

**STATE OF NEBRASKA
NEBRASKA POWER REVIEW BOARD**

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| IN THE MATTER OF THE APPLICATION OF |) | PRB-3949-ESR |
| THE OMAHA PUBLIC POWER DISTRICT, |) | |
| HEADQUARTERED IN OMAHA, NEBRASKA, |) | |
| REQUESTING AUTHORITY TO CONSTRUCT |) | ORDER |
| A ONE MEGAWATT ELECTRIC ENERGY |) | |
| STORAGE RESOURCE AND RELATED |) | |
| FACILITIES IN CASS COUNTY, NEBRASKA. |) | |

References in this Order to testimony are designated by a “T” followed by the transcript page, then the lines upon which the testimony appears, while references to exhibits are designated by “Exh.”

ON THE 12th day of July, 2021, the above-captioned matter came on for consideration before the Nebraska Power Review Board (the Board). The Board, being fully advised in the premises, and upon reviewing said application and the evidence presented to the Board at said hearing, **HEREBY FINDS AS FOLLOWS:**

FINDINGS OF FACT

1. That on June 17, 2021, the Omaha Public Power District (OPPD), headquartered in Omaha, Nebraska, filed an application with the Board requesting authority to construct a one megawatt (MW) electric energy storage resource (ESR) and related facilities. (Exh. 1). The application was designated “PRB-3949-ESR”.

2. The estimated total cost for PRB-3949-ESR, including the battery storage system, new substation and switchyard is \$2,500,000. Of the total cost, \$1,350,000 is for

the battery storage unit, while \$1,150,000 is for the substation and switchyard. (T109:17 to 21; Exh. 1, page 2).

3. That the proposed location for the generation facility in PRB-3949-ESR is adjacent to OPPD's substation 972, approximately two miles west of the City of Weeping Water, just north of the intersection of State Highway 50 and Fletcher Avenue in Cass County, Nebraska. Two maps showing the proposed location of the project area were included with the application. (Exh. 3, pages 4-5).

4. That those power suppliers, other than the Applicant, that the Board deemed to be potentially affected by or interested in application PRB-3949-ESR were the City of Lincoln doing business as the Lincoln Electric System, the Municipal Energy Agency of Nebraska, the Nebraska Public Power District, the City of Fremont, the City of Auburn, the City of Tecumseh, the City of Wahoo, and the City of Nebraska City. (Exh. 2, pages 4-5). Written notice of the filing of the application and the hearing date, and the opportunity to file a Petition for Intervention or a Protest, was provided to these potentially interested power suppliers, the Applicant, and the City of Weeping Water, via certified U.S. mail. (Exh. 2).

5. Notice of the filing of the application and the hearing date, and the opportunity to file a Petition for Intervention, was provided to the general public by publication in the *Omaha World-Herald* newspaper on Thursday, June 24, 2021. (Exh. 3). No members of the public filed a Petition for Intervention.

6. A certified copy of Consent and Waiver forms were offered and accepted into evidence at the hearing, as provided by law and the Board's Rules of Practice and

Procedure, whereby the Lincoln Electric System, the Municipal Energy Agency of Nebraska, and the Nebraska Public Power District consented to the approval of application PRB-3949-ESR and waived a hearing in the matter. (Exhs. 4, 5 and 6). No power supplier that received notice of the application filed a Protest or Petition for Intervention.

7. That pursuant to the requirement set out in Neb. Rev. Stat. § 37-807(3), the Board consulted with the Nebraska Game and Parks Commission (the Commission) to ensure that the Board utilizes its authority in furtherance of the purposes of the Nebraska Nongame and Endangered Species Act, and to ensure that approval of the proposed generation facilities would not jeopardize the continued existence of any endangered or threatened species or result in the destruction or modification of habitat of such species which is determined by the Commission to be critical. The Commission provided a letter to the Board, dated June 24, 2021, addressing PRB-3949-ESR. (Exh. 7).

8. In the letter addressing PRB-3949-ESR, the Commission stated that the project area is within the range of the threatened Northern Long-Eared Bat and the Western Prairie Fringed Orchid. However, there are no records of those species within the vicinity of the project area, and the Commission noted that the work will be performed entirely within an existing substation area. The Commission therefore determined that application PRB-3949-ESR will have “No Effect” on state-listed endangered or threatened species, and the Commission did not object to the Board’s approval of the project. (Exh. 7).

9. That on July 12, 2021, the Board convened the formal evidentiary hearing to address application PRB-3949-ESR.

10. The Board has previously issued Guidance Document 14, which sets out the Board's definition of ESRs, the Board's interpretation of state law with regard to the Board's jurisdiction over ESRs, and procedural issues related to the filing and consideration of applications for ESRs. In the Guidance Document, the Board finds that ESRs fall within the agency's jurisdiction, and ESRs must either be approved by the Board or found to be exempt. (Exh. 8).

