# Michigan Energy Public Forum

April 22, 2013

# Michigan Agriculture Sector

## *Renewable Energy*

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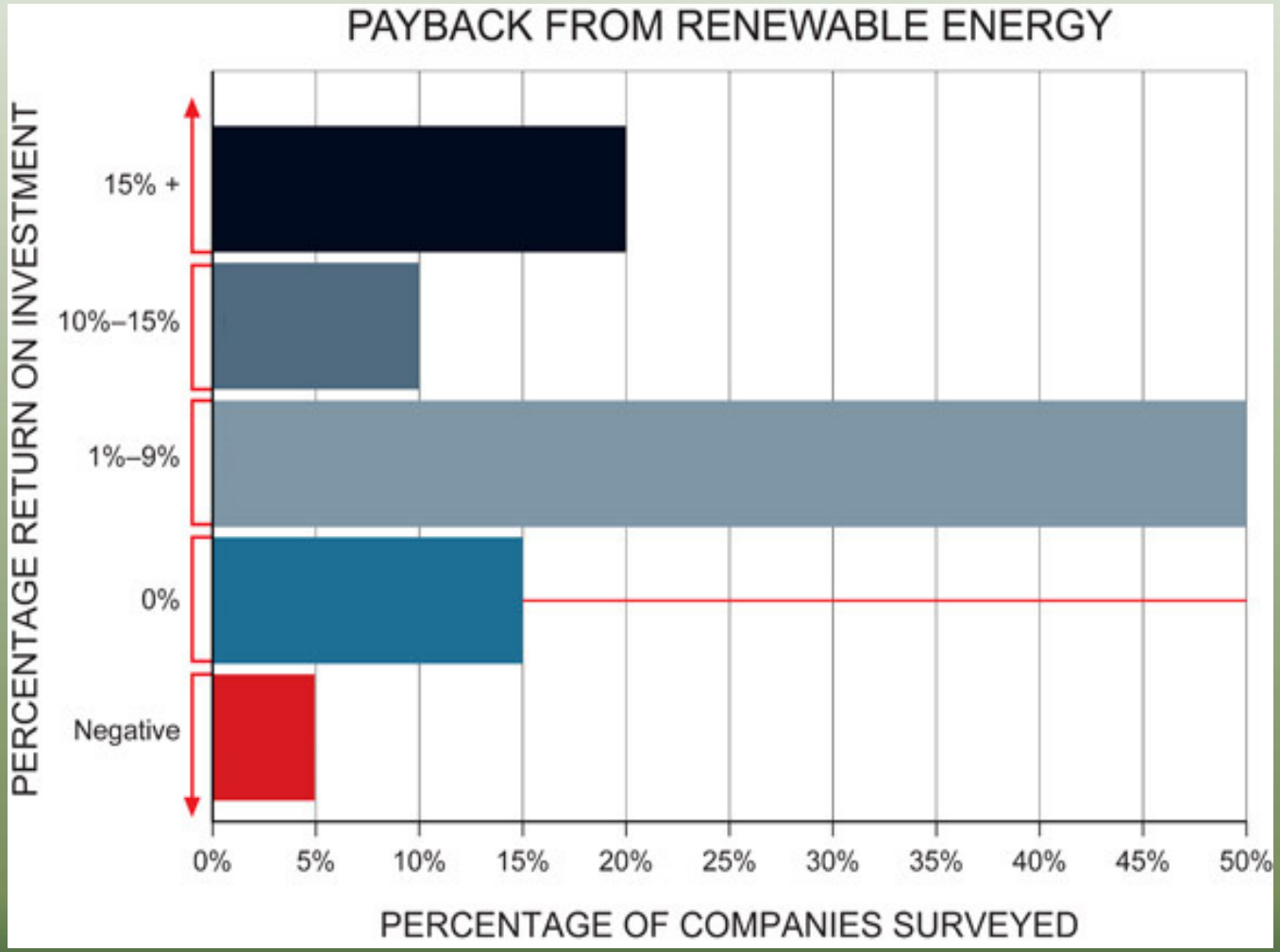
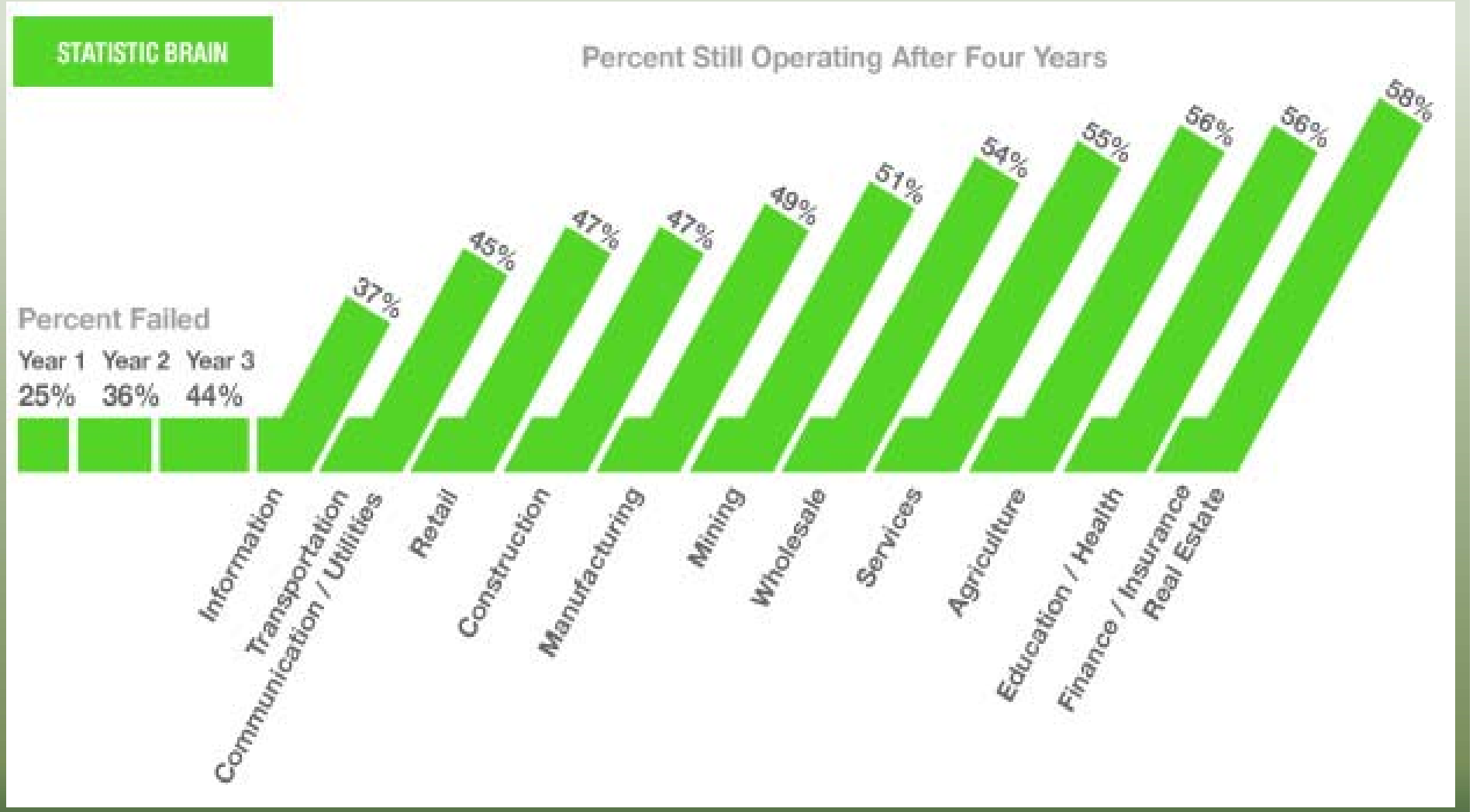
# Renewable Energy – Worthy Investment?

