



IPHE Project Recognition Guidelines

Established in 2003, the International Partnership for the Hydrogen Economy (IPHE) provides a mechanism for partners to organize, coordinate and implement effective, efficient, and focused international research, development and demonstration activities related to hydrogen and fuel cell technologies. Members include Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, New Zealand, Norway, Republic of Korea, Russian Federation, United Kingdom, and the United States.

The IPHE seeks to recognize leading and innovative pre-competitive international hydrogen and fuel cell research projects. Private, government and NGO sponsors of international hydrogen and fuel cell research are invited to apply for official recognition of their projects by the IPHE.

A total of twenty three projects were formally recognized by the IPHE in 2005 and 2006. Overviews of these projects can be found in **Appendix A** of this document.

IPHE recognition of international collaborative research projects is designed to:

- Encourage the leveraging of financial resources;
- Reduce duplication of research activities;
- Enhance the international visibility of proposed projects through a respected peer reviewed process of project selection;
- Signify that the proposed projects comply with appropriate health, safety and environmental regulations, norms and standards in the countries from which they are proposed; and
- Promote greater information sharing among the world's leading researchers.

Benefits of Recognition

Recognition of international collaborative research projects by the IPHE will confer the following benefits to project sponsors:

- Placement of project profiles on the IPHE website, official project recognition brochure and IPHE displays at international meetings and conferences;
- Invitations for project sponsors to highlight their projects and the project solicitation process at IPHE-organized committee meetings and events;
- Assistance in placing project sponsors on IPHE-endorsed and co-labeled industry event and conference agendas;
- Project updates in the semi-annual IPHE newsletter.

Project Submission Process:

Individuals or organizations from government, the private sector or non-government organization from IPHE member countries may apply for IPHE recognition of their hydrogen and fuel cell projects by submitting proposals through their member's representatives on the IPHE Implementation-Liaison Committee. (ILC). Contact information for each ILC member representative can be found on the IPHE website at www.iphe.net/ilcmembers.htm

Projects may be submitted at any time during the year. Project proposals seeking recognition in 2007 must be received by the ILC **by Friday, March 16, 2007**. Proposals received after this date will be considered for recognition in 2008. Demonstration projects are also eligible for consideration. Proposals will be evaluated by the ILC. Projects selected by the ILC will receive final endorsement by the Steering Committee at its September 2007 meeting.

Project Proposal Template

Applicants may submit proposals using the template provided in **Appendix B** of this document. Proposals should be concise, emphasizing the IPHE dimension and opportunities and mechanisms for collaboration and knowledge/information sharing. Proposals should also include a figure or diagram to explain the overall project. Where necessary, additional diagrams showing the overall planning, project structure, partnership and management structure may be appended, but should be limited.

Evaluation Criteria and Scores

Proposals will be evaluated based upon the following "Evaluation Criteria":

(1) IPHE Dimension (1 page)

- ✓ has at least two (and normally more) IPHE members, with the potential for multiple IPHE partners
- ✓ has sufficient critical mass to have impact at global scale
- ✓ brings together partnerships with necessary skills and competencies
- ✓ reduces research, development and/or commercialization costs
- ✓ explicitly identifies the value-added of the project in light of similar projects; should not duplicate ongoing or planned work established under other international frameworks (for example under IEA), though such work may form the basis for an IPHE proposal for expanded collaboration
- ✓ demonstrates results that can only be achieved, or are substantially enhanced, by international collaboration

(2) Scientific Program (2 pages)

- ✓ has highly developed objectives, strategic plans and annual work programs
- ✓ sound scientific/technical/socio-economic program
- ✓ includes timelines and IPHE-specific deliverables
- ✓ has potential for long-term collaboration

(3) Project Management (1 page)

- ✓ has a sound project management structure
- ✓ includes a proposal for managing IPHE collaboration (e.g., fully integrated task-shared RTD; information exchange by means of reports, exchange of researchers, workshops)
- ✓ identifies project deliverables
- ✓ clearly identifies that expected non-proprietary results will be disseminated to the IPHE countries
- ✓ includes a proposal for managing Intellectual Property issues (if applicable)

(4) Financing and Contractual (1 page)

- ✓ has clearly specified financial requirements that have been funded from secure sources
- ✓ has contractual and management arrangements in place to ensure completion
- ✓ provides a detailed summary of total project costs and commitments by individual partners
- ✓ provides information on human resource requirements for completion of project (i.e., the number of person-months needed to complete the project)

Project Recognition Agreement

Sponsors of projects selected for IPHE Recognition will be required to sign a “Project Recognition Agreement” (PRA) which is provided in **Attachment C** of this document. The PRA requires project sponsors to permit site visits by IPHE members; share non-proprietary project information with IPHE members; and make project summaries available for the IPHE website. These terms are subject to operational, intellectual property and other considerations, and prior approval of the project site coordinator.



