

## **Developing an Educational Tool for the Hydrogen Community**

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As a hydrogen economy begins to materialize there is a strong need to educate those who will be involved. As boundaries between countries become less significant, and industries begin operating on a global rather than national scale, this activity is critical. PATH's interest is in making sure that this education happens throughout the world and that the knowledge that each country has is universal. PATH is in a unique position, because of its diverse membership's input and guidance, to develop a mechanism to educate the future participants in the hydrogen economy. PATH has begun to develop the framework for a hydrogen energy educational tool, and is working with a variety of stakeholders to shape this effort. There is a common body of knowledge that the hydrogen community should comprehend. The difficulty is ensuring that individuals in different countries be taught the same information, and that a basic foundation of knowledge on hydrogen and fuel cells exists. The model for this approach is the British Commonwealth system of education. This system is used in Australia, Canada, Great Britain, India, and elsewhere in the British Commonwealth, and the basic instruction is similar enough to ensure that students know the same fundamentals. PATH would like to replicate this concept to develop an international curriculum, or educational tool, for hydrogen and fuel cells.

The most significant difficulty to curriculum development is that hydrogen is interdisciplinary and the diffusion of course material at the college level is slow and idiosyncratic. Additionally, each country may have a different approach to education. It will be near impossible to develop a set curriculum that can be used throughout universities in one country, much less internationally. The solution is to develop materials in segments that could be inserted into a curriculum in any one of a number of disciplines. The product developed should be designed to aid a professor in Canada, Japan, the United States, or any other country to incorporate hydrogen into the curriculum of his/her choosing. Because hydrogen and fuel cells cover a diverse range of topics, those who are conducting the leading research should be the ones to write the text on their areas of expertise. As research and technology develops, the modular format of the curriculum will be easier to keep current.

With these factors in mind, PATH has shifted its focus to the development of a handbook on hydrogen and fuel cells. The concept embodies four stages: writing the text, creating graphics to explain the equations, developing virtual experiments, making lectures on each topic available via the internet. The final product of this effort will likely be a CD with material for use in college-level courses and an extensive bibliography for each major topic.

One method of disseminating this information would be through short courses, which were originally proposed to PATH by representatives of the Hawaii Natural Energy Institute (HNEI) at the University of Hawaii. PATH also had discussions with the U.S. Department of Energy (DOE). DOE is planning an educational packet on hydrogen and fuel cells, likely distributed as a DVD, and has suggested that PATH members may select the topics, propose the content, and provide the background material for an RFP for DOE to manage. Current thinking is that the basics would be presented in animation; the equations would be interactive and graphically display changes in variables. More advanced material would be presented in both lecture form and with animation with equations displayed graphically. Film clips would be used to demonstrate the operation and use of equipment. The final segment would contain discussion by leading experts on results and direction of their current research, which, if appropriate, would be linked to the advanced material. Accompanying this product will be an extensive bibliography of material and papers on hydrogen and fuel cells.

PATH will continue discussions with both the DOE and HNEI to develop this effort. This project is critical to bridging international barriers to hydrogen and fuel cells and will enable the international hydrogen community to work from a baseline level of knowledge.