RED ROCK
wind project

Today you will be able to meet the team, learn more about the Project and get answers to your questions.

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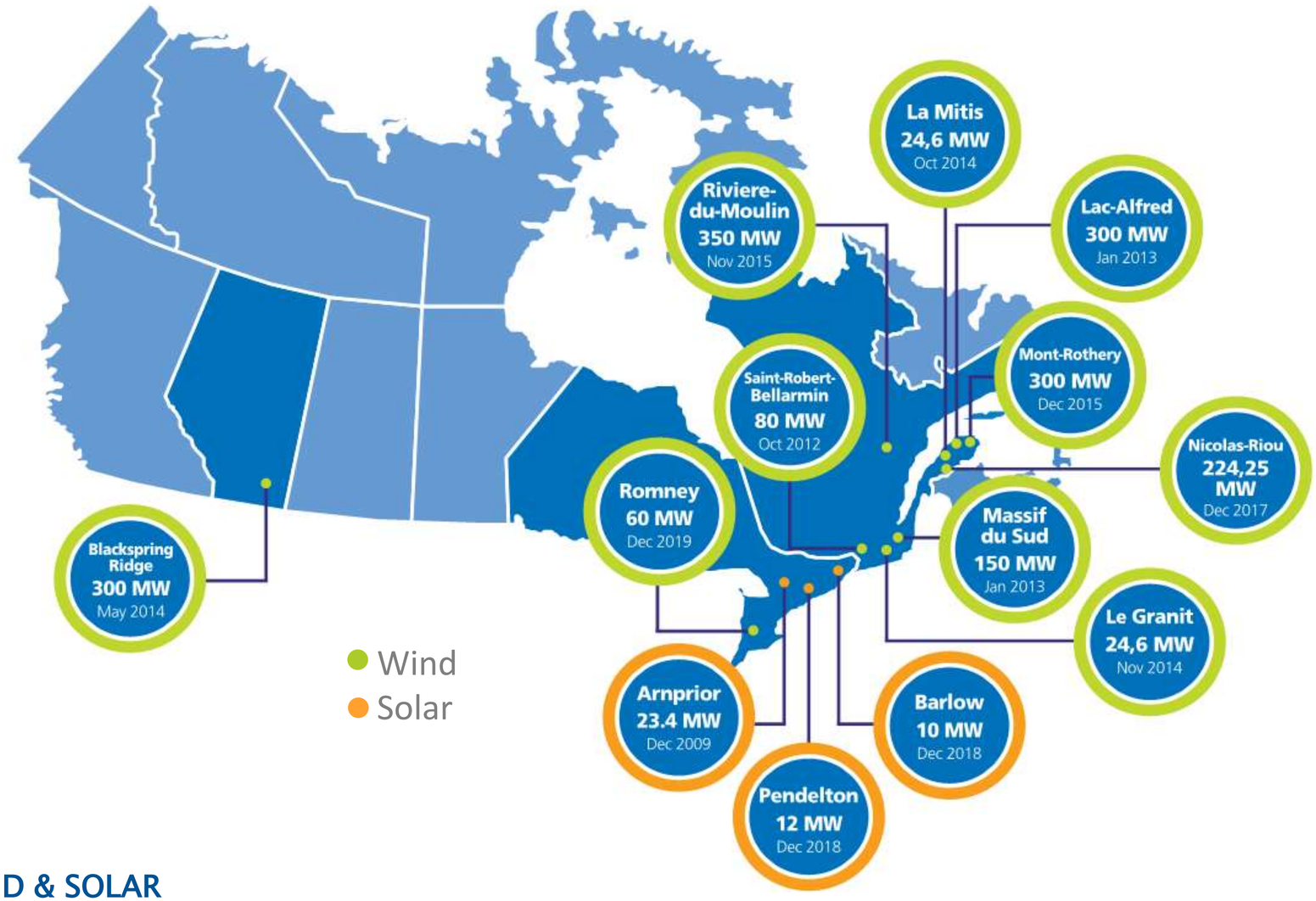
WELCOME TO EDF EN CANADA'S OPEN HOUSE

