

HyLights

**A Coordination Action to Prepare European Hydrogen and Fuel Cell
Demonstration Projects**

How to Learn to Prepare Future „Lighthouse Projects“

Ulrich Büniger

Co-ordinator HyLights

Hydrogen for Transport
DG TREN, Rue de Mot 28, Brussels
25 January 2006



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A Coordination Action to Prepare European Hydrogen and Fuel Cell Demonstration Projects

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Outline

Major objective

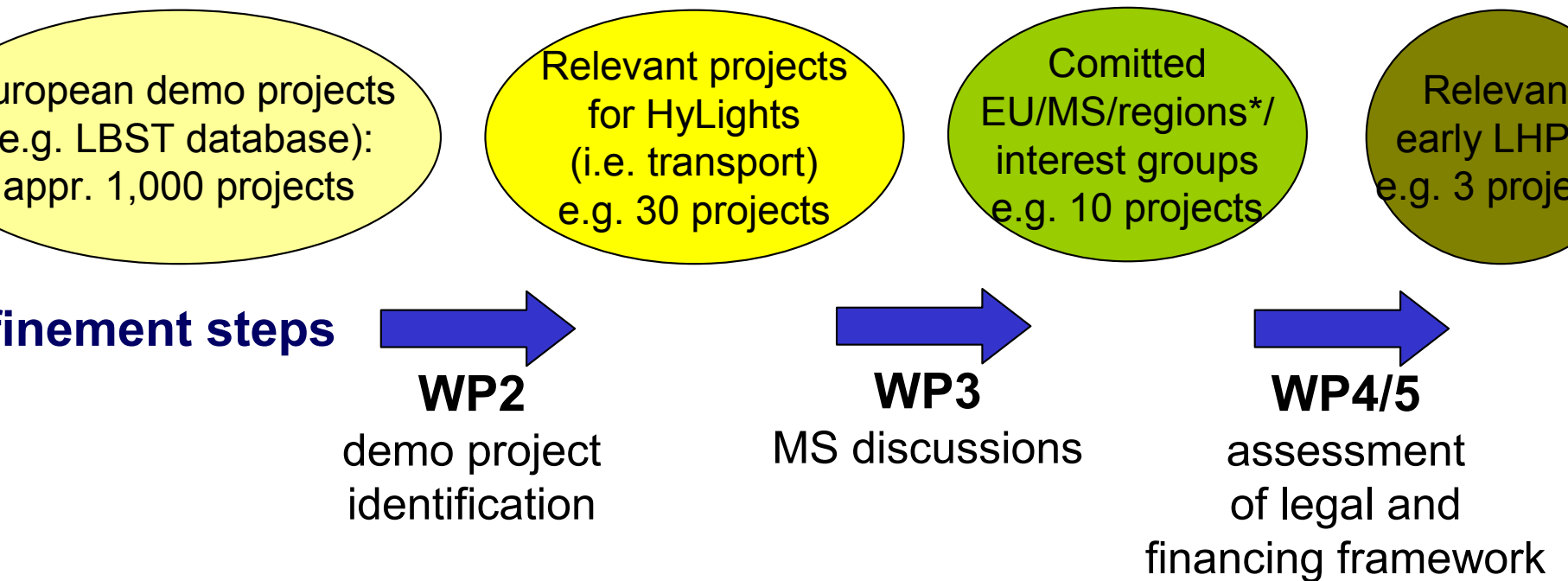
Partners

Alignment HFP

Project structure

Work programme

The thread is consolidation of profile for Lighthouse Projects on hydrogen for transport dynamically over time by transparent assessment procedure.



The workpackages subordinate their efforts to fulfill this general goal.

Under consideration of timescale from „early demo“ to „commercialisation“ and definition of „**key performance indicators**“ (KPI) and „**quality gates**“

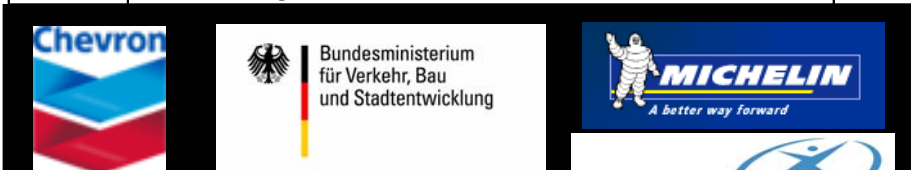
yLights - Partners



No.	Participant name	MS
01	L-B-Systemtechnik	D
02	Air Liquide Advanced Technology Division	F
03	Air Products	UK
04	Bayerische Motoren Werke	D
05	BP	UK
06	Centro Ricerche Fiat	I
07	DaimlerChrysler	D
08	Deutsche Energie-Agentur	D
09	Energy Research Centre of the Netherlands	NL
10	EniTecnologie	I
11	Ford Forschungszentrum Aachen	D
12	GM/Opel	D
13	Kellen Europe	B
14	Linde	D
15	Norsk Hydro	N
16	PSA Peugeot Citroën Automobiles	F
17	Repsol YPF	E
18	Shell Hydrogen	NL
19	Total	F
20	Vattenfall Europe	D
21	Volkswagen	D



