

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

**In the Matter of the Application of Flying Cow Wind, LLC for a Facilities Permit
for a 345 kV Transmission Line**

Docket No. EL18-__

**DIRECT TESTIMONY
OF JAMES THOMAS**

September 27, 2018

1 **INTRODUCTION AND QUALIFICATIONS**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is James Thomas. My business address is 11101 W. 120th Ave, Suite 400,
4 Broomfield, CO 80021.

5 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

6 A. I am testifying on behalf of the Applicant, Flying Cow Wind, LLC ("Applicant" or
7 "FCW").

8 **Q. WHO IS YOUR CURRENT EMPLOYER AND WHAT POSITION DO YOU
9 HOLD?**

10 A. I am employed by Renewable Energy Systems Americas Inc. ("RES") as a Transmission
11 Planner.

12 **Q. PLEASE DESCRIBE YOUR POSITION AND YOUR RESPONSIBILITIES FOR
13 THE PROJECT?**

14 A. My position is responsible for reviewing and analyzing data to determine the
15 interconnection and grid capacity for delivery of wind to MISO for the project.

16 **Q. WHAT IS YOUR PROFESSIONAL BACKGROUND?**

17 A. I graduated from the University of Wisconsin – Madison with a Bachelor of Science in
18 Electrical Engineering. I also earned a Master of Science in Electrical and Computer
19 Engineering and a Doctor of Philosophy from the Georgia Institute of Technology.
20 Throughout my education, I have concentrated in power and focused on power system
21 dispatch optimization algorithms during my PhD. After completing my PhD, I started at
22 RES as a Transmission Planner.

23

1 **Q. WAS THIS TESTIMONY PREPARED BY YOU OR UNDER YOUR DIRECT**
2 **SUPERVISION AND CONTROL?**

3 A. Yes.

4 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC UTILITIES**
5 **COMMISSION OF SOUTH DAKOTA?**

6 A. No.

7 **PURPOSE OF THE TESTIMONY**

8 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

9 A. The purpose of my testimony is to support information in the application regarding (1) the
10 technical specifications for the underground collection cabling system, the project
11 substation including the 34.5 kilovolt (kV) to 345 kV step-up transformer, and
12 approximately 10.42-mile 345 kV overhead transmission line (collectively, the "Project");
13 (2) the proposed route for the Transmission Line ("Proposed Route"), the transmission
14 routing and siting criteria and alternative routes, and (3) the engineering, construction, and
15 operation and maintenance of the Project.

16 **Q. DO YOU SPONSOR AN EXHIBIT IN SUPPORT OF YOUR TESTIMONY?**

17 A. Yes, I sponsor the following exhibit to my testimony:

18 Exhibit 1: James Thomas CV

19 Exhibit 2: Detailed Map of Proposed Route and Associated Facilities

20

21 **TECHNICAL SPECIFICATIONS OF THE PROJECT**

22 **Q. PLEASE DESCRIBE THE TECHNICAL SPECIFICATIONS OF THE**
23 **PROPOSED PROJECT.**

1 A. The Project consists of an underground electric collection cabling system with six circuits
2 of approximately 200 linear feet each, as measured from the Minnesota – South Dakota
3 border ("Collection Lines"); a substation with a 34.5 kilovolt (kV) to 345 kV step-up
4 transformer ("Project Substation"); and approximately 10.42 miles of 345 kV overhead
5 transmission line ("Transmission Line"). As described by Applicant Witness Michelle
6 Matthews, the Project is designed to connect the planned Bitter Root Wind Project, an up
7 to 152 MW to be located in Yellow Medicine County, Minnesota, to the point of
8 interconnection ("POI") located at a planned Otter Tail Power substation to be built in
9 Deuel County, South Dakota.

10 Specifically, the Transmission Line technical specifications are as follows:

- 11 • 10.42 miles in length;
- 12 • a single circuit 345 kV high voltage transmission line, with three phases that each
13 contain two conductors;
- 14 • the transmission line consists of a double bundle conductor assembly, a shield wire
15 assembly, and an optical ground wire assembly as described in Section 22.2;
- 16 • a total of 84 structures, including 69 steel monopole tangent structures, 9 self-
17 supporting steel monopole dead-end structures, and 6 self-supporting light angle
18 structure with heights ranging from 100 to 130 feet;
- 19 • an average span of 676 feet between structures, with the shortest span being
20 approximately 113 feet and the longest span being approximately 950 feet; and
- 21 • a permanent easement area of approximately 100 feet on either side of a centerline and
22 a 300-foot radius around pole locations.

