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GRIDBRIGHT

**FOUNTAIN WIND PROJECT
POWER SYSTEM BENEFITS REPORT**

PREPARED FOR

FOUNTAIN WIND, LLC

FEBRUARY 20, 2024



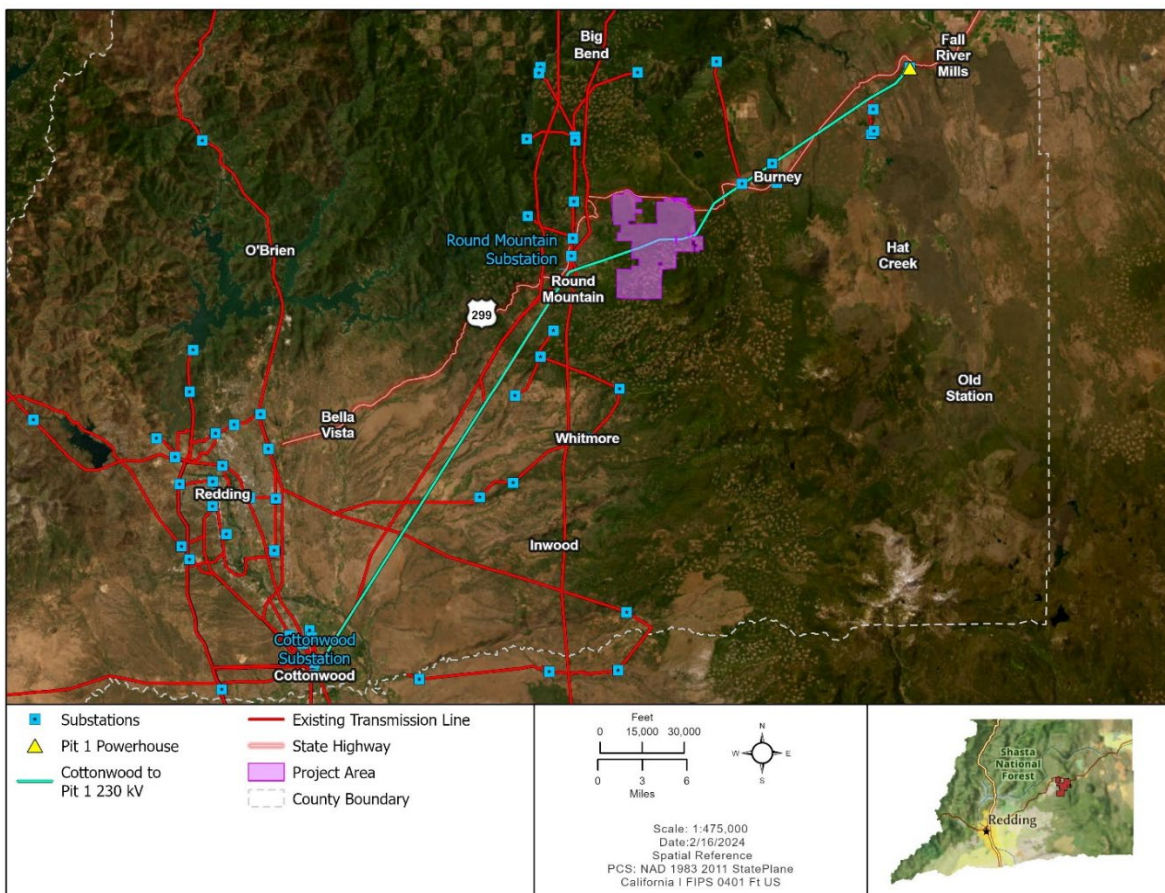
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Background

