PURPOSE

The proposal is to study hydrogen systems integrating with electricity and other energy and mobility networks. The Task should have considerable industrial input intended to move hydrogen systems to commercialization. The purpose of Task 29 is to progress the optimization and replication of "green" hydrogen within distributed and community energy systems. This will be accomplished by identifying situations where the use of hydrogen is appropriate and assessing the technical, environmental, economic, and social benefits of such systems. The Task will focus on H_2 applications in energy communities and distributed systems, mostly involving stationary applications but also looking at potential benefi ts for transportation. An energy community is defined as a group of people living in a common location featuring shared geographical location and energy needs. Communities to be considered should include up to 1000 people and the total installed power capacity of the hydrogen energy technologies (both producing and consuming hydrogen) in the communities should not exceed 500 kW.

STATUS OF THE TECHNOLOGY

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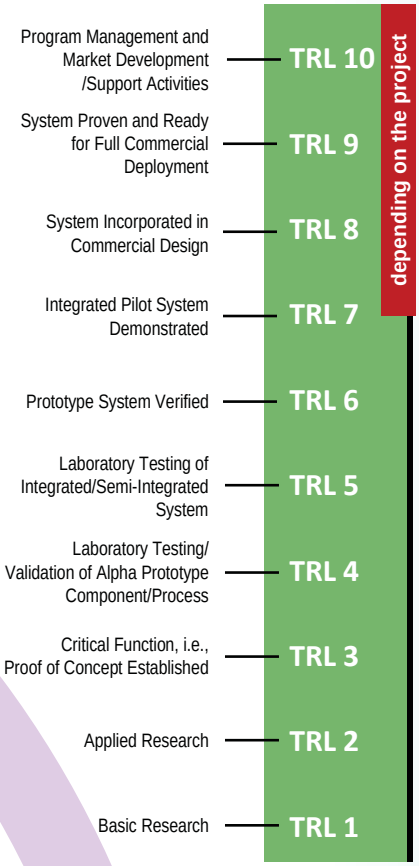
Since DISCO-H_2 is focusing on H_2 application in communities, in order to define the status of the technology an analysis case by case of the various applied technologies needs to be done. Some of them are in a start-up phase and need to prove the concept, while some others are in an early market phase and are currently aiming at demonstrating their technical reliability so to gain soon an improved economical viability. Due to the fact that the Task is looking into real life applications, the TRLs may range from TRL 7 to TRL 10 depending on the analyzed project.



TASK 29

DISTRIBUTED AND COMMUNITY HYDROGEN

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VITAL STATISTICS

Term

Dates 11/11/2010 - 31/12/2013

Members

Canada
France
Greece
Japan
New Zealand
UK
UNIDO
USA

Expert Participants

10 (including OA)

2011 Meetings

9th -11th February 2011
Istanbul, Turkey;
12th-13th September 2011
Edinburgh, Scotland

FRAMEWORK SUMMARY

Task 29 is organized in five subtasks (STs) as depicted in Figure 1.

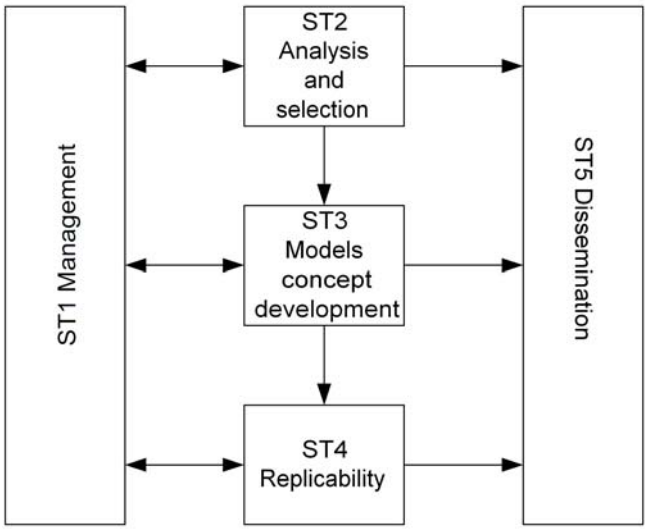

Figure 1: Flow chart of Subtasks

ST1 and ST5 run for the whole duration of the Task dealing with management and dissemination issues. They are led respectively by UNIDO-ICHET (Operating Agent (OA) of DISCO-H2) and HyER. ST2 produces as an output the selection of six projects representing the core group based on which three DISCO-H2 models concept will be extrapolated. CRES and AIST are ST2 and ST3 coordinators. Finally, ST4 provides an economical analysis for the concept applicability in order to achieve market penetration. In addition it assesses advantages and disadvantages of the three DISCO-H2 concepts.

MEMBERS

Task Member and Expert Table

TASK 29	COUNTRY	EXPERT NAME (SUBTASK LEADER)	INSTITUTION NAME
1	Japan	Hiroshi Ito (ST3 lead)	AIST - National Institute of Advanced Industrial Science and Technology
2	France	Aline Rastetter	Alphea
3	Greece	Emmanuel Stamatakis (ST2 lead)	CRES - Centre for Renewable Energy Sources
4	France	Jean-Christophe Hoguet	Helion
5	Canada	Raymond Schmid	Hydrogenics
6	France	Marieke Reijalt (ST5 lead)	HyER
7	UNIDO	Federico Villatico Campbell (Operating Agent, ST1 lead)	ICHET - International Centre for Hydrogen Energy Technologies
8	New Zealand	Alister Gardiner (ST4 lead)	IRL - Industrial Research Limited
9	USA	Robert Friedland	Proton On Site
10	UK	Daniel Aklil	Pure Energy

MEMBERSHIP CHANGES

Since the beginning of the Task, NREL from USA and ITC from Spain withdrew from the consortium, as they both encountered financial troubles to cover the necessary Task funding. ITM from UK is in the process of becoming member.

