Supplemental Project Notice

WIND NETWORK FOR ENHANCED RELIABILITY (WINNER™) WEB-BASED TOOL AND USER-GROUP

Improve Safety, Reliability, and Performance, and Reduce Costs

PROJECT HIGHLIGHTS

- Turbine digitalization and reliability data standardization
- Reliability benchmarking and OEM/supplier comparisons
- Wind farm O&M budgeting and forecasting

Background, Objectives, and New Learnings

Wind turbine major systems and components (including blades, pitch, main bearing, gearbox, and generator) reliability tracking is key for future failure rate predictions and O&M optimization. The design of a system and its configuration requires a collaborative effort between the suppliers and turbine OEM. The many variants of the design and configuration complicate the efforts of turbine operators to effectively manage their wind farms.

The following are the key issues that operators have been trying to address for effective turbine reliability assessments.

- Are there any data specifications and standards for turbine reliability data collection and tracking?
- What is the impact of design, supplier quality and operating conditions on system life and reliability?
- What are critical components and their failure mechanisms?
- How will failure rates change as my site ages? How can I use this reliability data for O&M budget forecasting for next year and beyond?

Objective

The goal of this project is to develop a collaborative web-based reliability tool, Wind Network for Enhanced Reliability (WinNER) for operators to conduct reliability assessments at industry-level, fleet-level, turbine-level, and system-level. This tool is based on the reliability data specifications, standards, and techniques outlined in EPRI Reports 3002016434 and 3002019010.

This work includes:

- Creating SQL database for the reliability data collected from participating funders/members
- Designing and developing WinNER, web-based tool for member access
- Developing and implementing advanced reliability methods in WinNER

Approach

This project provides WinNER access to funders for reliability benchmarking and forecasting at industry-level, fleet-level, turbine-level, and system-level. This includes the following tasks, most of which will recur annually:

Task 1: WinNER Access

EPRI to provide WinNER user access and tutorial during kickoff meeting with the participating member. WinNER functionality depends on member data contribution to this collaborative effort (see Deliverables).

Task 2: Reliability Data Specifications, Collection and Quality Assurance (QA)

EPRI to provide reliability data specifications and requirements (healthy and failed assets) template to participating member. Member to provide reliability data to EPRI to perform QA and analysis for WinNER SQL upload.

Task 3: WinNER Development and Implementation

Under this task, EPRI will develop and implement WinNER features on recurring basis in multiple sprints. This includes:

- Updating and adding new reliability data
- Adding new systems/components to WinNER
- Adding new WinNER features and analytical capabilities for reliability and O&M analysis

Task 4: Collaboration and Results Review

EPRI to host at least one annual collaborative meeting to share and discuss WinNER key findings and recommendations to reduce O&M costs.

Research Value

WinNER provides wind turbine reliability data along with specificity of certain major systems/components failures. This is important for wind farm and maintenance planning as this information can be used in adding reality to maintenance cost and resource projections. WinNER provides unbiased quantification for the following applications:

- Turbine digitalization and reliability data standardization
- Optimum O&M budgeting and forecasting, warranty valuation, contracting vs. self-operation decisions
- Reliability benchmarking, inventory management, and OEM/supplier quality assessments

Deliverables

Participants will receive access to WinNER (http://windturbinereliability.epri.com/).

There are four View Levels in WinNER:

1. Industry Level View (Entire Database) – Anonymized dataset for wind turbine industry-wide reliability analysis.
2. Member-specific Fleet Level View – Reliability dataset is filtered to focus on the member's specific fleet. Member can benchmark their fleet reliability against an aggregate of anonymized data of all other operator fleets in the database.
3. Member-specific Turbine Level View – Reliability dataset is filtered to focus on a specific turbine make and model that is a part of the member fleet. Member can compare the selected turbine's reliability information against an aggregate of anonymized data for the same turbine make and model of all other operator fleets in the database.
4. Member-specific System Level View – Reliability dataset is filtered to focus on a specific system make and model that is a part of the member's fleet. For instance, member can compare the selected gearbox reliability information against an aggregate of anonymized data for the same gearbox make and model of all other operator fleets in the database.

Limited WinNER Access

Members with no reliability data to contribute to WinNER can only access Industry-level View for reliability benchmarking and forecasting.

Full WinNER Access

Members who contribute their fleet reliability data to WinNER will get full access. This includes Industry-level View, Member-specific Fleet Level View, Member-specific Turbine Level View, and Member-specific System Level View.

Price of Project

The annual cost of this project is $12,000. To participate in WinNER, a funder is first required to be a member of EPRI's Wind Innovators Network (WIN) Interest Group,

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which is also included in the membership of Program 206, Wind Generation. This project qualifies for Self-Directed Funding (SDF).

Project Schedule

Task No.	Description	Est. Schedule
1	WinNER Access	1 month from kickoff
2	Reliability data specifications, collection, and QA	1–3 months from kickoff
3	WinNER Development and Implementation	1–12 months from kickoff
3	Collaboration and results review	8–12 months from kickoff

Who Should Join

Utilities and companies that own/operate wind farms with a desire to reduce O&M costs could benefit from participation in this project. Also, wind turbine OEMs, suppliers, and service providers can benefit from this industrywide collaborative effort.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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