



2005 DOE Hydrogen Program
Hydrogen/Alternative Energy Center
Award DE-FC36-04GO14218

Ruth Hohl Borger
Lansing Community College
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ED#2

This presentation does not contain any proprietary or confidential information



OVERVIEW

- Project started November 2004
 - Project end June 2006
 - 30% complete
 - Budget
 - DOE \$981,077
 - LCC \$1 m +
 - FY05 rec'd
 - Partners
 - Universities
 - Business/industry
 - Government
- Barriers
 - Educating consumers, industry leaders, and public policy makers about the benefits of hydrogen is critical to achieving the vision.*
 - An increase in the number of decision makers who understand the concept of a hydrogen economy, and how it may affect them.
 - Launch a comprehensive and coordinated public education campaign about the hydrogen economy and fuel cell technology by 2010.



OBJECTIVES

- Increase the number of technicians available to service and maintain equipment using hydrogen technologies
- Provide an open and accessible site to view and work with hydrogen fuel cells and alt energy equipment in a lab setting
- Build links with business and industry; educational institutions
- Become a resource center for educators, innovators and policy makers



APPROACH

- Curriculum Development using DACUMs
- Faculty Development and Teacher Prep
- Community Education and Outreach
- Equipping Alt Energy Education Technology Lab/Facility
- Project Management



ACCOMPLISHMENTS PROGRESS/RESULTS

- T.1 -- Alternative Energy Technician program
 - AEET degree well into development; first courses offered Spring 2005
- T.1--Hydrogen modules integrated across Tech curriculum
 - Integration of hydrogen elements underway/on track
- T.2 –LCC Tech Careers Faculty professional development; four programs
 - Faculty currently attending conferences, workshops; August development program planned
- T.2 – Faculty to Faculty training esp. across MI
 - Exploring use of interactive television to complete; conference planned for Spring 2006

- T.3 – Increased awareness of hydrogen education programs through conference presentations
 - Numerous meetings/presentations/media plan
- T.3 – Increased awareness through comprehensive public relations outreach program
 - Pre and Post Assessment of public opinion
 - Available print collateral/website

- T.4 --Hydrogen safety plan/safety readiness review with DOE participation
 - Activity scheduled for June –August 2005
- T.4 --Creation/operation of instructional laboratory
 - June 2005 dedication
- T.5 – Quarterly technical progress reports
- T.5 – Final technical report



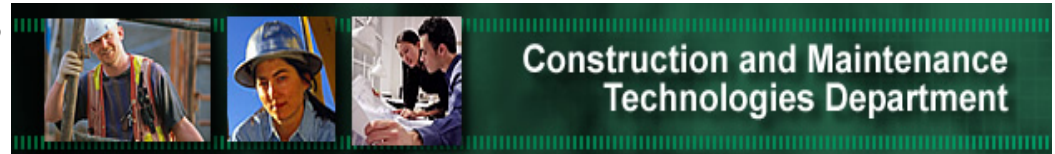
TECHNICAL CAREERS DIVISION

Collaboration between three departments:

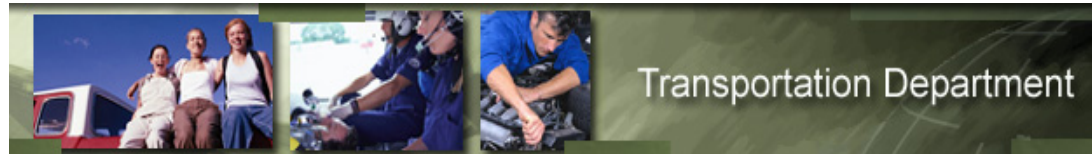
**Programs: CADD, Machine Tool,
Precision Machining, HVAC,
Electrical, Welding**



**Programs: Alternative Energy, Agriculture
Technology, Landscape Architect,
Horticulture & GIS, Residential
Building, Architecture, Civil
Technology, Interior/Fashion Design**



**Programs: Automotive, Aviation, Aviation
Maintenance, Collision Repair,
Heavy Equipment and Truck
Driver Training**



CREATION OF A NEW DEGREE

Alternative Energy Engineering Technology Associates Degree

2+2 Transfer Program with Partner Colleges & Universities

- Lawrence Institute of Technology
- Wayne State University
- University of Michigan, Ann
- Kettering University, formerly GM Institute

CURRICULUM DEVELOPMENT: DACUM PHILOSOPHY

- Expert practitioners are better able to describe/define their occupation than anyone else
- Any job can be effectively and sufficiently described in terms of tasks successful practitioners perform
- All tasks have direct implications for the knowledge and skills practitioners must have in order to perform

CURRICULUM DEVELOPMENT AND VALIDATION

Dacum's (Developing A Curriculum) was completed for the following:

- Alternative Energy
- Hydrogen Technology
- Automotive Fuel Cell
- Fuel Cell



AEET CURRICULUM

• Requirements	Total Credits: 67
• Code Title	Credit Hours
AEET 102 Prin of Alt/Renewable Energies	3
AEET 110 Conventional Energy Sources/Use	3
AEET 115 Geothermal Technology	3
AEET 116 Solar Energy Technology	3
AEET 117 Biomass, Biogas and Microtur Tech	3
AEET 118 Fuel Cell & Hydrogen Tech	3
AEET 119 Wind Energies	3
AEET 200 Energy Site Evaluation	3
AEET 220 Energy Efficiency & Management	3
AEET 250 Alt Energy Inventory & Analysis	3
AEET 251 Planning & Design	3
AEET 252 Alt Energy Implement/Maintenance	3
AEET 260 Codes, Regulations & Standards	3
*Other prerequisite courses are required to complete the curriculum	28



CONSTRUCTION AND MAINTENANCE TECHNOLOGY DEPARTMENT

- Alternative Energy Lab
- Integration of alternative energy for these programs:
 - Architecture
 - Residential Building
 - Civil Technology
 - Alternative Energy



MANUFACTURING AND LAND TECHNOLOGIES PROJECTS

- Curriculum Design Phase (Dec 10, 2004)
- Professional Development: HVAC & Electrical
(Start January 2005)
- Electrical Controls Equipment (Feb 2005)
- Faculty Trainings & Workshops (March – August 2005)
- HVAC Large Fuel Cell (Feb 2005)
- Courses: HVAC Hydrogen & Electrical Energy
(August 2005)



TRANSPORTATION PROJECTS

Advanced Vehicle Technology Components

- Faculty Training/Workshops
- Hydrogen Safety Plan for LCC
- Hydrogen Refueling Station
- Hydrogen Powered Engine
- Hydrogen Engine Lab
- Hydrogen Modules for Automotive Courses
- Fuel Cell Golf Cart
- Hybrid Vehicle
- Demonstration Truck/Trailer



FUTURE PLANS

- Remainder of FY 2005:
 - Implementation of instructional lab
 - Strategic engagement of community colleges across the country; ongoing awareness raising activities
 - Faculty development
- FY 2006:
 - Final curriculum development
 - Hydrogen ICE developed; lab; kiosk, vehicles integrated into classroom instruction
 - Expanded outreach/awareness activities
 - Full faculty development

Publications and Presentations

- American Community College Trustees
- MI Department of Economic Growth
- MI Department of Career Development Governor's Conference
- Edge 2 project (MI Governor's Office)
- MI Department of Environmental Quality
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Hydrogen Safety

The most significant hydrogen hazard associated with this project is:

Hydrogen storage for fueling vehicles

Hydrogen Safety

Our approach to deal with this hazard is:

- Working with DOE, local township officials, architects and contractors to design and build appropriate storage on site