

Proposed Evanston Offshore Wind Farm

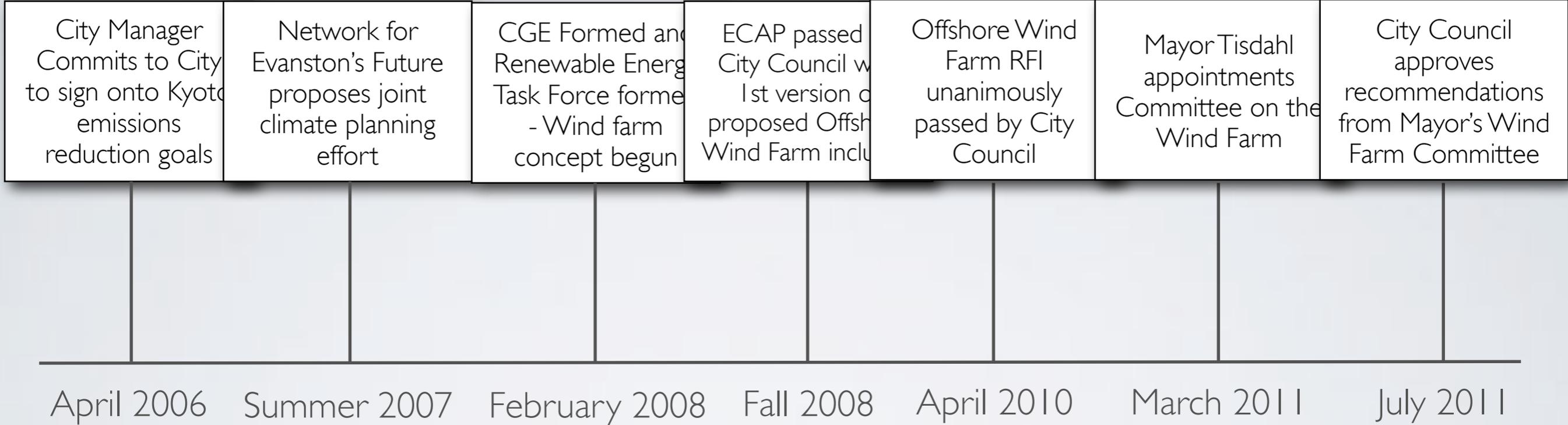
August 1, 2011



Off Shore Wind Farm

FAQ Document available from <http://www.greenerevanston.org/> at the Renewable Energy Task Force tab





Wind Farm Timeline



Oil





Coal





Thankfully, no current incidents to report with nuclear power



Conventional Power





“A major wind spill occurred today at the offshore wind farm... no injuries were reported.”



Wind



- (40) 5MW Wind Turbines
- Financed by alternative energy company
- Power agreement w/City of Evanston and/or NU and others or via Com Ed
- Enough power for approx. 59,000 households (based on 18 mph wind) - Evanston has 30,000 households
- CO2 abatement per 40 turbine array = 490,700 MTCO2E
- Would meet multiples of the CO2 abatement goal of the Evanston Climate Action Plan ($\pm 336\%$)

Wind Farm Overview

How much power is in wind?

$$\text{Power} = \frac{1}{2} d \times A \times v^3$$

d = air density

A = swept area

v = wind speed

For standard turbines;