RED ROCK WIND POWER PROJECT

EDF EN CANADA

1 680 MW

Put into Service, under Construction or in Development



WIND & SOLAR

1 374 MW (350 000 homes) Commissioned Capacity

224 MW (54 900 homes) Under Construction

82 MW (20 100 homes) In Development

OPERATIONS & MAINTENANCE

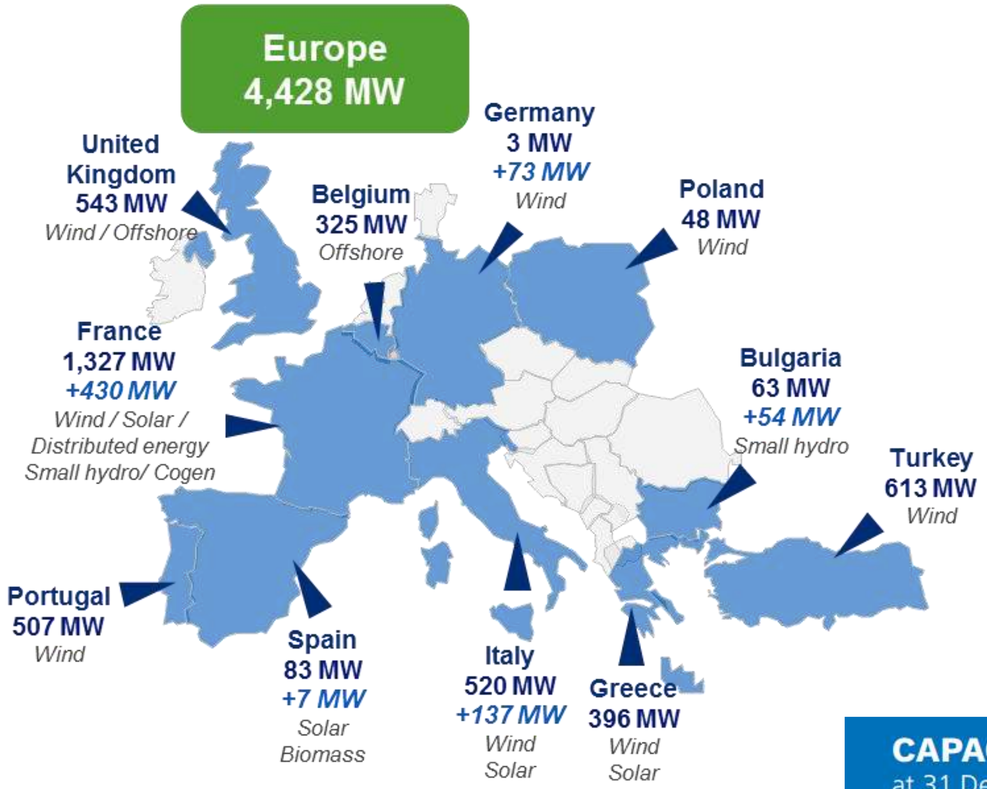
1 061 MW Wind

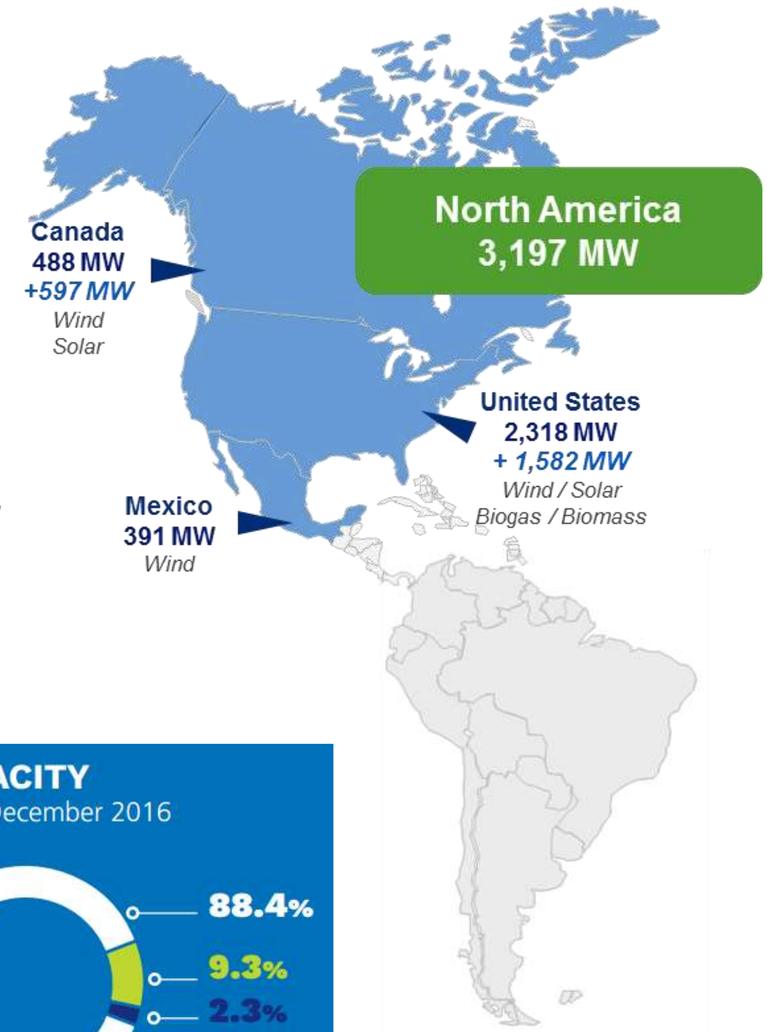
516 MW Solar

>$3.5 billion invested in Canada since 2008

EDF ENERGIES NOUVELLES

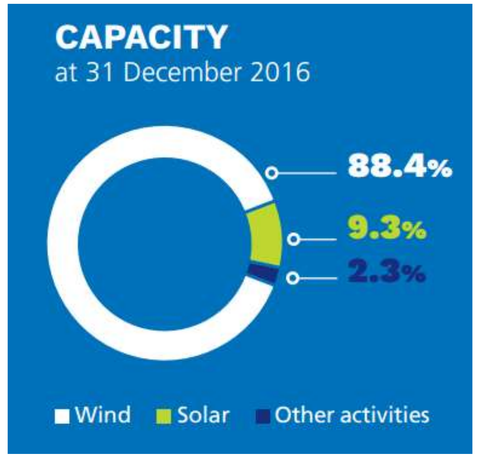
A WORLD LEADER IN RENEWABLE ENERGY





LEGEND

-**MW** : EDF EN **installed** capacity
-*MW* : EDF EN **developed, built and sold** capacity



21 countries throughout North America, South America, Europe, Africa, the Middle East, and India

> 3,000 employees

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WIND ENERGY: HOW DOES IT WORK?

1 **Turbine blades** generate lift from energy extracted from the wind with rotations between 9-16 rotations per minute (RPM).

- 10.5 km/h (3 m/s) is the minimum speed needed to generate enough lift to start operation and electricity.
- 43 km/h (12 m/s) is the speed needed to produce at full power.
- 90 km/h (25 m/s) is the maximum speed. At speeds higher than this, the turbine shuts down to ensure safety and prevent equipment failure.

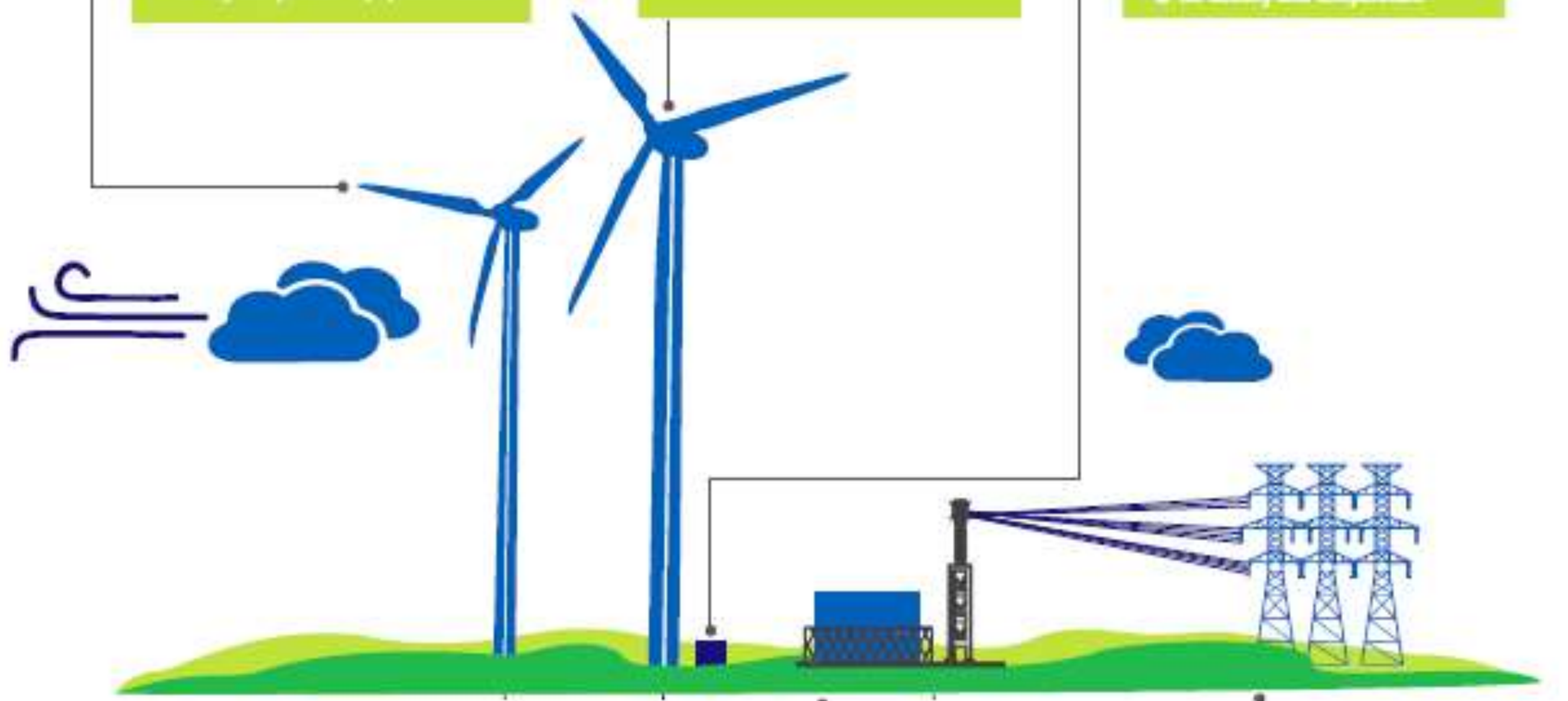
2 The **electrical generator** inside the turbine rotor converts mechanical energy into electrical energy. The electricity produced is then converted to the right voltage for distribution.

