



Crowned Ridge Wind, LLC

**230 kV Transmission Line
and New Reactive Power
Compensation Substation**

**SD Public Hearing
January 22, 2017**



Innovate. Invest. Grow.

Tonight's discussion

- ▶ Applicant overview
- ▶ Project overview
- ▶ Additional related applications
- ▶ Advantages of coordination between NEER and NSP
- ▶ Transmission line project benefits
- ▶ Routing criteria
- ▶ Stakeholder outreach
- ▶ Map of route
- ▶ Transmission line description
- ▶ Construction overview
- ▶ Timeline
- ▶ Contact Information

Applicant overview

- ▶ Crowned Ridge Wind, LLC is an wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NEER)
- ▶ NEER is the world's largest generator of renewable energy from the wind and sun
- ▶ NEER affiliates own approximately 8,500 circuit miles of high-voltage transmission lines and generation tie lines across the United States and Canada



world's
#1 TW1
generator of wind
and solar energy
2017

Slide 3

TW1 Checking with M&C for updated 2018 information
Wilhelm, Tyler, 1/10/2018

Project overview – Purpose of transmission line and substation

- ▶ The proposed Crowned Ridge 34-mile 230-kilovolt generation tie line and new reactive power compensation substation is located in Codington and Grant Counties, South Dakota and will terminate at the Big Stone South Substation
- ▶ The project is needed to deliver the power produced from two 300 megawatt (MW) wind projects (Crowned Ridge Wind and Crowned Ridge Wind II) to the transmission grid
 - » Crowned Ridge Wind possesses an executed Power Purchase Agreement with Northern States Power (NSP) for the sale of the 300 MW output
 - » Crowned Ridge Wind II possesses an executed Purchase and Sale Agreement with NSP who will obtain ownership of the 300 MW site upon commercial operations
- ▶ The proposed commercial operations date is December 2019

Why now

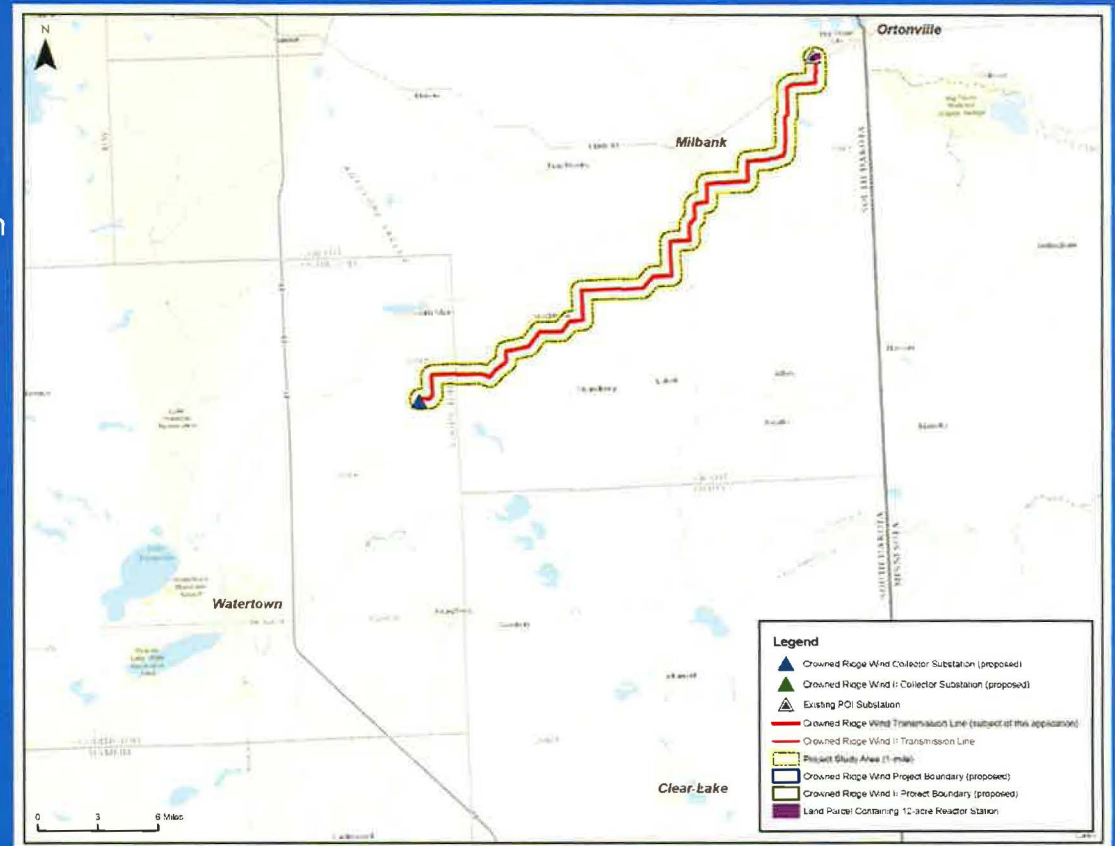
- ▶ Crowned Ridge Wind, LLC elected to submit the Crowned Ridge 230kV transmission line application in December of 2017 for a number of reasons:
 - » 99% completion of land access and transmission easements
 - » Environmental/cultural surveying has been completed for the transmission corridor and an avoidance strategy has been successfully implemented
 - » The South Dakota PUC's application review process reflects a December 2018 permit approval timeline for the project (12-month process)
 - › Beginning construction in December 2018 supports a construction timeline that allows for resources to work efficiently on the transmission line, at a pace that is safe, and ensures that the transmission lines and both wind farms will meet the project's commercial operations date of December 2019
 - › Beginning construction in December 2018 reduces impacts on landowners by lessening crop concerns and minimizing interference with farming operations