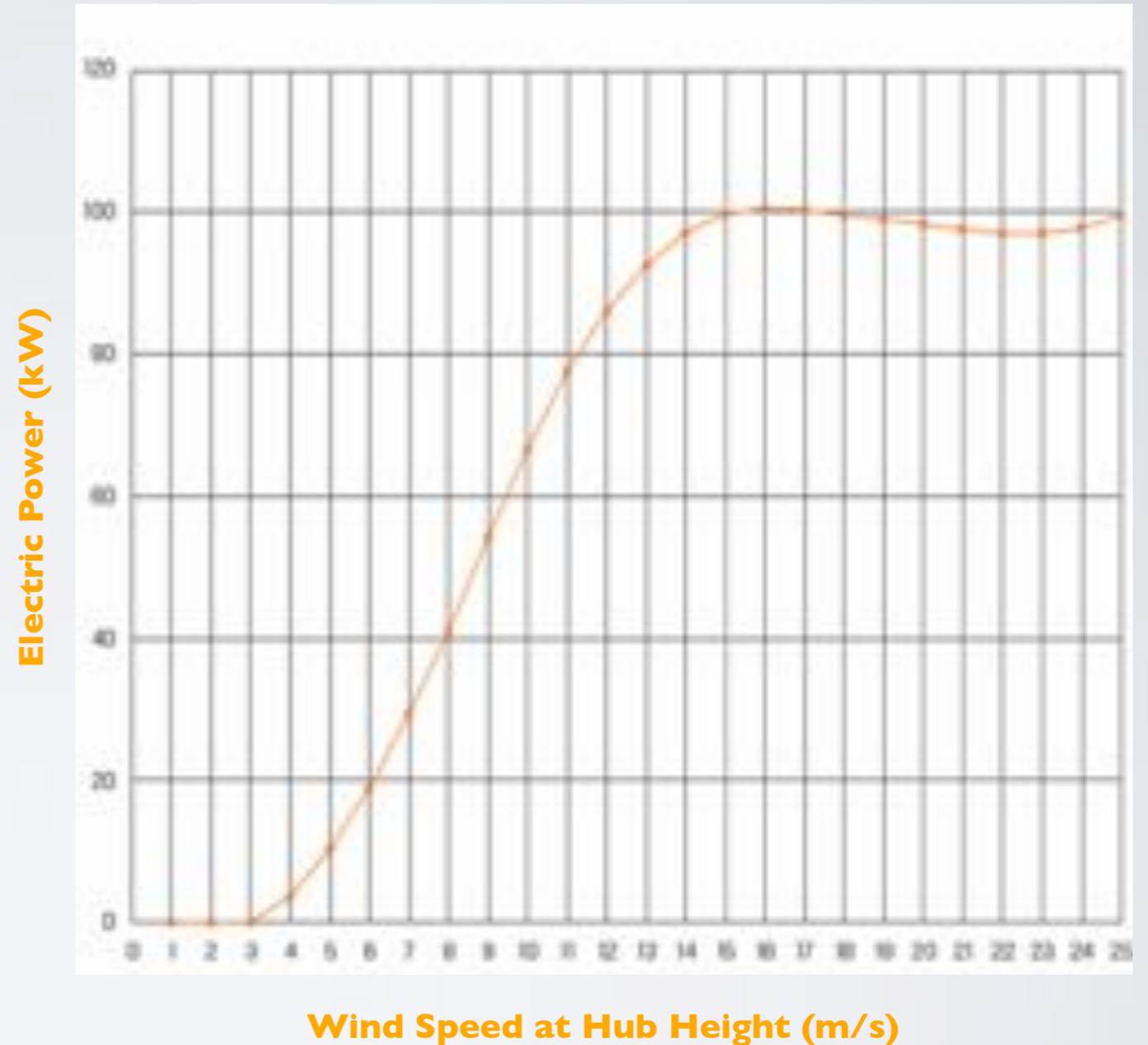
$$A = \pi r^2, \text{ so}$$

$$\text{Power} = \frac{1}{2} d \times \pi r^2 \times v^3$$

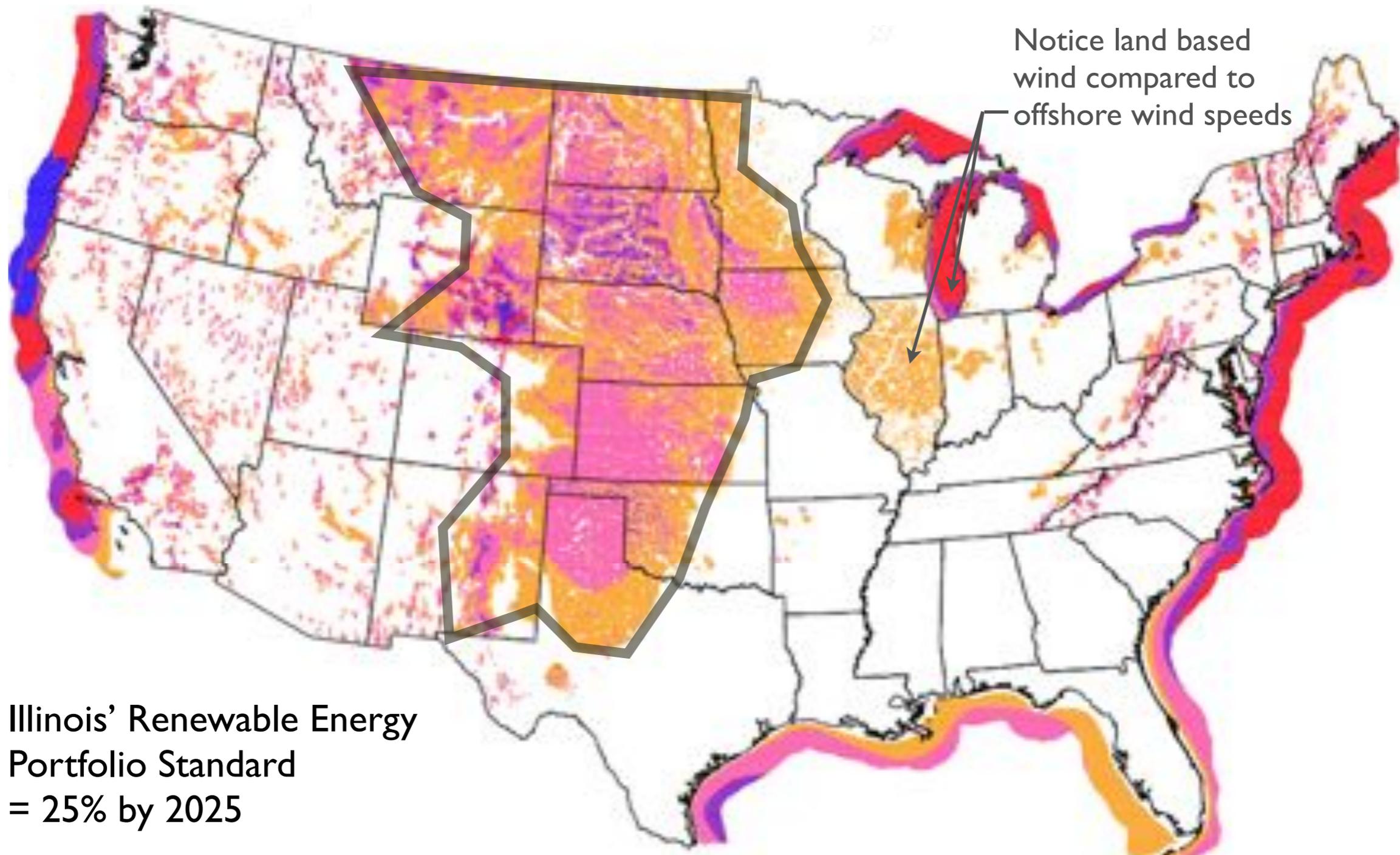