11. The proposed ESR will have the ability to operate as either a generation or transmission asset. (T78:12-14). It will therefore be a multi-use ESR, as defined in Guidance Document 14. (Exh. 8, page 3).

12. The ESR, when operating as a transmission asset, will be interconnected to the local distribution system at 13,800 volts, or 13.8 kilovolts (kV). (T32:8-13; T75:5-8; Exh. 9, page 5).

13. Although ESRs are sometimes paired with generation facilities, the proposed ESR in PRB-3949-ESR will be a stand-alone project. It will not be paired with any specific generation facility. (T33:11-13).

14. The ESR will have the ability to inject one megawatt of electricity onto the transmission or distribution grid for two hours. (T33:16-24).

15. In June 2020 the Nebraska Environmental Trust (the Trust) awarded OPPD a grant in the amount of \$600,000 to help offset the cost of the ESR. (Exh. 12). Part of the agreement is that OPPD will share the information learned from operating the ESR

15; Exh. 9, page 8). The grant from the Trust will therefore fund approximately 24 percent of the total cost of the project. The grant funds would not be available to OPPD if other resources (such as capacitor banks) were used to accomplish some of the services to be provided by the ESR. The grant is specific to a battery storage system, or ESR. (T109:22 to 110:14). The final cost of the ESR is not large enough to have an impact on OPPD's rates. (T110:4-6).

16. Intermittent resources, such as wind and solar generation facilities, are volatile in terms of dispatchability, or the ability to depend on the asset being available to produce electricity when needed. These resources are, of course, dependent on the availability of wind and sunshine, respectively, in order to produce electricity. Intermittent resources can experience rapid and significant fluctuations in their ability to generate electricity. ESRs have the ability to inject electricity onto the grid very quickly, and can thus provide stability to electricity supply and system reliability. (T36:10-23; Exh. 9, page 9). The dramatic increase in variable energy resources in recent years has caused the need for resources such as ESRs that can offset the negative impacts of the volatility of the intermittent resources. (T37:7-10; T43:7 to 44:6 ; T47:12 to 48:5; Exh. 9, pages 10, 15, 17).

17. The North American Electric Reliability Corporation (NERC) is a federally approved entity that establishes mandatory reliability standards for load-serving utilities such as OPPD. The Midwest Reliability Organization (MRO) performs auditing and enforcement of NERC's reliability standards for the region that includes Nebraska. Both NERC and MRO operate under the direction of the Federal Energy Regulatory

Commission (FERC). Compliance with NERC's reliability standards are mandatory for electric utilities that operate the bulk power system such as OPPD. (T38:5-14; Exh. 9, pages 11-12). Penalties for noncompliance with NERC's reliability standards can be as much as one million dollars in civil penalties per day for violations. (T38:20 to 39:1).

18. The Southwest Power Pool is a federally approved regional transmission organization that has authority over transmission facility planning, energy markets, and transmission grid operation in a region that includes Nebraska. (T38:15-18; Exh. 9, page 11).

19. NERC regularly issues reports that deal with risks within the electric industry. In two of NERC's most recent reports it pointed out that the changing resource mix is causing balancing and ramping concerns. The need for resources with flexible capacity is increasing. NERC acknowledged in its reports that ESRs or battery storage systems can help offset resource variability issues by providing voltage support and frequency response services. (T38:8-16; Exh. 15; Exh. 16). OPPD believes the proposed ESR would help ensure that OPPD has adequate tools to address variable generation and the volatility that comes with variable generation resources. (T48:6-13).

20. At this time OPPD intends to use the ESR to reduce OPPD's load. The ESR will not be registered as a generator in the SPP market, and the release of its electric charge will not be sold into the SPP market. This is subject to change depending on the circumstances and OPPD's familiarity with operating an ESR. (T40:4 to 41:9).

21. The proposed location for the ESR was selected to enhance reliability and provide voltage support to a rural substation, namely OPPD substation 972. Substation

972 provides electrical service to several industrial loads in the area. The ESR will be located adjacent to substation 972. (T:53:18 to 54:2; T75:5-8; Exh. 1, pages 4 and 5; Exh. 9, pages 18 and 29). Although Substation 972 is in a rural area, it has a relatively high amount of industrial load. This causes some fluctuations in the local grid. OPPD believes placement of the ESR adjacent to Substation 972 can help alleviate the fluctuations, making the proposed location an excellent choice not only for assisting with grid stability, but also for OPPD personnel to learn how to operate ESRs in such an environment. (T75:5-19; T77:9 to 78:11; Exh. 9, page 30).

