



WHERE PEOPLE & TECHNOLOGY PROSPER

**Oakland County
Michigan**
Emerging Sectors[®]



Alternative Energy & Power Generation Technology

Powering Your Future



Oakland County Michigan Information

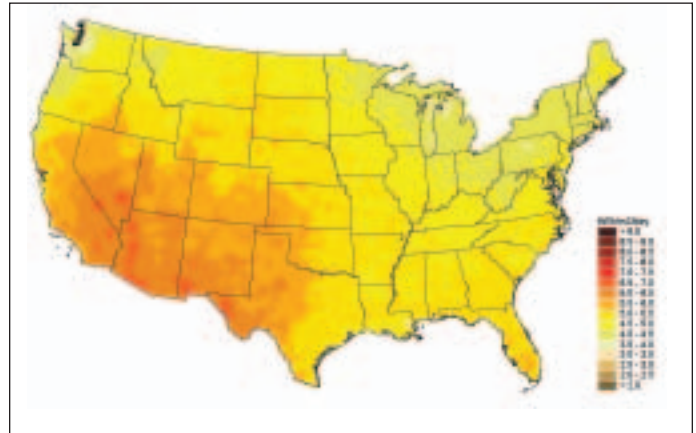
- ◆ More than one third of the state's R&D facilities are located in Oakland County
- ◆ Michigan ranks second in the nation in R&D spending
- ◆ Michigan companies file over 3,000 patents a year placing Michigan in the top 10 states for total number of patents granted
- ◆ Close to 20,000 acres of corn are grown every year for biotech purposes (ethanol)
- ◆ The Great Lakes around the state of Michigan contain the largest supply of fresh water in the world - **20% of the world's total fresh water is located here**

Oakland County's Alternative Energy Research Focus:

- ◆ Stationary
- ◆ Portable
- ◆ Transportation
- ◆ Military

Organizations To Support You:

- ◆ Automation Alley
- ◆ Center for Fuel Cell Systems & Powertrain Integration
- ◆ DTE Energy Hydrogen Research Parks
- ◆ EPA's National Vehicle & Fuel Emissions Laboratory
- ◆ Great Lakes Renewable Energy Association
- ◆ MARC - Michigan Alternative & Renewable Energy Center
- ◆ Michigan Bio-Economy Consortium
- ◆ Michigan Bio-Mass Energy Program (MBEP)
- ◆ Michigan Clean Tech Cluster
- ◆ Michigan Green
- ◆ Michigan Independent Power Producers Association
- ◆ Michigan Manufacturers Association
- ◆ Michigan Renewable Fuel Commission
- ◆ Michigan Wind Working Group
- ◆ Michigan's Hydrogen Highway Project
- ◆ Michigan's Technology Tri-Corridor
- ◆ MMTCC - Michigan Manufacturing Technology Center
- ◆ National Center for Manufacturing Sciences (NCMS)
- ◆ National Institute of Industrial Technology (NAIT)
- ◆ National Renewable Energy Lab
- ◆ National Vehicle & Fuel Emission Laboratory
- ◆ NextEnergy Center
- ◆ Society of Manufacturing Engineers (SME)
- ◆ TARDEC's National Automotive Center (NAC)
- ◆ US Tank-Automotive Research Development and Engineering Center (TARDEC)



Solar Energy: Ranking midway on the PV Solar Radiation Scale, Michigan is a practical location for solar technologies and is a viable option for everyone.

Workforce: Educated, Innovative & Motivated

- ◆ Over 40% of Oakland County residents have college degrees (national average is about 26%)
- ◆ **Oakland County has the third highest number of high-tech workers in the nation and twice the corporate R&D professionals compared to the national average**
- ◆ Population of Michigan's workforce: 5.1 million
- ◆ 15 public universities, 50+ independent universities and colleges, 29 community colleges in Michigan
- ◆ Over 96,000 college degrees are granted every year in Michigan - almost twice as many as the national average
 - ◆ 2 ½ times the number of master's degrees were granted in Michigan than the national average
 - ◆ **Close to 1,500 Ph.D.s are granted in Michigan every year - almost twice the national average**
- ◆ Michigan is third in the nation with the number of engineering degrees issued (in 2004, 6032, engineering degrees were granted)
- ◆ **In 2004, over 1,500 students enrolled in Alternative Energy courses and programs at Michigan universities/colleges**

