

**National Association of State Energy Officials Comments on
Request for Information (RFI) DE-FOA-0002291:
Building Technology Office's Draft Connected Communities Funding Opportunity
Announcement**

National Association of State Energy Officials (NASEO)

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The National Association of State Energy Officials (NASEO) represents the 56 governor-designated state and territory energy directors and their offices across the nation. We appreciate the opportunity to provide input on the U.S. Department of Energy's (DOE) Building Technology Office (BTO) RFI on its Draft Connected Communities Funding Opportunity Announcement (FOA).

NASEO's mission is to support the states' efforts to promote energy-related economic development, deliver affordable energy, including from cost-effective energy efficiency and demand management, meet state environmental objectives, and ensure energy system security, reliability, and resilience.

We recognize that improving technologies offer opportunities to advance demand flexibility and grid-interactive efficient buildings¹ (GEBs) that can enhance performance of buildings and the electricity and broader energy system. Such GEBs operating through Connected Communities offer:

- Enhanced energy efficiency and productivity,
- Reduced electricity system costs and greater savings to businesses and households,
- Better operation and utilization of building and grid resources, including
 - Moderated "ramp rates" and peak power demand,
 - Allowing buildings to serve as demand-side resources and virtual energy storage assets,
 - Improved integration of variable energy resources (both distributed and grid-side), vehicle electrification, and distributed energy resources (DERs) (including storage), and
 - Allowing transactive energy business opportunities,
- Improved environmental performance and natural resource stewardship, and

¹ We use the term buildings also to refer to other facilities and infrastructure that can provide grid-interactive functionality and services (e.g., water systems, wastewater systems, street lighting, outdoor facilities). We recommend that grid-interactive energy management of such facilities and infrastructure also be eligible for consideration under the planned Connected Communities FOA.

- Strengthened resilience of buildings and facilities and the electricity and broader energy system.

These benefits match well with state electricity and energy system interests and objectives, as noted in a 2017 resolution passed by NASEO's Board of Directors "Supporting Buildings-to-Grid Integration and Improved Systems Efficiency" which encourages states "to improve grid reliability and security, expand economic opportunity, reduce utility costs to consumers and businesses, and enhance resiliency in their buildings sector, to support the policies, programs, and practices that will improve systems energy efficiency and building-to-grid integration..."²

NASEO appreciates the DOE's research and development (R&D) and related analytical activities supporting this area. NASEO is also grateful for U.S. DOE's support of our partnership with DOE, the National Association of Regulatory Utility Commissioners (NARUC), and the National Laboratories through the [NASEO-NARUC Grid-interactive Efficient Buildings Working Group](#). The Working Group is facilitating state engagement and exchange and includes technical assistance aimed at accelerating piloting and implementation of demand flexibility and GEBs.

We applaud DOE in issuing this RFI and for its intent under the prospective FOA to support a set of pilot Connected Community demonstrations to derive real-world objective performance data and experience. Support for demonstration and validation was an emphasis in NASEO's February 2019 response to **RFI DE-FOA-0002070: Efficient and Flexible Building Loads**. That RFI response noted demonstration and validation's importance for raising confidence in demand flexibility and GEBs among building owners, developers, utilities, energy technology and service providers, and investors as well as policymakers, regulators, and other officials. The Connected Communities' planned FOA also meshes well with state feedback from the NASEO-NARUC GEB Working Group indicating strong interest in pilot projects and potential applications in public facilities. Also, NASEO's development of GEB roadmapping and pilot project guides under Working Group auspices is supportive of the planned Connected Communities effort.³

NASEO is pleased to have the opportunity under this RFI to offer comments that we hope will enhance the planned Connected Communities FOA and the pilot projects it will support as well as accelerate the demonstration and implementation of demand flexibility and GEBs to strengthen the nation's energy systems.

Please note that NASEO is also a signatory to a separate Joint Nonprofits letter with the Institute for Market Transformation (IMT), Rocky Mountain Institute (RMI), Urban Land

² NASEO Board of Directors Resolution: Supporting Buildings-to-Grid Integration and Improved Systems Efficiency, <https://www.naseo.org/Data/Sites/1/naseo-building-grid-resolution-feb-2017-.pdf>

³ NASEO, "[Roadmapping: A Tool for States to Advance Load Flexibility and Grid-interactive Efficient Buildings](#)" (November 2019) and NASEO, "[Considerations for Grid-interactive Efficient Buildings \(GEB\) Pilot Projects](#)" (December 2019).