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APPENDIX A: PROJECTS SELECTED FOR IPHE RECOGNITION IN 2006

At the IPHE Steering Committee meeting in Reykjavik, Iceland on 26-27 September 2006, the following thirteen outstanding hydrogen and fuel cell research, development and demonstration projects were endorsed by the seventeen members of the International Partnership for the Hydrogen Economy (IPHE).

1. Autobrane: Automotive High Temperature Fuel Cell Membranes

The objective is to develop innovative membrane-electrode assemblies (MEAs) for proton-exchange membrane fuel cells that are capable of operating at wider operating temperature range and have the ability to function at higher temperatures under at zero humidification. The project also seeks to adapt/ improve catalyst, electrode, and stack technology.

2. Hydrogen and Fuel Cell Bus Demonstration Program

The objectives of the project are to advance the commercial deployment of fuel cell transit buses; improve transit bus fuel efficiency and reduce petroleum consumption; reduce transit bus emissions; and increase public acceptance of hydrogen and fuel cell vehicles.

3. HYCHAIN MINI-TRANS : Deployment of innovative low power fuel cell vehicle fleets to initiate an early market for Hydrogen as an alternative fuel in Europe

The goal of this project is to deploy a fleet of small hydrogen fuel cell hybrid vehicles in a variety of application ranging from 250 watt power modules for tricycles to 3 kilowatt power modules for utility vehicles and up to 10 kilowatt power modules for hybrid mini-buses. The project also integrates the supply chain by addressing the hydrogen infrastructure which will be necessary for refueling, storage, distribution and dispensing to final end users.

4. HyLights- A Coordination Action to Prepare European Hydrogen and Fuel Cell Demonstration Projects

The project will monitor concluded and ongoing demonstration projects and assist with the planning for future demonstration project phases. The project is a coordination action that will develop an assessment framework for concluded and ongoing demonstration projects; analyze individual projects and establish a project database; perform analysis to identify gaps and prepare a requirement profile for the next stage projects; assess and identify necessary financial and legal steps in preparation of the new projects; and establish a “European Initiative Group on Hydrogen for Transport”.

5. HyApproval- “Handbook for Approval of Hydrogen Refueling Stations”

The goal of this project is to develop technical guidelines for the approval of public hydrogen refueling stations. The handbook is targeted to assist companies and organizations in the implementation and operation of hydrogen refueling stations. The handbook will also contribute to the International Standards Organization, Technical Committee 197 (ISO TC 197) on the development of international standards for hydrogen technology.

6. HYTHEC - HYdrogen THErmochemical Cycles

The project will investigate the potential for large hydrogen production through the Sulphur-Iodine cycle and compare it to Westinghouse cycle. The project aims to 1) conduct flow-sheeting, industrial scale-up, safety and cost modeling, 2) improve the fundamental knowledge and efficiency of the hydrogen production in the Sulphur-Iodine cycle and 3) investigate potential use of solar primary energy sources for decomposition of sulfuric acid.

7. Hydrogen for Clean Urban Transport in Europe (HyFLEET:CUTE)

The goal of the project is to advance the development of hydrogen powered public transport buses to the ‘pre-commercial’ stage through continued operational testing of fuel cell (FC) drive train buses while also testing hydrogen powered internal combustion engine (ICE) buses under similar conditions. The project also includes the design, construction and testing of advanced refueling stations and associated infrastructure as well as socio-economic evaluation of current and predicted impacts of a developing hydrogen economy.

8. NESSHY- Novel Efficient Solid Storage for Hydrogen

The goal of this project is to identify the most promising hydrogen solid storage solutions for mobile applications complementary in stationary systems. The project covers porous storage systems, regenerative hydrogen stores and solid hydrides performing under reversible hydrogen storage and improved gravimetric storage.

9. Mechanical Synthesis and Rehydrogenation of Complex Hydrides and Nanocomposites in Hydrogen Ball Mills

The focus of the project is on assessment and discovery of novel nanomaterials and nanotechnologies for hydrogen storage. This project will perform research in an effort to discover materials that will specifically direct synthesis of new complex hydrides, hydride mixtures and nanocomposites conducted in specialized ‘hydrogen ball mills’ under molecular hydrogen gas, hydrogen plasma and/or nitrogen plasma.

10. Hydrogen Pathways

This program is part of the University of California Transportation Studies and is focused on understanding the potential transition to a hydrogen-based transportation system. The project research is focused on four key areas: 1) Hydrogen Markets and Demand; 2) Hydrogen Infrastructure Modeling; 3) Policy and Business Strategy; and 4) Environmental Analysis.

