**
- **Lessons learned / best case studies**

- 
- **HYACINTH TOOLBOX: A TOOL FOR ACCEPTANCE MANAGEMENT**

## **HYACINTH toolbox: information**

- **Expert database:** to increase networking of interested stakeholders
- **Check lists** on how to consider the acceptance process in setting up and running hydrogen energy and FCH technology projects, in market analysis and preparation and activities along with identified “added-values” of the technology.

- **HYACINTH TOOLBOX: A TOOL FOR ACCEPTANCE MANAGEMENT**

## **HYACINTH toolbox:**

The management toolbox for stakeholders (industry, decision-makers and project responsible people) **will reveal critical factors** to global, local and market acceptance of hydrogen energy and FCH technologies.

It **will provide information and methodologies to facilitate decisions** on promotion activities, market preparation, and effective policy support mechanisms particularized for a given European region and a certain technology.



## • CONCLUSIONS

- **Public acceptance** is a **key consideration** for any attempts to deploy and extent new technologies, infrastructure, products and services.
- **Also for hydrogen technologies.**
- The **HYACINTH project** aims to study **the public acceptance** on hydrogen technologies of general public and stakeholders **in the transition phase** (between demonstration and commercialization) in seven countries and for different applications.



## • CONCLUSIONS

- **HYACINTH**, a project with 10 partners will start in april 2014 for 2 years.
- **7.455 interviews** will be carried out, quantitative (measuring) and qualitative (understanding).

**=> We need contributions!!**

- And a **toolbox will be developed to provide a closer link between industry, society and policy makers. It will reveal critical factors** to the acceptance of hydrogen energy and FCH technologies and **will provide information and methodologies to facilitate decisions.**

**Thank you!**

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