Institute (ULI), Alliance to Save Energy (ASE), and others suggesting that that U.S. DOE create a body of experts with strong scaling and collaboration expertise across the real estate, finance, utility, and other pertinent industries as well as with state and local governments to complement the National Coordinator's efforts to help accelerate scale up and deployment of solutions demonstrated by the Connected Communities pilots. Such a body would complement the NASEO-NARUC GEB Working Group which facilitates GEB input and actions by the governors' energy directors and public utility commissioners.

NASEO also endorses the suggestion in the RFI response prepared by the Alliance to Save Energy recommending approaches to better engage industry stakeholders, such as technology vendors, energy service companies (ESCOs), commercial real estate companies, renewable energy developers, utilities, financial institutions, grid services aggregators, and retail and hotel chains, in the Connected Communities initiative. Private industry, beyond individual firms partnered in individual projects, is critical to deploying demand flexibility and GEBs at scale. They should be engaged to address technical, interoperability, data management, measurement and verification (M&V), financing, and other pertinent issues.

The following provides NASEO's response to selected RFI questions.

Category 1: Technical Requirements

1.2.) How can the FOA be designed to enable future scaling of connected communities beyond pilots?

NASEO and states participating in the NASEO-NARUC GEB Working Group recognize that even with successful technical demonstrations of GEBs, it is policies, regulatory structures, and market signals that incite implementation by both building/facility owners and by utilities and other grid operators. These policy, regulatory, and market factors often differ by state and region, complicating scaling and replicability of implementation.

NASEO recommends that Connected Community projects, either individually or collectively as a portfolio, examine and assess policy, regulatory, market, and administrative aspects of GEB implementation. As project data, M&V, and other results are gathered and analyzed, they should be assessed with a view toward applicability under varied policy, regulatory, and market environments. How might a Connected Communities project demonstrated in one state operate in another state under different conditions? Such assessments can inform developers, product and service providers, and utilities on how to approach different state markets. They can also inform state and local officials of policy and regulatory design options for advancing benefits offered by demand flexibility and GEBs.

As noted above, NASEO joined IMT, RMI, ULI, ASE, and other parties in a Joint Nonprofits RFI response recommending creation of a body of experts with strong scaling and collaboration expertise across the real estate, finance, utility, and other pertinent industries as well as with state and local governments to complement the National Coordinator. This body can support examination and analyses of these policy, regulatory, market, and administrative factors to help

accelerate deployment of grid-interactive demand flexibility at scale. Such a body would complement the NASEO-NARUC GEB Working Group which facilitates GEB input and actions by the governors' energy directors and public utility commissioners.

Also previously noted, NASEO joins the Alliance to Save Energy in its RFI response recommending approaches to better engage industry in the Connected Communities initiative. Private industry, beyond individual firms partnered in individual projects, is critical to deployment at scale of demand flexibility and GEBs. They should be engaged to address technical, interoperability, data management, M&V, financing, and other pertinent issues.

1.4.) What should be the minimum square feet or number of buildings requirement for each project to demonstrate buildings can contribute as reliable grid resources? Is there a different way to require a minimum project size (e.g. load size)?

NASEO recommends that facilities and infrastructure that are not necessarily "buildings," such as water systems, wastewater systems, street lighting, and outdoor facilities, that can provide grid-interactive functionality and services be eligible for consideration under the planned Connected Communities FOA. In such cases, numbers of buildings or square footage would be inappropriate criteria for project selection.

Indeed, credible estimates and projections of load and modifiable load (include load shape data or projections) are better criteria for consideration than numbers of buildings and square footage. Buildings (and facilities and infrastructure) can vary greatly in energy use intensity, potential demand flexibility, and grid service provision based more on use and function than number and area.

1.6.) For the proposed FOA "grid resilience" is defined as the functional preservation of the electric grid operations in the face of natural and man-made threats and hazards and "grid services" is defined as services that support the generation, transmission, and distribution of electricity and provide value through avoided electricity system costs (generation and/or delivery costs). Are these definitions appropriate for this FOA or should FOA applicants define grid resilience or grid services in a manner that addresses both building and grid perspectives? If so, how?

We believe that "grid resilience" is more than functional preservation of electric grid operations in the face of threats and hazards but should also encompass rapid recovery from disruption. We note an "Industry Statement on Resilience" that, drawing from the National Research Council, defines "...resilience as the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events."⁴ We also cite the 2017 installment of the Quadrennial Energy Review: "Resilience is the ability to prepare for and adapt to changing

⁴ Industry Statement on Resilience

https://www.ashrae.org/File%20Library/Technical%20Resources/Resilience%20Activities/Statement_2016-0425.pdf

conditions, as well as the ability to withstand and recover rapidly from disruptions, whether deliberate, accidental, or naturally occurring.”⁵ Connected Communities pilots should be designed not only to support grid resilience by reducing stresses that can disrupt electric grid operations but should also facilitate rapid and orderly restoration of service and adaptation to adverse events.