ACTIVITIES AND RESULTS IN 2011

PROGRESS AND ACCOMPLISHMENTS

According to the timetable (Fig. 2), during 2011, ST2 was running and the subtask is now completed.

Figure 2: Gantt Chart

It is organized into three main Activities:

A2.1 Community identification

A2.2 Data Collection

A2.3 Projects selection.

Each activity produced a final report as deliverable.

Activity 2.1 reviewed a worldwide hydrogen (H2) projects database. A list of about fifty projects involving H2 technologies demonstration has been compiled, subdivided in the following categories:

- Urban communities
- Rural and island communities
- Industrial distributed H2 applications

Activity 2.2 (A2.2) assessed the identified projects' roster using also experience gained from Task 18, particularly related to technical issues. Moreover, the main studies already carried out on the subject (i.e. Roads2HyCom) have been consulted to fine tune the projects evaluation. A preliminary Strength, Weaknesses, Opportunities and Threats (SWOT) analysis for a smooth and successful introduction of hydrogen Communities to the market/public has been performed. After the identification of the S, W, O, and Ts in the SWOT exercise, success factors have been assigned to each S, W, O and T. These success factors have been divided into four categories:

- Economic
- Environmental/Technical

- Community (Social)
- Regulatory

Eventually, a list of 18 projects was extracted. These projects were considered to be compliant with DISCO-H_2 targets as they guarantee a good balance in terms of geographical distribution and size, technology application and community type.

Finally, the **activity A2.3** operated the final selection of six projects that will constitute the core group to be analyzed more in details within ST3, running for the whole duration of 2012.

The ST2 results are the selection of the six following projects:

RURAL/ISLAND communities

HARP Project (CANADA): off-grid application with real community involved in the project, and involving two energy storage technologies to be compared (H_2 and redox battery)

MYRTE Project (EU): grid-connected renewable energy storage application on an island

LOLLAND Project (EU): combined heat and power (CHP) application with strong community involvement in a rural area

URBAN communities

OCTAGON (US): green building application inside a city

CHP Japan (JAPAN): CHP application in urban area.

INDUSTRIAL communities

HyLog (EU): Forklifts (industrial) application in a warehouse coupled with PV panels.

In addition, two projects are also selected as either back-up option or complements of information for Subtask 3 works:

H2SUSBUILD (EU): a sustainable building featuring RES and H_2 energy

FITUP (EU): an industrial application deploying some 20 FC back-up systems for telecommunication application.

The selection of the six final projects as an output of ST2 marks the achievement of the first Task milestone (M1). The following milestone to be accomplished is the definition of the three DISCO-H_2 models at the end of 2012 as described in Table 2.

Table 1: Milestones list

MILESTONE N.	MILESTONE NAME	ST N.	MONTH
M1	Target projects identification	2	12
M2	(DISCO-H_2) models definition	3	24
M3	Final Task evaluation	4	36

OUTREACH AND COMMUNICATION

Summary of Strategy and Activities

The strategy of DISCO-H_2 foresees a set of workshops to disseminate the Task results. In the second half of 2012, the first workshop is targeted to be associated to the second annual meeting and to a major EU event which shall be organized in Brussels.

See Task Communication and Outreach Table below.

TASK 29	PUBLICATION / PRESENTATION NAME	PUBS	PRES
1	Participation aux travaux du groupe DISCO-H2 de l'IEA/HIA	1	
2	"Renewables and Hydrogen: an opportunity for Communities"		1
3	Distributed and Community Hydrogen (DISCO-H2)	1	1
4	LCES: Task 29 - Distributed and Community Hydrogen (DISCO-H2)		1
	SUB-TOTAL	**2**	**3**

Task websites

www.disco-h2.org

FUTURE WORK

ACTIVITIES AND /OR TARGETS FOR 2012

The target for 2012 is the achievement of milestone n. 2, namely, the definition of the three DISCO-H_2 models, one per each of the three communities' categories identified.

ACTIVITIES AND/OR TARGETS BEYOND 2012

The workshops organization linked to the next annual meetings of the Task is one of the main goals DISCO-H_2 consortium is working on, in order to widely disseminate the Task results. Toward this direction, since this first year, contacts with relevant stakeholders are being carried on.

R&D CHALLENGES

DISCO-H_2 carries no major R&D challenges as it is mostly focused on an analytic and dissemination type of work based on existing projects. However, the team is challenged to produce a useful tool (in the form of a document) that can suggest to communities the correct hydrogen energy solution tailored on their energy case and encourage their investments in order to increase the penetration of renewable energy into the energy mix.

REFERENCES

SELECTED KEY PUBLICATIONS

1] E.I. Zoulias, R. Glockner, N. Lymberopoulos, T. Tsoutsos, I. Vosseler, O. Gavalda, H.J. Mydske, P. Taylor, "Integration of hydrogen energy technologies in stand-alone power systems analysis of the current potential for applications", Renewable and Sustainable Energy Reviews, 10 (2006) 432–462

2] STORIES Project, Deliverable D2.2, Market applications for energy storage methods and RES units: Case studies

3] "Market Potential Analysis for Introduction of Hydrogen Energy Technology in Stand-Alone Power Systems" Contract No. 4.1030/Z/01-101/2001

4] Roads2HyCom, Hydrogen and Fuel Cells - A Handbook for Communities, Volume B: Project planning, EUROPEAN COMMISSION, Community research (2008)

5] Roads2HyCom, Hydrogen and Fuel Cells - A Handbook for Communities, Volume A: Introduction, EUROPEAN COMMISSION, Community research (2007)

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