22. ESR facilities, often referred to as battery storage, provide numerous benefits to a utility. An ESR provides grid support in that it can ramp up very quickly to discharge electricity into the grid to smooth variations in intermittent generation resources, and can provide support if the utility nears its peak demand. (T61:21-23; Exh. 9, page 23).

23. The ESR will be able to provide peak-load reduction. An ESR is able to charge during off-peak periods, or periods of lower electric consumption, and the charge in the ESR can be discharged during high or peak usage periods. By serving this purpose, the ESR can defer the need for system upgrades by helping to ensure that the system does not operate outside the loading levels for which the equipment is designed. (T86:13 to 87:6).

24. Another use the ESR can provide is energy arbitrage, or charging during off peak hours and then discharging during periods where the cost of electricity is high in the SPP market. This can produce savings by preventing OPPD from having to purchase the

amount of electricity in the ESR's charge from the more expensive SPP market during high cost periods. (T87:7-10).

25. The ESR can also help reduce losses on OPPD's transmission system. This can allow OPPD to carry less generating capacity to serve its load. (T87:11 to 88:8).

26. Another purpose served by the ESR is voltage support. The ESR can provide reactive power through its inverter in both the transmission and distribution level. (T87:17-22).

27. In addition to its operational benefits, the ESR will provide valuable educational benefits for OPPD and other Nebraska utilities regarding ESRs. As stated in paragraph 15, one of the conditions of the grant which OPPD received from the Nebraska Environmental Trust was that OPPD would share what it learns about ESRs with other Nebraska electric utilities. This is important, as the proposed ESR will be the first commercial ESR in the State of Nebraska. The ESR will allow OPPD to determine the value an ESR brings to a utility and compare that to other resources that could provide some of the same services, although none of the other resources individually could provide the package of services that an ESR can. (T90:3-21; T115:15-23).

28. The ESR will use lithium ion technology. Lithium ion is a common type of battery technology that has been used for many years. Lithium ion batteries are used in many applications, including cell phones and electric vehicles. Some battery technologies are better for applications that require longer duration for the discharge of electricity. For its ESR, OPPD needs a technology that is designed for short term durations. Lithium ion technology serves that purpose. Lithium ion technology has a

high efficiency ratio for charging and discharging, which lends itself to the type of purpose for which OPPD intends to use the ESR. (T64:19-23; T64:1-4; T63:17-25; T65:20 to 66:5; T66:21 to 68:5; Exh. 9, pages 25-26).

29. In determining the appropriate capacity and duration of charging and discharge, OPPD examined several options. One option was the one megawatt capacity with a two hour discharge capability, at 365 cycles. Another option was a one megawatt capacity facility with a four hour discharge capability, also at 365 cycles. This option was 40% more expensive than the ESR with a two hour discharge. The operating expenses for a four megawatt facility are also higher. OPPD also considered a one megawatt capacity facility at 250 cycles. At 250 cycles the wear and tear on the ESR would be reduced when compared to the 365 cycle options. The 250 cycle option was only three percent less capital cost than the 365 cycle option. Although a two megawatt facility was considered for comparison purposes, the grant from the Nebraska Environmental Trust was specific to a one megawatt facility, so a two megawatt facility was not considered a financially viable option. OPPD and its consultant engineering firm, Fractal Energy Storage Consultants, determined that the additional operating flexibility and durability provided by the one-megawatt, 365 cycle ESR offset the additional three percent higher capital cost. (T94:12 to 98:19 ; Exh. 9, page 32).

30. The Federal Energy Regulatory Commission (FERC), in Order number 841, requires electric utilities to allow ESRs and distributed energy resources to have access to wholesale markets. OPPD is one of utilities that must comply with Order 841. OPPD believes the proposed ESR will allow OPPD personnel to better understand the

interconnection requirements for ESRs, as well as what would be needed when developing processes and policies for ESRs in OPPD's operating area. It would also provide insight into what selection criteria should be used for future ESR projects, and operational safety aspects for ESRs. All this information will be shared with other Nebraska electric utilities. (T106:24 to 107:23; T108:24 to 109:3).

31. Although there are other technologies and equipment that could provide some of the individual services that the ESR will provide, no other resource is capable of providing the variety of generation and transmission services that the ESR will be able to provide. (T80:16 to 81:7; T83:23 to 84:16).

32. OPPD plans to have the ESR facility constructed or installed and ready for commercial operation in the summer of 2022. (T33:6-10; Exh. 1, page 2).

