



Before the Connecticut Joint Committee on Energy and Technology

Testimony of Andrew Gohn, Eastern Region Director of State Policy American Wind Energy Association

Support for Governor's Bill No. 9

Co-Chairs Winfield, Reed and Formica, and Members of the Committee,

My name is Andrew Gohn and I am the Eastern Region State Policy Director of the American Wind Energy Association, or AWEA. Thank you for giving me an opportunity to testify today in support of legislation to expand Connecticut's Renewable Portfolio Standard (RPS) to 40% by 2030.

I. Overview

The American Wind Energy Association (AWEA) is the national trade association for the U.S. wind industry – the country's fastest growing energy industry. With thousands of wind industry members and wind policy advocates, AWEA promotes wind energy as a clean source of electricity for American consumers. As the premier organization representing the interests of America's wind energy industry, AWEA counts hundreds of organizations in its membership program. Our members are wind power project developers and parts manufacturers; utilities and researchers – organizations at the forefront of the wind energy industry.

AWEA recognizes the leadership this committee has shown in advancing renewable energy. AWEA supports legislation to build on that leadership and increase the renewable energy requirements in the Connecticut RPS.

The RPS requires electric suppliers operating in Connecticut to supply a minimum percentage or amount of their retail load with eligible sources of renewable energy like wind. Suppliers comply by retiring Renewable Energy Certificates (RECs) equivalent to the generation of one megawatt-hour of electricity generated by eligible renewables. Ensuring a strong demand for RECs by raising the annual requirements will spur development of clean energy resources like wind in the region.

By enacting legislation that doubles the pace of expansion of the RPS annual requirements, Connecticut can continue to lead, along with a growing coalition of states in growing a clean

energy future. Increasingly, policymakers are encouraged to find that recent dramatic price reductions in technologies like wind energy enable us to strive for far more ambitious goals than once thought possible, and with far less impact on consumers than once feared. These developments are more needed than ever, as policymakers race to meet greenhouse gas reduction goals to avert the worst impacts of climate change.

II. Regional Wind and Offshore Can Help Meet Connecticut RPS and GWSA Goals

The wind industry is transforming the nation's energy grid. For the twelve months through November 2017, wind power in the United States amounted to 6.33% of all generated electrical energy – enough to power almost 29 million average American homes¹. In recent years, wind has added capacity faster than any other resource in the electricity markets. It's not hard to see why. As wind technology improves, the price of wind has decreased a spectacular 66 percent in the past 7 years, according to the U.S. Dept. of Energy.² Several reputable analyses now show wind energy to be cost-competitive with traditional sources of generation in much of the country.

Wind energy's consumer benefits stem from wind energy's fuel price stability. Wind is one of the few energy sources that offers perfect fuel price stability that can be locked in up front, as wind's fuel cost will always be zero. For all other major conventional sources of electricity, fuel prices cannot be locked in for the long term and are often set by the spot market. The costs of these fuel price increases and risk are passed directly on to consumers through their electric bills. In contrast, wind energy is more like a fixed-rate mortgage, locking in the fuel price for the life of the power plant.

Because of these pricing dynamics, corporate America is buying into wind energy in a big way. Fortune 500 companies like Wal-Mart, Google, Apple, Procter & Gamble, GM and many others have all recently taken advantage of these record low prices by locking in long term fixed price contracts for electricity. Upon signing one of these long-term contracts, Google recently noted, "We look for [wind projects] because in addition to creating more renewable energy and strengthening the local economy, they also make for smart investments: They offer attractive returns relative to the risks and allow us to invest in a broad range of assets."³

These dynamics also make it a great time to expand RPS policies. California, New York, Oregon, Hawai'i and Washington, DC have all raised their RPS policies to target 50 percent or greater renewable electricity by compliance dates ranging from 2030 to 2040. By committing to legislation increasing the Connecticut RPS target to 40% by 2030, Connecticut can join these states in leading on protecting the environment and investing in a clean energy future.