Project overview

Application I (Current Project)

Crowned Ridge, 34-Mile 230 kV Transmission Line and Reactive Compensation Substation

- » The Crowned Ridge 230kV transmission line application is part one of a four part process to complete the transmission line and wind farms associated with 600 MWs of total wind generation
- » The Crowned Ridge transmission line and reactive power compensation substation are necessary to successfully interconnect the two future wind farms to the grid
- » NEER to permit;
Shared ownership between NEER and NSP
- » PUC filing: December 5, 2017

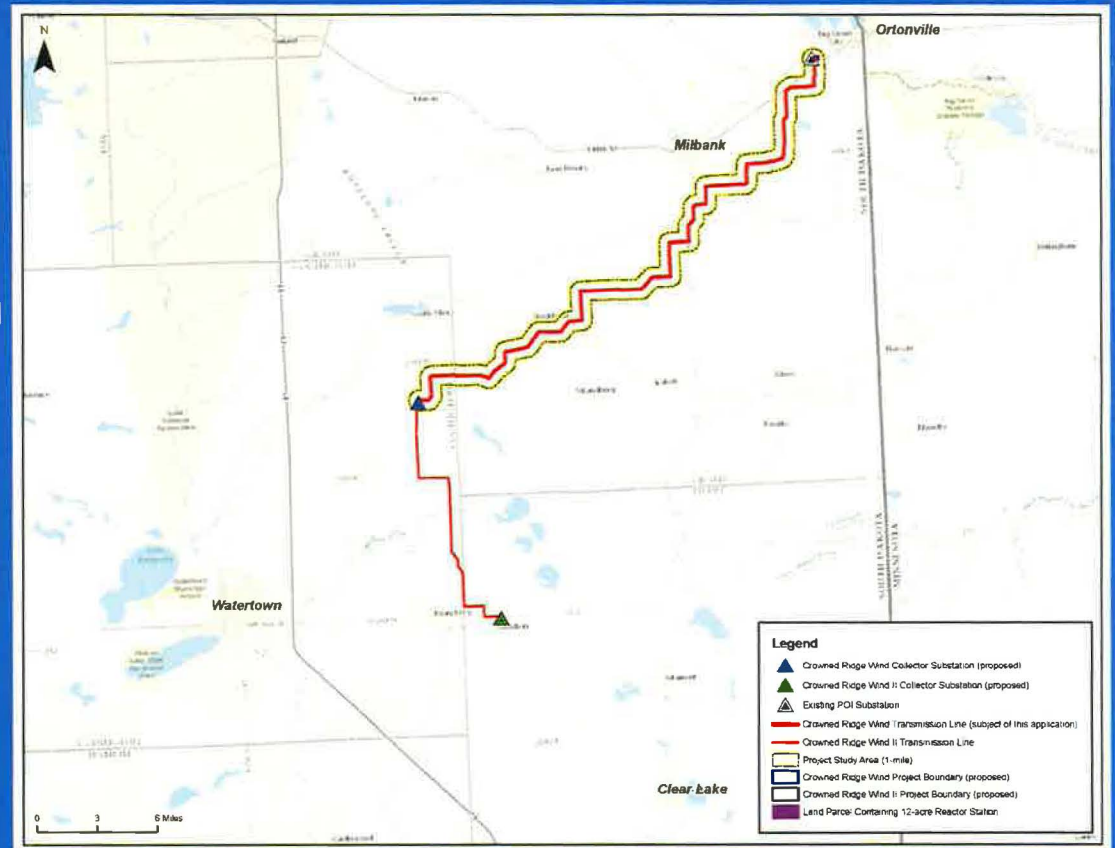


Additional related applications

Application II

