2023 NRECA RADWIND Survey

NRECA Research

PREPARED BY:

NRECA Market Research Services

NRECA
America's Electric Cooperatives

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RADWIND PROJECT REPORT SERIES:
2023 RADWIND Survey

Prepared By:

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RADWIND Project

This is a report summarizing the results of a recent survey of NRECA's distribution cooperative and other rural distribution utility members. Its focus is on co-op awareness, experience, and interest in wind technologies as a distributed generation resource.

NRECA's Rural Area Distributed Wind Integration Network Development (RADWIND) seeks to understand, address, and reduce the technical risks and market barriers to distributed wind adoption by rural utilities. The goal of the project is to reduce the barriers for distributed wind deployment, either as a standalone resource or as part of a hybrid power plant with other distributed energy resources (DER).

Additional Information on NRECA's RADWIND Project

For more information on the RADWIND project and additional resources, please visit the project landing page at www.cooperative.com/radwind.

Executive Summary

The following are the top-line findings based on the results of an online survey with responses from the CEO/GMs of 168 distribution cooperatives and other distribution utility members of NRECA. The survey was conducted in February 2023:

- Almost four in ten are discussing how distributed generation (DG) fits into their plans, 34% of the respondents are not considering distributed generation in their co-op's plans, 19% have already implemented DG in their plans, and 8% are expanding beyond their initial plans.
- Among those not considering DG in their plans, the lack of a clear business case and the "co-op Board is not interested" are most often mentioned as reasons. The lack of a clear benefit to the co-op and its members and/or members not being interested are also mentioned as major factors.
- Respondents rated executive management as being most familiar with distributed wind technologies at their co-ops, while they considered their board members and co-op staff to be somewhat familiar and member familiarity to be low. They indicated that interest in distributed wind is low across executive management, directors, co-op staff, and their membership. Most indicate that their interest in distributed wind has not changed in the last two years.
- One-quarter of the respondents say that the ability to combine distributed wind with other DER increases their level of interest. Twenty-nine percent have an increased level of interest in distributed wind based on the availability of direct-pay tax credits in distributed-scale wind or wind-hybrid projects.
- Just one in ten respondents say they have visited the RADWIND webpage found at www.cooperative.com/radwind. Of the small number who had visited, their evaluation for the value the resources provided is largely positive. Those who haven't visited the site most often cited a lack of awareness as their reason for not visiting. Eight in ten respondents were not sure if the RADWIND project had made progress in its goals.
- Six in ten respondents expect the number of requests for distributed wind interconnections to stay the same in the next 5 years, while 15% expect it to increase and 6% expect a decrease. Barriers to further adoption cited by respondents are co-op members not being interested in distributed wind, along with a lack of a clear benefit to the co-op and its members and concerns for siting.
- Just over one-quarter indicated that their service territory is well or very well suited for wind generation. Among those who do not feel their territory is well suited, *not being windy enough, terrain/ground cover,* and *local government factors* are most often mentioned as reasons for the territory not being well suited for wind.

Objectives, Methodology, & Analysis

Objectives

This survey addresses, but is not limited to, the following informational objectives:

- **Distributed Generation:** Assess the current status of distributed generation at distribution cooperatives across the nation.
- **RADWIND Resources:** Evaluate the percent of members who have viewed the RADWIND resources available and determine their perceptions of the value of those resources.
- **Distributed Wind Generation Activities:** Understand the current status of distributed wind generation.

Methodology

To help ensure a survey sample that is representative of all distribution members of NRECA, surveys were emailed to 829 CEO/GMs at distribution cooperatives on February 7. Two reminders were sent to increase participation in the survey. As of February 28, 168 surveys had been completed for a response rate of approximately 21%.

Analysis

When evaluating the mean ratings in this report, on a 5-point scale, a mean of 4.50 or above should be considered “excellent” and a mean between 4.00 and 4.49 is considered “good.” Means below 4.00 may be cause for concern and those below 3.75 indicate a need for improvement.

Distributed Generation

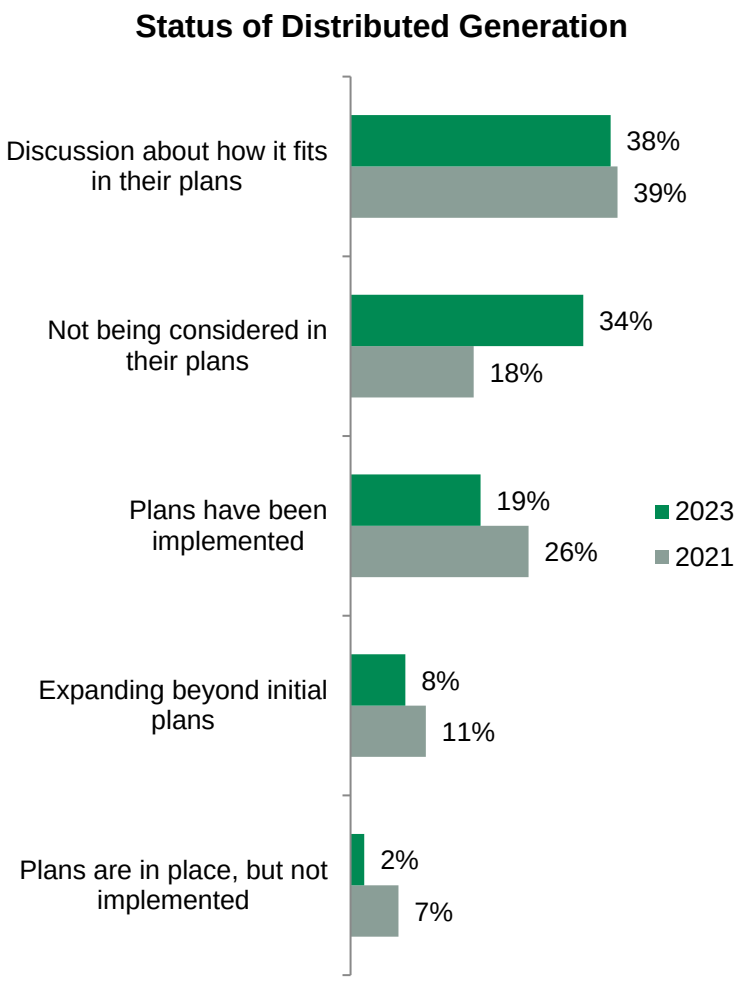
Current Status of Plans

Two-thirds of respondents indicate that their cooperative is having discussion about how distributed generation fits into their plans or has an implemented or current distributed generation (DG) plan, down from 83% in 2021. The change in the percent of systems planning for DG is likely driven by the larger sample size nationally and across regions, as opposed to a change in interest (See Appendix A).

