

## Energysheds: Exploring Place-Based Generation

DATE: July 8, 2021  
SUBJECT: Request for Information (RFI)

### Description

This request for information is intended to inform the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy by providing input and feedback on the concept of an “energyshed” as well as the benefits of and barriers to energyshed management systems. EERE is seeking input on:

- the concept and operational bounds of an energyshed,
- the value and uses of tracking the location of energy serving a particular load area for different stakeholders, and specific capabilities and information that would be most useful for that end,
- the development of tools and analyses to define and establish an energyshed and operate an energyshed management system,
- understanding the impact of more locally derived renewable electricity generation,
- how energyshed managements systems may affect grid operation on a day-to-day basis as well as long term,
- what business models are most appropriate to obtain more locally derived electricity generation, and
- how locally generated electricity will impact the development of a more resilient power system, including microgrids.

This information will inform DOE’s consideration of a potential funding opportunity to develop and deploy an energyshed management system. EERE is interested in responses from all stakeholders, including representatives of state and cities, academia, national laboratories, non-governmental organizations, interest groups, private sector, and more.

### Background

In fiscal year 2021, Congress directed the Office of Energy Efficiency and Renewable Energy to develop and demonstrate an “energyshed” management system that addresses a discrete geographic area in which renewable sources currently provide a large portion of electric energy needs. In the publication, *Energyshed Framework: Defining and Designing the Fundamental*

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Land Unit of Renewable Energy, John C. Evarts defines an energyshed as “that area in which all power consumed within it is supplied within it.”<sup>1</sup>

Analogous to the idea of a watershed, there are a number of similarities between the delivery of both water and electricity over the last 100 years. As the need for water and electricity grew in the 20th century, both of these types of utilities have greatly expanded in scale—delivering resources long distances through extensive networks to large population centers. Moving into the 21st century, many communities are investigating how to use more locally derived water to improve efficiency and decrease their dependence on water transported from long distances.

The energyshed concept follows a similar theme in terms of enabling understanding of an area’s energy generation – where it comes from geographically as well as what type of resources are used. Understanding the implications of implementing an energyshed management system may lead to a more efficient and resilient power system.

## **Purpose**

The purpose of this RFI is to solicit feedback from state and cities, academia, national laboratories, non-governmental organizations, interest groups, private sector, and other stakeholders on issues related to the concept and implications of energysheds and energyshed management systems. Given that the term “energyshed” is relatively new, DOE is specifically seeking feedback on its concept and definition, as well as its application to the electric grid. This will help inform DOE’s path toward the development and demonstration of an energyshed management system. This is solely a request for information and not a Funding Opportunity Announcement (FOA). EERE is not accepting applications.

## **Disclaimer and Important Notes**

This RFI is not a Funding Opportunity Announcement (FOA); therefore, EERE is not accepting applications at this time. EERE may issue a FOA in the future based on or related to the content and responses to this RFI; however, EERE may also elect not to issue a FOA. There is no guarantee that a FOA will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants if EERE chooses to issue a FOA regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of EERE funded awards, will be subject to Congressional appropriations and direction.

Any information obtained as a result of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a

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<sup>1</sup> <https://dalspace.library.dal.ca/xmlui/bitstream/handle/10222/71377/Evarts-John-MES-SRES-April-2016.pdf?sequence=3&isAllowed=y>

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formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. EERE will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request. EERE will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that EERE is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind EERE to any further actions related to this topic.

### **Confidential Business Information**

Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked “confidential” including all the information believed to be confidential, and one copy of the document marked “non-confidential” with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

### **Evaluation and Administration by Federal and Non-Federal Personnel**

Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to EERE providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to being given the access. Submissions may be reviewed by support contractors and private consultants.

### **Request for Information Categories and Questions**

#### **Category 1: Concept and Definition**

One piece of literature defines “energyshed” as “that geographical area in which all power consumed within it is supplied within it<sup>2</sup>” and an “energyshed management system” to be whatever tool or process oversees the grid operations within the geographical bounds of the energyshed. EERE is seeking feedback on the benefits and challenges associated with this definition as well as alternate definitions as we consider the nascent topic of energysheds.