Crowned Ridge II, 14-Mile 230 kV Transmission Line

- » The Crowned Ridge II 230kV transmission line application is part two of the four part process
- » The Crowned Ridge II 230kV transmission line will connect the generation from the Crowned Ridge Wind II wind farm to the Crowned Ridge Wind collector substation where all 600 MWs are transported to the transmission grid along the Crowned Ridge transmission line
- » NEER to permit;
Ownership transferred to NSP upon commercial operations date
- » PUC filing: February/March 2018



Additional related applications

Application III

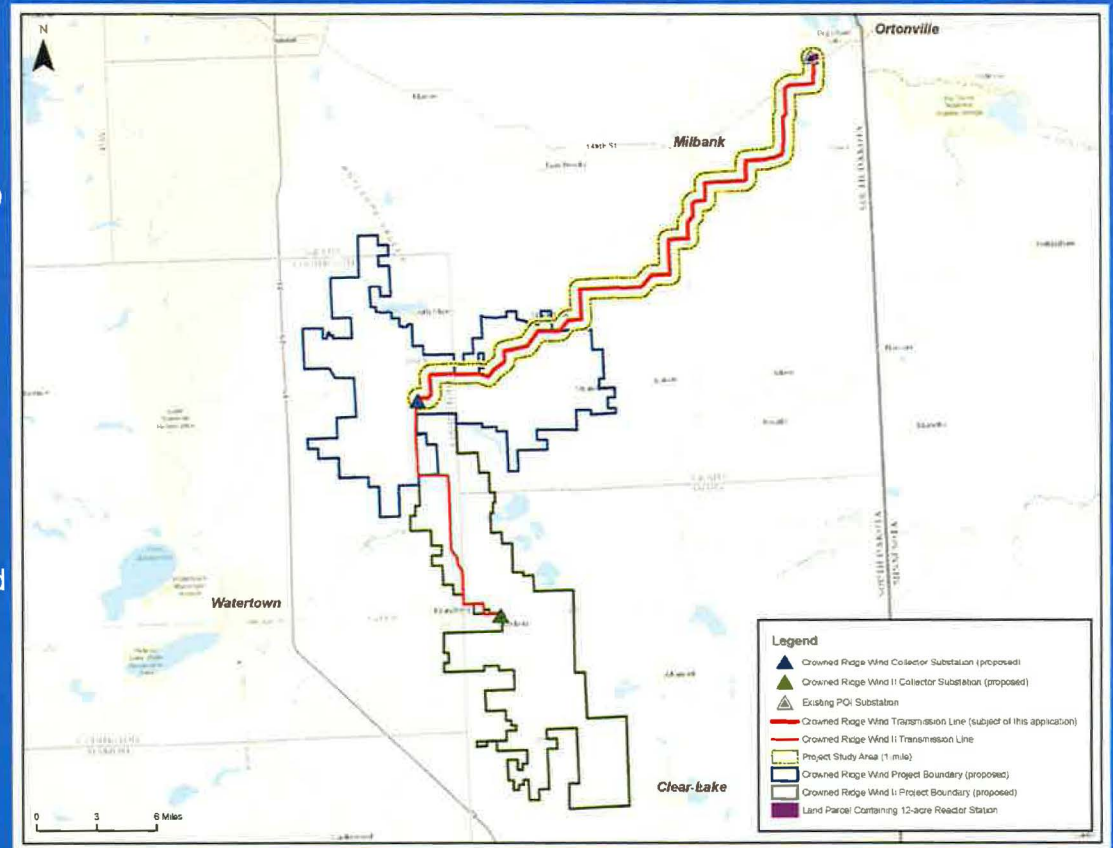
Crowned Ridge Wind, 300 MW Wind Energy Facility