Twenty-seven percent have already implemented DG plans at their cooperative, lower than the 37% rate among 2021 respondents. Among those who had already implemented DG plans, 8% indicated that they were currently expanding beyond their initial plans. Just 2% have plans in place awaiting implementation, down from 7% in the prior study.

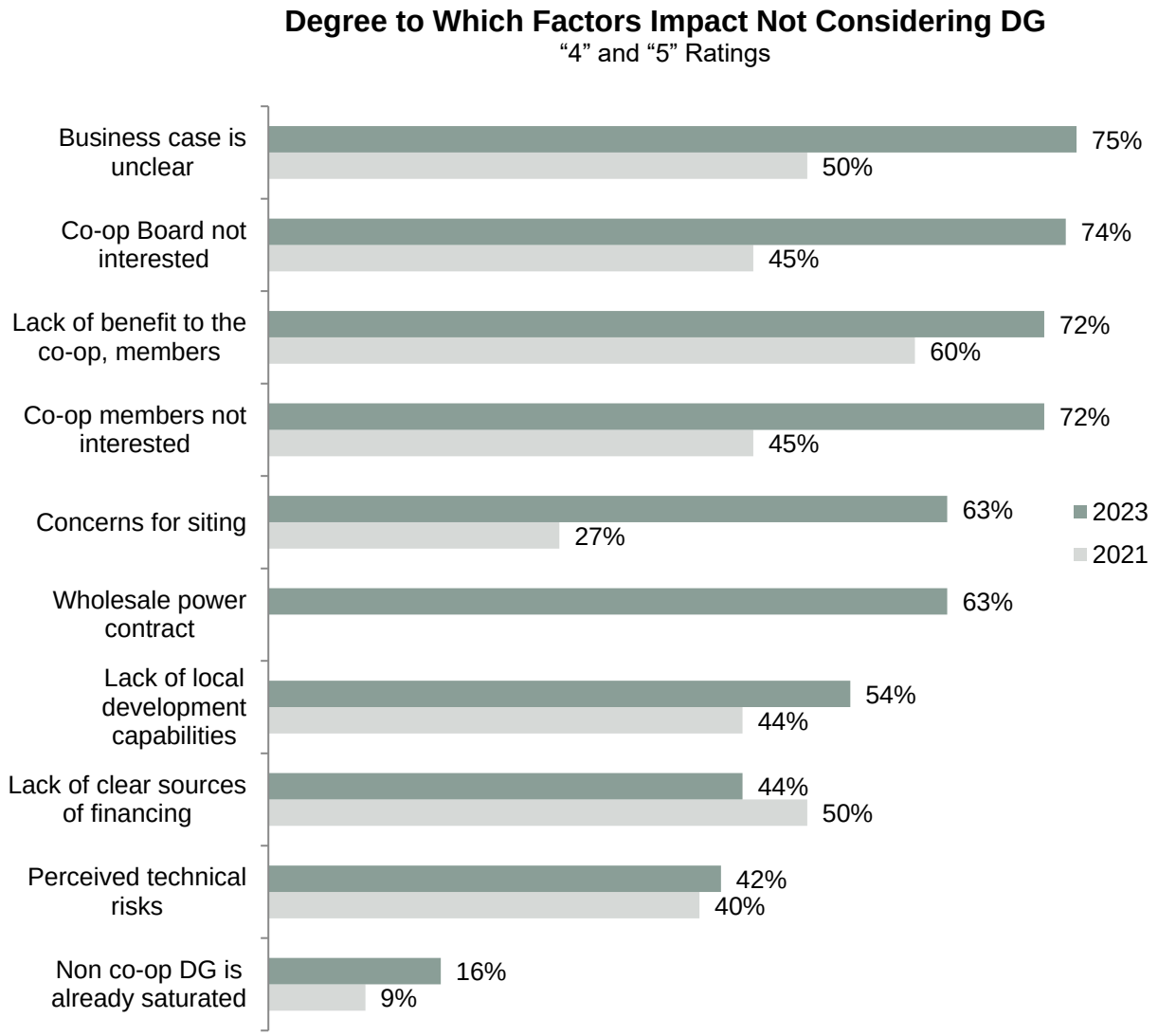
The most common response, 38%, indicates that their co-op is currently discussing how DG fits into their plans, but do not yet have a plan in place. This is unchanged from 2021.

Thirty-four percent say that DG is not being considered as part of their co-op's plans, up from 2021. As noted earlier, this is likely driven by the larger sample size as opposed to a true change in interest.



Those who said that distributed generation is not being considered by their co-op (57 respondents) were asked to rate the degree to which several factors had impacted that decision. These factors were evaluated on a 5-point scale, where 1 is not a factor and 5 is a big factor.

Respondents indicated that they felt that the lack of a clear business case and/or the "co-op Board is not interested" were major factors (i.e., rated "4" or "5") in not considering distributed generation in their co-op's plans (75% and 74%, respectively). Additionally, 72% indicated that a lack of benefit to the co-op and its members and/or co-op members not being interested was a major factor. The percentage citing these four reasons for not considering DG are much higher than in the 2021 study.