European Commission

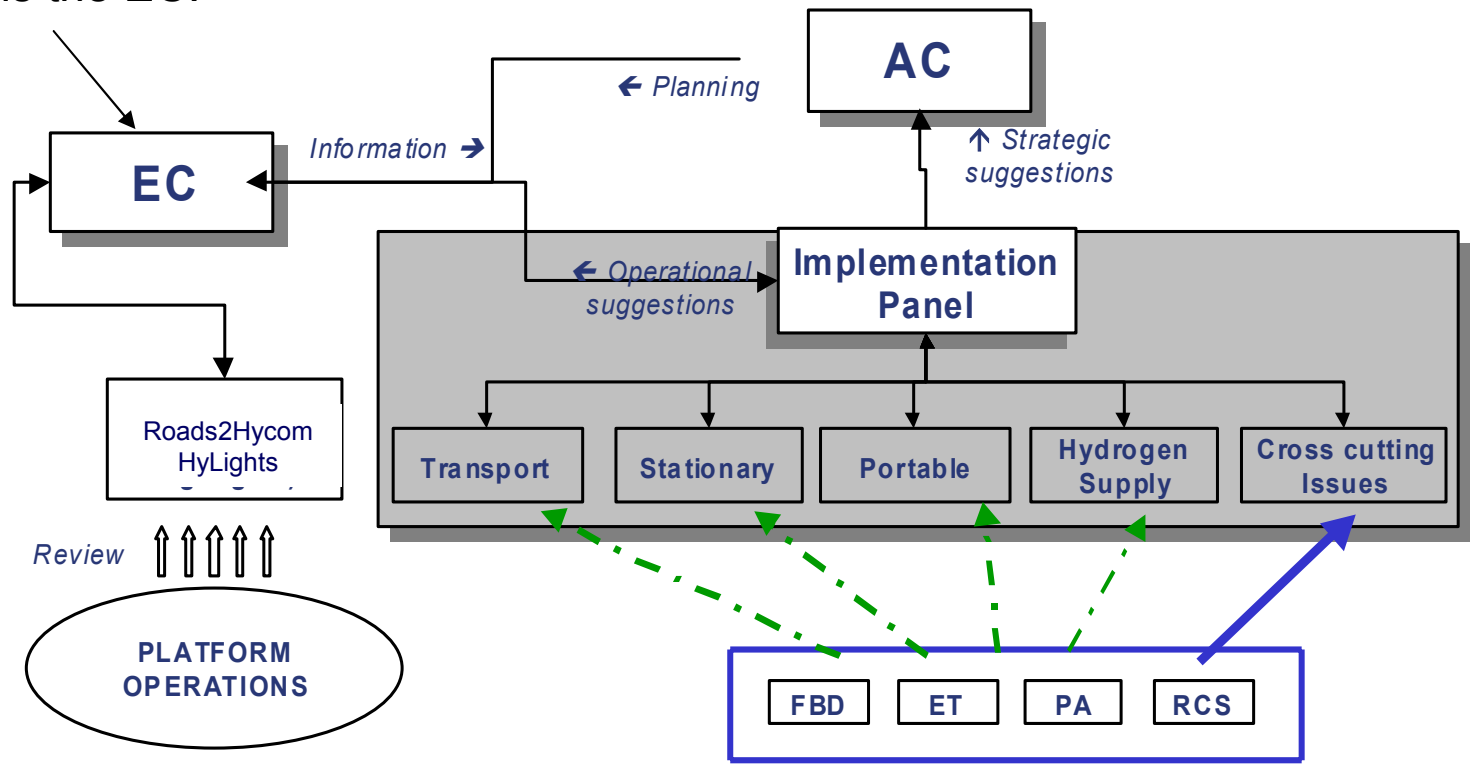


HyLights - Alignment with HFP

The HFP has provided a new structure for its future work (Implementation Panel (IP) as operational unit). The central role of HyLights is defined by the "IP Terms of Reference" (ToR).

Formally the link between HyLights and the HFP is the EC.

CONCEPT FOR TP STRUCTURE : LINKING WITH PLATFORM OPERATIONS



HyLights – In Transition from FP6 to FP7

Roads2HyCOM - Assessment, Planning
H2&FC Research and H2 Communities

HyLights – Assessment, Planning, Branding
Lighthouse Projects on H2 for Transport