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<sup>2</sup> <https://dalspace.library.dal.ca/xmlui/bitstream/handle/10222/71377/Evarts-John-MES-SRES-April-2016.pdf?sequence=3&isAllowed=y>, page 18

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1. What additional or alternate definitions should EERE consider for “energyshed”? Please provide explanation for your response, including additional detail, if any, should be included in this definition.
2. For the feedback provided in question 1, please describe the different stakeholder groups involved or impacted using the definition provided and how each stakeholder group might find value in the energyshed.
3. What additional or alternate definitions EERE should consider for “energyshed management system”? Please provide explanation for your response, including additional detail, if any, that should be included in this definition.
4. What are the benefits and drawbacks of having a more specific and detailed definitions for the terms “energyshed” and “energyshed management system”? Please provide explanation for your response, including how these definitions may impact the roadmap developed in response to the “*Renewable Energy Grid Integration*” congressional language.<sup>3</sup>

## Category 2: Tools and Analyses

1. What *tools and data* will be required to determine the location of generation and the proportion of electricity that is derived within the energyshed? For each tool listed, provide the tool’s purpose (e.g. modeling, operations, financial analysis) and specifics regarding the potential planning and operations functions.
2. What *analyses* will be required to determine the location of generation and the proportion of electricity that is derived within an energyshed? For each analysis listed, please include specifics regarding the potential information or decision insights that could be generated. Particular interest is in identifying what types of analyses will be required to determine the geographic location of any given area’s electricity generation (such as a community, municipality, state, tribal nation, or region).
3. What specific metrics should be used to characterize an energyshed or an energyshed management system? For each metric listed, please include specifics regarding the potential value or decision insights that could be generated.
4. Are there any tools, data, or analyses that currently do not exist and will need to be researched and developed in order to effectively operate and manage energysheds?

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<sup>3</sup> From H.R. 133: Consolidated Appropriations Act, 2021: “Renewable Energy Grid Integration.-To facilitate the oversight of grid integration activities, the agreement provides \$40,000,000 to be provided from across the Solar Energy, Wind Energy, Water Power, and Geothermal Technologies programs. Further, within available funds, the agreement provides \$10,000,000 for development and demonstration of an "energyshed" management system that addresses a discrete geographic area in which renewable sources currently provide a large portion of electric energy needs, where grid capacity constraints result in curtailment of renewable generation, and with very substantial existing deployment of interactive smart meters. The "energysheds" design should achieve a high level of integration resilience and reliability among all energy uses, including both on-demand and long-time energy scales, transmission and distribution of electricity.”

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**Category 3: Planning and Operations**

1. What are the implications of more locally derived generation on grid planning efforts? For each impact listed, describe how it differs from traditional integrated resource planning efforts.
2. What planning procedures or operations systems need to be updated, changed, or added in a more locally derived generation mix?
3. How might daily power system operations change to accommodate more locally derived power?
4. What are the barriers that must be overcome for power system operations when more electricity is locally generated? For each barrier listed, provide input regarding how it can be addressed, including the relevant stakeholder partners involved.
5. As more generation is locally derived, changes to traditional utility operations may be needed. How do the relationships between utilities, customers, and local governments need to change with more locally derived generation?

**Category 4: Resilience**

Locally generated electricity may lead to the development of a more resilient power system, including microgrids.

1. What are the resilience opportunities related to increasing locally generated electricity?
2. What are the resilience barriers related to increasing locally generated electricity?
3. What system architecture and operations will lead to a more resilient power system with more locally derived generation?

**Category 5: Energy Justice, Diversity, Equity and Inclusion**

Building a clean and equitable energy economy is a top priority for EERE.

1. Identify potential energy justice opportunities and energy justice<sup>4</sup> challenges that should be considered in developing energysheds.
2. What are ways to ensure energy justice challenges are addressed and the energy justice opportunities are enhanced, particularly in the planning stage and in defining boundaries for specific energysheds?
3. What are ways to ensure the energy needs of underserved communities, located within an energyshed are considered in a meaningful manner? In the context of an energyshed, underserved communities could include, but are not limited to, rural communities, economically distressed communities, and geographic communities that have been

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<sup>4</sup> <https://www.energy.gov/promoting-energy-justice>

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systematically denied a full opportunity to participate in aspects of economic, social, and civic life.

**Category 6: Other Information**

Please provide any additional information DOE should consider on the topic of energysheds or energyshed management systems.

**Request for Information Response Guidelines**

Responses to this RFI must be submitted electronically to [energyshed@ee.doe.gov](mailto:energyshed@ee.doe.gov) no later than 5:00pm (ET) on August 10, 2021. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 5 pages in length, 12-point font, 1-inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name;
- Company / institution contact;
- Contact's address, phone number, and e-mail address.

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