

The Opportunity of Wind

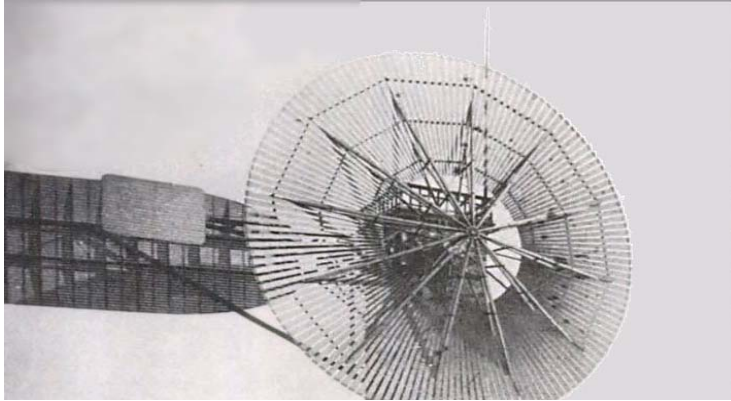


© Copyright 2012 GLWN™
A WIRE-Net Initiative 

Ed Weston, Director

© Copyright 2012 GLWN™
A WIRE-Net Initiative 

Wind Turbines: An American Invention



Charles Brush **Cleveland, OH**
12 Kilowatts **1888**



NASA **Oahu, HI**
3.2 Megawatts **1980**



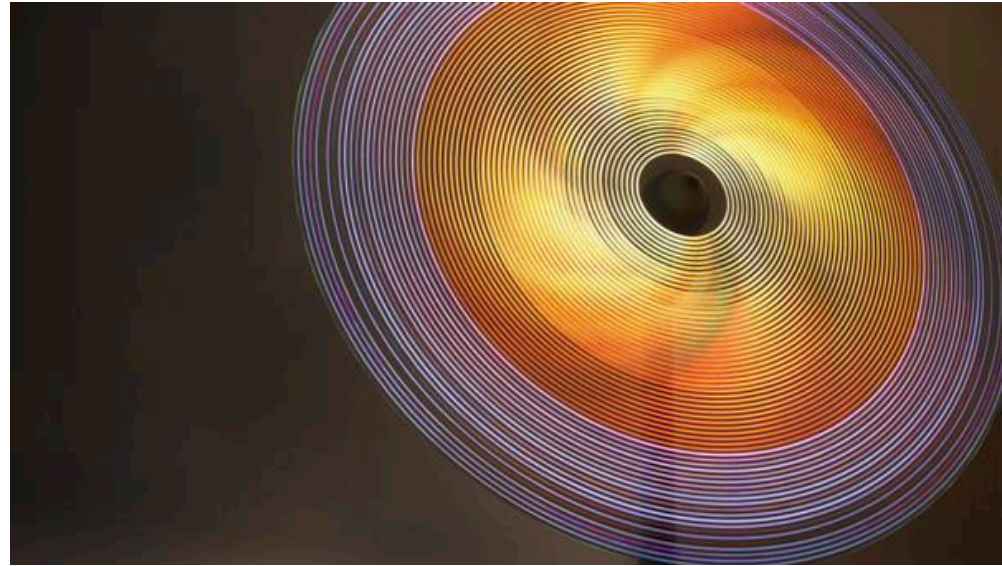
GLWN.....*Call us Global*

- ◆ **Membership-based, Non-Profit**
- ◆ **International Supply Chain Advisory Group**
- ◆ **1500 companies across 35 States + Canada**
- ◆ **Supplier Headhunters for the Wind Industry**
- ◆ ***Resource* for Suppliers and Service Providers**
- ◆ **Mission:**
 - Localize New Business Opportunities***
 - Increase the Domestic Content of North America's Wind Turbines***

