INDEPENDENT EVALUATOR'S REPORT

PUBLIC SERVICE COMPANY OF COLORADO
RUSH CREEK WIND PROJECT
FINAL REPORT

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INDEPENDENT EVALUATOR'S REPORT

PSCo RUSH CREEK WIND PROJECT

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May 10, 2016

Public Service Company of Colorado
1800 Larimer, Suite 900
Denver, CO 80202

Subject: **Independent Evaluator's Report**
Rush Creek Wind Project
FINAL

Ladies and Gentlemen:

INTRODUCTION AND SUMMARY

Presented in this report (the "Report") are the results of our review as Independent Evaluator ("IE"), of the Rush Creek Wind Project (the "Project") proposed to be built by Public Service Company of Colorado ("PSCo"). Generally, the scope of our review was to perform an independent assessment of whether the Project can be constructed at a reasonable cost compared to the cost of similar wind energy resources available in the market pursuant to the Colorado Public Utilities Commission ("CPUC") Rule 3660(h)(V).

This Report has been prepared in accordance with a Professional Services Agreement (the "PSA") dated April 12, 2016 between Leidos Engineering, LLC ("Leidos") and PSCo which includes the following tasks:

- Review PSCo's proposed wind project detailed design, construction estimates, timelines, equipment procurement, and wind resource analysis of the Project.
- Perform all work necessary to research, identify, gather and review appropriate data that is needed to conduct the assessment.
- Be able to bring to the CPUC, essential and unbiased information concerning national and regional construction costs for new renewable (wind) resources.
- Initiate contact with PSCo as often as necessary to conduct the assessment.

To accomplish these tasks, we obtained information from PSCo, and from our internal resources to conduct analyses to answer the following questions:

- How do the construction and operating costs estimated for the Project by PSCo, compare to those of comparable wind projects?
- Based on the estimates of construction and operating costs and other considerations, how would the resulting Levelized Cost of Energy ("LCOE") to be delivered by the Project compare to the LCOE of other wind projects available in the market available to PSCo?

To answer the first question, we selected a group of 12 wind projects with which we are familiar, and were constructed between 2007 and 2015 in generally similar terrain as the Project. These 12 projects will be referred to as the "comparable projects" in this Report. We compared their respective construction and operating costs to those estimated by PSCo for the Project with the following results:

- The sum of the wind turbine supply and balance of plant construction costs for the Project are 4.6 percent less than the average wind turbine supply and balance of plant construction costs for the comparable projects on a dollar per kilowatt basis.
- The total construction costs estimated for the Project are 4.7 percent higher than the average of the comparable projects principally due to the more extensive transmission and interconnection facilities proposed for the Project.
- The estimated operating costs for the Project are: (i) 21 percent lower than the average of the comparable projects on the basis of dollars per megawatt hour, and (ii) 18.4 percent lower than the average on the basis of dollars per megawatt.

Details of these analyses are contained in sections of this Report entitled "Construction Cost Comparison" beginning on page 17, and "O&M Cost Comparison" on page 23.

To answer the second question, we calculated the LCOE of the Project across a range of potential average annual delivered energy production values, and compared that LCOE to the LCOE of five existing Purchased Power Agreements ("PPA") representing the most recent information about the wind energy market available to PSCo. The analysis, in the LCOE section of this report beginning on page 25, indicates the following:

- The 50th percentile, or expected value, of the Project's LCOE is projected to be lower than any of the comparable PPAs.
- The Project's LCOE is projected to have a 90 percent probability of being lower than 4 of the 5 comparable PPAs.

We conclude that the Project as proposed by PSCo, is reasonably likely to be developed, constructed, and operated at a lower levelized cost than the projects from which PSCo is currently purchasing energy.

In this Report we have provided descriptions of the plans, engineering and technical provisions, cost estimates and schedules provided by PSCo and have offered our views of the reasonableness of the methodology undertaken by PSCo to develop those plans and provisions, as well as the reasonableness of certain estimates and schedules provided by PSCo.

PROJECT DESCRIPTION

The Project facilities are to consist of a 600 megawatt ("MW") wind project to be constructed on two sites: Rush Creek 1 ("RC1") rated at 400 MW, and Rush Creek 2 ("RC2") rated at 200 MW a/k/a Arriba. The RC1 site is located in Elbert County, Colorado southeast of Limon, Colorado (the "RC1 Project Site"), and the RC2 site is located in Lincoln, Kit Carson, and Cheyenne Counties, Colorado east of Hugo, Colorado (the "RC2 Project Site", and collectively the "Project Sites"). RC1 is to be constructed on approximately 74,320 acres and RC2 will be constructed on approximately 40,204 acres.

The Project Sites are being developed by Invenergy Wind Development North America LLC ("Invenergy") through two wholly owned subsidiaries, Rush Creek Wind Energy LLC ("RC1 Wind") and Rush Creek Wind Energy II LLC ("RC2 Wind"). Under terms of two Purchase and Sale Agreements (the "PSAs"), when the Project Sites are construction-ready and on satisfaction of the other conditions precedent to closing, PSCo will acquire 100 percent of the equity interests in RC1 Wind and RC2 Wind.

The wind turbine generators ("WTGs") are to be supplied by Vestas-American Wind Technology, Inc. ("Vestas") under terms of a Wind Turbine Supply Agreement between PSCo d/b/a Xcel Energy and Vestas (the "TSA Parties") dated April 7, 2016 in Pre-Notice to Proceed ("NTP") form (the "Original TSA"), providing for the purchase of components related to qualification for the Production Tax Credit (the "PTC Components"). The TSA Parties to the Original TSA expect to amend and restate the Original TSA to include purchase of the balance of the WTG equipment (the "A&R TSA"), including the PTC Components (the Original TSA and A&R TSA, collectively the "TSA"). The Project will utilize 300 Vestas V110 2 MW WTGs with a hub height of 80 meters ("m"), of which 200 will be located at RC1 and 100 at RC2.

The TSA Parties also anticipate executing a Service, Maintenance and Warranty Agreement (the "SMA") by which Vestas would provide maintenance, diagnostics, repair and replacement services on the specified equipment for a period of three years commencing on the commissioning completion date of the first WTG. PSCo, or an affiliate, will perform operations and maintenance ("O&M") of the balance of plant ("BOP") equipment not in the Vestas SMA scope. After expiration of the SMA, PSCo intends to competitively bid the work previously performed by Vestas.

The Project substations will transform the energy generated by the WTGs from 34.5 kilovolts ("kV") to 345 kV. PSCo's current plan is to have two substations at RC1 interconnected by an approximate 10 mile 345 kV transmission line then connecting to a new switching station. The RC2 substation will connect to a new switching station located at RC1 by an approximate 50 mile 345 kV transmission line. The new switching station will then connect to the existing Missile Site Substation, the point of interconnection ("POI") by an approximate 40 mile 345 kV transmission line.

During preparation of the Report, we have reviewed and relied upon various spreadsheet models and proposed agreements provided to us by PSCo associated with plans for the procurement, construction, and O&M of the Project.

In addition, we have reviewed, relied upon and discussed with PSCo: (1) the Xcel Master Wind Farm Specification (the "Xcel Spec") (2) the proposed method of construction and operation of the Project; (3) the methods used to estimate the cost of construction and the construction schedule; (4) projected operating capabilities of the Project; (5) projected O&M expenses; (6) the wind resource assessment reports for RC1 and RC2 (the "Vaisala Energy Assessments"); and (7) the technical inputs to the financial projections prepared by PSCo in the file *"Wind Rider Rev Req 345kV 5_5_16.xlxs"* (the "Pro Forma").

We plan to visit the Project Sites and proposed locations of the transmission lines during May 2016. While on the sites, we will review the proposed site layouts and workspaces, surrounding properties, land uses, meteorological ("met") equipment, site access, proposed interconnection locations and proposed rights-of-way ("ROWs") for the off-site facilities associated with the Project. The general field observations will be visual, above-ground examinations of selected areas which we deem adequate to allow us to comment on the existing condition of the Project Sites, but which will not be in the level of detail necessary to reveal conditions with respect to geological or environmental conditions, the internal physical condition of any equipment, safety, or conformance with agreements, codes, permits, rules, or regulations of any party having jurisdiction with respect to the Project Sites.

Certain statements included in this Report constitute forward-looking statements. The achievement of certain results or other expectations contained in such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause actual results, performance or achievements described in the Report to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. We do not plan to issue any updates or revisions to the forward-looking statements if or when our expectations or events, conditions, or circumstances on which such statements are based, occur. No warranty, guarantee, or promise, express or implied, related to any future results, performance, or achievements associated with such forward-looking statements is provided.

PROJECT PARTICIPANTS

The potential contractor and vendor responsible for the development, design, construction, and operation of the Project are discussed below.

EPC Contractor

PSCo circulated the Xcel Spec to three potential balance of plant ("BOP") construction contractors and received indicative budgetary estimates for the engineering, procurement and construction ("EPC") of the Project. PSCo has analyzed these estimates in light of the work scopes proposed by the contractors and the combined experience of its affiliates and produced its own estimate of the construction costs. The EPC scope is to include the 345 kV line interconnecting the two RC1 substations, while the balance of the 345 kV transmission line work will be executed by PSCo.

Wind Turbine Supplier

Vestas, founded in 1982 and headquartered in Portland, Oregon, provides sales and service of Vestas WTGs in North America and includes a large engineering group as well as a training facility. Vestas is a subsidiary of Vestas Wind Systems A/S ("Vestas Wind"). Vestas Wind was founded in 1945 and entered the wind energy business manufacturing kilowatt ("kW") class wind turbines in 1979. They merged with NEG Micon in 2004 to form the largest WTG manufacturing company worldwide under the name Vestas Wind. Vestas Wind has developed more than a dozen distinct models with capacities ranging up to 3.3 MW. The corporate headquarters and main engineering offices are located in Denmark. Vestas Wind has worldwide manufacturing and support facilities including field service locations throughout the U.S. and Canada. Vestas Wind has over 30 years of operating experience and is a leading WTG supplier with over 64,500 MW of WTGs installed worldwide at year end 2014, accounting for approximately 17.5 percent of global installed capacity. In 2014, Vestas Wind ranked third among other WTG manufacturers with the installation of approximately 5,300 MW of WTG capacity worldwide. The accumulated installed capacity of Vestas Wind WTGs is presented in Table 1, along with the installed capacity of other current major WTG vendors.

Table 1
Accumulated Global Installed Capacity by Manufacturer Through 2015 (1)

Manufacturer (2)	2012 MW	2013 MW	2014 MW	2015 MW	Percent of Total	2015 MW Installations
Vestas	53,438	58,311	63,581	71,223	16.4%	7,641
GE	37,452	39,886	45,293	51,699	11.9%	6,406
Enercon	27,540	31,150	35,306	38,217	8.8%	2,911
Gamesa	25,968	27,492	29,690	33,277	7.7%	3,587
Siemens	20,376	22,912	28,469	33,049	7.6%	4,580
Goldwind	15,464	19,238	24,028	30,936	7.1%	6,908
Sinovel	14,252	15,316	16,135	16,515	3.8%	380
Suzlon	13,548	13,917	14,995	15,497	3.6%	503
United Power	7,296	8,784	11,385	14,449	3.3%	3,065
Senvion	8,075	9,938	11,364	13,536	3.1%	2,172
Other Manufacturers	61,432	73,378	92,380	115,227	26.6%	22,847
Total	284,842	320,322	372,624	433,624	100%	61,000

(1) Source: Make Consulting A/S.
(2) In decreasing order by accumulated total capacity in MW through 2015.

Vestas has manufacturing capacity in North America, operating tower and blade manufacturing facilities in Pueblo, Colorado and Windsor, Colorado, respectively and a nacelle assembly facility in Brighton, Colorado. Spare parts are stored at depots in the Midwest and Pacific Northwest regions of the U.S. If North American manufacturing becomes constrained, Vestas has the ability to bring turbines, towers, or blades from Europe or Asia.

We are of the opinion that all three potential construction contractors have previously demonstrated the capability to construct, and manage the construction of, projects of similar size and technology as the Project. Vestas has previously demonstrated the capability to manufacture, supply, operate and maintain WTGs of similar size and technology as planned for the Project.

THE PROJECT SITES

The Project Sites are located as shown in Figure 1A, and the transmission lines are shown in Figure 1B. Invenergy is in the process of executing a number of wind energy lease agreements with various landowners that will allow the construction and operation of the Project. As of April 25, 2016, Invenergy reported that 56,161 acres of the 74,320 acres at the RC1 Project Site has been secured by lease arrangements, and all of the RC2 Project Site acreage of 40,204 acres has been secured.

