

# Lanfine

Lanfine North and South Wind Power Projects



OPEN HOUSE



# Welcome to BowArk Energy and Pattern Development's Open House

## Lanfine North and Lanfine South Wind Power Projects

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



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## Who are we?

Since our last public engagement in February 2017, Pattern Development Lanfine Wind ULC, a subsidiary of Pattern Renewable Holdings Canada 2 ULC, acquired the Lanfine North and Lanfine South Wind Power Projects from BowArk Energy Ltd.

Though the projects' owner has changed, BowArk will lead the projects' development until the operations phase.

### BowArk Energy

- BowArk Energy Ltd. is a renewable energy and natural gas power developer based out of Calgary, Alberta
- Owned by Clearwater Fine Foods Inc., a multi-million dollar seafood company based in Nova Scotia
- BowArk Energy has the experience, knowledge, and financial backing to be an industry leader in renewable energy projects in Alberta

### Pattern Development

- Pattern Development is a leader in developing renewable energy and transmission assets
- With a long history in wind energy, our highly-experienced team has developed, financed and placed into operation more than 4,500 MW of wind power projects
- We have a global footprint currently spanning the United States, Canada, Mexico, Chile and Japan and a strong commitment to promoting environmental stewardship drives our dedication in working closely with communities to create renewable energy projects

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# BowArk and Pattern Development's highlighted projects

We have a previous partnership track record that dates to 2009, with two operational wind power projects

## South Kent Wind Farm

- Owned by Pattern Energy and Samsung Renewables
- Electricity generation and environmental attributes are sold under a 20-year power purchase agreement with the Independent Electricity System Operator
- The South Kent Wind Community Fund is administered by the Chatham Kent Community Foundation and contributes approximately \$250,000 to local charitable organizations each year in perpetuity
- There was an average of 300 workers on-site throughout project construction and over 500 workers during peak construction periods
- The operating team employees more than 20 permanent positions

Location	Chatham, Ontario
Number of Turbines	124
Project Size	270 MW
Turbine	Siemens 2.3 MW
Commercial Operation	2014

## St. Joseph Wind Farm

- Owned by Pattern Energy
- Second commercial wind power project in Manitoba and the largest in the province
- Electricity generation and environmental attributes are sold to Manitoba Hydro under a long-term power purchase agreement

Location	St. Joseph, Manitoba
Number of Turbines	60
Project Size	138 MW
Turbine	Siemens 2.3 MW
Commercial Operation	2011

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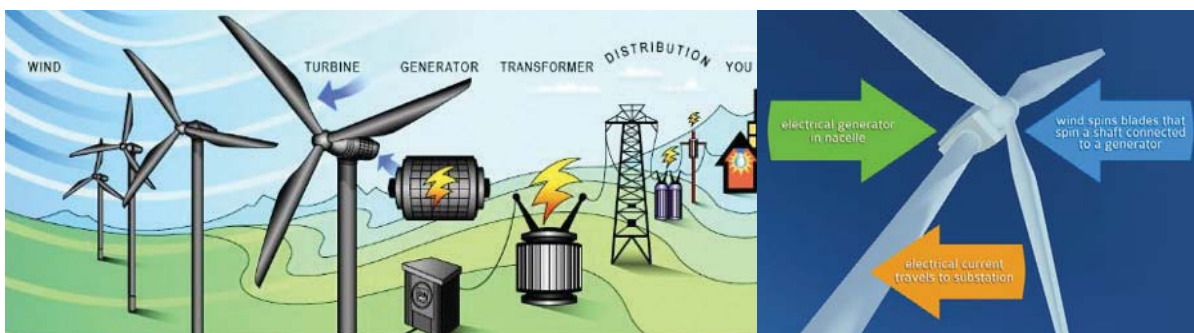
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## How wind power works

Wind is produced by the uneven heating of the earth's surface by the sun. The wind causes the turbine blades to spin. The spinning blades cause a generator to rotate, converting the wind energy into electricity.



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## Benefits of wind power

- Wind power provides free fuel for life, with stable prices to protect consumers
- It is more cost-competitive than any other new source of energy today, and the costs are still declining
- It uses very little water and does not pollute water in the production of electricity
- It helps to diversify Alberta's electricity supply
- It reduces air pollution



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## Local community benefits

- We have committed to a community benefit fund, We would like to hear from you for how the fund should be structured and how we can help you
- Municipal tax revenues throughout the Project life
- Construction and operations jobs, and support services during and after construction of the Project
- Contract opportunities for local businesses
- Increased local spending on goods and services during the Project's development, construction, and operational phases

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## Why wind? Why now?

- Alberta is changing its mix of power generation to include a larger portion of renewable energy in the province — including wind and solar
- The Alberta Electric System Operator (AESO) intends to encourage the development of renewable power through a series of competitions
- Lanfine North Wind Power Project submitted a response to the AESO's request for qualifications in June 2017, and we are continuing to participate in the Renewable Electricity Program (REP)
- The first round of the REP, includes procuring up to 400 MW of renewable electricity for projects that are required to be online by 2019
- Lanfine South Wind Power Project intends to participate in future rounds of procurement

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## Why was this site chosen?