2x blade radius = 4x power

2x wind speed = 8x power!!

Turbine Power Curve



Wind Power Physics



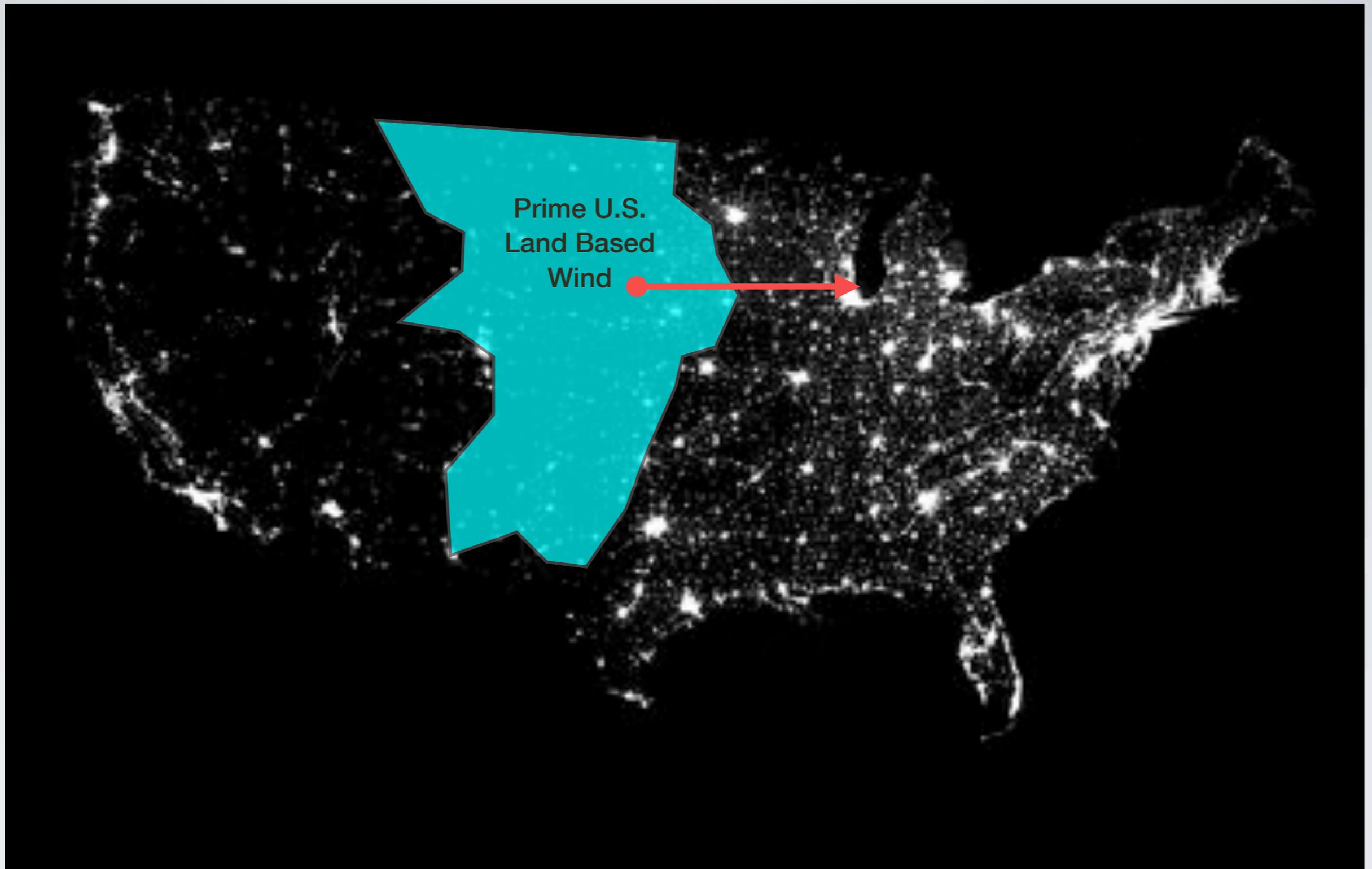
Notice land based wind compared to offshore wind speeds

