



NREL Microgrid Workshop

22 - 24 Jan 2019

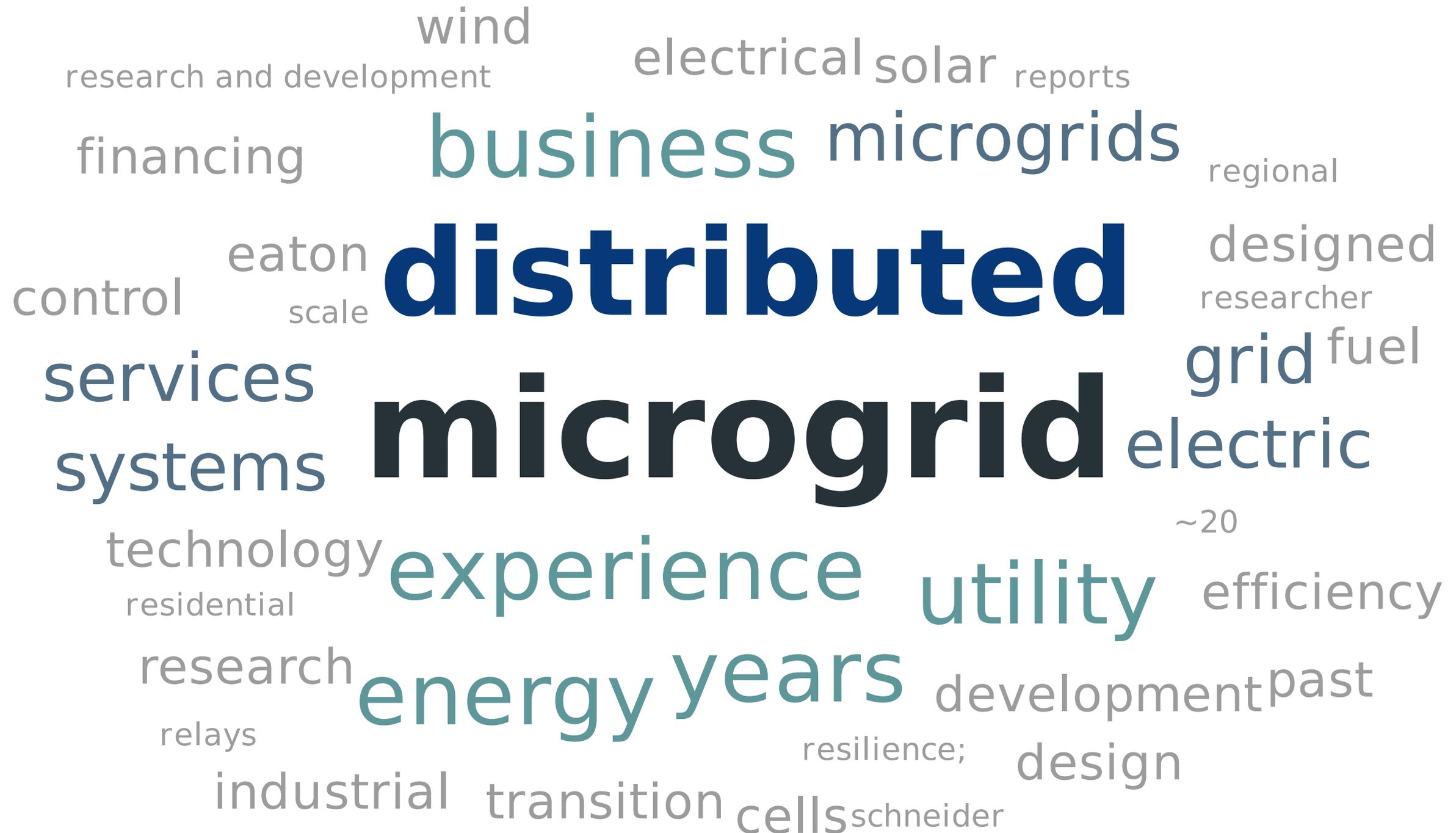
Poll results

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Welcome! What unique expertise / resource do you bring to this workshop?

014



Most critical barrier to microgrids?