Figure 1A

RC1 and RC2 Wind Projects

Location Map

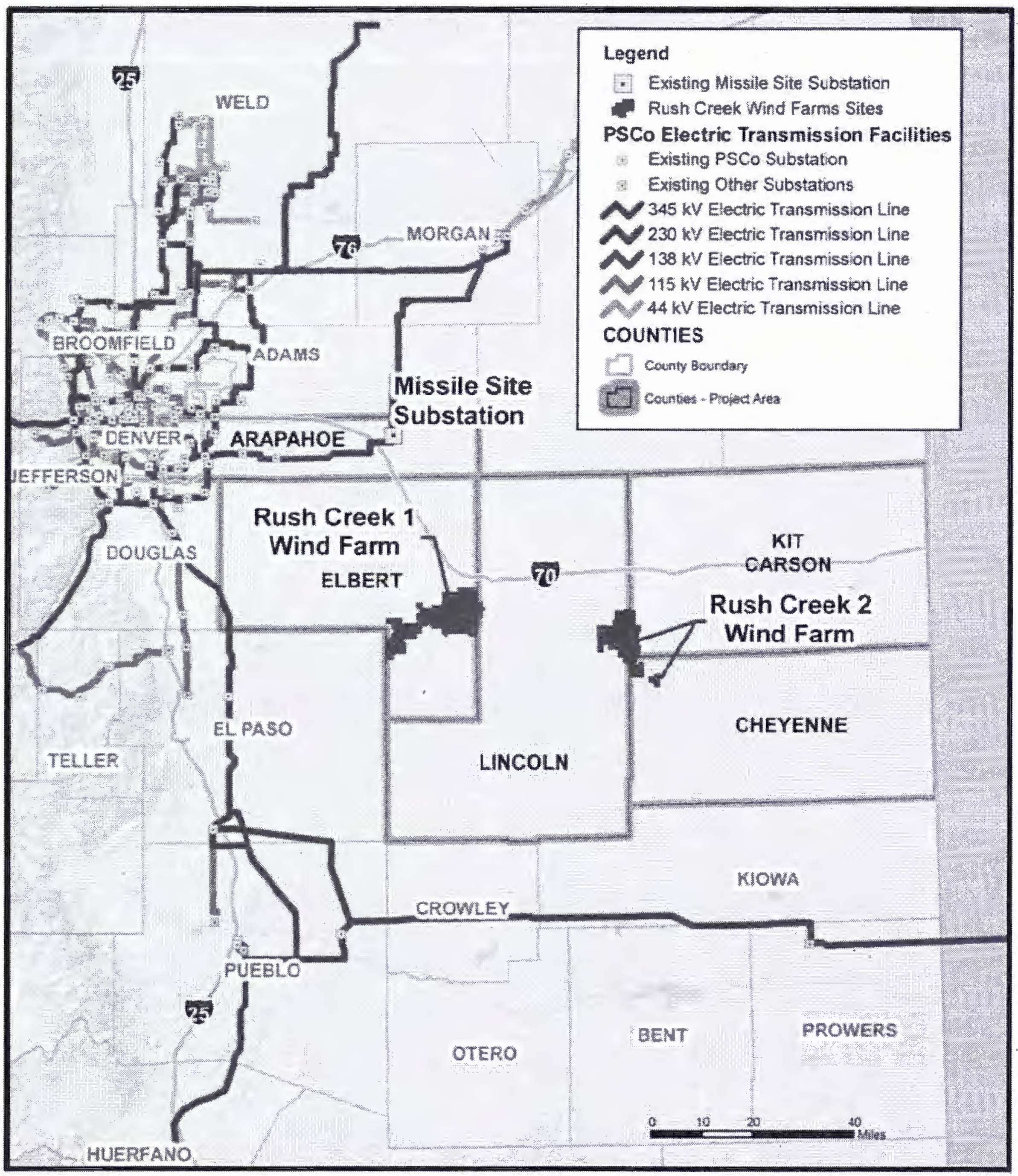
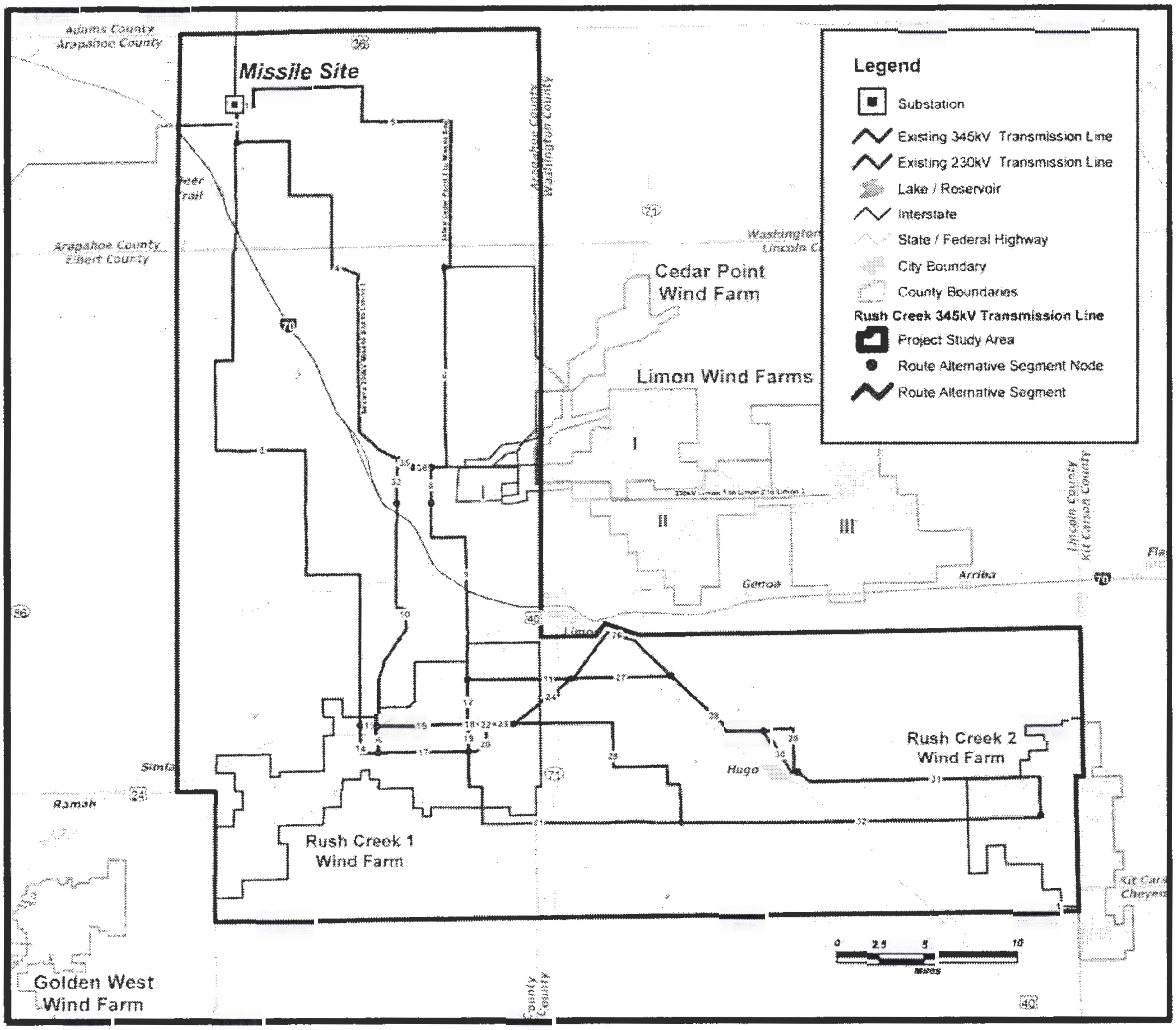


Figure 1B

RC1 and RC2 Wind Projects

Transmission Lines Map



Nearby Development

Vaisala provided two wind resource evaluations to PSCo in files named *"Xcel-RushCreek1-Net Report_V110_80m_issueB.pdf"* and *"Xcel-RushCreek2-NetReport_V110_80m_issueB.pdf"* both dated April 26, 2016, collectively the ("The Vaisala Energy Assessments"). Vaisala reported that the distances between RC1 and the closest operating wind projects, Cedar Point and Limon 1, 2 and 3 are over 12 km and these same operating projects are over 20 km from RC2. Vaisala also did not identify any planned projects within the vicinity. Vaisala determined that the distance between these projects and RC1 and RC2 would result in negligible wake impacts. Using the 110 meter RD of the Vestas WTG, external wake effects could potentially impact the Project if another project were located within 5.5 km. Based on the information provided by Vaisala, and our independent review of available databases for operating and planned wind projects, no projects were identified that could be expected to have wake impacts on the Project.

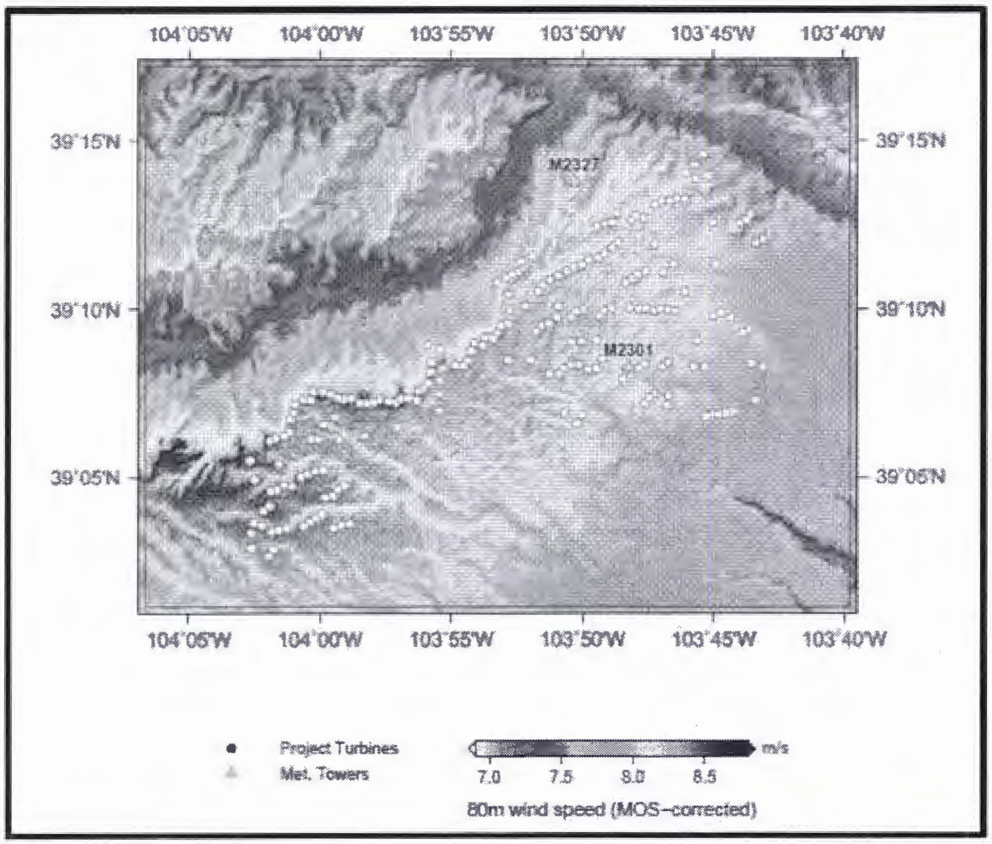
Site Arrangement

Vaisala was provided the initial turbine locations as shown in Figures 2A and 2B, and used them in their analysis. The Project WTG Layouts for RC1 and RC2 are shown in Figures 2A and 2B, respectively. The 200 Vestas V110-2.0 RC1 WTGs are to be arranged in several rows generally oriented in arrays from east to west, generally perpendicular to the predominant southern wind resource. The 126 V110-2.0 RC2 WTGs analyzed by Vaisala would be arranged in several rows generally oriented in arrays from southeast to northwest, generally perpendicular to the predominant south-southeast wind resource. PSCo advises the 126 WTGs analyzed by Vaisala at RC2 will be reduced to 100 WTGs to achieve the 200 MW capacity. The average ground elevation at the RC1 WTG locations is approximately 1607 meters above sea level ("masl") with an elevation range of approximately plus or minus 81 masl. The average ground elevation at the RC2 WTG locations is approximately 1819 masl with an elevation range of approximately plus or minus 233 masl. Within each row, the minimum distance between WTGs is over 2.9 rotor diameters (326 m), and the minimum distance between rows is approximately 4.0 rotor diameters (441 m). PSCo reported that Invenergy will continue to optimize WTG locations over the next few weeks from the date of this Report in order to maximize energy production, minimize energy losses, and minimize construction costs.

Figure 2A

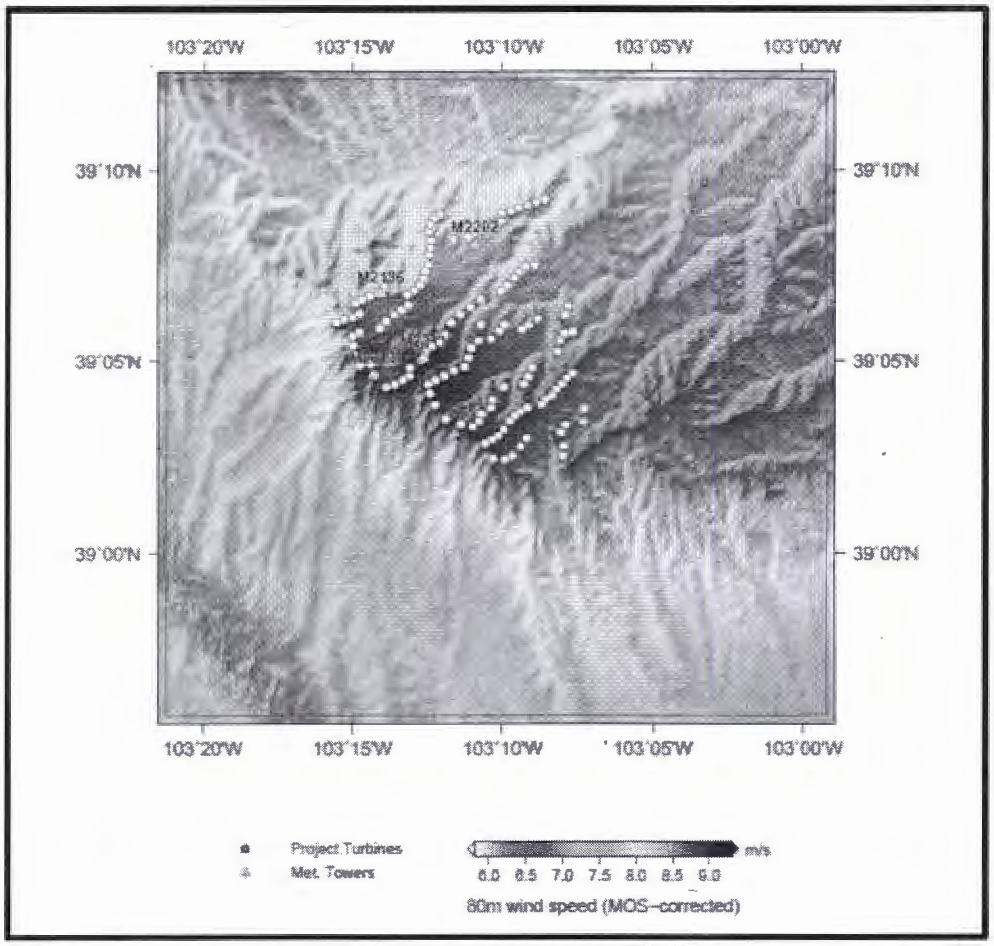
RC1 Wind Project

Preliminary WTG Layout



Courtesy, Vaisala

Figure 2B
RC2 Wind Project
Preliminary WTG Layout



Courtesy, Vaisala

Based on our review of the RC1 and RC2 layouts, we believe the Project Sites are of adequate size to support the construction, and operations and maintenance of the Project.

