

HYLIGHTS

Hydrogen for Transport in Europe

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Minutes of HyLights Regions Workshop: “Strategies for Successful Hydrogen Implementation in the Transportation Sector: Exchange of Regional and Industrial Perspectives”

on May 16th 2007, Berlin

Creation Date: June 22nd 2007

Prepared: German Energy Agency (dena) GmbH



A Coordination Action to Prepare European and Fuel Cell Demonstration Projects on Transport

Acknowledgement:

HyLights is financed by funds from the European Commission under FP6

Contract: TEN/05/FP6EN/S07.53917/019990.

MINUTES**TABLE OF CONTENTS**

1	Introduction.....	3
2	Participants.....	3
3	Workshop Structure and Content	4
	3.1 PART 1: THE INDUSTRY PERSPECTIVE.....	5
	3.2 PART 2: CASE STUDY GERMANY	7
	3.3 PART 3: THE REGIONS PERSPECTIVE.....	10
4	Annex	16

1 Introduction

This workshop was a follow up event to the workshop realised on 04/06 October 2006 in Brussels that had been jointly organised by the projects Roads2HyCom and HyLights on behalf of the European Commission. During the October workshop the commitment of European regions to the implementation of hydrogen technologies and the need for European coherence in terms of activities and strategies of regions had been identified. The conclusion on this issue was that many European regions are ready to take part in the preparation of a market for hydrogen and fuel cells, but they are in need of further information, especially on industrial strategies.

With respect to these outcomes the workshop “Strategies for Successful Hydrogen Implementation in the Transportation Sector: Exchange of Regional and Industrial Perspectives” was organised by HyLights as part of the project deliverables in order to contribute to establish and mutually communicate an understanding of industrial and regional objectives, qualifications/conditions and prospects for implementing hydrogen in the road transportation sector.

2 Participants

The invitation including program (see Annex 1) of the workshop was sent by email to more than 250 individuals coming from approximately 50 different European regions and municipalities. Finally, 51 participants registered for the workshop, consisting of representatives of 15 European regions and municipalities, industry representatives, representatives of institutions or ministries at European and national level, as well as project partners of the EC projects Roads2HyCom and HyLights.

The most numerous delegations came from Italy representing Regione Piemonte, Regione Lombardia and Regione Abruzzo, from Germany representing the Rhein-Main-Region, Nordrhein-Westfalen, Berlin and Hamburg, from London and from France representing the Region Nord-Pas de Calais, the national level and industry. Furthermore the Scandinavian regions were represented by regional networks namely HyFuture (Sweden), Hydrogen Link (Denmark) and HyNor (Norway) as well as the Spanish regions Aragon and Andalusia. All regions attending have ongoing activities and/or commitments on hydrogen and fuel cell technologies or are in the planning stage for activities to come.

For more details please it is referred to the attendance list in Annex 1.

MINUTES**3 Workshop Structure and Content**

Ulrich Büniger, in his competence as the HyLights Co-ordinator, opened the workshop and Stefan Haendschke provided an overview of the first results of the regions assessment activities realised by the German Energy Agency (dena). Afterwards the three main parts of the workshop addressed the industrial perspective (I), the case study Germany (II) and individual regional perspectives (III).

The industry perspective part was focussed on development objectives and dealt with the next steps for the introduction of hydrogen as transportation fuel in Europe from a hydrogen application technology point of view, roadmaps for hydrogen and fuel cell R&D and the portable equipment industry represented by the HyChain-Project. The case study part presented an overview of German activities for hydrogen in the road transport sector from initial conception to future plans. The Transport Energy Strategy (TES) and future activities documented in the National Hydrogen and Fuel Cell Technology Innovation Programme (NIP) were represented, including an overview of German regional activities.

The regions perspective part was focussed on successful implementation activities. Three regions gave exemplary presentations: London and the London Hydrogen Partnership (LHP), the Norwegian Hydrogen Network (HyNor) and the Scandinavian Hydrogen Highway Partnership (SHHP) and a joint presentation of the Italian regions Lombardia and Piemonte including a side statement by Regione Abruzzo.

Kellen Europe as HyLights Partner presented initial findings on legal forms and management structures of hydrogen projects as these issues are analysed in view of the establishment of large-scale hydrogen demonstration projects (so-called "Lighthouse Projects") in the road transportation sector. Issues such as legal forms of co-operation, including public private partnerships (PPPs) and state aid, insurance, risk management etc. on the one hand and governance aspects on the other are being analysed within this HyLights task.

