

Task 33: Local hydrogen supply for energy applications

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Overall goal for the task is to *provide an unbiased evaluation of the merits of the various pathways for local hydrogen supply for energy applications*. This will be achieved by creating an exclusive network of suppliers of reformers and electrolyzers as well as end-users to contribute to the development, evaluation and harmonization of on-site production technologies and optimal use of feedstock. The ambition is to contribute to reduced production costs, improved system performance and mass production of on-site production units.

The task will be a continuation of *Annex 16 Subtask C Small stationary reformers for distributed hydrogen production (2002-2005)* and *Task 23 Small scale reformers for on-site hydrogen supply (2006-2011)*. It has been strong motivation among the industrial partners of Task 23 to bring forward a new task on small scale production of hydrogen. The network will enable interaction across technology and market segments to support harmonisation of on-site supply technology. The new task will be an industry driven task and empowering the IEA-HIA with industrial support, data and market expertise.

**Objectives**

The main objective of the task is to provide an unbiased evaluation of the merits of the various pathways for local hydrogen supply. This will be achieved through a number of sub goals as illustrated in Figure 1. The sub goals are:

1. *Supplier assessment and harmonization of components for on-site production units*
2. *Monitor and review new on-site production technologies and their barriers*
3. *Evaluation of technological barriers*
4. *Develop an international expert group on on-site production technologies*

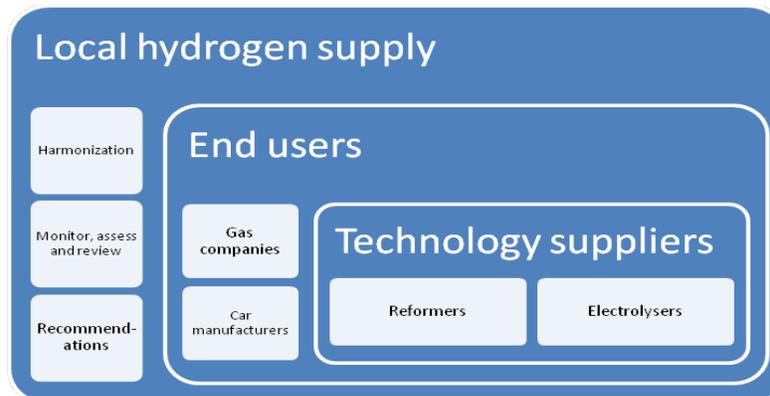


Figure 1. Task overview: Participants and activities

## ***Organization***

The task will be organized in three subtasks. The subtasks are:

### *Subtask 1* Production technology assessment (Leader:??)

The goal of Subtask 1 is to ***Assessment, harmonization and development of components for on-site production units***. The task will include the following activities:

- Harmonization and development of on-site production framework and units
- Evaluate and monitor various production technologies
- Practical development of the local production logistics
- Support the development of IEA-HIA database of running refuelling stations with on-site production (link to Task 30)

### *Subtask 2* New technologies and concepts (Leader: Christian Hulteberg, Lund University, Sweden)

The goal of Subtask 2 is to ***Monitor and review upcoming technologies and new supply concepts***. The task includes the following activities:

- Fuel requirements and feedstock options
- Research and review new on-site production technologies and components
- Review new supply concepts and business models

### *Subtask 3* Harmonized interaction (Leader: ??)

The goal of subtask 3 is to ***Review technological constraints and barriers***. The task includes the following activities:

- Review and discuss barriers and constraints related to delivered pressure and purity etc
- Link to future demands for hydrogen purity
- Contribute to the achievement of social acceptance for use of hydrogen, link to international projects
- Harmonization of control concepts (maintenance and operation)

## ***Expectations***

The new task is expected to contribute to several aspects of the IEA HIA work.