THE PROJECT

Civil Site Works and WTG Foundations

The design and construction of the site works encompass four distinct tasks: (1) improvements to public roads to facilitate the transport and delivery of turbine equipment; (2) modifications of public road system to facilitate the turning of turbine delivery equipment; (3) the on-site road network and crane paths; and (4) the crane pads, laydown and standing areas required for erection of the WTG.

The specification included in the TSA for the civil site works focuses on the site access roadways within the Project Sites which are to be constructed from the existing public or private roads to the WTG locations. The on-site access roadways and modifications to the applicable off-site roadways are specified in the TSA to be a minimum of 5 meters (approximately 16 feet) wide for tangent road sections. The civil works specification provides required bearing capacity of roadways, vertical grade of the road section and vertical curves, cross-slope of the road section to provide roadway drainage, minimum requirements for turning radius at intersections, and widening of roadway curves or intersections including vertical area required for blade sweep. Where the on-site access roadways will be used for crane travel, the TSA site preparation specifications provide guidance for typical crane path widths which vary between 16 feet wide and 41 feet wide (depending upon the crane model employed), however the actual width of the crane path is to be designed for the crane model employed.

Each of the WTGs is to be located within its own area within the respective Project Site. The TSA provides typical laydown area space requirements for the WTG components around a constructed foundation, including crane pads and also provides a flatness criterion for the laydown/assembly area that must be met by the EPC contractor. The TSA specifications also require the design of the access roads be based on the results of the geotechnical report for the Project. The specifications for the design and construction of the on-site roads, off-site access roads and off-site intersection improvements and the crane pads, laydown and staging area requirements for turbine transport enumerated in the TSA, are generally consistent with accepted industry practice for roadway design.

The basis of design for the foundation supporting each WTG included in the TSA includes the functional requirements of the WTG foundation and the foundation loads based on International Electrotechnical Commission ("IEC") IEC61400-1 edition 3. The functional requirements for the design WTG foundation include, providing a service life of at least 20 years, not exceeding the maximum permanent rotation of the tower foundation due to differential settlement and other requirements related to the detailing of the foundation construction. Site-specific conditions such as the location of water bodies in the vicinity of the WTG foundation, the topography of the site, soil and subsurface conditions are to be considered in the design of the WTG foundation. A geotechnical report is to be performed by an independent party with experience which includes projects that are of similar size and nature to RC1 and RC2. The basis of foundation design in addition to providing foundation loads also provides the required stiffness of the foundation which will result in the nominal required frequency of the turbine and for the loads provided to be valid for the design of the foundation. This basis of design of the WTG foundations is generally consistent with accepted wind industry practice.

The type of foundation proposed by the three potential contractors is the gravity-type spread footing, comprising a large diameter, cast-in-place, reinforced octagonal mat. For each foundation, upon completion of the base mat, with the threaded anchor rods or bolts embedded, the circular upper pier, or pedestal, is formed and the concrete is placed. After backfill and compaction are completed, and upon the achievement of sufficient strength in the concrete, the tower base section is to be set and grouted on the pedestal. Subsequently, the threaded anchor rods are to be post-tensioned to the designed level. The foundation type proposed by the three potential contractors, and 54 feet diameter proposed by two of the three, is consistent with other WTG foundation diameters in our data base for WTGs imposing similar loads on the foundation, with groundwater below the foundation bearing elevation and allowable bearing pressures above 3,000 pounds per square foot.

WTG Technology

The Vestas V110-2.0 MW 60 Hertz ("Hz") WTG is a three-bladed, upwind, horizontal-axis, variable-speed, full-span pitch control WTG, which is typical of most modern utility-scale WTGs. The variable-pitch rotor allows for adjustment of the blade operation angle to optimize wind energy capture below rated wind speed and regulation of power above rated wind speed. Pitching the blade to the feathered position is the primary mode of braking for the rotor. The rotor consists of three blades oriented upwind of the tower, an internal hydraulically driven pitch system for each blade, and a hub. Each blade pitch system operates independently in order to provide redundant aerodynamic braking. The up-tower components are supported by a bedplate structure that rotates or "yaws" to align the rotor with the wind. A transformer located in the nacelle produces medium-voltage power that is then conducted down the tower to electrical switchgear in the tower base. The nacelle and tower are completely enclosed and contain the necessary components and operating systems for each WTG to function independently. The tower is a tubular steel structure that includes access ladders, platforms, internal lighting, and safety equipment and is secured to a concrete foundation. The V110-2.0 WTG specifications are summarized in Table 2.

Our detailed review of the Vestas V110-2.0 MW WTG overall technology and its major components, as well as Vestas' WTG operating experience appears in Appendix A.

Table 2
Vestas V110-2.0 MW Summary
Specification

Rated Power (kW)	2,000
Hub-Height (m)	80
Rotor Diameter (m)	110
Rated Wind Speed (m/s) [1]	11.5
Cut-In Wind Speed (m/s)	3.0
Cut-Out Wind Speed (m/s)	20

(1) Meters per second ("m/s").

Electrical Systems

The Project is to be designed and constructed with three electrically similar 200 MW subprojects identified as Rush Creek 1A ("RC1A"), Rush Creek 1B ("RC1B"), which together occupy the RC1 Project Site, and one at the RC2 Project Site ("RC2A"). The electrical systems as described in the Xcel Spec and other preliminary design documents provided by PSCo indicate the design features described in the following paragraphs. Xcel, as the parent of PSCo provides design standards applicable to its subsidiaries.

Electrical Collection System

The collection systems at the RC1A, RC1B, and RC2A subprojects are each to be made up of eight collector circuits with 12 WTGs on four circuits and 13 WTGs on the other four circuits. The collection system circuits are each to be constructed underground using three 34.5 kV single aluminum conductor cables with a copper concentric neutral, and tree retardant cross linked polyethylene insulation which connect groups of WTG units to open air isolation switches on the 34.5 kV collector bus in the associated collector substation. The feeder cables are to be direct buried, with groups of WTGs in a given circuit connected in aboveground junction boxes. Fault indicators are to be located at each above ground junction box and at other strategic locations on the collector circuits. While underground splices made with approved splice kits may be used between junction boxes as required by the distance between the cabinets relative to the amount of cable on a reel, the design requirement is to minimize the use of splices. When required, the cables may be run in directionally-drilled conduits to cross roads or wetlands. Cables from the transformers in the nacelles of the WTGs to the switchgear at the bases of the WTGs are to be installed in Schedule 40 polyvinyl chloride ("PVC") conduit. The WTGs in each circuit are to be connected in a loop-fed configuration using non-loadbreak bushings and separable conductors in a junction box located near the switchgear at the base of the WTG. Surge arrestors are to be installed at the end of each string of WTGs and at the cable risers in the collector substation. A continuous ground conductor and fiber optic communications conductors for control of the WTGs are to be installed with the collector system power conductors.

The P50 electrical energy losses assumed in the Vaisala Energy Assessments are 2 percent, excluding the substation and transmission line losses. The maximum electrical system losses for which the Project will be designed and constructed in accordance with the Xcel Spec is a 2.25 percent maximum power loss at full output between the WTG and the collector substation 34.5 kV circuit breaker which Xcel equates to a 2 percent energy loss or equal to the Wind Energy Assessment.

PSCo has separately modeled electrical system losses which will include the generator step-up transformers in the substations ("GSU") no-load, load and auxiliary losses, and transmission line losses up to the POI.

On-Site Substations

The collection systems for RC1A, RC1B, and RC2A are each to supply power to the associated collector substation. Note: At the time of publishing this Report, PSCo was evaluating the option of building only one substation at RC1 rather than two. Since that option has not been confirmed, this Report is based on two substations located at RC1.

Each collector substation is to step up the voltage to 345 kV for interconnection to the PSCo transmission system at the POI. The collector substations are each to include eight 34.5 kV branch circuit breakers in combination with open air-type isolation switches to connect the collection system feeders to one of two 34.5 kV main substation busses with four feeders each. Grounding transformers are to be included for each collector feeder to mitigate transient overvoltage conditions. There are also to be two circuit breakers on each bus, to connect power factor correction capacitors subject to confirmation as part of the detailed design. There is also to be one breaker on each bus to connect a reactor also subject to confirmation as part of the detailed design. A bus tie switch is provided between the two main busses. Each main bus is to be connected to one of two 34.5-345 kV, wye-delta-wye GSUs which PSCo expects to be rated at 150 megavolt amperes ("MVA"), with two stages of forced air cooling in operation through a 34.5 kV circuit breaker and isolation switches. Each GSU is to include an on-load tap changer. Each GSU is to be connected to a common 345 kV bus through a circuit breaker and isolation switches. The common bus is to be connected to the 345 kV outgoing generator lead transmission line through a 345 kV motor operated disconnect switch. The 345 kV common bus in the RC1A collector substation will include an additional circuit breaker with isolation switches to accommodate the incoming transmission line from the RC1B collector substation. Each collector substation is to also include protective relay and metering equipment, telemetry to transfer electrical quantity and status data to PSCo, and station service transformers will be connected between each main breaker and its associated GSU to provide power to the control house and the collector substation station service loads. The two station service transformers supply alternating current ("AC") panelboards in the control house with the source transformer selected through automatic transfer switches. The collector substations are to designed and constructed in accordance with PSCo/Xcel engineering and design standards.

Electrical Interconnection

The power output from the Project is intended to flow through several new transmission lines and a new switching station to the POI. There are to be new 345 kV transmission lines to connect RC1B to the 345 kV common bus at RC1A, and connect RC2 to the new switching station, and the new switching station to the POI. RC1A and the new switching station are to be constructed adjacent to one another and connected by bus structures or a slack span of transmission conductor crossing their common fence.

RC2A will be connected to the new switching station by approximately 50 miles of new 345 kV transmission line, and the new switching station will connect to the POI by approximately 40 miles of new 345 kV transmission line.

PSCo plans that the transmission structures will be "H-frame" single circuit 345 kV supporting a 1272 ACSR (aluminum core steel reinforced) bundled conductor. The foundations for the transmission structures are planned to be directly embedded for tangent structures (primary structures) and three-pole deadend structures will be set on engineered foundations (concrete caissons). PSCo has assumed the ROW to be 150 feet.

The new switching station located adjacent to the RC1 Project Site is to be a three breaker ring bus designed and constructed to PSCo/Xcel standards. It is to include three circuit breakers with isolation switches to interconnect the transmission lines from RC1A and RC2A and the outgoing line to the POI. The switching station is also to include protective relay and metering equipment, telemetry to transfer electrical quantity and status data to PSCo, a station service transformer and low voltage panelboards, battery systems, structures and appurtenances.

The interconnection at the POI is to include the necessary structures to bring the transmission line from the new switching station into the POI and a new circuit breaker bay between the two existing main busses of the Missile Site Substation to accommodate the incoming line and a new 75 megavolt amperes reactive ("MVAR") capacitor bank in a breaker and a half configuration. The Missile Site Substation has transmission system connections at 345 kV to the PSCO Pawnee and Smoky Hill Substations.

Control Systems

The control and monitoring system is to be comprised of three separate, but integrated systems: (1) a wind turbine controller at each WTG; (2) the Vestas Online Business Supervisory Control and Data Acquisition ("VOB SCADA") System(s); and (3) the substation and utility interface supervisory control and data acquisition ("SCADA") control system. These systems will be connected together through a communications system comprised of a fiber optic network with provisions for RS232/422/485 communications interface.

Each WTG is to be equipped with a Vestas-supplied wind turbine control system. The control system is microprocessor-based and provides control and supervision of the yaw, pitch, hydraulic and lubrication systems. The controller automatically starts and stops the WTG in response to wind and temperature conditions and adjusts power generation and power factor during operation. The control unit is capable of producing operating and production data reports, and operations and alarm logs. Information from the control system is transmitted to the VOB SCADA System server over a fiber optic link installed with the collection system.

The SCADA system for the Project is to be the VOB SCADA System including VOB Client software. There is to be one complete VOB SCADA System associated with each of RC1A, RC1B, and RC2A. The SCADA system provides remote monitoring and control capabilities for the individual WTGs, archives WTG operational data, and generates performance reports on a WTG-specific or project-wide basis. It also receives data from the project substation through a Vestas power plant controller ("PPC") and a Vestas Grid Panel. The Vestas PPC provides control through the VOB SCADA of the reactive power production by the WTG as well as the reactive compensation equipment in the respective substation to meet voltage requirements at the POI. The VOB SCADA System allows authorized users web based access to data files and reports, facilitating multiple-party access to the data. The server for each VOB SCADA System is to be located in the associated O&M building.

There is to be a separate substation and utility interface SCADA system(s) dedicated to substation protection and PSCo requirements. This SCADA system is intended to exchange metering data and equipment status from the collector substation and the switching station with PSCo. Information to/from the Project facilities and utility interface SCADA system can be provided to the VOB SCADA system through the fiber optic network.

CONSTRUCTION OF THE PROJECT

Construction Arrangements

WTG Supply

The TSA provides the terms under which the WTGs will be supplied to the Project by Vestas as well as the obligations of both Vestas and PSCo. Generally, the Vestas obligations include meeting certain schedule milestones for WTG delivery, commissioning and substantial completion and associated liquidated damages for failure to meet these milestones. The TSA specifies the requirements for achieving mechanical completion, commissioning completion substantial completion, SCADA completion and final completion.

Construction

The construction of the Project is planned by PSCo to be accomplished under terms of a BOP EPC contract expected to be executed on a fixed price basis with date certain completion milestones and liquidated damages for late completion of specified milestones. The work scopes provided in the indicative budget estimates by the three prospective contractors encompass the major activities to be accomplished and the assumptions underlying the proposed budgets.

These proposed construction arrangements are normal and customary in the wind energy industry and similar to projects with which we are familiar.

Capital Costs

We reviewed the Project capital costs as estimated by PSCo and presented in excel spreadsheet form. The BOP construction costs were estimated from the three prospective contractor's indicative budget estimates and the experience of PSCo and its affiliates. The "Total Project Capital Costs" are summarized in Table 3 and are broken down into total construction costs (the "Total Construction Cost"), other Project costs (the "Other Project Costs"), and financing costs (the "Financing Costs"). The Total Construction Costs are approximately $1,036,407,000 and the estimated Total Project Capital Costs are approximately $1,095,799,000 and are discussed in the following sections.