Distributed Wind

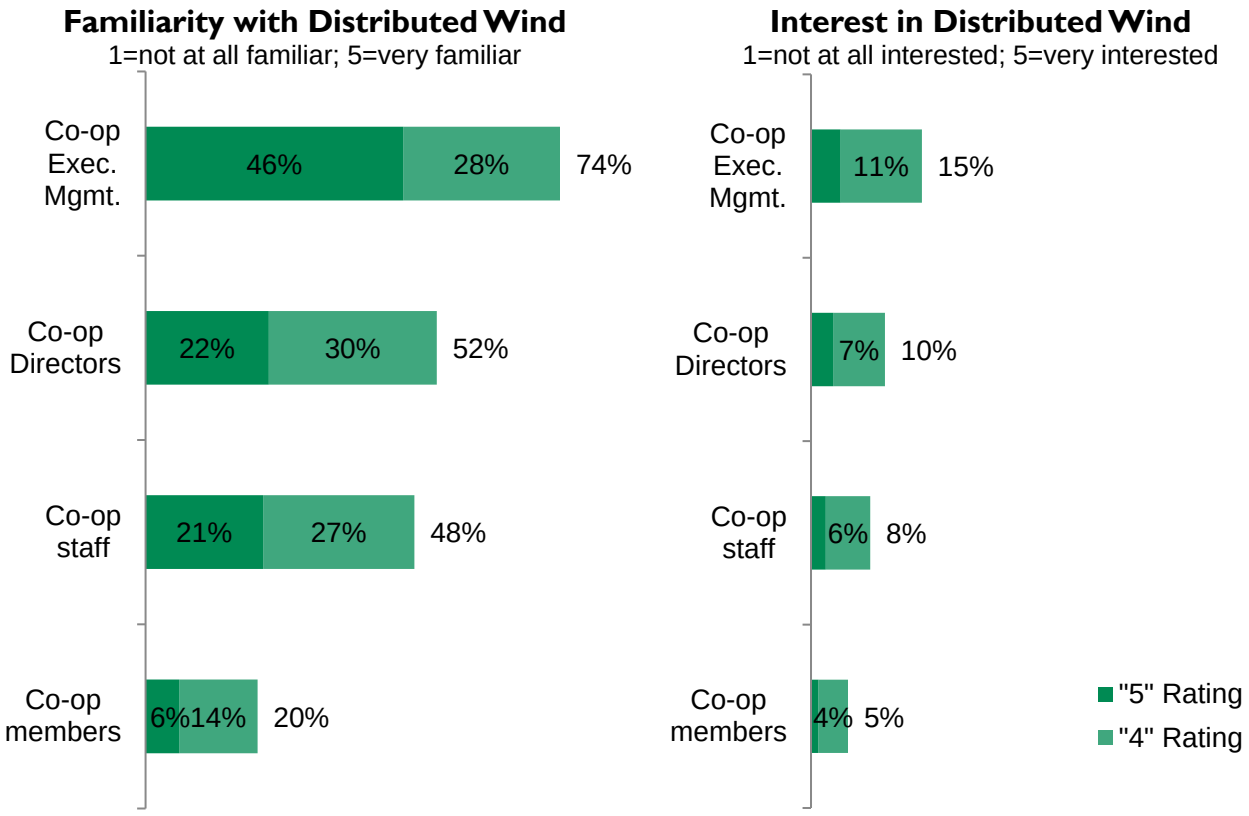
Familiarity and Interest

Respondents were asked to assess their familiarity with and interest in distributed wind, as well as familiarity and interest among other co-op stakeholders, ranking both on a 1 to 5 scale.

Respondents say that the executive management team has the highest level of familiarity with distributed wind (74%), as well as the highest level of interest (15%) among co-op stakeholders. Approximately half of co-op directors and staff also have high levels of familiarity with distributed wind, but as with executive management, the level of interest is much lower than the level of familiarity. Respondents indicate that co-op members have the lowest level of familiarity with distributed wind and the lowest level of interest.

Familiarity among the executive management team is much higher than in 2021 (up 16 percentage points). Familiarity has also increased among other stakeholders, but to a smaller extent. While familiarity has increased, interest is slightly lower than in the prior survey.

The graphs below show the respondents' opinion on various co-op stakeholders' levels of familiarity and interest in distributed wind (i.e., a "4" or "5").



Eight in ten respondents indicate that their interest in distributed wind has not changed in the last two years. Thirteen percent say that their interest has increased.

Additionally, one-quarter of the respondents say that the ability to combine distributed wind with other DER increases their level of interest. Twenty-nine percent have an increased level of interest in distributed wind based on the availability of direct-pay tax credits in distributed-scale wind or wind-hybrid projects.

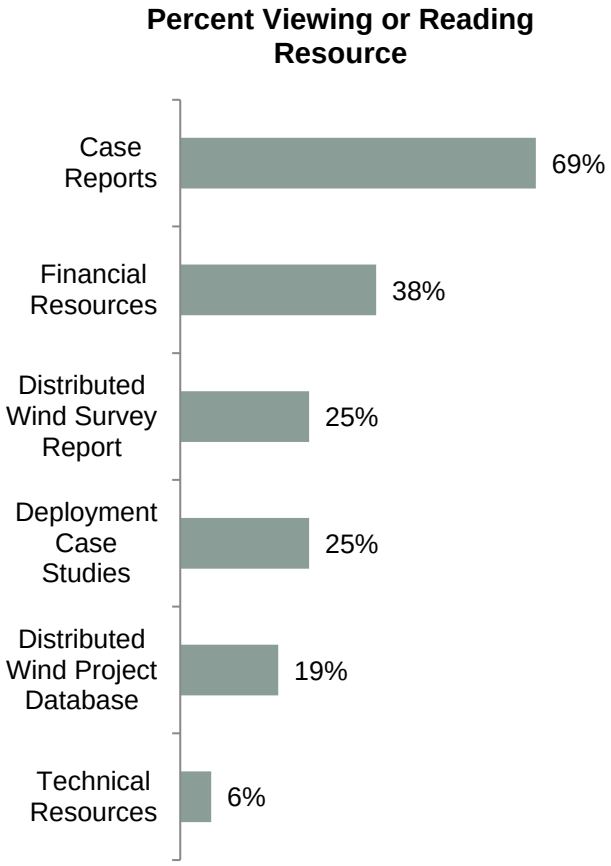
RADWIND Project Resources

Just one in ten respondents say they have visited the RADWIND webpage found at www.cooperative.com/radwind.