Illinois' Renewable Energy Portfolio Standard = 25% by 2025

Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed [*] at 50 m m/s	Wind Speed [*] at 50 m mph
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

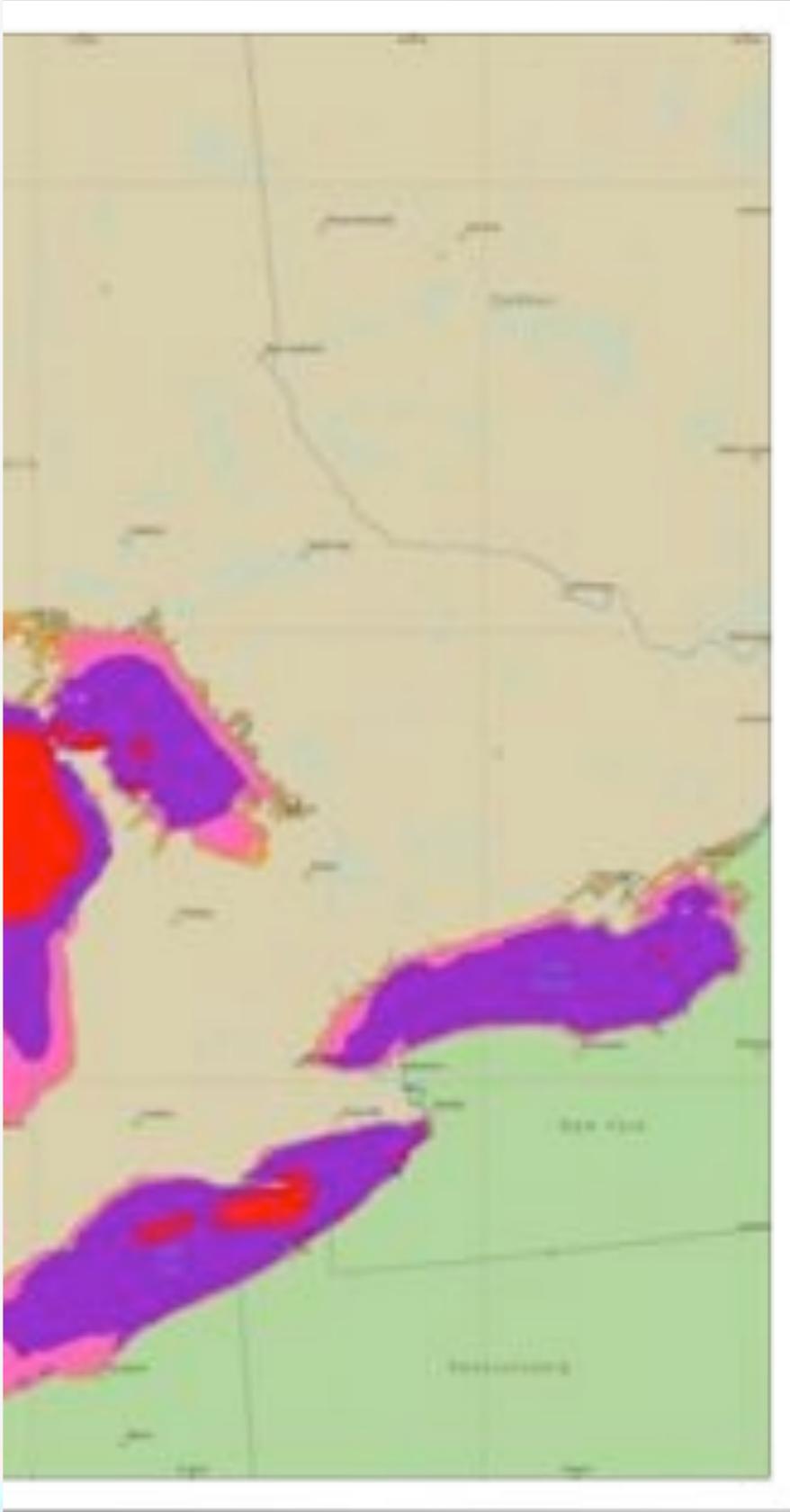
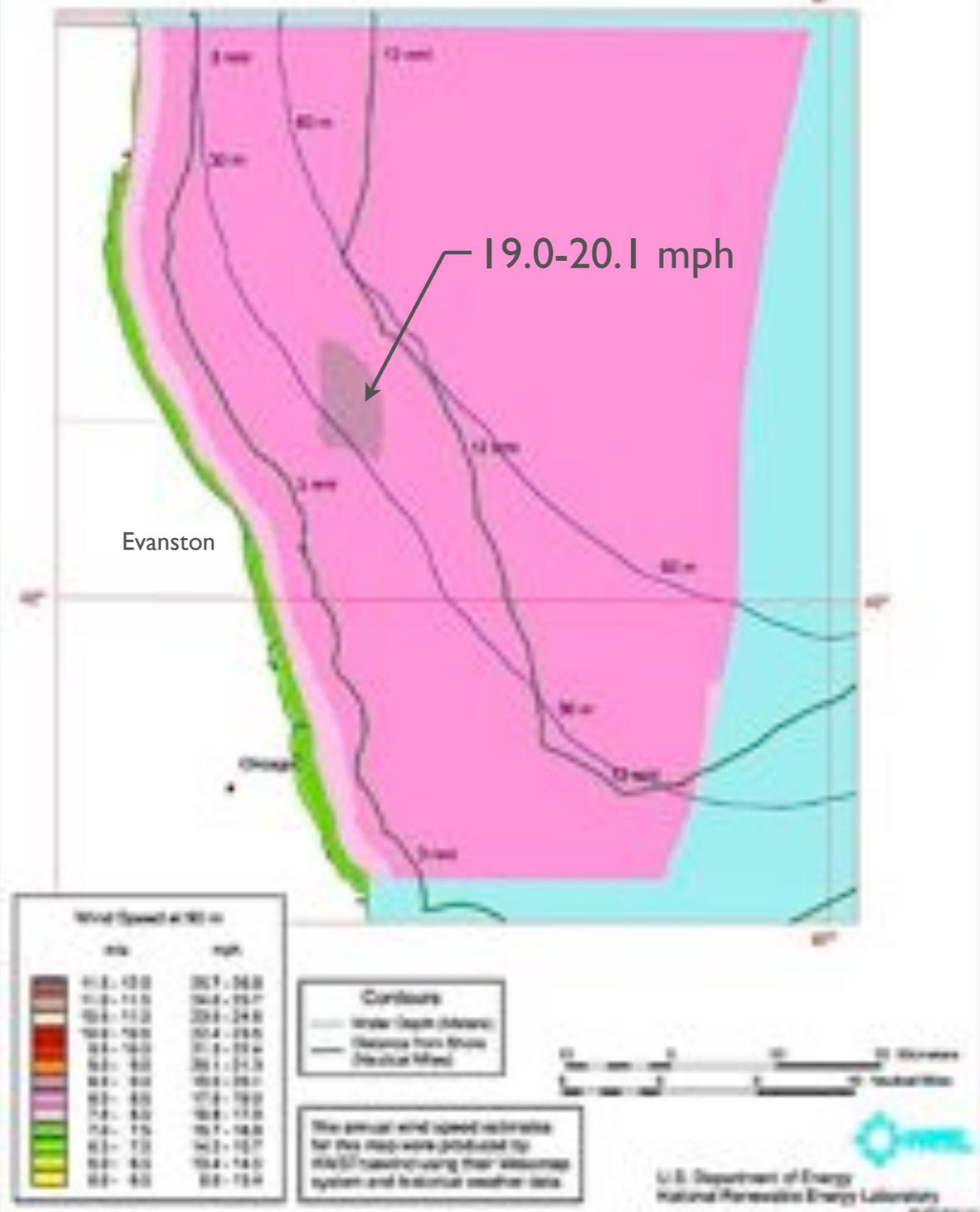
^{*}Wind speeds are based on a Weibull k value of 2.0