Microgrid Barriers Survey (6/9)

015

Most important next step from this workshop?
(1/2)

- DOE/NREL needs to acknowledge that policy change should be one of their most important objectives in the microgrid area.
- Customer oriented screening tools
- follow through on 24 month action plans and NREL using workshop inputs and sharing output
- Clear direction and a concrete deliverable.
- follow through on 24 month action plans and NREL using workshop inputs and sharing output
- Continuing to bring stakeholders together (finance partners appeared not to be represented) to drive necessary alignment and clarity of benefits to all stakeholders.
- implement some of the work plans

Microgrid Barriers Survey (6/9)

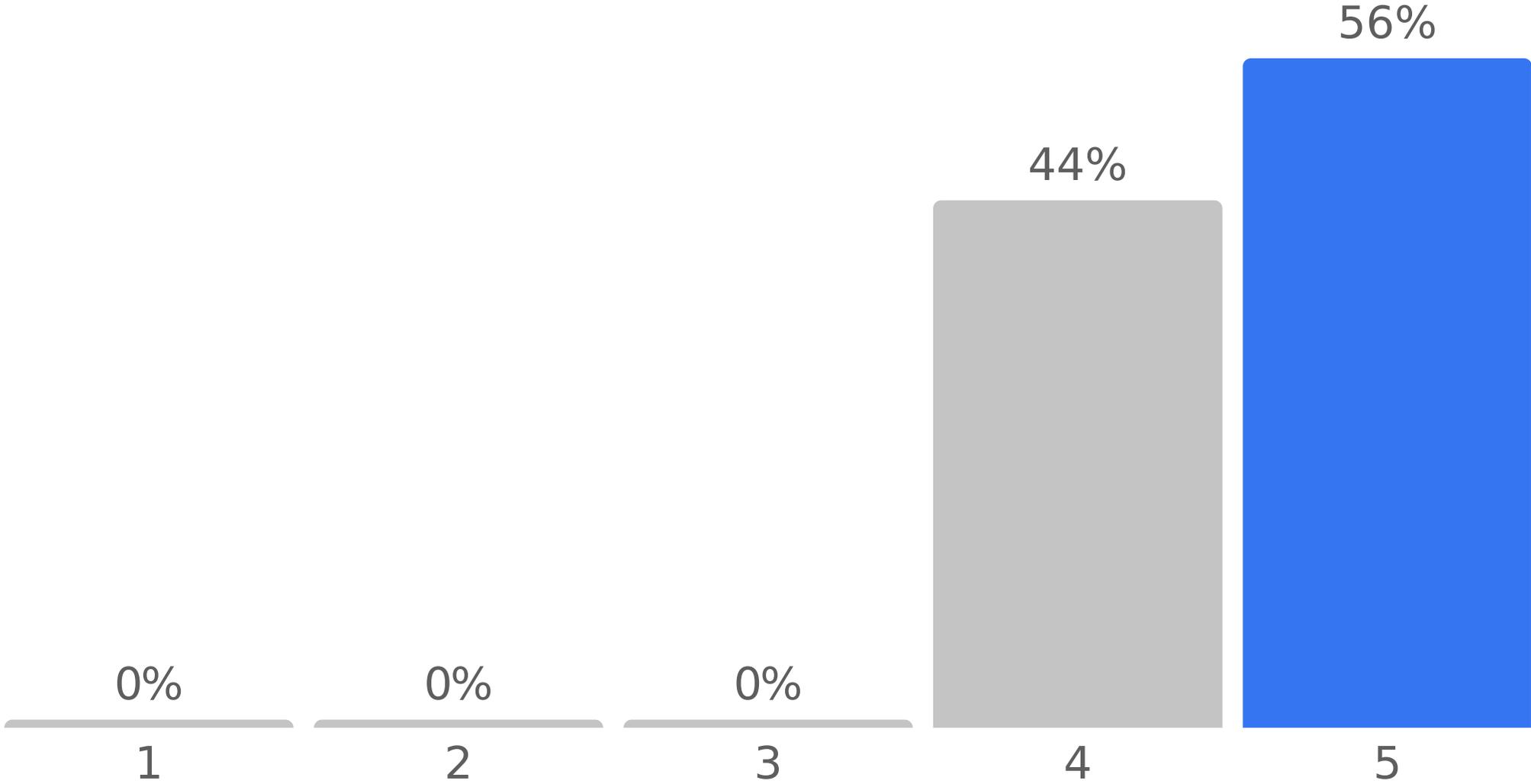
015

Most important next step from this workshop?
(2/2)

- Continue to develop valuation metrics to help sell the benefits of resiliency.
- Determine how to take the very wide array of microgrids into something that is specific and has understood context to align efforts to promote them as a solution
- Convene a further discussion on cost
- Keeping group engaged
- Continued collaboration
- Work on 6, 12, and 24 month plan
- Clarifying value of resiliency
- Develop economic models and regulation to support
- Renewables integration & systems management

Workshop rating?