It might appear relatively small, but the powerful nacelle, which is the box at the top of the turbine, weighs roughly 70 tonnes and contains the majority of the wind turbine components, which includes the gearbox, rotor shaft, brake assembly and the transformer.

3 The pad-mounted **transformer** is located at the base of the turbine or inside the nacelle and efficiently transports electricity by the collector system.

The quantity of energy produced by a turbine largely depends on:

- wind speed
- the area swept by the blades
- generator size
- air density and temperature



4 The **collector system** carries electricity to the Project collector substation. Collector systems are circuits, usually underground, that connect wind turbines together.

5 At the **Project collector substation**, the voltage is transformed once more to higher voltages.

6 Electricity is metered and delivered to the utility.

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WHAT IS THE AESO RENEWABLE ELECTRICITY PROGRAM?

Alberta is changing the mix of power generation to include a larger portion of renewable energy in the province - including wind and solar.

In March 2017, the Alberta Electric System Operator (AESO) launched the Renewable Electricity Program (REP) – a competitive procurement program intended to encourage the development of 5,000 MW by 2030.

The REP will administer a series of competitions. Round 1 of the program begins in 2017 and the Project intends to participate in this round.

The first round of the REP competition includes the procurement of up to 400 MW of renewable electricity for projects that will be operational by December 31, 2019.

More information can be found at www.aeso.ca

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WHY DID WE PICK THIS PROJECT SITE?

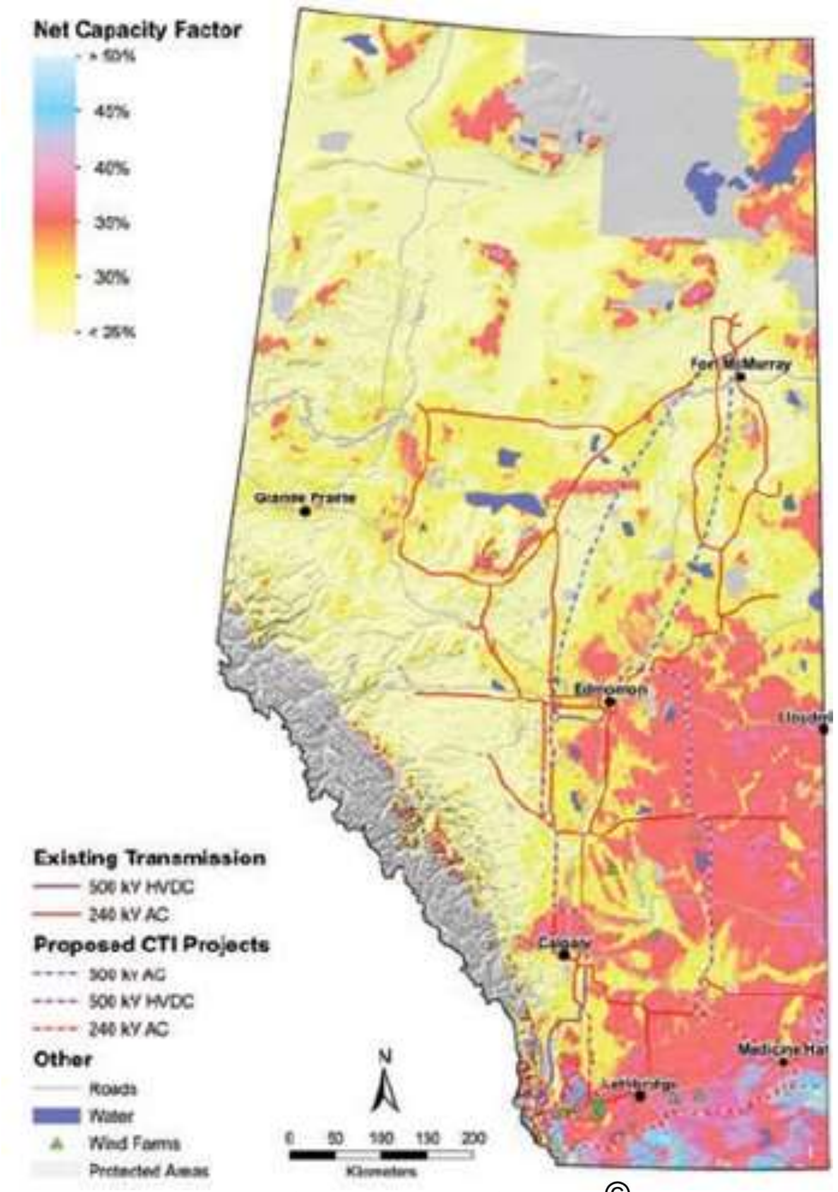
Close proximity to existing transmission

Strong wind resource

Supportive local community

Compatible with existing agricultural use

ALBERTA'S WIND RESOURCE



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wind project

PROJECT DESCRIPTION

DEVELOPER	EDF EN Canada Inc.
PROJECT NAME	Red Rock Wind Power Project
HOST MUNICIPALITIES	County of Forty Mile
CONTRACT CAPACITY	Up to 250 MW

ENERGY

The Project will generate sufficient electricity to power up to 75,000 homes

LOCATION

Located on approximately 11,400 acres of privately owned land

ELECTRIC SYSTEM

Each turbine will be linked to the Project collector substation by a collector system that will be underground, wherever practical. The location of the Project collector substation has not been determined at this time.

INTERCONNECTION

The Project will be interconnected to the 240 kilovolt (kV) transmission system in the area that is operated by AltaLink.

