

## RADWIND Project Report Summary: Business Case for Distributed Wind in Rural Electric Cooperative Service Areas

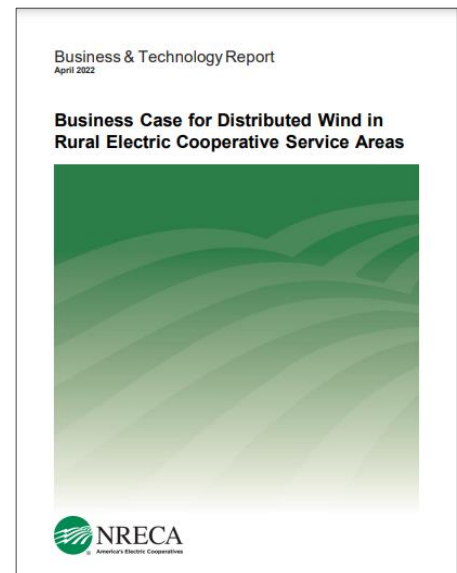
### Abstract

*Business Case for Distributed Wind in Rural Electric Cooperative Service Areas* is part of a series of project reports produced by NRECA Research's Rural Area Distributed Wind Integration Network Development (RADWIND) project about wind as a distributed energy resource (DER). It seeks to identify and address market barriers to distributed wind adoption by laying out the business case for distributed wind in the three use cases established by the RADWIND project: front-of-the-meter, behind-the-meter, and off-grid. These use cases can involve turbine technologies of various scales, as well as hybridization with other complimentary technologies such as solar PV and battery energy storage.

### Overview

The recently released report *Business Case for Distributed Wind in Rural Electric Cooperative Service Areas* report (Business Case Report) builds on earlier RADWIND<sup>1</sup> [project reports](#) addressing use cases, value cases, and financing options for the deployment of wind technologies as a distributed energy resource, either on their own or in conjunction with other complementary resources such as battery storage and solar PV.

This report covers a wide range of topics related to distributed wind business cases. Most sections are independent of others, so readers can get valuable information from reading all or part of the document, and should feel free to access only those portions that address their interests. Various resources that cooperatives may find useful are distributed throughout the report.



### Section Summaries

As an aid to readers, this advisory offers a brief summary of the sections in this report.

<sup>1</sup> This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Wind Energy Technologies Office Award Number DE-EE0008958.

## **Section 1. Background**

This section gives background on the RADWIND, links to previous reports developed as part of this project that the Business Case Report builds upon, and gives the definition of distributed wind and use cases used by the project team (front-of-the-meter, behind-the-meter, off-grid).

## **Section 2. Introduction**

This section briefly discusses the purpose of the Business Case Report and the potential contributions of wind as a distributed generating resource in the evolving U.S. electric grid, introducing the concepts within subsequent sections at a high level.

## **Section 3. Distributed Wind Project Lifecycle**

This section walks through the types of questions and issues that an electric cooperative or other rural utilities<sup>2</sup> should consider when doing due diligence on a distributed wind project. It also outlines the stages of project lifecycle (Pre-Development, Development, Operations), and touches upon retirement or repowering considerations.

## **Section 4. Understanding Distributed Wind's Value**

This section summarizes some of the findings of the earlier [Value Case Report](#), discusses potential contributions of distributed wind to system resilience and security, and offers a deeper discussion of the potential, challenges, and opportunities for pairing distributed wind with battery energy storage. It also touches upon the potential for distributed wind to contribute to local economic development. Finally, it explains the opportunity to pursue multiple, utility-scale, front-of-the-meter distributed wind projects with significant combined scale, in lieu of a single large transmission-tied project; this can expedite project development in areas with long transmission interconnection backlogs and circumvent the difficulty of building new transmission lines.

## **Section 5. Front-of-the-Meter Business Cases**

This section focuses on the deployment of wind as a front-of-the-meter resource by electric co-ops. These projects tend to utilize one or more large (i.e., 1 MW or greater) turbines as utility-scale generation projects interconnected on the distribution side of the electric grid. The section covers potential value streams both to the electric cooperative and to its member-owners, several potential businesses models, such as collaboration with a generation and transmission (G&T) or other wholesale provider, ownership vs. power purchase agreement with a developer, community wind, and the potential for hybridization with complimentary technologies, like solar PV and battery storage. It includes both real-word and potential examples of various business cases.

## **Section 6. Behind-the-Meter Business Cases**

This section focuses on the deployment of wind as a behind-the-meter resource at a home, business, or institution by member-owners, utilizing various scales of wind turbines depending on load. The section covers potential value streams both to the electric cooperative and member-owners, and several current and potential business models for behind-the-meter wind deployment. Because behind-the-meter resources serve on-site energy needs and are generally not developed directly by a co-op, this section focuses on rate

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<sup>2</sup> While the report generally uses “cooperatives” or “co-ops,” NRECA’s membership also includes more than 40 utilities that are not organized as cooperatives, mostly rural public power districts as well as small municipal, tribal, and mutual utilities. Though business models differ, this report should be applicable to them as well as other rural utilities that are not NRECA members.

models and advisory services that a co-op can provide to help integrate and optimize the resource for the entire membership. It includes both real-world and potential examples of various business cases.

## **Section 7. Off-Grid Business Cases**

This section focuses on the deployment of wind as an off-grid resource by a co-op or its member-owners, usually using small (< 100 kW) or micro (< 1 kW) turbines to directly serve a load where retail electric distribution service is not available. The section covers potential value streams both to the electric cooperative and member-owners, and several current and potential business models for off-grid wind deployment. There is potential for a co-op to be directly involved in the deployment of off-grid wind as a service or in advising member-owners who want to deploy these resources. This can provide a lower-cost option to power loads in-lieu of a line extension or upgrade in hard-to-reach areas, as well as opportunities to provide an additional value-added service to member-owners.

## **Section 8. Additional Services Supported by Distributed Wind**

This section looks at the potential for distributed wind as a technological vehicle for co-ops to offer additional energy-related services to their member-owners. It covers the integration of wind technologies into commonly offered programs such as demand response, newer opportunities such as electric vehicle charging, and the larger emerging opportunity of Energy-as-a-Service. Broadly, these services offer co-ops opportunities for broadening their revenue base beyond retail energy sales in ways that positively impact member-owner relations by meeting their evolving needs, though developing and delivering these types of services presents costs and challenges as well.

## **Contact for Questions**

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### **Additional Information on NRECA Research's RADWIND Project**

For more information on the RADWIND project and additional resources, please visit the project landing page at [www.cooperative.com/radwind](http://www.cooperative.com/radwind).

Want to stay informed of our progress with the RADWIND project, and provide your input and feedback? We welcome all NRECA voting members to join the project as advisors.

Contact our team at: [RadwindProject@nreca.coop](mailto:RadwindProject@nreca.coop).