PREMIA – Assessment Framework
Demo projects alternative fuels



CUTE
FC buses and re fuelling



HyFLEET-CUTE
H2 buses and re fuelling



ZERO-Regio
H2 for Transport in Regions

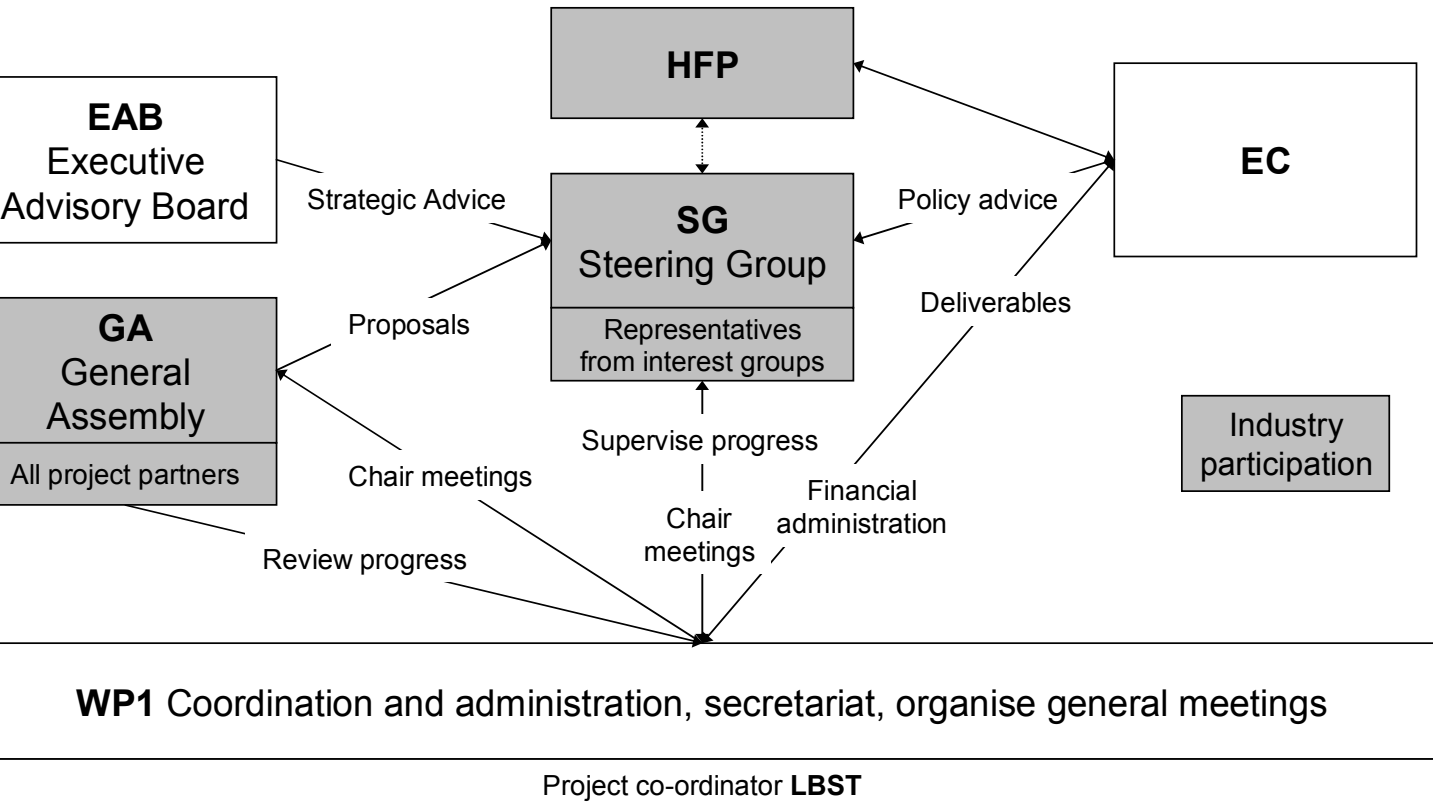


HyCHAIN
H2 for Transport in Regions



Project family “Demonstration Hydrogen for Transport”