Importantly, we are concerned that the RFI text and question focus on “grid” resilience and services without a corresponding emphasis on resilience of and service to building and facility owners, operators, and occupants. It is critical that GEBs and Connected Communities provide service and value, including resilience value, to buildings and facilities. FOA applicants should endeavor to enhance service and resilience from both building/facility and grid perspectives.

U.S. DOE should also consider adaptability and resilience of FOA applicant facilities in the face of energy and other emergencies and contingencies. Recent years have seen weather-induced outages harming public health and safety. Well implemented DERs, including energy efficiency, generation, and storage, have mitigated those threats not only in traditional “critical infrastructure” (e.g., hospitals, water and wastewater facilities, police and fire/rescue facilities, military bases) but also at community centers, schools, and residential buildings serving as shelters. In the current COVID-19 pandemic, we see public and private buildings converted into health care facilities, hotels and dormitories used for quarantine and self-isolation, and repurposing of space to manufacture critical medical and personal protective equipment. The adaptability of space and expanding scope of “critical” facilities, products, and services should also modify our views and priorities for energy resilience and, accordingly, should be a factor in selecting among Connected Community proposals.

1.7.) Are the required teams “composed of critical stakeholders representing grid resources/assets (e.g. utility), buildings owners/assets (e.g. home builder, building owner, developer, building manager), and researchers (e.g. national lab, university)” and suggested additional collaborators such as “relevant technology manufacturers and local governments” appropriate to meeting outcomes of the anticipated FOA? If not, are there other important partners that should be included?

NASEO views state and local officials as critical players in the implementation of Connected Communities. As noted previously, policy and regulatory environments shape the benefits and attractiveness of Connected Communities solutions, serving as drivers or impediments depending on details. State Energy Offices, for example, have purview over many state energy policy, planning, and program functions and can be valuable partners in Connected Communities projects. They and sister agencies often have responsibilities for state and public buildings that may be offered as Connected Communities pilot opportunities and represent

⁵ Transforming the Nation’s Electricity Sector: The Second Installment of the QER (January 2017) p. 4-4

<https://www.energy.gov/sites/prod/files/2017/01/f34/Chapter%20IV%20Ensuring%20Electricity%20System%20Reliability%2C%20Security%2C%20and%20Resilience.pdf>

potential markets for and participants in grid-interactive services. Public Utility Commissions and local officials that govern public power utilities have key utility regulatory authority.⁶ Local authority over building code implementation, zoning, and land use is also pertinent. State and local energy, climate, and sustainability policies and objectives also can be drivers for demand flexibility, GEBs, and Connected Communities.

National, regional, state-based, and local nongovernmental organizations (NGOs) can also be valuable project partners that bring expertise to the table. Some energy-related NGOs have extensive experience and contacts across industries, sectors, and regions, allowing them to facilitate exchanges, information sharing, and dissemination as well as offering expertise in technology transfer and market transformation to support replication of solutions at scale.

Also, as previously noted with reference to a Joint Nonprofits response, NASEO supports creation of a body of experts to work with and complement the National Coordinator to advance replicability, scaled-up deployment, and market transformation. And NASEO reiterates its support of an Alliance to Save Energy response suggesting approaches to enhance private sector engagement.

1.8.) Should natural gas technologies be considered in the pilots? If yes, how should they be included?

NASEO feels that natural gas, including renewable natural gas, opportunities, such as through combined heat and power (CHP), should be considered. Onsite natural gas as well as renewable generation can serve as valuable, resilient assets that can be coordinated with other onsite DERs and grid resources.

We also note DOE and wider interest in hydrogen as a carrier and store for energy. The blending of hydrogen into natural gas supply and potential use of some current natural gas infrastructure for hydrogen open opportunities to expand the role of hydrogen to balance, complement, and store renewable and nuclear power generation and to efficiently utilize natural gas system capital assets.

1.9.) What technical communication (e.g. data access, data transport, network technologies, interoperability) requirements should be included for maximum project effectiveness and future scaling of the technologies? What cybersecurity and privacy requirements should be included?