Score: 4.6



Microgrid Barriers Survey (8/9)

006

Optional feedback:
(1/2)

- interesting perspectives and quite valuable. The top two 24 month plans were both necessary. Lets assume both can be accomplished within 24 months (and I believe possible), which will increase microgrids after the 24 months? Screening tool is a standardized approach and will result in immediate growth impact. Report to congress appears to me to require another 1-5 years to impact growth of microgrid. It will be a larger long term impact than screening tool, but not as much short term as screening tool. Again, both are necessary.
- Enjoyed the workshop, level of engagement and diversity of experience, expertise and perspectives brought together. Working sessions and assignments provided great opportunities for discussion and debate on

Microgrid Barriers Survey (8/9)

006

Optional feedback:
(2/2)

perspectives, with ability to drive alignment at our tables. (in a way, an approach to modeling the overcoming the alignment barrier, I believe we need to overcome)

- Great work! Good mix of workshop and presentations. Thanks for organizing this.
- Great inputs
- Fantastic workshop! Thank you!
- Very well-facilitated process. I enjoyed this.

ESIF Survey (4/7)

008

How can the ESIF best support industry growth and advancement? (1/5)

- ESIF can best support industry growth and advancement by: 1. Continuing to bring stakeholders together for regular constructive conversations to further drive alignment, develop value propositions and clearly define the benefits of microgrid deployment for all stakeholders at large. 2. Consider supporting stakeholders with how to prioritize near term and long term action items to support the sustainable deployment of microgrids 3. Continued partnerships for independent lab tech support, collaboration with NREL researchers, whitepapers, and access to demonstrations of diverse technologies, including generation, modeling, data and controls systems 4. Include

ESIF Survey (4/7)

008

How can the ESIF best support industry growth and advancement? (2/5)

finance entities and regulators in these conversations/workshops 5.

Continued thought leadership, research on monetizing the benefits of microgrids for all stakeholders

- It seems that the vast majority of companies that ESIF has partnered with are large organizations with significant financial resources. Small companies

like mine cannot afford to pay for NREL staff time or for access to NREL facilities. In some cases, we cannot even afford to provide our equipment to be tested at NREL. I would like NREL to allocate a portion of its budget to collaborate with small business at little to no cost to the business. There is a lot of innovation being done

ESIF Survey (4/7)

008

How can the ESIF best support industry growth and advancement?

(3/5)

by small business that is being steamrolled by the likes of Eaton, SEL, etc. It is healthy for the economy and society to not have the energy technology market dominated by a handful of mega corporations.

- More advanced technology and financial Microgrid models.
- Continue your work focused on controls, since that is the technology which governs

whether the microgrid can meet its stated goals, whether resiliency, economic optimization or renewable integration. How to standardize and insure interoperability?

- So many answers to this question. I will stick with my top thoughts, in order of preference: 1. create ways to engage the utility sector in the microgrid

ESIF Survey (4/7)

008

How can the ESIF best support industry growth and advancement? (4/5)

conversation. As witnessed at today's workshop, this conversation between utilities and customers is just not occurring fast enough. 2. advance research and publications concerning the benefits achieved by microgrids. In particular, my hot button: determining a standardization methodology to quantify resiliency outcomes, and

other value propositions. NREL's standing as an unbiased researcher gives additional credibility to these findings 3. begin to determine ways to assist microgrid developers and implementors (like Ameresco) to deploy these solutions. One of the most significant barriers to microgrid scale is the lack of third-party, reliable, unbiased

ESIF Survey (4/7)

008

How can the ESIF best support industry growth and advancement? (5/5)

- validation that microgrids make sense for the consumer.
4. continue your outstanding R&D work to advance the capabilities of different advanced microgrid controllers by various technology developers (i.e. S&C, Eaton, etc.)
- Make available support services for modeling and simulating microgrid systems
 - Identify product gaps
 - Work with industry to deeply understand technical problems being encountered and collaborate on ways to solve them. Increase industry engagement through more dialogue and deeper dive discussions to identify industry gaps. Communicate laboratory capabilities and experience.
- to install microgrids Metering needs for microgrid interconnection needs

ESIF Survey (5/7)

008

What type of large-scale lab systems or capabilities are needed to advance the state-of-the-art in energy technology (i.e. microgrids, networking communications, transportation, advanced fuels, etc.)?
(1/3)

