

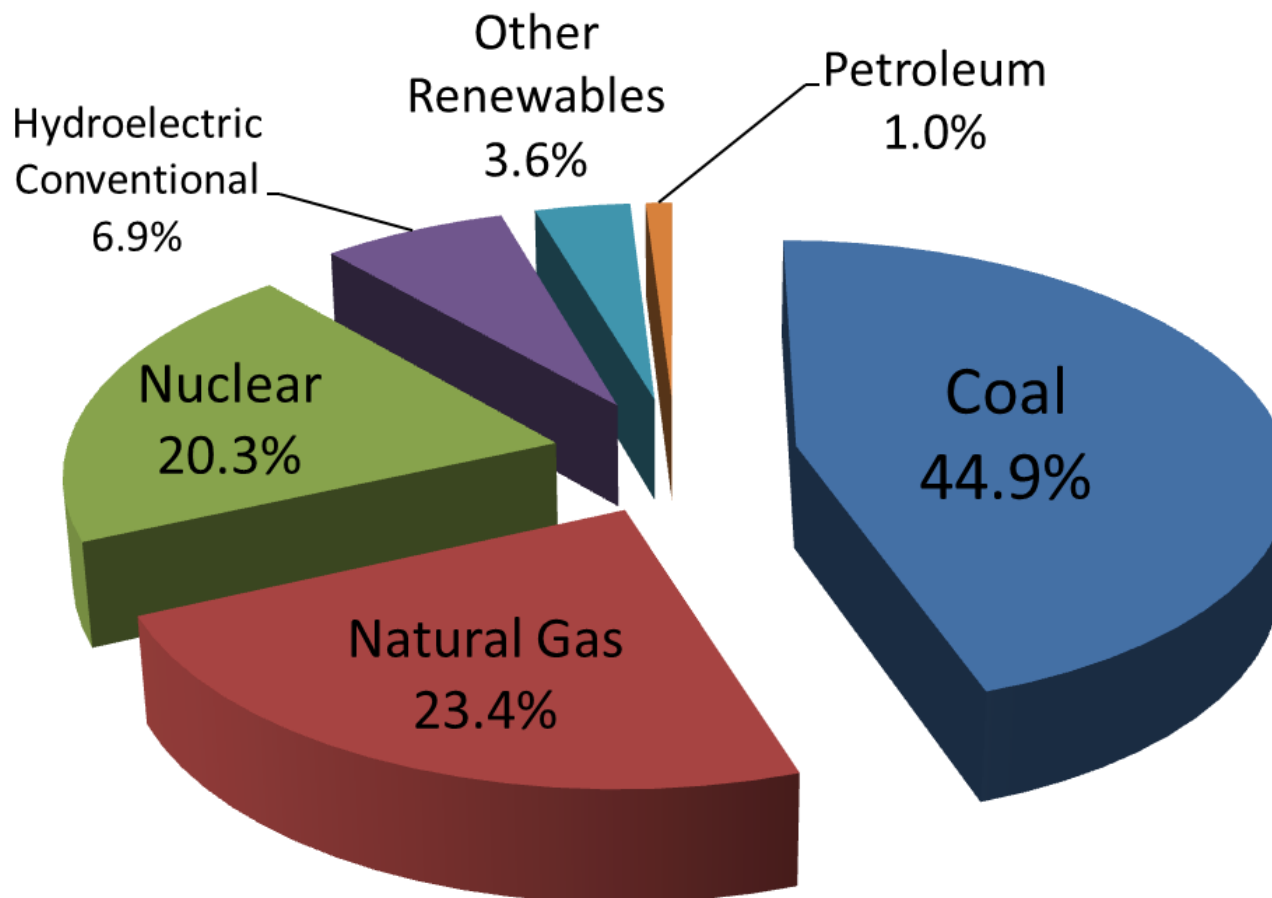
# Powering Ohio's Economy with Offshore Wind



**First in the Water, First in Jobs**

# US Electric Power Sources

## 2009 U.S. Electricity Generation by Source





Regional

Public/Private

Private Investment



Lake Erie Energy Development Corporation

Jobs

Offshore Epicenter

20 MW Pilot Project

Turbine Supplier

"Freshwater Wind"