yLights - Project Structure



WP2
Mapping ongoing
demo projects and
data aggregation,
PR framework

WP leader: **LBST**
Partners: ECN, dena,
Kellen, industry

WP3
Assessment
framework,
MS co-ordination

WP leader: **dena**
Partners: ECN, LBST,
industry

WP4
Gaps analysis,
plan future demo
projects based
on key criteria

WP leader: **ECN**
Partners: Industry,
Kellen, LBST

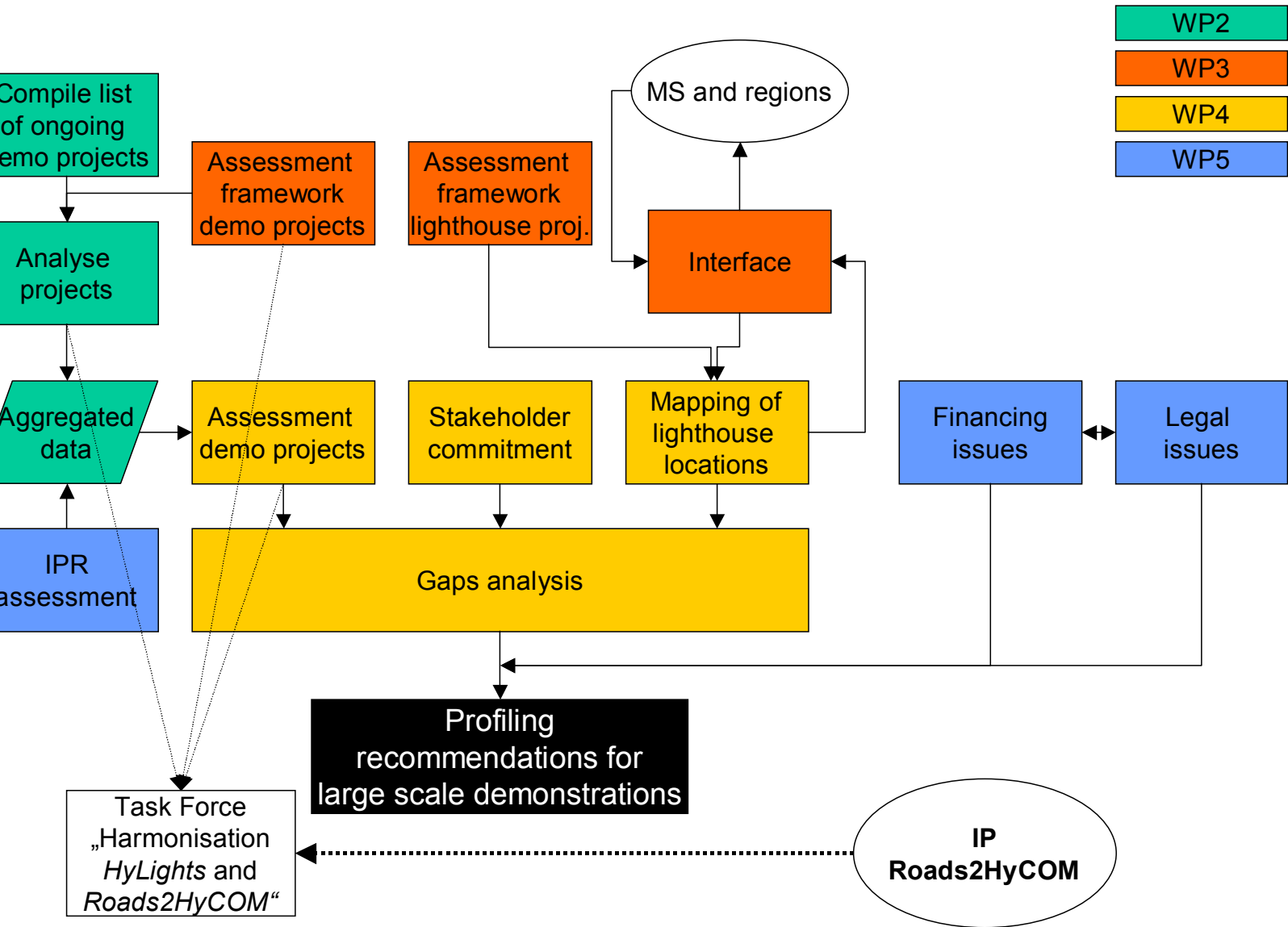
WP5
Assess financial
and
legal framework