Following the workshop sessions an excursion was organised to the Clean Energy Partnership (CEP) hydrogen refuelling station of Total at Heerstraße in Berlin-Spandau. The Participants were transferred by one hydrogen bus with internal combustion engine provided by the Berliner Verkehrsbetriebe (BVG) and a F-Cell fuel cell car from DaimlerChrysler operated by Vattenfall Europe. At the site a description was realised of the refuelling station facility including reformer, hydrogen storage and stationary fuel cell and the

refuelling processes with gaseous and liquefied hydrogen of a BMW Hydrogen and a DaimlerChrysler F-Cell were demonstrated.

For more details of the workshop program see the agenda in Annex 2. All presentations of the workshop are now available on the HyLights website (www.hylights.eu).

3.1 PART 1: THE INDUSTRY PERSPECTIVE

Next Steps for Hydrogen as Transportation Fuel in Europe

Philippe Mulard (Total) and Roland Krüger (Ford Motor Company) gave a joint presentation on behalf of several automotive and energy companies (BMW Group, DaimlerChrysler AG, Ford Motor Company, GM Europe AG, Volkswagen AG, MAN AG, Shell Hydrogen and Total France). They presented background information on the current situation on hydrogen and transport in Europe and gave reasons for the importance of a joint industry approach. The main content dealt with the transition phase (bridge between demonstration and commercialisation), certain phases of vehicle deployment, industry criteria and drivers for identification of pilot/demonstration regions or locations. Concerning demonstration projects, the industry mentioned the main goal is to extract the maximum learning's in the most cost effective way towards commercialisation. The most limiting factor at the moment is the availability of vehicles.

The deployment period in the next 10 years can be subdivided in to a technology development and cost reduction phase (phase 1), a pre-commercial technology refinement and market preparation phase (phase 2) and a final commercialisation phase (phase 3) towards mass production.

The presenters point at the importance of European regions as actors within the deployment process, but in order to realise deployment as quickly and efficiently as possible there will be a focus on one first pilot region for passenger cars as a starting point. This pilot region has to meet technical, legal and financial criteria such as existing hydrogen infrastructure, favourable legislative environment, potential organic growth of infrastructure (lighthouse project function) and the relevance of market preparation (differentiated and balanced market). The fostering of hydrogen transport development in that one pilot region will help to speed up further deployment all across Europe without a waste of resources. It is also expected that the development of demonstration activities for hydrogen-fuelled city buses might provide additional opportunities for hydrogen in transport across Europe.

MINUTES

Expected lessons learned and outcomes however must be shared among all European regions.

Roadmap for Hydrogen and Fuel Cells R&D – HFP Implementation Plan

Rittmar von Helholt (GM Europe AG) introduced the HFP Implementation Plan for the next years regarding the framework, the elements (Innovation and Development Actions - IDAs) of the roadmap (vehicles and refuelling facility, hydrogen production, stationary applications and fuel cells for early markets) and important milestones. The plan will provide approximately 7,4 bn € (2,66 bn € for hydrogen vehicles and refuelling station – IDA 1 with 30 % R&D, 63 % demonstration and 7 % support activities) for the development and deployment of hydrogen and fuel cell technologies in Europe from 2007 to 2015. Within the Implementation Plan development and deployment are seen as the major program elements for a secure and sustainable energy and new high-value industry in Europe. The proposed Joint Technology Initiative (JTI) for fuel cells and hydrogen, an industry-led public-private partnership, is in preparation which would provide the framework structure for the program execution.

The indicative timeframes and major milestones for transportation applications (hydrogen vehicles and refuelling stations) are the years 2010 and 2015. By 2010 the first phase of large-scale demonstration projects will be completed and 13 demonstration sites for road vehicles including captive fleet, 200 vehicles and 9 refuelling stations are projected in Europe. In 2015 the extension of the demonstration phase will end with 30 demonstration sites, 3000 vehicles and a anticipated cost of hydrogen at pump of less than 2,50 €/kg (excluding taxes). In parallel to the demo phases R&D on components, integration, storage and refuelling technologies will be undertaken. For 2015 a fuel cell propulsion system with widely accepted costs of 100 €/kW and a durability of 5000 h is envisaged.

Portable Equipment Industry

Roland Perren (Air Liquide) presented the HyChain Minitrans project as reasonable near term step on the roadmap to deployment. This roadmap ranges from early projects (mostly EC funded) from 2005-2010, over lighthouse projects and early hydrogen infrastructure and distribution from 2010 to 2015 to early deployment between 2015 and 2020.

The HyChain-Project has a timeframe from 2006 to 2010 with a development and realization phase (2006-2008) and a demonstration and deployment phase (2008-2010). The target is to bring 158 small vehicles (34 wheelchairs, 40 cargo-bikes, 40 scooters, 44 utility vehicles and 10 minibuses) into

operation in 4 European regions (Castilla y León, Emilia-Romagna, Emscher-Lippe Region, Rhône-Alpes). These low power (up to 10 kW) fuel cell captive fleets in selected early market niches shall enhance public awareness and acceptance. All use cartridges for hydrogen storage. The project is funded by the European Commission with a budget of 17 M€. Together with the budget of 24 stakeholders and the 4 regions the total amount is about 37,6 M€.