Among the small number of respondents (16) who have visited the page, the Case Reports are the section most often viewed on the site, followed by the Financial Resources, Distributed Wind Survey Report, and the Deployment Case Studies.

While the number of respondents' who viewed the materials is small, most give positive evaluations of the value of the resources viewed.

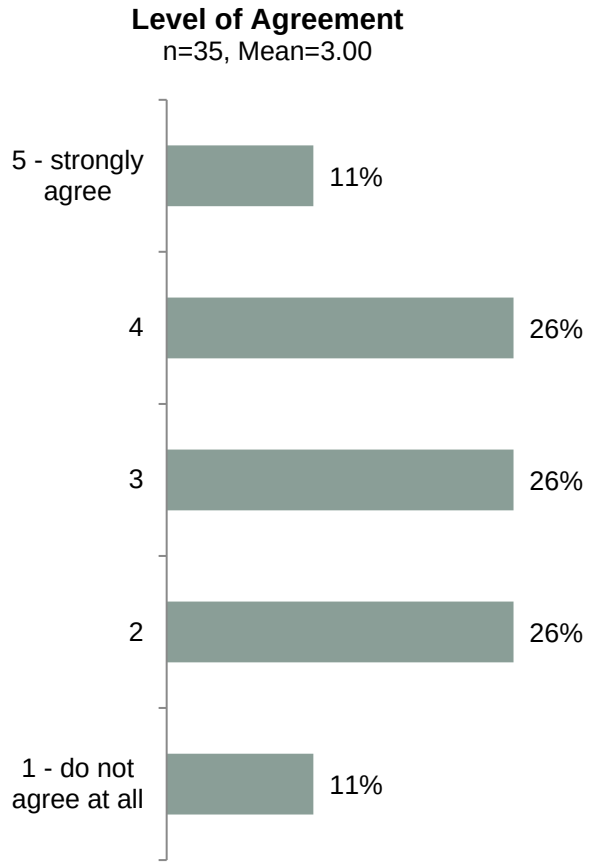
Among those who have not visited the RADWIND webpage, a lack of awareness that the page existed is the most common reason given for not having visited (56% of respondents). Respondents also mention not being interested in distributed wind and not having the opportunity as reasons for not having visited (24% and 13%, respectively).



RADWIND Project Progress

Seventy-eight percent of the respondents answered "not sure" when asked if the RADWIND project had made progress in its goal to understand, address and reduce the technical risks and market barriers to distributed wind adoption.

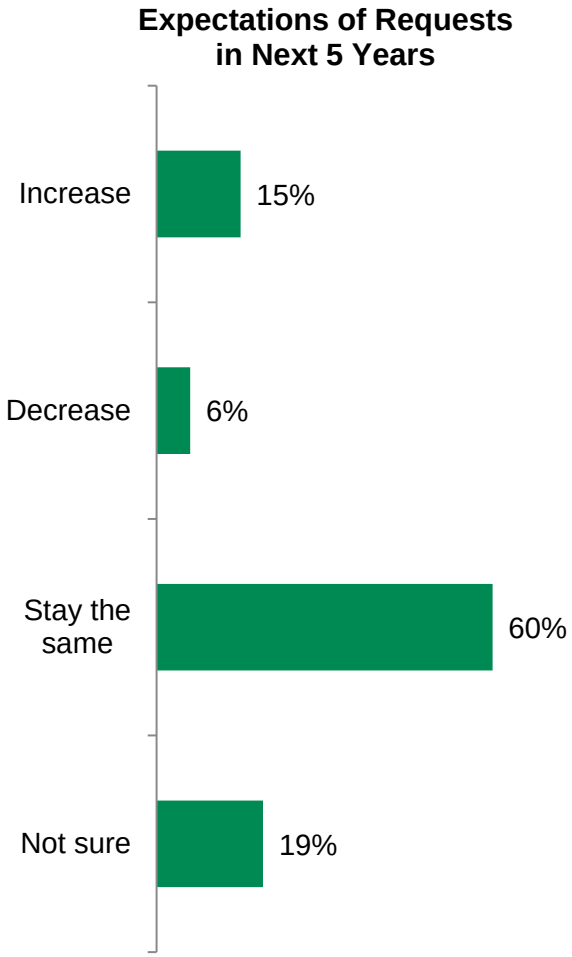
Among the 35 respondents who evaluated the project's progress, just over one-third (37%) give the top two ratings of "4" or "5," while an identical number give the two lowest ratings of "1" or "2".

