

Watt's Happening? #238

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Good news for 2023: *Danish wind power will blow you away* *How EVs reduce the cost of electricity*



The Danish North Sea Wind Power Hub will be largest wind facility in the world, and will also produce green hydrogen from sea water, a powerful zero carbon liquid fuel.

If you are as convinced as I am that we need to move to the clean energies of sun and wind as quickly as possible, then these two stories will pick up your day considerably.

Denmark has been a world leader in wind power for some 40 years, but their newest plan to build the world's largest wind farm will blow you away.

Denmark was the first country to install off-shore wind turbines, which are more efficient and have a lower environmental footprint than land based generators.

Now Denmark is thinking big, really big, with a project that could be a major player in meeting the

European Union's aim to depend entirely on renewable energy by 2031 and Denmark's goal of ending all oil and gas extraction in the North Sea by 2050.

THE NORTH SEA WIND POWER HUB

This is a proposed energy island complex to be built in the North Sea. The islands, each about six square kilometers in size, will act as energy hubs interconnecting most European countries.

Thousands of floating wind turbines will surround the islands. Described as a "hub and spoke" scheme, the islands will both transmit and store the

electricity generated as well as making green hydrogen (using green electricity to break down sea water into hydrogen and oxygen) which will be piped across Europe and exported around the world.

The first phase will power about one million homes, but that first hub will eventually power some ten million homes.

This shallow area on the North Sea, known as Dogger Bank, can generate up to 110 GW (110 billion watts) of wind electricity, more than fifteen times Denmark's current needs. Fully completed by 2050 it will be by far the largest wind park in the world.

WIND REACHES NEW HEIGHTS

As wind technology improves, wind turbines get bigger. The larger the blade span and the higher the tower, the more energy is produced per kilogram of material invested, and the fewer the turbines needed.

All good news for the birds too. Although domestic cats and glass windows kill many, many, many more birds than wind turbines, the bigger the blades the slower they rotate, reducing the threat to our feathered friends even more. With wind, bigger actually is better!

The newest Danish off-shore turbines are 260 meters tall (850 feet) with 100 meter blades, each producing about 8 megawatts (8 million watts) of power in a nice breeze. Just 300 of these would power all of the homes in Denmark.

Never to be outdone in the renewable energy field, China's largest manufacturer of wind turbines, MingYang, has just announced their giant 16 MW turbine, expected to be operational by 2024. Wow.

EV'S REDUCE THE COST OF ELECTRICITY

New studies indicate that widespread use of electric

vehicles (EVs) is decreasing the overall cost of electricity to consumers. Here is how it works:

Increased energy use for charging EVs increases revenue to the utilities. But most utilities have caps on the amount of revenue that they can generate. That extra revenue cannot be kept in the pockets of the utility companies, but instead must be returned to customers in the form of reduced rates.

A recent National Resources Defense Council study looked at three California utilities that serve more than 735,000 households with EVs. They looked at the cost of providing electricity to those vehicles, compared with the revenue generated by them. It showed that between 2012 and 2021 the utilities made \$1.7 billion in excess profits.

In other words, EVs increase utility revenues more than they increase utility costs, leading to reduced rates for both EV owners and non-EV owners alike.

IN CANADA TOO

Every Canadian province has a regulatory body that approves the rates for electricity and restricts utilities from making more money than their capital costs, so similar principles are at work here too.

Another reason EVs benefit the grid is that they primarily charge during off-peak hours, such as overnight, imposing minimal costs to the grid for new infrastructure while utilizing resources more efficiently.

"Time-of-use" rate structures also help with any grid capacity problems, encouraging EV owners to charge during off-peak hours to save money. Ontario already has time-of-use rates, and most other provinces are close to adopting them too.

So don't worry about all the electric vehicles overwhelming the grid and driving up electricity prices. That's just not Watt's Happening. GOOD NEWS!

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