Wind Resources



Distance from Prime Land Based Wind





Great Lakes Wind Resources

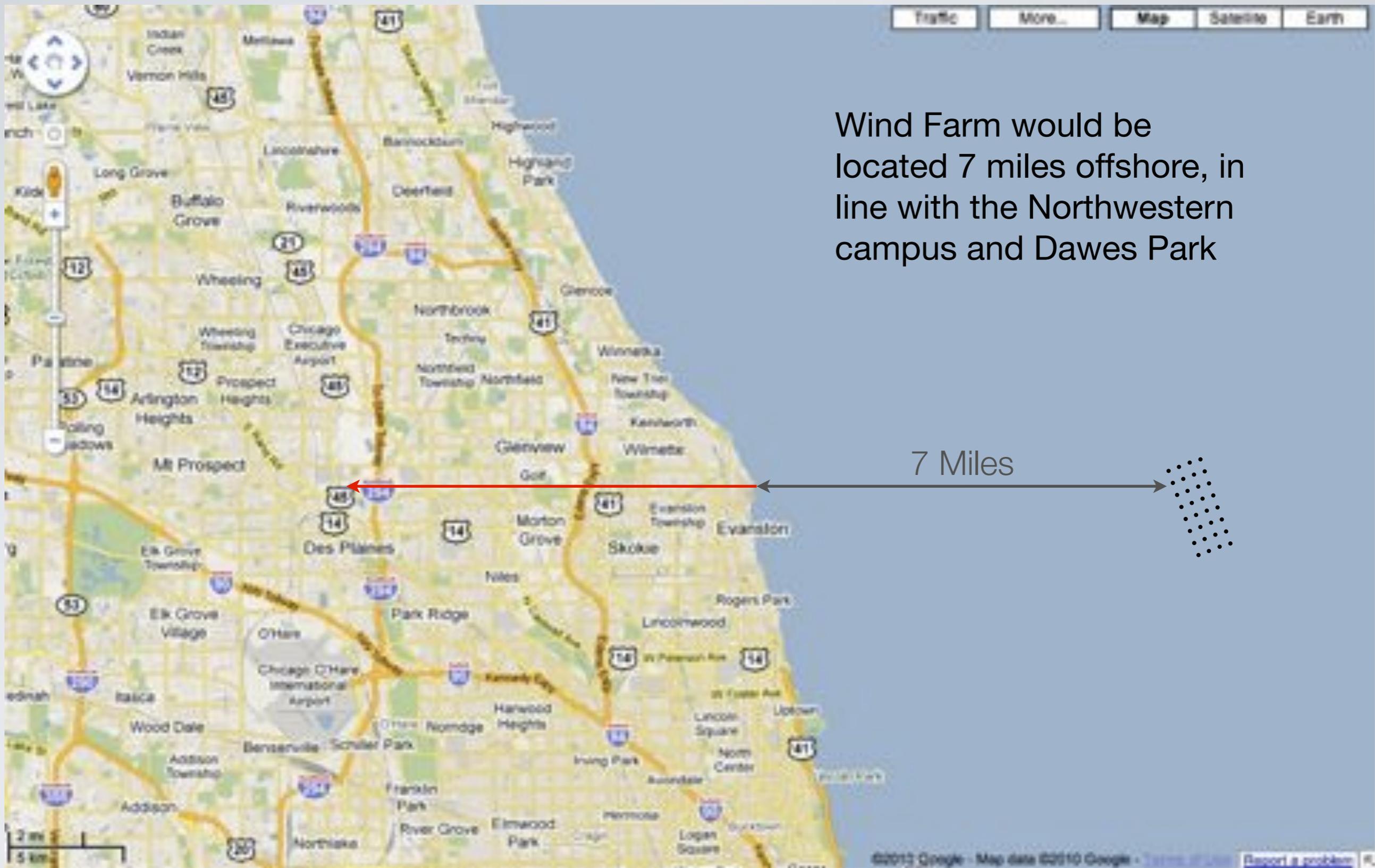




Wind Farm would be located 7 miles offshore, in line with the Northwestern campus and Dawes Park