**"Happy returns? Few companies lose money embracing renewable energy, but they don't make much either, according to an Environmental Leader survey of nearly 400 companies that have adopted solar, wind, and other renewable power sources. Credit: Mark McKie"**




**Source: MIT Technology Review, 2011**

# Business Investment Statistics




**Source: University of Tennessee , July 26, 2012**

# MICHIGAN'S LEADING INDUSTRIES

- Manufacturing
- **Food &Agriculture** ($91.4B)
- Tourism
- Services
- Forestry & Lumber

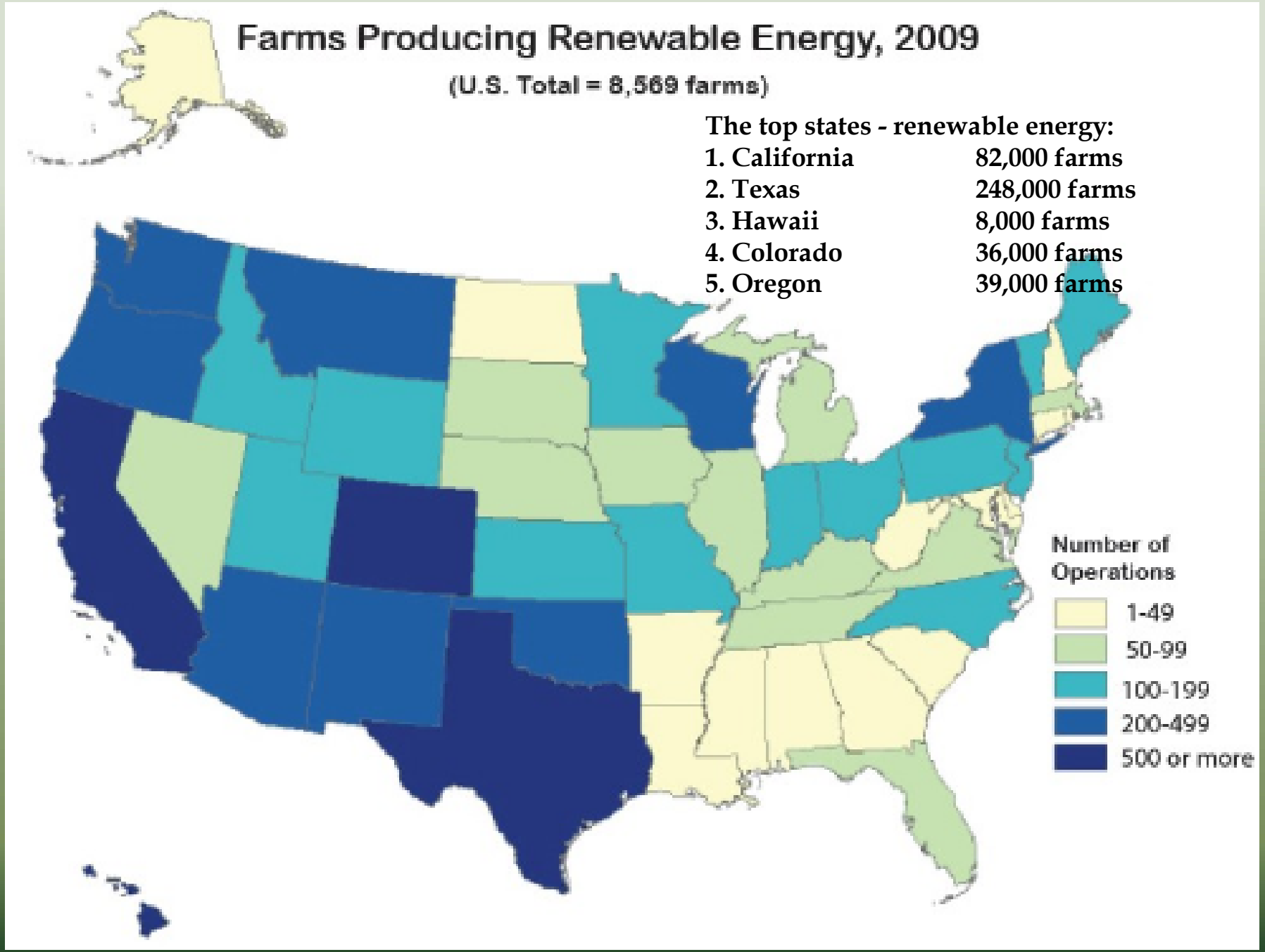
# Michigan's Agriculture Sector

When you talk about renewable energy, you can not ignore talking about the Ag. Sector and the vast potential that lies within it.

Renewable technologies that are commercially available today can all be economically implemented in farms, ranches and rural communities/businesses that make-up this sector. No other sector or industry can make that claim.