All in all these vehicle types are also used for further applications lend themselves to be used in further demonstration projects.

Discussion

Following the presentations an intensive discussion concerned the identification of regions for upcoming large-scale hydrogen demonstration projects. Philippe Mulard and Roland Krüger pointed out that an assessment will be used to understand the individual regional commitment and be based on clear parameters and indicators. During the last years industry has invested 100 M€ each year for R&D and demonstration activities, therefore market access is aimed at as soon as possible. From the involved industry's perspective this requires a first focus on one pilot region as starting point and an extension of learning's and outcomes to further regions afterwards. Hence the number of demonstration sites depends on timescale and project phase.

Nevertheless, these presenters stressed the fact that there is no strategy of single winner regions merely a time relation. In this context several regional representatives underlined the importance of transparent and reasonable requirements which second adopters will be faced with. The different timescales of commercialisation of the presented industry strategy (BMW, DaimlerChrysler, Ford, GM Europe, Volkswagen, Shell Hydrogen and Total) on the one hand and the HFP Implementation Plan on the other hand led to some confusion. To add by way of explanation the differences are traced by the fact that the Implementation Plan has been defined using, as terms of reference, the objectives given by the snap-shoot 2020 produced by the former Development Strategy panel of the HFP while the presented industry strategy relies on more recent assumptions and data.

3.2 PART 2: CASE STUDY GERMANY

Transport Energy Strategy (TES) and Clean Energy Partnership (CEP)

Klaus Scheuerer (BMW Group) resumed the challenging German path towards hydrogen as a vehicle fuel starting with the Transport Energy

MINUTES

Strategy (TES) and its scenarios and leading to the Clean Energy Partnership (CEP) in Berlin. The vision of TES was to identify alternative fuel options and the realisation of sustainable mobility in road transport. After a pre-selection and study of compressed natural gas, methanol and hydrogen the final decision of the group was for hydrogen as the most prospective and universal future fuel with high substitution potential. The selection criteria applied were security of supply, production and distribution, vehicle technology and customer benefits and the decision was based on criteria such as economics, environment and the achievement of strategic goals.

The obstacles for hydrogen identified by the assessment are the technical realisation of hydrogen production from renewable sources, the harmonisation of legislations and further development of infrastructure and technology. Key issues of the strategy were a concept how to set-up the required refuelling infrastructure, the development of a market introduction strategy, the definition of the political framework and the deployment through demonstration project in Berlin (CEP).

The CEP project is an ongoing international public private partnership of 11 European companies (duration: 2002-2016). The project is supported by the Federal German Government (for 2008-2016 as part of the National Innovation Program (NIP)). The target is to test and demonstrate production, storage, transport, distribution and refuelling of hydrogen as well as operation, service and maintenance of vehicles during the demonstration phase (2004-2007) and a phase for extended infrastructure and vehicle use for system validation and optimisation in operation, durability and costs (2008-2016) under real-life constrains. More information is available at the CEP website (www.cep-berlin.de).

The German Regions

Holger Grubel (Vattenfall Europe) gave an overview on regional hydrogen initiatives and networks in Germany (Bavaria, Berlin, Hamburg, Hessen, Nordrhein-Westfalen). The presentation was based on issues such as initiatives, funding schemes and levels, leading projects, project partners, project targets and key issues. Regions to be particularly highlighted are Berlin, Hamburg and Nordrhein-Westfalen. Hamburg with more than 20 projects at different development levels, a hydrogen initiative and the HySOLUTIONS GmbH as public private partnership to foster hydrogen as energy carrier.

Hamburg's focus is on hydrogen applications with high visibility and on system integration. The main conclusions of this presentation are that PPPs ensure a close co-operation between private players and regional administrations and state-run agencies typically provide a sound platform for

local stakeholders. Major requirements within all regions are efficient networking and communication, harmonisation with existing resources, continuity in the strategies and activities and focus on strength.

National Hydrogen and Fuel Cell Technology Innovation Program (NIP)

Nilgün Parker (Federal Ministry of Transport, Building and Urban Affairs, BMVBS) presented the “German Hydrogen and Fuel Cells Technology Innovation Program (NIP)” which in the next 10 years will provide approximately funds of 500 M€ in total by the Federal Government of Germany. The implementation will be done through public private partnerships with an average public funding rate of 50%. Industry will contribute the other 50% (the total budget of approximately 1 bn € will be topped by other funds for fundamental and applied R&D on hydrogen and fuel cells).

