The University of Montana College of Technology Hydrogen Education Program

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Objectives

- **The overall objective is to develop educational programs and facilities for training energy technicians with an emphasis on hydrogen technologies**
  - **Develop an Energy Technician's Curriculum**
  - **Develop a Hydrogen Safety Center**
  - **Establish an Educational/Interactive Web Site**
  - **Plan for the Montana Hydrogen Futures Program**

Education

“Education crosscuts all of the Hydrogen, Fuel Cells & Infrastructure Technologies Program Components”

–HFCIT 6/03/03

Objectives

- **College Curriculum – Energy Engineers and Technicians**
  - Work with DOE to Develop and Make Available a Complete **Alternative Energy Curriculum**
    - **1, 2, and 4 Year Programs that Provide Hydrogen Workforce Infrastructure**
      - **Training for Potential End-Users**
      - **Training of the Labor Force**

Objectives

- College Curriculum – Energy Engineers and Technicians
  - *Aim:*
    - Provide traditional, non-traditional, and hands-on training for hydrogen and alternative energy (wind, solar, biomass)
      - Energy professionals
      - Lay persons
        - Business entrepreneurs
        - Government Agencies
        - Organizations

Objectives

- Hydrogen Safety Center
  - Establish world class hydrogen safety training and education
  - Provide focal point for educational transfer of information and communication
    - Based on input from national professionals, DOE labs, energy leaders, academic faculty and staff (MT Tech, UM), energy leaders, and safety training providers

Objectives

- Develop a Hydrogen Futures information and educational web site
  - Support growth and development of hydrogen technologies
  - Create a digital and hard copy library
  - Provide an interactive information clearinghouse concerning the use of hydrogen and fuel cell technologies:
    - Clearly communicate
      - Benefits and Challenges
      - Safety Issues
      - Economics (Market Introduction)
      - Research (Status, Requirements)
      - Education (Understanding)

Objectives

- Planning for the UM/COT Hydrogen Futures Program
  - Identify programs and facilities needed to assist and support:
    - DOE and DOE laboratories
    - Government agencies
    - Teachers and Students
    - Large-scale end users
      - Energy industry
      - Businesses
      - Public

Budget

- Total Funding for the Project
  - $ 735, 807 - 12 Month
  - Project Period
    - ~ June 1, 2004-May 30, 2004
- New Project
  - Not yet started

Technical Barriers & Targets

- The hydrogen economy is a revolutionary change
  - People are hesitant or resistant to change
  - High degree of comfort with using gasoline
- Education is essential
  - Trained Work Force
  - Public Awareness/Understanding

Technical Barriers & Targets

- Lack of awareness
  - Result in little incentive to change
- Lack of Experience
  - Real world, hands on enhances understanding and comfort
- Institutional Barriers
  - Need to identify and reach intended audiences
- Regional Differences
  - What applies to one, any not apply to another

Technical Barriers & Targets

- **Safe Practices are Essential**
  - **Can't afford catastrophic failure**
  - **Irreparable harm to hydrogen future**

Technical Barriers & Targets

- Safety Information and Training
  - Access to proprietary data
  - Find up to date/validated sata
  - Obtain industry consensus
  - Address liability issues
    - Lack of reporting requirements for safety incidents
    - Lack of standards and protocols
    - Lack of technical and scientific understanding of hydrogen systems
  - Address QA and expense of data collection and management

Approach

- Identify audience/end-user needs
  - Develop activities and materials
  - Test activities (curriculum, safety, web)
    - Revise Activities
  - Implement programs
  - Assess results
    - Obtain feedback from stakeholders and audiences

Approach

- **Messaging is important**
  - **Communicate**
    - **Benefits of hydrogen and fuel cell technologies**
    - **Technical challenges ahead**
    - **Important research, development, and demonstration (RD&D) needed for successful commercialization**
    - **Safety awareness**
    - **Timeframe for mass market introduction**

Approach

- Obtain stakeholder input
  - DOE Programs
  - DOE Laboratories
  - Industry
  - Government
  - Non-government organizations
  - Universities

Timeline

- Timeline

	H2 Safety	Curric.	Web	Future Prg
Aug- Dec	ID Eq/Trng	ID Cs	ID Cont	Arch
Jan- Mar	Est Log	St Ap	Outline	Prog Pl
Apr- Jun	Schedule	Dev.	Dev.	Fac
July Sept	Offer	Offer	Set up	Plan Comp

Technical Accomplishments/Programs

- Component Identification/Planning
  - Technical program elements
  - Safety program technical requirements
  - Curriculum demands on Equipment for Training

Interactions/Collaborations

- MT Tech – Butte
- INNL – Idaho Falls
- Hydrogen Safety Inc.
- Pacific Northwest Labs
- NREL