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RED ROCK wind project

PROJECT MAP

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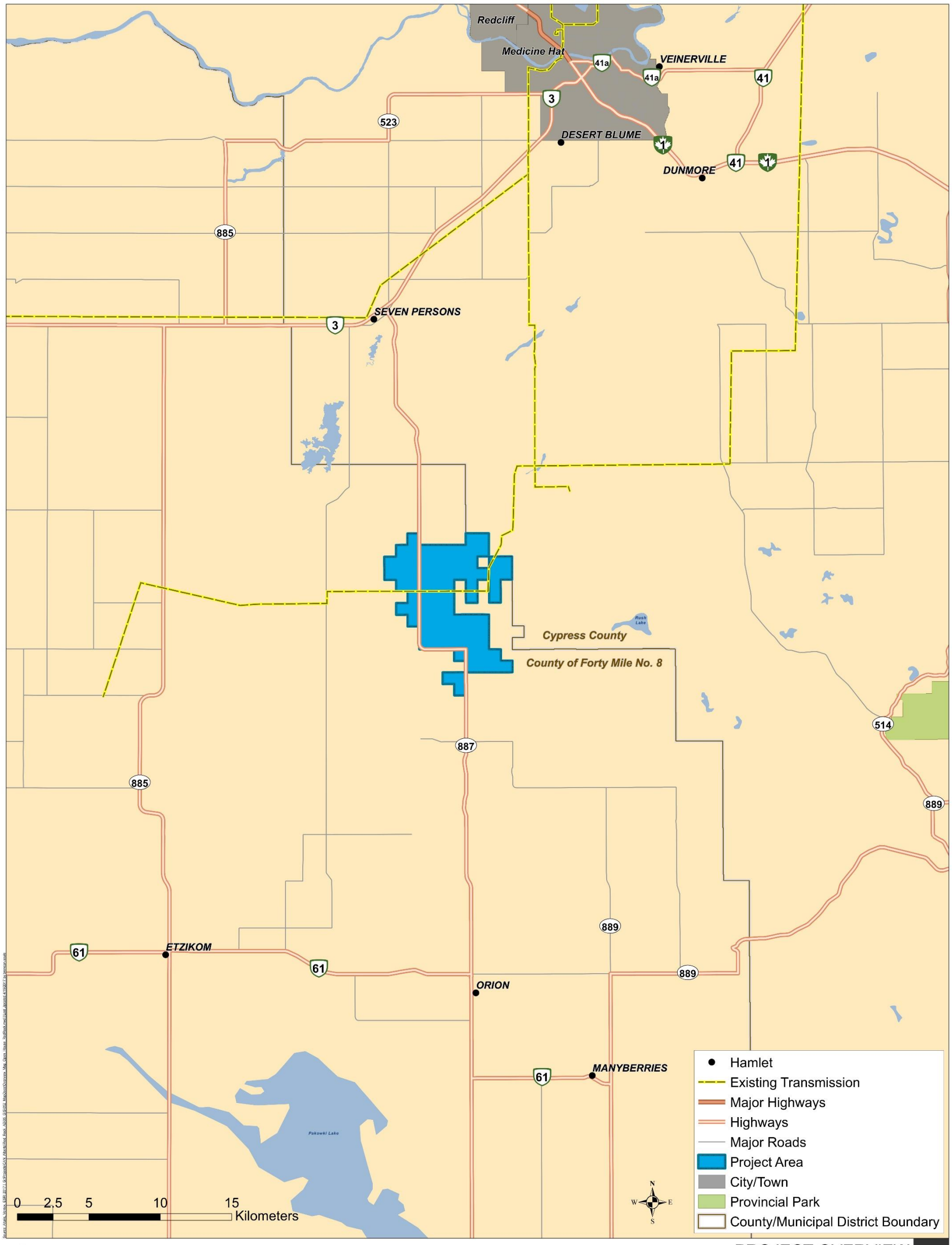

Regional Map

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PROJECT MAP

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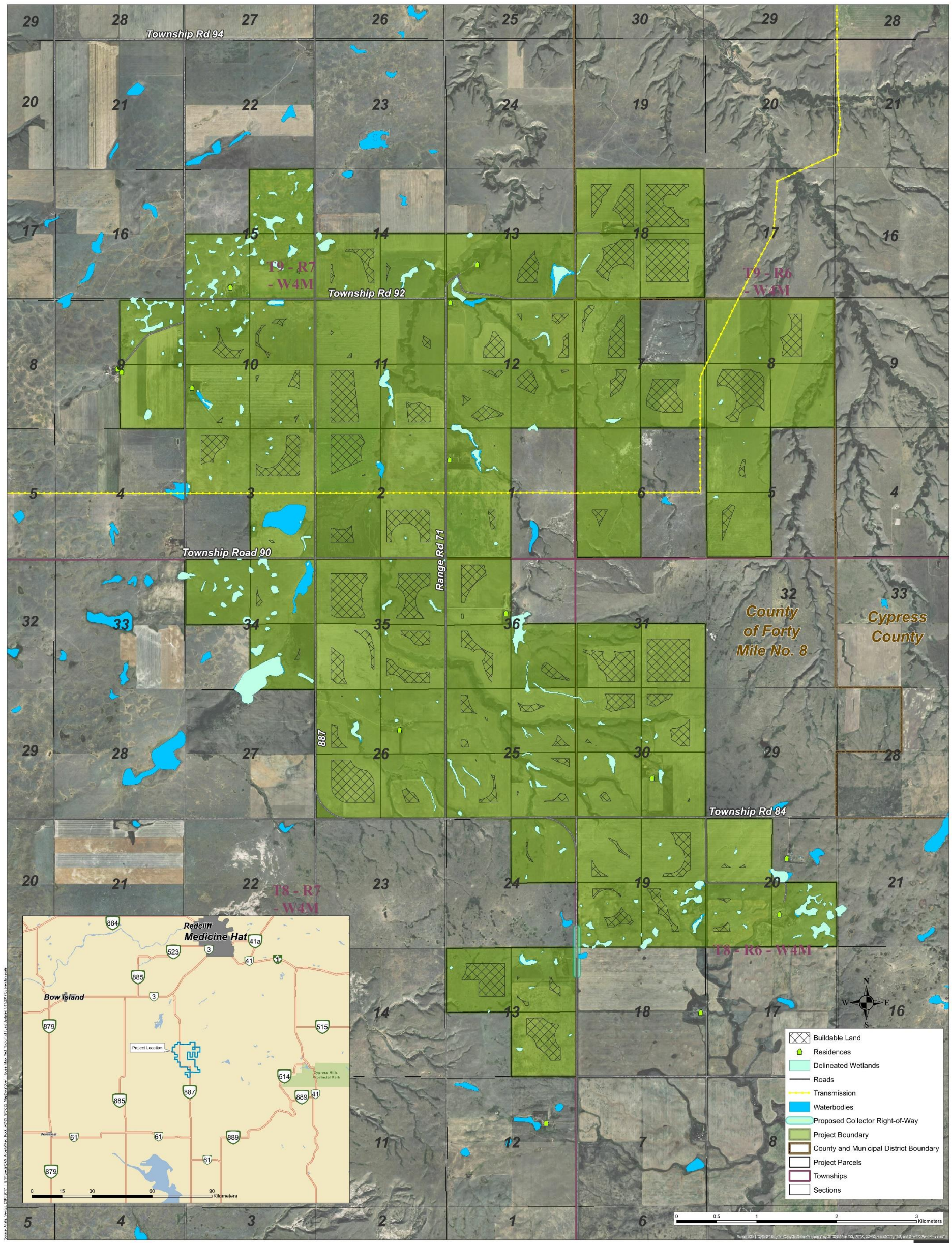