Table 3
Total Project Capital Cost
($000)

Construction Costs	
Direct Construction Costs	
WTG Supply Costs plus	
BOP Construction Costs	[redacted]
Main Transformer Costs	[redacted]
Communications and Security	[redacted]
Interconnection Costs including contingency	121,407
Subtotal Direct Construction Costs	951,809
Indirect Construction Costs	
Owner's Engineering	[redacted]
Construction Management	[redacted]
Owner's Indirect Costs	[redacted]
Meteorological Towers	[redacted]
Start-up Costs and Spare Parts	[redacted]
Subtotal Indirect Construction Costs	[redacted]
Wind Farm Construction Contingency	[redacted]
Total Construction Costs	969,558
Other Project Costs	
Sales Tax	[redacted]
Insurance	[redacted]
Development Fee / Costs	[redacted]
Payments to Landowners	[redacted]
Overhead	[redacted]
Advisor fees	[redacted]
Subtotal Other Project Costs	[redacted]
Total Project Costs before financing	1,036,407
Financing Costs	
Interest During Construction	59,392
Working Capital and Initial Reserves	-
Project Transaction Fees	-
Miscellaneous Financing Costs	-
Total Project Capital Costs	1,095,799

Construction Costs

The Total Construction Cost of $969,558,000 includes direct construction costs of [redacted], indirect construction costs of [redacted] and contingency of [redacted].

Direct Construction Costs

WTG Supply Costs and BOP Construction Costs

The WTG supply costs and BOP construction costs are estimated to be [redacted]. The WTG supply costs for the supply of 300 WTGs includes (300) WTGs with 110 meter diameter rotors, power supply for the FAA lighting, capability to connect SCADA to the FAA lighting alarms, transformers, cabling from transformer to switchgears, control panels, anemometers, low temperature packages, earthing kits, and solid metal tips on blades along with 300 climb assists, a condition monitoring system and ten ice detection sensors. The BOP construction costs include site civil work, WTG foundation materials and installation, WTG installation, collection system materials and installation, collection substation materials and installation (excluding the PSCo supplied main transformer), O&M building and yard, existing road upgrades, storage yard and double handling of WTGs, along with contractor overhead, fees and profit for both RC1 and RC2 Projects. PSCo analyzed the three indicative budget estimates and utilized what it believes to be the more conservative line item amounts from the various bids, as well as the experience of PSCo affiliates, to develop the BOP construction cost portion of the estimate.

Interconnection Facilities Costs

PSCo's cost estimate for the supply and installation of $121,407,000 includes the ROW and the transmission line tie of approximately 50 miles from RC2 to RC1, the new switching station, and the ROW and the transmission line of approximately 40 miles from RC1 to the POI. Also included in the budgeted costs is the SCADA system for both RC1 and RC2 and the transmission line system. The interconnection cost estimate is based on a parametric sample cost from Xcel Energy assuming a similar cost per mile with roughly seven structures per mile. The methods and assumptions provided by Xcel Energy in their cost estimate are in the range of similar projects that we are familiar with in this region.

Indirect Construction Costs

Construction Management and Owner's Engineering Costs

The construction budget includes estimates for construction management of [redacted] and Owner's indirect costs of [redacted]. PSCo does not plan on installing new meteorological towers. Startup costs and spare parts have been indicated by PSCo to be included in the WTG supply and BOP construction costs above.

Construction Contingency

PSCo has established a construction contingency budget of [redacted]. The budgeted construction contingency is for potential change orders related to scope changes or other unexpected circumstances that would not otherwise be included or anticipated in the proposed construction and supply contracts. In addition to the construction contingency budget stated above, PSCo has included contingency in the interconnection costs of approximately [redacted] which includes 10 percent contingency in the transmission line materials costs and 20 percent contingency in the labor costs. An additional contingency of approximately [redacted] has also been included in the budgeted costs for unforeseen risk items. The construction contingency combined for RC1, RC2, and interconnection is the combination of the [redacted] and [redacted] or $36,214,000.

We believe the estimates which serve as the basis for the Total Construction Cost, including the Construction Contingency, were developed in accordance with generally accepted engineering practices and methods of estimation. Further, the Total Construction Cost and Construction Contingency are comparable to the costs of projects of similar size and technology with which we are familiar.

Other Project Costs and Financing Costs

The Other Project Costs delineated in the Total Project Capital Costs include development fees and costs of approximately [redacted] and insurance costs of [redacted]. Payments to landowners during construction have been estimated by PSCo at [redacted]. Overhead costs are estimated to be [redacted] and advisor fees are estimated at [redacted]. The Financing Costs delineated in the Total Project Capital Costs include interest during construction costs of $59,392,440. We did not review the Other Project Costs and Financing Costs budgeted by PSCo as they are outside our area of expertise.

Construction Schedule

We were provided a schedule titled, *"Colorado Wind PUC Schedule 04-11-16.pdf"* dated April 11, 2016. The key dates from the Construction Schedule are summarized in Table 4. Anticipated and guaranteed delivery dates for complete WTGs (nacelles, towers and blades) are shown in Tables 5A and 5B.

Table 4
Construction Schedule (1)

Activity	Start Date	Completion Date
Mobilization	February 6, 2017	
Road Construction	February 20, 2017	February 17, 2017
WTG Foundation	May 1, 2017	November 1, 2017
Substation Construction	February 20, 2017	August 1, 2018
Collection System Installation	May 1, 2017	November 1, 2017
WTG Deliveries	April 23, 2018	September 14, 2018
WTG Erection	April 25, 2018	September 28, 2018
Transmission Line	May 10, 2017	August 1, 2018
Backfeed Power		August 1, 2018
WTG Mechanical Completion	May 23, 2018	October 12, 2018
WTG Pre-Commissioning	June 18, 2018	August 1, 2018
WTG Commissioning	August 2, 2018	October 31, 2018
Guaranteed Substantial Completion		**[TBD]**
Commercial Operation		October 31, 2018
Final Completion		**[TBD]**

(1) Dates are from the Construction Schedule dated April 11, 2016.

The Construction Schedule is based on all access roads, foundations, and collection system installation being completed for both RC1 and RC2 Projects during the summer of 2017 starting February 20, 2017 along with the start of construction of the new switching station at the RC1 Project Site. The delivery and erection of the WTGs at the RC1 and RC2 Projects is scheduled for the summer of 2018 starting in late April 2018 with WTG commissioning completing October 31, 2018. The delivery of the WTGs to the RC1 and RC2 Project Sites is scheduled between April 23, 2018 and September 14, 2018 and should not present delivery or erection issues based on this level of schedule detail. It is our understanding that the construction of RC1 and RC2 would be accomplished in parallel.

Table 5A
RC1 and RC2 Combined – Anticipated WTG Delivery Schedule

Project Milestone Grouping	Quantity	Completion Date (Week of) Date
[redacted]	[redacted]	[redacted]

Table 5B
RC1 and RC2 Combined – Guaranteed WTG Delivery Schedule

Project Milestone Grouping	Quantity	Completion Date (Week of) Date
[redacted]	[redacted]	[redacted]

Construction Cost Comparison

The cost comparison analysis provided below is based on our review of the estimated Project costs and approximately 12 comparable wind farm projects developed and constructed during the time frame of October 2007 to September 2015 with a range of sizes from 99 MW to 298 MW. The projects reviewed used a variety of wind turbine suppliers as well as different BOP construction companies but had adopted construction arrangements similar to those proposed for the Project. Our comparison values are based on dollars per kilowatt for the 12 wind farms reviewed along with the estimated costs for the Project.

Table 6 provides a comparison of the Project's aggregated WTG supply and BOP construction costs against these 12 wind farm projects. For the combined WTG supply and BOP constructions costs, the 12 wind farm projects ranged from a low value of $1,283 per kW to a high value of $1,972 per kW with an average cost of $1,451 per kW. The variation in costs is attributable to the variability of wind turbine costs and BOP construction costs among the various providers, differences in wind farm configurations, transmission and interconnection requirements, as well as locational variations.

The combined WTG supply and BOP construction cost for the Project is [redacted] per kW which is 5 percent below the average of the same costs for the comparable projects, and well below the high end of the range.

Interconnection costs for the 12 comparable projects ranged from a low value of $0 per kW to a high value of $127 per kW with the average at $38 per kW. Some projects are located such that existing transmission lines support the projects and no new transmission lines are required. The cost for the proposed interconnection of the Project is $202 per kW. The budgeted costs include the new 345kV switching station at the RC1 Project Site, ROW costs for the transmission line from the RC2 Project Site to the RC1 Project Site, and ROW costs for the transmission line from RC1 to the POI, along with the engineering, transmission line materials, installation labor and SCADA communication costs. It should also be noted that the proposed interconnection costs are based on the transmission line being constructed to 345 kV standards as compared to 230 kV standards.

The comparison of the Total Construction Costs (without other project costs or financing costs) for the comparable projects provided a low cost of $1,337 per kW to a high cost of $1,972 per kW with the average cost of $1,543 per kW. It should be noted that the high cost project had interconnection costs of zero dollars. The Total Construction Cost estimated by PSCo of $1,616 per kW is slightly above the average of the comparable wind farm projects analyzed largely due to the higher interconnection costs estimated for the Project.

Table 6 (1)
Comparable Wind Projects

Item	Rush Creek ($/kW)	Comparable Wind Projects Low ($/kW)	Average ($/kW)	High ($/kW)
WTG and BOP Combined Costs	[redacted] (2)	1,283	1,451	1,972
Interconnection Costs	202 (3)	0	38	127
Total Direct Costs	[redacted]	1,294	1,502	1,972
Total Construction Costs	1,616 (4)	1,337	1,543	1,972

(1) 99MW to 298MW. Construction 2007 to 2015 samples.
(2) Reference to Table 3: Costs for WTG Supply plus BOP Construction plus Main Transformer plus Communications and Security totaling [redacted] divided by 600,000 kW.
(3) Reference to Table 3: Interconnection Costs of $121,407,000 divided by 600,000 kW.
(4) Reference to Table 3: Total Construction Costs of $969,558,000 divided by 600,000 kW.

The results of this analysis are:

- The sum of the wind turbine supply and BOP construction costs for the Project are 4.6 percent less than the average wind turbine supply and BOP construction costs for the comparable projects on a dollar per kilowatt basis.
- The estimated total construction costs for the Project are higher than the average of the comparable projects by 4.7 percent principally due to the more extensive transmission and interconnection facilities proposed for the Project.

TECHNICAL REVIEW OF THE PROJECT

WTG Technology

Our detailed review of the Vestas V110-2.0 MW WTG overall technology and its major components, as well as Vestas' WTG operating experience appears in Appendix A.

Projected Energy Production

Wind Resource

The following summarizes our review of the overall methodologies and energy calculations in the Vaisala Energy Assessments contained in files named *"Xcel-Rush Creek1-NetReport_V110_80m_issueB.pdf"*, and *"Xcel-Rush Creek2-NetReport_V110_80m_issueB.pdf"*, both dated April 26, 2016. We have not independently evaluated any wind resource data nor validated any estimates presented in the Vaisala Energy Assessments. We did, however, review the technical assumptions used to project energy production of the Project in the Vaisala Energy Assessments. We also confirmed that the power curve used in the Vaisala Energy Assessments is the same as provided in the TSA general specifications.

A total of 6 meteorological ("met") towers, two for RC1 and four for RC2 collected wind data on the Project Sites for a 4-year period. The mean long-term 80-meter hub height wind speeds at each met tower are provided in Tables 7A and 7B.

Table 7A
RC1
Measurement Mast Long-Term
80-m Wind Speeds

Mast	Wind Speed (m/s)
2301	8.16
2327	8.24

Table 7B
RC2
Measurement Mast Long-Term 80-m
Wind Speeds

Mast	Wind Speed (m/s)
2196	8.78
2202	8.51
2311	9.08
2313	9.00

The wind speeds across the Project area masts range from 8.16 to 9.08 m/s.

WTG Layout and Energy Assessment

The WTG layouts proposed for the Project Sites are provided in Figures 2A and 2B. The 200 Vestas V110-2.0 MW WTG locations for RC1 and 126 for RC2 are indicated by white circles. (PSCo reported that the 126 WTGs at RC2 will be reduced to 100 to achieve a 200 MW project).

The Vaisala Energy Assessments were conducted using data from the 6 met towers. Vaisala conducted site visits to verify the documented configurations of the towers. Vaisala conducted a validation process of the data, following commonly accepted wind industry practices. Vaisala examined data from three global climatological datasets to adjust the on-site data to long-term conditions, and a combination of the correlation results for the three datasets was used to calculate the long term adjustment at each met tower. The adjustments ranged from 2.6 percent downward to 0.6 percent upward across the 6 met towers. The Vaisala approach to adjusting measured data to a long-term reference station is a commonly accepted industry practice, and is consistent for extending each tower's dataset to long-term conditions.

Vaisala extrapolated hub-height wind speeds using standard industry practices, which use measurements from the on-site meteorological towers at different heights to determine a shear value. The shear value is then applied using a power law to determine hub-height wind speeds for each tower. Vaisala reported shear values ranging from 0.13 to 0.19. Measured wind speeds from the top sensors at each meteorological tower, each tower's shear, and the final adjusted hub-height wind speed for each tower were reported by Vaisala.

Vaisala used the Weather Research and Forecasting ("WRF") and the Time-Varying Microscale ("TVM") numerical wind flow models to predict mean annual wind speeds across the Project area. Vaisala used temperature and atmospheric pressure data generated by the models to calculate an air density which is a suitable methodology for use in estimating energy.

Vaisala then used their in-house wake model to predict wake loss at each turbine location.

The long-term P50 annual net energy production used in the Pro Forma is 2,311.8 gigawatt-hours ("GWh") per year based on the combined RC1 and RC2 Vaisala Energy Assessments. PSCo has included a 0.82 percent loss for transmission line electrical loss resulting in delivery of 2,292.7 GWh at the POI. The Project aggregate net capacity factor ("NCF") calculated by PSCo is 43.6 percent in the Pro Forma, which includes the transmission line loss.

Vaisala determined energy loss factors to represent Project site conditions to estimate net energy output and net capacity factor for the Project. Losses were calculated, estimated, or assumed by Vaisala. Vaisala notes that no loss factor was calculated for curtailment due to wind sector management since Vestas has not yet conducted its site suitability analysis and produced its Wind Power Plant Production Analysis.

Table 8 provides a summary of the gross and net energy along with a summary of losses due to WTG wakes and other losses from the Vaisala Energy Assessments for RC1 and RC2.