- » Crowned Ridge possesses an executed Power Purchase Agreement with Northern States Power (NSP) for the sale of the 300 MW output
- » Crowned Ridge will own and operate the 300 MW site (NEER to permit, own and operate)
- » PUC filing: May/June 2018

Application IV

Crowned Ridge Wind II, 300 MW Wind Energy Facility

- » Crowned Ridge II possesses an executed Purchase and Sale Agreement with NSP who will obtain ownership of the 300 MW site upon commercial operations (NEER to permit; NSP to own and operate)
- » The Minnesota Public Service Commission approved NSP's Petition for Approval of the Acquisition of Wind Generation from the Company's 2016-2030 Integrated Resource Plan
- » PUC filing: May/June 2018



Advantages of coordination between NEER and NSP

- ▶ The two wind projects will be effectively designed to utilize one transmission line (the project) to deliver the power produced from both wind projects
 - » Eliminates the needs for two generation transmission lines with two separate routes and reduces the impacts to one line. One route utilized by two different companies; NEER and NSP
 - » Minimizes the time by which landowners are impacted, reduces unnecessary impacts to agricultural lands and lessens aesthetic impacts that would have resulted from a two transmission line configuration (one transmission line per wind farm to the transmission grid)
- ▶ The wind projects are less spread out (concentrated footprint) and utilize lands closer to suitable transmission lines
 - » Projects are able to maximize generation while minimizing total project footprint

Benefits of the transmission line project

- ▼ 50 temporary construction job opportunities
- ▼ Increased local business
 - » Hotel, dining and other places to conduct general business
- ▼ \$1 million to \$1.5 million in sales/use tax
- ▼ Plays an integral role in the delivery of 600 MWs of clean energy
 - » Ensures the future benefits tied with the wind farms (approximately \$3 million per year in property taxes generated)

Routing criteria

- ▶ Minimizing the total transmission line length between the collector substation and the Big Stone South Substation;
- ▶ Minimizing impact to human settlements;
- ▶ Maximizing the paralleling of existing road rights-of-ways (ROW) where possible;
- ▶ Avoids sensitive cultural and tribal resources and impacts to USFWS grassland easements;
- ▶ Locating the transmission line and associated infrastructure outside of County ROW per requests of both Codington and Grant County to avoid unnecessary impacts to existing infrastructure
- ▶ Locating the transmission line and associated infrastructure as close as reasonably possible to existing ROW to minimize impacts to agricultural fields and farming operations