RPS policies like the one under consideration by this committee have driven development of renewable energy that has created \$20 billion in annual gross domestic product (GDP) just through 2013 according to NREL and LBNL. A recent Michigan Public Service Commission on that state's RPS found the policy attracted \$2 billion in investment to the state.

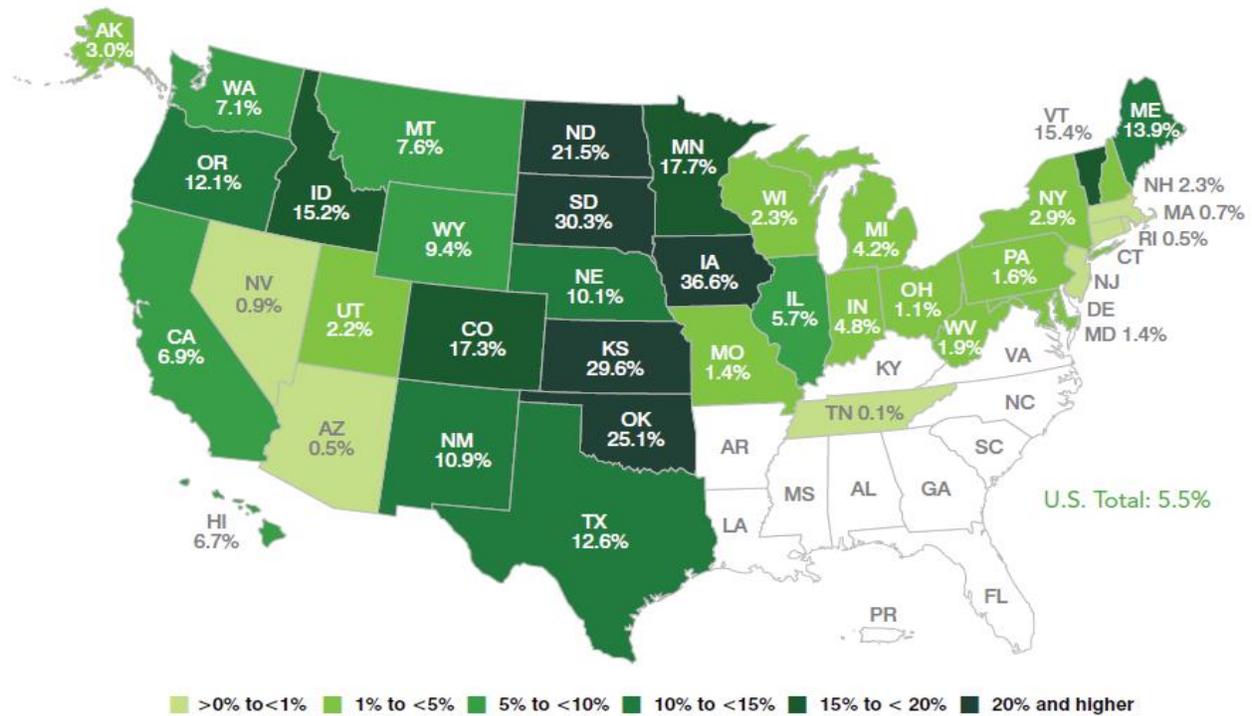
¹ "[Electric Power Monthly](#)" (PDF). Report. U.S. Department of Energy, Energy Information Administration. 4 Mar 2015

² U.S Department of Energy 2014 Wind Market Report, <http://energy.gov/2014-wind-market-report>

³ <https://googleblog.blogspot.com/2013/01/a-wind-investment-deep-in-heart-of-texas.html>

III. Grid Operators Can and Do Reliably Integrate Large Amounts of Renewable Energy

Wind power is a reliable energy source and provides significant amounts of electricity to several states. Utility system operators rely on wind power and successfully integrate it in large amounts. Wind already generates large amounts of electricity across the country. Iowa and South Dakota now reliably produce more than 30 percent of their electricity from wind power; Kansas, Oklahoma, and North Dakota more than 20 percent and in total, 14 states now produce over 10 percent of their electricity from wind. Across the Central U.S., from Montana to Texas, wind energy supplied the Southwest Power Pool (SPP) with a new record of 52 percent of its electricity early in February 2017.