WP leader: **Kellen**
Partners: dena, ECN,
LBST, industry

WP6
Project
dissemination,
info management,
promotion

WP leader: **LBST**
Partners: dena,
ECN Kellen

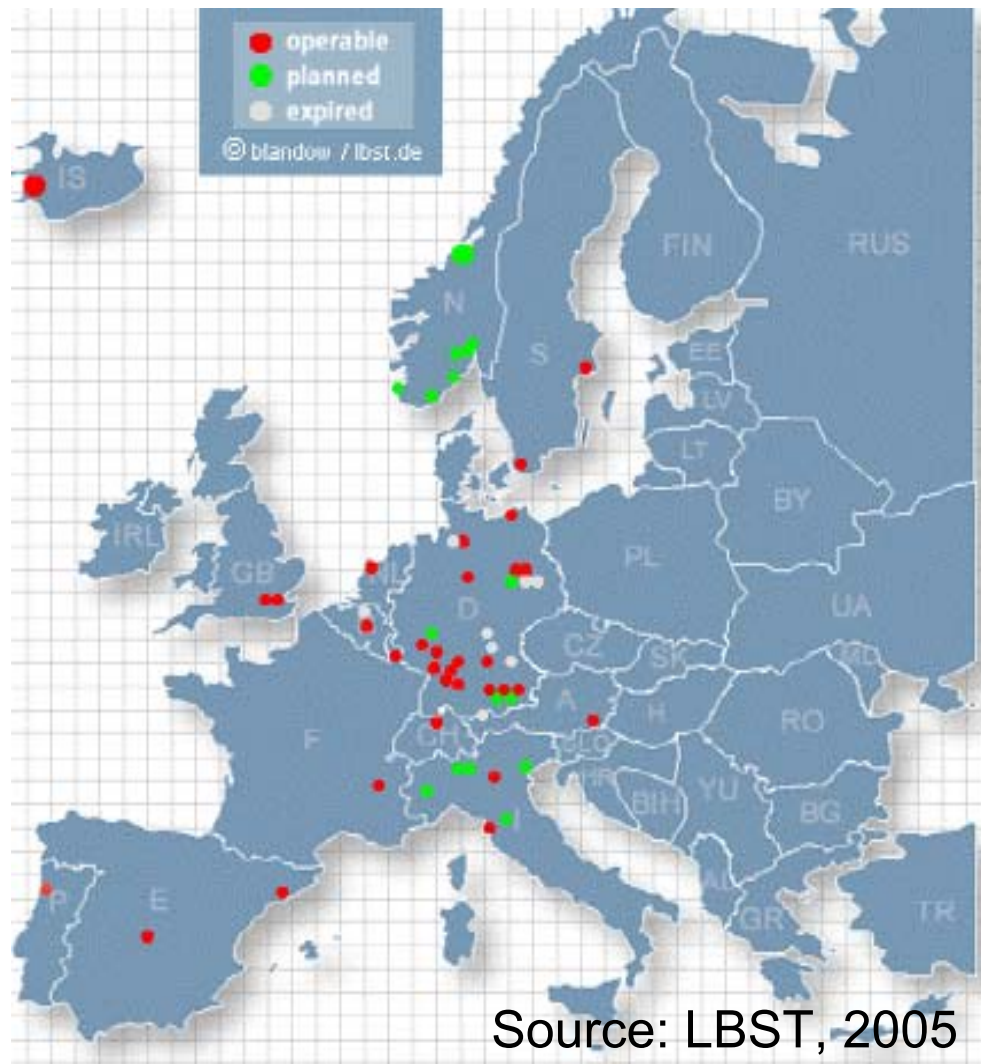
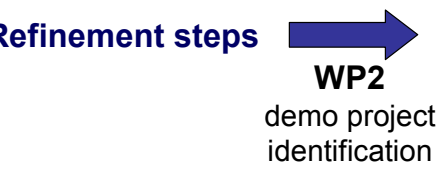
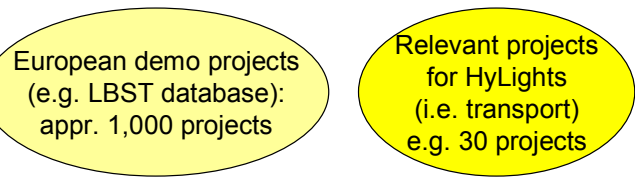
HyLights - Cohesion of Work Packages



Mapping and Aggregation of Demonstration Projects

Compile and assess a list of all European H2&FC demonstration projects*

Example:
Database for hydrogen refuelling stations worldwide (here: Europe)

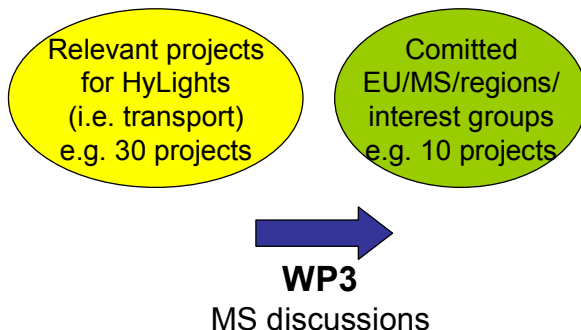


Source: LBST, 2005

Assess European Member State Views

Identify and compile the **commitment of European member states** in hydrogen energy and fuel cell demonstration projects:

- Develop and arrange criteria for assessment of national and regional interests and strategies
- Main focus on national efforts of key actors, assess funding of national demonstration activities on hydrogen for transport (past, ongoing, future)
- Incorporate Eastern Europe member states by specific workshops
- Link to and co-operate with HFP Member State Mirror Group



Reducing an Assessment Framework

Develop **list of key criteria and indicators** to assess the performance of relevant demonstration projects:

- establish comprehensive and transparent methodology
- use existing and tested assessment frameworks where ever possible and acceptable
- take into account various aspects of research/demonstration (Task Force in co-operation with Roads2HyCOM)
- data/information collection framework needs several dimensions to address demonstration projects on local, regional, national and international level

Reducing an Assessment Framework

QUALITY GATES use more than 'only technical' KEY PERFORMANCE INDICATORS (KPI) to assess demonstration projects