Table 8
Summary of the Project Generation and Losses

Item	RC1	RC2(1)	RC2(2)
Number of WTGs	200	126	100
WTG Mean Free Wind Speed (m/s)	8.27	8.83	
Air Density (kg/m^3)	0.997	1.019	
Gross Energy (GWh/year)	1909.7	1321.0	1048.4
Wake Loss (%)	93.4	92.7	
Total Losses (%)	78.5	77.6	
P_{50} Net Energy (GWh/year)	1498.4	1024.9	813.4

(1) As reported in the Vaisala Energy Assessment
(2) Corrected by PSCo to reflect 100 WTGs at RC2

Availability and Performance Loss Estimates

The Vaisala Energy Assessments include a detailed analysis of individual energy losses which are used to determine the net energy production for the Project. The rationale and techniques used to determine each loss are detailed in the Vaisala Energy Assessments. While we have not conducted an extensive review of each individual loss factor nor conducted our own calculations based on site specific data, we have reviewed the Vaisala losses and the explanatory text in their report for overall suitability, and we find they are representative of normal wind industry practice and the site-specific conditions.

Uncertainty

The variability of the wind resource and the energy estimate is determined by calculating the uncertainty of each set of calculations that make up the energy assessment. We have reviewed the Vaisala uncertainty calculations and the calculation methodology is consistent with normal wind industry practice. The 1-year and 10-year uncertainties for capacity factor from the Vaisala Energy Assessments are provided in Table 9.

Table 9
Net Capacity Factors for Various Probabilities (%)

P Values	1-Year		10-Year	
	RC1	RC2	RC1	RC2
P50	42.7	46.4	42.7	46.4
P75	40.4	44.4	40.6	44.6
P90	38.3	42.6	38.7	43.0
P95	37.1	41.5	37.6	42.0
P99	34.8	39.5	35.5	40.2

Based on our review of the Vaisala Energy Assessments, we are of the opinion that the methodology and assumptions used by Vaisala in preparing its estimates of energy production for RC1 and RC2 are reasonable. The P50 energy production estimate in the Pro Forma is consistent that in the Vaisala Energy Assessments.

OPERATIONS AND MAINTENANCE

Asset management and BOP O&M of the Project are to be carried out by PSCo or an affiliate. For the first three years, the WTGs are to be operated and maintained by Vestas under the SMA. Following the initial three year term of the SMA, PSCo intends to competitively bid the WTG maintenance work initially performed by Vestas.

PSCo plans to operate RC1 and RC2 as a single project organization. The PSCo staff on site is expected to be one site manager, one site superintendent, two engineers, and one administrative person. In addition to the PSCo site staff, Vestas is to have approximately 25 technicians during the term of the SMA (discussed below). PSCo is to supplement, as required, the site staff with regional specialist employees and/or specialist contractors. Examples of specialist contractors are road maintenance and substation corrective maintenance crews.

Operating Agreements

SMA

Under terms of the draft SMA, Vestas is to perform all maintenance, diagnostics, repair and replacement services on the serviced equipment as specified in the SMA for a period of three years commencing with commissioning completion of the first WTG. Vestas is to be paid [redacted]. The [redacted] specified in the SMA.

The SMA includes warranties for parts, serial defects, and the WTG sound level.

BOP O&M

PSCo expects to self-perform the BOP O&M.

Projected Operating and Maintenance Cost

The Pro Forma assumes commercial operations starting in October 2018. The projected operating costs prepared by PSCo for the Project are set forth in the Pro Forma. Costs in the Pro Forma are escalated at 2 percent annually. The Plant O&M costs in the Pro Forma include the Vestas SMA fee and estimated costs for BOP O&M. The first five full years of Pro Forma operating costs are shown in Table 10A for RC1 and Table 10B for RC2 and expressed in 2018 dollars.

Table 10A
RC1 Pro Forma Operating Costs
($Real)

Item	2019	2020	2021	2022	2023
Production-Related O&M Costs					
Labor (Company)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Labor (Contractor)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
O&M and Sub Buildings	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Miscellaneous	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
End of warranty inspections	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gearbox oil change	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Blade LE repair	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Production-Related O&M Costs	11,403,952	11,903,951	11,487,685	8,607,218	9,269,218
$/MW	28,510	29,760	28,719	21,518	23,173

Table 10B
RC2 Pro Forma Operating Costs
($Real)

Item	2019	2020	2021	2022	2023
Production-Related O&M Costs					
Labor (Company)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Labor (Contractor)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
O&M and Sub Buildings	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Miscellaneous	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
End of warranty inspections	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gearbox oil change	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Blade LE repair	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Production-Related O&M Costs	5,781,974	6,031,974	5,820,839	4,355,460	4,686,460
$/MW	$28,910	$30,160	$29,104	$21,777	$23,432

Production-Related O&M Costs

The O&M costs indicated in the Pro Forma include the Vestas SMA fee and estimated costs for BOP O&M. The Labor (Company) line item includes the fully burdened cost of the six PSCo employees planned for the Project organization. The Labor (Contractor) line item includes the Vestas SMA fee and estimated contractor costs for the O&M of the substation, roads, and collection system. The Pro Forma assumes commercial operations starting in October 2018.

BOP costs are approximately [redacted] percent and WTG costs are approximately [redacted] percent of the Production-Related O&M budget, which is consistent with other similar projects. PSCo projects lower costs following the three year term of the Vestas SMA (2022) because PSCo plans to seek competitive proposals for the WTG O&M following the Vestas SMWA term.

PSCo makes provisions for annual and periodic activities in the Pro Forma. The annual maintenance activities include, among other things, the preventative maintenance specified by the original equipment manufacturers. Periodic maintenance activities include: end of WTG warranty inspections, gearbox oil changes hydraulic oil changes, and blade leading edge maintenance.

O&M Cost Comparison

We have compared the O&M costs of the Project estimated by PSCo to the same population of 12 wind projects discussed in the Construction Cost Comparison section above with results shown in Table 11. PSCo provided O&M Costs including costs associated with the generation plant and costs associated with the 345 kV generation tie-line. O&M Costs are associated with the direct operation of the Project and include, costs for labor, materials, forecasting services, parts, consumed electricity, cranes, environmental monitoring, contracted services, asset management and fees, and BOP O&M fees.

For the Project, the annual Pro Forma O&M costs for RC1 and RC2 were consolidated and discounted to 2018 and divided by the discounted annual P50 net generation. For the comparable projects, budgeted O&M costs were discounted to 2018 and divided by the discounted annual P50 net generation for the period of the respective budgets.

Table 11
O&M Cost Comparison (1)

O&M Costs (2)	Rush Creek	Low	Average	High
Annual $/MW (3)	30,733	26,580	37,689	51,991
$/MWh (4)	9.87	8.59	12.51	17.37

(1) Average annual O&M Costs.
(2) Operations and Maintenance ("O&M").
(3) MegaWatt ("MW") rating at the point of interconnect.
(4) MegaWatt-hour ("MWh") at the P50 electrical production budget.

The results of this analysis are:

- The estimated operating costs for the Project are: (i) 21 percent lower than the average of the comparable projects on the basis of dollars per megawatt hour, and (ii) 18.4 percent lower than the average of the comparable projects on the basis of dollars per megawatt.

Based on our review, we are of the opinion that the methodology used by PSCo in preparing the estimate of O&M Costs for the Project is reasonable. Assuming the costs in the model are reflected materially in the completed contracts and other arrangements, the estimated O&M Costs are comparable to the O&M Costs at the facilities used in this analysis.

LEVELIZED COST OF ENERGY

Previous sections of this report have focused on comparing estimated construction costs of the Project with other regional wind energy facilities with which Leidos is familiar. This section of this report will focus on evaluating the LCOE of the Project, and how it compares to other wind energy facilities which have or can deliver energy directly to the PSCo system. The LCOE of the Project was compared to the LCOE of 5 other wind energy facilities which are currently counterparties to existing PPAs with PSCo.

LCOE

LCOE is often used as a convenient summary measure of the overall competiveness of different generating facilities. At a fundamental level, LCOE is the average cost of energy per MWh over the life of a project, taking into account the time value of money, representing the per-Megawatt-hour cost ($/MWh, in real dollars) of constructing and operating a generating facility over assumed operational and financial lives.

Key inputs to calculating LCOE of wind energy facilities include capital and other development costs, fixed and variable O&M costs, financing costs, and an assumed utilization rate, or capacity factor, for each facility for which an LCOE is being developed. For a technology such as wind generation that has no fuel costs and small variable O&M costs relative to its development and construction costs and is also sensitive to the projected energy production of the facility over time. For the Project, the federal Production Tax Credit ("PTC") – itself a function of the assumed energy output – also impacts the calculation of its LCOE. As with any projection, there is uncertainty about all of these factors and all LCOE projections must be interpreted with these uncertainties in mind.

LCOE of the Project

Calculating the LCOE of the Project required identifying the projected annual costs to develop, construct, and operate the Project, and the projected annual energy produced by the Project. To project the LCOE over a range of potential levels of energy production, Leidos developed a range of corresponding annual costs corresponding to those levels of energy production. While the majority of the projected annual costs do not vary with energy production, a small portion of them do income tax, and land lease payments; additionally, while PTCs are treated as a revenue item and not a cost, they also vary with energy production.

Annual Costs Projection

PSCo is proposing to recover its costs related to the Project by projecting the annual revenue requirements of the Project and including those revenue requirements in its rate base. To calculate the LCOE of the Project, Leidos primarily relied upon a model developed by PSCo to calculate the Project's revenue requirements for the purpose of regulatory reporting ("Revenue Requirements model"). At Leidos' request, PSCo provided copies of that model to Leidos, as well as miscellaneous other spreadsheets and supporting workpapers. Leidos followed the process described below to develop the annual costs used in its LCOE projections:

- *PSCo Revenue Requirements model review.* Leidos reviewed the Revenue Requirements model for accuracy and consistency with the projected development, construction, and operating costs which were reviewed in the cost to construct comparison described previously in this report. Leidos determined that the Revenue Requirements model values for estimated development, construction, and operating costs were consistent with the cost to construct comparison in this report. Leidos did not verify and does not opine on the accuracy or appropriateness of the Revenue Requirement model's treatment of financing costs including AFUDC; however, those costs were included in Leidos' development of the Project's LCOE. Leidos also did not verify and does not opine on the accuracy or appropriateness of the Revenue Requirements model's methodology for converting the development, construction, and operating costs of the Project into annual revenue requirements.

- *Calculation of annual revenue requirements, less property taxes and insurance expenses.* The Revenue Requirements model projected nearly all the annual revenue requirements associated with the Project. However, property taxes, and insurance expenses were projected in separate workpapers as described below. The Revenue Requirements model included the Project's projected net capacity factor as an input; changing the capacity factor in the model produced different annual revenue requirements due to changes in estimated lease payments, PTC and income tax impacts. Leidos conducted several iterations of the Revenue Requirements model to identify the annual revenue requirements associated with a range of average net capacity factors.

- *Incorporation of property taxes and insurance expenses.* PSCo provided workpapers identifying the projected property tax and insurance expenses for the Project, which are not projected to vary with energy production and Leidos incorporated those assumptions directly into its own LCOE model. Leidos did not verify and does not opine on the accuracy or appropriateness of PSCo's assumptions related to property taxes or insurance expenses.

- *Calculation of total projected annual revenue requirements for the Project.* Leidos summed the partial annual revenue requirements identified in the Revenue Requirements model and property tax and insurance expenses provided to develop projected total annual revenue requirement for the Project associated with assumed range of average net capacity factors.

Annual Delivered Energy Production Projection

Leidos calculated the projected annual delivered energy production associated with a range of net capacity factors using the following equation:

> ***Projected Annual Delivered Energy Production = Capacity Factor *Yearly Hours* Nameplate Capacity rating of the Project *Transmission Loss Factor***

Leidos calculated the Delivered Energy Production for a series of net *capacity factors*, ranging from 35 percent to 48 percent. *Yearly Hours* refers to the hours in any given year including leap years. The *Nameplate Capacity* rating of the Project was assumed to be 600 MW.

Transmission Loss Factor. The Vaisala Energy Assessments determined energy loss factors to represent Project site conditions to estimate net energy output and net capacity factor for the Project. Additionally, PSCo developed loss assumptions associated with delivering energy from the Project to the POI at the Missile Site Substation via the proposed 345 kV transmission line. The loss assumptions developed by PSCo included stepup transformer losses as well as line losses between the Project and the POI. ·Over the Project's most likely range of annual energy production, PSCo loss assumptions averaged 0.82 percent. This figure was used to project the annual delivered energy production associated with a range of net capacity factors. Leidos did not verify and does not opine on accuracy or appropriateness of the PSCo loss assumptions associated with delivering energy from the Project to the POI.

Table 12 below provides the annual projected delivered energy and associated capacity factors, including transmission loss assumptions:

Table 12
Annual Average Delivered Energy Production
and Net Capacity Factor[1]

Average Delivered Energy Production (GWh)	Net Capacity Factor (%)
1,839.6	35
1,997.3	38
2,155.0	41
2,312.6	44
2,522.9	48

1. Includes loss assumptions related to the Project site conditions and transmission losses related to delivery to the POI.

Calculation of the LCOE of the Project

Completing the calculations described above yielded a series of projected annual revenue requirements and projected annual energy production associated with each 0.5 percent capacity factor increment from 35 percent to 48 percent. To calculate the LCOE associated with each capacity factor increment, Leidos used the following equation:

> ***LCOE = Present Value of Total Annual Revenue Requirements / Present Value of Total Annual Energy Production***

The Present Value of Annual Revenue Requirements was calculated by discounting the annual revenue requirements associated with the Project to 2016 dollars, using an After Tax Weighted Average Cost of Capital ("After-tax WACC") discount rate of 6.78 percent, over the 2016-2099 period. 2099 is the final year of the depreciation for the transmission portion of the project. The After-tax WACC was provided by PSCo and is consistent with PSCo's current regulatory filings. Leidos did not verify and does not opine on the accuracy or appropriateness of the After-tax WACC. The Present Value of Annual Delivered Energy Production was also calculated by discounting the annual delivered energy production associated with the Project at the given net capacity factor increment to 2016, using the After-tax WACC discount rate of 6.78 percent.

Table 13 provides Leidos' calculation of the Project's LCOE by selected net capacity factor. Because each increase in projected average capacity factor yields a corresponding increase in projected annual delivered energy production (which is the denominator in the LCOE equation), as the projected average net capacity factor increases, the resulting LCOE decreases. Note that while each increase in projected average net capacity factor does yield some corresponding increase in projected annual revenue requirements, the increase in projected annual revenue requirements is small relative to the increase in projected annual delivered energy production. The net effect of increasing average annual delivered energy production is to lower the LCOE of the Project.

