

# Alberta Wind Market Profile



## Wind Energy in Canada

Wind energy is one of the fastest growing major sources of new electricity around the world, and Canada is no exception.

More wind energy has been built in Canada over the last decade than any other form of electricity generation, with installed capacity growing by an average of 20 per cent per year. Canada is a major player on the global scene ranking ninth in the world for total installed wind energy capacity.

Despite this progress, we have barely scratched the surface of our wind energy potential.

## Wind Energy in Alberta

Wind energy is an established and growing player in the Alberta electricity market, providing clean and renewable electricity for Albertans. **Alberta now ranks third in Canada with an installed wind energy capacity of 1,483 MW.**

**Generating approximately seven per cent of Alberta's electricity in 2017, wind energy helps to diversify Alberta's electricity generation mix.**

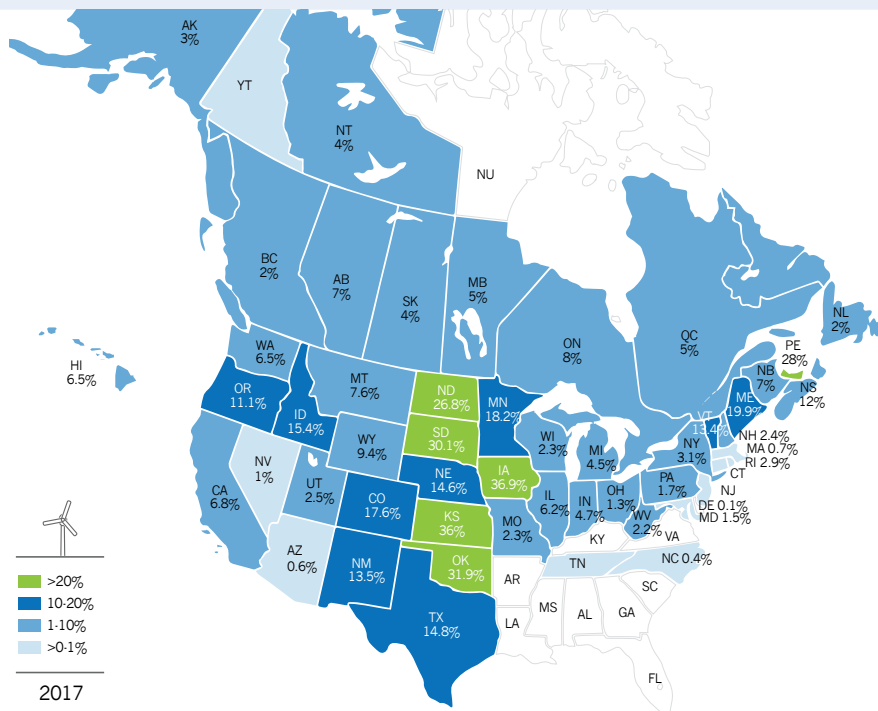
The amount of electricity produced by the province's wind farms is equivalent to the amount of electricity needed to power approximately 380,000 average sized homes.

## Part of Building a Modern and Reliable Electricity System

There is no doubt that Alberta's high-quality wind energy resource represents a huge opportunity to build a modern electricity system – one that contributes low-cost power and flexibility.

It is a myth that equal amounts of back-up power, such as natural gas or hydro generation, must be available to manage the variability of wind energy generation. Independent of wind energy, a level of reserve power is always maintained to manage existing grid variability – this reserve power is necessary for all types of electricity generation on the grid. The incremental reserve power required to manage the additional variability from wind represents only a small fraction of the total amount of wind energy added to the grid. In Alberta for example, a 2016 technical study prepared by GE Energy Consulting with the input from grid operators in Canada showed that if by 2025 the province increased its wind energy capacity to meet 50 per cent of electricity demand, the additional regulation reserves required would be as low as 2.4 per cent of the total wind generating capacity<sup>1</sup>.

1 GE Energy Consulting, Pan-Canadian Wind Integration Study, 2016



**Meeting about seven per cent of electricity demand, wind energy in Alberta has room to grow.** Levels of wind energy integration are going up, and in many jurisdictions around the globe, large amounts of wind energy are being reliably and cost-effectively integrated within the electricity grid. In fact, five U.S. states (Iowa, Kansas, Oklahoma and North and South Dakota) already have wind energy reliably providing more than 20 per cent of electricity.



## Diversifying Electricity Supply Stimulates Investment and Creates Jobs

Alberta stands to benefit from increased world-wide investment in clean energy. **It has been estimated that almost 750 billion dollars will be invested globally in renewable energy sources by 2040 – almost three quarters of all new power investment<sup>2</sup>.**

**Alberta has the supply and the skills to be a wind energy leader in a global market.**

Diversifying electricity generation with wind energy stimulates investments and creates jobs in one of the key technologies associated with the transition to lower carbon energy production and use. In fact, the 2017 *Alberta Wind Energy Supply Chain Study* estimates that Alberta's Renewable Electricity Plan is expected to drive \$8.3 billion of investment in new wind energy projects in the province. These projects are expected to result in \$3.6 billion in local spending in province and 28,000-job years of employment by 2030.

<sup>2</sup> Bloomberg New Energy Outlook 2017

Host communities also realize significant economic and social benefits through new municipal tax revenues, plus stable income for farmers and landowners from land lease agreements. It has been estimated that the wind industry will make additional annual contributions of \$25.5 million in municipal property taxes and \$13.5 million in land lease payments to Alberta land owners in meeting the Alberta government's target of 30 per cent renewable electricity by 2030.