11. Hydrogen Transportation Partnership and Demonstration Park (Beijing Hydrogen Park)

The objectives of this project are to demonstrate pre-market innovative hydrogen and fuel cell technologies to build a platform to promoting the international cooperation and to increase public awareness on new energy and high-efficiency power technologies, especially those related to hydrogen and fuel cell vehicles.

12. Combination of Amine Boranes with MgH_2 & $LiNH_2$ for High Capacity Reversible Hydrogen Storage

The purpose of this project is to synthesize and characterize hybrid materials that combine light element metal hydrides with the amine borane chemical based hydrogen storage through a coupled endothermic-exothermic approach for hydrogen storage.

13. Fundamental Safety Testing and Analysis of Hydrogen Storage Materials & Systems

The objectives of this project are to demonstrate technologies that minimize the risks of systems using solid-state hydrogen storage materials and to quantify physical risks associated with the synthesis, handling and utilization of these materials as hydrogen storage media. This project will also develop methods to mitigate the identified risks that would lead to commercially acceptable high density hydrogen storage system designs.

PROJECTS SELECTED FOR IPHE RECOGNITION IN 2005

At the IPHE Steering Committee meeting in Kyoto, Japan on 14-15 September 2005, the following ten outstanding hydrogen and fuel cell research, development and demonstration projects were endorsed by the sixteen members of the IPHE.

1. Preparing For The Hydrogen Economy By Using The Existing Natural Gas System As A Catalyst

The project will define the conditions under which hydrogen can be mixed with natural gas for delivery by the existing natural gas system and later withdrawn selectively from the pipeline system by advanced separation technologies. The socio-economic and life cycle consequences of this hydrogen delivery approach will be mapped out.

2. Solar Driven High Temperature Thermochemical Production Of Hydrogen

In this project, the most promising thermochemical cycles for hydrogen production will be identified, and one or two cycles will be down-selected for demonstration. Lower cost solar concentrating technology will be developed, as well as solar receiver and thermochemical reactor technology to demonstrate a fully integrated thermochemical process on-sun.

3. Reversible Solid State Hydrogen Storage For Fuel Cell Power Supply System

The project develops reversible solid state hydrogen storage and purification systems and their integration with fuel cell power supplies. Integration results in appearance of new possibilities to increase the overall energy efficiency of the power supply systems together with identification and development of new technical challenges.

4. Advanced Membranes

The technical goal of this project is to develop membranes for polymer electrolyte fuel cells to lower the cost and enhance the durability of hydrogen-air and direct methanol polymer electrolyte fuel cell systems. The objective of developing the IPHE program is substantially enhanced collaboration between parties to the project to ensure maximum leveraging of resources through researcher and material exchanges and joint meetings.

5. Fuel Cell Testing, Safety And Quality Assurance (FCTESQA)

The project addresses pre-normative research, benchmarking, and validation through round robin testing of harmonised, industry-wide test protocols and testing methodologies. This activity will contribute to the early and market-oriented development of specifications and pre-standards. FCTESQA results will be discussed, debated and agreed in co-operative progress meetings and dedicated international workshops under the IPHE auspices.

6. Application Of Gradient Porous Composite MEAs For Different Types Of Fuel Cells

This project develops a new design of thin monolithic multilayer more efficient and reliable MEA for different types of fuel cells (DMFC, Compact Mixed-Reactant Direct Methanol Fuel Cells (CMR-DMFC)) with the focus on small fuel cells for portable application, testing methodology for MEA as well as possible ways for FC miniaturization.

7. HyWays - The Development And Detailed Evaluation Of A Harmonised “European Hydrogen Energy Roadmap”

In spring 2004, the EU 6th Framework project HyWays was launched in order to develop a European hydrogen roadmap, to meet scientific, technical, strategic, and political concerns. The project partnership consists of 32 organisations from industry, institutes, governments and SMEs from 9 EU member states (B, D, E, F, GB, GR, I, NL, P) and one associated state (N).

8. HySafe – Safety Of Hydrogen As An Energy Carrier

HySafe will focus on safety issues relevant to improve and co-ordinate the knowledge and understanding of hydrogen safety and support the safe and efficient introduction and commercialisation of hydrogen as an energy carrier of the future, including the related hydrogen applications. To this end the project will prepare the foundation of the European Hydrogen Safety Centre.

9. Solar Hydrogen From Reforming Of Methane

The project aims to design, test and demonstrate a unique, low temperature, steam reforming reactor using concentrated solar energy. A world-class solar facility for international collaboration in hydrogen production from solar sources will be constructed to integrate the system.