Source: U.S. Wind Energy Share of Electricity Generation, by State
 AWEA U.S. Wind Industry Annual Market Report Year Ending 2016

Department of Energy data show wind power is now the fourth largest electricity source in the U.S. providing electricity to power the equivalent of 25 million average American homes. Wind power makes the utility system more reliable because it can help keep the lights on when other power sources fail. Whereas other types of power plant can shut down suddenly, changes in the aggregate output of a wind fleet occur gradually and are predictable. Wind power has kept the lights on when fossil power plants failed, including several times in recent years. The cost of integrating wind is far smaller than the cost of accommodating failures at conventional power plants.

Utility systems can deal with wind power's variability without difficulty. Utility systems were created to allow many different types of power plants to work together to reliably generate electricity for many consumers. The largest grid operator in the U.S., PJM, recently reported it

could reach 30 percent of wind power while maintaining electricity reliability. As Bruce Rew, the VP of operations for the Southwest Power Pool, recently explained, “Ten years ago we thought hitting even a 25 percent wind-penetration level would be extremely challenging, and any more than that would pose serious threats to reliability. Now, we have the ability to reliably manage greater than 50 percent. It’s not even our ceiling. We continue to study even higher levels of renewable, variable generation as part of our plans to maintain a reliable and economic grid of the future.”

Tapping offshore wind as part of expanding clean energy for Connecticut further increases the resource diversity, geographic variation, and reliability benefits of a balanced electricity portfolio. With increased proximity to energy-consuming coastal regions, and very high capacity factors, offshore wind is an important part of a strong, reliable electricity clean energy future for Connecticut and the region.

IV. Wind Energy Is Cost Effective

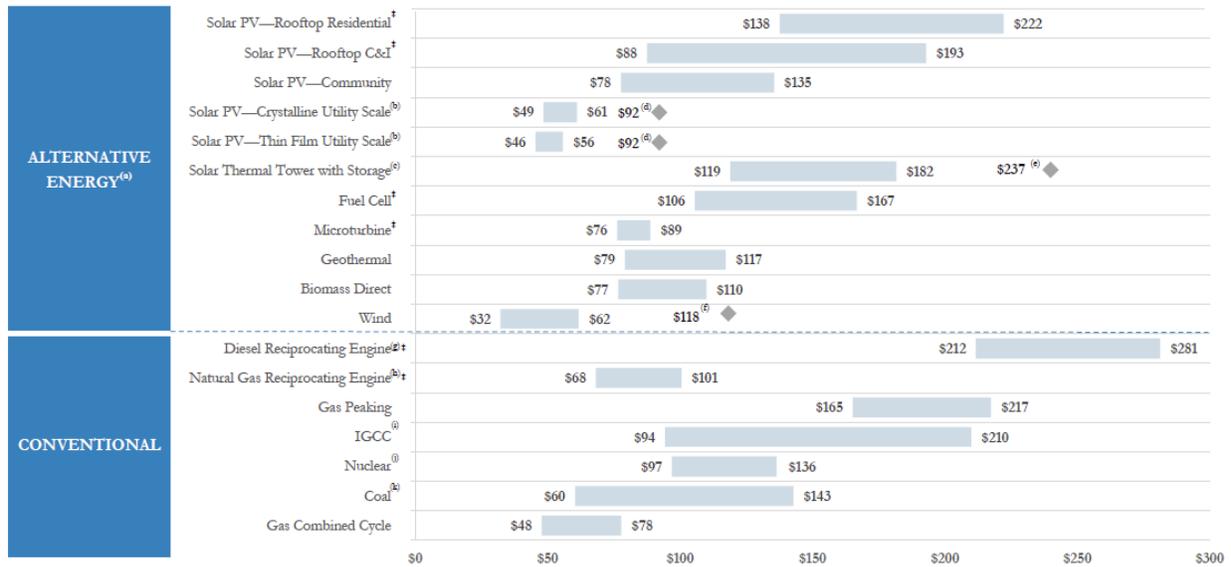
Large-scale renewable energy resources in the region are cost effective, with larger wind energy projects creating the greatest economic efficiency. This is consistent with a dramatic reduction in the cost of wind energy nationally.