Table 13
Project LCOE by Net Capacity Factor

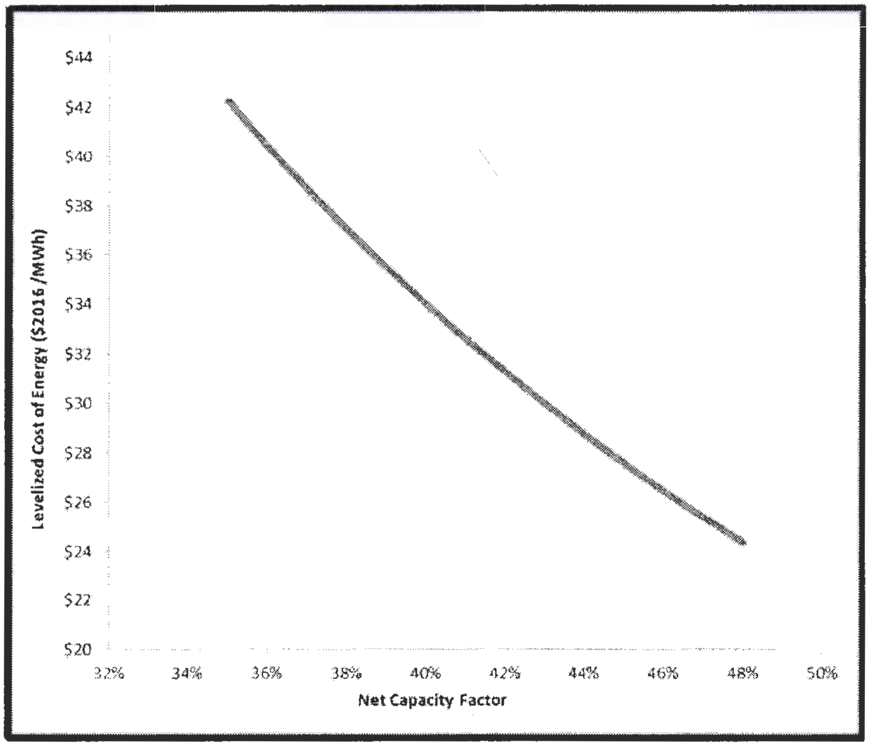
Net Capacity Factor (%)	Project LCOE ($/MWh)
35	$42.23
38	$37.03
41	$32.58
44	$28.74
48	$24.37

Figure 3 provides a graphical representation of the projected LCOE of the Project across a range of capacity factors.

Figure 3

Rush Creek Project

Projected LCOE of the Project by Capacity Factor



Probability of the LCOE of the Project

After calculating the LCOE of the Project at various assumed capacity factors, Leidos used the Vaisala Energy Assessments ("Energy Assessment") reports to evaluate the probability that the Project produces a given level of energy production and associated capacity factor.

The Energy Assessment reports consist of wind resource assessments conducted using Vaisala's modeling platform that combines on-site observations with mesoscale and microscale weather simulation models to produce probabilities that the Project will produce average annual levels of gross and net energy production. The Energy Assessment reports provided 8 probabilities associated with both individual Project sites' annual energy production. The RC1 site was modeled as a 400 MW project and RC2 was modeled as a 252 MW project, because the RC2 site will be reduced to 200 MW as planned by PSCo, the RC2 results were scaled by a factor of 200/252. Leidos applied the Transmission Loss Factor described above to this adjusted sum of both reports for each of the 8 identified probabilistic delivered energy production values to arrive at the probability that the Project's total delivered energy production will exceed various GWh values.

Table 14 below provides the Probability of Exceedance Values in GWh associated with the individual Project sites and the Project totals. The Exceedance Values terms (Net-P10, Net-P25, Net-P50, etc.) refer to the probability that the individual Project's annual average annual generation will *exceed* the indicated GWh. The terms 10-year and 20-year refer to the probability that the Project's average delivered energy production over any given 10-year or 20-year period, respectively, will *exceed* the indicated GWh.

For example, after adjusting for transmission losses, the Energy Assessment reports indicated that there is a 50 percent probability that the total Project's annual average delivered energy production will *exceed* 2,292.9 GWh in any 10-year or 20-year period, and there is a 95 percent probability that the Project's annual average delivered energy production will *exceed* 2,038.3 GWh over any 10-year period, and 2,039.8 GWh over any 20-year period.

Table 14
Probability of Exceedance Values (GWh)

Exceedance Value	**Scaled Project Site RC2**		**Project Site RC1**		**Total Project**	
	10-year	**20-year**	**10-year**	**20-year**	**10-year**	**20-year**
Net-P10	866.0	865.6	1,625.2	1,624.4	2,491.2	2,490.0
Net-P25	838.0	837.8	1,559.3	1,558.8	2,397.3	2,396.6
Net-P50	806.8	806.8	1,486.1	1,486.1	2,292.9	2,292.9
Net-P65	789.0	789.0	1,444.3	1,444.5	2,233.3	2,233.5
Net-P75	775.6	775.8	1,412.8	1,413.3	2,188.4	2,189.2
Net-P90	747.5	747.9	1,347.0	1,347.8	2,094.5	2,095.7
Net-P95	730.7	731.2	1,307.6	1,308.6	2,038.3	2,039.8
Net-P99	699.2	699.9	1,233.6	1,235.1	1,932.8	1,935.0

Table 14 and Figure 3 above provided the projected LCOE of the Project over a range of potential capacity factors. Converting the Probability of Exceedance Values above into capacity factors allows the projection of the probability that the Project will exceed various LCOE values.

Table 15 below converts the Energy Assessment reports' probabilities of exceeding net energy production as measured in GWh to probabilities of exceeding net energy production as measured by capacity factor. The conversion to capacity factor included the assumed Transmission Loss Factor as described above. For each level of probability, (Net-P10, Net-P25, Net-P50, etc.) the projected energy production is indicated for any 10-year and 20-year period. For example, after adjusting for the assumed Transmission Loss Factor, the Energy Assessment reports indicated that there is a 95 percent probability that the total Project's annual average delivered energy production will *exceed* a 38.8 percent capacity factor over a 20 year period.

Table 15
Probability of Exceedance Values (Capacity Factor)

Exceedance Value	**Scaled Project Site RC2**		**Project Site RC1**		**Total Project**	
	10-year	**20-year**	**10-year**	**20-year**	**10-year**	**20-year**
Net-P10	46.4%	46.4%	46.7%	46.7%	47.4%	47.4%
Net-P25	49.8%	49.8%	44.8%	44.8%	45.6%	45.6%
Net-P50	48.2%	48.2%	42.7%	42.7%	43.6%	43.6%
Net-P65	45.4%	45.4%	41.5%	41.5%	42.5%	42.5%
Net-P75	44.6%	44.6%	40.6%	40.6%	41.6%	41.7%
Net-P90	43.0%	43.0%	38.7%	38.8%	39.8%	39.9%
Net-P95	42.1%	42.1%	37.6%	37.6%	38.8%	38.8%
Net-P99	40.2%	40.3%	35.5%	35.5%	36.8%	36.8%

Table 16 below expands on Table 15 above by providing the Project's projected LCOE over a range of potential net capacity factors, with the net capacity factors associated with specific probabilities included. It is important to note the specific probabilities refer to the probability that the net capacity factor will *exceed* the given value. Because LCOE decreases as net capacity factor increases, the probabilities associated with exceeding (or being higher than) given capacity factors are also associated with the probabilities of the LCOE being *lower than* the given values. For example, Table 17 indicates there is a 90 percent probability that the Project's net capacity factor will exceed 39.9 percent, which also indicates there is a 90 percent probability that the Project's LCOE will be *lower than* $34.17/MWh. The LCOE associated with the 50 percent probability, or expected value, is $29.20/MWh. There is a 10 percent probability that the Project's net capacity factor will exceed 47.4 percent and a 10 percent probability that the Project's LCOE will be *lower than* $25.01/MWh.

Table 16
Project LCOE by Net Capacity Factor

Exceedance Value	Net Capacity Factor (%)	Project LCOE ($/MWh)
	35	$42.23
Net-P99	36.8	$39.98
	38	$37.03
Net-P95	38.8	$35.76
Net-P90	39.9	$34.17
	41	$32.58
Net-P75	41.7	$31.70
Net-P65	42.5	$30.60
Net-P50	43.6	$29.20
	44	$28.74
Net-P25	45.6	$26.91
Net-P10	47.4	$25.01
	48	$24.37

Figure 5 below provides the Project's probabilities of producing a range of LCOE. For example, the figure indicates that the LCOE associated with the 50 percent probability, or expected value, is $29.20/MWh. The figure also indicates that the Project has a 90 percent probability of producing an LCOE *lower than* $34.17, and a 10 percent probability of producing an LCOE *lower than* $25.01/MWh.

Table 17 below expands on Table 16 above by providing the Project's projected LCOE over a range of potential net capacity factors, with the net capacity factors associated with specific probabilities included. It is important to note the specific probabilities refer to the probability that the net capacity factor will *exceed* the given value. Because LCOE decreases as net capacity factor increases, the probabilities associated with exceeding (or being higher than) given capacity factors are also associated with the probabilities of the LCOE being *lower than* the given values. For example, Table 17 indicates there is a 90 percent probability that the Project's net capacity factor will exceed 39.9 percent, which also indicates there is a 90 percent probability that the Project's LCOE will be *lower than* $34.17/MWh. The LCOE associated with the 50 percent probability, or expected value, is $29.20/MWh. There is a 10 percent probability that the Project's net capacity factor will exceed 47.4 percent and a 10 percent probability that the Project's LCOE will be *lower than* $25.01/MWh.

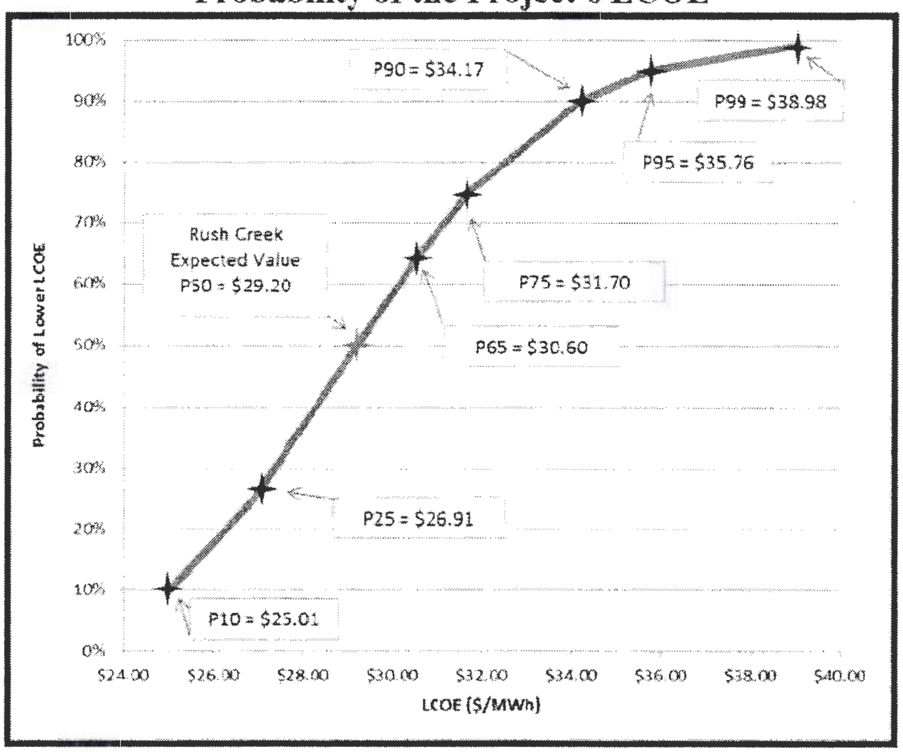
Table 17
Project LCOE by Net Capacity Factor

Exceedance Value	Net Capacity Factor (%)	Project LCOE ($/MWh)
	35	$42.23
Net-P99	36.8	$39.98
	38	$37.03
Net-P95	38.8	$35.76
Net-P90	39.9	$34.17
	41	$32.58
Net-P75	41.7	$31.70
Net-P65	42.5	$30.60
Net-P50	43.6	$29.20
	44	$28.74
Net-P25	45.6	$26.91
Net-P10	47.4	$25.01
	48	$24.37

Figure 4 below provides the Project's probabilities of producing a range of LCOE. For example, the figure indicates that the LCOE associated with the 50 percent probability, or expected value, is $29.20/MWh. The figure also indicates that the Project has a 90 percent probability of producing an LCOE *lower than* $34.17, and a 10 percent probability of producing an LCOE *lower than* $25.01/MWh.

Figure 4

Rush Creek Project
Probability of the Project's LCOE



LCOE of Comparable Projects

This section compares the LCOE of the Project to that of 5 other wind energy facilities which are currently counterparties to existing PPA with PSCo (the "comparable PPAs"). Due to confidentiality provisions in the PPAs, the identity of the facilities associated with each of the 5 comparable PPAs cannot be provided publicly. Information related to each of the PPAs is provided in Confidential Appendix E to this report.

Leidos reviewed the annual pricing and contract termination dates of the comparable PPAs. The volume of energy associated with the comparable PPAs has no bearing on the calculation of the PPA LCOE, i.e., the LCOE for a given comparable PPA would be the same as if PSCo purchased 500,000 MWh in that year or 50,000 MWh in that year. The fundamental equation for calculating the LCOE of the comparable PPAs is similar to that of calculating the LCOE of the Project:

LCOE = Present Value of Total Annual PPA Costs / Present Value of Total Annual PPA Energy Production

Leidos calculated the Present Value of Total Annual PPA Costs for each PPA by assuming PSCo purchased one MWh of energy at the specified price for each year of the remainder of the PPA. For example, if a comparable PPA's price was $40.00 in a given year, Leidos assumed the Annual PPA Cost for that year was $40.00. The LCOE calculation for each PPA began in 2016 and extended through the termination date; Leidos made no assumptions related to the potential renewal of any of the comparable PPAs.

The Present Value of Annual PPA Costs was calculated by discounting the annual PPA Cost associated with the PPA to 2016 dollars, using the After-tax WACC discount rate of 6.78 percent. The Present Value of Annual PPA Energy Production was also calculated by discounting the annual one MWh assumed for the PPA for each remaining year of the PPA to 2016, using the After-tax WACC discount rate of 6.78 percent.

