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POWERING GENERATIONS 2019

LEGACY TO THE FUTURE

www.cleanenergybc.org

Trail, BC
June 4th - 6th

Top Myths about Wind Turbines

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Myth 1
Wind Turbines kill lots of birds

A Comprehensive Analysis of Small-Passerine Fatalities from Collision with Turbines at Wind Energy Facilities

Authors
Wallace P. Erickson
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Douglas H. Johnson,
Joelle L. Gehring
Published: September 15, 2014

Report based on evaluating data from
116 studies at 70 operating facilities.

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Sources of bird fatalities

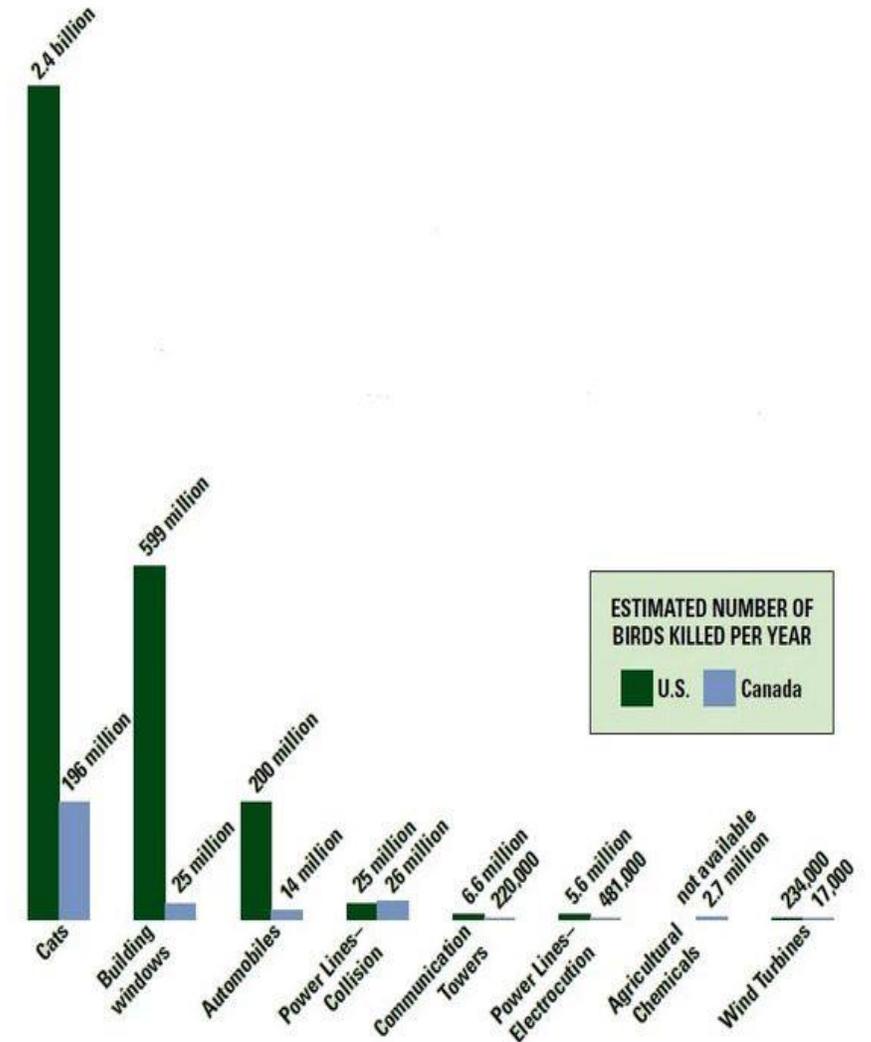| Source of fatalities	Total US and Canada
Wind turbines	368,000
Oil waste water pits	1,000,000
Communication towers	6,500,000
Overhead transmission lines	64,000,000
Buildings and windows	988,000,000