Research Partners

Strategic Advisors



CASE  
CASE WESTERN RESERVE UNIVERSITY



Bowling Green State University



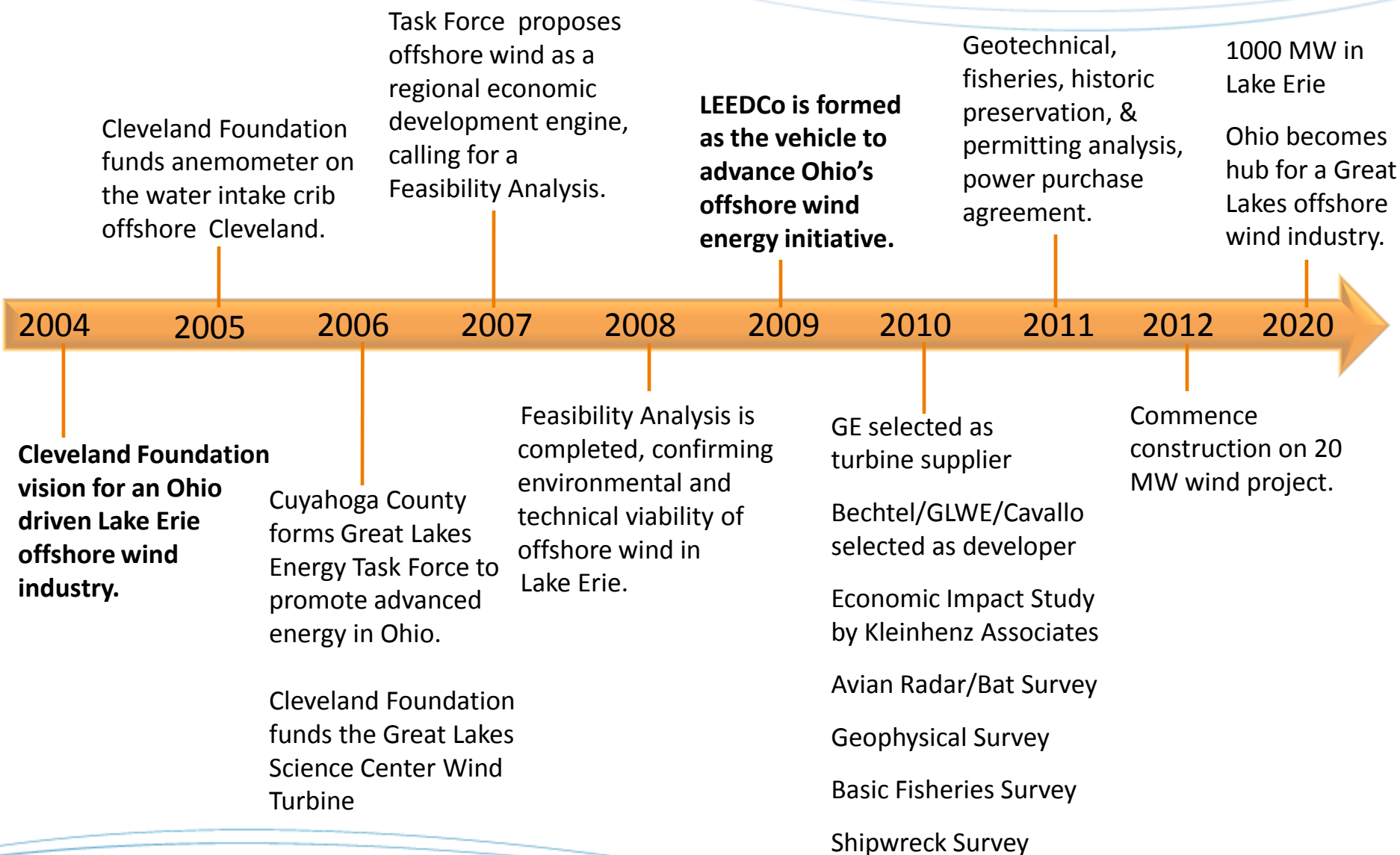
Cleveland State University



GREAT LAKES  
ENERGY DEVELOPMENT  
TASK FORCE  
A Cuyahoga County Initiative



# Timeline

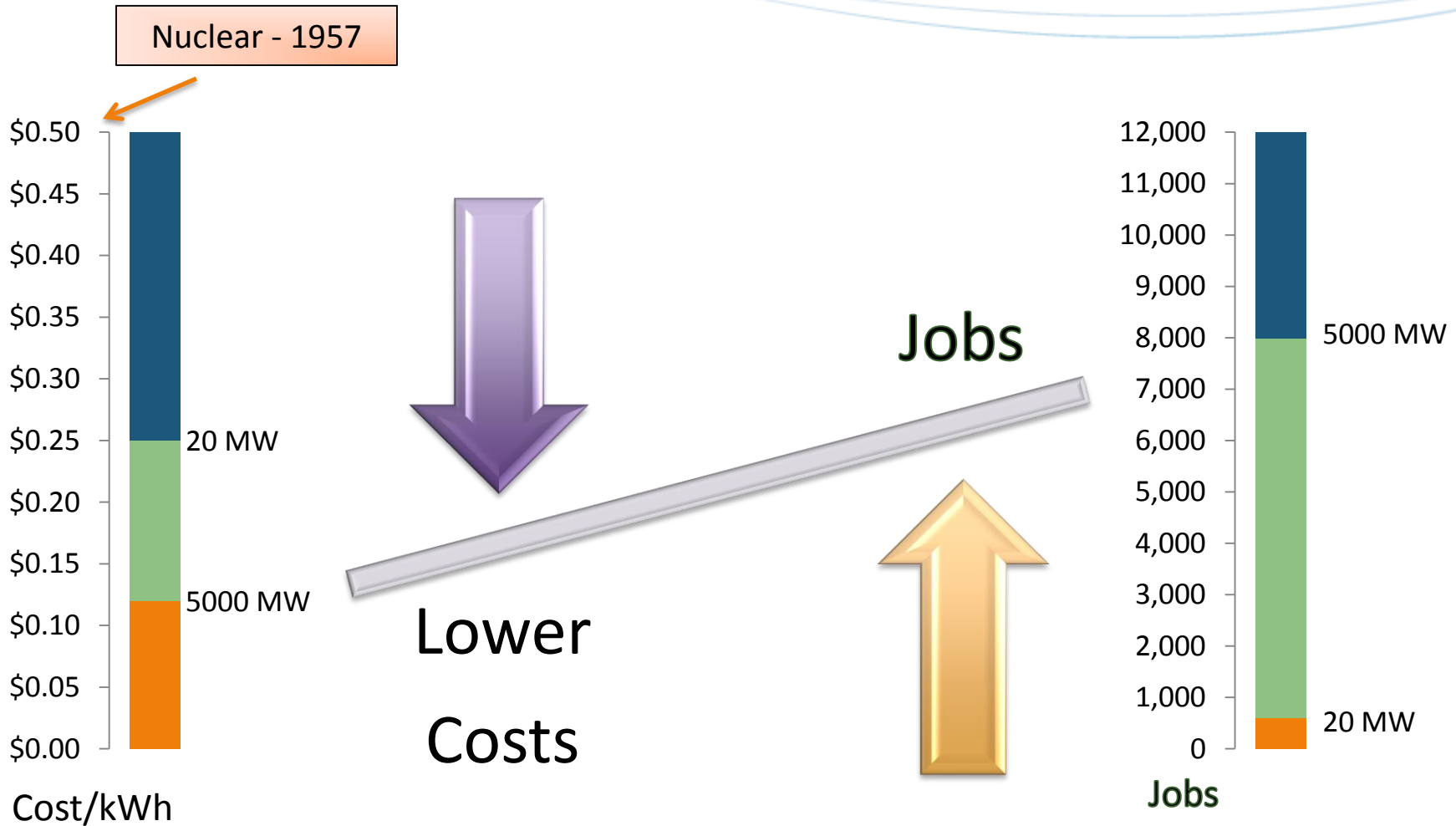


