

## Role of Hydrogen in Green Buildings

Buildings in the future will be much greener than they are today.

**Uses?** Transportation or Local?

**Where would the hydrogen come from?** Native sources, local generation, import

**Transport?** Under these scenarios it might be important to transport hydrogen—which scenarios, and how?

**Storage?** What storage options of hydrogen are necessary?

**Policy?** What policy issues are there—safety, incentives, maintenance, reliability, assistance from first world, ...

**Cost Issues?** For each of these scenarios what are the price benchmarks (installation, maintenance, \$\$/km, \$\$/watt)

*Q: Which scenarios make sense?*

Feb 2

10:00 – 11:00 Problem presentation

11:00 – 12:00 Costing discussion

12:00 – 1:00 problem assignment within group and timeline

Feb 4

9:00 – 10:00 Preliminary presentation preparation

10:00 – 11:00 Preliminary presentation (*Which scenarios make sense?*)

11:00 – 12:00 Jigsaw Uses, Sources, Transport, Storage, Policy and Cost

12:00 – 1:00 Scale-up

Statement of scale-up problem: How would sensible hydrogen scenarios be integrated into full system (PV, fossil, nuclear, geothermal, .....)? Here the full system would need to consider grid vs. off grid.

Feb 6

9:00 – 10:00 Use Whiteside's spaghetti diagram to Estimate Reasonable Sources of Energy in 2015?

What fraction hydrogen and which scenarios? Prepare energy spread sheet showing sources, uses, and wasted energy. One page for final report.

10:00 – 11:00 Describe technical advances necessary for hydrogen incorporation. Prepare description of advances, where are we now, what do we need to attain. One page for final report

11:00 – 12:00 Describe policy advances necessary for hydrogen incorporation. Prepare description of government policies that would make technical solutions possible. One page for final report

12:00 – 1:00 Make Assignments for final presentation

Feb 9

9:00 – 10:00 Presentations *Roadmap for Incorporation of Hydrogen Energy Technology into Developing Countries.*

10:00 – 11:00 Revisit problem #1—what would your group change

11:00 – 12:00 evaluation of group, course

12:00 lunch

Preliminary reading—G. M. Whitesides and G. W. Crabtree, “Don’t Forget Long-Term Fundamental Research in Energy,” *Science*, **315**, 796 – 798 (2007).