The main objectives are to maintain and further expand German industry’s pole position in this field internationally and to prepare hydrogen and fuel cell applications for commercialisation in the next ten years. Germany has been significantly involved in the development of the EU hydrogen roadmap project HyWays. For that reason the German roadmap was developed analogously to the EU roadmap and based on input from TES. The implementation will be focused on market preparation with demonstration and lighthouse projects in parallel with targeted R&D projects. The challenge regarding the implementation is the threshold between R&D and demonstration and the changeover of hydrogen and fuel cell applications in everyday use. The work programme of NIP is divided into 4 development plans: transport including hydrogen infrastructure (1), domestic energy application (2), industrial applications (3) and special markets for fuel cells (4).

The R&D activities are focused on key components and system integration as well as the build-up of the necessary infrastructure. The demonstration activities including car fleets, buses, hydrogen production and refuelling stations are limited to a few sites for phase 1 to be expanded after optimization and synchronisation of vehicle operations and infrastructure during phase 2. Cross-cutting issues such as regulations, codes and standards and education and training will be addressed in parallel with the R&D and demonstration activities.

Discussion

Also in this discussion the concentration of car related demo projects and bus related demo projects to only a few regions were discussed.

MINUTES

Doubts were raised whether the German case could be compared and transferred to other nations as the strong engagement for a successful hydrogen implementation of the German national authorities is based on a strong national automotive industry, its interests and its support.

Other opinions were that other regions without comparable conditions could as well address mainly economical benefits of hydrogen implementation towards their national governments in order to justify substantial engage due to the broad impacts on economy of energy markets and their growing need for sustainability.

3.3 PART 3: THE REGIONS PERSPECTIVE***The London Hydrogen Partnership (LHP)***

Ben Madden (Element Energy) introduced activities of the LHP giving background information on its structure, legal issues and funding, the "London Transport Action Plan", deliveries, progress and results.

The partnership was established in 2002 by the London Mayor and is supported by the Greater London Authority (GLA). The main objective is to stimulate a hydrogen economy in London and the UK. The 5 task groups are transport applications (1), stationary applications (2), infrastructure and renewables (3), safety and regulation and skills (4) and training and communication (5). The partnership has no formal corporate identity and as such is not a delivery body, but a facilitator. Its annual budget of £ 250000 (approx. 370000 €) is for the secretariat, dissemination activities and some consultancy. Funding is contributed by the GLA and Steering Board members (public private split: 50:50). The vision for hydrogen as future fuel in London is detailed in the LHP Transport Action Plan that provides plans for vehicle deployment until the year 2020. The early demo phase (5 years) will involve the operation of 70 hydrogen-fuelled vehicles (10 buses, 60 light duty vehicles) by the year 2011. Specific targets for the year 2010 are:

- 10 buses on London routes, operated under commercial conditions (5 years, 20 hrs/day, fast refuelling etc.),
- one large on-site refuelling facility,
- up to 60 vehicles operated by public sector fleets (e.g. police, fire and underground) – mix of OEM and SME vehicles,
- 2 small hydrogen refuelling stations in central London,
- independent hydrogen vehicle support and maintenance and
- wide spread dissemination and publicity events.

The project is managed and funded by Transport for London (TfL). The tenders phase for buses and depot refuelling has already been finished so far (the contract signatures are anticipated later in May 2007). The competitive dialogue for hydrogen vehicles is nearing the final stage and 5 different types of vehicles will be selected. London has cooperated with a number of cities to initiate the "Hydrogen Bus Alliance". The first vehicle operation is expected mid 2008 and the complete bus route by end 2008. Further vehicles will be delivered in 2009 and 2010. The total project costs for the London Hydrogen Action Plan are estimated at £ 25 million (72% for the bus project) funded by TfL budgets (86 %) and DTI (14 %). Any private funding is additional. In comparison to the demonstration location criteria of industry London has a number of potential benefits for demo activities like strong political support (e.g. for low carbon vehicles), a large bus fleet, well funded public sector fleets with a strong environmental goal and neutrality with respect to the origin of hydrogen vehicles. Industry has been asked to provide further information on cost reduction in order to continue support for further project phases (2010-2020).