In addition to addressing cybersecurity threats, the Connected Communities projects should anticipate other contingencies, including communications disruptions, equipment failure, and software fault. Systems should be designed to go into default or "safe" modes under such contingencies and allow authorized manual controls. As buildings become more automated—which GEBs and Connected Communities will accelerate—systems may become difficult to

⁶ We note the importance of including eligibility of projects served by and partnered with consumer-owned public power and cooperative utilities as well as of investor-owned utilities.

override in an emergency situation. Some form of backup and system override functionality is needed.

In terms of building-to-grid connectivity requirements, the FOA should emphasize the use or development of interoperability standards to facilitate exchange of data and other interactions among DERs, building technology systems (e.g., smart building systems, connected HVAC equipment, and electric vehicle charging), and the grid.

1.11.) Are there new or emerging technologies or strategies that support DER optimization that could leapfrog the outcomes of the anticipated FOA that should be incorporated into pilot design and implementation?

Digital twinning approaches should be encouraged under the Connected Communities FOA. Such approaches can operationally enhance performance of a Connected Community's buildings, grid interactions, and DERs. In addition, digital twins would be useful to simulate physical and financial performance under differing climates, use cases, grid conditions, and regulatory and market structures (e.g., rate structures, grid service markets), thus supporting Connected Communities' replicability, scaling, and market penetration objectives. Inclusion of digital twinning and partnership with pertinently capable entities (National Laboratories, academic institutions, private firms) should be positive factors in considering FOA proposals.

Category 2: Funding, Cost share, and Period of Performance

2.1.) Is the proposed DOE funding level per project (i.e. up to \$7 million) reasonable to achieve the drafted FOA objectives? If not what would be more appropriate and why? Note that all demonstration projects must meet a minimum cost share requirement of 50%.

DOE should clarify what will be allowable/eligible costs for funding under the FOA and which costs can be counted as eligible non-federal match. For example, it is unclear whether allowable costs and match apply to many of the standard or routine costs in construction and renovation ("bricks and mortar" and general construction labor) or if the costs must tie directly to equipment, materials, and installation of components specific to demand flexibility and grid-interaction as well as associated M&V, analyses, reporting, and dissemination activities. We recommend broad criteria that allow a wide range of project costs to be eligible for funding under the FOA and to count as match funding.

The current COVID-19 pandemic is creating a great amount of fiscal stress in state and local government as well as for many private sector firms. We recommend that non-federal match funding requirements be waived or minimized to encourage or even simply allow pertinent projects to occur. Indeed, proposed FOA funding with waived non-federal match requirements can support broader economic recovery as well as the specific objectives of Connected Communities.

Category 4: Other

4.1.) How can DOE best design the FOA to allow applicant teams to form and provide strong proposals? What additional aspects should be considered for successful pilot design and implementation?

and

4.2.) Is there any other feedback on the FOA goals, design, requirements, etc. you would like to provide?

[Addressing 4.1 and 4.2] The RFI says little or nothing about requiring or preferring applications to address operator workforce training, occupant engagement, and operation and maintenance (O&M) in their FOA proposals. Yet the skills of building operators and O&M practices are critical to building performance. Similarly equipped buildings perform very differently due to occupant behavior and operator practices. Also, there are many cases of rapid degradation of building performance following initial commissioning or subsequent retrocommissionings as operator staff turns over, training is not kept up to date, and good O&M practice is not rigorously followed.

We recommend that FOA requirements explicitly include operator training, occupant education, and ongoing commissioning mechanisms for the project to assure durable high performance. These factors should also be included in education/outreach and replicability planning components of each project so that future projects include pertinent training, education, ongoing commissioning, and O&M planning.

As noted for Question 1.6 above for the reasons stated therein, DOE should also consider adaptability and resilience of FOA applicant facilities in the face of energy and other emergencies and contingencies.

We reiterate our use of the term buildings also to refer to other facilities and infrastructure that can provide grid-interactive functionality and services (e.g., water systems, wastewater systems, street lighting, outdoor facilities). For example, water supply systems can include renewable (including inline hydropower) generation, batteries, and pumped storage (such as in reservoirs and water towers) as well as water treatment and conveyance processes that can be controlled and managed in coordination with the grid to provide shed, shift, and modulation services. We recommend that grid-interactive energy management of such facilities and infrastructure also be eligible for consideration under the planned Connected Communities FOA.

Conclusion

NASEO, on behalf of the nation's State and Territory Energy Offices, appreciates the opportunity to respond to this important RFI. We hope this is useful to the DOE and are grateful for our partnership with the Department to support state energy priorities. We look forward to ongoing collaboration with DOE on this very important topic and initiative.