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Markets to watch include Canada, Mexico, Brazil and South Africa but China will be the biggest leader for installing wind energy capacity in 2016.



## BIGGEST OFFSHORE WIND PROJECT YET GETS GREEN LIGHT FROM DONG

Dong Energy A/S is moving ahead with work on what will become the world's biggest offshore wind farm once it's complete, a facility generating 1.2 GW of power off the Yorkshire coast in the U.K.

The Hornsea Project One wind farm may cost \$5.7 billion, according to Bloomberg New Energy Finance. The Danish utility said the project is its largest ever financial commitment and is due to be complete in 2020, according to a statement on Feb. 3. A spokesman for the company said it would be a multiple of 1 billion pounds (\$1.4 billion).

Offshore wind is the only major renewable energy source not to face cutbacks in subsidies since Prime Minister David Cameron's Conservatives won the election in

May. In November, U.K. Secretary of State for Energy Amber Rudd vowed to support the growth of installing turbines at sea, saying it is "one area where the U.K. can help make a lasting technological contribution."

The U.K. government awarded Hornsea One a 15-year contract for difference with a strike price of 147.42 pounds per MWh in an auction on April 2014. The company also won government contracts to develop the second and third phases of Hornsea, which would add another 3 GW of capacity to the U.K. grid.

The projects will be a major contributor to Dong's target to install 6.5 GW of offshore wind by the end of the decade.

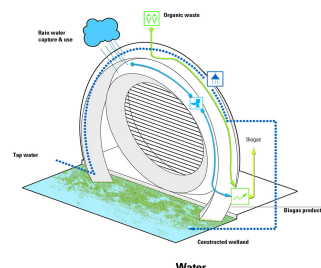
"Reaching our strategic target is

important as volume is required to reduce the cost of new technology," Henrik Poulsen, chief executive officer of Dong Energy, said in a statement. "It is vital in order to make all players in the value chain advance up the learning curve."

Onshore construction work will start immediately, with offshore works due to begin in 2018. First power from the site is expected in 2019, with the project fully commissioned by 2020, the spokesman said.

Brent Cheshire, head of Dong's U.K. unit, last month said neither a British departure from the European Union nor the precipitous drop in oil prices will derail its plan to invest 6 billion pounds (\$8.7 billion) in wind farms off the U.K. coast by the end of the decade.

*A number of companies around the world are developing novel technologies in an effort to grab a slice of the global renewable energy market. Although many of these technologies are simple incremental improvements to established technologies such as solar PV, some are focused on shaking up the sector with more innovative and futuristic designs. FIND OUT MORE ABOUT THE DUTCH WINDWHEEL - Page 4.*



### 1) At COP21, countries agreed to the Paris Agreement. Does that mean the Agreement is now in effect?

No, countries still need to take steps so that it takes effect. What occurred on December 12 at COP21 was the “adoption” of the Paris Agreement by the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC). Adoption is the formal act that establishes the form and content of an agreement.

### 2) What needs to happen now?

Broadly speaking, countries must now actually join the Paris Agreement and become Parties to it. To do this, each country must now sign and indicate their consent to be bound by the Agreement. Only after at least 55 Parties to the UNFCCC representing at least 55 percent of total global greenhouse gases sign on and indicate their consent to be bound will the Agreement “enter into force,” meaning it will come into effect and be legally binding.

### 3) What’s the timeline for countries to ratify the Agreement? On April 22, 2016, all Heads of State can sign the Agreement at a high-level signing ceremony at the United Nations in New York.

cont.

## When Will the Paris Agreement Take Effect?



 WORLD RESOURCES INSTITUTE

## RESPONDING TO THE COMPETITIVE RISE OF SOLAR AND GAS: THE CHALLENGE FOR WIND

The U.S. wind industry’s growth prospects for the next decade will be shaped by its response to the changing market landscape, including emerging factors such as lower electric demand growth and competition on cost from solar and gas generation. Despite the existence of a select few regions where the quality of wind is strong relative to solar (meaning the economics of new wind generation compete favorably with new solar generation), policies at both the U.S. federal and state level have shifted toward a preference for solar generation in many cases, and more specifically distributed solar generation. This new paradigm will require a more sophisticated approach to competing with energy resource alternatives than simply lobbying for an extension of the Production Tax Credit (PTC).

### State Policies for Solar

At the state level, there are two primary mechanisms that have accelerated the adoption of solar (in many cases distributed solar) relative to wind generation over the last several years: renewable portfolio standards (RPS) and/or net energy metering (NEM).

Twenty states and the District of Columbia have created an RPS with specific solar and/or distributed generation (DG) provisions. In addition, two states have non-binding goals. Eight of the 20 states have specific requirements for DG, often focusing on distributed solar. A large portion of the U.S. wind industry’s traditional growth has been to meet state RPSs; however, in recent times, the renewable generation that has been entering the markets has increasingly been solar (utility scale more than distributed solar).