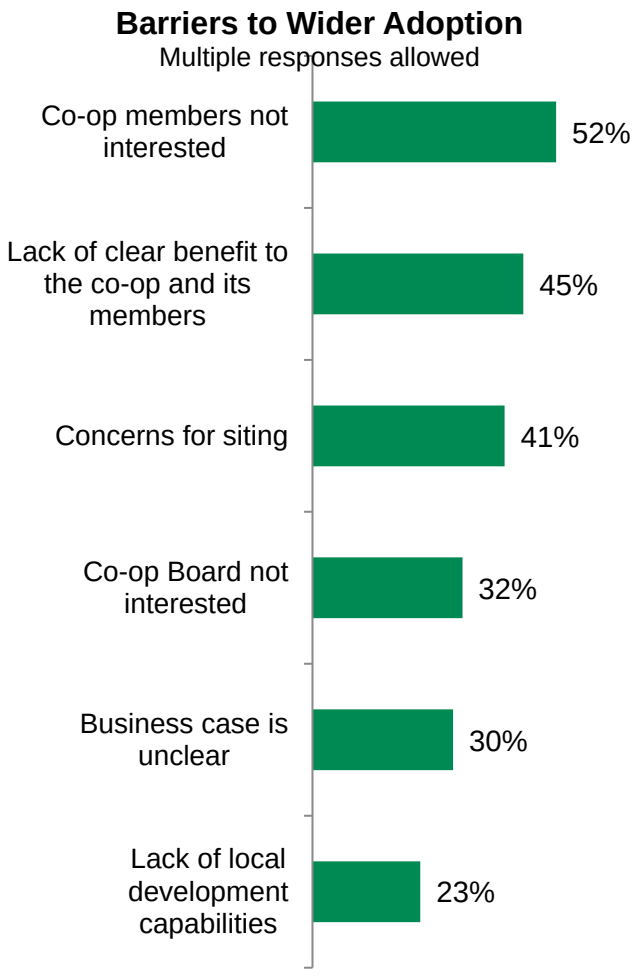


Future of Distributed Wind

Six in ten respondents expect the number of requests for distributed interconnects to their system to stay the same in the next 5 years. Fifteen percent expect an increase, while 6% expect the number of requests to decrease. About two in ten are unsure of how they will change.

Just over half of respondents perceive lack of interest by co-op members as a barrier to wider distributed wind adoption. Forty-five percent see a lack of clear benefit to the co-op and its members as a barrier, while 41% note concerns for siting as a barrier.



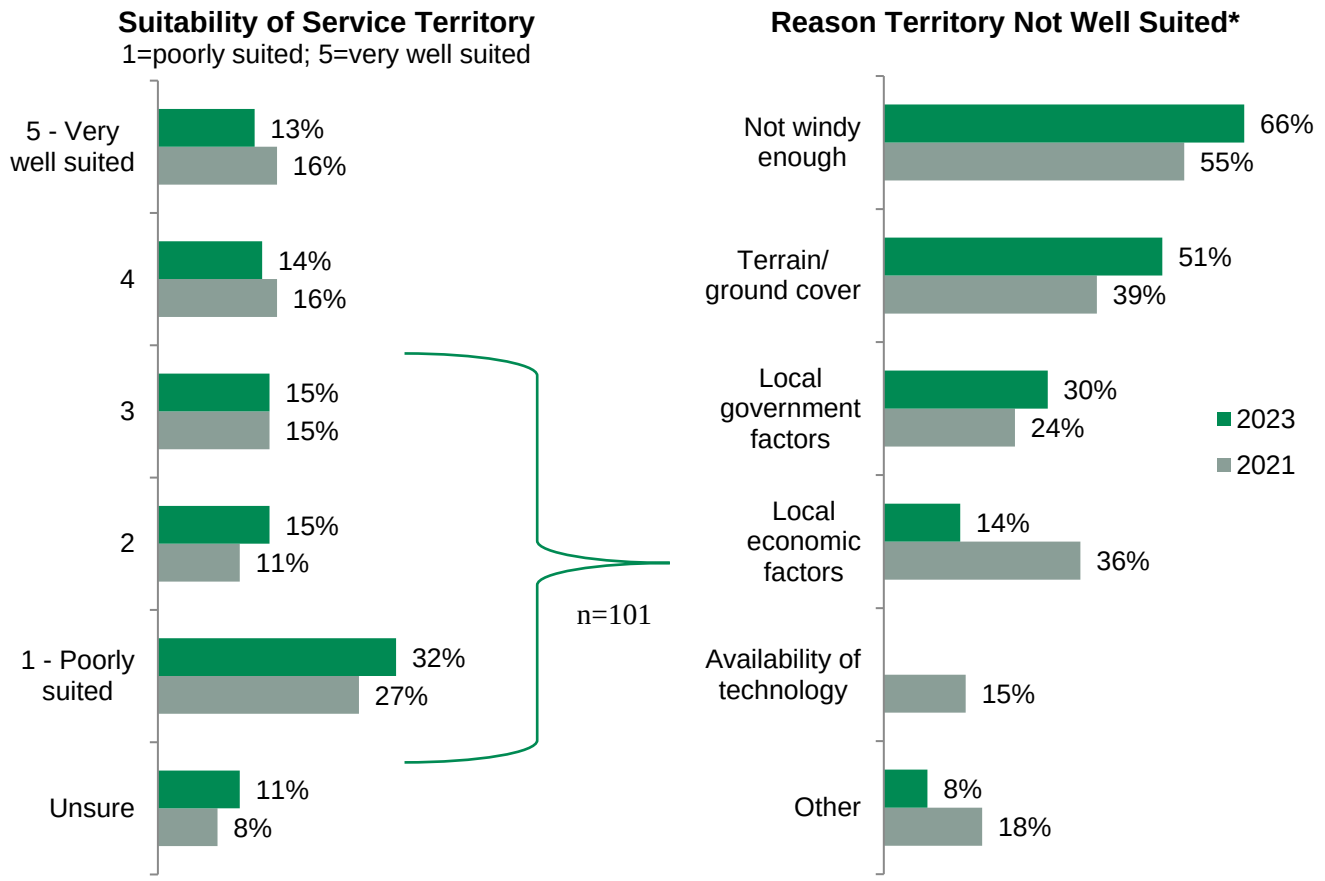


Suitability of Service Territory

One-quarter of the respondents indicate that their service territory is well or very well suited for distributed wind ("4" or "5" ratings), down from 32% in 2021.

Among those who give a rating of "3" or less (101 respondents), 66% indicate that their area is not windy enough for distributed wind, while 51% say terrain/ground cover makes the territory not well suited, and 30% site local government factors (increases of 11, 12, and 6 percentage points, respectively). The percent of respondents who cite local economic factors as a reason has decreased from 36% to 14%, and none of the respondents give the availability of technology as a reason (down from 15% in 2021). As noted earlier, these changes are likely driven by the larger sample size nationally and across regions, as opposed to a change in interest (See Appendix A).

