2021 NRECA RADWIND Survey

NRECA Research

PREPARED BY:

NRECA Market Research Services



RADWIND PROJECT REPORT SERIES: 2021 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 Research's Rural Area Distributed Wind Integration Network Development (RADWIND) initiative 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 DER.

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.

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 an advisor.

Contact our team at: RadwindProject@nreca.coop.

Executive Summary

The following are the top-line findings based on the results of an online survey of 62 distribution cooperatives. Respondents were either CEO/GMs or senior leaders in Operations and/or Engineering. The survey was conducted in January/February 2021.

- There were responses from each of NRECA's 10 member regions (see Appendix A for more detail and a map of these regions). Response rates were highest from the windiest parts of the country, with 26% of responses coming from NRECA Region Seven (Colorado, Kansas, Nebraska, and Wyoming) and 16% of responses from Region Six (Minnesota, North Dakota, and South Dakota).
- Eighteen percent of the respondents are not considering distributed generation in their co-op's plans. Four in ten are discussing how distributed generation (DG) fits into their plans, 37% have already implemented DG in their plans, and 7% are in the implementation process.
- Solar is the technology that often plays a primary or supporting role (90%) in respondents' DG plans, followed by battery storage (49%). Wind came in third, with 36% of respondents saying wind plays a role in their DG plans, primarily in a supporting role.
- 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.
- One-third 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 windy enough, terrain/ground cover, and local
 economic factors are most often mentioned as reasons for the territory not being well suited for
 wind.
- Almost half have at least one wind interconnection within their service territory. Among those with interconnections, most have five or fewer, and most of the wind assets are owned by residential members.
- Respondents rate the availability of useful/relevant distributed wind resources low, with less than
 half saying that resources are available. Business/financial models are the resources that are most
 needed for distributed wind.
- Almost one-quarter indicate that the opportunity to combine distributed wind with other distributed energy resources as a hybrid solution increases their interest.

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.
- **Interest in Distributed Wind:** Evaluate the level of interest in distributed wind among cooperative members, staff, and directors.
- **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 198 CEO/GMs and 612 senior leaders in Operations and/or Engineering at distribution cooperatives on January 25th. Two reminders were sent to increase participation in the survey. As of February 16th, 62 surveys had been completed for a response rate of about 8%.

Analysis

When reviewing the survey results, it is important to keep in mind that the sample size is small, and results should be viewed as *directional*, as opposed to *projectable* as would be expected with a larger sample.

Distributed Generation

Current Status of Plans

More than eight in ten respondents indicate that their cooperative has a distributed generation (DG) plan or is having discussion about how distributed generation fits into their plans.

Thirty-seven percent have already implemented DG plans at their cooperative, including 11% who indicate that they have already expanded upon their initial plans. Another 7% have plans in place awaiting implementation.

The most common response, 39%, indicated that their co-op is currently discussing how DG fits into their plans, but do not yet have a plan in place.

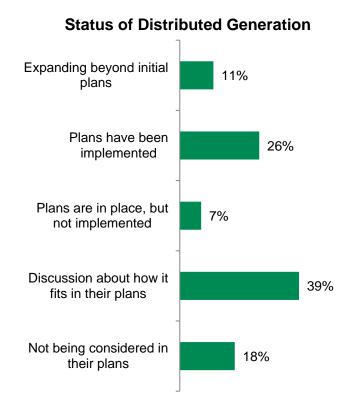
Only 18% say that DG is not being considered as part of their co-op's plans.

The small number of respondents (11) who say distributed generation is not being considered by their co-op 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 lack of interest was a major factor (i.e. rated "4" or "5") in not considering distributed generation in their co-op's plans. Forty-five percent of respondents indicated that "co-op board not interested" was a major factor, and the same percentage indicated that "co-op members not interested."

