



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

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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



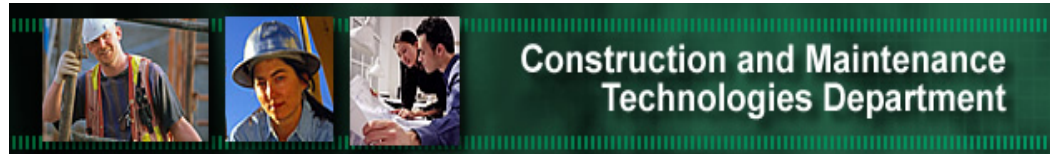
# TECHNICAL CAREERS DIVISION

**Collaboration between three departments:**

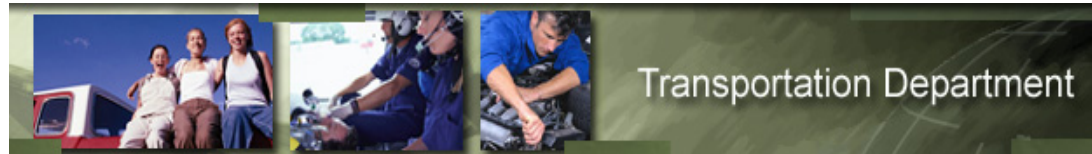
**Programs: CADD, Machine Tool,  
Precision Machining, HVAC,  
Electrical, Welding**



**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
	<b>AEET 102 Prin of Alt/Renewable Energies</b>	<b>3</b>
	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
	<b>AEET 118 Fuel Cell &amp; Hydrogen Tech</b>	<b>3</b>
	AEET 119 Wind Energies	3
	<b>AEET 200 Energy Site Evaluation</b>	<b>3</b>
	<b>AEET 220 Energy Efficiency &amp; Management</b>	<b>3</b>
	<b>AEET 250 Alt Energy Inventory &amp; Analysis</b>	<b>3</b>
	<b>AEET 251 Planning &amp; Design</b>	<b>3</b>
	<b>AEET 252 Alt Energy Implement/Maintenance</b>	<b>3</b>
	<b>AEET 260 Codes, Regulations &amp; Standards</b>	<b>3</b>
	<b>*Other prerequisite courses are required to complete the curriculum</b>	<b>28</b>



## 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