23 **Q. WHAT IS THE ESTIMATED CONSTRUCTION COST FOR THE PROJECT?**

1 A. The estimated construction cost for the Project will be \$19.85 million. As described in
2 Section 5.0, this estimate includes the cost of the facilities that RES will construct as well
3 as a portion of the costs for the construction of facilities at the POI that will be constructed
4 by Otter Tail Power Company.

5 **Q. PLEASE DESCRIBE ANY ASSOCIATED FACILITIES FOR THE**
6 **TRANSMISSION LINE.**

7 A. As noted above, in addition to the Transmission Line, the Project also includes
8 approximately 200 linear feet of 6 circuits of Collection Lines that connect to a Project
9 Substation. The Project Substation is planned to be on approximately 2.8 acres, and will
10 consist of a gravel area enclosed with a chain link fence and lockable gate, inside of which
11 will be located switch gear, metering gear, transformers, electrical control and
12 communication systems, and other high voltage equipment needed to transform the
13 electricity generated by the Wind Project and delivered to the Project Substation via the
14 Collection Lines from 34.5 kV to 345 kV.

15 **PROJECT ROUTE AND SELECTION PROCESS**

16 **Q. PLEASE DESCRIBE THE PROPOSED ROUTE FOR THE PROJECT.**

17 A. The Project will commence at the South Dakota and Minnesota border. Underground
18 electrical Collection Lines will pass into Deuel County from Bitter Root in Yellow County,
19 Minnesota. The Collection Lines will run to the Project Substation, which will be located
20 on approximately 2.83 acres within an approximately 6.5-acre parcel at the southwest
21 corner of the intersection of 488th Avenue and 189th Street, approximately 8.5 miles
22 east/southeast of the town of Brandt, South Dakota. The Transmission Line runs south and
23 west from the Project Substation for 10.42 miles to the POI at the Astoria Substation. The

1 Collection Lines, Project Substation and approximately 0.97 miles of the proposed
2 Transmission Line are located in Norden Township, and the remaining approximately 9.45
3 miles of transmission line are located Scandinavia Township. A detailed map of the route
4 is attached as Exhibit 2.

5 **Q. WHAT ROUTING AND SITING CRITERIA WERE USED TO DEVELOP THE**
6 **PROPOSED ROUTE FOR THE TRANSMISSION LINE?**

7 A. The Applicant applied a multi-layered selection process to identify the Proposed Route, as
8 well as the Project Substation site, considering criteria to address Midcontinent
9 Independent System Operator, Inc. ("MISO") interconnection requirements and connection
10 point, the Project Substation site and routing of the Proposed Route. The specific criteria
11 used to develop the Proposed Route are set forth in Sections 7.1 and 7.2 of the Application.

12 **Q. HOW WERE THE ROUTING AND SITING CRITERIA APPLIED, AND HOW**
13 **WAS THE ROUTE OPTIMIZED DURING DEVELOPMENT?**

14 A. The Applicant initially undertook to identify possible point(s) of interconnection to the
15 transmission system with MISO. After working with MISO, the POI at the Astoria
16 Substation was identified as the only viable interconnection point for the Project. Once the
17 POI was established, the location for the Project Substation was then determined by
18 applying the siting criteria, the most limiting of which was land availability. With the two
19 endpoints of the planned Transmission Line established, the Applicant's next step was to
20 identify potential route options from the Project Substation to the POI. Various
21 transmission line routes between the endpoints were possible following existing linear
22 infrastructure or across greenfield areas. Analysis of potential routes and alternate route
23 segments involved review of available land, natural resources, existing land uses,

1 regulations, and applicable Geographic Information System (GIS) data. The Applicant
2 also evaluated sensitive areas and other constraints to exclude certain route and route
3 segment options. These route and route segments were then further refined as Section 7.2
4 to minimize impacts and apply South Dakota Public Utilities Commission siting criteria.

5 **Q. PLEASE PROVIDE AN OVERVIEW OF THE ALTERNATIVE ROUTES**
6 **CONSIDERED.**

7 A. As noted, the Applicant initially evaluated the possibility of an alternative point of
8 interconnection in Yellow Medicine County, Minnesota. Once the alternative point of
9 interconnection was eliminated from consideration and the POI was chosen by MISO,
10 various sites were evaluated for locating the Project Substation. With the location of the
11 Project Substation determined, various routes and route segments were evaluated for
12 establishing the Proposed Route. Alternative routes and route segments were eliminated
13 from consideration based on land availability, avoidance of sensitive resources, minimizing
14 the length of the Transmission Line, and other criteria as set forth in Section 7.1 and 7.2.
15 With the Proposed Route identified, various possible adjustments to segments of the route
16 were considered, such as moving segments to co-locate the Transmission Line with
17 existing infrastructure and roads.

