

### III.10 Hydrogen Analysis Support

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*Projected End Date: Project continuation and direction determined annually by DOE*

#### Objectives

- For FY 2005: Better understand uncertainty of future oil, gasoline and natural gas prices
- For FY 2005: Develop a protocol for collection and use of standard data and assumptions to be used in Hydrogen, Fuel Cells and Infrastructure Technologies analytical efforts
- Long-term: Support the development of tools, methods and data for the conduct of sound analysis of hydrogen production/delivery costs, markets, policy options and other key analysis topics

#### Technical Barriers

This project addresses the following technical barriers from the Systems Analysis section of the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan:

- B. Lack of Consistent Data, Assumptions and Guidelines
- E. Lack of Understanding of the Transition of a Hydrocarbon-Based Economy to a Hydrogen-Based Economy

#### Approach

In FY 2005, two tasks are being performed:

*Task 1. Energy, Economic and Environmental Modeling*

One of the needs within Hydrogen, Fuel Cells and Infrastructure Technologies (HFCIT) is for models or tools that can support the analysis of energy, economic and environmental factors affecting the potential market for hydrogen. One particular area of HFCIT concern is that U.S. prices for gasoline and other petroleum products that would compete with hydrogen in transportation energy markets cannot be adequately assessed without examining global factors influencing those prices. For example, rising demand for gasoline in developing countries could begin to exhaust global petroleum reserves in this century. Some studies, for example, those conducted by the U.S. Geological Survey, indicate that global production may peak and decline within 50 years. Furthermore, refinery capacity in the U.S. is being operated at near 100% capacity and is not likely to be expanded to meet gasoline demand growth. Consequently, the U.S. will be increasingly forced to import gasoline rather than crude oil. In order to address these and other important factors, Pacific Northwest National Laboratory (PNNL) used its long-term global energy/economics-based Mini Climate Assessment Model (MiniCAM) to estimate gasoline and natural gas prices under a variety of possible future energy supply/demand scenarios. Results showed world oil prices ranging from \$28 to \$64/barrel in 2050, depending on assumptions about world economic growth and oil reserves.

*Task 2. Standardized Data and Assumptions*

The HFCIT Program has begun several systems analysis efforts, such as the Hydrogen Analysis (H2A) work, the Macro System Modeling activity, and several other model development tasks that were awarded through competitive solicitation. All of these projects require data and assumptions. In addition, the HFCIT Program is often called upon by external parties to answer questions on a wide range of topics related to hydrogen (and other energy-related topics). The Program would benefit from easy access to various data sets that would help answer external questions, ensure consistency of assumptions among analysis tasks, and provide information to support sound analysis products. The purpose of this task is to develop a web-based “resource center” that will enable searches for, and access to, data relevant to hydrogen analysis topics. The main purpose of the data resource center (data book) is to provide consistent and transparent data to be used for analytical activities. The data will serve as the basis for modeling and other analytical activities. The data resource center, contained on the EERE website, will contain “official” assumptions to be used in HFCIT analyses, as well as hydrogen market information, energy data (e.g., data on production, consumption, prices, resources, etc. for electricity, natural gas, coal, biomass, etc.), financial data for use in cost analyses, technical information (e.g., technology and product characteristics) and other relevant information. The data on the website will be updated each year (some data may be more frequently updated).