Many factors contribute to the dramatic decline in pricing of wind energy. The US wind industry has broadly achieved better economies of scale and mature supply chains. The turbines themselves have similarly increased in size, with taller towers and longer blades supporting drive trains better customized to diverse wind environments. Optimized siting technology and practices offer greater efficiency and improved community engagement. Forecasting technology and advanced analytics enable better predictive operations and maintenance. Finally, development of greater transmission infrastructure reduces congestion and losses. Cumulatively, these factors have resulted in a national average reduction in the cost of land-based wind of 66 percent.⁴ Offshore wind has similarly enjoyed significant cost reductions in Europe and appears to be following that trajectory in the US.

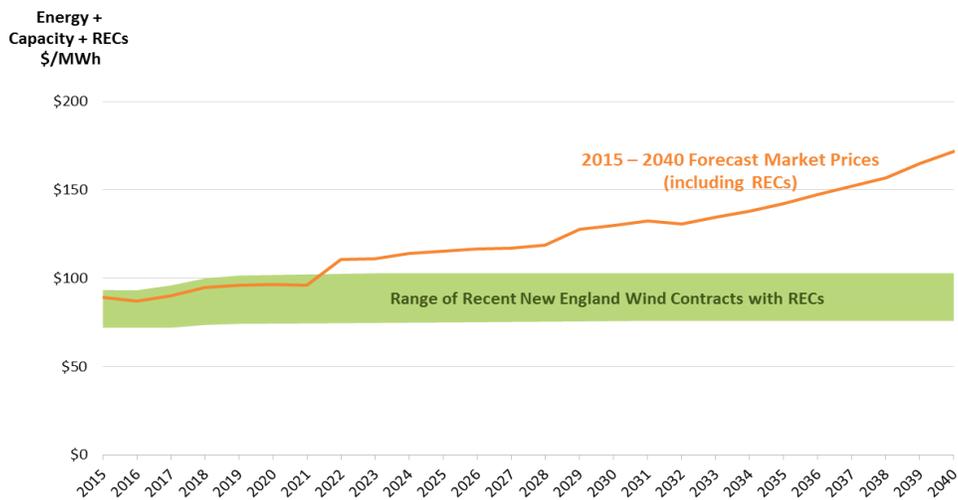


⁴ Source: Lazard, Version 10.0, 2016

These price reductions have resulted in wind energy being the most economic form of new generation available in many areas. Energy consulting firm, Lazard, in their annual analysis of levelized cost of energy found that land-based wind is now competitive with combined-cycle gas turbines and is often the lowest cost resource, as seen below.



In New England, wind energy prices are higher than the national average, although this is to some extent reflective of broader energy prices in the region. In 2015, Synapse Energy Economics conducted analysis of the cost-effectiveness of wind energy in the region for RENEW Northeast, a New England-based non-profit renewable energy industry association that is a regional partner of AWEA. That analysis is reflected below.⁵



Energy price forecast based on EIA Annual Energy Outlook 2014. Capacity market price forecast based on recent auction results. REC price forecast based on 2015 AESC forecast

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⁵ Synapse Energy Economics, Benefits of Long-term Wind Contracts (June 26, 2015) (Prepared for RENEW. On file with author.)

V. Conclusion

Thank you for the opportunity to testify before you this afternoon. AWEA looks forward to providing any resources or assistance this Committee may seek in evaluating opportunities to drive economic development, protect Connecticut citizens' health and environment, and advance a sustainable and prosperous clean energy future for the state.

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