**Beyond generating power, LEEDCo seeks to maximize Ohio's offshore wind energy potential by capturing the emerging Great Lakes industry – dubbing Ohio as the epicenter.**

## **Vision:**

2013 – 20 MW  
2020 – 1000 MW  
2030 – 5000 MW

# Mission



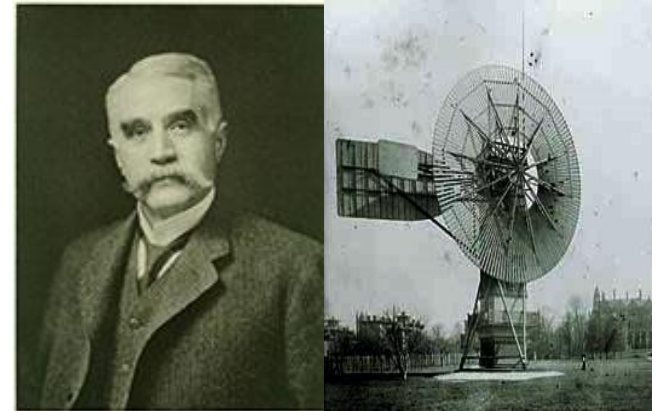
Lake Erie 68,000 MW Capacity  
Great Lakes 250,000 MW