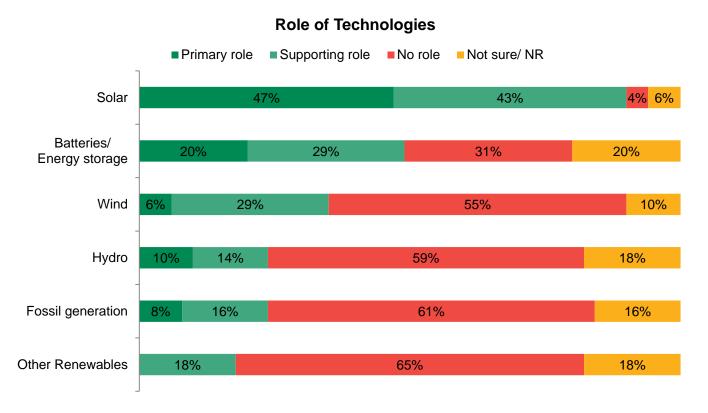
Respondents also indicated some barriers or gaps as major factors in not including DG in their planning. These included "lack of clear benefit to the co-op and its members" (60%), "business case unclear" (50%), "lack of clear sources of financing" (50%), "lack of local development capabilities" (44%), and "perceived technical risks" (40%).



Role of Technologies

Respondents with distributed generation plans were asked to evaluate the role five technologies play in those plans. Solar is often mentioned as having a primary (47%) or supporting (43%) role in respondents' DG plans, reflecting its wider deployment in recent years. Batteries/energy storage is also mentioned by 49% as having a primary or supporting role in the plans.

Wind came in third among the technologies, with just over a third of respondents indicating that wind played a role in their DG plans. This was higher than other renewable technologies besides solar, and fossil generation. Interestingly, while only 6% of respondents saw wind as playing a primary role in their DG plans, 29% saw it playing a supporting role; the same share who indicated a supporting role for batteries/energy storage. This might indicate receptiveness to wind as part of hybrid deployments.



Board Policy

A bit over a third (37%) of the respondents say their co-op has a board policy in place regarding distributed energy resources, while 61% did not and 2% were unsure. Of those co-ops that do have a policy in place, 37% percent implemented their policy 10 years ago or more, and an additional 26% implemented it in the last 6 to 10 years. While many policies have been in place for more than 5 years, 85% of respondents indicate that they have updated their plans in the last 5 years.

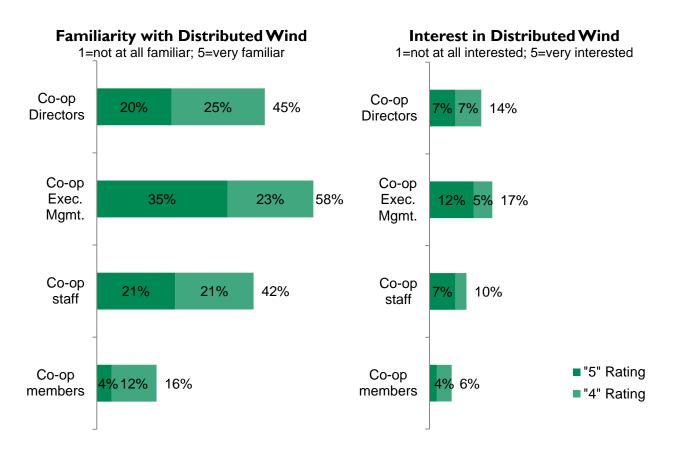
Distributed Wind

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 (58%), as well as the highest level of interest (17%) among co-op stakeholders. More than four in ten 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. Respondents indicate that co-op members have the lowest level of familiarity with distributed wind and the lowest level of interest.