- Supply data to HIA analysis work
- Supply information on the state of the art of industrial solutions for on-site supply
- Identify and evaluate new on-site production technologies
- Identify technical barriers and suggest actions
- Generate a platform for exchange of information on industrial driven research activities

## ***Approach***

Dr. Ingrid Schjølberg from Norway will serve as the Task Organizer until the task is formally approved by the IEA HIA ExCo in March 2013. Dr. Øystein Ulleberg from Norway will function as an Operating Agent for the task.

The meeting plan for the task is given in the table below.

<b>Activities</b>	<b>Milestones</b>
Task definition meeting, Oslo	September 2012
Expert meeting, Paris	February 2013
Expert meeting, US	September 2013
Expert meeting	March 2014
Presentation WHEC 2014	June 2014
Expert meeting	September 2014
Expert meeting	March 2015
Final expert meeting	September 2015

The table below gives the list of participants in the meeting in Oslo and Paris.

<b>Country</b>	<b>Organization</b>	<b>Expert/contact-Person</b>	<b>Type</b>	<b>Confirmed</b>
Belgium	Hydrogenics	R.de.Maeyer	Electrolyzers	x
Denmark	Haldor Topsø	J.B.Hansen	Reformers	x
Europe	Nissan	F.J.S.Carranza	End-user	x
France	GDF Suez	J.Saint-Just	End-user	x
France	Air Liquide	M.Julien/M.Meimary	End-user/Technology supplier	
France	EDF	M-M.Quemere	End-user	
Germany	Mahler AGS	R. Stauss/I.Heil	Reformers	x
Italy	Rosetti Marino	J.Wilhelms	Reformers	x
Japan	Tokyo Gas	I.Yasuda	End-user/Technology supplier	
Nederlands	HyGear	D. Liefink	Reformers	x
Nederlands	Shell	A.Murphy	End-user	
Nederlands	JRC	G. Tsotridis	Research	x
Norway	IFE	Ø.Ulleberg	Research	x
Norway	Hydrogen Technologies (NEL)	A.Taalesen	Electrolyzers	x
Norway	SINTEF	I.Schjølberg	Research	
Norway	RotoBoost	Å.Skomsvold	Electrolyzers	x
Sweden	Catator	F. Silversand	Reformers	x
Sweden	Lund University	C.Hulteberg	Research	x
Sweden	Swedish Gas Centre	M.Svensson	End-user	x
US	Proton-OnSite	E. B. Anderson	Electrolyzers	x

## ***Justification***

The results developed in Annex 16, Subtask C Small stationary reformers for distributed hydrogen production, were the starting point of Task 23. On-site hydrogen supply is an important stepping-stone towards the development of a hydrogen infrastructure and a more environmental friendly transport sector. Current infrastructure development is mainly part of demonstration projects, and experiences show that hydrogen from on-site production is more competitive compared to many other alternatives (i.e Task 23 report, IPHE-HyWays project report).

Task 23 has contributed to the development of a basis for safe and harmonized technology and a global market guide for on-site reforming. The 2009-2015 Strategic Plan foresaw indeed a successor task, but it was focused more on market studies for SSR.

The results of Task 23 verify the need for a more unbiased verification of on-site production technologies (reforming and electrolysis). Such work can only be performed under an impartial global organisation as IEA-HIA. A continued strong industrial engagement in the work performed under the IEA-HIA is essential to ensure that industrial (real) data are supplied to future analysis, and to ensure global industry support in development of the hydrogen society.

## ***Relationship to IEA-HIA long term strategy***

### ***The mission***

The HIA has the mission to accelerate hydrogen implementation and widespread utilization. The new task supports this mission by being an industry driven task and supporting the development of local supply solutions.

### ***The strategy and market environment goal***

The strategy of the HIA is to facilitate, coordinate and maintain innovative research activities through international cooperation. Cooperate research is an important activity in many of the companies involved in the new task. One of the goals of Task 33 is to create a platform for exchange of information between business units. This was achieved in Task 23. Task 33 will contribute to the foundation for standardization of components, evaluation of new technologies and development of new components, codes and standards for on-site supply units to support infrastructure development.