# Ohio & Wind Energy History

- Charles F. Brush

- Born in Euclid, Ohio
- 1887 - world's first wind-powered electric generator in Cleveland.
- 144 blades, 50-ft. Rotor = 12 kilowatts
- Brush's company eventually became GE.



- NASA Glenn Research Center



- Located in Brook Park, Ohio
- Led U.S. Wind Energy Program between 1974-1980
- Turbine development paved the way today
- Program eventually divested.

**Question:** "Where did Ohio's turbines go?"



3.2 MW turbine in Hawaii

# Learning Curve vs. Economic Urgency

## Europe:

- 3,185 MW in operation
- \$100 BB planned
- Manufacturing is growing
- Ports revitalized/Jobs created



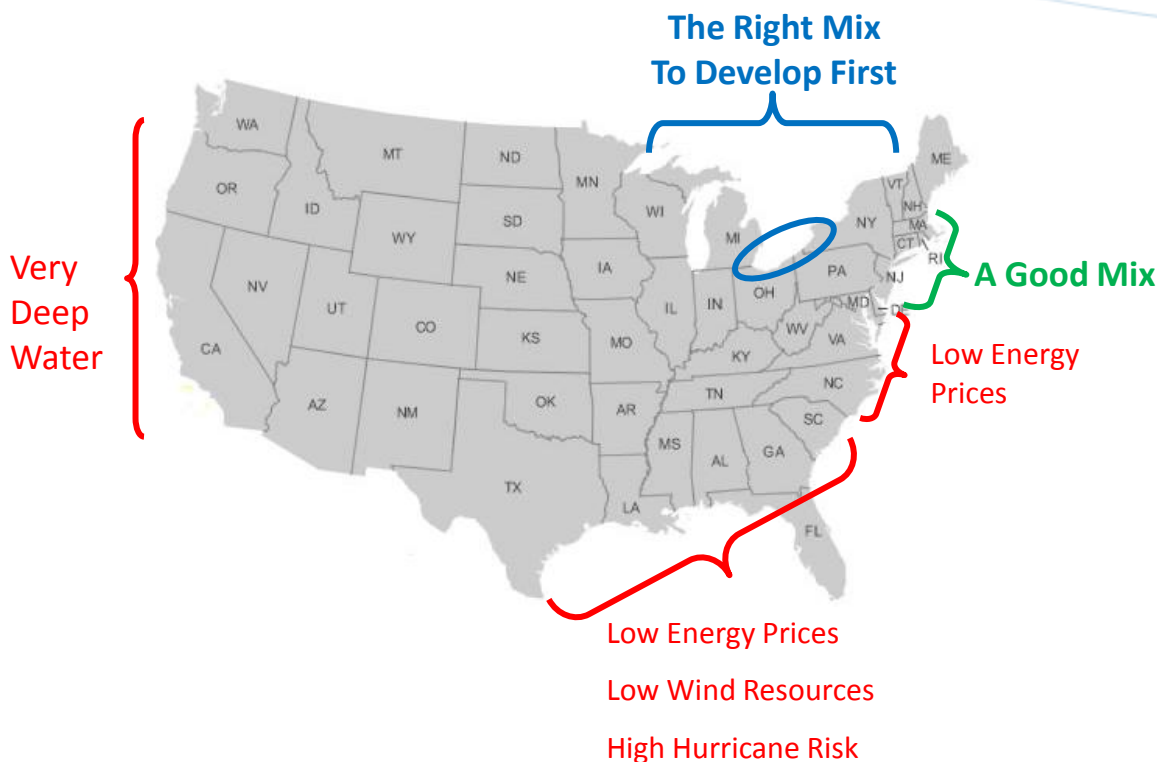
## Asia:

- \$30 BB Investment in Wind
- Using European experience & dramatically driving costs down