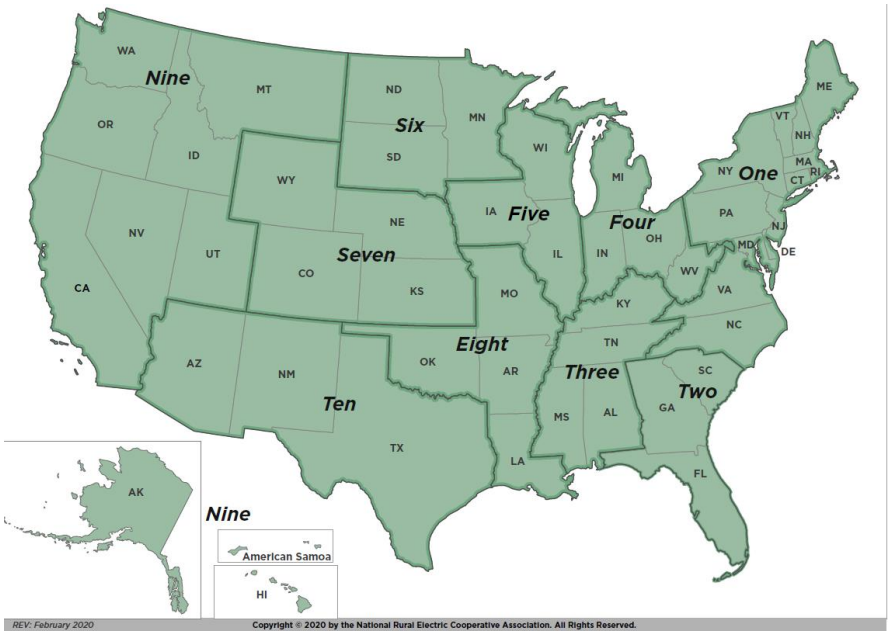
Fully three-quarters of the respondents say their view of the suitability of their service territory for wind generation has not changed in the last two years, while 7% say it is less favorable and 5% say their view is more favorable.

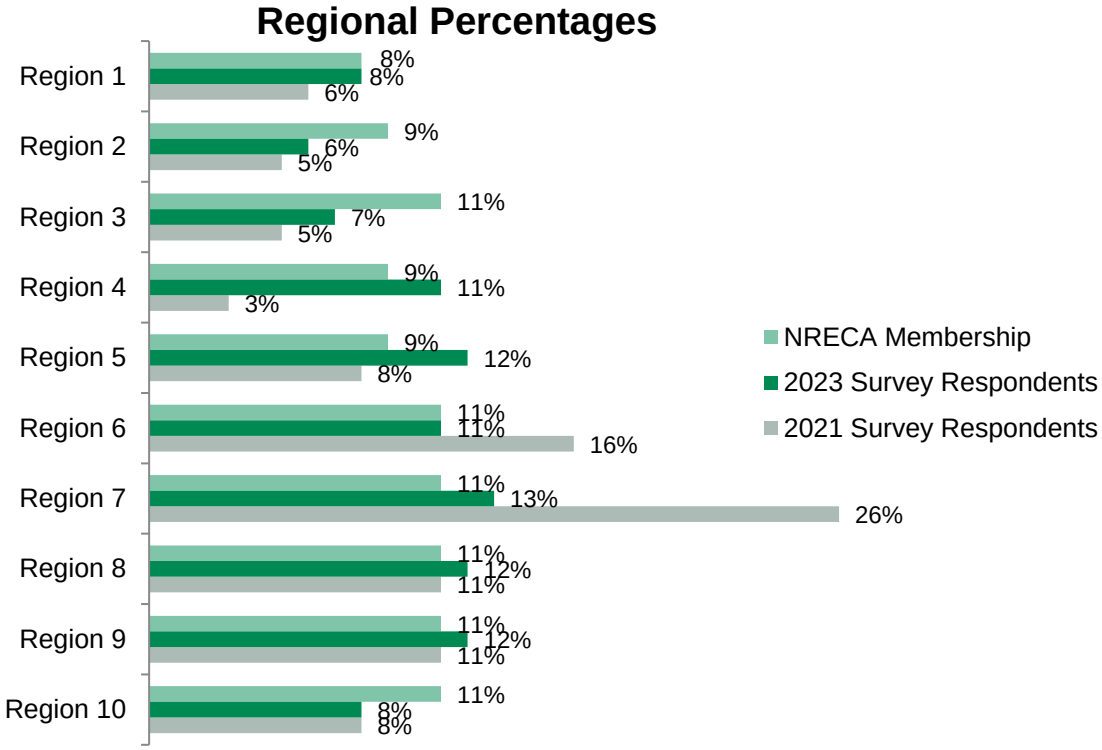


*Asked of those giving a rating of "3" or less, multiple responses allowed

APPENDIX A: Responses by NRECA Region

The 168 responses to this survey were more reflective of the overall regional alignment of NRECA's distribution members than the 62 respondents to the 2021 survey.





APPENDIX B: Verbatim Responses

Some questions either asked respondents to type in an answer or had an option to do so under “Other.” Only those questions are included here. Verbatim responses are reported below for those questions where this applies. The full questionnaire with all response options is included in Appendix C.

Question 11. Why haven’t you visited the RADWIND website?

Other Responses

- *I'm not sure I care. I've built wind projects - and there are organizations that do this all the time. Wind isn't like solar - companies tend to be large and well funded.*
- *Long term contract prevents investment in local DG.*
- *No wind here in South Carolina.*
- *Our wholesaler does not allow us to build or own generation.*
- *We've looked at more specific wind locations - some traditional facilities and a few associated with our substations.*
- *Wind generation is not feasible in our part of the state.*
- *Wind is not economically feasible.*

Question 14. What are the primary barriers you perceive as preventing wider distributed wind adoption in your service territory?