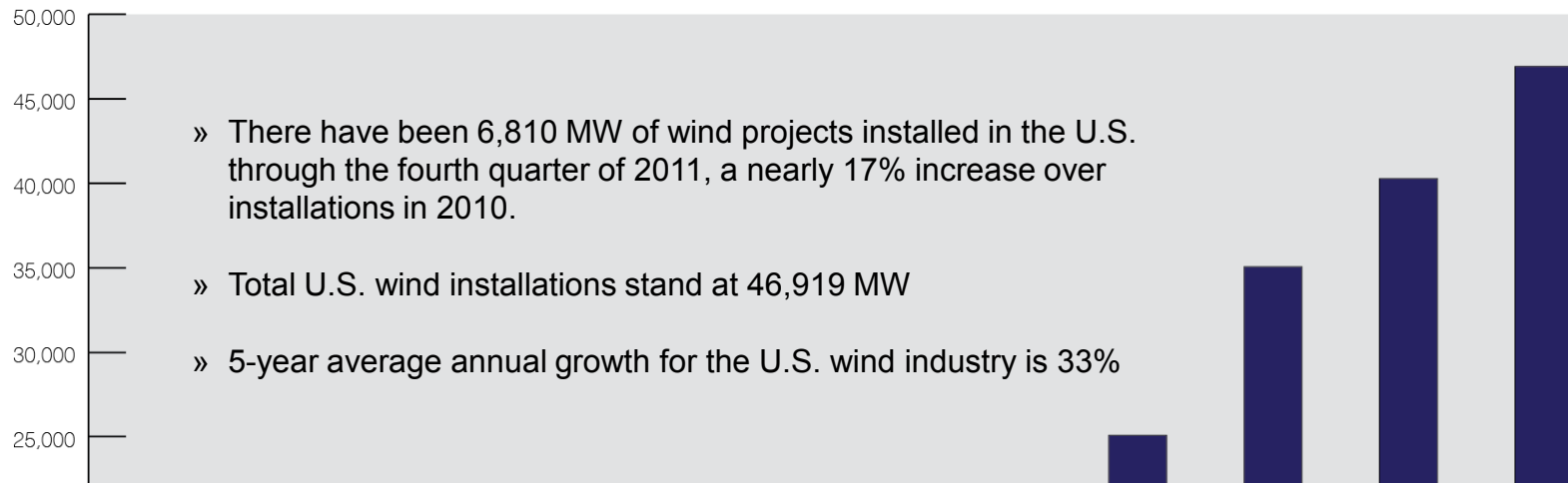




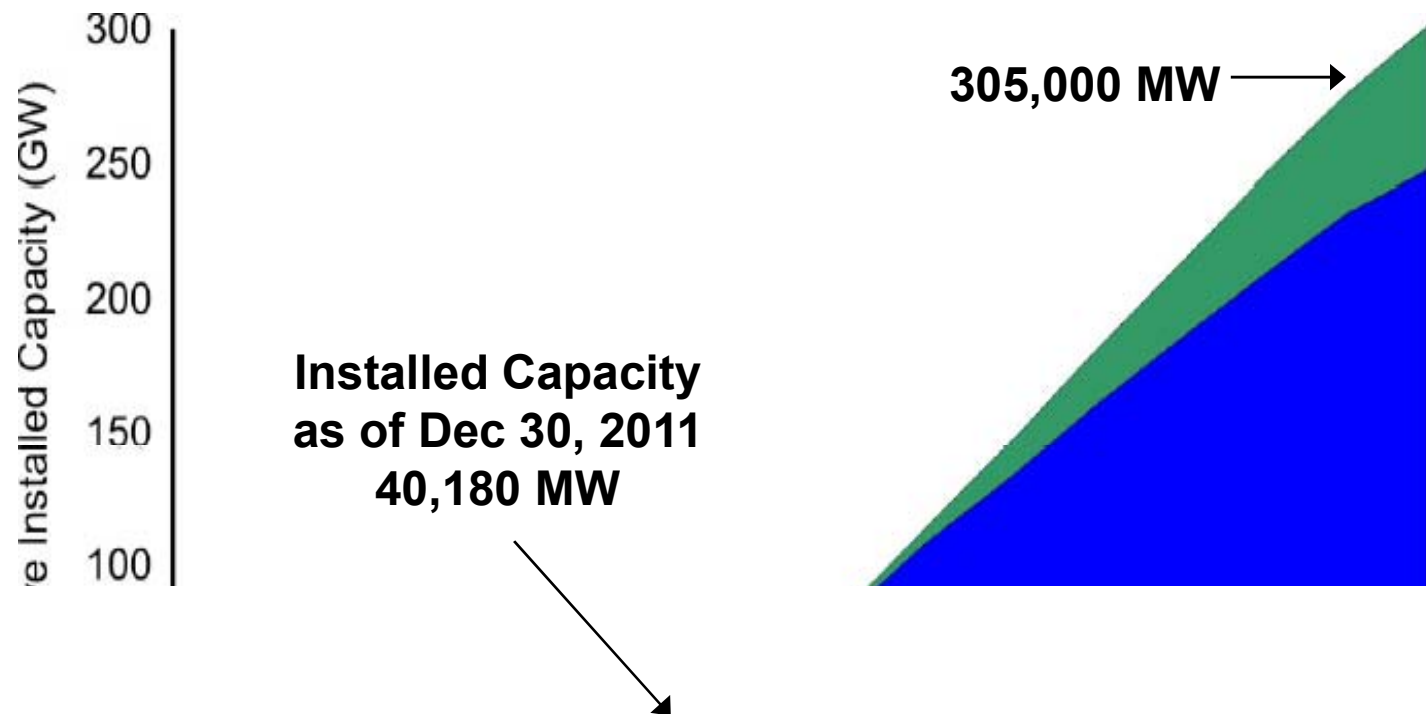
The Market



U.S. Annual and Cumulative Wind Power Capacity



U.S. 20% Wind Scenario



Source: US DOE: 20% by 2030

© Copyright 2012 GLWN™
A WIRE-Net Initiative





The Players



NA Mfgs Operating Today

Wind Turbine OEMs

- ◆ General Electric
- ◆ Gamesa
- ◆ Clipper Windpower
- ◆ Acciona
- ◆ DeWind
- ◆ Northern Power
- ◆ Vestas
- ◆ Nordex
- ◆ Siemens



What's Exciting?