Source of fatalities	Relative to wind
Wind turbines	
Oil waste water pits	2.71 times
Communication towers	17.66 times
Overhead transmission lines	174 times
Buildings and windows	2684 times
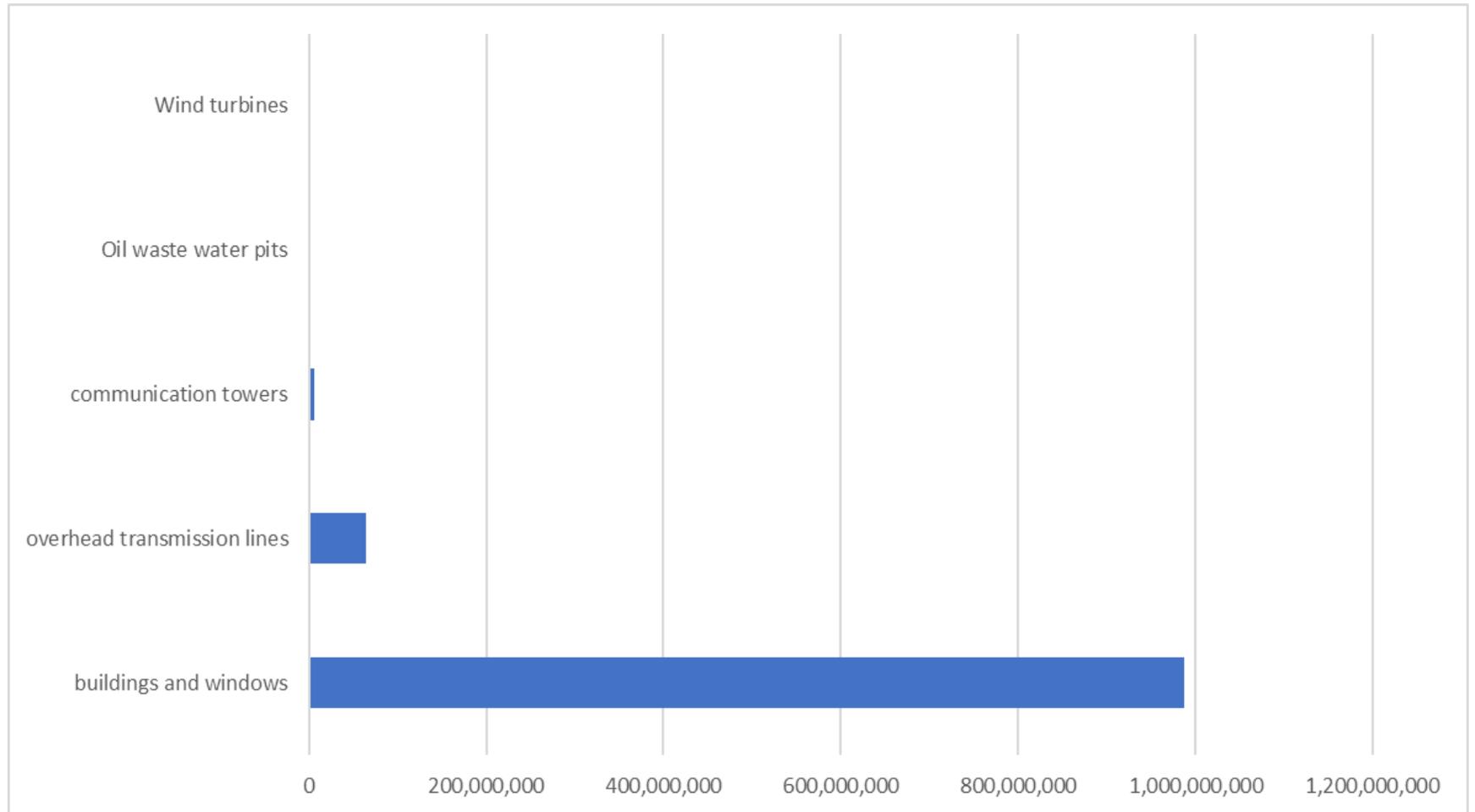
Study based on 62,000MW of operating facilities
BC has @700MW.