Other Responses

- *Already part of wholesale power purchases.*
- *Cost as compared to existing resources.*
- *Financial Benefit cannot be guaranteed. Supply chain and cost issues.*
- *For the 20 locations that we studied, the distributed ones (5-10 MW near subs) did not have the favorable economics of larger facilities in windier locations because of the economies of scale and capacity factors.*
- *G&T contract.*
- *Huge controversy in our community and county government. Government has made it nearly impossible for the opportunities.*
- *Lack of available wind resource.*
- *Lack of Transmission.*
- *Lack of viable wind.*

Question 14 Other Responses (continued)

- *Lack of wind. (3 mentions)*
- *Long term wholesale contract with G&T.*
- *Maintenance/replacement cost.*
- *More interest in solar than wind.*
- *No wind.*
- *No wind in service area.*
- *No wind opportunities in Georgia.*
- *Not a reliable source.*
- *Not enough consistent wind.*
- *Our co-op service territory is not located in an area with wind resources to support a wind generation project.*
- *Part of service territory where members live not ideal for wind.*
- *Poor wind resources.*
- *Retail rates are low, no real perceived benefit.*
- *Rural Alaska, and the need to turn off diesel is not satisfied by wind to date. We are looking at integrating into a possible Hydro concept that could be complimented by a wind regime.*
- *SPP.*
- *The lack of wind speeds to create a reliable resource.*
- *There isn't much wind in our area.*
- *Vermont has ridiculous regulatory sound requirements that dramatically limit wind.*
- *Waste of money poor investment.*
- *We have large scale wind projects in our territory. This has divided our community.*
- *We ran a pilot wind system for over a decade and it was a resounding failure and we tore it out. Not enough decent wind.*
- *Wholesale power contract does not allow us to consider any sources of distributed generation.*
- *Wind does not demonstrate itself as a viable alternative.*
- *Wind doesn't work in KY well! We have an all requirements contract with our G&T with very little flexibility that requires generation to be connected to our Distribution system.*
- *Wind is not a good resource in our region.*
- *Wind is not economically feasible.*

Question 14 Other Responses (continued)

- *Wind is not technically feasible for our area.*
- *Wind is very site specific. Behind the meter wind has a 0 for 3 record in our service area.*

Question 17. Why is your service area NOT well suited for distributed wind power generation?

Other Responses

- *Endangered Bats.*
- *In addition to poor wind availability, a proposed commercial project in our county was denied by the state Power Siting Board.*
- *Interconnection to the grid.*
- *Locals have already petitioned the shutdown of multiple projects.*
- *Member aesthetic issues.*
- *Supply chain and cost questions.*
- *Too urban.*
- *Transmission. (2 mentions)*
- *Tribal Trust Lands.*
- *Valleys poorly suited; mountaintops suited.*
- *We are next to a national park, multiple lakes and rivers, and beautiful scenery that people so not want disturbed.*

Question 18. Given the steps taken as part of the RADWIND initiative, what should DOE's next priorities be to support wider deployment of distributed wind generation?

Grouped by category:

Question 18: Battery Storage, Hybridization, and Addressing Intermittency

- *Battery storage for supply during peak load times.*
- *Better pairings for longer duration.*
- *DOE's priority should be cost-effective wind DG paired with battery storage.*
- *Get it to match load profiles.*
- *I think that distributed generation only improves the grid when combined with storage. Improving storage is the necessary next step.*

Question 18: Battery Storage, Hybridization, and Addressing Intermittency (continued)

- *Wind is such an intermittent source of generation we need battery backup/storage to really get any benefit from it.*
- *On our lightly loaded system with a very low beta ("Railbelt", Alaska) and very few shafts spinning at any one time, 1) adequate BESS capacity to firm up wind and deal with ramp rates and 2) real-world experience on similar systems to quantify the MW of BESS needed to follow XX MW of wind.*
- *Integrated wind/battery storage.*
- *Provide incentives to make wind/solar/battery storage hybrid more economical.*
- *Require a secondary source of power to support the capacity market.*
- *They should address then intermittent nature of the resource.*

Question 18: Cost/Operations/Maintenance

- *We currently have one wind generator that is 15 years old and just broke. If we were able to get a couple implemented on our system to get valuable data from them, I feel we could get good support for them with the tax credits that are available.*
- *Need for quality vendors and maintenance programs.*
- *Solar has taken off due to subsidies and the minimal maintenance.*
- *I am very skeptical towards wind generation. In my state (Ohio), I've seen multiple locations where wind generation units were removed or are not functioning, apparently due to equipment failures that are prohibitively expensive to repair. It looks to me like financial subsidies are necessary to both construct and maintain them.*
- *I think any wider distribution of wind generation needs to be looked at in terms of projects that have a smaller impact on the environment. In other words, DOE needs to prioritize projects and technologies that have smaller footprints, less impact to wildlife, and require fewer resources.*
- *Drive the cost down.*
- *Continue to disseminate best practices and provide evaluation of existing projects; meeting expectations.*
- *Identify ways to make power generation more reliable.*

Question 18: Consumer/Member Engagement and Interest

- *Work on community buy-in through town hall type meetings. Dispelling negative rumors about wind generation.*
- *Investment in new sustainable technologies to harvest wind power and shift grants from grid resources to end-use consumers.*
- *The concerns we have are based on issues with Large Scale Projects. Environmental concerns (bird and bat deaths). Ice being thrown off of blades. Farmland being lost to large scale wind projects. Neighbors being impacted with view and noise from the wind turbines (lowering of neighboring property values). These need to be addressed.*
- *No one seems to like the looks of the wind turbines. I am not sure what DOE can do about that.*
- *My co-op membership believes wind and solar are far left projects connected to throwing money "in the wind" and they don't see a path to mixing DG technology with gas, coal, or anything else. They also feel the DOE is pushing some resources and not others like nuclear.*

Question 18: Grid Reliability and Integration with Bulk Scale Resources

- *DOE should insure there is enough reliable sources of power in the mix with renewables-i.e.: gas, nuclear, storage.*
- *Continued access to pros and cons of a non-firm generation sources so that everyone is well educated on what it will take for all parties involved as the U.S. attempts to move to all renewables.*
- *Focus on reliability to ensure that subsidized wind generation does not cause the energy market to struggle. Wind generation is a good renewable, but in Texas we need to add a capacity market to ensure reliability is sustained.*
- *Figure out how to keep base power plants operational to back up the unreliable wind resources, address concerns with reliability going forward. The Southwest Power Pool is already saturated with wind resources.*
- *Understanding that subsidizing this doesn't handle the power reliability and quality and the base load requirements needed to back/cover our power contracts with members.*
- *Focus on transmission infrastructure upgrades and new installations. Focus on solar with battery. Focus on large wind at the G&T level.*
- *Does not make sense to invest in wind at this time.*

Question 18: Other

- An additional 11 respondents thought that DOE should not be involved in supporting distributed wind or wind in general, or that support should be shifted to other technologies.
- An additional six responded “not sure” or “no opinion.”