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

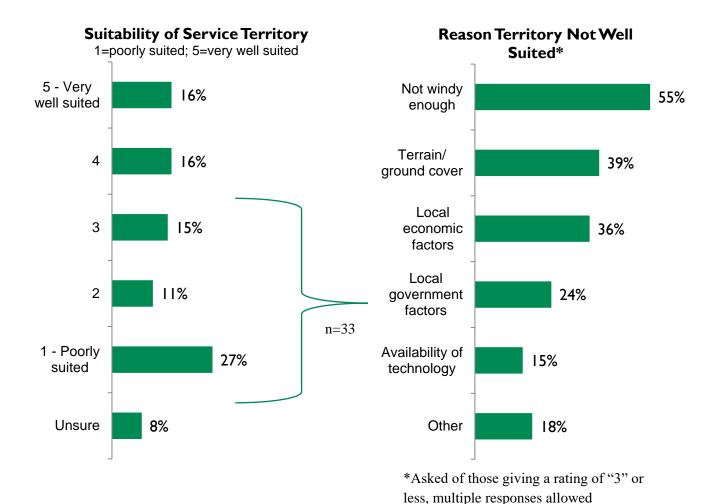


When asked how they gauge member interest in distributed wind, 69% of the respondents said that they use the number of member inquires they receive, and 60% said that they use the number of existing installed systems as their gauge. Eighteen percent use member surveys to gauge interest.

Suitability of Service Territory

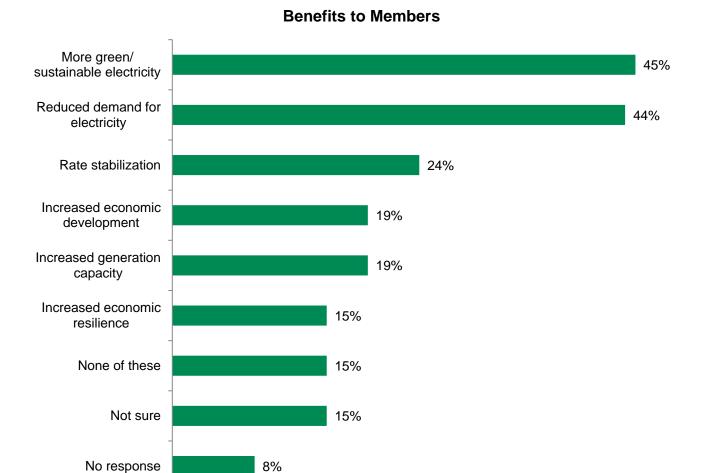
One-third of the respondents indicate that their service territory is well or very well suited for distributed wind ("4" or "5" ratings).

Among those who give a rating of "3" or less (33 respondents), 55% indicate that their area is not windy enough for distributed wind, while 29% say terrain/ground cover makes the territory not well suited and 24% site local government factors. Eighteen percent give other reasons for their rating of the suitability of their territory. Those responses are included in Appendix B (Question 9) of this report.



Member Benefits

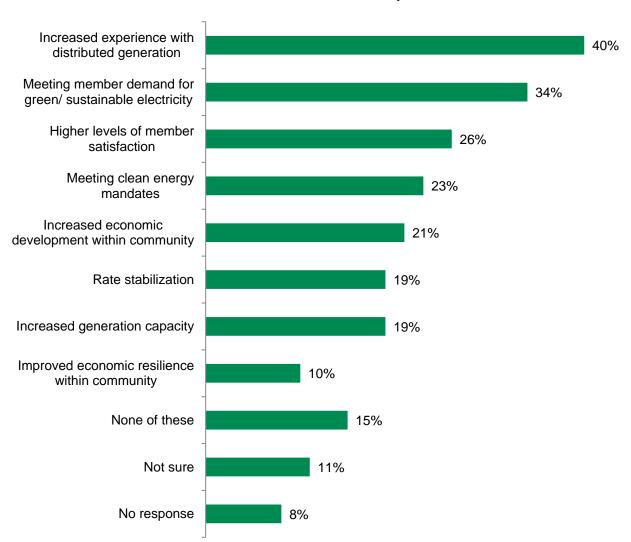
Sixty-two percent of respondents identified at least one benefit from distributed wind to members. The three most often selected benefits are "more green/sustainable electricity" (45%), "reduced demand for electricity" (44%), and "rate stabilization" (24%).