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"Cats that live in the wild or indoor pets allowed to roam outdoors kill from 1.4 billion to as many as 3.7 billion birds in the continental U.S. each year".
USA Today Jan 29th 2013

U.N. Biodiversity report says 1 million species face extinction - May 6th 2019

ESTIMATED NUMBER OF BIRDS KILLED PER YEAR

U.S.   Canada

2.4 billion — 196 million — Cats
599 million — 25 million — Building windows
200 million — 14 million — Automobiles
25 million — 26 million — Power Lines-Collision
6.6 million — 220,000 — Communication Towers
5.6 million — 481,000 — Power Lines-Electrocution
not available — 2.7 million — Agricultural Chemicals
234,000 — 17,000 — Wind Turbines

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Myth 2
Wind Turbines are noisy

Wind turbines do make noise. All turbines make noise.
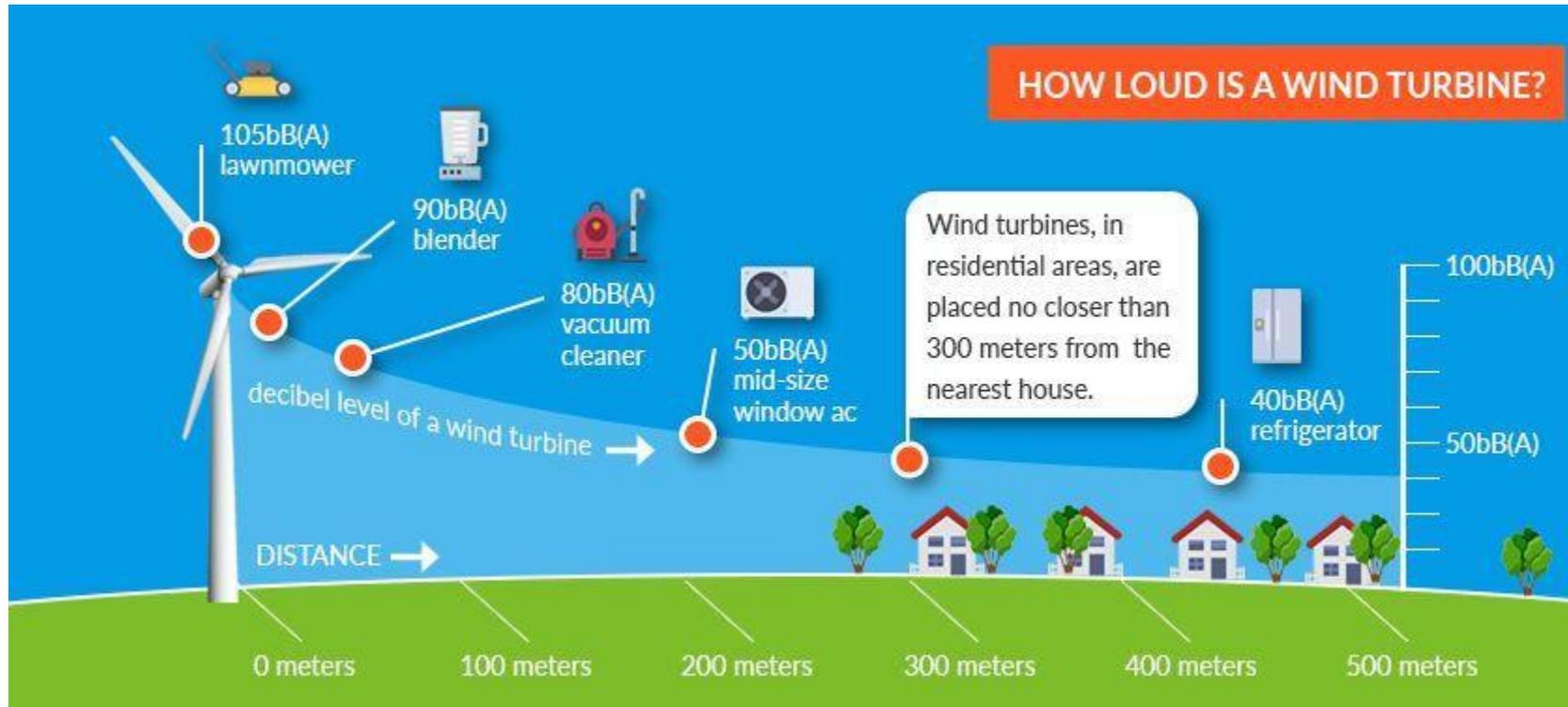
Extract from BC Wind Policy 2019

