



International Partnership *for the* Hydrogen Economy



Education Work Group Update



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Joint IPHE ILC/SC Meeting

December 1-3, 2009

Washington, DC



Most recent “gathering”

- Teleconference: September 2009
 - 4 countries represented
 - Updates on education activities in the EC and the U.S.
 - Discussions on:
 - IPHE Global Student Competition
 - Curriculum integration of FC and H₂ topics
 - EU JTI call for proposals



IPHE recognized Master Class

- Ongoing within the Renewable Energy Science School in Akureyri Iceland.
- 13 intensive months – 3 trimesters. Thesis work in various IPHE countries.
- Up to now about 20 students out of 80 specializing in hydrogen and fuel cells.
- 37 international professors. From Germany, Italy, Iceland, US, New Zealand, Denmark, Sweden.....

The screenshot shows the website for RES (Renewable Energy Science) at The School for Renewable Energy Science. The header includes the RES logo and the school's name. A navigation menu on the left lists various sections: About RES, Facilities, Student Life, Iceland, International Office, Corporate Information, and Contact us. Below this is a 'Useful links' section with links for Prospective Students, Why Iceland?, Why MSc at RES?, About RES, Administration, and Academic Coordinators. The main content area features a large image of a landscape with mountains and water, and a text block that reads: 'With global warming a reality and limited fossil fuels, the choice today will directly impact our ability to make choices tomorrow. The School for Renewable Energy Science strives to strengthen our research by inviting the brightest minds to explore progressive, alternative energy. RES offers an intensive and unique interdisciplinary research program.'



International Partnership *for the* Hydrogen Economy



RES has paved the way in renewable energy education.
A co-chair of the hydrogen and fuel cell faculty is Prof. David Dvorak of the
University of Maine



Rector Björn Gunnarsson

RES

THE SCHOOL *for* RENEWABLE ENERGY SCIENCE

The screenshot shows the website for RES (The School for Renewable Energy Science). The header includes the RES logo and navigation links for Graduate School, Summer School, and Executive Education. A sidebar menu lists various pages such as About RES, Facilities, Student Life, and Contact us. The main content area features a banner image of a coastal landscape with mountains and water, followed by a paragraph of text about the school's mission and a list of useful links for prospective students and administration.

With global warming a reality and limited fossil fuels, the choice today will directly impact our ability to make choices tomorrow. The School for Renewable Energy Science strives to strengthen our research by inviting the brightest minds to explore progressive, alternative energy solutions.

RES offers an intensive and unique interdisciplinary research program.



Renewable Hydrogen has many advantages

Primary Method	Process	Feedstock	Energy	Other
Thermal	Steam Reforming	Natural Gas	Heat, possibly from nuclear power plants	70% efficient. Will require carbon sequestration
	Thermochemical Water Splitting	Water	High temperature heat from advanced gas-cooled nuclear reactors	No emissions
	Gasification	Coal, Biomass	Steam and oxygen at high temperature and pressure	Some emissions. Will require carbon sequestration
	Pyrolysis	Biomass	Moderately high temperatures steam	Some emissions. Will require carbon sequestration
Electrochemical	Electrolysis	Water	Renewables, including wind and solar, and electricity	Some emissions depending on source of electricity
	Photoelectrochemical	Water	Direct sunlight	Minor emissions
Biological	Photobiological	Water and algae strains	Direct sunlight	No emissions
	Anaerobic Digestion	Biomass	High temperature steam	New, undeveloped technology
	Fermentative Micro-Organisms	Biomass	High temperature steam	New, undeveloped technology



EWG Activities

- **Database of Educational Material**
 - To be managed by HyRaMP, database hosting site unclear
- **IPHE Student Competition**
 - (Update to be presented later in the meeting)
- **Collection and possible translation of hydrogen-related curriculum activities**
 - On hold pending decisions on the structure of EU educational activities
- **Education-focused IPHE newsletter**
 - Just published!



EWG Activities

- EU Update
 - Activities of HYFED6 are now part of HyRaMP, the EU's consortium of regions for hydrogen and fuel cell activities
 - HYFED6 hydrogen education newsletter expected to be continued under HyRaMP
 - July JTI call included two topics for education
- U.S. Update
 - Launched 5 university projects (curriculum, textbook, lab kits, internship), 7 state & local outreach programs, and a forklift end-user education project.
 - In collaboration with Safety, Codes and Standards Team:
 - Launched advanced-level first responder training that includes hands-on prop
 - Launched Introduction to Hydrogen for Code Officials web course
http://hydrogen.energy.gov/codes_standards.html



Education is central at the Essen conference in May
Excellent preparatory work by Prof. Stolten and colleagues.

Scope & Conference Programme



- Promotion of hydrogen as a sustainable and environmentally friendly energy
- Presentation of cutting edge hydrogen & fuel cell science and technology
- Outreach to the public and private sector, politicians
- Students' Day as a training and information event

International Partnership for Hydrogen Economy (IPHE):
Global Competition for students aged between 15 and 17





Next Steps

- Next meetings
 - Teleconference January/February 2010
 - In-person meeting alongside WHEC 2010
 - Desirable to decide on such a meeting now...