CONCLUSIONS OF LAW

33. Pursuant to Neb. Rev. Stat. §§ 70-1012, 70-1013, and 70-1014, the Board has jurisdiction to conduct a hearing and either approve or deny an application for authority to construct generation and certain transmission facilities located in the State of Nebraska or owned by a power supplier headquartered in the State of Nebraska. Such approval is required prior to commencement of construction of the generation or transmission facilities.

34. Pursuant to Guidance Document 14, the Board has already determined that under Nebraska law it has jurisdiction over ESRs built by power suppliers in the State of Nebraska. (Exh. 8). The proposed ESR will be a multi-use ESR due to its ability to be operated as a generation asset or a transmission asset. (Exh. 1, page 6). The Board

therefore finds that it does have jurisdiction over the construction of an ESR facility such as the one described in application PRB-3949-ESR.

35. The Board has complied with the requirements under Neb. Rev. Stat. § 37-807(3) to consult with and request the assistance of the Nebraska Game and Parks Commission in order to utilize the Board's authority in furtherance of the purposes of the Nebraska Nongame and Endangered Species Act, and to insure that approval of the proposed generation facilities would not jeopardize the continued existence of any endangered or threatened species or result in the destruction or modification of habitat of such species which is determined by the Commission to be critical.

36. It is in the best interests of OPPD's customers to install equipment at the proposed location in Cass County to address voltage support issues in the affected area. The ESR will be able to reduce the volatility of the voltage in the area and ensure that the local grid system remains in compliance with required operational standards.

37. The use of ESRs is expected to increase over time. It is therefore in the best interests of OPPD's customers for OPPD's personnel to be able to understand how to effectively operate and use an ESR resource. The proposed ESR is sized to ensure that it is large enough to serve this purpose, without incurring significant costs that might have an impact on rates. OPPD has agreed to share what it learns with other electric power suppliers in Nebraska. It is in the best interests of the other electric utilities in the State and their customers to learn about ESRs from this project.

38. Although it is possible that other equipment could serve several of the purposes for which the ESR will be installed, no other single type of equipment could

serve the breadth of purposes that will be served by the ESR. To provide the same services as the ESR with other equipment, multiple different types of equipment would need to be installed, which impacts the cost involved. Serving multiple purposes with one ESR eliminates the possibility of duplication of equipment by installing several different types of equipment to serve the same purposes as the ESR.

39. The ability for OPPD to engage in arbitrage with the ESR will provide not only operational and educational benefits, but financial ones as well. Using the output from the facility during periods when the cost of energy is high in the SPP market will save OPPD, and therefore its customers, money that would otherwise go to pay for high-cost electricity.

40. OPPD's cost for the ESR are greatly reduced due to a \$600,000 grant provided by the Nebraska Environmental Trust. This subsidizes approximately one-quarter of the cost for the facility. The funds would not be available to OPPD if the equipment installed were not an ESR.

41. The Board finds that the proposed ESR facility will serve the public convenience and necessity.

42. The Board finds that the evidence demonstrates that OPPD can most economically and feasibly supply the electric service resulting from the proposed project.

43. The Board finds that the evidence demonstrates the proposed project will not unnecessarily duplicate other facilities or operations.

44. That based on the foregoing findings, OPPD is entitled to an Order approving the construction of the ESR facility described in application PRB-3949-ESR.

ORDER

That during that part of its public meeting on July 12, 2021, held subsequent to the hearing on application PRB-3949-ESR, a majority of the members of the Power Review Board (4 yes, 0 no) voted in favor of a motion to approve application PRB-3949-ESR.

IT IS THEREFORE ORDERED by the Nebraska Power Review Board, pursuant to the Board's action taken during its public meeting held July 12, 2021, that the application designated PRB-3949-ESR, for authorization to construct a one megawatt electric energy storage resource and related facilities in Cass County, Nebraska, and hereby is, APPROVED.

Reida (Chair), Hutchison (Vice Chair), Grennan, Loutzenhiser and Moen participating.

Ms. Loutzenhiser did not participate in the vote during the Board's public meeting on July 12, 2021, but did participate in the issuance of this written order.

Dated this 10th day of September, 2021.

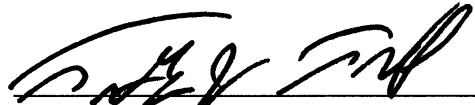


Frank Reida
Chairman

CERTIFICATE OF SERVICE

I, Timothy J. Texel, Executive Director and General Counsel for the Nebraska Power Review Board, hereby certify that a copy of the foregoing **Order** in PRB-3949-ESR has been served upon the following parties by mailing a copy of the same to the following persons at the addresses listed below, via certified United States mail, on this 10th day of September, 2021.

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Timothy J. Texel
Executive Director and General Counsel