## Lowest Cost Option for New Electricity in Canada

In December 2017, a competitive electricity-supply auction in Alberta yielded **the lowest-ever rate paid for wind energy in the country**, a weighted average of \$37 per MWh. Furthermore, with wind energy costs falling so steeply, some new wind energy facilities have already surpassed yet another milestone – they have begun to produce power even more cost-effectively than many existing generating facilities.

As with many other renewable energy technologies, there are no fuel costs for wind energy which means stable pricing over the long-term.

# Canada's wind energy industry has...



Attracted more than **\$23 billion in investment**



Created nearly **58,000 person-years of employment** in construction and operations



Directly benefited more than **299 communities** in **12 provinces and territories**, including involvement with over **35 Indigenous communities**



**Manufactured** blades, towers and other components in the wind turbine supply chain

## Alberta Wins by Growing Wind Energy Industry

**Wind energy could meet more than 90 per cent of Alberta's renewable energy target and result in:**

**28,000**

job years

**\$25.5 million**

annual municipal property taxes

**\$3.6 billion**

project development and construction spending

**\$13.5 million**

annual land lease payments



## Reducing Emissions in Alberta's Electricity System

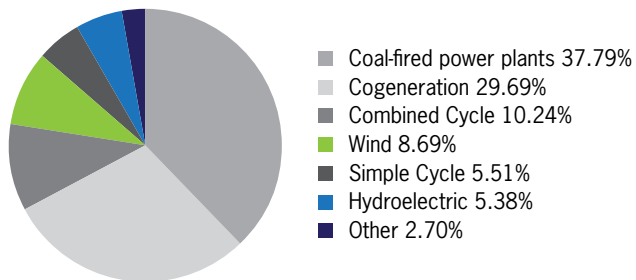
By replacing coal-fired generation with wind energy Alberta can reduce GHG emissions in the electricity sector and lay a foundation for deeper cuts through electrification of other sectors of the economy.

### How can wind energy benefit the environment?

- Wind energy generates electricity without emitting air pollutants, particulate matter, or waste of any kind.
- Wind energy uses significantly less water than conventional power plants.
- Coal-fired electricity releases about 20 times more GHGs per kilowatt-hour than wind-powered electricity.<sup>3</sup>

Phasing out the province's coal generation fleet and sourcing 30 per cent of power from renewables by 2030 puts Alberta well on its way to achieving long-term and sustained reductions in GHG emissions. In fact, it has been estimated that Alberta's coal phase out will offset approximately nine to ten million tonnes of GHG emissions per year<sup>4</sup>.

### Where Does Alberta's Power Come From?



Source: Alberta Electric System Operator as of March 2018

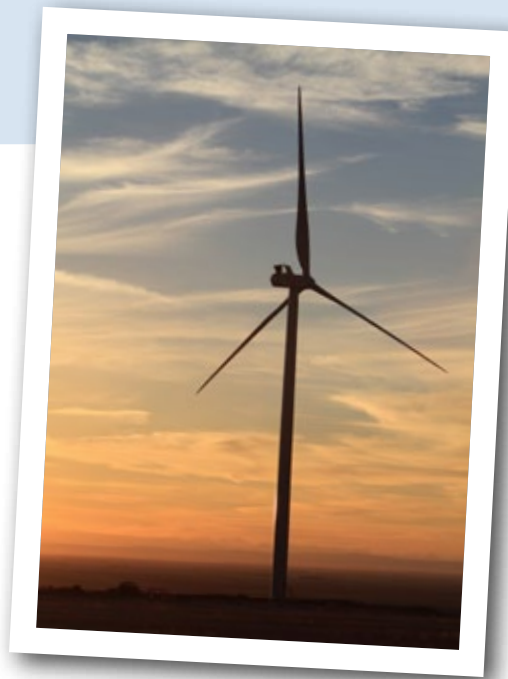
<sup>3</sup> Life Cycle Greenhouse Gas Emissions from Electricity Generation, <https://www.nrel.gov/analysis/life-cycle-assessment.html>

<sup>4</sup> Tim Weis, Ph.D., P.Eng., Executive Director, Electricity, Centre for Applied Business Research in Energy and the Environment (CABREE), University of Alberta

## Blackspring Ridge Wind Farm in Vulcan County

### A wind farm this size:

- Reduces Alberta's GHG emissions by approximately 600,000 tonnes a year – that's the equivalent of taking 120,000 cars off the road.
- Reduces water consumption by 960 million litres a year, relative to natural gas generation – equivalent to the volume of 320 Olympic-sized swimming pools.



Visit [canwea.ca](http://canwea.ca) for more facts, infographics and success stories related to wind energy in Alberta.

## Get the Facts!

**Fact:** Wind energy is a cost-effective solution for Albertans

**Fact:** Wind energy is providing significant economic benefits to local communities across Alberta

**Fact:** Wind energy is helping Alberta diversify the economy, create local green jobs, reduce greenhouse gas emissions, improve air quality and fight climate change

**Fact:** Public opinion polling in Alberta in 2017 shows that 83 per cent of respondents believe climate change is happening and the majority believe immediate and significant action is needed

**Fact:** Alberta has enormous wind energy potential, easing the transition from the use of coal in electricity generation