Buildable Areas Map

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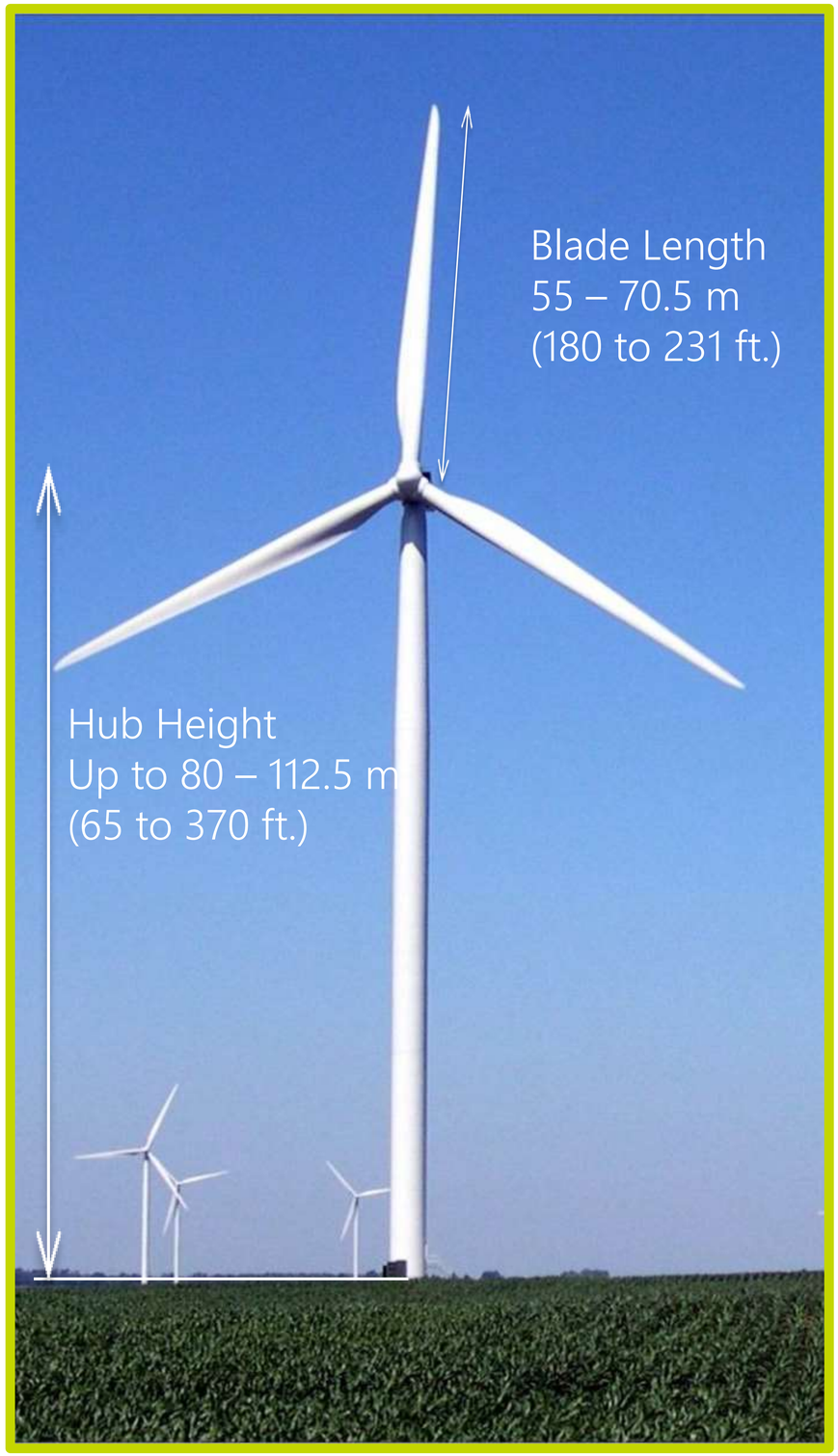
TYPICAL PROJECT INFRASTRUCTURE

- Wind Turbines
  - 59-125 Turbines
  - Blades (55 – 70.5 m)
  - Hub Height (up to 112.5 m)
  - Rotor Diameter (110 to 141m)
  - Foundation
  - Capacity (2 to 4.2 MW)
- Access Roads
- Temporary Laydown Area
- Collector System
- Project Collector Substation
- Pad Mounted Transformers
- Operation and Maintenance Building
- Temporary and Permanent Meteorological Towers



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PROJECT AND COMMUNITY ENGAGEMENT TIMELINE

Q4 2016
- Initiation of Public consultation
- Commence environmental fieldwork

APRIL 2017
- First Project mail-out to affected stakeholders
- First open house

Q2 2017 / Q3 2017
Buildable areas phase 1 application submitted to AUC for review and approval

Q3/Q4 2017
Second open house

SEPTEMBER 2017
Update Project mail-out to affected stakeholders

Q4 2017
Completion of Environmental field studies

Q4 2017 / Q1 2018
Buildable areas phase 2 application submitted to AUC for review and approval

Q2/Q3 2018
Anticipated AUC approval

Q4 2018
Anticipated start of construction

Q4 2019
Anticipated commercial operations

ALBERTA'S RENEWABLE ENERGY APPROVAL PROCESS

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Step 1 *

Public consultation by the applicant.

Step 2

Application filed with the Alberta Utility Commission (AUC) .

Step 3

The AUC issues a notice of application or notice of hearing.

Step 4*

Interested parties submit filings to the AUC with any outstanding issues or objections. If the AUC does not receive any submissions, the application will be reviewed and a decision may be made without a hearing.

Step 5*

The AUC issues a notice of hearing, if it was not already issued in Step three.

- Continued opportunity for consultation and negotiation with the applicant.

Step 6*

Public Hearing

Step 7

The AUC issues its decision. Options the AUC may consider for:

Needs applications from the Alberta Electric System Operator:

- Approval of applications.
- Return to the Alberta Electric System Operator with suggestions.
- Denial of application.

Facilities applications:

- Approval of application.
- Approval of application with conditions.
- Denial of application.

Step 8

Options to appeal decision or ask the AUC to review its decision.

Step 9

Approvals, construction and operation of facility, if approved.

*Denotes opportunity for public involvement.

WHY WIND MAKES SENSE

1 MW Turbine ~ 300 homes

= 25 Households

Every 1 000 MW of new wind energy drives $2.5 billion in investments, creates 10 500 person-years of employment, and provides enough clean power for over 300 000 Canadian homes.