Because the PPA terms specify the price at which PSCo will purchase all energy produced from the associated wind energy facility in each given year, and because those prices do not vary according to the energy production in that year, *there is no uncertainty* associated with the LCOE of the comparable PPAs.

Table 18 below provides a summary of the comparable PPA's LCOE and how they compare to the probabilities associated with the Project's LCOE. The comparison indicates that the expected value of the Project's LCOE is projected to be lower than any of the comparable PPAs. Further, the Project's LCOE is projected to have a 90 percent probability of being lower than 4 of the 5 comparable PPAs.

Table 18
Rush Creek and Comparable PPA LCOE

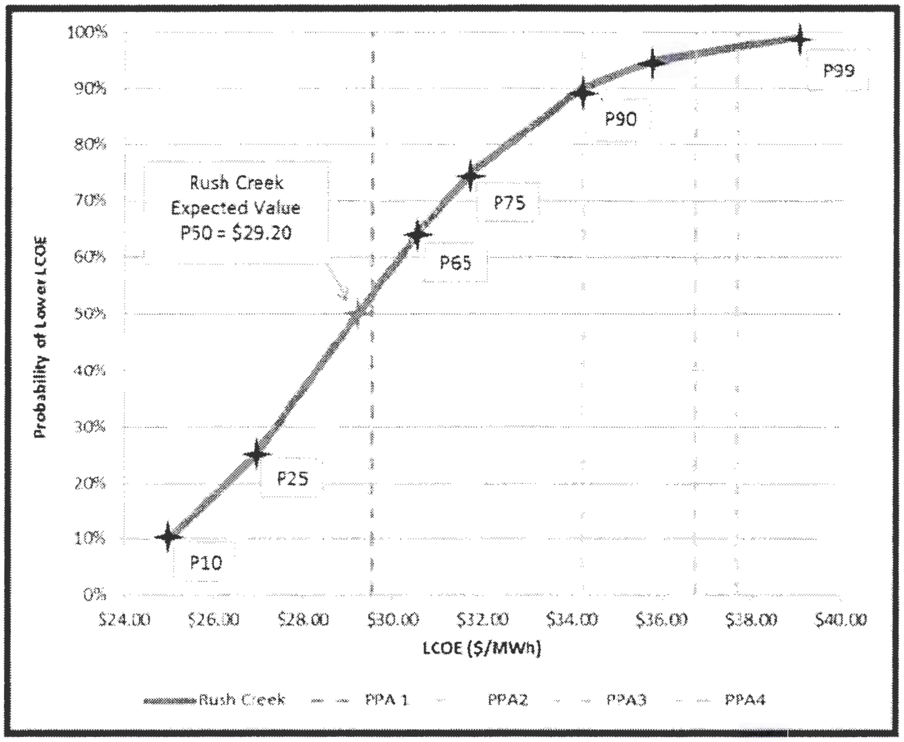
Probability of Project's LCOE being lower than given LCOE (%)	PPA	Project/PPA LCOE ($/MWh)
	PPA 5	$58.64
99		$39.98
	PPA 4	$37.66
		$37.03
	PPA 3	$36.73
95		$35.76
	PPA 2	$34.23
90		$34.17
75		$31.70
65		$30.60
	PPA 1	$29.52
Project's Expected Value - 50%		$29.20
25		$26.91
10		$25.01

Figure 5 below provides the LCOE associated with each comparable PPA and how those LCOE values compare to the Project's potential LCOE over a range of potential capacity factors.

Figure 5

Rush Creek Project

Projected LCOE of the Project and Comparable PPA



The dashed lines indicate the comparable PPA numbers 1-4 and their calculated LCOE. The data points indicated on the blue LCOE curve indicate the probability that the Project's LCOE will be *lower than* the LCOE associated with the data point. The expected value of the Project's LCOE is projected to be lower than any of the comparable PPAs. Further, the Project's LCOE is projected to have a 90 percent probability of being lower than 4 of the 5 comparable PPAs. The comparable PPA number 5 was not included in Figure 5 because its calculated LCOE was $58.64/MWh, well exceeding the Project's 99th percentile and placing it outside the range of the figure.

Summary of the LCOE of the Project

Leidos projected the LCOE of the Project across a range of potential levels of annual average delivered energy production. It was determined that there is a 50 percent probability that the Project's LCOE will be $29.20/MWh in real 2016 dollars when using a 20-year average wind resource assessment. There is a projected 99 percent probability that the Project's LCOE will be lower than $38.98/MWh when using a 20-year average wind resource assessment.

Table 18 and Figure 5 indicate that there is more than a 95 percent probability that the Project's LCOE will be lower than the LCOE of the comparable PPAs numbers three through five, and more than a 90 percent probability that the Project's LCOE will be lower than the $34.23/MWh LCOE of comparable PPA number two. The figure indicates that the probability of the Project's LCOE being lower than the $29.52/MWh LCOE of comparable PPA number 1, is approximately 53 percent.

There is no uncertainty related to the calculated LCOE of the comparable PPAs, because the terms of the PPA specify the prices at which all energy will be purchased. However, because of the inherent uncertainty in projecting the energy production from any wind energy facility, it is important to interpret the LCOE values associated with the Project presented in this report with that uncertainty in mind. When considering that uncertainty, Leidos believes that there is a 90 percent probability that the Project's LCOE will be lower than those of 4 of the 5 comparable PPAs, and a better than 50 percent probability that the Project's LCOE will be lower than all comparable PPAs.

PRINCIPAL CONSIDERATIONS AND ASSUMPTIONS

In the preparation of this Report and the opinions presented in this Report, we have made certain assumptions with respect to conditions which may exist or events which may occur in the future. While we believe these assumptions to be reasonable for the purpose of this Report, they are dependent upon future events, and actual conditions may differ from those assumed. In addition, we have used and relied upon certain information provided to us by others. While we believe the use of such information and assumptions to be reasonable for the purposes of this Report, we offer no other assurances with respect thereto, and some assumptions may vary significantly due to unanticipated events and circumstances. To the extent that actual future conditions differ from those assumed herein or provided to us by others, the actual results will vary from those projected herein. This Report summarizes our work up to the date of the Report. Thus, changed conditions occurring, or becoming known after such date could affect the material presented to the extent of such changes.

1. As Independent Evaluator, we have made no determination as to the validity and enforceability of any contract, agreement, rule or regulation applicable to the Project. For the purposes of this Report, we have assumed that all contracts, agreements, rules and regulations will be fully enforceable in accordance with the contractual terms. Moreover, it is assumed that all parties will comply with and fulfill the provisions of the contracts and agreements.

2. The Project will be designed and constructed in accordance to the technical provisions of the contracts, the permit requirements, federal, state and local regulations, industry standards and major equipment supplier requirements.

3. The BOP EPC contractor and Vestas will undertake generally accepted project management techniques to closely monitor construction and will react in a timely fashion to lagging performance such that the Project will be constructed in accordance with the construction schedule.

4. The Project will be maintained in accordance with good engineering practices, all required renewals and replacements of equipment will be made in a timely manner, and the equipment will not be operated to cause it to exceed the equipment manufacturers' recommended maximum ratings.

5. Qualified and competent personnel will be employed who will properly operate and maintain the Project in accordance with the equipment manufacturers' recommendations and generally accepted engineering practices and will generally operate the Project in a sound and businesslike manner.

6. Inspections, repairs, and modifications are planned for and conducted in accordance with equipment manufacturers' recommendations, and with special regard for the need to monitor certain operating parameters to identify early signs of potential problems such as WTG failures of a nature experienced by certain other commercial units.

7. All licenses, permits and approvals necessary to construct and operate the Project will be obtained on a timely basis and any changes in required licenses, permits or approvals will not result in changes in design, construction delays, reduced operation, or increased capital or operating costs of the Project.

Respectfully submitted,

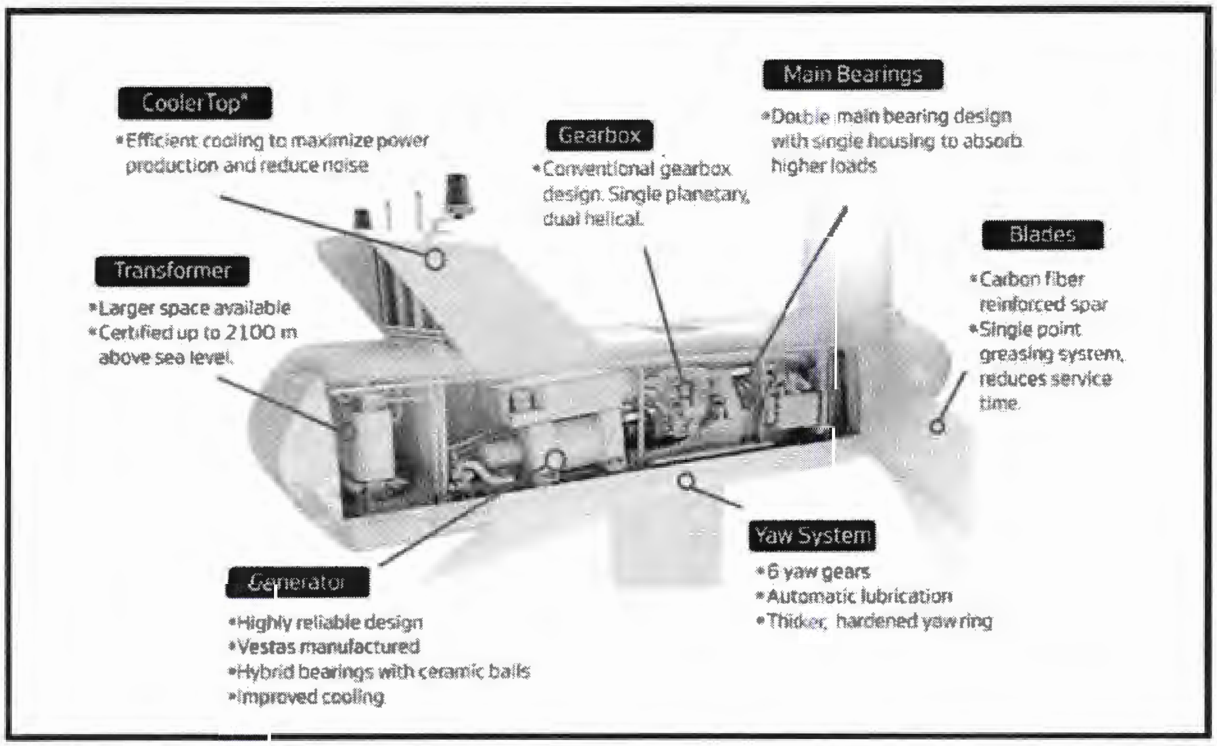
LEIDOS ENGINEERING, LLC

APPENDIX A

WTG Technology

The V110-2.0 Mk 10C WTG planned for the Project is a newer model within Vestas' 2 MW series and shares most of its design elements with the V100-1.8 and V100-2.0 WTGs. Previously the Vestas 2 MW series consisted of 1.8 MW WTGs with 80 m, 90 m, and 100 m rotor diameters and 1.8 MW WTGs were typically supplied to the North American market (60 Hertz ("Hz") units) and 2.0 MW WTGs were supplied to Europe (50 Hz units). In 2013, the V100-2.0 60 Hz Mk 10 WTG model was introduced to the North American market and a similar 110 m rotor diameter model was also introduced, the V110-2.0 60 Hz Mk 10 WTG.

Figure A-1
Rush Creek Wind Project
Vestas V110-2.0 Nacelle View



Source: Vestas.

The V100-2.0 and V110-2.0 WTGs are nearly identical in design and most components are interchangeable between the two models, with the exception of the blades which are longer and use a different design on the V110-2.0 WTG. The V100-2.0 and V110-2.0 WTG use the same converter and controls as the more proven V100-1.8 WTG, but use a new gearbox, new generator design, a new blade design (in the V110), more robust castings in the hub and nacelle, and the "OptiStop" pitch control feature, which reduces loads during stopping events. Some additional modifications to the hydraulic system have been made as well as automated blade pitch locks. All of these new additions to the series can be considered improvements over previous designs.

The various models within the 2 MW series are defined by the "Mark" or "Mk" number, with Mk 10C being the most current model available. A summary of the various Mark numbers of the 2.0 MW WTG platform is presented in Table A-1.

Table A-1
Vestas 2.0 MW WTG Mark
Version Summary

Version	Comments
Mark 1-5	Legacy turbines installed through 2009. The only turbine model in this line to be installed in North America was the V80-1.8.
Mark 6	Introduced in 2009. Included Vestas Converter Unity System ("VCUS") converter design and mechanical upgrades to accommodate higher loading from larger rotor diameters.
Mark 7	Installed 2010 to 2013. Includes a major visual redesign resulting from the addition of a radiator on top of the nacelle. Upgraded converter software allows control of reactive power. Sold in North America as the V90-1.8 and V100-1.8. The V100-1.8 incorporates Tilt Yaw Control ("TYC") which enables individual blade pitch for load control. TYC was previously used on V90-3.0 MW WTGs and relies upon strain gages in the blade roots to provide loads inputs to the turbine controller.
Mark 8	"GridStreamer" turbine that uses a permanent magnet generator and full power conversion, adapted from the V112 3.0 MW WTGs. Only developed as a 50 Hz variant and never sold in North America.
Mark 9	Uses the electrical system and generator from the Mark 8 along with a new "Atlas" gearbox, developed jointly by Vestas and ZF.
Mark 7H	Installed 2013 to 2014. A hybrid of the generator and electrical system of the Mark 7 and the ZF Atlas gearbox from the Mark 9. Sold in North America as the V100-2.0.
Mark 10	Introduced in 2014. Includes increased load bearing capacity in the nacelle and hub compared to the Mark 7H to accommodate a larger 110 m rotor diameter. Introduces "OptiStop" control feature, which reduces oscillations and loads during stopping of the rotor. Also includes increased hydraulic pressure for the blade pitch system, hydraulic pitch torque arms adapted from the V112-3.0, hub accumulators moved to the outside of the hub casting (but still within the fiberglass spinner), and blade coning increased from 2 degrees to 3 degrees in order to provide additional blade-tower clearance. Sold in North America as the V100-2.0 and V110-2.0.
Mark 10B	Introduced a reduced weight generator, variable frequency drive for gearbox lubrication, modifications to vortex generators (on the V100 blades only), and other materials and design optimization of minor components.
Mark 10C	Introduced in 2015. Includes increased power modes (2.05-2.2 kW), cooling system improvements, integrated switchgear in tower control cabinets, and a change in nacelle wall materials.