New Assembly Plants

Siemens,

Kansas, 600 turbines/yr

Vestas,

Colorado, 1,400 turbines/yr

Nordex

Arkansas, 300 turbines/yr

Aeronautica

New Hampshire, 200/ yr

Alstom

Texas, 300 turbines/yr



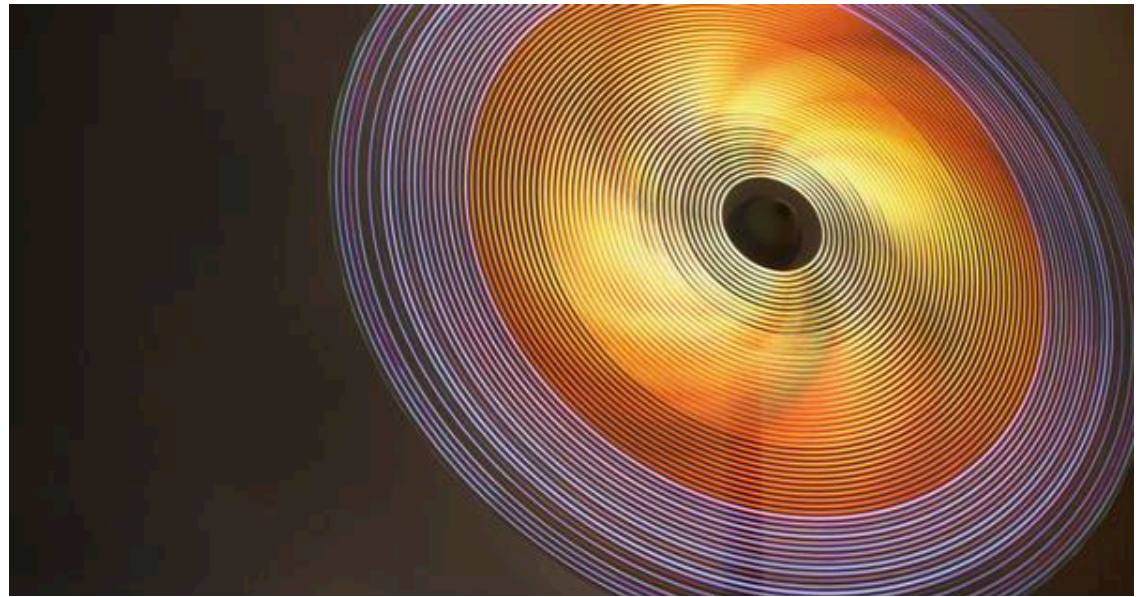
WTG OEMs on the Way

- ◆ **Kenersys (Germany)**
- ◆ **REpower (Germany)**
- ◆ **Areva (Germany)**
- ◆ **Hyundai (Korea)**
- ◆ **Sinovel (China)**
- ◆ **Goldwind (China)**
- ◆ **Mingyang (China)**
- ◆ **HZ (China)**





The Parts



Turbine Components

There are over 8000 components in a turbine, including:

Towers:

- ◆ Towers
- ◆ Ladders
- ◆ Lifts

Rotor:

- ◆ Hub
- ◆ Nose Cone
- ◆ Blades
- ◆ - Composites
- ◆ - Blade Core
- ◆ Pitch Mechanisms
- ◆ Drives
- ◆ Brakes
- ◆ Rotary Union

Nacelle:

- Nacelle Cover
- Nacelle Base
- Heat exchanger
- Controllers
- Generator
- Power Electronics
- Lubricants
- Filtration
- Insulation
- Gearbox
- Pump
- Drivetrain
- Ceramics
- Shaft

Foundation:

- Rebar
- Concrete
- Casings

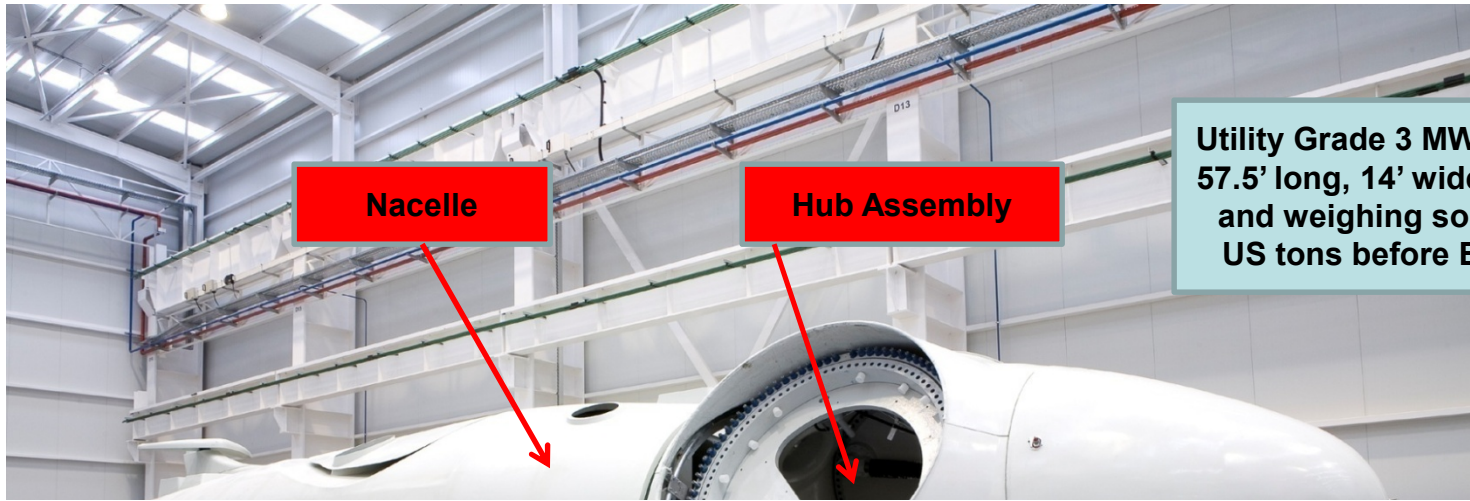
Other:

