



*Wind energy projects are operating in over 70 countries around the world as well as in every province in Canada.*

Modern wind turbine technology is a result of advancements in aerodynamics, engineering, electronics and instrumentation. Each of these changes have immensely improved the performance and efficiency of the modern wind turbines.

#### What is Wind Power?

- Wind power has long been used to drive water pumps on Canadian farms – and for centuries in Europe to grind grain.
- Wind energy harnesses the kinetic energy from the wind and converts it into electrical energy for use in our homes and businesses.
- A wind turbine is comprised of 5 key elements; rotor, hub, nacelle, tower and foundation.
- Inside of the turbine is the electrical installation. The nacelle contains the electric generator as the crucial element.
- Typical wind turbines can now generate up to 3 megawatts (MW) of electricity each and are 200 times more efficient than they were two decades ago.
- Advancements in turbine technology have made wind power more competitive. The cost of wind generated electricity has decreased by over 90% since 1980.<sup>1</sup>
- Wind Power is a clean, reliable source of electricity with no exhaust emissions like greenhouse gases or air pollutants.
- Wind energy projects are operating in over 70 countries around the world as well as in every province in Canada.

#### WHY WIND?

- Wind generated power provides a continuous source of clean, green renewable energy with minimal environmental impact.
- Wind energy is proven and cost competitive.
- Wind energy compliments hydro storage projects, allowing water to be stored when the wind is blowing.
- Wind energy projects provide community benefits through property taxes, local employment and tourism.
- Wind energy reduces our reliance on fossil fuel based electricity.

#### THE TECHNOLOGY

- Modern wind turbines convert wind (kinetic energy) into electricity (electrical energy).
- Wind turbines sit atop high towers to take advantage of higher and more constant wind speeds.
- When the wind blows and passes the blades, the rotor of the turbine starts rotating. The rotor is attached to a shaft which subsequently turns gears and a generator inside the nacelle.
- Cables carry the produced electrical current from there down the tower to a substation and onward to transmission lines that then carry it to local homes and businesses.
- The modern commercial scale onshore wind turbine typically stands between 70 to 130 meters tall with three blades each 40 to 60 meters in length.



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Our mandate is to develop a viable independent power industry in BC that serves the public interest by providing cost-effective electricity through the efficient & environmentally responsible development of the province's energy resources.



## WIND POWER IN BC

- British Columbia has some of the strongest, most consistent wind regimes in Canada and the ideal hydro resource base to integrate wind power.
- BC currently has four large operating wind power projects; three in the Peace Region and one on Vancouver Island. In addition there are numerous projects in development and/or construction across the province. A number of areas in BC are undergoing intensive study for the development of wind projects including: Vancouver Island, Northwest Coast, Peace Region and the Interior.
- British Columbia also has vast offshore wind potential; particularly along the north coast where the seabed is flat, the water is shallow and winds are strong.

## ENVIRONMENTAL & REGULATORY CONSIDERATIONS

- A typical 100 megawatt (MW) wind energy project can produce over 300,000 megawatt hours (MWh) of green energy annually, displacing more than 100,000 tons of carbon dioxide; equivalent to taking 25,000 cars off the road each year.
- A single 2 MW turbine can generate the equivalent annual power usage of over 500 BC homes.
- Projects are subject to review by government agencies at both the federal and provincial levels with numerous licenses and permits required to construct and operate a wind power project.
- Throughout the development, construction and operation phases, wind developers work hard to consult with local residents and First Nations regarding project benefits and potential impacts.
- In British Columbia, wind power projects over 50 MW must undergo a comprehensive Environmental Assessment Process.
- The most environmentally responsible way of generating wind energy is also the most economical way to do it: The development of wind projects with multiple wind turbines that use a single transmission line right-of-way to provide more power with a smaller environmental footprint.
- The EAO website (see *Key Links*) contains specific process and project information.

## PUBLIC VS. PRIVATE

- Development of wind projects can be very expensive. Private development transfers all cost and risks during the prospecting, permitting, development, construction and operations to the private industry.
- Competition among private developers and intensive environmental and regulatory application processes ensures only projects which are cost effective and environmentally sustainable are built. Significant public and First Nations consultation occurs throughout the application processes.
- All wind power generated in BC is sold to BC Hydro through contracts lasting between 20 and 40 years.

## SOCIOECONOMIC BENEFITS

- Diversifies economic activity in remote areas.
- Provides training and employment opportunities for regional First Nations and local communities.
- Some First Nations communities have become project partners through participation agreements with the developer.
- Wind energy supports jobs in British Columbia's construction, engineering and design sector.
- Ensures environmentally sustainable development of local resources.
- Building new power generation will reduce BC's reliance on imported power.
- By providing power at a fixed price, wind power eliminates variability in the cost of fuel.



## KEY LINKS

**Canadian Wind Energy Assoc.  
(CanWEA)**

[www.canwea.ca](http://www.canwea.ca)

**American Wind Energy Assoc.**

[www.awea.org](http://www.awea.org)

**European Wind Energy Assoc.**

[www.ewea.org](http://www.ewea.org)

**British Wind Energy Association**

[www.renewableuk.com](http://www.renewableuk.com)

**German Wind Energy Association**

[www.wind-energie.de/en](http://www.wind-energie.de/en)

**Environmental Assessment Office**

[www.eao.gov.bc.ca](http://www.eao.gov.bc.ca)

**BC Ministry of Energy, Mines  
& Petroleum Resources**

[gov.bc.ca/empr](http://gov.bc.ca/empr)