Cooperative Benefits

Two-thirds of respondents identified at least one benefit from distributed wind to the cooperative. The three most often selected benefits are "increased experience with distributed generation" (40%), "meeting member demand for green/sustainable electricity" (34%), and "higher levels of member satisfaction" (26%).

Benefits to the Cooperative

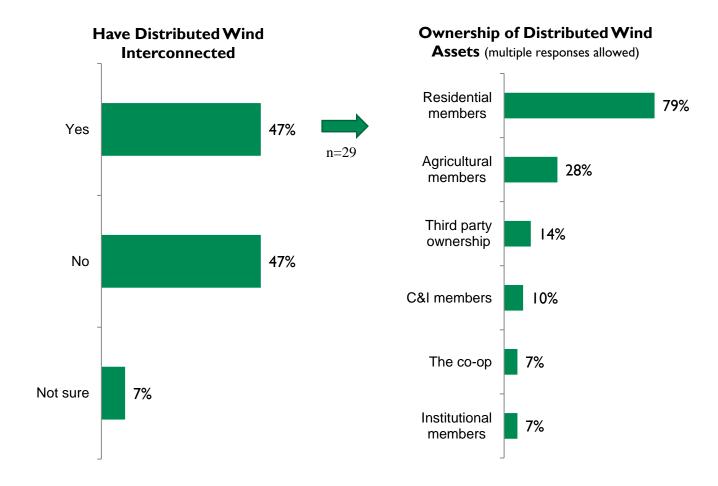


Current Activities

Current Status

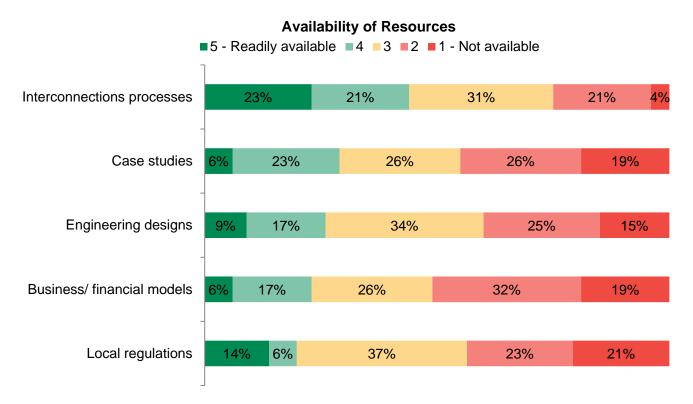
Forty-seven percent of the respondents currently have one distributed wind interconnection in their service territory. Among the twenty-nine respondents who have interconnections, twenty-one have five or fewer members with distributed wind interconnections, five have 6 to 10, and three have 10 or more. Among those with more than 10, the highest number of interconnections is 40.

The majority of the distributed wind assets are small turbines owned by residential members (79%), while 28% are owned by agricultural members. Fourteen percent are owned by a third party and 10% are owned by commercial and industrial (C&I) members. Forty-eight percent offer electricity generated by distributed wind energy as part of their overall power supply-mix, while 14% offer it as part of an opt-in green power program; 38% of the respondents with distributed wind interconnections indicated that they do not offer electricity generated by distributed wind to their members. This might be because these are behind-the-meter turbines that either do not sell power back onto the grid or that sell their power to a third-party.



Availability of Resources

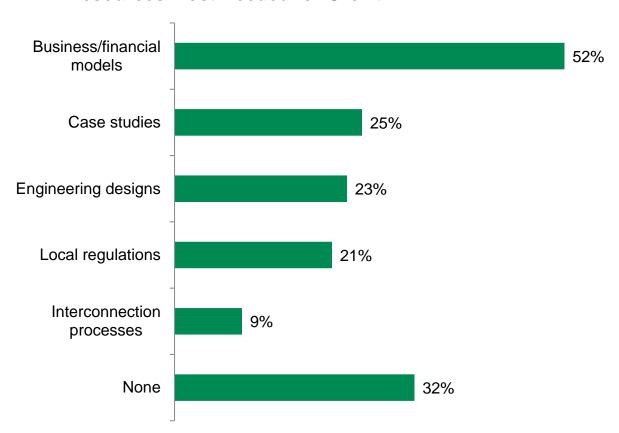
Respondents were asked about the availability of useful/relevant distributed wind resources. Resources related to interconnection processes are most readily available (44% give "4" or "5" ratings), followed by case studies (29%) and engineering designs (26%). Local regulations are the resource that most indicate are not readily available (81% give ratings of "3" or less).