HyNor & the Scandinavian Hydrogen Highway Partnership (SHHP)

Ulf Hafsel (Norsk Hydro) presented the Scandinavian Regions including Norway, Sweden and Denmark which have the collective vision to become one of the first regions in Europe where hydrogen is available and used in a network of refuelling stations (2 stations are in operation now, 1 to be opened in June 2007, 2 further ones are planned for 2008 and 3 are planned for 2009). The Scandinavian Hydrogen Highway Partnership (SHHP) is a trans-national network that will eventually connect the national networks of Norway (HyNor), Sweden (HyFuture) and Denmark (Hydrogen Link). The objectives are to facilitate the establishment of a hydrogen infrastructure (by 2012) that enables hydrogen fuelled vehicles to operate and refill along the network, to qualify Scandinavia's SHHP as a Lighthouse Project in Europe and to connect the network to the rest of Europe e.g. via Hamburg. The vehicle fleet within the HyNor network is made of up to 15 "Toyota Prius" cars part of which have already been delivered, 5 "Thlink Hydrogen" cars that are planned to be put into operation by 2007/08 and plans for buses in 3 hydrogen nodes by 2008/09. The future targets for the phase of 2008-2015 are to present a Lighthouse Project function, to build a network of refuelling stations (15 stations, 30 satellite stations) and to demonstrate a large vehicle fleet (100 buses, 500 cars, 500 speciality vehicles). The challenges that have to be taken up are technical ones (e.g. vehicles), the match of customer demands and availability of vehicles, the network consortium with relevant partners and securing funding (national and EU).

MINUTES

Further issues of the presentation were legal and management issues as well as details on the network structure of the HyNor partnership.

Regione Piemonte and Regione Lombardia

Giuseppe Rovera (on behalf of Regione Piemonte) presented the common “Sustainable Mobility and Energy Strategy” of several Italian regions. He gave background information on the involved regions with a focus on the regions Lombardia and Piemonte, regarding ongoing activities, next steps, management structures, budgets and lessons learned from activities so far.

Piemonte and Lombardia have set-up RTD programs on hydrogen and fuel cells including basic research, technology development and demonstration. Furthermore both regions are implementing support policies on Renewable-Energy-Strategy (RES) development (particularly Biomass and Solar) and energy efficiency. On 20 March 2007 Lombardia and Piemonte signed a strategic agreement on “Sustainable Energy and Mobility Strategy (REGIO-ISEM)” on a common RTD effort for the deployment of H2FC technologies in line with FP7 of the European Commission. The strategy is open to other Italian regions and countries located along the 5th corridor (for a detailed picture it is referred to the presentation, please) in the Mediterranean area. The main objectives are to find synergies, share RTD programs as well as competences and infrastructure to achieve a common energy and mobility strategy. The main tasks are basic research, development of H2FC technologies for mobile and stationary use, technology transfer, demonstration, cooperative programs with other regions and municipalities and a multi-stakeholder observatory.

The goals for the year 2015 regarding the transportation sector are fuel diversification (10% of new vehicles to adopt biofuel, biogas, CNG, H2-CNG mixtures) on one hand and hydrogen from renewable sources to cover 50% of hydrogen use in mobile and stationary applications on the other hand. These goals are planned to be reached by activities as the deployment and demonstration of such named fuels, the verification of functionality, the increase of user acceptance of hydrogen related vehicles, infrastructure and services and the assessment of safety, costs and environmental impacts of alternative fuels along the value added chain. The timescale of REGIO-ISEM will be aligned with the EU FP7 program (2008-2013).

The initiative intends to efficiently contribute to the EU FP7 and JTI. The regions are able to provide funds to support the initiative by 70-100 M€/year. The management structure will adopt the reference model foreseen for the JTI as industry and public administration grouping that equally sharing costs. The participating regions will constitute the strategic board of the initiative.

The ongoing activities of Regione Lombardia having a strong reference to transport applications. Both projects Zero Regio and Milano Bicocca aim to develop and demonstrate a hydrogen infrastructure. The Regione Piemonte founded the “Sistema Piemonte Idrogeno – SPH2 (The Piedmont Hydrogen System)” to foster hydrogen technologies in the region. Several projects regarding hydrogen technologies for transport applications are in progress. Furthermore the regions of Abruzzo (see next presentation), Toscana, Veneto and Lazio have ongoing activities on hydrogen applications mostly on H₂-CNG mixtures for ICE but fuel cell R&D and application as well.

Further information e.g. on lessons learned from projects and bottlenecks of demonstration programs are reflected in the presentation.

Side statement Regione Abruzzo

Thomas Gromeier (Eni S.p.A.) presented a joint proposal of several Italian regions (Abruzzo, Piemonte, Lombardia, Toscana and Veneto) to the Italian Environment and Transport Ministry for setting up and demonstrating a multifuel infrastructure for natural gas, biogas, hydrogen and blending thereof. Within this strategy a cost effective hydrogen infrastructure will supply NG vehicles – widely available in Italy today – to operate with mixtures of hydrogen and CNG (up to 30% hydrogen rate). This technology is foreseen as a bridge towards pure hydrogen technology and has a triple focus. Once a hydrogen service station distribution network will be built, second sustainable project cost can be supported by the participating regions and last the entire hydrogen chain can be built through PPPs. The vehicle mini fleet (15-25 vehicle) for every region will initially costs 300000-500000 €, the cost for the development of a H₂-CNG mix fuel vehicle (Fiat) will be about 1 M€ and the H₂-CNG fuelling equipment about 1.2 M€ (Eni S.p.A.). These costs will be shared between the project partners.