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Michigan Universities: Research Centers

Central Michigan University

- ◆ The Center for Applied Research and Technology

Eastern Michigan University

- ◆ Experimental Laser Physics Laboratory/Chemical Sensors

Grand Valley State

- ◆ Michigan Alternative & Renewable Energy Program

Kettering University

- ◆ Center for Fuel Cell Systems & Powertrain Integration

Lansing Community College

- ◆ Alternative Energy Engineering Program

Lawrence Technological University

- ◆ Alternative Energy Technology Center

Macomb Community College

- ◆ Center for Alternative Fuels

Michigan State University

- ◆ Energy Devices & Systems Center
- ◆ Great Lakes Bioenergy Research Center
- ◆ Office of Biobased Technologies
- ◆ Thermal Engineering Laboratory
- ◆ Turbomachinery Laboratory

Michigan Technological University

- ◆ Alternative Fuels Group Enterprise
- ◆ Power and Energy Research Center (PERC)
- ◆ Sustainable Futures Institute (SFI)

Oakland Community College

- ◆ Customized Alternative Energy Programs & Certificates

Oakland University

- ◆ Product Development and Manufacturing Center

University of Michigan

- ◆ Alternative Fuels & Vehicles
- ◆ Center for Sustainable Systems
- ◆ Center for Transportation
- ◆ Environmental Management Institute

Wayne State University

- ◆ Alternative Energy Center
- ◆ Smart Sensors and Integrated Microsystems

Green - These universities are either located in Oakland County or have campuses in Oakland County

NextEnergy Tax Incentives & Education Grants

NextEnergy is a non-profit corporation founded to advance the alternative energy industry in Michigan. Companies that are certified by the Michigan NextEnergy Authority (MNEA) as alternative energy companies have access to several state-wide incentives. NextEnergy education grants given to Michigan colleges and universities ensure that Michigan schools continue to develop curriculum that will deliver the brightest and most advanced workforce focusing on alternative energy technologies.

Access to Capital

Oakland County's Economic Development Team will help your company find potential sources of capital and financing.

Michigan Venture Capital Association - Established by venture capital and private equity investors in the state, the Michigan Venture Capital Association (MVCA) is the state's premier public policy advocate for the private equity/venture capital industry. MVCA works to promote entrepreneurship and private equity investment.

Venture Capital - In four years alone, over \$694 million in venture capital has been invested in 101 businesses in Michigan. For new emerging technology initiatives, Michigan has created the \$150 million Venture Michigan Fund to catalyze investment in early-stage firms operating in Michigan. With the matching requirement, this initiative will attract an additional \$450 million in capital to Michigan for investment in promising new companies.

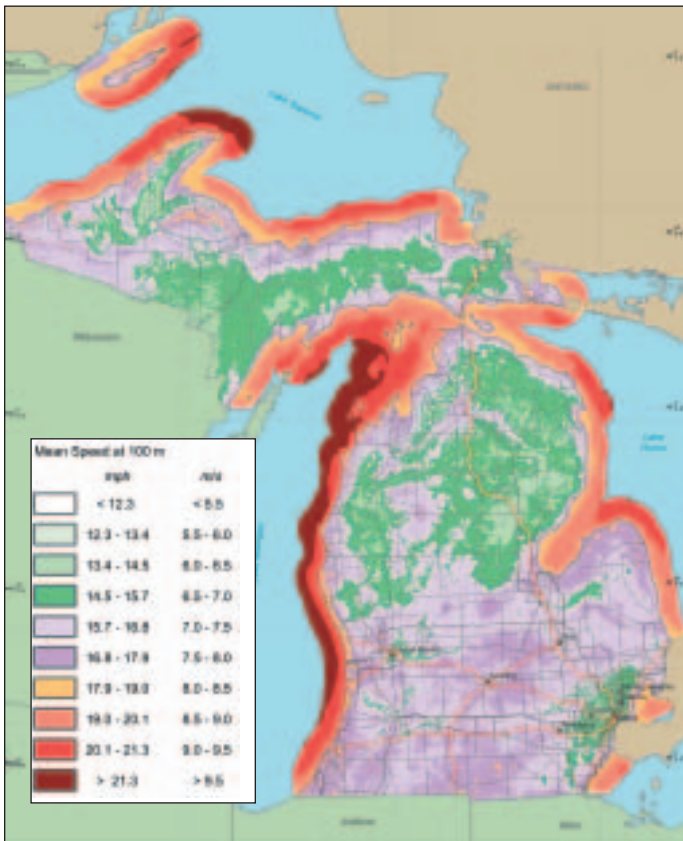
Angel Networks - Aimed at helping companies with early stage seed financing, Michigan is fortunate to have three active Angel Networks: The Great Lakes Angels, The Grand Angels and The Ann Arbor Angels.