A variety of sources are used for the resources and there is no one resource that is used most often. A full list of the sources used for these items can be found in the Appendix B (Question 18) of this report.

Of the resources that are not readily available, respondents say business/financial models (52%) are the most important resource to enable the growth of distributed wind. This is followed by case studies (25%), engineering designs (23%), and local regulations (21%). One-third say there are no resources needed to enable the growth.

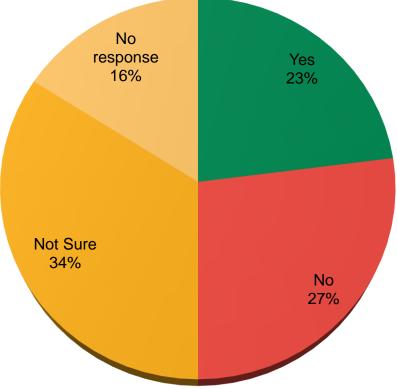
Resources Most Needed for Growth



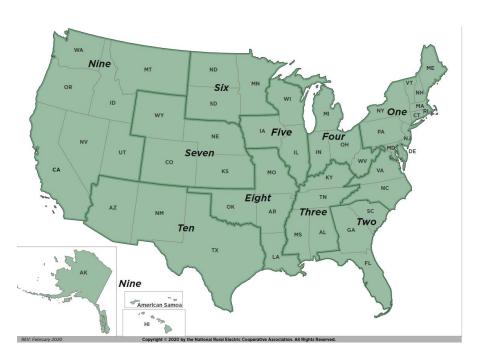
Combining Distributed Wind with Other DER

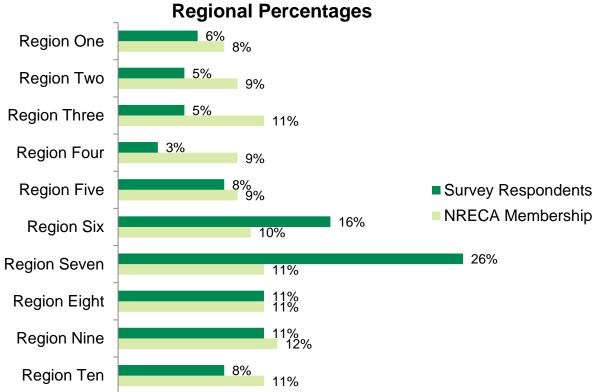
Almost one-quarter say that the opportunity to combine distributed wind with other distributed energy resources as a hybrid resource increases their interest in distributed wind. Twenty-seven percent say that it does not increase their interest, while 34% are unsure. Sixteen percent did not respond to this question.





APPENDIX A: Responses by NRECA Region





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 3. How much of a role do the following technologies play in a distributed generation plan at your cooperative?

Other Responses

- All requirements wholesale contract with G&T.
- If this is specifically referring to wind, then this is not a viable possibility for the South East region.
- Poor use of finances won't pay out.
- We are a distribution co-op with an all requirements contract we do have policies in place for member owned generation and have several small member projects on our system.
- Wholesale power contract does not allow under the buy all/sell all provision.

Question 7. How do you gauge interest in distributed wind among your co-op's members?

Other Responses

- Complaints about regional large-scale wind farms.
- Conversations with members.
- Few inquiries but mostly landowners don't want them. Also, wind doesn't fit our load profile.

Question 9. Why is your service area NOT well suited for distributed wind power generation?