Source: CanWEA http://windfacts.ca/community-property

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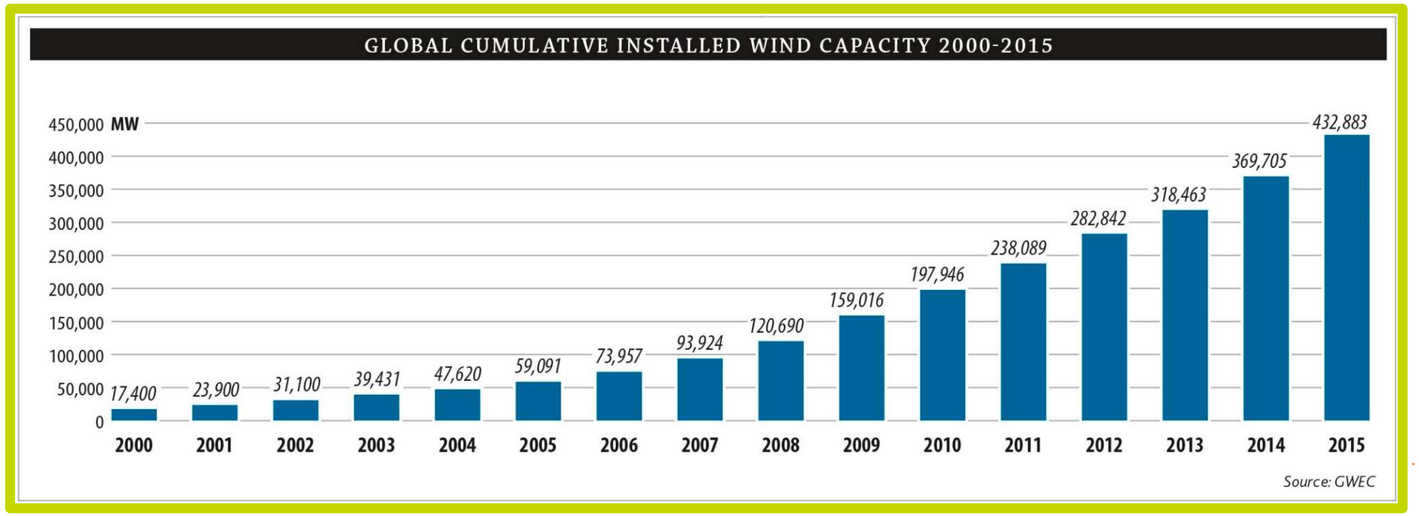
Global Installed Wind Capacity 2000–2015



Clean power — Wind energy reduces dependence on other forms of electricity generation that contribute to greenhouse gas emissions.

Local job opportunities — Contractors, suppliers and local businesses benefit from the direct and indirect economic activity the project brings to the local economy.

Clear air — Wind energy emits no greenhouse gas during the production of electricity.

Water conservation — Wind turbines do not use water to produce electricity.

Predictable pricing — Wind generated electricity prices are fixed and stable, unlike natural gas or oil which have volatile and unpredictable pricing.

HEALTH CANADA STUDY

In 2014, Health Canada commissioned a $1.2 million study on the potential impacts of wind turbines on human health.

A hardcopy of the key findings brochure is available. Please ask any EDF EN Canada staff for a copy.

- ## Illness and disease

  No evidence was found to support a link between exposure to wind turbine sound and any of the self-reported illnesses and/or chronic conditions.

- ## Stress

  No association was found between the multiple measures of stress and exposure to wind turbine sound.

- ## Sleep

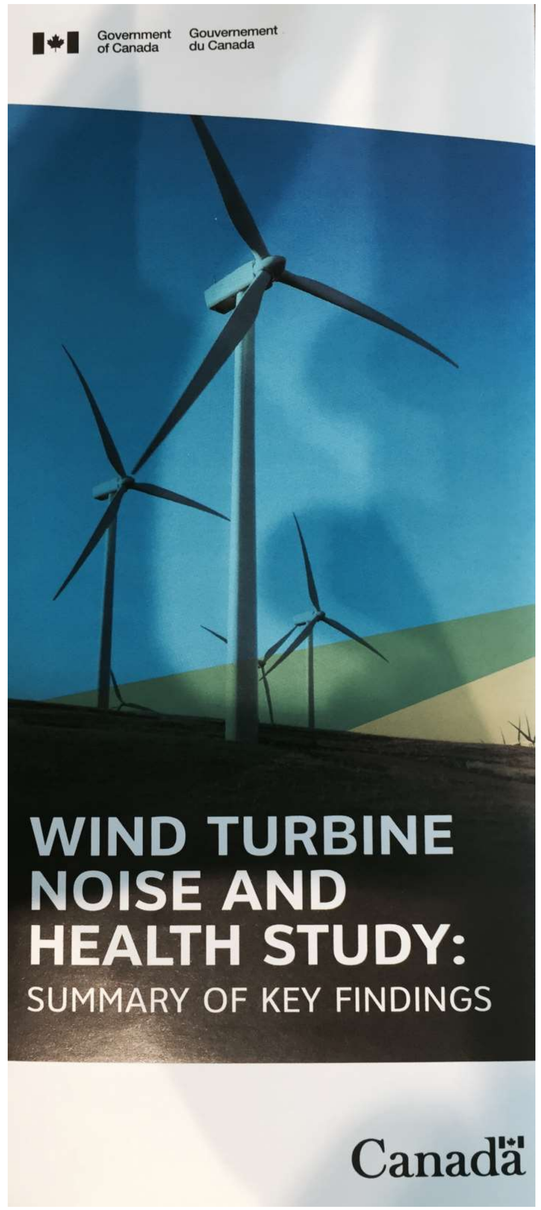
  No association between wind turbine sound and self-reported or measured sleep quality.

- ## Annoyance and quality of life

  No association was found with any significant changes in reported quality of life, or with overall quality of life and satisfaction with health.*

Ontario Chief Medical Officer's 2010 report which concluded:

There is "no scientific evidence of any direct causal link between wind turbines and adverse health effects."



*Assessed using the World Health Organization's Quality of Life Scale.

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WIND AND PROPERTY VALUES

According to CANWEA, studies have consistently shown there is no causal relationship between wind farms and negative impacts on property values.

"The Board finds there is **no evidence** to allow the Board to conclude that since the construction of the wind farm properties on what [the landowner] defines as the west side of the Island have sold for less than properties on the east side."

(Source: Ontario Assessment Review Board. File No: WR 113994. Municipality: Township of Frontenac Islands)

In 2014, MPAC (Municipal Property Assessment Corporation) performed a study that looked at all properties close to 1 157 turbines in total, and concluded that "there is **no statistically significant impact** on sale prices of residential properties in these market areas resulting from proximity to an industrial wind turbine."

(Source: Municipal Property Assessment Corporation)

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AVIAN IMPACTS

"It is estimated that each year more than 10 000 migratory birds are killed in Toronto between the hours of 11:00 p.m. and 5:00 a.m. in collisions with brightly lit office towers."

Source: www.flap.org

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Well sited wind projects should have minimal impacts upon local bird and bat populations.

- Working closely with Alberta Environment and Parks, EDF EN Canada Development will undertake significant bird and bat studies to quantify potential risks and develop mitigation tools to ensure sustainable development.
- Potential impact on birds, bats and raptors will be considered in the Environmental Evaluation.
- A multi-year post-construction wildlife monitoring program will be undertaken to determine the actual Project effects.

A report published in Avian Conservation & Ecology stated:

"Overall…the effects of collisions, nest mortality, and lost habitat on birds associated with Canadian wind farms appear to be relatively small compared to other sources of mortality."