Wind Farm Location



Wind Farm would be located 7 miles offshore, in line with the Northwestern campus and Dawes Park

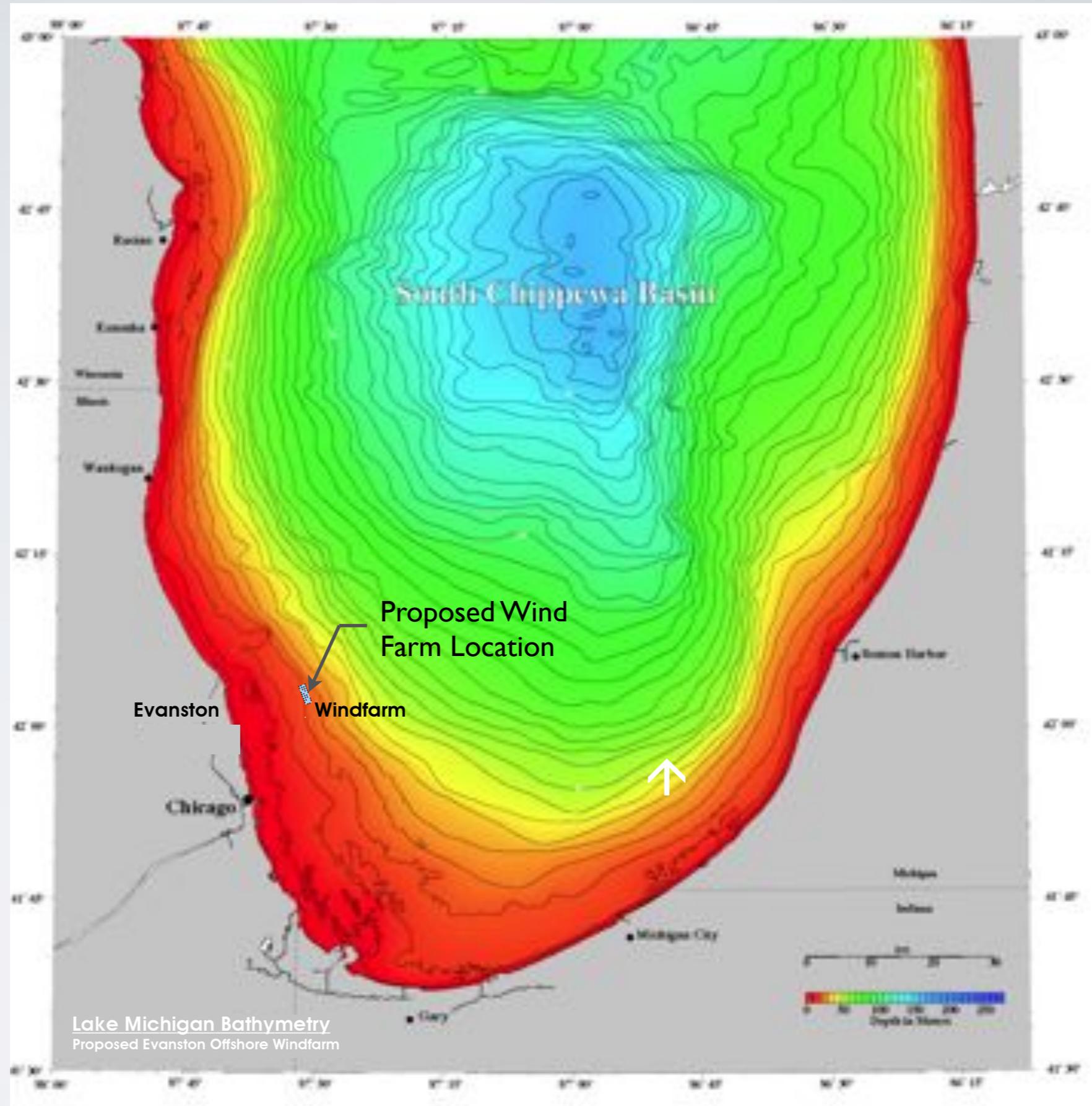
7 Miles



Wind Farm Location

At 7 miles out, Lake Michigan's water depth is approx. 70' and about 90' deep at 9 miles out.