# Competitive Landscape



## Select Great Lakes Projects\*

MI – Scandia Wind – 150 MW  
NY – NYPA – 100-500 MW  
WI – Aquilo Wind – 50 MW  
IL – Evanston – 200 MW  
OH – LEEDCo/Freshwater Wind – 20 MW  
OH – LEEDCo/Freshwater Wind – 1,000 MW

## Select East Coast Projects\*

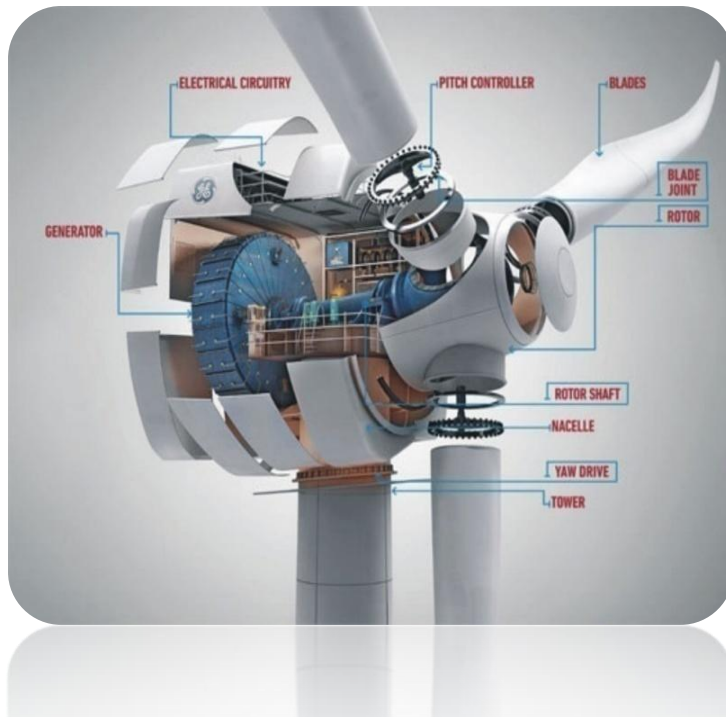
MA – Hull - 15 MW  
MA – Cape Wind – 468 MW  
RI – Deepwater Wind/Block Island – 30 MW  
RI – Deepwater Wind/RI Sound – 385 MW  
NY – Con Ed/LIPA – 350/700 MW  
NJ – Fishermens Energy Atlantic City – 20 MW  
NJ – Fishermens Energy Federal Waters – 350 MW  
NJ – Garden State Offshore Energy – 350 MW  
NJ – NRG Bluewater Wind – 350 MW  
DE – NRG Bluewater Wind – 300-450 MW  
VA – APEX Wind – 1,200 MW  
VA – Seawind Renewable Energy – 1,000 MW

## *What does this mean for Ohio?*

- *Sputnik moment...*
- *Ready or not: Offshore wind industry is coming*
- *Urgency: Race is on to capture economic benefits*
- *Utilize momentum to be first in the water*

# Ohio Currently...

- Ohio a leader onshore
- 7,500 wind manufacturing jobs
- World Class Manufacturing Strengths