Traditional and Non-Traditional Financing - Oakland County's Business Finance and Economic Development Corporations help companies with the SBA 504 Loan and with Tax-Exempt Revenue Bond programs. Through the Automation Alley Technology Center, emerging companies can be assisted with securing non-traditional and unique sources of financing and capital.

State Incentives / Tax Credits - Michigan has a wide variety of incentive programs and credits for companies that qualify.

Research Projects at Michigan Universities *(partial list):*

- ♦ Hydrogen interaction with metals
- ♦ Low-cost fuel processors to convert hydrocarbons into hydrogen for PEMs
- ♦ Solar-powered vehicles
- ♦ Fully CMOS compatible micro-fuel cells for portable device power
- ♦ Carbide and nitride supported water gas shift catalysts
- ♦ Photoconductive step-function sampler and detector
- ♦ Combustion-based micro thermionic power generator
- ♦ Selective sorbents for desulfurization of liquid fuels
- ♦ Multifunctional electrochemical energy storage materials
- ♦ Particle beam driven chemical reactions and combustion
- ♦ Ultrahigh activity catalysts for low-temperature selected catalytic oxidation of ammonia to nitrogen
- ♦ Microscale fuel cells: PEMFC and DMFC
- ♦ Hydrogen sensors - detecting hydrogen concentrations down to 1ppm
- ♦ Solar-powered portable fuel cells
- ♦ Ethanol effectiveness
- ♦ Chemical processes to densify agricultural waste products to increase their energy potential
- ♦ Green oxidation catalysts
- ♦ Estimating battery power needed for a space mission-balancing needs with weight
- ♦ Thin-film cells that can be incorporated in building materials
- ♦ Lightweight lithium-ion batteries for the military
- ♦ Unmanned plane that can fly across the Pacific Ocean with advanced lithium-ion batteries
- ♦ SUNTRAKER-calibrating solar cells in the stratosphere under near air mass zero (NAM0) conditions using low-cost helium balloons and state-of-the-art communication technologies
- ♦ AIChE Chem E Car project
- ♦ New fuel cell designs, sulfur-based fuel cells, and improved anode and cathode designs
- ♦ Hybrid military vehicles
- ♦ Distributed generation, distributed resources
- ♦ Wind farms - integration/interface into power grid
- ♦ Wind generators, frequency converters, and control systems
- ♦ Wind farms - operational stability and electrical transients
- ♦ Control algorithm development for the sodium fuel cell vehicles
- ♦ Fuel cell APU modeling and integration within vehicle system simulation (ARC)
- ♦ Direct injection investigation for optimized cold start
- ♦ Reactor physics and transmutation studies for advanced nuclear fuel cycle



WIND ENERGY: With 9,402 miles of shoreline in Michigan, wind energy is truly a viable option for everyone.

Alternative Energy & Power Generation Technology Companies

Research Projects at Michigan Universities *(partial list continued):*

- ♦ Systematic design of pore size and functionality for methane and hydrogen storage
- ♦ Fuel processors for dynamic hydrogen generation
- ♦ Ni-H Battery cell electrode microstructural analysis
- ♦ Lifecycle assessment of thin film and multi-crystalline PV technologies
- ♦ Assessment of greenhouse gas emissions and energy consumption
- ♦ Control algorithm development for the sodium fuel cell vehicles
- ♦ Li-ion electrodes: simulations and experiments on conductivity and mechanics
- ♦ Level of particulate matter emitted in hydrogen production as well as by diesel, spark-ignited and jet engines