Project scope/characteristics

Technological success



Energy consumption/ emissions

User/operational success

Relevant cost elements for comparison

Safety and risk elements/incidents

Project management

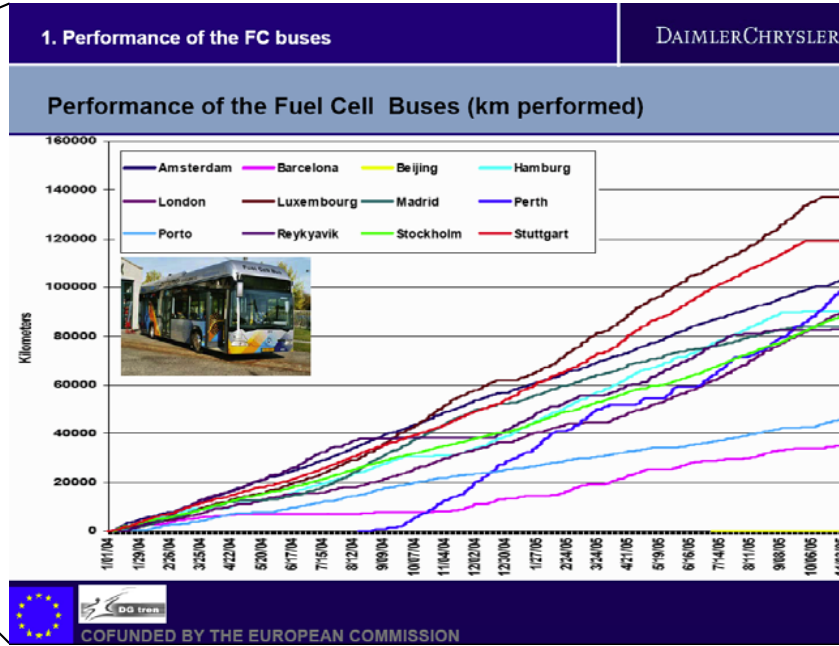
Regional issues / European coherence

Public visibility and acceptance, PR

Financing issues

Legal issues

etc.



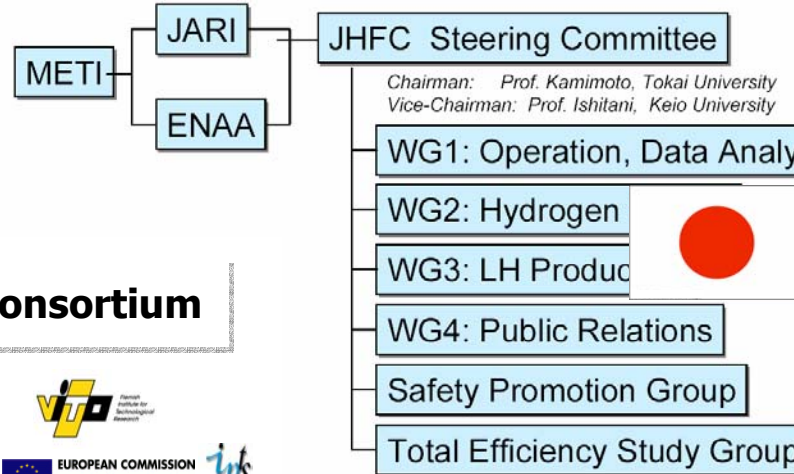
Source: CUTE, 2006

International Cooperation

Assessment frameworks for road transport related demonstration projects have already been developed in Europe (PREMIA), Japan (JARI, ENAA) and the U.S. (NREL). To avoid re-inventing the wheel cooperation is necessary.

 National Renewable Energy Laboratory

Key Vehicle Data	
Stack Durability	
Fuel Economy (Dyno and Vehicle Range)	
Fuel Cell System Efficiency	
Maintenance, Safety Events	
Top Speed, Accel., Grade	
Max Pwr & Time at 40C	
Idle Start Ability (Time, Energy)	
Continuous Voltage and Current (Power) from Fuel Cell Stack, Motor/Generator, Battery & Key Auxiliaries: (Dyno & On-Road)	



PREMIA - Consortium



VITO
Flemish Institute for Technological Research



JRC-IPTS
European Commission - Joint Research Centre,
Institute for Prospective Technological Studies



CERTH-HIT
Centre for Research and Technology Hellas,
Hellenic Institute for Transport