**TIMKEN**

**Lubrizol**

**EATON**  
Powering Business Worldwide

**LINCOLN**  
**ELECTRIC**

**AVTRON**

**KELLY AEROSPACE**

**Parker**

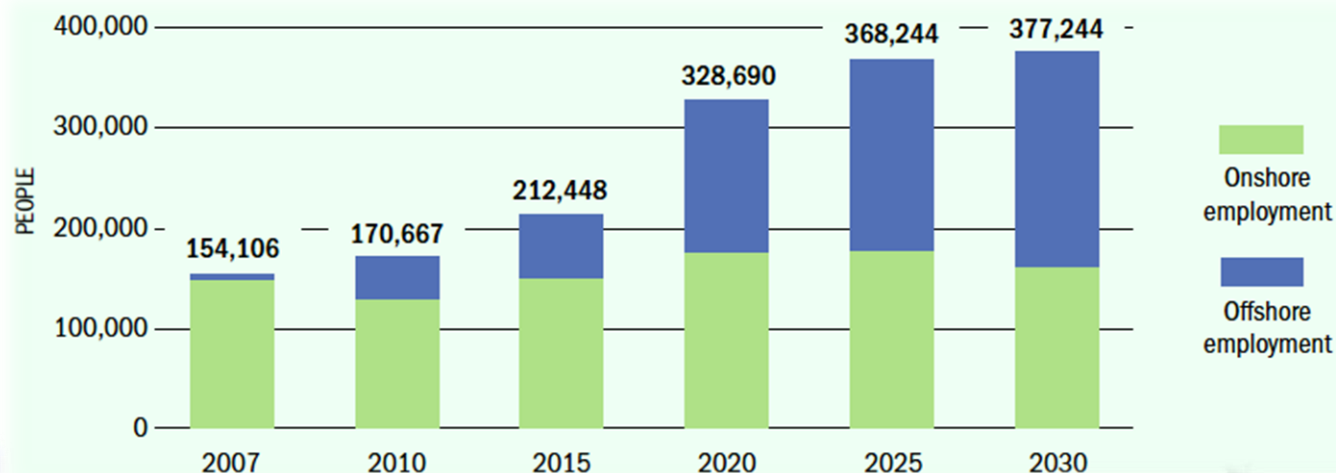
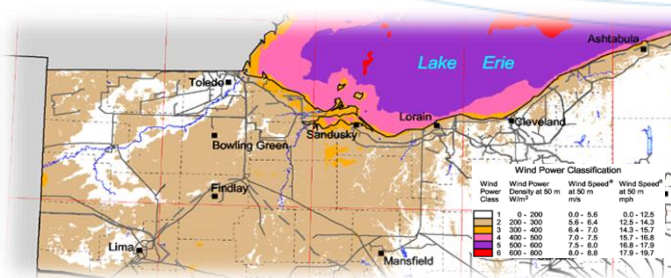
**Great Lakes Construction, Inc.**  
A member of GHT representing quality wind construction in your community

**Rockwell Automation**

**EBNERFAB**

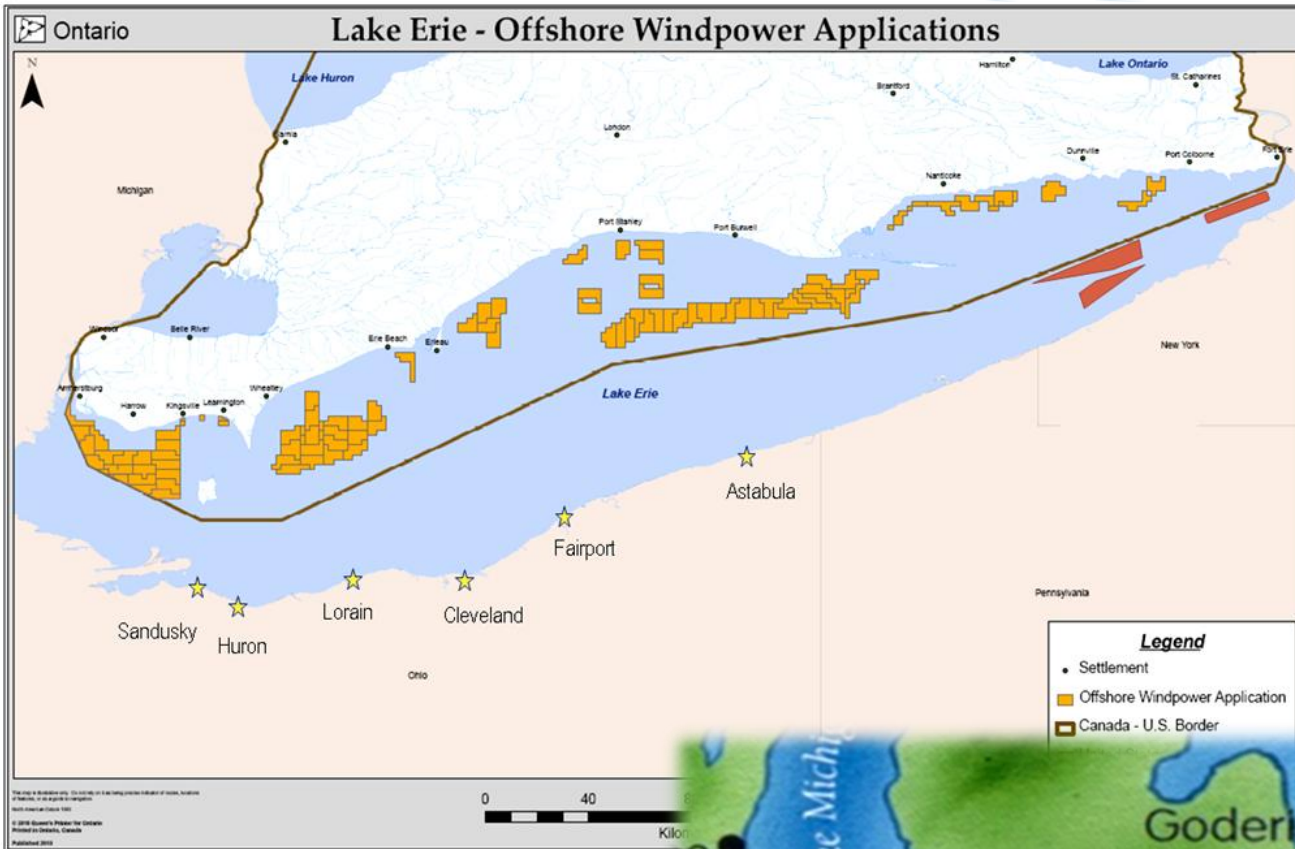
**kokosing**  
CONSTRUCTION COMPANY, INC.