- Continued investment state of the art laboratories, innovative technologies for demonstration/testing and partnership to provide access to labs, technologies, data and research.
- NREL's existing facilities are already quite advanced and represent a great resource to the private sector. Rather than spending money on additional facilities, I would rather NREL spend more of its budget on making the existing facilities accessible to small business.
- The 3D modeling of electrical power distribution systems was very

ESIF Survey (5/7)

008

What type of large-scale lab systems or capabilities are needed to advance the state-of-the-art in energy technology (i.e. microgrids, networking communications, transportation, advanced fuels, etc.)?
(2/3)

- cool and has great potential to anticipate and solve problems.
- Focus on communications, control and optimization, especially for community microgrids, which face the largest barriers in U.S. today.
- Your existing large-scale lab systems are impressive and it is
- important to continue working with actual field deployments so that more people understand who your resources and talents can be used as a resource for actual project deployment.
- ESIF looks like it has most everything.
- MV interconnection fault identification

ESIF Survey (5/7)

008

What type of large-scale lab systems or capabilities are needed to advance the state-of-the-art in energy technology (i.e. microgrids, networking communications, transportation, advanced fuels, etc.)?
(3/3)

- with fault simulators.
- Not sure how to answer this, but one of our greatest long-term challenges is how to square very high renewables scenarios (even 100%) with the 24/7 reliable power requirement in every hour, day, month and season. Long-term storage, dispatchable

zero-carbon generation, etc.
These are the long term needs for a utility.

ESIF Survey (6/7)

009

What type of partnership model would help your organization further its R&D objectives (independent use with lab tech support, collaborative R&D with NREL researcher, other)?

(1/3)

- Collaboration on thought leadership, R&D with NREL researchers and sharing data/results from respective demonstration projects. Potential partnerships on on-site demonstration projects.
- Testing of our equipment in NREL facilities with the oversight of NREL researchers.
- Eaton recently located part of our R&D team at NREL.
- R&D into business model and financing innovation recognizing the complexity of teams working on a single microgrid project. Can models also test out contracts behavior?
- We are not a technology

ESIF Survey (6/7)

009

What type of partnership model would help your organization further its R&D objectives (independent use with lab tech support, collaborative R&D with NREL researcher, other)?

(2/3)

provider, rather a developer and implementor interested in building the microgrid ecosystems. In our instance, collaborative opportunities are of the greatest interest, especially, when such opportunities could lead to new business development.

- Collaborative with NREL involvement seems to

be the empty cost-effective for industry

- This exists
- Utility consortiums can be useful. It can be difficult for a single utility to drive a focused research effort, due to lack of time and staff. But utilities grouped together can do more. This is similar to how EPRI has successfully operated.

ESIF Survey (6/7)

009

What type of partnership model would help your organization further its R&D objectives (independent use with lab tech support, collaborative R&D with NREL researcher, other)?

(3/3)

- Collaborative R&D

ESIF Survey (7/7)

009

What are the core elements needed in a microgrid research platform to serve the industry for the next decade?

(1/3)

- Continued thought leadership, researcher and modeling.
- Ability to test interactivity between microgrid controllers with TSOs, DSOs, DERMs, etc.
- Tie in DERs, battery storage, EV, thermal storage for multiple use cases at the residential, C&I and utility scale levels.
- Accommodating the various stakeholder benefits and costs, both hardware and software, and thinking outside the box in terms of DERs (hydrokinetic, new kinds of batteries, DC architectures, etc).
- Advancements with the microgrid controller Scaling the microgrid controller into more standardized applications Developing and optimizing automated deployments between

ESIF Survey (7/7)

009

What are the core elements needed in a microgrid research platform to serve the industry for the next decade?

(2/3)

multiple DERs One final important point: I thought that this workshop series was helpful, but candidly also frustrating in that we are really only scratching the surface of what needs to be a much larger conversation. So, in this regard, I wonder whether NREL might be able to organize some sort of

quarterly microgrid leadership forum. This is really what our industry needs - a dedicated group to continue this discussion as policy, utility engagement, technologies, economic justifications, understandings as to how to value resiliency, etc. on a repetitive basis. Needless to say, I would be willing to invest the time

ESIF Survey (7/7)

009

What are the core elements needed in a microgrid research platform to serve the industry for the next decade?

(3/3)

- to be a part of this sort of critical effort.
- Grid simulation, demand response or load control modeling
- Standard performance measurement indexes for short term and long term. API's for integrating solar forecasting toneasily integrating it into the controls.
- Follow our mission statement
- the workshop developed.
- Continuous and frequent engagement with industry to understand status quo and future needs

What is the most critical barrier to widespread microgrid deployment?

001

