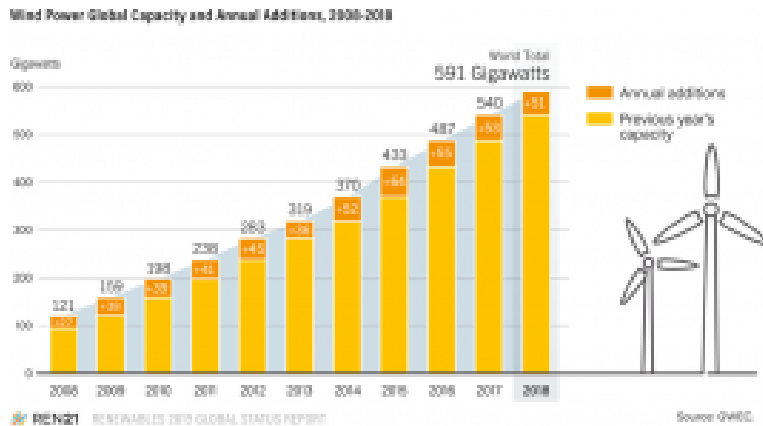


Offshore Wind

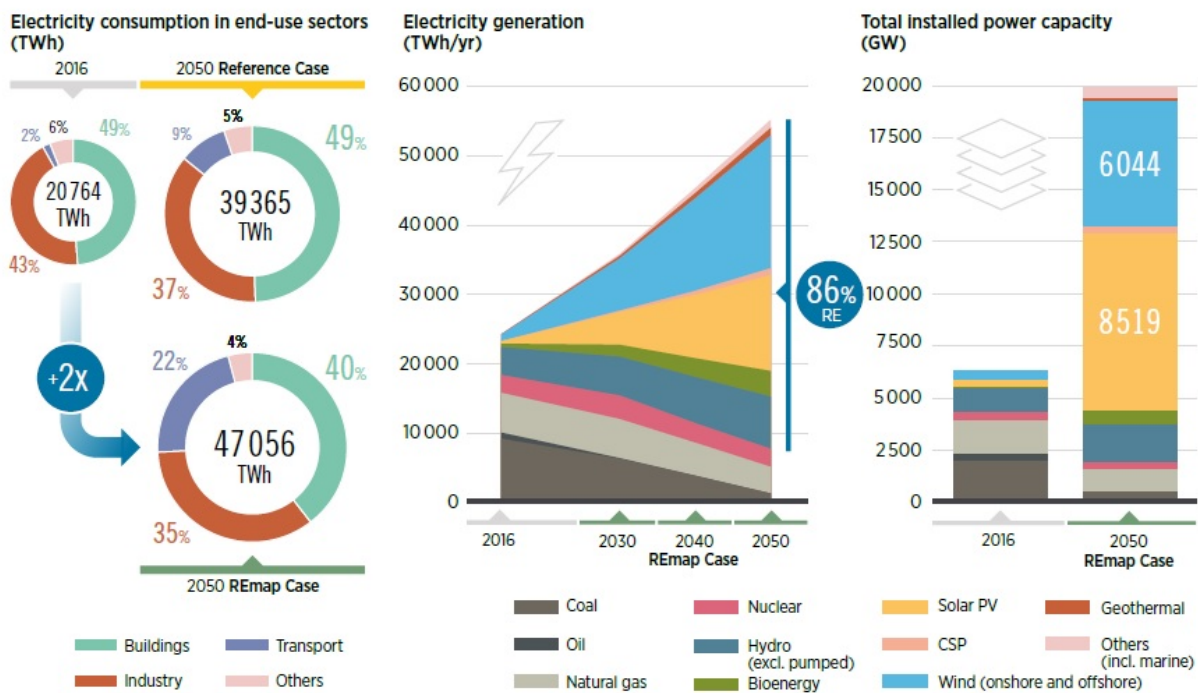


I was discussing renewables with my class the other day and recounted an event I moderated a few years back in which one of the panelists, [Minoru Takada](#), observed that there was much to celebrate on the renewable energy front, very much including the fact that policy makers, both in governments and the private sector, and general publics around the world, have been steadily gaining **confidence** in our ability to transition away from fossil fuels. I think we can all draw a great deal of hope as energy economies around the world continue to build confidence in this **critical transition** in which we are engaged.

Nowhere are the winds more favorable, as it were, than in the key sector of wind power. The [International Renewable Energy Agency](#) (IRENA) has established that wind could cover more than one-third of global power needs, delivering one-quarter of the annual CO₂ emission reductions needed by 2050 to avoid **catastrophic climate change**. IRENA's "[Remap transition pathway](#)" identifies that renewables could generate 86% of the world's power by 2050.

Figure 9. Wind and solar power dominate growth in renewable-based generation

Electricity consumption by sector (TWh, %), electricity generation mix (TWh/yr) and power generation installed capacity (GW) by fuel, REmap Case, 2016-2050



I sat in last week on a couple of excellent symposiums on a key component of the overall wind picture: offshore. As with Dr. Takada’s observation from five years ago, confidence is rapidly rising in the ability of offshore wind to substantially boost our ability to provide clean, virtually limitless, immensely cost-effective power, phasing out fossil and nuclear plants and eliminating energy poverty globally.

[Our Energy Policy](#), a policy forum, hosted an event focusing on “New York’s Emerging Offshore Wind Market.” [The New York State Energy Research and Development Authority](#) (NYSERDA) director of policy and regulatory affairs, John Williams, outlined the goals of the new NY State climate and energy law: Climate Leadership and Community Protection Act. (See this [comprehensive look](#) at the new law from veteran energy and environment journalist, David Roberts.) The target is for 100% zero carbon power by 2040. A big factor in that equation is the 9 GW of offshore wind power capacity by 2035.