Foundations are typically cost effective to 30m



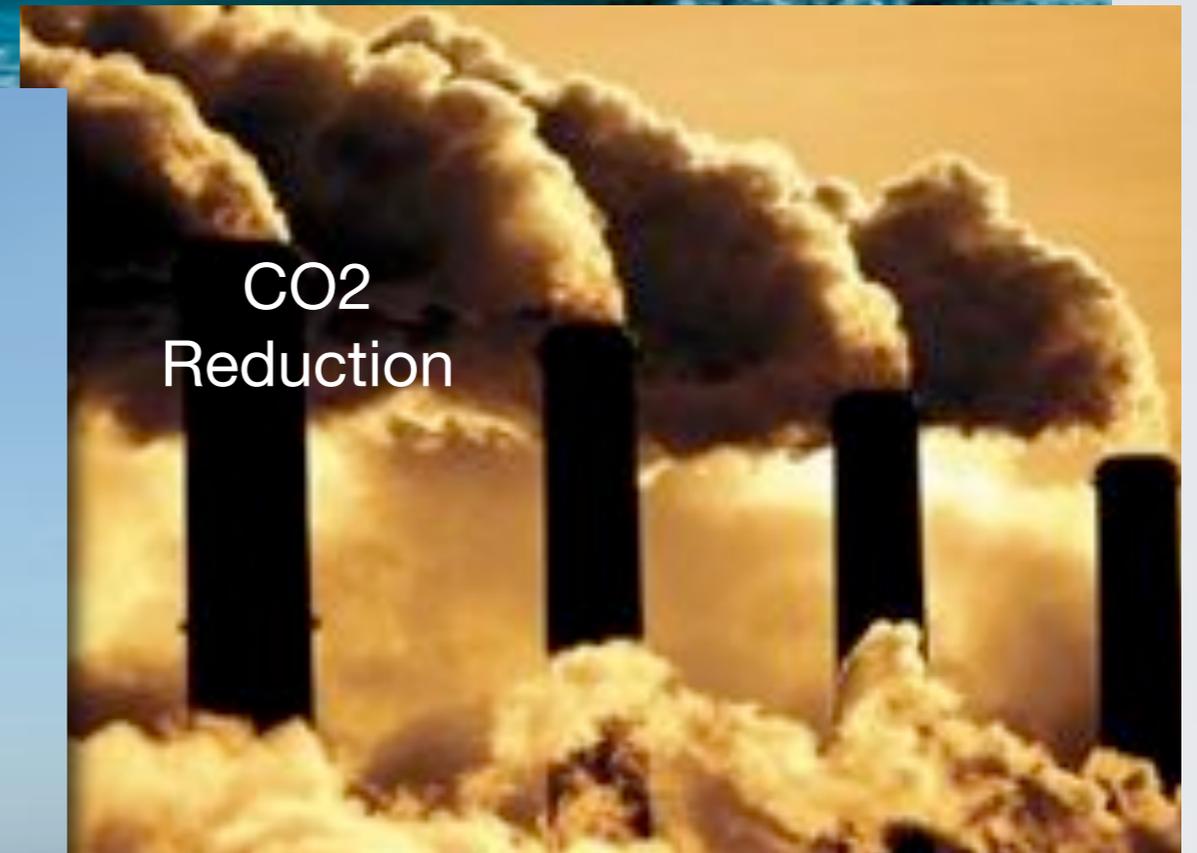
Lake Michigan Depth Chart



Green Image for Northwestern & Evanston



Civic Pride



Jobs



Local Benefits





CAD simulation



± View from Shore

Required Approvals - Many Steps and Many Years

If started now, complete ± 2018 at the earliest

- Request for Information
- Community buy in
- Request for Qualification
- Request for Proposal
- Setup Phase
 - Wind Studies
 - Power Purchase Agreements
- Approvals/Construction phase
- Operational Phase (20+ years)
- Decommissioning



Approvals

Moving forward based on the recommendations of the Mayor's Committee on the Wind Farm

- Push for seat on State of Illinois Offshore Wind Committee that is close to being signed by the Governor
- Obtain actual wind speed data offshore via data from Chicago's water cribs and test equipment on site via State or Fed grant
- Continue with the Mayor's Committee on the Wind Farm or something similar to it
- Continue with community education



Next Steps



Evanston Offshore Wind Farm Update

May 1, 2011

Questions & Answers