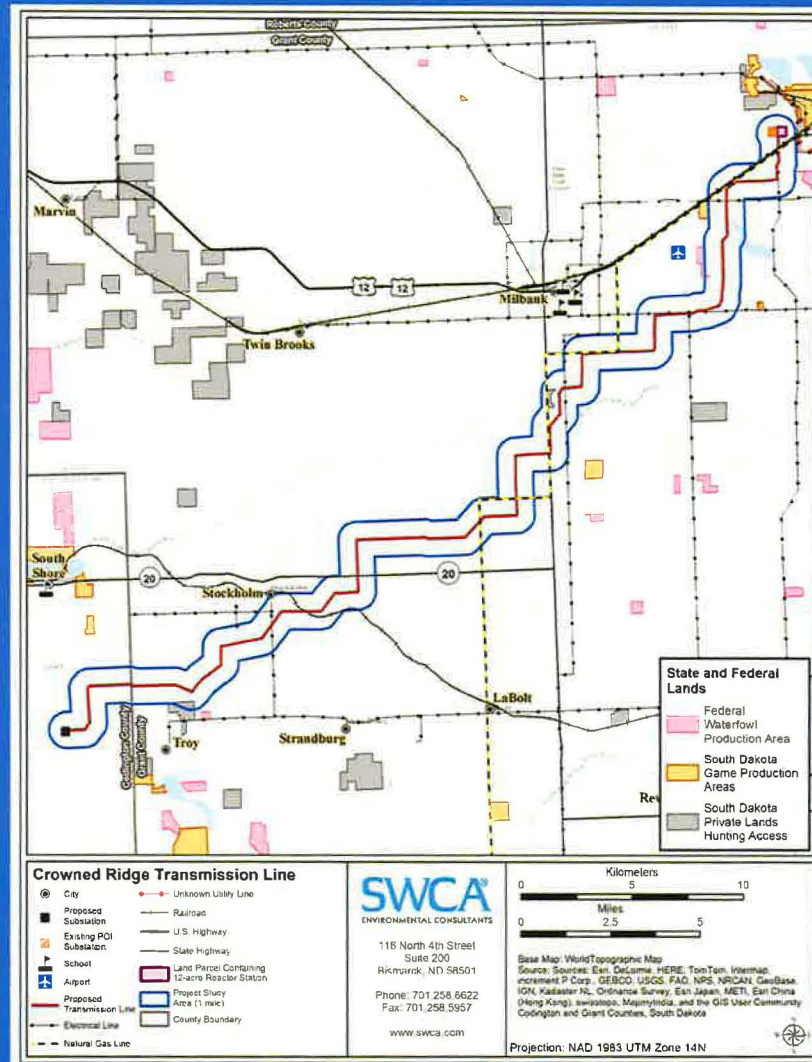
Application of routing criteria

- ▶ Worked diligently with county officials and landowners on transmission line route
- ▶ Shortest line from proposed wind projects to point of interconnection
- ▶ 99% of the transmission route is under easement
- ▶ Parallels existing transmission corridors for approximately 4.5 miles, which reduces aesthetic impacts to areas that do not have existing transmission infrastructure
- ▶ USFWS federal grasslands and protected basins within USFWS wetland easements were avoided
- ▶ Minimizes routing across agricultural fields and, instead, runs along landowner boundaries and quarter section lines as much as possible

Stakeholder outreach

- ▶ Crowned Ridge's stakeholder outreach has resulted in 99% completion in land acquisition (no eminent domain will be used)
- ▶ Stakeholder outreach involved communication with landowners, local tribes, wildlife agencies and government officials in both Codington and Grant Counties:
 - » Grant County Auditor, Planning and Zoning and County Commission
 - » Codington County Planning and Zoning Administrator
 - » Sisseton Wahpeton Oyate Tribe, Spirit Lake Tribe and three others
 - » United States Fish & Wildlife Service (USFWS)
 - » South Dakota Game, Fish & Parks (SDGFP)
 - » Open House conducted on November 16th 2017 in Watertown, SD

Map of route



Transmission line description

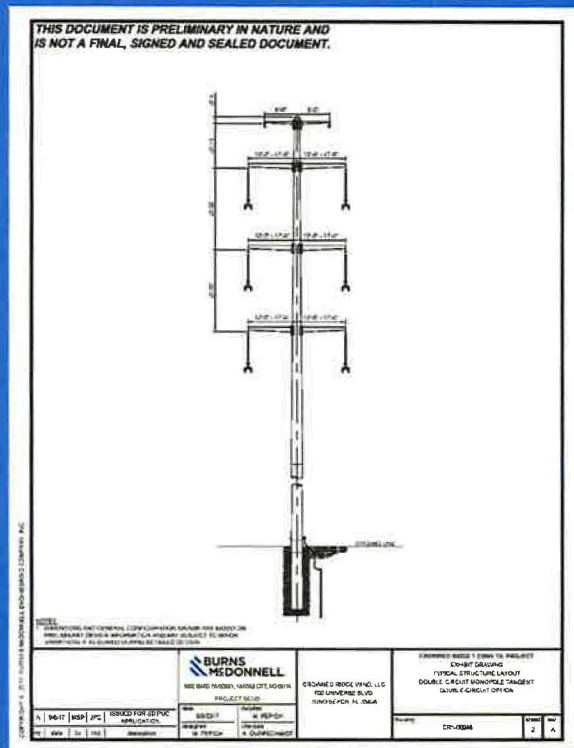
- ▶ The project's double circuit transmission line consists of the following:
 - » 600 – 1,000 foot long spans between transmission structures
 - » Typical 150 foot wide transmission easement corridor
 - » Typical 140 foot tubular steel structure height
 - » Typical structure will have six 12 – 17 foot steel arms that will support the high voltage insulators and conductor
 - » Typical structure will have two 8 foot steel brackets to support the optical ground wire / shield wire