For distributed solar, no policy has been more influential at the state level than NEM. Designed to facilitate DG installation, NEM provides an electricity tariff billing mechanism to allow customers to offset electricity usage with production from a DG system. It also allows them to sell back excess production from DG systems to the utility (typically at either retail rates or the utility’s avoided cost of generation). While the capital costs of distributed solar are higher than utility scale solar, states with retail NEM allow distributed solar owners to be compensated for their investment at a much greater rate than the avoided energy cost or wholesale market price.

However, the growth potential for distributed solar in the U.S. is not without its own risks and pitfalls. Forty-four states, and the District of Columbia, have established NEM programs with 27 of these states having net metering caps. Fifteen of the 27 states have strict cap limits, while the enforcement and adjustment of caps in the other 12 states with net metering legislation like New Jersey and New York is left to the discretion of public utilities commissions. In addition, many states have approved or are considering rate design changes to increase fixed charges, and in some instances, introduce demand charges to address fairness and cost allocation concerns between utility customers with and without distributed solar installations. That option is particularly evident in states like Arizona, where net excess generation

is compensated at full retail rates rather than at the utility's avoided cost of generation.

That said, states with ambitious clean energy aspirations and distributed energy resource goals are likely to raise their caps in the future. For example, in late 2014, New York increased its NEM cap from 3 percent to 6 percent of 2005 peak electric demand. More recently, Nevada is contemplating its future NEM cap as it has been recently met.

All this underlines that with the political and economic landscape favoring alternative technologies, the wind industry has to consider innovative and targeted strategies that go beyond a narrow focus on PTC extension.

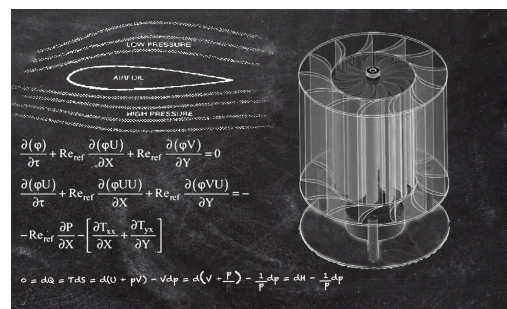
*At right is the Vortexis Poseidon Hybrid PV 2.0 kW, a proposed compact VAWT system for use by NOAA. The Vortexis system is a Marine version of our land-based Off-the-Grid Prometheus.*



## A RISING WIND: BETTER TECH MEANS GREATER STATE WIND POTENTIAL

For states looking to reduce their reliance on dirty, imported energy, the National Renewable Energy Laboratory brings good news on the wind. In a May 2015 report, significantly more wind power potential was found in nearly every state thanks to advancing turbine technology.

In 2015, 40 states could produce 50% or more of their annual electricity use from wind power alone, up from 28 just five years ago. Over two-thirds of states could produce 100% or more of their annual consumption from wind energy.



### Paris Continued:

The Agreement will then be open for signature for one year, until April 21, 2017. Given the importance of the Paris Agreement and the political momentum created at COP21, experts expect many countries will attend the high-level signing event.

**4) How do countries indicate their consent to be bound and become Parties?** Most countries will sign the Agreement “subject to ratification, acceptance and approval,” making their signature conditional on obtaining the required domestic approval for joining the Agreement. In some cases, they will also enact any national legislation necessary to implement the Agreement. For example, in Australia, the only requirement is formal notification and introduction of the Agreement in Parliament, whereas in Mexico, the consent of the Senate is also required. In the United States, many international agreements are joined as “executive agreements” based on presidential authority.

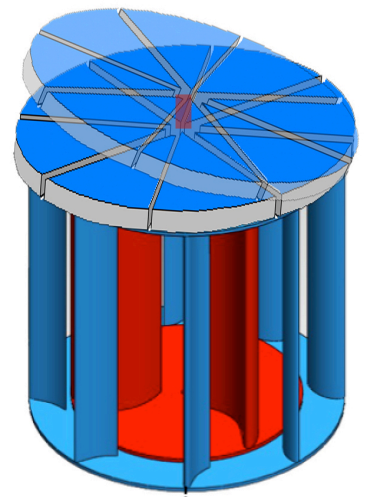
**5) Can Parties still join the Paris Agreement after April 22, 2017 if they didn't sign it before then?** Yes. After the one-year signing period, the Agreement will be open for what is called “accession.”



## MATERIALS ARE BLOWING IN THE WIND

Wind energy is big business, and with 1,184 offshore turbines, the UK is a world leader. According to Renewable UK, wind energy's contribution to UK energy needs has skyrocketed in less than 15 years, from less than 400 MW to over 11,000 MW today. In 2013/14 alone, wind capacity grew by almost 15 percent, achieved by increasing the number of both offshore and onshore systems available to the grid.