Clint Plummer, head of Market Strategies and New Projects for Ørsted in the US, talked about the obvious advantages of offshore wind, particularly on the East Coast: tremendous demand – particularly from the Northeast megalopolis, aka [BosNYWash](#); tremendous offshore [wind resources](#); and [a shallow continental shelf](#). Ørsted (the Danish company formerly known as DONG Energy), extremely experienced in European wind projects, is bullish about [its US projects](#).

I asked about energy storage because, to be quite clear, you’re not going to be bringing all this variable power onto the grid on an ongoing basis, so you have to store some of it. You **want** to

store it. I prefaced my question by saying that one of the most painful words in the English language is “curtailment.” It is “a purposeful reduction in renewable electricity output below the levels that could otherwise have been produced.” (The Union of Concerned Scientists has a great explanation [here](#), showing how to mitigate it.) [Rudy Wynter](#), a top executive at National Grid US whose portfolio includes transmission and distribution, answered my question by citing their [48 MWh battery](#), and by referencing the importance of initiatives to advance [power to gas](#), and specifically hydrogen. (I am extremely [gung ho about hydrogen](#).)

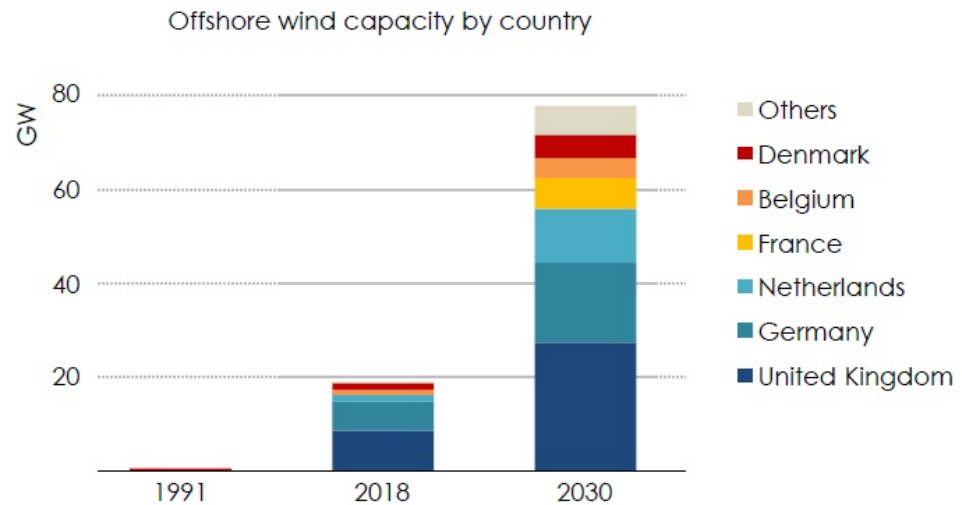
The next day I attended the afternoon session of the “[German American Forum on Offshore Wind Energy](#).” The sponsor of this event, the [German American Chamber of Commerce](#), is, as you might imagine, a big booster of renewables and trans-Atlantic cooperation in that sector. An important player in offshore in Germany, and beyond, is the [Association of German Wind Farm Operators](#), with 18 members across [a spectrum](#) of businesses working to build offshore wind. They count over 1,800 wind farms in German waters, with 6.4 GW of installed capacity, and employing nearly 30 thousand people. The target is for 20 GW by 2030. Their representative made it clear that a stable regulatory framework is critical for the sector to continue to grow. This is, of course, a universal need.

Jim Bennett, the chief of the [Office of Renewable Energy Programs](#) in the US Dept. of the Interior’s Bureau of Ocean Energy Management (BOEM), had some important things to report on the progress of offshore wind in the US. He echoed the sentiments of the Ørsted executive from the previous day’s event: The Eastern US coast has great advantages for wind. Bennett also cited the fact that because the West Coast has a much quicker drop-off into deep water that [floating wind turbines](#) are going to be the technology of choice there. Again, as the technology improves, capital costs go down, and the confidence of investors and developers goes up, the US offshore scene is rapidly progressing. He cited the huge jump in lease prices for offshore sites in just the last three years.

The ED of the [National Offshore Wind Research and Development Consortium](#), Carrie Cullen Hitt, moderated a panel of three key officials from states in the vanguard here in the East: [New York](#), [New Jersey](#), and [Rhode Island](#). Each of these folks had a lot to say about the many benefits of offshore wind, very much including how many jobs there are in construction, as well as operations & maintenance. Each of these states is involved in workforce development as a critical factor in advancing the industry.

Europe, as with so much on the clean energy front, has led the way on offshore wind. As you can see from the graphic here from the IEA’s [recent report](#), there is great potential.

Europe is the technology leader for offshore wind



Europe has fostered the development of offshore wind technology over the past three decades and with current policies it is set to quadruple its capacity by 2030

WindEurope has an even higher goal: 450 GW by 2050. Their report, "[Our Energy, Our Future](#)," shows how eminently realizable that lofty goal is. This video gives you a sense of the possibilities.

Let me leave you with a last thought: As the sector continues to grow, perhaps exponentially in the coming years, the tech is going to explode along with it. Here's a look at how big turbines can get. The [Segmented Ultralight Morphing Rotor \(SUMR\) project](#) could make things **really** interesting offshore.

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