Structure Summary – Double-Circuit Option

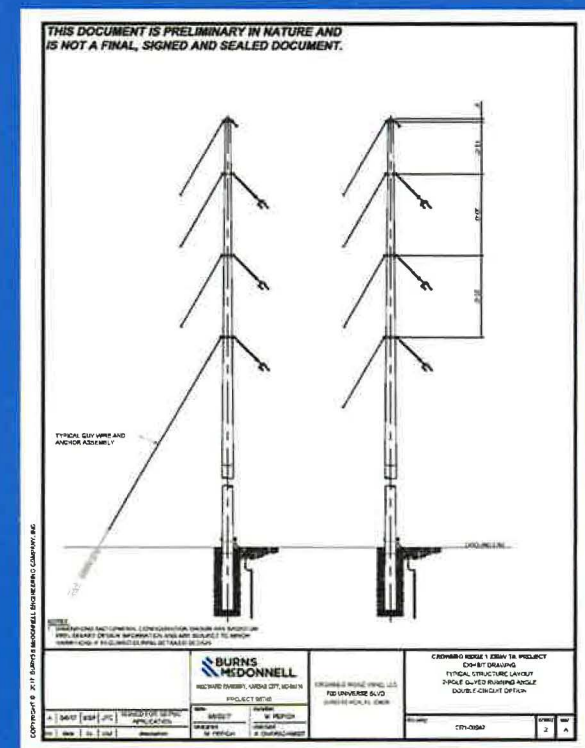
Structure Type	Typical Application	Structure Material	Typical Structure Height (feet)	Typical Foundation Diameter Per Pole (feet)	Typical Span Length (feet)
Direct-Embedded Monopole	Tangent, Light Angle	Galvanized Tubular Steel	140	8-10	600 - 1000
Guyed, Direct-Embedded 2-Pole	Angles and Deadends	Galvanized Tubular Steel	140	6-8	600 - 1000
Self-Supporting 2-Pole	Angles and Deadends	Galvanized Tubular Steel	140	8 - 12	600 - 1000

Transmission line description

Monopole Tangent Exhibit



2-Pole Guyed Running Angle Exhibit



Construction overview

- ▶ The removal of all trees, brush, and other low-growing vegetation will occur within the construction easement and along construction/maintenance travel paths
- ▶ Temporary laydown areas will be staged along the transmission line right-of-way to facilitate material deliveries and house the contractor's vehicles and equipment
- ▶ Foundations for steel structures will require excavating or auguring a hole approximately 25 – 35 ft. deep and approximately 6 – 12 ft. in diameter
- ▶ Construction of permanent access roads along the length of the transmission line will not be required
- ▶ Disturbed areas will be restored and reclaimed; inclusive of debris removal/disposal, dismantling of all temporary facilities, and controlling erosion

Construction overview

- 1) Survey locations
- 2) Deliver structures
- 3) Auger holes and pour foundations if required
- 4) Ground assembly of structure and equipment
- 5) Lift and set structure
- 6) Pulling of conductor
- 7) Restoration and energization



Project timeline

- Submit PUC Facility Permit Application

- Material Procurement
- Final Transmission Line / Substation Connection Design

- Completion of Construction Easement Acquisition

December 2017

April 2018

August 2018

- Anticipated Date of Commission Decision on Facility Permit
- Construction Start for Transmission line

- In-Service Operations

December 2018

December 31, 2019

Contact information

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South Dakota PUC Website

<https://puc.sd.gov/Dockets/Electric/2017/el17-050.aspx>