UNIVERSITIES

· More than 93,000 students attend the Detroit Region's ten universities, with another 28,000 attending 13 colleges and 137,000 attending 18 community college campuses.

· Supported in part by a NextEnergy competitive grant, community colleges and universities in Michigan will be creating undergraduate, graduate and community college degreed programs in alternative energy technology.

· Renowned research institutions like the University of Michigan (U-M) and Wayne State University are able to attract the top echelon of alternative energy researchers. Professor Levi Thompson, a faculty member with U-M 's Department of Chemical Engineering, is working with several industry partners to develop catalysts that would significantly reduce the size, weight and cost of fuel processors. Fuel processors are essential components for the conversion of hydrocarbons like gasoline into hydrogen for proton exchange membrane fuel cells.

University of Michigan Solar Decathalon Home project.
Photo by, Chris Gunn, Solar Decathlon

FEDERAL COMMITMENT

· U.S. Department of Energy (DOE) Secretary (and former Michigan Senator) Spencer Abraham announced a $1.2 billion, 10-year program of alternative energy research grants and tax credits at the Detroit Economic Club in February 2003. Secretary Abraham pointed out that "the success of this project will ultimately depend on the scientific genius and engineering know-how of those in this city and beyond…the future will not be constructed in the halls of government, but in the labs and factories of GM, Ford, Chrysler and others."

· The Environmental Protection Agency's National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan is the first federal facility capable of testing and certifying a fuel cell vehicle for emissions and fuel economy.

· FreedomCAR, a public-private partnership between the DOE and the Big 3 automakers will focus on technologies to enable mass production of affordable hydrogen-power fuel cell vehicles and the hydrogen supply infrastructure to support them.

· The U.S. Army Tank-Automotive and Armaments Command National Automotive Center (TACOM-NAC) in Warren recently introduced a class-eight Freightliner truck fitted with a methanol-fueled fuel cell auxiliary power unit (APU) at the Society of Automotive Engineers 2003 World Congress in Detroit. The 5-kW APU, which includes a fuel cell stack manufactured by Ballard Power Systems, will provide electricity for on-board demands and external devices, including computers, satellite dishes and three-dimensional mapping systems, in military trucks.

INCENTIVES

In addition to the incentives available to companies locating in NextEnergy's Alternative Energy Renaissance Zone (see above), the following incentives are available to alternative energy companies in Michigan:

· Certified alternative energy companies in Michigan may be eligible to claim a credit against Michigan Business Tax. (MBT).

· Certified alternative energy technology businesses may be eligible for a personal property tax exemption through 2012. Non-alternative energy businesses may be eligible for an exemption on personal property that is used solely for the purpose of researching, developing or manufacturing alternative energy technologies.

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Alternative Energy

Detroit Regional Economic Partnership

DetroitRegionalChamber Research & Information Center

INTRODUCTION

Alternative energy technology has the potential to revolutionize every facet of our lives, powering our transportation, homes, schools and work.

· Home to the state of Michigan's NextEnergy Center and Kettering University's (formerly GMI) Center for Fuel Cell Systems and Powertrain Integration, the Detroit Region is uniquely positioned to become the world's leading center for alternative energy technology, research & development, education and manufacturing.

· Michigan leads the nation in automotive research and development. The state is home to 85 percent of all vehicle-related research and development activity with $13.5 billion spent annually and 65,000 workers employed by these companies.

· There are over 100 companies in the Detroit Region involved in development of alternative energy technologies. Michigan is 4th in the nation in high technology jobs.