The short-term action plan provides the introduction of 200-300 Fiat ECO Panda triple fuel vehicles for urban transport, 10-15 eco-compatible multifuel service stations for H₂-CNG mix fuel (open to public and prepared to handle pure hydrogen) and an energy generation network within these stations to supply energy for the hydrogen generation. Open issues for the realisation of the H₂-CNG strategy are European standards and guidelines for hydrogen distribution and storage, safety standards with building provisions, definition of the fiscal treatment of hydrogen, self service in Italy for gaseous fuels to deliver better refuelling facilities and European standards for hydrogen and mix fuel vehicle homologation and public use.

MINUTES***Conclusions on Legal Forms and Management Structures***

The closing presentation on contractual and management issues for Lighthouse Projects was given by Ellas Papadopoulou (Kellen Europe). The task of Kellen Europe within HyLights as institute partner deals with the analysis of legal and contractual forms of PPPs for the realisation of hydrogen road transport demonstration projects, the benchmark of advantages and disadvantages and the assessment of efficiency and effectiveness of such management structures.

The main findings of the assessment and benchmark were categorised relationships between partners (horizontal or vertical), types of agreement (informal or EU-led partnership), the high risk profile of LHPs under consideration of solid legal forms, the provision of funds associated with incorporated legal entities, the gap between H2FC R&D and large-scale commercialisation and the effect of solid legal forms on that gap.

More information on the main findings and examples of project management structures are provided in the related HyLights reports (executive summary of the report prepared in December 2006) which are available on the HyLights website (www.hylights.eu). The information therein reflect knowledge to-date and combine project and factual findings, with those sourcing from reports on Hydrogen demonstration projects as well as feedback from project partners/managers that were interviewed. The findings are initial, non-binding and non-prescriptive as work on these issues continues within HyLights and will be finalised with project closure (December 2008).

Discussion

The last discussion round mostly concentrated on the specific Italian H2-CNG mixed fuel strategy. The question whether H2-CNG mixture technology could be an adequate bridge to pure hydrogen technology in the future was discussed in detail.

Italian industry raised the criticism that the HFP is not addressing the issue at all, the Italian regions' representatives adding that the issue is not only a question of general agreement of the HFP but also on existing regional conditions and infrastructures. At the moment 500000 CNG vehicles are being operated in Italy and the number is expected to grow to more than 100000 vehicles each year.

From the automotive industry's and German government's perspective natural gas is only a short- or medium-term option, but will never become a long-term solution. Due to its independence from primary/input energies hydrogen as a secondary energy carrier and fuel can in contrast unify various energy inputs to become one fuel requiring only a limited number of end-use

technologies and infrastructure. Therefore investments in natural gas/hydrogen mixture infrastructure and vehicles point in a wrong long-term direction. Furthermore this strategy does not coincide with the European hydrogen implementation strategies as documented in the recent Implementation Plan.

