Education Work Group Update

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EWG Co-Chairs

Joint IPHE ILC/SC Meeting

December 1-3, 2009

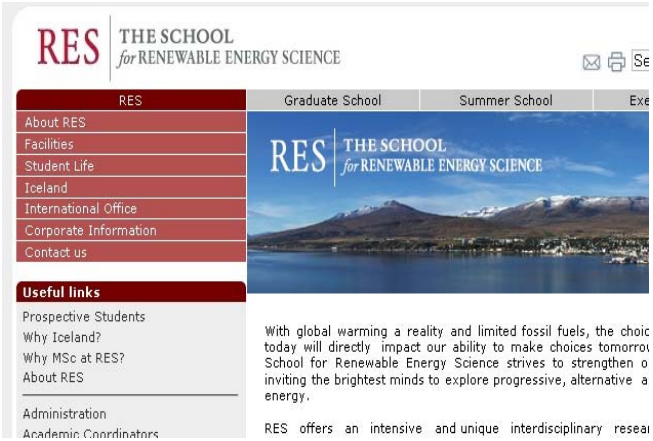
Washington, DC

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

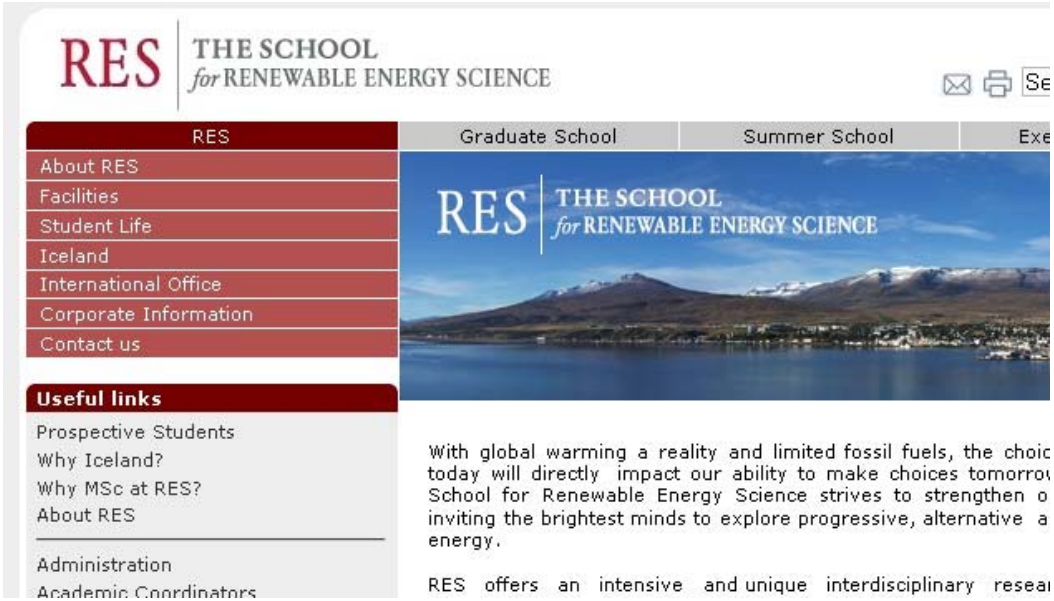
- Ongoing within the Renewable Energy Science School in Akureyri Iceland.
- 13 intensive months – 3 trimesters. Thesis work in various IPHE countries.
- Up to now about 20 students out of 80 specializing in hydrogen and fuel cells.
- 37 international professors. From Germany, Italy, Iceland, US, New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



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



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

The Taming of The Proton, Sigfusson, 2008

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

International Partnership *for the* Hydrogen Economy

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

www.whec2010.com

Next Steps

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