VTT
Technical Research Centre of Finland



SETREF
South-East European Transport Research Forum

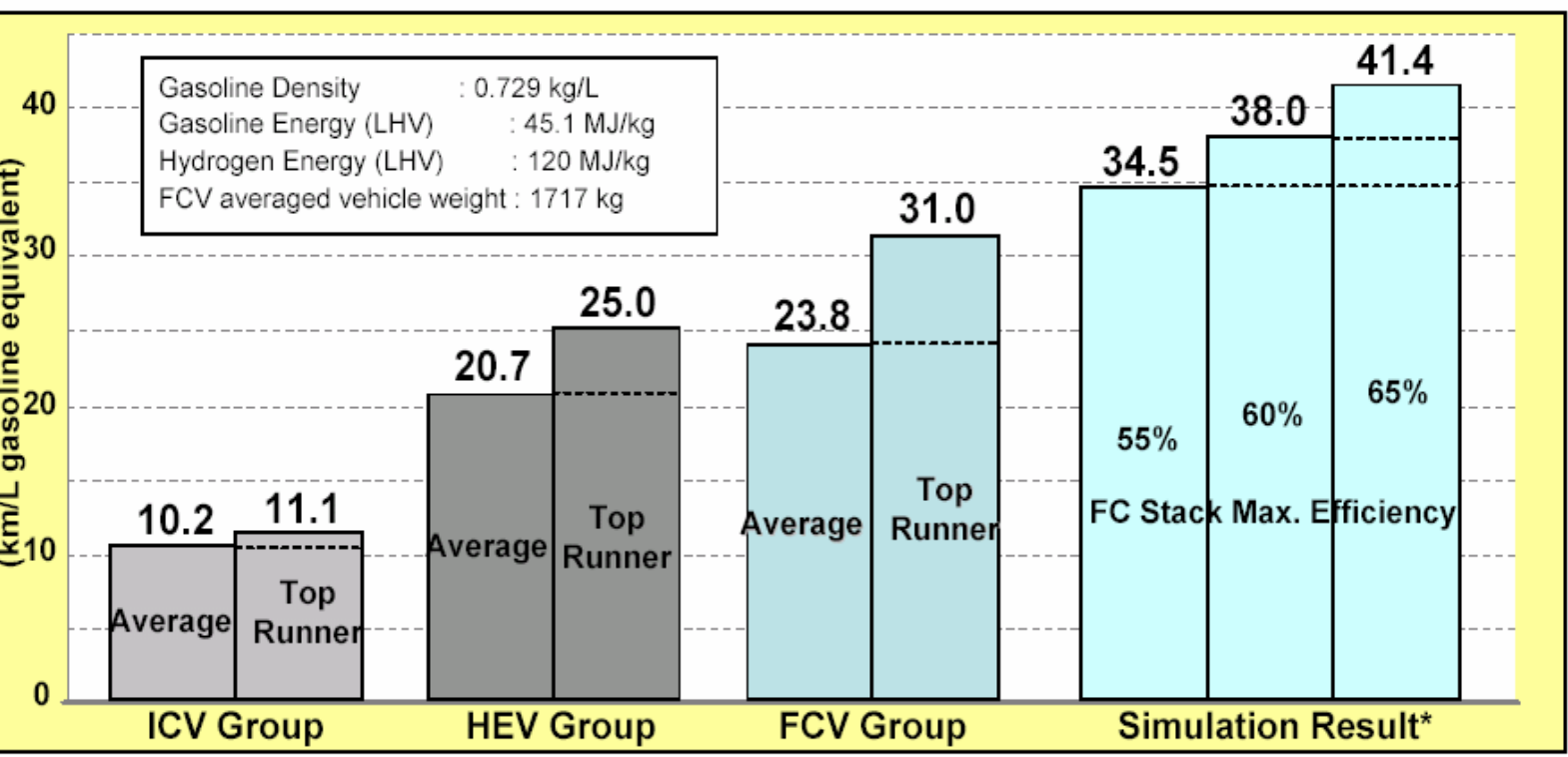


PREMIA Assessment Framework, 25 May 2005

Mapping and Aggregation of Demonstration Projects

Example:

Aggregated FC vehicle data from JHFC project



Source: Japan Hydrogen and Fuel Cell Demonstration Project, 2005

Detailed Planning of Future Demo Activities

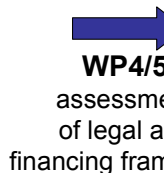
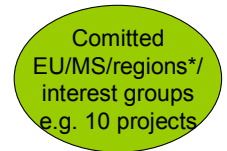
Analyse concluded and ongoing hydrogen and FC demonstration projects for relevant gaps

Consider the detailed planning of appropriate future large scale demonstration activities to develop hydrogen as a transport fuel

Provide recommendations specifically for project developers and EC

This will be achieved by gaps analysis on the desired future and current situation including:

- Best practices of recent and ongoing projects (technology)
- Best practices of stakeholder commitment and interests
- Potential locations for future large scale European demonstration projects to develop hydrogen as a fuel for transport
- Financing issues, regulation



Legal and Financial Assessment

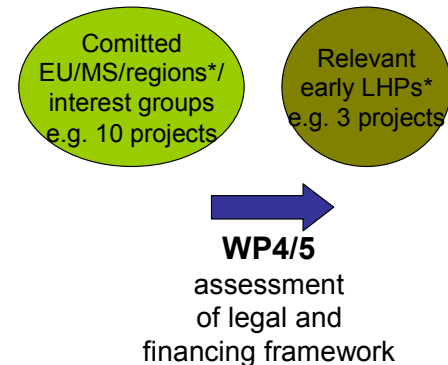
Effectively contribute to financial and legal planning of future Lighthouse Projects on hydrogen for transport to

- the overall goals of FP7 (GROWTH Initiative)
- and short-term the planning phase of the JTI.

Collect and assess data from past and ongoing European hydrogen demonstration projects with regard to their different legal and financing schemes in order to identify key project success factors.

Development of strategic advice and recommendations for future projects for EC, partners & other stakeholders to serve future planning:

- best practices,
- financial instruments & mechanisms (e.g. taxation),
- legal establishment, etc.



ommunication and Dissemination

Share experience from the separately acting demonstration projects to enhance their visibility in respect of a coherent European strategy for the introduction of hydrogen for transport

Create visibility of hydrogen and fuel cells at high level (industry, EC, member state governments) by documenting industry's commitment

Prepare a European market for hydrogen and fuel cell vehicles by fostering public awareness of the coherence of ongoing and coming hydrogen and fuel cell demonstration activities in hydrogen for transport

Complement ongoing dissemination work of individual EC-projects and industry PR by common „branding“, e.g. logo, flyers, brochures, concise web presentation, press statements, distribution of common material to multipliers in Europe and international

Communication and Dissemination



Overview

to develop a validated and well-accepted roadmap for the introduction of hydrogen into the European market until 2030 and to provide an outlook to 2050.