# ...But There's More in Offshore





# Ohio Ports to Dominate



## Lake Erie Activity

- Canada - 4,500 MW
  - 1500 Turbines
- New York - 500 MW
  - 150 Turbines
- PA - 1000 MW
  - 300 Turbines



- 50% Canadian content = Ohio component/job exports
- LEEDCo as a model

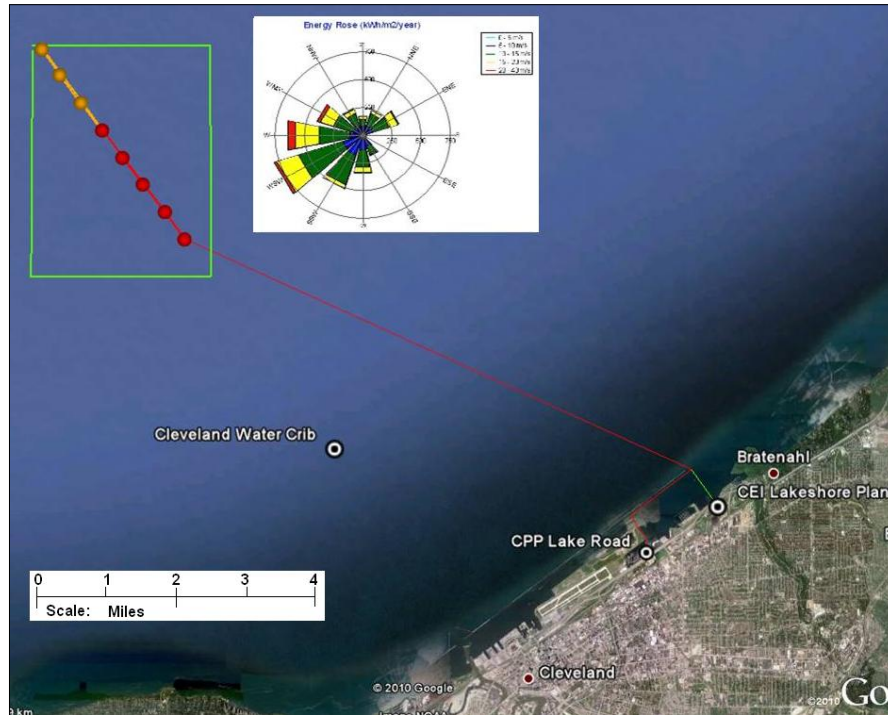
# Scale of Deployment

- Revitalize Ohio's Ports/Shipyards
- Initial fabrication & staging to be in Cleveland or Lorain.
- Commercial scale projects could utilize most ports.





# Initial Project:



- ⚓ Iconic
- ⚓ 7 Miles offshore
- ⚓ 5-8 turbines producing 20-30 MW

- Big enough to capture attention
- Small enough to do fast and position Ohio as first
- Small enough to limit rate impact
- Target dates:
  - ✓ Begin 2012
  - ✓ COD late 2013



# 20 MW Catalyst...

Industry to coalesce where 1<sup>st</sup> projects are built.

## ✚ Claim stake

- Demonstrate
- Capture new investment
- Supply Chain



## ✚ Jobs

- Manufacturing, construction, installation, maintenance, research, and innovation

## ✚ Infrastructure

- Ports, Shipbuilding, Grid-System



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