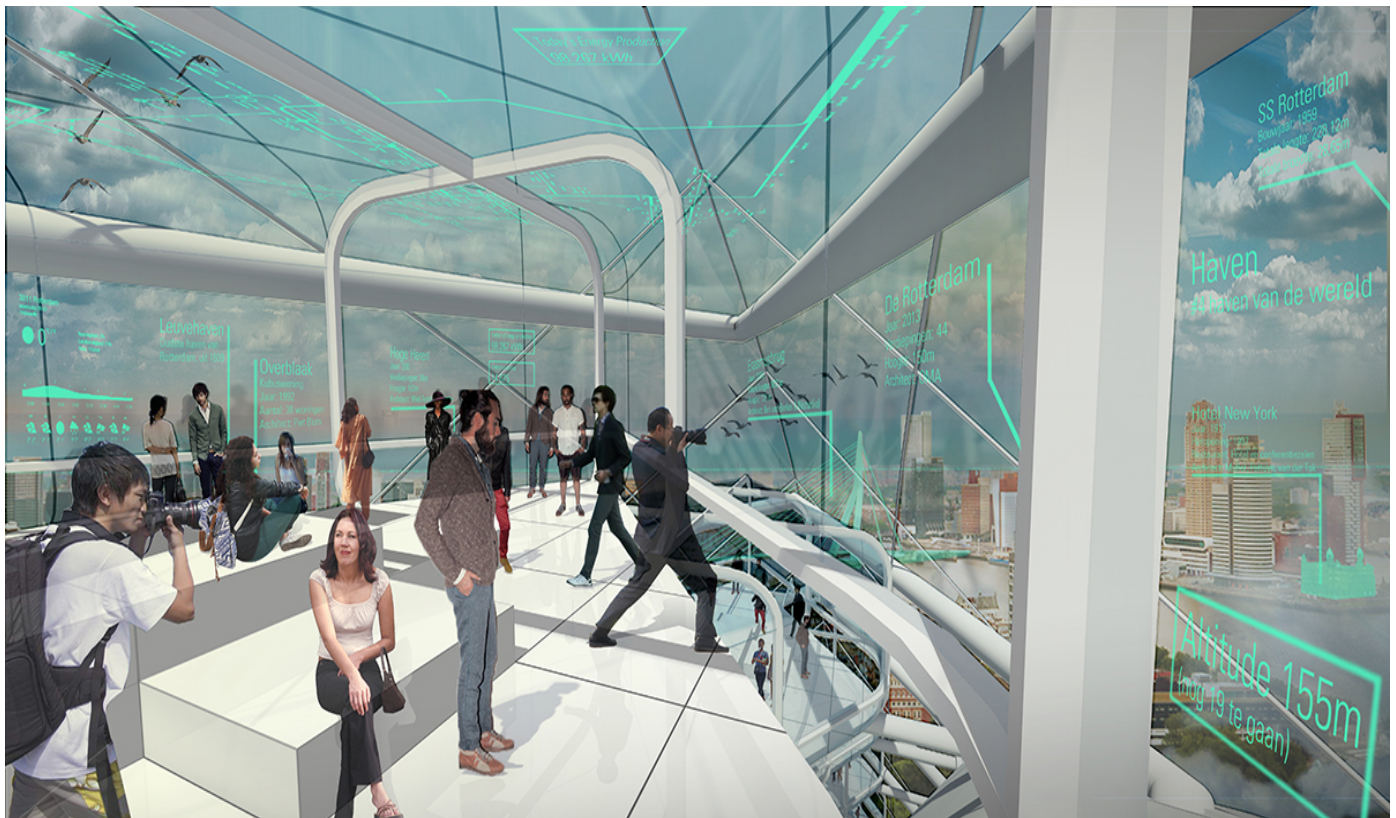
One of the biggest remaining challenges in turbine performance is also materials-related - to better understand the failure mechanisms of turbine blades and to predict the material behavior. Led by Dr Kirsten Dyer at the Offshore Renewable Energy (ORE) Catapult, a large research activity called BLEEP (blade leading edge erosion program) aims to do just that.



The simple, yet beautiful aerospace engineered design of the Vortexis Prometheus PV hybrid 2.0 kW.



The Dutch Windwheel is a concept for an eye-catching 174-metre tall building in the port city of Rotterdam designed to act as a platform for a wide variety of groundbreaking renewable energy technologies.



The building itself is slated for completion in 2025 — with the finalization of the design concept scheduled to take place over the next two years, followed by preparations for physical development between 2017 and 2021 and construction from 2021 to 2025. Although coy about the exact details, Graaff does reveal that the Dutch Windwheel team are talking to several organizations — including energy corporations, research institutes, developers and investors — about their involvement in the construction process.