Courtesy Cobasys

3-Dimensional Services, Inc.
3M Fuel Cell Components
A.B. Myr Industries, Inc.
ABB Flexible Automation
Abode Building & Remodeling
Adaptive Materials
Adco Circuits Inc.
Admamede LLC
Adopt-A-Watt, Inc.
ADSC
Advanced & Alternative Diesel Injection, Inc.
Advanced Biodiesel Partners
Advanced Modular Power Systems
Advanced Sensor Technologies Inc.
Advantage Electronics
Ag Solutions Inc.
Air Compressor Energy Systems, Inc.
Aircraft Precision Products
Aisin World Corp of America
AlgerDelta
Altair Engineering
Alternative Fuel Technology LLC
Alternative Power Solutions
Alternative Power Supply
Aluminum Blanking Co., Inc.
American Axle Mfg.
American Instrumentation Inc.
Amerigon
Arbor Partners LLC
Ardesta LLC
Arris International Corporation
ArvinMeritor, Inc.
Auxiliary Energy Solutions
AVL North America Inc.
Backwards to the Future Ltd.
Ballard Power Systems Corp.
Bauer Power Inc.
Bay Energy Services
Bekaert ECD Solar Systems
Benham Companies, LLC
Best Options LLC
Biodiesel Industries
Biofuel Industries Group LLC

Biomass Energy Solutions
Blue Northern
BorgWarner Inc.
BTF Solar Ltd.
Cascade Engineering Inc.
CD-adapco
Century Inc.
CHEMAC International Corp.
Chrysler R & D
City Creations, Inc.
Clayton Industries
CMS Energy Corporation
CoalTek
COBASYS LLC
Coffman Electrical Equipment
Compact Power Inc.
Controlled Power Company
Convergence LLC
Coritech Services, Inc.
Criptonic Energy Solutions, Inc.
Crorey Biomass Gasifier Systems LLC
Crystal Flash of MI
Cummins Bridgeway LLC
Currin Corporation
DanWin Associates
Delphi Corporation
DENSO International America Inc.
Detrex
Diversified Natural Products Inc.
Diversified Sales & Service
Dovetail Solar & Wind
Dow Chemical Corp
Dow Corning
DTE Energy
Dynamic Electrical Systems
Eaton Corp Innovation Center
Ecostar Electric Powertrain and Power Conversion Systems
Emmeskay Inc.
Encel
Enerex LLC
Energy Conversion Devices Inc.
Energy Conversions LLC
Energy Options & Solutions
EnVironmental Transportation Solutions, LLC
Event Horizons Solar and Wind
FC Moran & Son
FEV Engine Technologies Inc.
Ford Motor Co. R&D
Freedom Power
Fuel Cell Safety Systems
Gast Manufacturing Corporation
General Motors R & D
Geo-Renew Systems, Inc.
Global Electronics Ltd
Global ET
Grayling Generating Station
Hartsell Alternative Energy
Helix Synergy LLC
Homeland Builders Group
Honda North America
Honeydale Farms
Huran Systems LLC
HY9
Hybra-Drive Systems, LLC.
IES of Mid-Michigan LLC
IMPCO Engine Systems
Inergy
Isuzu Motors America Inc.
J & J Services - Energy Specialists
K & M Machine Fabricating, Inc.
Kraftube Inc.
KTM Industries Inc.
Kulick Enterprises, Inc.
Lean, Clean Energy Services
Light Corp.
Livernois Vehicle Development LLC
Mackinaw Power LLC
Mechanical Energy Systems Inc.
Michigan BioDiesel LLC
Michigan Energy Works
Michigan Wind Energy, LLC
Midland Energy LLC
MidWest-Solar LLC
Millenium Cell
Mosaic Energy
Newman Consulting Group, LLC.
Nextek
Nissan Technical Center North America
Noble Environmental Power
Northwoods Energy Alternatives
Novi Energy LLC
Odyssey Farm
Ovonic Battery Company Inc.
Ovonic Fuel Cells
Pacific Industrial Development Corp.
PAICE
Panoramic Electric