Fountain Wind, LLC proposes to develop and interconnect the Fountain Wind Project (“Project”) to the California Independent System Operator (“CAISO”) grid in eastern Shasta County, California. The Project will interconnect to the existing Pacific Gas & Electric (“PG&E”) 230 kV system, specifically the Cottonwood - Pit #1 230 kV transmission line, via a new interconnection switching station that will be owned and operated by PG&E. In addition, this Project has completed all the interconnection requirements for commercial operation. These requirements include a System Impact Study (“SIS”), a Facilities Study (“FA”), and has an executed Large Generation Interconnection Agreement (“LGIA”). As such, from an electrical system perspective this Project has been thoroughly studied by both PG&E and the CAISO and these studies have demonstrated that this Project can be connected to the PG&E system without causing any adverse impacts to the PG&E electrical system and the CAISO controlled electrical grid.

Existing Electrical System & Grid Conditions

The CAISO manages the flow of electricity across the high-voltage, long-distance power lines for the grid serving 80 percent of California to ensure the secure and reliable operation of the ISO controlled grid. It sets the standards for voltage deviation under normal and contingency operating conditions for the 500 kV and 230 kV system. For example, for the 500 kV system, the maximum voltage is 540 kV under normal operating conditions. The Fountain Wind Project will connect to the Pit #1 – Cottonwood 230 kV line as shown in the figure below.



The CAISO 2018-2019, & 2020-2021 Transmission Plans identified steady state problems on the northern CAISO controlled grid, namely high voltages and thermal overloads. High voltages exceeding 540 kV were observed in real time on the 500 kV system during light load conditions, which resulted in high voltages on the 230 kV system and to some degree the 115 kV network. The high voltages impact both Round Mountain and Cottonwood 230 kV substations. In addition, during peak load scenarios, power flows into the Cottonwood 230 kV bus overload the underlying 115 kV and 60 kV network connected to Cottonwood substation whereas power flows out of the Round Mountain 230 kV bus overloads the Round Mountain-Cottonwood 230 kV line. The CAISO 2020-2021 Transmission Plan listed the following solutions to mitigate the transmission voltage issues and thermal overloads in the Round Mountain / Cottonwood area identified in the bulk system assessment¹.

- Manage COI flow according to the seasonal nomograms.
- Implement SPS to bypass series capacitors on the Round Mountain-Fern Road-Table Mountain 500 kV lines # 1 and # 2 if any of these lines overloads.
- Implement installation of dynamic reactive support on the Round Mountain 500 kV Substation that was approved in the 2018-2019 Transmission Planning Process. This reactive support will be installed 11 miles south of Round Mountain and will be connected to the Round Mountain-Table Mountain 500 kV lines # 1 and # 2.
- Upgrade protection at Cottonwood and Round Mountain 230 kV substations²

Once the above mitigation measures are in place, no voltage or thermal overload problems will remain in the Round Mountain / Cottonwood area. The Cluster 8 Phase 2 Report for the Fountain Wind Project showed that this project would not create any new overloads on the transmission grid.

CAISO Queue Trends

All interconnection requests submitted during a specific time window each year are lumped into one cluster and studied together to determine their impact on the grid reliability. Each cluster is assigned a number for study purposes. The projects that complete the Phase I study advance to the Phase II study prior to being readily available for construction and operation. Cluster 14 had a total of 359 projects, but only 205 projects advanced to Phase II. Cluster 15 is expected to be similar in size with a total of 541 projects requesting interconnection. The massive sizes of Cluster 14 and 15 resulted in CAISO implementing reforms to streamline the interconnection process and prioritize projects based on existing and/or planned transmission capacity. However, even with these changes, the lead time for construction and commercial operation of these projects will be at least three years, and probably much longer, whereas the Fountain Wind Project has already completed all studies and agreements and is ready for construction to begin once all necessary permits are in place.

Grid Reliability Benefits

The addition of the Fountain Wind Project will have a positive impact on the grid and will help mitigate some of the high voltage problems seen in the CAISO Transmission Assessments. Modern wind turbines

¹ Since the 2020-2021 Transmission Plan supersedes the 2018-2019 Transmission Plan, there is no need to list any mitigation measures outlined in that plan since those earlier measures would either already be implemented or would be included in the 2020-2021 Transmission Plan.

