Briefing Paper — Factors Affecting Cost-Effectiveness of Siting Offshore Wind Projects

This informal briefing document will discuss some of the considerations and constraints affecting the cost-effectiveness of offshore wind farms. These are conceptual, intuitively-driven items only. Specific site designations would be contingent on a number of specific environmental, aesthetic, and wind resource constraints not discussed here.

At a very general level, four items are likely to affect effectiveness and cost of wind projects. These are: wind resource, water depth, financial incentives, and proximity to high power transmission and distribution systems.

Wind Resource

The wind resource offshore of New Jersey is significantly better than that onshore, according to wind mapping conducted on behalf of the USDOE. According to those maps, the farther offshore you move, generally, the better the wind resource. The wind resource onshore in New Jersey is generally considered marginal, at best, by that same mapping. For this reason, it is likely that potential wind developers will look to offshore locations.

Water Depth

Current technology in wind turbine development favors "monopile"mounting. This is a technique where a single steel shaft is driven, like a piling, into the ocean floor and the turbine is mounted atop. Generally, this technology is employed in relatively shallow waters (up to 80 feet depth, roughly). Gravitational-based foundations, made of concrete or steel, have also been used. Placing a turbine in water deeper than this would require modified bases, or floating platforms upon which turbines would be mounted. These are not past conceptual design, currently. Either would likely significantly increase construction costs.

Financial Incentives

Offshore wind turbine development is not currently cost competitive without federal and state financial incentives. The federal incentive is the Production Tax Credit. Currently, the federal government provides a tax credit of 1.8 cents per kWh production, recently reauthorized through December, 2005. Over the past year, when that PTC had lapsed in arguments over the federal energy bill, wind development nationwide significantly slowed. It is worth following the action in Washington to extend the PTC past its currently authorized expiration of December, 2005. It will be an important factor in determining the rate of growth of wind energy project development.

The State of New Jersey provides grants and loans to renewable energy project developers through its Clean Energy Program. This program, established by the Electric

Discount and Energy Competition Act (NJSA 48:3-49 et. seq.) is authorized through 2008.

Proximity to High Power Transmission/Distribution System

Any potential wind turbine site will desire proximity to an existing, robust on-land transmission/distribution infrastructure. The cost of constructing transmission lines to connect to the grid is extremely expensive, and could entail environmental considerations (if it needed to traverse wetland, or other sensitive coastal ecosystems). Developers will strive to locate close to existing infrastructure, to minimize these costs and potential environmental impacts. The wind mapping done for the USDOE also includes locations of existing transmission system rights-of-way which can be used as an available reference.

Readers are cautioned that any potential offshore wind development will require a much more rigorous analysis than provided by this general guidance, to inform any decision making. This briefing paper does not address environmental concerns, which are sufficiently complex as to warrant a separate briefing analysis. Nor are aesthetic issues discussed, a comparatively complex issue.

Prepared by NJDEP
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