Other Responses

- Integration costs.
- Landowners are very against towers on their property. Also, wind generation isn't a fit for our load profile.
- Low price of electricity in state.
- Tower height requirement.
- We are split between the east grid and west grid.
- Winds very gusty and over 60 mph at times. Good resources for wind are very localized.

Question 15. 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? For what reason(s) do you give that response?

Increase:

- Colorado has a big push for renewable resources, and I think demand will continue to go up for all types of resources.
- Interconnect history.
- Members are inquiring more about solar, once the cost of wind installations is reduced, we would see more installations.
- Predict subsidies will increase, decreasing critical pricing.

Decrease:

- Members are more interested in solar generation.
- Members are moving to solar.
- Poor wind resources and increasing solar penetration.
- The industry is trending towards solar.

Stay the Same:

- Early interest by 2 members shortly after establishing our policy; little to no interest since.
- Existing members do not want stranded investment. Future members see more advantages to solar.
- Has remained flat due to solar being more cost beneficial and less maintenance.
- I feel solar is more economically feasible for smaller scale projects and our members have been inquiring into solar at a much higher rate than wind.
- I have not heard of anyone expressing interest in wind. We have seen an increase in solar, but not wind.
- Interconnected solar seems to be more prevalent in our territory.
- Interest has remained the same for years.
- Lack of opportunity.
- No inquiries for additions.
- Small scale wind is fading, small scale solar is not readily available.
- Solar creates more interest than wind.
- Solar more prevalent.
- The amount of maintenance required for these units.
- Uneconomic difficult to get service in a very rural area.
- We are seeing more solar DG.

Not Sure:

- No inquiries.
- Solar has become more popular due to lower costs to implement.
- Solar more popular.

Question 18. What sources do you use for the items that you indicated are available?

- BPA interconnection standards and business practices.
- Company data/records and knowledge.
- Consultants.
- Cooperative policies, procedures, and engineering tools and reference material available.
- IEEE.
- Industry publications.
- Industry, financial partners and regulatory information sources.
- Interconnection documents from our G&T.
- Interconnection process and application.
- Local G&T.
- POLLS.
- Regulatory mandates, Feasibility Reports, Rate making.
- The interconnection process we already have in place for solar.
- Trade publications, NRECA, G&T information, local IOU, state utility commission, state office of energy.
- Transmission provider documentation, online searches.
- Vendors, consultants, trade publications, industry trade groups.
- We have them on our website.
- Websites, internet, and vendors.
- Wholesale power provider, existing policy, and trade allies.

APPENDIX C: Questionnaire

Distributed Generation

1.	Which of the following best describes your co-op 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	o's sta	atus	s reg	gardi	ng d	istrib	outed generation? (*required)
lf n	ot in being considered, go to Q2 else go to Q3.								
2.	To what degree are the following factors a part of current plans? Please use a 5-point scale where Co-op members not interested Co-op Board not interested Lack of clear benefit to the co-op and its member 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 (please specify)	e 1 is i							ration in your
Go	to Q5								
3.	How much of a role do the following technologie No r					outed rting	-		-
	Solar								
	Wind								
	Hydro								
	Other Renewables (i.e. bio-fuels, geothermal, etc.)								
	Fossil Generation (i.e. diesel or NG)								
	Batteries/Energy Storage								