The 2 MW series WTGs use pitch-to-feather regulation to control WTG power output. Each blade is mounted to the rotor with a rolling-element pitch bearing and is equipped with a hydraulic actuator to rotate the blade and change pitch position. Each blade pitch system receives a unique pitch command from the turbine controller, which is intended to reduce mechanical loading caused by wind shear and veer across the rotor. This blade pitch control methodology is referred to as cyclic blade pitch or independent blade pitch. Each pitch system is equipped with a hydraulic accumulator back-up system, allowing the turbine to pitch the blades to a stalled position in the event of a safety system trip or grid loss. This arrangement provides three independent aerodynamic brakes to slow the rotor in the event of a fault. The hydraulic actuators used in the Mark 10 version of the V100-2.0 and V110-2.0 WTGs are adapted from the V112-3.0 MW WTG for added strength compared to previous versions of the V100. The system includes hydraulic accumulators attached outside the hub casting but inside the fiberglass spinner, to provide backup hydraulic power for safe shutdown in the event of a grid outage. The mounting of the hydraulic accumulators has been modified compared to past versions of Vestas' 2.0 MW turbines in order to avoid reversing gravitational loading on the accumulators to increase their reliability. The pitch system utilizes a hydraulic union to transfer hydraulic fluid between the rotor and they hydraulic power unit located in the nacelle. Should the rotating union fail between inspections, the WTG is designed to shut down so that the union can be replaced from within the nacelle.

The 54 m blades used on the V110-2.0 WTG are manufactured as a structural aerodynamic shell bonded to two shear webs with pultruded carbon fiber spar caps. Vestas has considerable experience with the structural shell design in its fleet, with over 2,000 V82-1.65 WTGs in North America using this blade design concept. The structural shell design will also be used in the V164 and V126 WTGs, although both of these WTG models are in the prototype/testing phase and do not have significant operating experience in the field. The V110-2.0 WTG blade does not use any aerodynamic features on the blade surface, such as vortex generators or stall strips

The lightning protection system ("LPS") in the V110-2.0 WTG blades consists of a solid copper cap at the blade tip, 16 receptors inboard of the tip, and expanded metal foil incorporated into the blade shell over the carbon fiber spar caps. Energy from a lightning strike is transferred from reception points though a copper conductor to the blade root, where it is transferred into the nacelle grounding via lighting current transfer units ("LCTUs"), which direct current away from blade bearings, the main bearings, and the gearbox. The LPS on the V110-2.0 WTG has been extensively tested and has been designed according to the highest level of the International Electrotechnical Commission ("IEC") 61400 24 standard, lightning protection Level 1; the highest class of lighting protection under the standard. Many details of the V110-2.0 WTG LPS have been developed from advances over time in the Vestas fleet and can be considered industry leading.

The 2 MW series drivetrain consists of the main shaft, two main bearings, and a gearbox. The forged main shaft transmits torque from the hub into the gearbox. Two main bearings support the main shaft and rotor. A cast housing attaches the main bearings to the bedplate. Torque, or twisting, from the rotor is reacted into the main foundation through torque arms on the gearbox. The gearbox utilizes a three-stage design, which is common for MW-scale WTGs. The low-speed stage employs a planetary gear system; the intermediate- and high-speed stages employ parallel shafts. The high-speed shaft drives the variable-speed generator at a range of design speeds.

The V100-2.0 and V110-2.0 WTGs include a new gearbox for the 2.0 MW series, the "Atlas 1" gearbox, produced by ZF in a manufacturing facility in Gainesville, Georgia. ZF is one of the largest suppliers of automotive and industrial transmissions and acquired Hansen Transmission in 2011, which was previously a leading gearbox supplier for the wind industry. The Atlas 1 gearbox was developed as a collaboration between Vestas and ZF and incorporates many features considered to be best practices that may alleviate issues experienced in other WTG gearboxes. Vestas has announced that Winergy will also supply gearboxes for the 2 MW series. The Winergy Model PEAB 4440 incorporates the new design features developed in the ZF Atlas 1 gearbox. Other older models within the 2.0 MW series have included Bosch Rexroth and Winergy gearboxes; however, the Mk 10C WTGs will use only the new ZF Atlas 1 gearbox and the Winergy PEAB 4440. Both gearboxes incorporate several significant improvements including: use of forged gear blanks to improve steel grain structure and allow for reduced weight, improved heat treatment processes for gears and bearings, variable speed lubrication, increased acceptance levels for steel quality used in gears, and black oxide coatings on the high-speed and intermediate-speed shaft bearings. Additionally, some of the quality control procedures employed by ZF and Winergy, such as phased array ultrasonic scanning, can potentially identify material defects in the factory and reduce failures in the field. Both gearbox designs include a removable cover that allows up-tower repair and replacement of both the high-speed and intermediate-speed shafts, bearings, and gears. Both gearboxes have been subjected to full scale Highly Accelerated Life Testing ("HALT"), including application of non-torque loading to simulate the full spectrum of loading experienced by a wind turbine gearbox. Operational field experience with the Atlas 1 and PEAB 4440 gearboxes is limited, but Vestas has demonstrated the ability in the past to monitor and support new components such as gearboxes, and respond appropriately to issues that have arisen.

The 2 MW series generator is a 60 Hz, six-pole doubly-fed induction generator ("DFIG") with a wound rotor and partial-load frequency conversion and a maximum power rating of 2.0 MW for the V110-2.0 WTG according to the type certificate; however, Vestas is currently pursuing a design certificate allowing operation of the same generator design to 2.2 MW, and variants below that rating (e.g., 2.05 MW and 2.10 MW), with a new Type Certificate expected in the third quarter of 2016. The generator is made in-house at Vestas in facilities in Germany, Spain, and China. DFIG generators have historically suffered from reliability issues related to slip rings and bearing failures. Vestas has improved the slip ring and slip ring cooling in subsequent design iterations of their 2.0 MW WTG platform and, while the slip rings will require maintenance and inspections over their 20-year design life, they are not expected to be high-risk items in terms of overall WTG reliability. The bearings used in Vestas' generators are made of ceramic which aids in isolating stray currents in the generator's rotor and minimizes the potential of arcing across the generator bearings. The generator switches between a star configuration in low winds and a delta configuration in higher winds in order to maximize performance and efficiency. The generator utilizes an air-to-water heat exchanger that prevents outside contaminants from contacting the internal components of the generator. Vestas, through their acquisition of Weier several years ago, has substantial experience designing and manufacturing generators.

The yaw system employs six yaw drives, each with a worm/planetary gear arrangement connecting an electric drive motor to a pinion gear. The pinion gears interact with a large ring gear that is integrated into a yaw bearing on top of the tower. The use of six yaw drives is an improvement compared to Mark 6 and earlier versions of Vestas 2 MW WTGs that utilized only four yaw drives. A series of polymer friction pads support the nacelle on top of the yaw bearing, providing friction and damping to the yaw drive system. The use of friction pads reduces the need for yaw braking. This arrangement has been common to all Vestas WTG designs for more than seven years.

The gearbox, generator, brake system, yaw drive system, and transformer are all housed inside the nacelle located on the top of the tower. The nacelle cover is a fiberglass shell enclosure that protects the mechanical and electrical equipment from the outside environment. There is an on-board gantry crane for service work and the rotor hub can be accessed directly from inside the nacelle.

Technology Operating Experience

Vestas first released the 1.8 MW V80 WTG in 2001 and subsequently released the V90 WTG in 2004 and the V100-1.8 WTG in 2010. Serial production of the V100-2.0 WTG began in the second quarter of 2014, and 105 Mk 10 WTG units were operational by March 2015. The prototype V110-2.0 WTG was installed in March 2014 and the first commercial units were installed in October 2014. There are currently 258 V110-2.0 WTG units operating worldwide as of June 2015.

Vestas reports more than 15,000 2.0 MW series WTGs installed worldwide. While the Mk 10 version of the V100-2.0 WTG is relatively new, more than 1,500 Mk 7 units of the 2.0 MW platform are now in operation. Vestas reports that 10 Mk 7H V100-2.0 WTG units are operational in Brazil, Canada, and the U.S., and 30 Mk 9 units in Brazil. Both the Mk 7H and Mk 9 units include the new ZF Atlas 1 gearbox, which is one of the most significant upgrades to the 2.0 MW platform and will also be used in the V110-2.0 Mk 10 WTG. Vestas has stated that over 370 V110-2.0 WTGs are currently operating in North America.

Vestas recently announced that new V100-2.0 and V110-2.0 WTGs will be "Mk 10C" versions, which will include a number of modifications to the previous Mk 10B version. Vestas could not report how many Mk 10C units are currently in operation. The major change with the Mk 10C is the addition of four new power modes which allow higher rated power, up to 2.2 MW. To support this uprating Vestas has made improvements to the cooling system, which represent the majority of changes in the Mk10C version. Several other Mk 10C changes can be considered minor and allow Vestas to use additional suppliers, lower the weight of some components (e.g., the transformer walls), or reduce cost by eliminating components that are redundant or not needed. Vestas anticipates an updated type certificate from DNV-GL will be complete in Q3 2016, which will include the Mk 10C modifications.

Given the similarities in WTG design within the 2.0 MW platform, the operating experience of all models within the platform is applicable to the Project. Some of the technical issues exhibited by the 2.0 MW platform are discussed below:

- In April 2016, Vestas reported there have been 22 cases out of a population of 1500 where the new Atlas 1 gearboxes required replacement or repair in the 2 MW series due to metallurgical defects from one supplier. In 19 of the 22 incidents the issue was resolved through up-tower repairs, significantly reducing the time and cost of repairs compared to a complete replacement of the gearbox requiring a crane. In the remaining three incidents the failure occurred in the planetary section of the gearboxes, which required a complete removal and replacement of the gearboxes. A root-cause analysis ("RCAs") was completed by Vestas which identified non-metallic inclusions in gear steel that led to the failures. In response, a new steel supplier is being used and ultrasonic testing methods have been improved. While Vestas has shared their conclusions from the RCA, we have not reviewed the RCA report. In all cases, repairs/replacements were made under warranty. Additionally, the Winergy gearboxes have not been affected by this issue and Vestas reports none of the 700 Winergy gearboxes in operation have experienced failures after approximately one year of operation.

- In December 2015, a blade failure occurred on a V110-2.0 WTG shortly after commissioning. The Vestas RCA indicated the failure was caused by a malfunction of a glue application machine in the factory, which required a non-standard work procedure to be used during manufacturing. As a result, there was an insufficient bond between the shear webs and structural shell of the blade and the shear web failed. Vestas identified five other blades, which may have been affected by the same issue. All suspect blades were removed from service and Vestas reported this issue should be resolved for new blades by the procedural change in manufacturing.
- The V82 WTG blade, which is similar in design to the V110-2.0 WTG, had a serial defect with the LPS in some versions manufactured prior to 2007 that made it more susceptible to lightning damage. A Vestas field retrofit to address this issue involved adding a copper cap over the tip to better direct lighting strikes into the LPS. The addition of the copper caps on blade tips has been shown to reduce lighting damage by 90 percent according to Vestas. Copper tips are incorporated into the V110-2.0 WTG blade design.
- Previous 2 MW series gearboxes have experienced bearing failures including: planet bearing failures, high-speed rotor-side bearing failures, and intermediate rotor-side bearing failures. Similar failures have occurred in bearings from other WTG manufacturers and this has been an area of considerable study in the industry for several years. The black oxide coating in specific locations and changes in the bearing size and geometry that will be incorporated into the ZF Atlas gearbox directly address the bearing issues encountered in previous 2 MW series gearboxes. Vestas has also experienced tooth fractures in the intermediate-stage pinion due to inclusions. Vestas reported the increased steel purity standards in the ZF Atlas gearbox are intended to address this issue and increasing steel quality is an accepted method of reducing inclusions and other material defects in steel gears.
- Testing of the Atlas 1 gearbox indicated that a bolt in the planetary section had an increased risk of failure, which required a modification to the bolt design that will be applied to all new Atlas 1 gearboxes. The bolt did not fail in testing; the risk of failure was based on theoretically calculated loads. Further, a number of V100-2.0 WTG nacelles have been shipped to project sites without gearboxes installed, to allow for modifications to be made to gearboxes before erection. These modifications to the Atlas gearbox may require additional work and testing to be completed on site before commissioning, although it is expected that this issue will be resolved before the Project's WTGs are shipped. Vestas reported this issue has been addressed in the factory and will not affect new projects.

Vestas defines "Energy-Based Availability" as produced MWh divided by the total number of possible MWh in a given period. Energy-Based Availability does not exclude downtime associated with scheduled maintenance or consider any period of time where wind speeds are below cut-in or above cut-out. Vestas reports that the Energy-Based Availability for the North American 2.0 MW series fleet (including Mark 6 and later WTGs only) ranged from approximately 97.8 percent to 98.7 percent from January 2013 through February 2016. This includes approximately 3,000 WTGs.

V110-2.0 Summary

The Vestas 2.0 MW series is a mature MW class WTG platform and is the result of an evolutionary design process. Vestas continues product modifications to remedy defects and to provide refinements that are focused on improving the level of reliability and cost effectiveness.

APPENDIX B

PPA Information

To determine the degree to which the proposed Rush Creek wind project is competitive with alternative wind sources, Leidos calculated the levelized cost of energy for five currently operational power purchase agreements to which PSCo is a counterparty. For the purposes of confidentiality, the names of the relevant projects are withheld from the text of the report above. Table B-1 below provides identifying information for each of the existing PPAs:

Table B-1
Confidential Information for Existing PPAs

Confidential Reference Name	Wind Project Name	Date of Commercial Operation	Agreement Term	Nameplate Capacity (MW)	Levelized Cost of Energy(1) ($2016/MWh)
PPA1	Limon III	October 2014	25 Years	200	$29.52
PPA2	Golden West	October 2015	25 Years	249.4	$34.23
PPA3	Limon I	November 2012	25 Years	200	$36.73
PPA4	Limon II	November 2012	25 Years	200	$37.66
PPA5	Cedar Point	November 2011	20 Years	252	$58.64

1) The LCOE of each PPA was calculated beginning January 2016 through its respective termination month.