Management of Sound The sound emitted from wind turbines is not to exceed a maximum of 40 dBA on the outside of an existing permanently-occupied residence (not owned by the proponent) or the nearest property line of existing, undeveloped parcels zoned residential (not owned by the proponent) in existence at the time of application for a Land Act tenure to construct a wind farm. If monitoring has confirmed that the maximum acceptable sound level of 40 dBA is being exceeded at the receptor, the Authorizing Agency may direct the tenure holder, at his/her own expense, to identify, discontinue use of, and decommission those turbines and associated improvements whose emitted sound contributes to the unacceptable sound level.

Myth 3
Wind isn't really environmentally friendly

CO2 production in the manufacture of wind turbines.
Studies by independent research institutes show that wind turbines are champions in the reduction of CO_2. Depending on the examined wind farms, the amount of CO_2 generated by the construction has already been saved after 3-9 months.

Rare metal mining
Permanent magnets, which are used in many electric motors and, indeed, turbines, require rare metals such as neodymium. These types of magnets can be up to 10 times as effective as normal iron magnets. Many companies are conducting research into a replacement of these expensive rare metals. There is a balance between using more effective rare commodities versus making more turbines.
(Rare metals are found across a massive range of consumer goods including mobile phones, laptops, cars and planes. It is a societal issue, not a wind turbine issue. Teck Cominco is, for example, one of the largest producers of indium in the world as a "hitchhiker metal" associated with refining copper, aluminum and zinc, great for solar panel manufacture).

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Myth 4
Wind is not a reliable source of power.

Wind is a predictable source of power.

On an annual basis typical wind turbines produce power 35-55% of the time. The top results now exceed 65%.

In BC the wind is stronger in winter than summer, so higher percentages in winter and lower in summer.