Source: Zimmerling, R. J., Pomeroy, A.C., d'Entremont, M. V., and Francis, C.M. (2013)

IN HARMONY WITH AGRICULTURE

- EDF EN Canada recognizes that we can't have a project without the support of local landowners and we work diligently to make sure we listen and co-operate.
- Well designed wind energy projects complement farming activity with minimal disruption.
- We work very closely with our landowners to ensure project infrastructure fits with current and future land use.

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POWERING PROGRESS WITH COMMUNITY PARTNERS

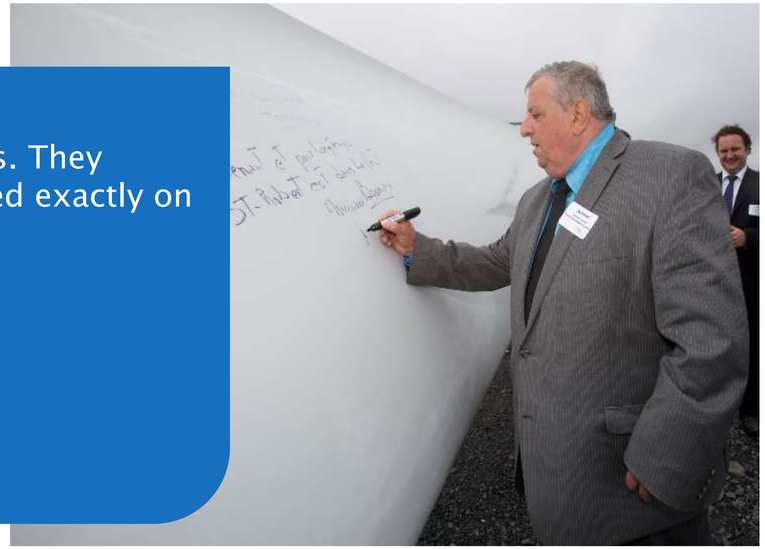
"Our community is very proud to be a part of such an important renewable energy project. There are tremendous economic benefits to our community including the more than 350 jobs that were created during construction and another 20 permanent operations and maintenance jobs."

Kym Nichols,
Mayor of Carmangay, AB
Blackspring Ridge Wind Project (300 MW)

"EDF EN Canada has established an open and honest communication process. They shared with us their plans and have delivered exactly on their promise. This is the key to success."

Jeannot Lachance and Michel Polin,
Mayors of Saint-Robert-Bellarmin, QC

Saint-Robert-Bellarmin Wind Project (80 MW)
Le Granit Wind Project (24,6 MW)



"I consider the work done for this wind project to always have respected the important values of the MRC du Granit. Moreover, respecting the vision of the MRC, EDF EN Canada was able to put the citizens and the environment at the heart of their priorities in the development and construction of this valuable wind project."

Maurice Bernier,
Prefect of Granit MRC, QC (2005-2014)
Le Granit Wind Project (24,6 MW)

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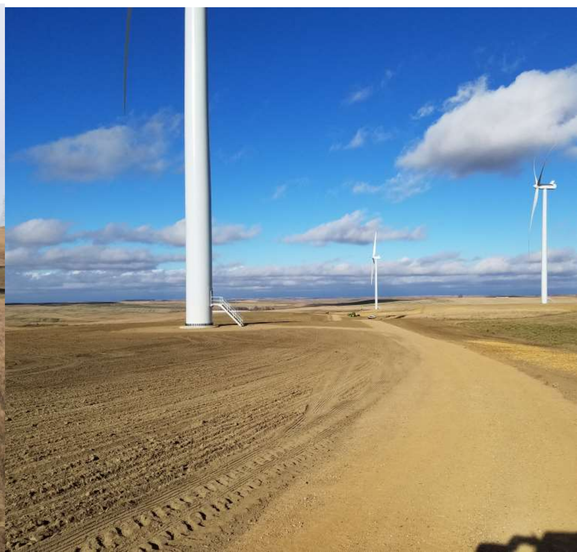
ENVIRONMENTAL AND TECHNICAL ACTIVITIES UNDERWAY

Wind power project design includes consideration of impacts on wildlife and vegetation.

EDF EN Canada commenced environmental studies in 2016. As development progresses, additional field studies will focus on:

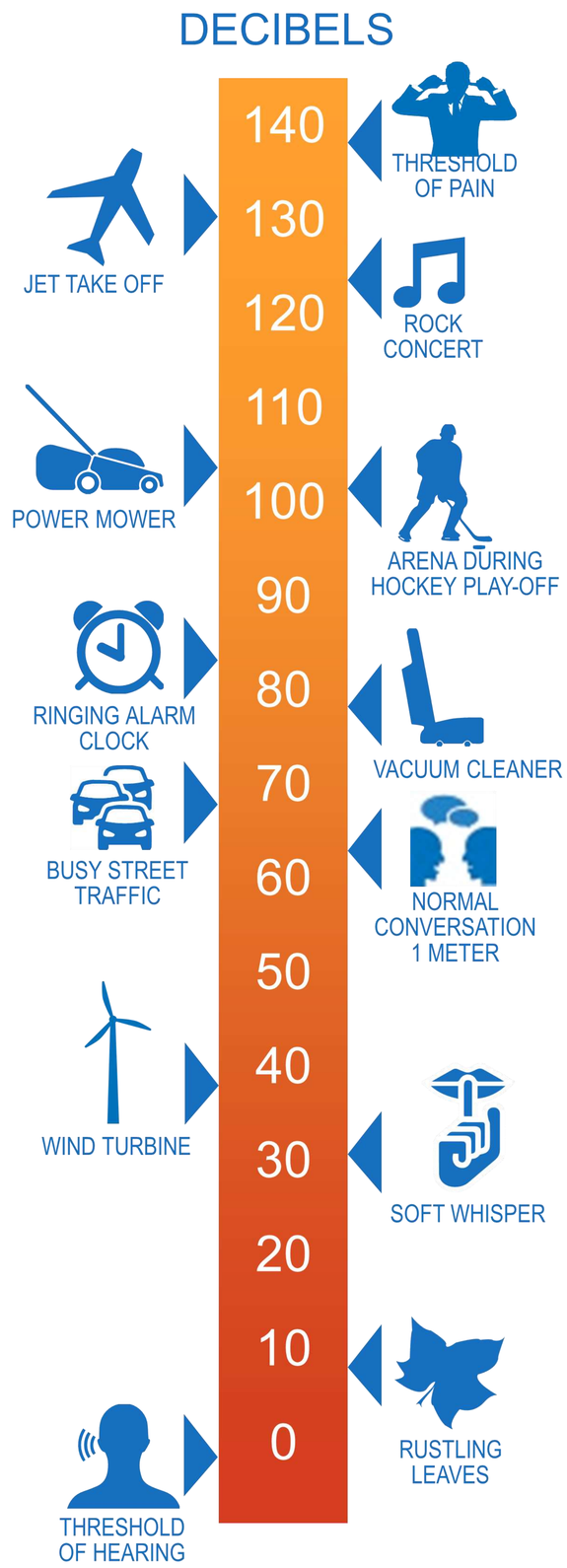
- Wildlife – birds, bats and other wildlife
- Wetlands
- Noise Impact Assessment
- Historical Resources

Throughout the development of the Project, we will work closely with Alberta Environment and Parks to ensure a robust understanding of the site.