- Transformers
- Bolts/Fasteners
- Wire
- Paints and Coatings
- Lighting
- Lightning Protection
- Steel Working/Machining
- Communication Devices
- Control and Condition Monitoring Equip.
- Electrical Interface and Connections
- Batteries
- Bearings
- Brakes

Courtesy - AWEA



Machine Head / Nacelle



Nacelle

Hub Assembly

**Utility Grade 3 MW Nacelle
57.5' long, 14' wide, 13' tall
and weighing some 154
US tons before Blades.**

Shell

Spinner

Credit: Acciona



Main Shaft



Blades



Credit: US Dept of Energy "20%
Wind Energy by 2030" Report



Towers



Credit, DMI.

© Copyright 2012 GLWN™
A WIRE-Net Initiative



Wind Farm Construction



Operations and Maintenance





The Benefit

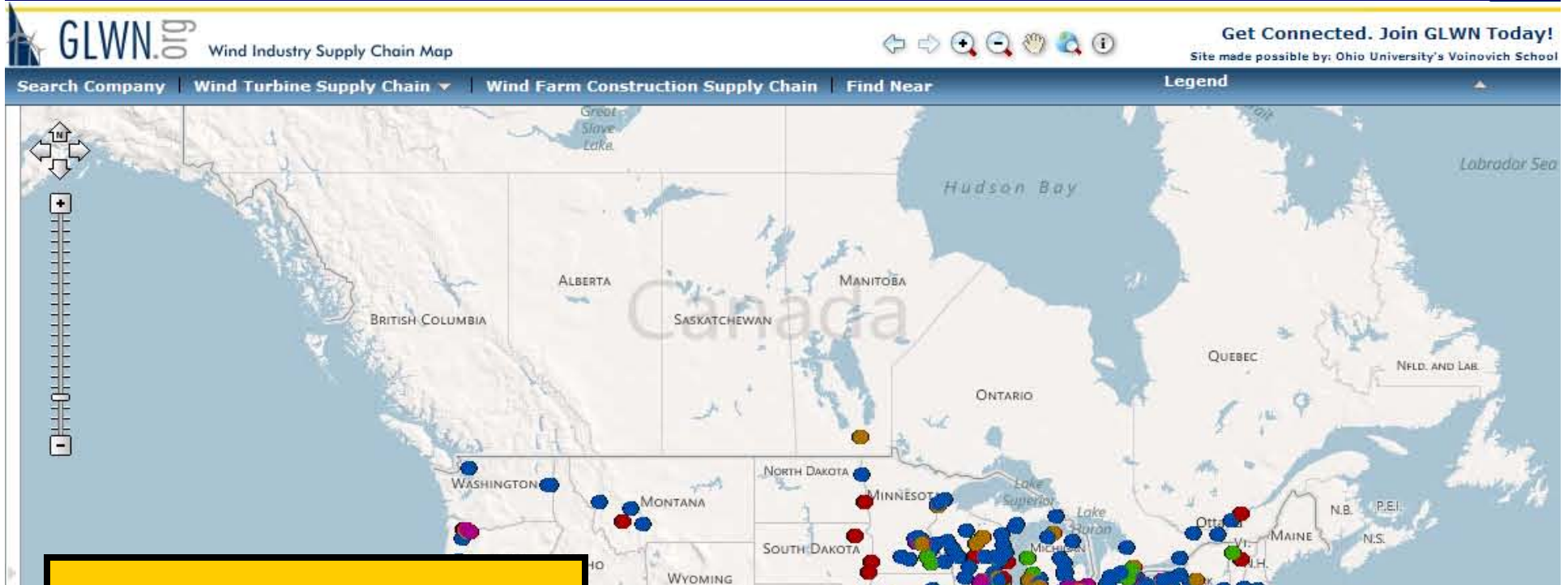


How much is 10 Gigawatt\$?