BC's electricity production is mostly based on water, which is driven by melting snow and rainfall, which peak in summer months. Wind in winter is the perfect balance to that system.
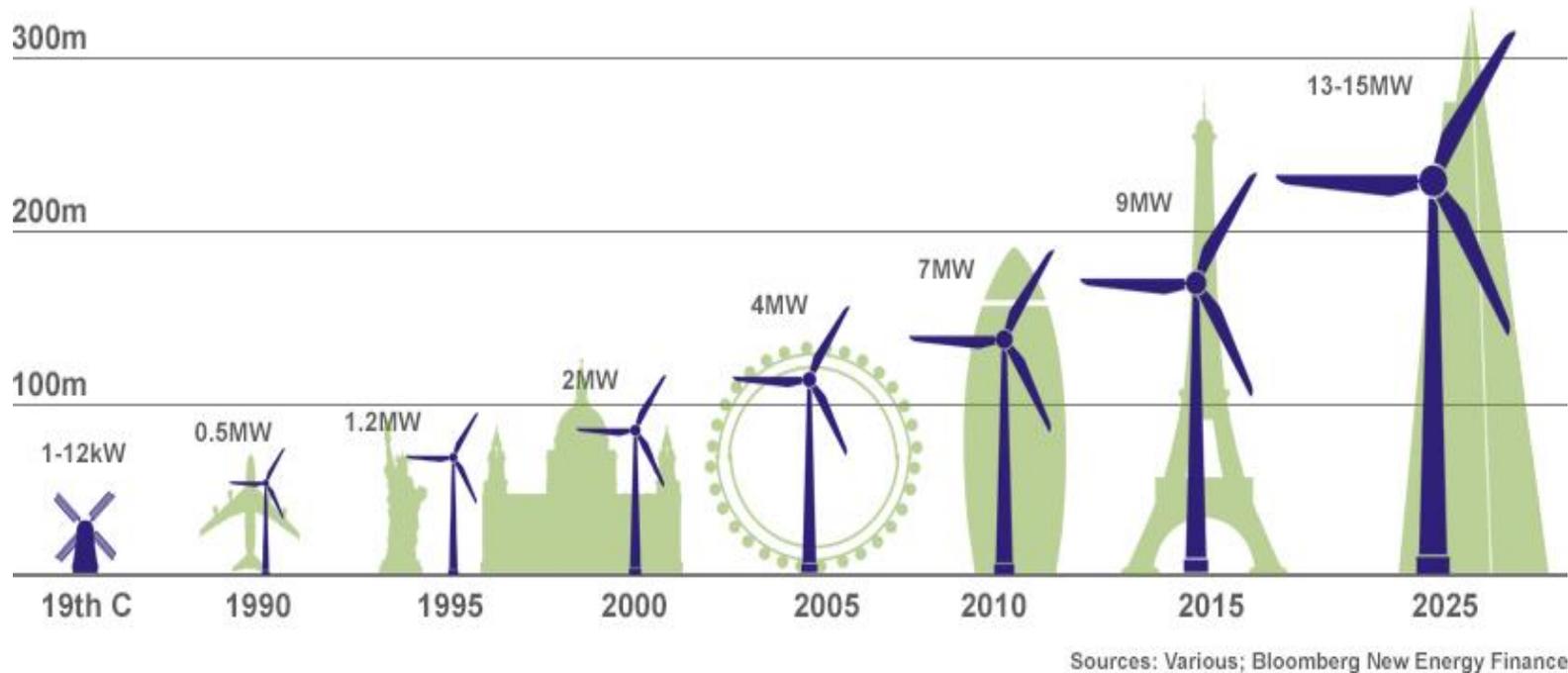
Operators can predict, with 95% accuracy, what they will produce the next day.

More and more wind (and solar) projects are constructed with some form of storage options. Lithium-ion batteries are the commonly expected storage (think cell phones and cars) but flow batteries are probably more appropriate for grid scale storage. Think forwards here. NASA and several private companies intend to have long term bases on Mars within a few years. No gas, no diesel, no hydro facilities available. Massive effort is going into longer term battery storage systems.

BC currently has some of the biggest storage options in the world. We have massive hydro electric dams that are perfectly suited to support all forms of renewables. BC Hydro has added thousands of MW of capacity onto the system in the last two decades. "Capacity" does not create more total electricity, but it does allow you to create more at any one moment in time.

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Myth 5
Wind cannot produce enough power for the Province

300m

200m

100m

1-12kW   0.5MW   1.2MW   2MW   4MW   7MW   9MW   13-15MW

19th C   1990   1995   2000   2005   2010   2015   2025

Sources: Various; Bloomberg New Energy Finance

GE is planning to build the world's largest wind turbine outside the city of Rotterdam. 850 feet from the base of the turbine to the top of the blade. It will produce 12 megawatts of power, enough to keep the lights on in more than 15,000 homes.
(Note – designed for offshore deployment, one onshore test model).

BC Hydro 2013 Integrated Resource Plan Resource Options update showed BC had a potential annual firm energy supply of 46,165 GWh a year from wind. This is based on really old technologies and data as it was based on "BC Hydro Wind Data Study (DNV Global Energy Concepts Inc., April 2009)". BC uses around 60,000GWh a year in total.