4.	Does your co-op have a Board policy in place that outlines your approach to addressing distributed energy resources?		
	Yes, if so, when was it impleme	nted? when was it last revised?	
	No		
	Not sure		
Dis	tributed Wind		
5.	How familiar are the following grou	ps with wind generation?	
	Co-op members	Not at all familiar 1 2 3 4 5 Very familiar Not Sure	
	Co-op staff	Not at all familiar 1 2 3 4 5 Very familiar Not Sure	
	Co-op executive management	· ·	
	Co-op board of directors	Not at all familiar 1 2 3 4 5 Very familiar Not Sure	
6.	How would you rate the level of inte	erest in distributed wind among the following groups?	
	Co-op members	Not at all interested 1 2 3 4 5 Very interested Not Sure	
	Co-op staff	Not at all interested 1 2 3 4 5 Very interested Not Sure	
	Co-op executive management	Not at all interested 1 2 3 4 5 Very interested Not Sure	
	Co-op board of directors	Not at all interested 1 2 3 4 5 Very interested Not Sure	
7.	How do you gauge interest in distri Number of member inquiries red Number of existing installed sys Member surveys Other (please specify)	stems	
8.	To what degree is your service term Poorly suited 1 2 3 4 5	itory suited for distributed wind generation? Very well suited Unsure	
If y	ou selected "3" or less go to Q9, els	e skip Q9 and go to Q10.	
9.	 Not windy enough Terrain/ground cover Local economic factors Local government factors (e.g. I Availability of technology (e.g. e 	suited for distributed wind power generation? (check all that apply) and use/zoning/height restrictions) equipment/vendors)	

 10. Which of the following benefits, if any, could your <u>members</u> recognize from the develop wind generation? (check all that apply) Reduced demand for electricity Increased generation capacity 	oment of distributed
Rate stabilization	
Increased economic development within the community	
Increased economic resilience within the community	
More green/sustainable electricity from their cooperative	
Other (please specify)	
Not sure	
None of the above	
11. Which of the following benefits, if any, could your co-op recognize from the developmed generation? (check all that apply) Higher levels of member satisfaction Meeting member demand for green/sustainable electricity Meeting clean energy mandates Increased generation capacity Rate stabilization Increased economic development within the community Improved economic resilience within community Increased experience with distributed generation Other (please specify) Not sure None of the above	nt of distributed wind
Current Distributed Wind Generation Activities	
 12. Does your co-op currently have distributed wind generation interconnected to your distr (*required) Yes No (skip Q13-Q16 and go to Q17) 	ibution system?
13. Who owns the distributed wind generation assets on your system? (check all th Residential members	at apply)
Agricultural members	
C&I members	
Institutional members (i.e. school, hospital, local government)	
The co-op	
Third party ownership	
Other (please specify):	

14.	Approximately how many members currently have distributed wind generation interconnected to your distribution grid?
15.	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
	For what reason(s) do you give that response?
16.	Does your co-op offer power generated by distributed wind to your members? If so, how is it offered? Not offered As part of the overall power supply-mix As part of an opt-in green power program Other (please specify)
17.	How would you rate the availability of useful/relevant distributed wind resources related to the following items: Case studies 1 - Not available 2 3 4 5 - Readily available Business/financial models 1 - Not available 2 3 4 5 - Readily available Interconnection processes 1 - Not available 2 3 4 5 - Readily available Local regulations 1 - Not available 2 3 4 5 - Readily available Engineering designs 1 - Not available 2 3 4 5 - Readily available Other (please specify) 1 - Not available 2 3 4 5 - Readily available
	ny item in Q17 is rated as 4 or higher, ask Q18 What sources do you use for the items that you indicated are available? ———————————————————————————————————
	which of the items that are not readily available do you see as the most important resource(s) to enable the growth of distributed wind? (check all that apply) Case studies Business/financial models Interconnection processes Local regulations Engineering designs Other (populated from what was given as Other from Q17) None
20.	Does the opportunity to combine distributed wind with other distributed energy resources as a hybrid resource increase the interest in distributed wind? Yes No Not sure

21.	The RADWIND project will entail exploring solutions, developing sharable resources, and demonstrating wind
	technologies for rural communities. Are you interested in joining a group of other cooperative utilities and
	industry participants to work with NRECA on this project?
	Yes, willing to be contacted for further information on distributed wind
	Yes, interested in actively participating
	Yes, interested in being consulted and participating in some aspect
	Interested in very limited participation
	Interested in results and outcomes of the work
	Not interested
	If response to Q21 IS NOT "Not Interested" ask:
	Who can we contact at your co-op for additional information? (Name and E-mail):