Pernetic Generator Group LLC
Phase 3 Developments & Investments LLC
[Phil's Construction](#)
[Phoenix Design Technologies](#)
[Pilot Systems LLC](#)
[Pi Technology](#)
POET Biorefining - Caro
[Prodrive Engelhard LLC](#)
[REB Research and Consulting Co.](#)
Ricardo Inc.
[R.L. Deppmann Co.](#)
Renewable Energy Center LLC
[Renewable Energy Group LLC](#)
Renewable Energy Solutions
Renewable Service
[Renovare Energy Inc.](#)
Resource Engineering
[RGP Pro](#)
[RKA Petroleum Companies](#)
[Robert Bosch Corp.](#)
[Rofin-Sinar Technologies Inc.](#)
Solar Works in Michigan
S.U.R. Energy Systems LC
[Sanyo R&D](#)
[Select Engineering Services](#)
[Self Reliant Energy](#)
SES Flexcharge USA
[SGL Technic Inc.](#)
[Siemens VDO Automotive Corporation](#)
Solar First
Solar Specialists
[Southern Exposure Renewable Energy Co.](#)
[Southwest Research Institute](#)
[Spider Energies](#)
SPM Windpower
[Stirling Biopower Inc.](#)
[STM Power Inc.](#)
[Subaru Of America Inc.](#)
Sundu Solar Energy Sales & Service
Sustainable Systems Inc.

[S-Y Systems Technology](#)
[T/J Technologies Inc.](#)
Tellurex Corporation
[Texaco Ovonic Hydrogen Systems](#)
[Therma-Netics](#)
ThermoAnalytics Inc.
Tip of Mitt Alternative Energy Systems
[Titan Energy Development](#)
[Toyota Technical Center USA Inc.](#)
[Transportation Design and Manufacturing Co.](#)
U.S. BioEnergy Woodbury LLC
[Umicore Autocat USA Inc.](#)
[United Solar Ovonic Corp.](#)
[Universal Parametrics Inc.](#)
VanAire Inc.
Venture Industries
[Virent Energy Systems](#)
[Volkswagen of America Inc.](#)
Vos Energy Concepts
[Walker-Miller Energy Services, LLC](#)
Wind Power Services LLC
[Windstor Power Co.](#)
Woodland Wind LLC
Zeeland Farm Services, Inc.



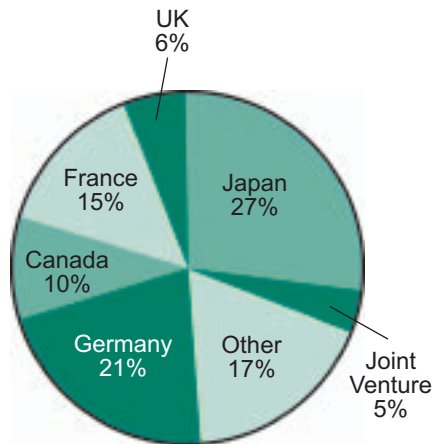
Oakland County Can Help Your Business

Our Economic Development Team offers free and confidential assistance in:

- Site location
- Financing
- Tax incentive
- Liaison with state and local agencies
- Workforce development
- Business Assistance Center (business consulting)
- Information products - to ensure you make the right decision for your company's location

Oakland County is an International Hub

Foreign firms make the strategic decision to locate in Oakland County because of the highly skilled workforce, strong educational systems and the international support services available to them.



- 653 foreign-owned firms from 24 countries are in Oakland County
- 259 of these firms came to Oakland County in the last 12 years-that's an average of two foreign companies a month opening up a location in Oakland County



L. Brooks Patterson,
Oakland County Executive

*With the support of
The Oakland County Board
of Commissioners*

Oakland County is Strategically Located



- Centrally located between Chicago, Toronto and Cleveland, Oakland County is strategically positioned to capture the entire Midwest market
- The Michigan-Ontario border is the busiest U.S.-Canada crossing in the country, making this area an ideal location to reach the United States and the Canadian markets. Ontario, less than an hour's drive from Oakland County, generates some 40% of Canada's total gross domestic product



Contact us today for more information:

**Oakland County Department of Economic Development & Community Affairs
Planning & Economic Development Services**

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Website: www.emergingsectors.org

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