MINUTES

4 Annex

Attendance list

Invitation and programme

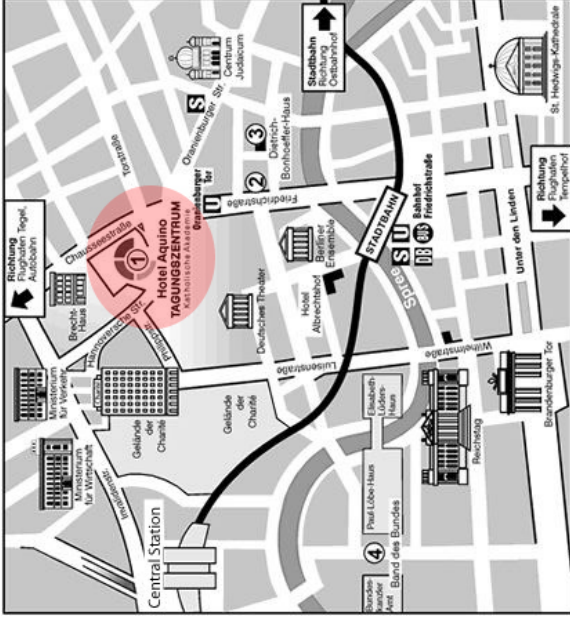
Surname	First Name	Region/ Project	Institution/ Company	E-mail
Boening	Achim	Rhein-Main-Region, Hessen, Germany	Infraserv Hoechst	Achim.boening@infraserv.com
Braune	Oliver	HyLights	German-Energy-Agency (dena)	braune@dena.de
Bunzeck	Ingo	HyLights	Energy Research Centre of the Netherlands (ECN)	bunzeck@ecn.nl
Bürger	Uli	HyLights	Ludwig-Bölkow-Systemtechnik	coordinator@hylights.eu
Bürger	Helmut	Berlin, Germany	Senate Department for Economics, Technology and Woman Issues	Helmut.buerger@senwtf.verwalt-berlin.de
Caramanico	Franco	Regione Abruzzo	Regione Abruzzo	
Carbonaro	Salvatore	Industry, Italy	Eni S.p.A.	Salvatore.carbonaro@eni.it
Fuhrmann	Katrin	Roads2HyCom	College of Europe	KFuhrmann@coleurop.be
Gnörich	Bruno	Roads2HyCom, University of Aachen, Germany	Drive Train Department, Institut für Kraftfahrwesen, RWTH Aachen	gnoerich@ika.rwth-aachen.de
Godfroij	Per	HyLights	Energy Research Centre of the Netherlands (ECN)	godfroij@ecn.nl
Gromeier	Thomas	Industry, Italy	Eni S.p.A.	thomas.gromeier@eni.it
Grubel	Holger	HyLights	Vattenfall Europe AG	Holger.grubel@vattenfall.de
Hacque	Francoise	France	French Atomic Energy Commission (CEA)	Francoise.HACQUE@cea.fr
Haendschke	Stefan	HyLights	German-Energy-Agency (dena)	haendschke@dena.de
Hafsel	Ulf	HyLights	Norsk Hydro	ulf.hafsel@hydro.com

Surname	First Name	Region/ Project	Institution/ Company	E-mail
Heinze	Erna	Hamburg, Germany	Ministry for Urban Development and the Environment (BSU)	erna.heinze@bsu.hamburg.de
Helmolt	Rittmar v.	Industry	GM Europe/ Adam Opel AG	rittmar.dr.von.helmolt@de.opel.com
Hill	Rosita	London, UK	Department of Trade and Industry (DTI)	rosita.hill@dti.gsi.gov.uk
Hölzinger	Nadine	Berlin, Germany	MVV Consulting	n.hoelzinger@mvv-consulting.com h.niemeyer@mvv-consulting.com
Jackson	Stuart	HyLights	Kellen Europe	SJackson@kelleneurope.com
Junker	Michel	Lorraine, France	Alpheia Hydrogen	Michel.junker@alpheia.com
Karlström	Magnus	Sweden	Hydrogen Sweden	magnus.karlstrom@vatgas.se
Kattenstein	Thomas	Nordrhein-Westfalen, Germany	Fuel Cell and Hydrogen Network Northrhine-Westfalia	kattenstein@energieagentur.nrw.de
Klingenberg	Heinrich	Hamburg, Germany	hySOLUTIONS GmbH	Heinrich.klingenberg@hysolutions-hamburg.de
Krüger	Roland	HyLights	Ford	rkruge9@ford.com
Landinger	Hubert	HyLights	Ludwig-Bölkow-Systemtechnik (LBST)	landinger@lbst.de
Lopez-Lara	German	Andalusia, Spain	Andalusian Energy Agency	direcciontecnica.aae@juntadeandalucia.es
Maclaurin	Dougal	London, UK	Element Energy Ltd.	Dougal.Maclaurin@element-energy.co.uk
Madden	Ben	London, UK	Element Energy Ltd.	ben.madden@element-energy.co.uk

Surname	First Name	Region/ Project	Institution/ Company	E-mail
Møller	Jens-Chr.	West Denmark	Hydrogen Innovation & Research Centre (HIRC)	jcm@hirc.dk
Morte-Gomez	Cristina	HyLights	Kellen Europe	cmortegomez@kelleneurope.com
Mulard	Philippe	HyLights	Total	philippe.mulard@total.com
Mussinatto	Adriano	Regione Piemonte, Italy	Regione Piemonte	adriano.mussinatto@regione.piemonte.it
Müller	Poul	Region Midtjylland, Denmark	Region Midtjylland	Poul.muller@rr.rm.dk
Nietsch	Thomas	Industry, France	Helion/ Areva	thomas.nietsch@helion-fuelcells.com
Papadopoulou	Elias	HyLights	Kellen Europe	epapadopoulou@kelleneurope.com
Parker	Nilgün	Berlin	Federal Ministry of Transport, Building and Urban Affairs (BMVBS)	Nilguen.Parker@bmvbs.bund.de
Perren	Ronald	Industry	Air Liquide	Ronald.PERREN@AirLiquide.com
Reijalt	Marieke	Europe	European Hydrogen Association (EHA)	reijalt@h2euro.org
Romero-Elu	Leire	Aragon	Foundation for the Development of New Hydrogen Technologies in Aragon	lromero@hidrogenoaragon.org
Ros	Menno	HyLights	Energy Research Centre of the Netherlands (ECN)	ros@ecn.nl
Rota	Alberto	Regione Lombardia, Italy	Regione Lombardia/ Politecnico di Milano	rota.agm@tin.it
Rovera	Giuseppe	Piemonte	Centro Ricerche Fiat	giuseppe.rovera@crf.it

