



NARUC

National Association of Regulatory Utility Commissioners



*National Association of
State Energy Officials*

EXECUTIVE SUMMARY

Private, State, and Federal Funding and Financing Options to Enable Resilient, Affordable, and Clean Microgrids



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Executive Summary

In fall 2019, the National Association of Regulatory Utility Commissioners (NARUC) and the National Association of State Energy Officials (NASEO) initiated a joint Microgrids State Working Group (MSWG), funded by the U.S. Department of Energy (DOE) Office of Electricity (OE). The MSWG aimed to bring together NARUC and NASEO members to explore the capabilities, costs, and benefits of microgrids; discuss barriers to microgrid development; and develop strategies to plan, finance, and deploy microgrids to improve resilience.

Based on member input, the MSWG developed two companion briefing papers to answer key questions about microgrids: (1) *User Objectives and Design Approaches for Microgrids: Options for Delivering Reliability and Resilience, Clean Energy, Energy Savings, and Other Priorities* and (2) *Private Sector, State, and Federal Funding and Financing Options to Enable Resilient, Affordable, and Clean Microgrids*. Read together, these resources provide readers with an understanding of both why and how customers—whether an investor-owned, cooperative, or municipal utility; federal, state, or local government entity; individual or group of residential, commercial, and/or industrial customers; or other organization—select, design, and pay for microgrid projects.

A microgrid consists of a facility or group of facilities and power sources on a single property or adjacent properties that are electrically connected to each other and can connect or disconnect from the larger electric grid to function independently in case of electrical grid service interruptions. Microgrids can confer many benefits to state and local governments, including increased community resilience during natural disasters and power generation from cleaner fuel sources.¹ However, the upfront costs of microgrid development, the novelty and complexity of projects, and the misperception of microgrids as useful only in disaster scenarios pose challenges for public and private sector entities wishing to invest in these technologies.

Nevertheless, microgrids offer a variety of value streams that microgrid developers can leverage to mitigate financial risk and make projects more compelling for investors. Demand response program participation, electricity exports, and local energy market participation, in addition to the energy savings potential of the critical facilities connected by the microgrid, make microgrids an intriguing option for public and private capital to finance.²

Many microgrid projects to date have involved some form of co-investment between the public sector and private sector partners. Thus, a growing number of public-private partnership financing structures are now available to help provide capital for microgrid development. These products can provide the up-front capital needed to deploy microgrids while offering specific payback options that take advantage of potential revenue streams the microgrid may offer. Public-private partnership structures that state and local governments have used to finance microgrids include:

- **Energy-as-a-Service** – an off-balance sheet transaction that pays for itself using the project’s own energy cost savings;
- **Energy Savings Performance Contracts** – a contract with an Energy Service Company (ESCO) that provides a guaranteed level of energy savings that pays for the upgrades done by the ESCO; and
- **Commercial Property Assessed Clean Energy** – a financing product where commercial and industrial building owners repay upfront capital loans through a voluntary assessment on their properties.

1 For more information on use and design cases for microgrids, please see the companion paper to this report, Zitelman, Kiera, Rep. User Objectives and Design Options for Microgrids to Deliver Reliability and Resilience, Clean Energy, Energy Savings, and Other Priorities. National Association of Regulatory Utility Commissioners and National Association of State Energy Officials, December 2020.

2 Stadler, Michael et al., Rep. Value Streams in Microgrids: A Literature Review. Lawrence Berkeley National Laboratory, p.4, October 2015. https://eta-publications.lbl.gov/sites/default/files/value_streams_in_microgrids_a_literature.pdf

Due to the relative novelty of microgrid development, public funds may be necessary to reduce the risk of projects or fill in gaps that private capital is unwilling or unable to finance. States with successful microgrid programs have used various sources of public capital to ensure the timely development of microgrids, including through:

- **State Energy Revolving Loan Funds** – State Energy Revolving Loan Funds (RLFs) are run by many State Energy Offices and can provide capital at low interest rates to fund parts of the microgrid construction process. State Energy Program (SEP) funds can support both RLFs as well as grant and incentive programs;
- **Grant and Incentive Programs** – States can use grants and other incentives to subsidize various stages of the microgrid development process. Grants are more commonly used at the beginning of the process, whereas incentive programs are useful at enticing private capital to invest in microgrids when they would not choose to otherwise;
- **State-Supported Green Banks** – States can establish these entities with public funds and charge them with deploying capital to various financeable clean energy projects, including microgrids;
- **Green Bonds** – States can use General Obligation or Revenue Bonds to raise capital for specific climate or environmentally-focused projects; and
- **Competitive Grants** – States can offer grant funding as an incentive for developers who work with local governments to develop microgrids that meet specific criteria.

States can also leverage other revenue streams to provide funding and financing for microgrids. U.S. SEP funds have supported state energy offices' analytical and planning activities toward microgrid development and have assisted in the deployment of financing programs that can support microgrid construction. Federal funds, like those allocated for the Federal Emergency Management Agency's (FEMA's) Pre-Disaster Mitigation program, offer significant opportunities to fund microgrid development for critical facilities. For those states that participate in carbon pricing regimes, the revenues from those programs can also be used to fund microgrid development. States can also use legal settlement funds to fund RLFs, as is the case in Nebraska and Texas, whose RLFs are capitalized with petroleum escrow violation funds.