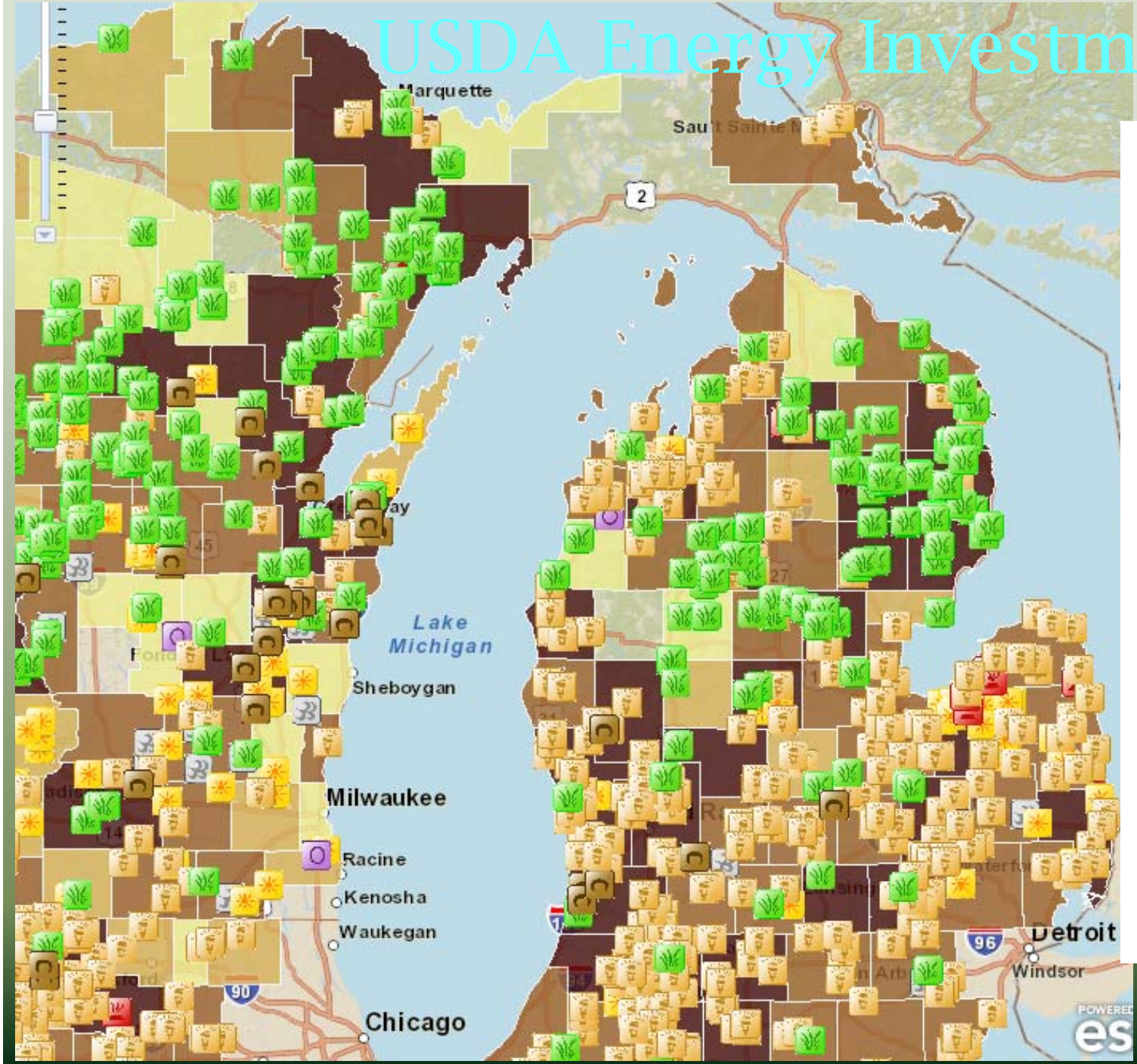
- Biofuels
- Biopower
- Bioproducts
- Geothermal heat pumps
- Geothermal direct use
- Hydroelectric power
- Passive solar heating
- Photovoltaic (solar cell) systems
- Solar hot water systems
- Wind energy"

# Renewable Energy for Michigan's Ag. Sector




Source: US Department of Agriculture.