18 **Q. DO YOU ANTICIPATE ANY SIGNIFICANT CHANGES IN THE PROPOSED**
19 **ROUTE?**

20 A. No. There are no plans at this time for future additions or modifications to the Project
21 because it is being solely constructed to deliver power from the Wind Project to the
22 transmission grid. The Applicant has no current or pending plans for future additions or
23 modifications of the Project. Changes in the final design of the Project may include slight

1 modifications based on landowner feedback and field survey information. In the event
2 additions and/or modifications to the Project are identified in the future, the Applicant will
3 follow applicable procedures for notifying and seeking necessary approval from the South
4 Dakota Public Utilities Commission.

5 **PROJECT CONSTRUCTION AND OPERATION**

6 **Q. PLEASE DESCRIBE THE PROJECT CONSTRUCTION PROCESS**

7 A. Project construction and site preparation activities (e.g., clearing) will commence once
8 final design is completed, soil conditions are known, easements are acquired, and approval
9 from applicable local, state and federal agencies are obtained. Construction will take place
10 in various stages.

11 Staging areas will be established for construction of the Project at select locations
12 along the Project route. Staging consists of delivery and temporary storage of materials and
13 equipment needed to construction the Project. Construction materials required for the
14 installation of the transmission line, such as poles, conductor, insulators, optical ground
15 wire (OPGW), shield wire, etc. will be staged both at the Project Substation and in a
16 construction storage yard located in Yellow Medicine County, MN (and shared with the
17 Wind Project) to facilitate construction flexibility and minimize transportation efforts.
18 Temporary laydown sites may also be needed for the Project for additional storage space
19 during construction.

20 Access for construction and installation of poles will be gained from existing public
21 roads and private field access roads or trails, as much as possible. The Applicant will obtain
22 permission from the landowner prior to accessing the construction corridor. Existing roads
23 may be upgraded and a temporary 20-foot gravel drive path along the Proposed Route will

1 be used to accommodate construction equipment and delivery of materials. Construction
2 matting may also be used in providing access to sensitive areas to minimize site impacts.

3 Poles will be configured with insulators and other necessary hardware while on the
4 ground. The steel poles will then be lifted, placed and secured by a crane, and one of four
5 foundations types will be utilized to secure the poles. Stringing setup areas will be
6 established within the ROW approximately every two miles and at corners. Temporary
7 clearance poles will be installed over existing electric transmission and distribution lines,
8 communication lines, streets, roads, highways, railways, driveways, etc. Upon completion
9 of steel pole installation, crews will pull conductor line to the required tension, and will
10 use bucket trucks or helicopters to finalize conductor installation.

11 Following completion of construction, areas disturbed during construction and not
12 required for continuing operations of the Project facilities will be restored to preexisting
13 contours and elevations. Where possible, some locations where vegetation is disturbed or
14 removed for construction and operation of the Project will be allowed to naturally
15 reestablish to pre-construction conditions. In other locations, disturbed areas will be
16 restored through use of appropriate erosion control measures and reseeded areas. Native
17 species that do not interfere with safe operation of the Project will be allowed to reestablish
18 in disturbed areas, or returned to cropland, according to landowner preferences. Cropland
19 will be restored by regrading contours and elevations in accordance with landowner
20 preferences. In locations where significant soil compaction and disturbance from
21 construction activities occur, various methods may be used to reestablish the vegetation
22 stratum and control soil erosion including.

1 **Q. PLEASE DESCRIBE THE ONGOING OPERATIONS AND MAINTENANCE**
2 **ACTIVITIES FOR THE PROJECT.**

3 A. The Transmission Line, poles and associated facilities will require periodic inspection,
4 maintenance and repair once the Project is constructed and operational, with more
5 moderate maintenance after the initial years of operation. Regular ROW vegetation
6 maintenance for the Project will include, but is not limited to vegetation inspection and
7 management, transmission line visual inspection, special line assessment, and general
8 facilities/grounds upkeep. The Applicant's O&M staff for the Wind Project will also be
9 responsible for inspection and maintenance of the Project.

10 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

11 A. Yes, it does.

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Dated this 27 day of September, 2018.

James Thomas
James Thomas