- Wind resource is strong and steady and not too gusty which means larger rotor machines can be used
- Proximity to the Alberta transmission system means a competitive interconnection cost
- Land use is generally agricultural which is compatible with wind turbine technology and avoids environmentally sensitive areas
- Proximity to community centres for local employment and services





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# General project information

Developer: BowArk Energy Ltd. and Pattern Development

Total installed capacity: 285 MW

Municipalities: Special Areas 3 and the Municipal District of Acadia

Project Name	Lanfine North Wind Power Project	Lanfine South Wind Power Project
Project Capacity	145 MW	Up to 140 MW
Number of Turbine Locations Considered	40 or 42 turbine locations	39 turbine locations
Project area (private agricultural land)	15,000 acres	14,500 acres
Projected Commercial Operations	Q4 2019	Q4 2020

The Project will generate enough electricity to power approximately **150,000 homes**

Typical project infrastructure includes: Wind turbines, access roads, collector systems, substations, transmission lines, operations and maintenance building, temporary laydown areas and meteorological towers

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## Project infrastructure

Turbine Option A and Turbine Option B:

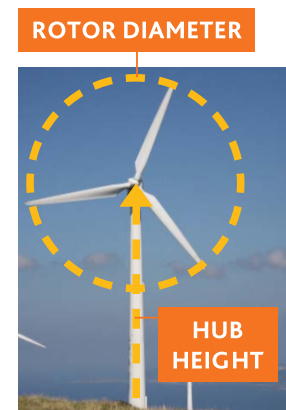
Number of turbines: 81 or 79

Total number of turbine locations: 83 considered

Turbine capacity: 3.465 or 3.6 megawatts

Hub height: 97 or 105 metres

Rotor diameter: 132 to 136 metres



Access roads:

- Temporary access roads will be used during construction and are wider than permanent access roads to accommodate cranes
- Permanent access roads will be designed to allow landowners easy crossing by farm machinery

Project collector system and substation:

- Link the turbines to the Lanfine North and Lanfine South collector substations
- Medium-voltage power collection system
- Combination of above- and below-ground cables

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# Project infrastructure

## Interconnection

- 144 kV transmission lines developed and constructed by ATCO Electric will connect Lanfine North and Lanfine South separately to the Alberta Integrated Electricity System
- Lanfine North will connect to the existing ATCO 959S substation
- The interconnection location for Lanfine South continues to be evaluated

## Operations and maintenance building

- One building will be used to support Lanfine North and Lanfine South
- The building will either be located at SW-19-27-4-W4M beside the Lanfine North Project collector substation, or in the Town of Oyen

## Temporary laydown areas

- Will be used during construction for storage of equipment and materials
- Location to be determined and is in consultation with the Town of Oyen

## Meteorological tower

- Meteorological towers form part of the project footprint

Final project infrastructure will be determined through stakeholder consultation, noise studies, constructability reviews, and environmental and engineering studies

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## Project siting Setbacks

The following setbacks have been integrated into the Project design:

- Environmental setbacks from sensitive species and sensitive habitat;
- Noise compliance under the Alberta Utilities Commission Rule 012: Noise Control;
- Municipal bylaws and development permit requirements;
- Existing infrastructure such as roads, pipelines, oil and gas facilities, wells, transmission lines and distribution lines;
- Electromagnetic interference such as weather and defense radar and communication links;
- Airports and airstrips; and
- Constructability

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## Project siting Environmental considerations

- Environmental studies help assess and mitigate potential environmental impacts
- Studies completed include:
  - **Wildlife:** birds, bats, and other sensitive species
  - **Vegetation:** habitat mapping and native prairie grass and rare plant studies
  - **Wetlands:** mapping, classification, and field verification
  - **Noise:** impact assessment
  - **Historical resources:** archaeological and cultural features
- Alberta Environment and Parks will review the field survey data and provide a wildlife referral report that will be submitted to the Alberta Utilities Commission
- Wind power project design considers impacts on wildlife and vegetation

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## Project siting Noise impact assessment

- All wind energy projects must meet Alberta Utilities Commission (AUC) Rule 012: Noise Control
- BowArk is conducting a noise impact assessment for all residences and dwellings within 1.5 kilometres of the Project
- This study includes the noise from the Project and other operational and proposed facilities nearby, including oil and gas
- BowArk used the noise impact assessment results to determine the final turbine layout
- Results are available on the Project Infrastructure Map for Turbine Option A and Turbine Option B and will be submitted as part of the AUC Phase 2 buildable areas application
- Health Canada conducted a study from 2012 to 2015 that shows there are no long-term human health effects from wind turbine noise

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## Key regulatory agencies and permitting bodies

**Alberta Utilities Commission:** Regulatory body providing approval for power plants

**Alberta Environment and Parks:** Reviews and provides a wildlife referral report sign-off for any impacts to species or sensitive habitat

**Alberta Culture & Tourism:** Ensures the protection of heritage resources

**Alberta Transportation:** Ensures safe operation of highways and protection of infrastructure

**NAV Canada:** Governs the safe navigation of aircraft and vessels

**Transport Canada:** Identifies lighting requirements for wind turbines

**Environment and Climate Change Canada:** Monitors weather conditions and generates forecasts based on radar data

**Special Areas Board and the Municipal District of Acadia:** Provides development permits aligned with rural development policies