- ◆ 10,000 MW or 10,000,000 kW **2.5 million homes**
- ◆ OE Parts for 5,500 Turbines **\$7,000,000,000**
 - New Towers **\$1,650,000,000**
 - Gears, Shafts **\$ 235,000,000**
 - Fabricated Frames **\$ 106,000,000**
 - Roll-threaded studs **\$ 34,000,000**
- ◆ Balance of Plant
 - Cubic Yds Concrete **980,000**
 - Pounds of Rebar **190,000,000**



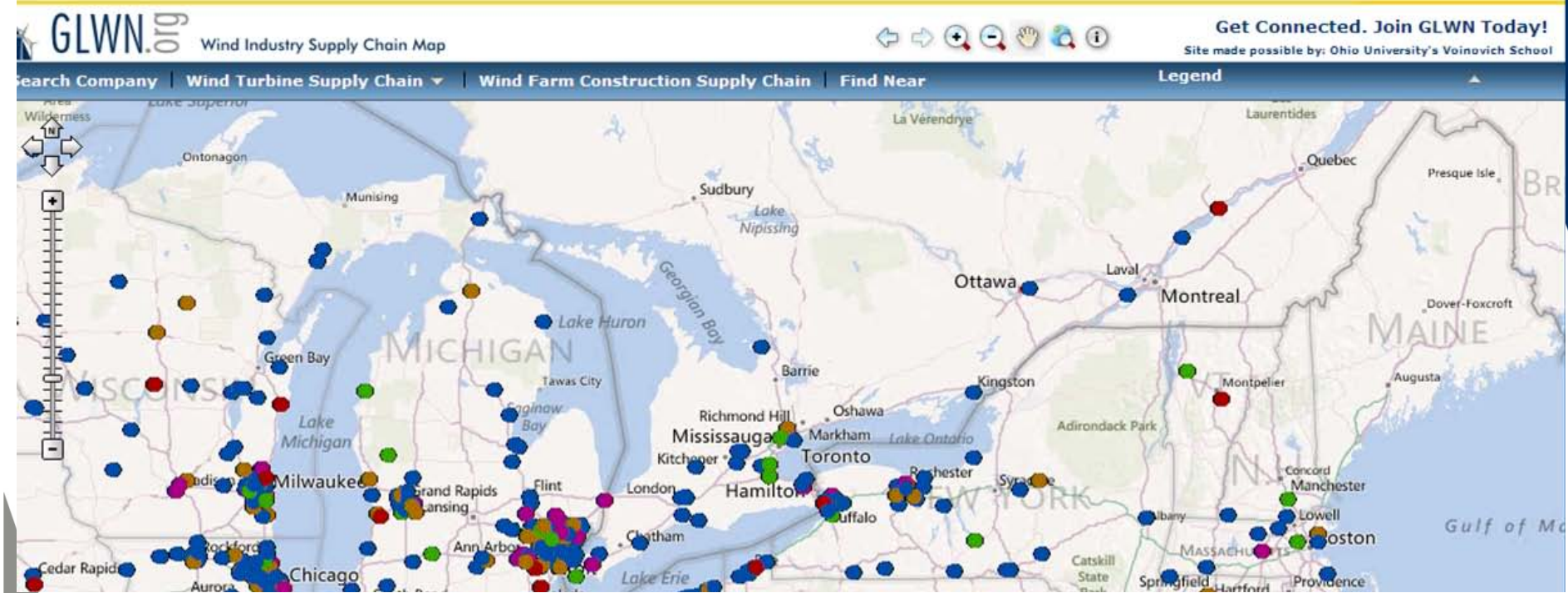
GLWN Wind Supply Chain



**Over 1500 North
American Manufacturers
and Service Providers
listed with GLWN**

497 "ACTIVE" Suppliers





Sustained Growth and US Jobs : Depend on National Policies

Energy:

Extending the Grid
Incenting
Renewables, too

Manufacturing:

Offsetting Subsidized
Competitors





Thank You
www.glwn.org