NOISE IMPACT ASSESSMENT

- All wind energy projects must meet Alberta Utilities Commission (AUC) Rule 012: Noise Control.
- The Noise Impact Assessment will be completed for all residences and dwellings within 1.5 kilometres of the Project.
- The study will include the noise from the Project and other operational and proposed facilities nearby.
- The Noise Impact Assessment results will be used to determine the final turbine layout.



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MUNICIPAL AND LOCAL COMMUNITY BENEFITS

EDF EN Canada values the long-term benefits of working with the local community. If the Project is approved, the local community will benefit from:

- **Employment** opportunities during the construction and operation phases of the Project
- **Contract opportunities** for local businesses
- **Local investments** into hospitality and construction services during the development, construction and operation phases of the Project
- **Tax revenues** throughout the life of the Project

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LOCAL ECONOMIC BENEFITS

Direct benefits

The Project will result in increased job opportunities for the local area. Some of these job opportunities may include:

- Surveying
- Civil engineering
- Mechanical work
- Electrical work
- Road construction
- Transportation equipment
- Earthwork activities
- Maintenance of vehicle fleet
- Maintenance paths
- Snow removal
- Other related services

Indirect benefits

Increased spending on goods and services during the operations and construction phases.

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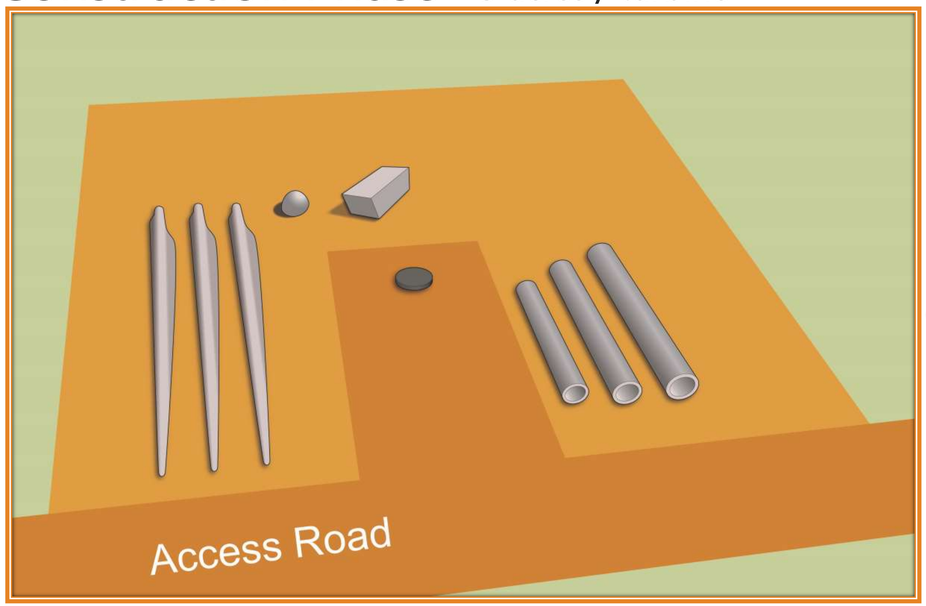
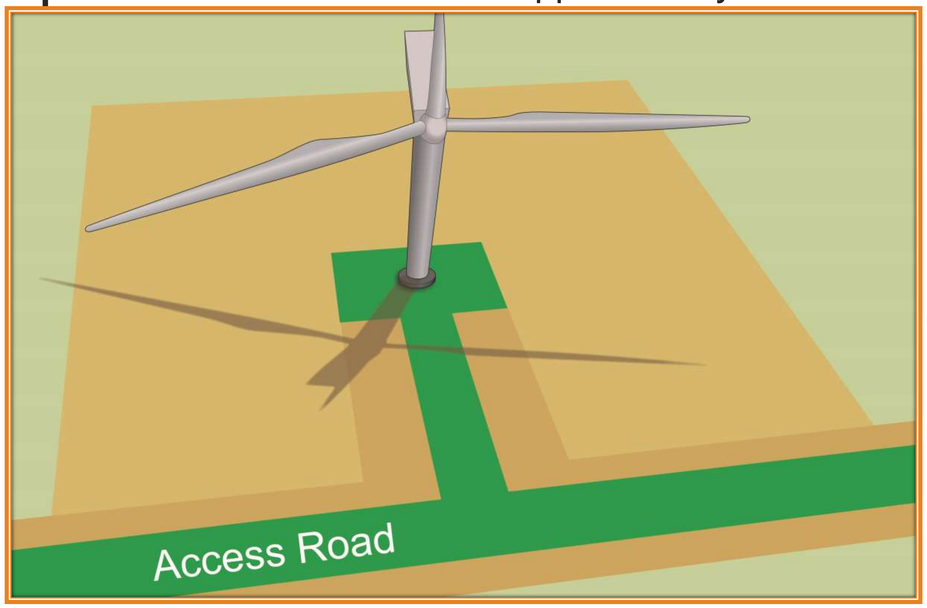
ACCESS ROAD & TURBINE PAD

Construction Phase - 5 acres / turbine



A temporary turbine pad area of about 80m diameter will be created at each turbine location, in order to deliver all the required turbine components on each turbine pad.

Operational Phase – approximately 0.25 to 0.5 acres / turbine



After construction, the access road width and the turbine pad will be reduced to limit impacts on agricultural use.

TURBINE FOUNDATION & COLLECTION SYSTEM CONSTRUCTION

- The turbines will be installed on top of a buried, cast-in-place reinforced concrete foundation.

Foundation excavation. Diameter approx. 20 m

Reinforcing steel installation. Between 40-50 tons of rebar

Each foundation requires approx. 400-600 m3 of concrete.

- **The electrical system will consist of underground cables or overhead lines and a Project collector substation. Ploughing, trenching, and directional drilling will be used to install underground cables. The cabling will be buried at a depth that will not interfere with normal agricultural practices.**

Buried collection system

Substation connecting a project to a transmission line

TURBINE ASSEMBLY

Transportation of turbine components

Approximately 12 trucks are required for delivery of a complete turbine.

Tower assembly

6 to 7 tower sections.

Nacelle installation

The nacelle weighs about 65 tons.

Blade assembly

The blades will be attached to the hub on the ground or lifted one at a time onto the hub.

OPERATION AND MAINTENANCE BUILDING & PERMANENT METEORLOGICAL TOWERS

- An operation and maintenance (O&M) building will be built to allow operators to maintain the turbines and house spare parts.
- Wind speed, wind direction, temperature and humidity will be measured by permanent meteorological towers. At least one permanent meteorological tower will remain on site for the duration of the Project.

A WORLD LEADER IN RENEWABLE ENERGY

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THANK YOU FOR ATTENDING

Your feedback is important to us

Did you fill out a feedback form ?

CONTACT US:
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844-553-3336
WEBSITE:
www.edf-en.ca/project/red-rock-wind-power-project/