The roadmap will reflect real life conditions by considering technical, institutional, geographic and economic barriers and opportunities at a country level. Both mobile and stationary applications are included, including possible synergies between the two.

The roadmap comprises two phases of 18 months each. In the first phase, an analysis of the introduction of hydrogen was carried out in six countries (France, Germany, Greece, Italy, Netherlands and Norway). In the second phase, the roadmap will be carried out for another four countries.

The main assumptions produced in HyWays Phase I are of a preliminary nature and are subject to change. Therefore, no final conclusions can be presented at this time. Nevertheless, some robust conclusions can be drawn at this stage of the project.

Key Messages

The headline conclusions that can be drawn from the HyWays project are:

Hydrogen, including background references and key messages, can be found in the full report "HyWays: Roadmap Assumptions, Visions and Robust Conclusions from Project Phase I". This can be downloaded from publications at the HyWays website.

The second phase of HyWays is due to start on 1st January 2010. The second phase of HyWays, a priority topic will be the impact of the price gap between fossil fuel gas and hydrogen produced from renewable energy in order to identify and discuss the opportunities related to the introduction of renewable hydrogen.

Example: HyWays Flyer



Feedback

The HyWays consortium invites feedback from readers on this flyer and the full report. Feedback is requested on both the key assumptions as well as the Phase I conclusions. Please direct any feedback to the project coordinator:

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Fax: +49 89 606 97 31

Acknowledgement/Preface

HyWays is an integrated project, co-funded by research institutions, industry, national agencies and by the European Commission (EC) under the 6th Framework Programme contract N° 502594.

HyWays Phase I Conclusions

Until 2030, hydrogen production from fossil fuels with carbon capture and sequestration (CCS) is expected to be the most important production source in Europe, with renewable hydrogen slowly being phased in.

Hydrogen infrastructure build-up will likely comprise both central and on-site hydrogen production.

Hydrogen vehicles will need to show cost competitiveness in the marketplace. Four major drivers will influence this:

- 1.1 The crude oil price
- 1.2 The price of hydrogen (infrastructure cost)
- 1.3 Internalisation of CO₂ emissions
- 1.4 Costs of hydrogen drive systems

The cost development for the hydrogen drive system has the biggest impact on cost-competitiveness, followed by the variation of crude oil price. These drivers determine both the pace at which a cost-competitive level is reached and also the total investments needed to achieve market entry.

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HyWays Partnership

Industry	Institutes	Member State Representatives
<ul style="list-style-type: none"> Air Liquide Air Products BMW Group BP plc DaimlerChrysler AG Det Norske Veritas (DNV) Electricité de France Acciona Energia GE Oil & Gas Nuovo Pignone HyWays Hydro ASA Infrasev Hordt Linde AG GM / Opel Regipol VWF S.A. Statkraft Hydrogenics Europe Total Vattenfall Europe 	<ul style="list-style-type: none"> French Atomic Energy Commission (CEA) Energy Research Centre of the Netherlands (ECN) Railian National Agency for New Techn. Energy and Environment (ENEA) Fraunhofer Institute for Systems and Innovation Research (ISI) Imperial College of Science, Technology and Innovation (ICSTI) Instituto de Engenharia Mecânica (IST) L-B-Systemtechnik (LBST) [Coordinator] Université Louis Pasteur (ULP) Zentrum für Europäische Wirtschaftsforschung (ZEW) 	<ul style="list-style-type: none"> French Atomic Energy Commission (CEA) Railian National Agency for New Techn. Energy and Environment (ENEA) German Energy Agency (dena) Hellenic Institute of Transport (HIT) Senter Novem Western Norway Research Institute (WRI)

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This integrated project is co-funded by the European Commission under the Framework Programme 6, priority 1.6 "Sustainable Development, Global Change and Ecosystems"

Establish an initiative group on hydrogen for transport

Buses

HyFLEET:CUTE



Cars

ZERO REGIO



*Zero Regio
H2-MotorFuel*



Mini: Transport

HyCHAIN



HyLights

Monitoring and Preparation of «Lighthouse projects»

Coordination Action

Acknowledgement

This project is financed by funds from the European Commission under **FP6 Contract TREN/05/FP6EN/S07.53917/019990**.



The project partners would like to thank the EC to create the right framework for the discussion process.

Goals of the day

Inform about progress of the work by institute partners

(management issues, methodology, harmonisation with EC)

Develop consensus on key management and methodological issues

(Consortium Agreement, EIGHT, regions survey, gaps analysis, etc.)

Agreement on next steps and involvement in project work

(work for IP, assessment framework, demo project analysis, gaps analysis)

Update objectives between EC project officer and project partners