# USDA Energy Investment Map

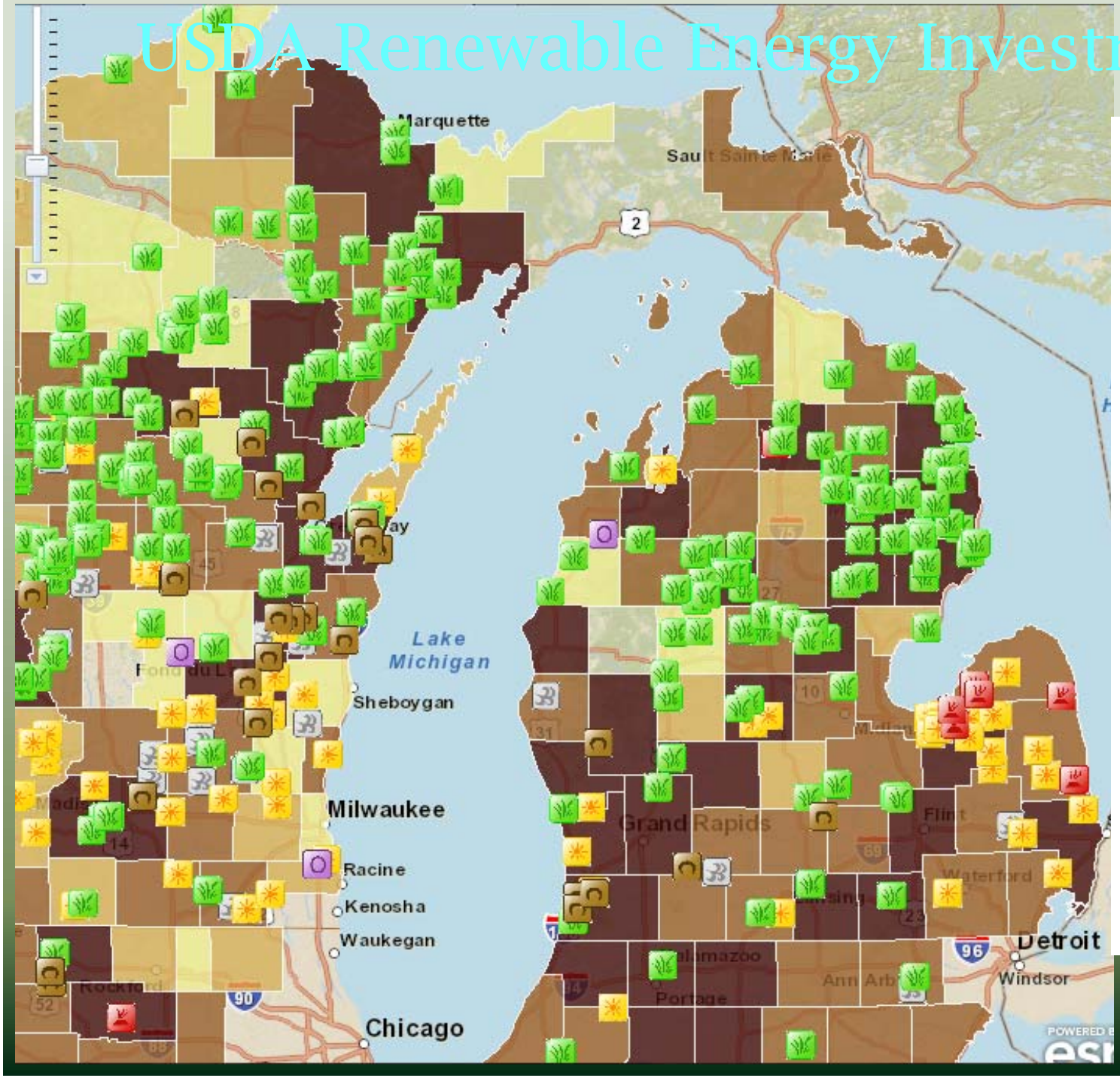



**Map Legend/Data Layers**

- Anaerobic
- Biomass
- Energy Efficiency
- Geothermal
- Hydroelectric
- Hydrogen
- Other
- Solar
- Wind
- Total Investments by County (in thousands of Dollars)
  - 1 - 35
  - 36 - 100
  - 101 - 500
  - > 500
- Investment Totals by Congressional District (in millions of Dollars)