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# Myth 6
Wind power, and all renewable options, are expensive
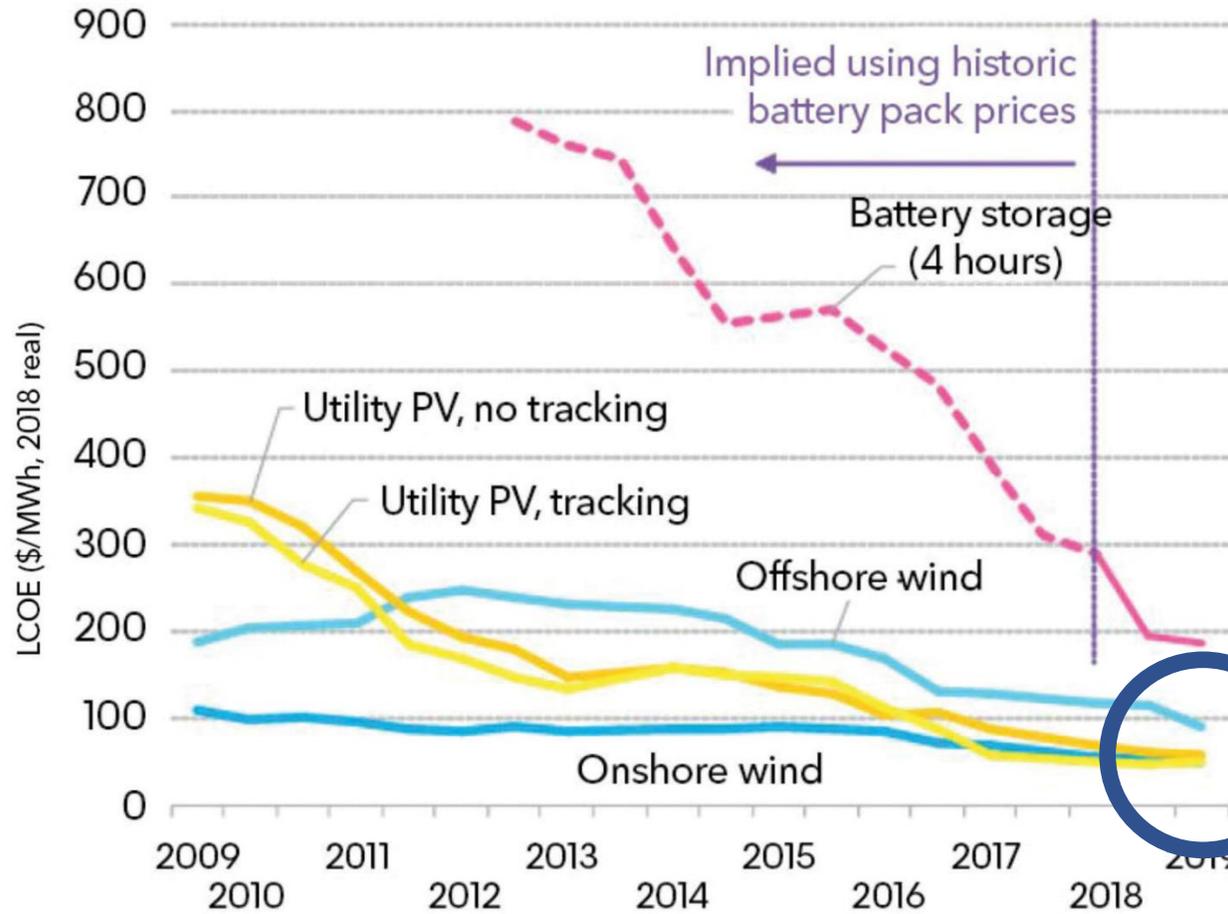
Wind and solar currently around US$50 per MWh on a global basis with Alberta announcing successful bids at Cdn$48 for solar and Cdn$39 for wind in the last six months. Prices are continuing to fall.