Venue

Hotel Aquino
Convention Centre, Catholic Academy
Hannoversche Strasse 5b, 10115 Berlin



from Central Station: *Bus 240* to Philippstraße (approx. 8 min); from Airport Tegel: *Bus TXL* to Central Station & *Bus 240* to Philippstraße (approx. 35 min); from Airport Schoenefeld: *Train S9* to Friedrichstraße & *Metro U6* (Direction: Alt-Tegel) to Oranienburger Tor (approx. 1h), from Airport Tempelhof: *Metro U6* (Direction: Alt-Tegel) to Oranienburger Tor

Participants who will travel by car have the possibility to use the parking garage at the venue (access: Hannoversche Straße)

Language

English (no simultaneous translation to/from other EU languages is foreseen)

Registration

Please register to the workshop by 3th May 2007 the latest.

Fax: +49 (0) 30 726165 – 699

E-Mail: braune@dena.de

- Yes. I will participate in the **Workshop**
 Yes. I will participate in the **Excursion**

Name

Region / State

Administration / Institution / Company

E-Mail

Workshop

16 May, Berlin

Strategies for Successful Hydrogen Implementation in the Transportation Sector:

Exchange of Regional and Industrial
Perspectives



Contact Persons

Stefan Haendschke
German Energy Agency (dena)
haendschke@dena.de
Phone: +49 30 726165-673

Oliver Braune
German Energy Agency (dena)
braune@dena.de
Phone: +49 30 726165-637



Introduction

This workshop will be a follow up event to the Regions workshop that took place on 04/06 October 2006 in Brussels and was jointly organised by the projects Roads2HyCom and HyLights and the European Commission. The objectives of this successful two-part-workshop were to map the needs and expectations of the participating regions concerning the Joint Technology Initiative for Hydrogen and Fuel Cells (JTI), to learn about the role of European Regions in the JTI and to concretise this role in terms of structure and process.

During the previous workshop the commitment of European Regions to the implementation of hydrogen technologies and the need for European coherence has been identified. One of the major conclusions was, that European regions are ready to take part in the preparation of a market for hydrogen and fuel cells, but they are in need for further information in order to define effective strategies.

The workshop "Strategies for Successful Hydrogen Implementation in the Transportation Sector: Exchange of Regional and Industrial Perspectives" will contribute to establish and mutually communicate an understanding of industrial and regional objectives, framework conditions and prospects for implementing hydrogen in the transportation sector.

Programme

09:30	Registration
10:00	Welcome by the HyLights Co-ordinator Ulrich Büniger, LBST
10:10	HyLights: 1st results regions assessment Stefan Haendschke, dena
10:20	Industry perspective: Development objectives <i>Next steps for hydrogen as transportation fuel in Europe</i> Philippe Mulard, Total Roland Krüger, Ford <i>Roadmap for hydrogen and fuel cell R&D – HFP Implementation Plan</i> Rittmar v. Helmolt, GM Europe <i>Portable equipment industry</i> Roland Perren, Air Liquide Discussion
11:30	Case study Germany: from TES to CEP to LHP <i>Transport Energy Strategy (TES) and Clean Energy Partnership (CEP)</i> Klaus Scheuerer, BMW AG <i>The German Regions</i> Holger Grubel, Vattenfall Europe Hamburg AG

National Hydrogen and Fuel Cell Technology Innovation Programme

Nilgün Parker, Federal Ministry of Transport, Building and Urban Affairs (BMVBS)

Discussion

12:40

Lunch

13:40 **Regional perspective: Successful implementation activities**

London Hydrogen Partnership (LHP)

Ben Madden, Element Energy

HyNor & the Scandinavian Hydrogen

Highway Partnership (SHHP)

Ulf Hafseid, Norsk Hydro

Piemonte/Lombardia

Giuseppe Rovera

Conclusions on legal forms & management issues

Ellas Papadopoulou, Kellen Europe

14:40

Coffee Break

14:50

Discussion

15:30

End of workshop

15:40 **Excursion: Visit of a CEP hydrogen filling station**

transfer with hydrogen buses of Berliner Verkehrsbetriebe (BVG)

18:30

Arrival back at venue

(via Berlin Central Station)