As microgrids grow in use,³ coordinated funding from multiple programs could be needed. State Energy Officials and Public Utility Commissioners can develop and establish regulatory regimes that allow for the monetization of various microgrid capabilities and to enable existing financing mechanisms to finance microgrid development. Actions State Energy Offices (NASEO's members) and Public Utility Commissions (NARUC's members) could take include:

1. **Developing new rate structures that microgrids can use to develop predictable revenue streams.** Microgrids are able to use demand response and cost savings from time-differentiated rates to produce revenue, but if a state's regulations do not allow for those options, then private capital may find financing microgrids less attractive. Several states are also developing microgrid-specific tariffs that account for the ancillary services microgrids can provide to the distribution-level grid, or that recognize the potential for a microgrid to act as a non-wires alternative to a grid investment, which can provide additional revenue. State Energy Offices and Public Utility Commissions can work to develop rate structures that reward microgrids for the services they provide to the grid.
2. **Enabling public-private capital financing options as a first step to provide more alternatives for microgrids to source capital.** Commercial Property Assessed Clean Energy (C-PACE) and Energy Savings Performance Contracts (ESPCs) are both methods that microgrid developers can potentially leverage to

3 "DEE-Dollar and Energy Saving Loans." Nebraska Department of Environment & Energy. Accessed November 30, 2020. <https://neo.ne.gov/programs/loans/loans.html> and "LoanSTAR Revolving Loan Program." Texas Comptroller of Public Accounts. Accessed November 30, 2020. <https://comptroller.texas.gov/programs/seco/funding/loanstar/>

allow customers to finance energy efficiency and renewable energy improvements. However, C-PACE financing is not yet authorized in some states and, even in states with enabling legislation, many are still in the process of developing C-PACE programs. Ensuring that C-PACE is a viable financing option can provide microgrid developers with additional flexibility to source capital. Additionally, many states lack effective, robust ESPC programs, which provide the level of support and technical assistance microgrid owners need to successfully leverage that financing mechanism. This lack of support limits the potential use of ESPC for potential microgrid customers in many states. State energy offices can manage robust ESPC programs and oversee third-party C-PACE administrators, and are well-positioned to develop policies and programs to support these financing options.

3. **Providing public funding at key points in the microgrid financing process to reduce private investment risk in microgrid development.** Public funding has been a key component of many states' microgrid efforts to date, because it supports the development of microgrids in the early design stages when fewer investors are willing to provide capital due to real or perceived risks⁴ including regulatory uncertainty, uncertain utility support, and a high required level of technical expertise by designers, which can increase costs. Targeted public financial support makes microgrids for local governments and the Municipals, Universities, Schools, and Hospitals (MUSH) market a more attractive investment proposition for private capital providers than for projects with no public backing.⁵ State Energy Officials, through the use of grants, incentives, and State Energy RLFs, have the tools needed to provide capital to fill in funding gaps and support microgrid development from inception.
4. **Providing comprehensive technical assistance and support for customers considering various funding and financing options.** Private financing arrangements through ESPC and C-PACE can involve multiple steps and parties to finalize, making them complex transactions that can confuse potential microgrid developers and customers. States can provide technical assistance and support for parties working with unfamiliar financing products, to help guide them through these processes. Additionally, many of the options discussed in this report can be combined and information about how/when/where to blend many of these mechanisms together to achieve the outcomes customers need would lessen an information gap hindering microgrid development and deployment. State Energy Offices can and do provide technical assistance, education, and other forms of support to customers using ESPC and C-PACE throughout the financing process.
5. **Ensuring that regulatory certainty for microgrids is present to support investor plans.** One barrier to accessing financing for microgrid projects is a lack of regulatory certainty towards how microgrids are treated. Microgrids, especially those serving multiple customers, do not fit into categories established by Public Utility Commissions for traditional electric utilities.⁶ Public Utility Commissions and State Energy Offices could work to ensure that there is clarity around how the microgrid operator is regulated, provide clear processes and/or timelines for microgrid interconnections that can be enforced, and develop new microgrid rate structures and pilot programs. Regulatory certainty is key for developers to obtain financing from investors for microgrid projects.
6. **Empowering underserved communities to finance microgrids to meet their needs.** Hyper-local community needs can be met through participation in microgrids through operation or asset ownership and as a result incorporate community voices, needs, and employment in microgrid planning and

4 Wood, Elisa. "Microgrid Investment in U.S. to Reach \$12.5B: GTM Research." Microgrid Knowledge, November 30, 2017. <https://microgridknowledge.com/microgrid-investment-gtm/>

5 MUSH stands for Municipalities, Universities, Schools, and Hospitals. These customers constitute a significant opportunity to deploy campus microgrids.

6 Hoffman, Steve, and Charles Carmichael. Issue brief. Six Barriers to Community Microgrids and Potential Ways Developers Can Surmount Them. Hoffman Power Consulting, September 30, 2020. <https://hoffmanpowerconsulting.com/wp-content/uploads/2020/10/Microgrid-Best-Practices-White-Paper-Hoffman-Power-Consulting-2020.pdf>

operation. This can include an explicit focus on communities with significant low-to-moderate-income (LMI) households and/or environmental justice communities, and their specific energy needs. However, financing for LMI communities is challenging, so State Energy Offices and Public Utility Commissions may want to be creative and develop new financing structures that meet their microgrid needs and priorities.

In addition, State Energy Offices can coordinate with publicly owned electric utilities to develop approaches and solutions to financing microgrids that enable rural areas to take advantage of the benefits microgrids provide to the community. These utilities can take advantage of many different revenue streams to finance microgrid construction and meet the needs of rural communities. State energy offices can help educate publicly owned utilities and provide technical support and assistance in identifying financing structures to help fund microgrid development in those service territories.

State Energy Officials and Public Utility Commissioners possess the tools needed to support funding and financing of microgrid development, leading to increased microgrid deployment throughout the country and a safer, cleaner, and more resilient grid. The MSWG will continue to develop additional resources to support this process and enable State Energy Officials and Public Utility Commissions to more effectively speed the deployment of microgrids throughout the states.