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Crash Course

The cost of solar and wind power is expected to keep plummeting

╱ Utility-scale solar PV   ╱ Onshore wind

$50/megawatt-hour

Technology
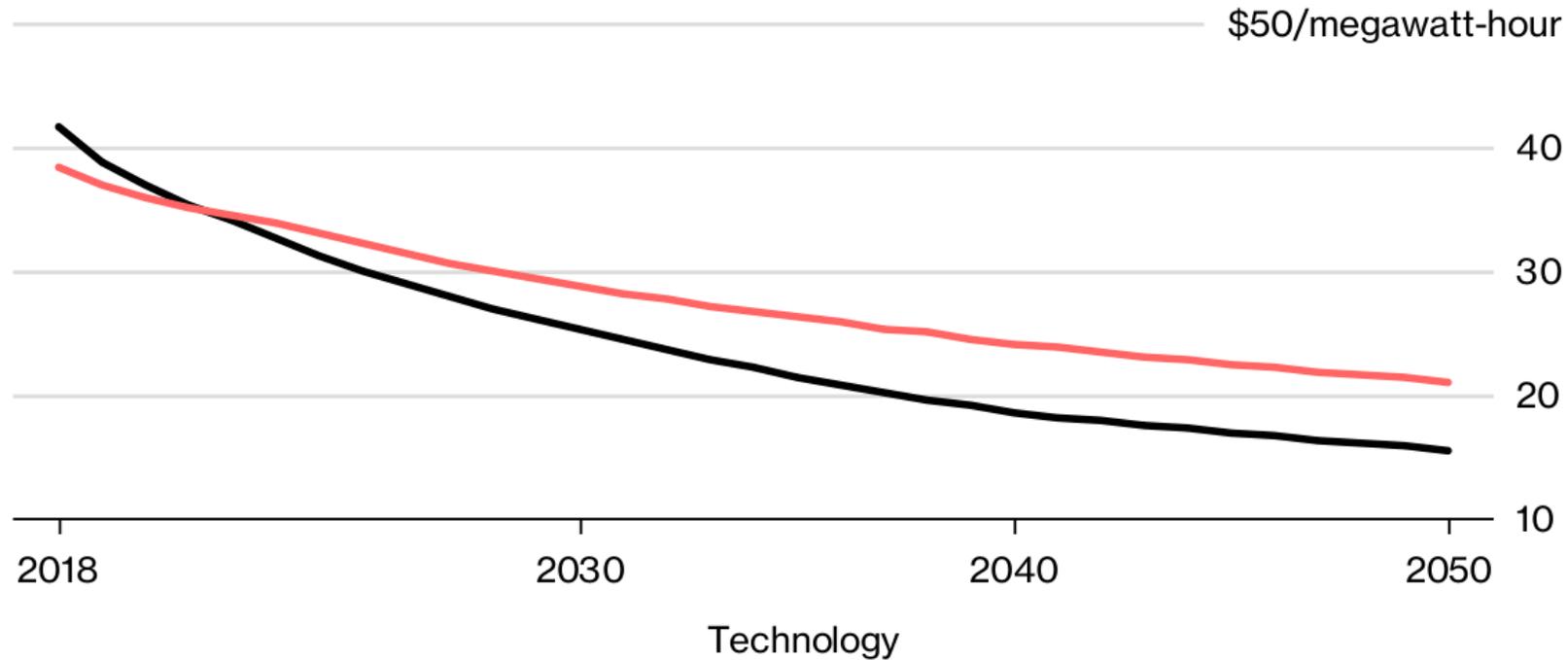
Note: U.S. forecast, figures show levelized cost of energy which is the end-to-end cost of setting up a power plant
Source: Bloomberg New Energy Finance

Bloomberg

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