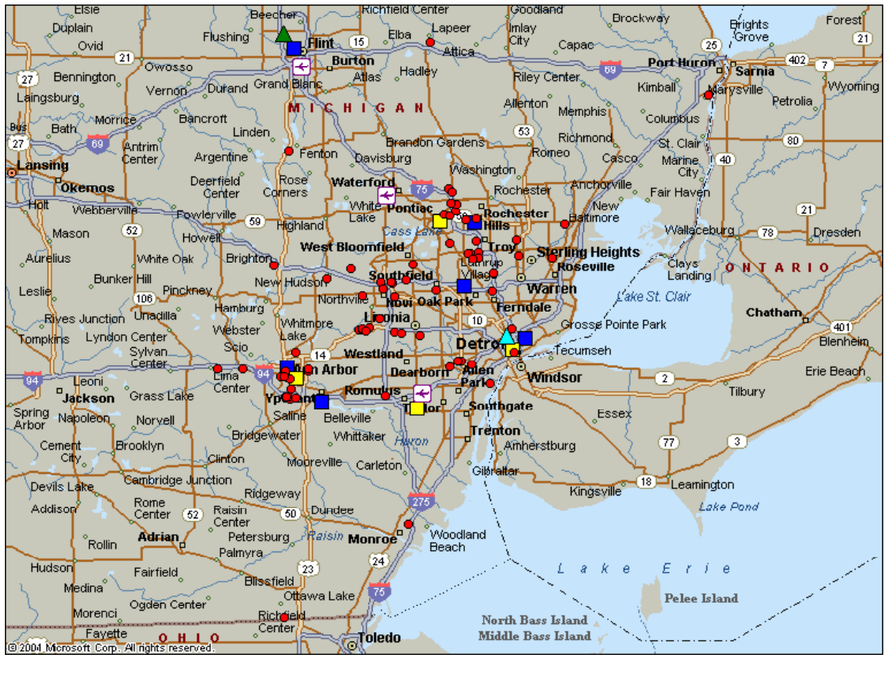
· General Motors, Ford and Chrysler are making significant investments in the development of fuel cell technology. Not only has each company developed a fuel cell-powered automobile, but also made a commitment to contribute and participate in the Department of Energy's FreedomCAR program.

· In 2005, DTE Energy built and tested a hydrogen system capable of generating more than 15,000 kilowatt-hours of electricity. The $3-million test project was funded by DTE and the U.S. Department of Energy.

REGIONAL DETROIT ALTERNATIVE ENERGY

Pushpins

- Alt. Energy Companies
- Kettering University
- NextEnergy
- Major Airport
- Colleges/Universities
- SmartZones



APPLICATIONS

Stationary
More than 200 alternative energy systems have been installed all over the world in hospitals, nursing homes, hotels, office buildings, schools, utility power plants and an airport terminal, providing primary power or backup. In large-scale building systems, fuel cells can reduce facility energy service costs by 20-40 percent over conventional energy service.

Alternative energy sources are ideal for power generation, either connected to the electric grid to provide supplemental power or backup assurance for critical areas. Systems may also be installed as a grid-independent generator for on-site service in areas that are inaccessible by power lines.

Portable
Micro fuel cells will help consumers talk for up to a month on a cellular phone without recharging. Fuel cells will change the telecommuting world, powering laptops and palm pilots hours longer than traditional batteries. Other applications for micro fuel cells include pagers, video recorders, portable power tools and low power remote devices such as hearing aids, smoke detectors, burglar alarms, hotel room locks and meter readers.

Mobile
All of the major automotive manufacturers have a fuel cell vehicle either in development or in testing. Each of the Big 3 are committed to the advancement of fuel cell technology and the application of alternative energy technology to the automobile:

· In May 2003, General Motors and Shell Hydrogen began providing Washington policy makers with a fleet of six fuel cell minivans and two pumps to refuel them. The Zafira minivans will be powered by a 94-kilowatt HydroGen 3 fuel cell system.

· Chrysler plans to lease as many as ten of its F-Cell fuel cell cars in Japan over the next two years. DCX has received approval from the Japanese government to begin testing the vehicles on public roads this summer.

