Great Lakes Wind Energy Center:
Building the U.S. Offshore Wind Industry

By: Richard T. Stuebi, The Cleveland Foundation

Offshore wind—the installation of wind turbines in a body of water to capture consistently higher winds—is not a new phenomenon. In Europe, at least 16 offshore windfarms are in operation, employing over 300 turbines with aggregate rated capacity of nearly 600 megawatts.

So when civic leaders promote a Great Lakes Wind Energy Center (GLWEC) in Lake Erie, entailing up to ten turbines a few miles offshore from downtown Cleveland, some might be tempted to ask: What's the big deal?

And when people read about offshore wind projects being delayed or cancelled in the U.S. due to their high costs or other issues, some might become concerned enough to wonder: Why do our leaders want offshore wind here?

The answer is simple. To reinvigorate our regional economy, we need to build and lead entirely new industries that offer the potential for employing many thousands of citizens. With the GLWEC, we are positioning Cleveland+ to become the U.S. leader in the massive offshore wind industry of the future.

"Future" is important to highlight, as there is essentially no offshore wind industry today in the U.S., and even in Europe the offshore wind industry is relatively quiet. This is because the onshore wind market is booming due to favorable economics and strong market acceptance, and both manufacturers and developers are focusing all of their resources to capture onshore wind opportunities as fast as possible. Meanwhile, offshore wind has been largely relegated to the "back-burner."

Photo courtesy of www.sandia.gov

A wind farm on the southwest coast of Denmark.

Eventually, the onshore market for wind will experience diminishing returns, as the best sites with both good wind resources and access to power transmission lines will have been developed. Once this begins to happen, given the significant economic and environmental challenges inevitably to be faced by most other forms of energy, the offshore wind industry is destined to bloom into something big.

The long-term fundamentals for offshore wind are solid. Winds are consistently stronger above the smooth surface of a large body of water, and half of the world's population lives near a major coastline. Aesthetics, noise and other concerns that come into play with onshore wind are lessened, and the size limits imposed by transportation logistics are eliminated. Offshore wind technology is already proven to work; it's simply not cheap enough—yet.

Worldwide, thousands of gigawatts of wind turbines could feasibly be installed offshore in the coming decades. Given that each gigawatt represents over $2 billion in investment—comprising capital equipment and installation services—the offshore wind market can become a huge industrial opportunity for Cleveland+.

Just as Houston has become a center of the offshore oil/gas industry due to its pioneering work in the Gulf of Mexico three decades ago, Cleveland+ can become a recognized global leader in the offshore wind mega-industry of the future by taking the initial steps now while other regions stand on the sidelines. The GLWEC is our vehicle for doing so, by focusing on improving the economics of offshore wind turbines and windfarm deployment.

By completing a working windfarm in Lake Erie, the GLWEC would establish the required precedents and eliminate the ambiguities that stymie private sector developers. After the GLWEC is commissioned and confirms the environmental acceptability of offshore wind, it will be possible for many more windfarms—representing perhaps hundreds of gigawatts—to be developed in Lake Erie and the other Great Lakes.

The GLWEC is envisioned as more than just a demonstration project: it will also be a real-world testbed for companies, researchers and inventors to improve and perfect wind energy technologies for offshore application. With the affiliated participation of Case Western Reserve University and its newly-announced Institute of Energy Innovation, the GLWEC is aimed to become a leading venue for tackling the technical and engineering challenges that are required to improve the economics of onshore wind.

These challenges are non-trivial, but they are not insurmountable either. As breakthroughs occur at the GLWEC, Cleveland+ would stand to gain the lion's share of the manufacturing and services businesses and jobs that follow.

Currently, the GLWEC is still in its earliest stages of conceptualization. With funding from Cuyahoga County, Case Western Reserve University, The Cleveland Foundation and The Fund For Our Economic Future, a thorough feasibility study is being launched to confirm the proposition that the GLWEC can be funded from both private and public sources, and that the GLWEC can become a major hub of wind industry research that can produce long-term economic benefit for Cleveland+. Assuming that the feasibility study to be released next year is positive, it will include a detailed implementation plan to be followed to bring the GLWEC to fruition.

In short, the GLWEC is conceived as an economic development engine for Cleveland+ and a symbol of our region's bold 21st Century economic renaissance.

Stay tuned as the GLWEC matures from initial vision to detailed plan. **For more information contact Richard T. Stuebi at (216) 861-3810 or rstuebi@clevefdn.org.**

Environmental Benefits of Wind Power

Wind power uses the force of the wind to drive a turbine that produces electricity. Wind power is renewable because it is created by the energy from the sun that drives the earth's weather patterns. Typically, turbines are clustered in "wind farms" scattered throughout reliably windy areas and often share space with productive agricultural lands. These large installations supply electricity to regional power grids for sale to homes and businesses. Smaller installations to meet specific needs are also common where grid electricity is not available.

WHAT ARE THE BENEFITS OF WIND POWER?

- **ECONOMIC GROWTH:** Manufacturing wind turbines and developing wind farms create jobs, diversifies local economies and increases local tax bases. By 2020, wind energy alone could create 80,000 new jobs and $1.2 billion in new income in the U.S. Because wind farm jobs are often located in rural areas they add economic diversity to a region, cushioning local economies from changes in other sectors.
- **ABUNDANT & INEXHAUSTIBLE ENERGY:** According to the U.S. Department of Energy (DOE), good wind areas, which cover 6 percent of the contiguous U.S. land area, have the potential to supply more than 150 percent of the current electricity consumed in the U.S. Typically, within those areas only 1 to 2 percent of the land would be used by the turbine and access roads, leaving the rest as productive working land.
- **SECURE & STABLE SUPPLY:** Because wind farms are on U.S. soil, the power they produce would never be subject to international price spikes or interruptions from conflicts overseas. And once a wind farm is constructed, the fuel is free forever.
- **LOW COST:** According to the DOE, by 2010, electricity from new wind power projects will be cheaper than electricity from new conventional power plants.
- **CLEANER AIR:** Wind power helps reduce air pollution from electricity generation facilities powered by coal, natural gas and other non-renewable fuels. Because wind turbines do not burn fuel, they do not emit any carbon monoxide, particulate and toxic chemical emissions that threaten public health and the environmental.
- **REDUCTION IN GLOBAL WARMING:** Wind power produces zero emissions of CO_2 or other greenhouse gases and can replace sources with high greenhouse gas emissions.

For more information contact 25x'25 at 912.495.9584; info@25x25.org; www.25x25.org. *25x'25's vision is to get 25 percent of our energy from renewable resources like wind, solar and biofuels by the year 2025.*