Source: US Department of Agriculture

# USDA Renewable Energy Investment Map

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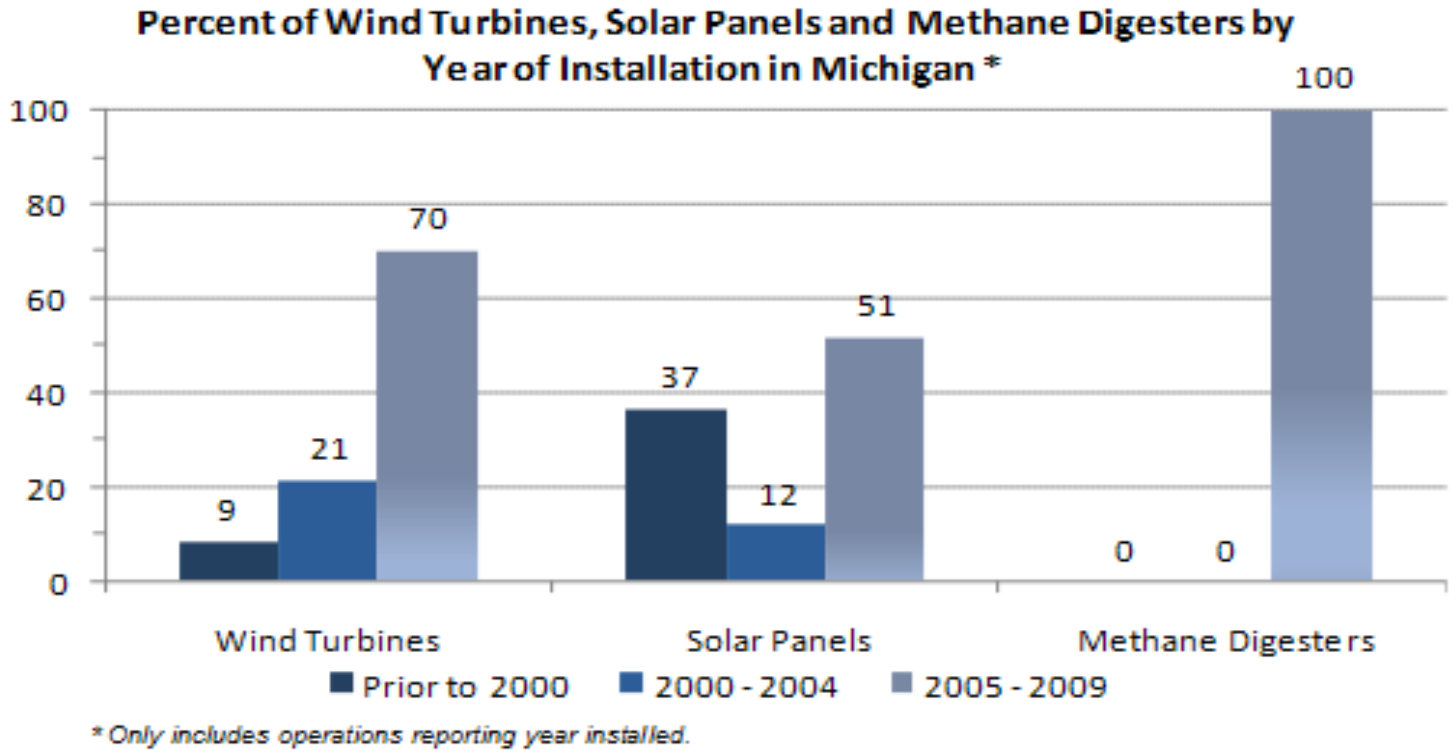
**Source: US Department of Agriculture**

# MI USDA Renewable Energy Investment

| Renewable Energy Type | Farms | Number | Installation Cost per Unit | Percent of installation cost funded by outside sources |
|---|---|---|---|---|
| Small Wind Turbines | 34 | 47 | $9,981 | (D) |
| Methane Digesters | 5 | 10 | $1,322,222 | (D) |
| Solar Panels | 75 | (NA) | $7,416 | 30 |




* Only includes operations reporting year installed.

www.agcensus.usda.gov

# Three-Phase Electrical Service Access

## *Restrictions to Renewable Energy*

The need for three-phase service usually occurs where large motors are present. Up to a motor size of about 5 horsepower (hp), single-phase service is usually adequate. Beyond 5 hp, the single-phase line may have trouble delivering the current needed to start the motor. Starting a motor can require six times as much current as it takes after it's running. A large motor start-up on a single-phase line can cause blinks and related problems for other customers on the line, as well as the farm in question. **Source: Consumers Energy - AgriCulture, Fall 2006**

Connection/access cost are very expensive and rewiring is often required.

# Three-Phase Electrical Service Advantage

The predominant electrical service to the Agriculture Sector is single-phase electrical service. An informal survey of electric utilities show about 98% of rural customers are on single phase service.

Three-phase machines and controls can be smaller, lighter in weight, and more efficient than comparable single-phase equipment. More power is supplied to them in the same period than can be supplied by a single-phase power circuit.

Only about 75 percent as much copper wire is required for distributing three-phase power as is required for distributing the same amount of single-phase power.

# Michigan Rural Electrical Service

## *Number 1 in the 20th Century*

**In 1927, first electric service to rural customers: Mason-Dansville power line is activated.**

Invest in rural energy and information infrastructure for the Agricultural Sector and Rural Businesses to be competitive in the 21th century with access to energy efficient and renewable energy options, energy sources (i.e. natural gas), and information technology.

# MICHIGAN FARM ENERGY PROGRAM

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