ALTERNATIVE ENERGY COMPANIES IN THE DETROIT REGION

ABB Flexible Automation
Adaptive Materials
Arris International
ASG Renaissance
AVL North America
Bekaert ECD Solar Systems
Ballard Power Systems
Chevron/Texaco Ovonic Battery Systems
Chrysler
Convergence
Dana
Delphi Automotive Systems
DENSO International America
Dow Corning
DTE Energy
Eaton
Energy Conversion Devices
FEV of America
Ford Motor
Froude Consine
Fruedenberg-NOK
Futuristic Design International
General Motors
Honda North America
IAV
Isuzu Motors America
Nissan Technical Center North America
OMG
Ovonic Battery
PAICE
Praxair
PowerQuest Partners
Prodrive Englehard
REB Research & Consulting
Ricardo
Robert Bosch
Siemens Automotive
SPX/Valley Forge Technical Information Services
STM Power
Subaru Research and Design
T/J Technologies
TACOM-National Automotive Center
Toyota Technical Center
Trane
TRW Automotive
United Solar Systems
Universal Parametrics
Valeo
Venture Industries
Volkswagen of America

NEXT ENERGY

Michigan's NextEnergy initiative is dedicated to accelerating the commercialization of alternative energy technology.

· The NextEnergy Center, located in the Wayne State University (WSU) Research & Technology Park, will be a 40,000-square-foot facility. The Center will house laboratory space, business incubator space, collaborative meeting space and other features to support the alternative energy industry.

· This 50-acre urban Detroit location has been designated an Alternative Energy Renaissance Zone by the City of Detroit and offers a 20-year state and local tax exemption for companies that locate and perform alternative energy technology research, development, and manufacturing. Qualified alternative energy companies locating in the Zone may also be eligible for a personal income tax credit against any income taxes paid by their employees who work in the Zone for up to 20 years.

· An alternative energy micro-grid will be built to power the Center and related developments. NextEnergy intends to build the infrastructure that will push the demonstration of alternative energy technology to a higher level. Infrastructure to handle hydrogen for the micro-grid, fueling of demonstration vehicles and for use in laboratory testing is the goal as the Center develops.

Companies and researchers will be invited to exhibit their technologies against the micro-grid and infrastructure. Regulatory agencies and independent research institutions will be invited to utilize the facility to advance alternative energy code and standard work.

· Through competitive grants, NextEnergy will assist community colleges and universities to create curriculum leading to graduate, undergraduate and community college degreed programs in alternative energy technologies (AET) as well as continuing education and technical certification programs in AET. The Center will also establish scholarship and industry placement programs for students interested in advancing their education and experience in AET.

"The 20th Century was the century of the internal combustion engine. The 21st Century will be the century of the fuel cell."
Rick Wagoner, CEO, General Motors Corp.

CENTER FOR FUEL CELL SYSTEMS & POWERTRAIN INTEGRATION

· Kettering University has established a Center for Fuel Cell Systems and Powertrain Integration in Flint. The Center is housed in Kettering's new $42-million, 120,000-square-foot Mechanical Engineering and Chemistry Building which was completed in 2003.

· The Center will lead Michigan and the nation in educating current and future generations of engineers to conduct world-class fuel cell systems R&D, testing and evaluation and improve manufacturing capacity. The Center is powered by a 200-kilowatt stationary fuel cell and will feature classrooms, labs and offices.

· The Center offers testing and research services combined with an incubator environment for supporting tier one and tier two automotive companies and their emerging technologies. The primary focus is fuel cell systems testing and integration, validation of fuel cell codes and standards and seeking niche research initiatives to advance product development.

One of the five Flint MTA mini-buses that are retro-fitted with a hybrid electric/diesel system. Plans are to bring hydrogen fuel cell technologies to MTA buses in the city within three years.

· Kettering University will also attract alternative energy companies to its industrial research park which is designated as a tax-free Renaissance Zone.

"I believe fuel cell vehicles will end the hundred-year reign of the internal combustion engine as a dominant source of power for personal transportation. It's going to be a wining situation all the way around – consumers will get an efficient power source, communities will get zero emissions and automakers will get another major business opportunity – a growth opportunity."
Bill Ford, CEO, Ford Motor Company