10. Clean Urban Transport For Europe - Ecological City TranspOrt System (CUTE - ECTOS)

The CUTE – ECTOS project is an ambitious field trial of 30 fuel cell buses and hydrogen infrastructure in 10 participating European cities. Accompanying studies investigate the benefits of hydrogen and fuel cells in transport applications. Education, training, dissemination, quality and safety as well as permits & approvals are integral elements of the project.

APPENDIX B: IPHE COLLABORATIVE PROJECT PROPOSAL TEMPLATE

Proposals should be structured according to the four main sections set out below under “Proposal Content”. The bullet points listed in each section identify the criteria that will be applied by the Evaluation Team when considering proposals for IPHE recognition, although for some projects not all these criteria will necessarily apply. It is not appropriate for a proposer to submit a detailed “Description of Work” for an ongoing project.

The Evaluation Team requests that proposers strictly respect the page limit for each section - as set out below. Proposals should be brief, to the point, emphasizing the IPHE dimension and opportunities and mechanisms for collaboration and knowledge/information sharing. Proposals should normally include a figure or diagram to explain the overall project. Where necessary, additional diagrams showing the overall (not detail) planning, project structure, partnership and management structure may be appended, but must be strictly limited.

Proposal Structure

Title Page (One Page)

- **Project Title:**
- **Project Category:** (Either Hydrogen Production, Hydrogen Storage, Fuel Cells, Socioeconomics of Hydrogen, Codes and Standards, or Demonstration.)
- **IPHE Contact Person :**
- **Summary of Project Goal:** (One Paragraph)
- **Project co-ordinator and contact details:**
- **Signature of co-ordinator:**

Proposal Content (5 Pages)

The proposal should be structured in the following main sections. The “Evaluation Criteria” to be used in considering a project for IPHE Recognition are set out in the bullet points for each section and will be applied as appropriate to the project.

1. IPHE Dimension (1 page)

- ✓ where applicable, has at least two (and normally more) IPHE members, with the potential for multiple IPHE partners
- ✓ has sufficient critical mass to have impact at global scale
- ✓ brings together partnerships with necessary skills and competencies

- ✓ reduces research, development and/or commercialization costs
- ✓ explicitly identifies the value-added of the project in light of similar projects; should not duplicate ongoing or planned work established under other international frameworks (for example under IEA), though such work may form the basis for an IPHE proposal for expanded collaboration
- ✓ demonstrates results that can only be achieved, or are substantially enhanced, by international collaboration

2. Scientific Program (2 pages)

- ✓ has highly developed objectives, strategic plans and annual work programs
- ✓ sound scientific/technical/socio-economic program
- ✓ includes timelines and IPHE-specific deliverables
- ✓ has potential for long-term collaboration

3. Project Management (1 page)

- ✓ has a sound project management structure
- ✓ includes a proposal for managing IPHE collaboration (e.g., fully integrated task-shared RTD; information exchange by means of reports, exchange of researchers, workshops)
- ✓ identifies project deliverables
- ✓ clearly identifies that expected non-proprietary results will be disseminated to the IPHE countries
- ✓ includes a proposal for managing Intellectual Property issues (if applicable)

4. Financing and Contractual (1 page)

- ✓ has clearly specified financial requirements that have been funded from secure sources
- ✓ has contractual and management arrangements in place to ensure completion
- ✓ provides a detailed summary of total project costs and commitments by individual partners
- ✓ provides information on human resource requirements for completion of project (i.e., the number of person-months needed to complete the project)

Proposals should normally include a figure or diagram to explain the overall project. Where necessary, diagrams showing the overall (not detail) planning, project structure, partnership and management structure may be appended to support descriptions under the above sections, *but any such additions must be strictly limited in length.*



APPENDIX C: IPHE PROJECT RECOGNITION AGREEMENT

IPHE PROJECT RECOGNITION AGREEMENT

The International Partnership for the Hydrogen Economy hereby endorses the INSERT NAME OF PROJECT as an international cooperative effort that is in accord with the objectives of the IPHE.

The INSERT NAME OF PROJECT is located in INSERT LOCATION OF PROJECT and will INSERT OBJECTIVE OF PROJECT.

In compliance with the working principles for an IPHE Project, INSERT NAME OF LEAD PROJECT PARTNER AND OTHER PROJECT PARTNERS are the IPHE nominators and agree, subject to operational considerations on behalf of project coordinator, to permit site visits by IPHE members, share non-proprietary project information with IPHE members, and make project summaries available for the IPHE website.

The International Partnership for the Hydrogen Economy serves as a mechanism to organize and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies. It also provides a forum for advancing policies, and common codes and standards that can accelerate the cost-effective transition to a global hydrogen economy to enhance energy security and environmental protection.



SIGNATURE PAGE

IPHE PROJECT RECOGNITION AGREEMENT

INSERT NAME OF PROJECT

Printed Name

Affiliation

Signature

Date