APPENDIX C: Questionnaire

Distributed Generation

1. Which of the following best describes your co-op's status regarding distributed generation?
   - □ Not being considered in our plans
   - □ Discussion about how it fits in our plans
   - □ Plans are in place, but not implemented
   - □ Plans have been implemented
   - □ Expanding beyond initial plans

If not being considered, go to Q2 else go to Q3.

2. To what degree are the following factors a part of the decision to not include distributed generation in your current plans?

	1 – not a factor	2	3	4	5 – a big factor	Not Sure
Co-op members not interested	□	□	□	□	□	□
Co-op Board not interested	□	□	□	□	□	□
Lack of clear benefit to the co-op and its members	□	□	□	□	□	□
Business case is unclear	□	□	□	□	□	□
Lack of local development capabilities	□	□	□	□	□	□
Lack of clear sources of financing	□	□	□	□	□	□
Perceived technical risks	□	□	□	□	□	□
Concerns for siting	□	□	□	□	□	□
Non-co-op DG is already saturated	□	□	□	□	□	□
Wholesale power contract	□	□	□	□	□	□

3. How familiar are the following groups with wind generation?

	1 – not at all familiar	2	3	4	5 – very familiar	Not Sure
Co-op members	□	□	□	□	□	□
Co-op staff	□	□	□	□	□	□
Co-op executive management	□	□	□	□	□	□
Co-op board of directors	□	□	□	□	□	□

4. How would you rate the level of interest in wind as a distributed energy resource among the following groups?

	1 – not at all interested	2	3	4	5 – very interested	Not Sure
Co-op members	□	□	□	□	□	□
Co-op staff	□	□	□	□	□	□
Co-op executive management	□	□	□	□	□	□
Co-op board of directors	□	□	□	□	□	□

5. Has your interest in wind as a distributed generation source increased over the last two years?
   □ Yes □ No □ Not sure

6. Does the opportunity to combine distributed wind with other distributed energy resources (e.g., solar PV and battery energy storage) as a hybrid resource, including as part of a microgrid, increase the interest in distributed wind?
   □ Yes □ No □ Not sure

7. Does the availability of direct-pay tax credits make you more interested in exploring a distributed-scale wind or wind-hybrid project?
   □ Yes □ No □ Not sure

RADWIND Resources and the Future

8. Have you visited the RADWIND project webpage, found at www.cooperative.com/radwind?
   □ Yes □ No (go to Q11) □ Not sure (go to Q12)

9. Which of the following sections have you read or viewed project resources from? (select all that apply)
   □ Case Reports
   □ Financial Resources
   □ Deployment Case Studies
   □ Technical Resources
   □ Distributed Wind Project Database
   □ Distributed Wind Survey Report
   □ Not sure
   □ Other (Please specify): _____
   □ None of these

For the options selected in Q9:

10. How valuable did you find the materials you viewed?

	1 – not at valuable	2	3	4	5 – very valuable	Not Sure
Case Reports	□	□	□	□	□	□
Financial Resources	□	□	□	□	□	□
Development Case Studies	□	□	□	□	□	□
Technical Resources	□	□	□	□	□	□
Distributed Wind Project Database	□	□	□	□	□	□
Distributed Wind Survey Report	□	□	□	□	□	□

11. Why haven't you visited the RADWIND website? (check all that apply)
    - □ Was not aware of it
    - □ Haven't had the opportunity
    - □ Not interested in distributed wind
    - □ Other (please specify): _____
    - □ Not sure

12. How strongly do you agree that the RADWIND project has made progress in its goal to understand, address, and reduce the technical risks and market barriers to distributed wind adoption by electric cooperatives and other rural utilities by providing solutions, developing sharable resources, and highlighting innovative wind technologies to reduce the soft costs and barriers to distributed wind deployment?
    □ 1 – do not agree at all □ 2 □ 3 □ 4 □ 5 – strongly agree □ Not sure

13. During the next five years, do you expect the rate of requests for distributed wind interconnections on your system to increase, decrease, or stay the same?
    □ Increase □Decrease □ Stay the same □ Not sure

14. What are the primary barriers you perceive as preventing wider distributed wind adoption in your service territory? (check all that apply)
    - □ Co-op members not interested
    - □ Co-op Board not interested
    - □ Lack of clear benefit to the co-op and its members
    - □ Business case is unclear
    - □ Lack of local development capabilities
    - □ Lack of clear sources of financing
    - □ Perceived technical risks
    - □ Concerns for siting
    - □ Non co-op DG is already saturated
    - □ Other _____
    - □ Not sure

15. To what degree is your service territory suited for wind generation?
    □ 1 – poorly suited □ 2 □ 3 □ 4 □ 5 – very well suited □ Not sure

16. Given available information, has your view of the suitability of wind generation in your service territory changed over the last two years?
    □ Yes, view is more favorable
    □ Yes, view is less favorable
    □ No, view has not changed
    □ Not sure

    If "3" or less is selected in Q15, go to Q17.

17. Why is your service area NOT well suited for distributed wind power generation? (check all that apply)
    □ Not windy enough
    □ Terrain/ground cover
    □ Local economic factors
    □ Local government factors (e.g. land use/zoning/height restrictions)
    □ Other (please specify) _____

18. Given the steps taken as part of the RADWIND initiative, what should DOE's next priorities be to support wider deployment of distributed wind generation?
    _____
    _____

19. Would you or a member of your staff like to join the Distributed Wind professional community on cooperative.com for occasional updates on information and opportunities?
□ Yes
□ No
□ Staff Contact (e-mail) _____