² Board Approved 2020-2021 Transmission Plan, pages 79 & 90.

like those proposed for this project can always provide reactive power support (even when there is little or no wind to provide real power generation). This capability can be used to help regulate the voltage on the 230 kV side of the system during both light and heavy load conditions. In addition, the Fountain Wind Project won't adversely affect any thermal overloads under P5-5 multiple contingency events (delayed clearing caused by a non-redundant relay failure) since the Project's output power may help reduce the flow on the most limiting element or if necessary, the Project can be curtailed or switched off completely as required to help mitigate any such overloads³⁴⁵.

Furthermore, under peak system load conditions when a sudden loss of generation occurs, the addition of the Project will help mitigate and/or offset part of the load shedding needed to maintain stable operation of the system. For example, on August 14th, 2020, CAISO implemented 1000 MW of load shedding due to sudden loss of generation in the system. If the Fountain Wind Project had been online during this event, the amount of load shedding could have been reduced by 200 MW based upon the historical wind data for that date. As such, the addition of the Project will provide backup reserve capacity to partially mitigate load shedding under such contingencies in the future.

Conclusions

The Fountain Wind Project will have a positive impact on grid reliability since it will help mitigate voltage problems by providing or absorbing reactive power to support system voltage stability. It will also help mitigate thermal overloads by reducing the flow on the most limiting element or if necessary, the Project can be curtailed or switched off completely to help mitigate such overloads.

In addition, the Fountain Wind Project will provide additional generation capacity that can reduce or eliminate load shedding when system generation is constrained due to high loads and/or generation outages.

Finally, the Fountain Wind Project can be constructed and placed into operation to provide emergency backup reserve much sooner than most of the other projects in the Interconnection Queue that aren't at such an advanced stage and that will require significant additional lead time to commence operation and provide such benefits.

About GridBright

Fountain Wind, LLC has requested that GridBright perform a third-party assessment of the benefits and potential impacts that the Fountain Wind Project could have on the bulk electric system in Northern California. GridBright is a wholly owned subsidiary of Qualus Corporation (Qualus) and was acquired by Qualus in October 2023.

GridBright consultants have assisted nearly 100 GW of wind, solar, geothermal, storage, and conventional resources through various stages of the grid interconnection process with more than 60 transmission & distribution service providers in all regions of North America – More than 10 GW of such

³ If needed, these P5-5 overloads can be mitigated by simply adding a second set of relays to the elements whose outages are causing the overload(s).

⁴ It should be noted that the interconnection studies performed by the CAISO for the Fountain Wind Project did not identify any overloaded facilities that the Fountain Wind Project would be required to mitigate.

⁵ The planned upgrade of the protection at Cottonwood and Round Mountain 230 kV substations will eliminate these overloads.

resources are already in operation. In addition, our consultants have assisted several transmission developers, including utilities, with the required reliability and regulatory studies necessary for the design and approval of their transmission projects by regulatory and reliability authorities. We are also increasingly assisting emerging vehicle electric charging, data center, and hydrogen filling station developers navigate the complex technical and regulatory requirements of their grid interconnections.

Almost all of GridBright consultants have more than ten years of experience working in electrical utilities, RTOs/ISOs, and consulting companies, with more than 75% having at least 30 years of experience. Our experts help determine the most suitable interconnection point and prepare and submit the required interconnection applications. We assist projects through all interconnection studies and regulatory approval processes by the transmission & distribution service providers and regulatory agencies, including reviewing and critiquing interconnection study reports and negotiating the project interconnection agreements. In addition, we guide the project through the maze of regulatory and operational requirements, including material modification assessments and other agreements that might be entered into post-interconnection. GridBright consultants have also acted as expert witnesses in the related regulatory proceedings.