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The Honorable Sam Graves
Chairman
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Scott Perry
Chairman
Subcommittee on Economic Development, Public Buildings, and Emergency Management
Committee on Transportation and Infrastructure
House of Representatives

Federal Hazard Mitigation: FEMA Has Funded Small-Scale Renewable Energy Projects and Requires Applicants to Demonstrate Project Cost Effectiveness

Natural hazards can damage energy and related infrastructure, creating threats to the reliability of the electricity grid. Specifically, extreme weather events have been the principal contributors to an increase in the frequency and duration of power outages in the United States.

Natural hazards, such as hurricanes, can produce dangerous conditions, including high winds, storm surge, and flooding, that cause significant damage to the electricity grid.¹ The electricity grid involves three distinct functions: generation, transmission, and distribution. Electricity is generated at power plants by burning fossil fuels, through nuclear fission, or by harnessing renewable sources such as wind and solar. Once electricity is generated, it is sent through the electricity grid, which consists of high-voltage, high-capacity transmission systems, to areas where it is transformed to a lower voltage and sent through a local distribution system for use by residential and other customers.

¹See GAO, Electricity Grid: Opportunities Exist for DOE to Better Support Utilities in Improving Resilience to Hurricanes, [GAO-21-274](#) (Washington, D.C.: Mar. 5, 2021).

Natural hazards can disrupt the ability to generate power as well as diminish the efficiency of electricity generation.² However, more than 90 percent of power system interruptions are caused by outages in the distribution system.³ For example, power lines that provide electricity to customers are particularly susceptible to damage from severe weather.⁴ Power outages can affect residential, commercial, industrial, and other customers' ability to use electricity for lighting, heating, cooling, and refrigeration, and for operating appliances, computers, electronics, machinery, and public transportation systems.

Private companies own most of the electricity grid, but the federal government plays a significant role in promoting grid resilience—the ability to adapt to changing conditions, withstand potentially disruptive events, and recover rapidly if disrupted. The Federal Emergency Management Agency (FEMA) leads the nation's efforts to mitigate against natural disasters and administers hazard mitigation assistance programs to increase disaster resilience.

FEMA manages several assistance programs that can be used to fund measures to mitigate the impacts of natural hazards, such as the adoption of microgrids or backup power that could minimize the impact of power outages. These include three hazard mitigation assistance programs: the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Congressionally Directed Spending, and the Building Resilient Infrastructure and Communities (BRIC) program.⁵ According to FEMA officials, hazard mitigation assistance programs can fund activities to mitigate power loss for critical facilities during a disaster and to implement utility infrastructure protective measures. Installing generators to provide secondary or back-up power for critical facilities is one of the most common project types funded under these programs, according to FEMA officials. In addition, FEMA's Public Assistance program can fund hazard mitigation measures in conjunction with the repair of disaster-damaged facilities receiving Public Assistance program funds. FEMA-funded mitigation activities must be technically feasible and cost-effective.⁶

You asked us to review FEMA funding for renewable energy to enhance resilience and hazard mitigation. This report examines (1) what funding FEMA has provided for renewable energy projects from fiscal years 2022 through 2024, and (2) what FEMA requires from applicants to demonstrate cost effectiveness of projects.

²See GAO, Electricity Grid Resilience: Climate Change Is Expected to Have Far-reaching Effects and DOE and FERC Should Take Actions, [GAO-21-346](#) (Washington, D.C.: Mar. 5, 2021).

³In addition, less than 5 percent of power interruptions typically relate to the energy source. National Renewable Energy Laboratory, *Explained: Reliability of the Current Power Grid*, NREL/FS-6A40-87297 (Golden, Colo.: January 2024).

⁴[GAO-21-274](#).

⁵In April 2025, FEMA announced that it was ending the BRIC program. In July 2025, 20 states challenged FEMA's action in court, and in December 2025, the court ordered FEMA to reverse its termination of the BRIC program and prohibited the agency from taking any further actions to cancel or suspend the program. *Washington v. FEMA*, 1:25-cv-12006 (D. Mass. July 16, 2025). In March 2026, FEMA issued a Notice of Funding Opportunity for the program for fiscal years 2024 and 2025.

⁶See, e.g., 42 U.S.C. § 5170c(a) (Hazard Mitigation Grant Program); 42 U.S.C. § 5133(f)(1) (Building Resilient Infrastructure and Communities program and Pre-Disaster Mitigation Congressionally Directed Spending); 44 C.F.R. § 206.226(e) (Public Assistance program). See also Federal Emergency Management Agency, *Hazard Mitigation Assistance Program and Policy Guide* (Washington, D.C.: Jan. 20, 2025); and "Benefit-Cost Analysis," Federal Emergency Management Agency, last updated April 8, 2026, <https://www.fema.gov/grants/tools/benefit-cost-analysis>.

To determine what funding FEMA provided for renewable energy, we reviewed and analyzed available FEMA funding data from fiscal years 2022 through 2024—the most recent 3 years of available data. We requested and reviewed project description information that matched key terms to identify projects that included solar or wind energy generation.⁷ We focused our review on solar and wind renewable energy because they are among the most common renewable energy sources for electricity generation.⁸ We excluded seven projects (out of 31 identified) that did not indicate solar or wind energy generation in the project descriptions. For example, one project in the data included renewable construction material, and another included a diesel generator to supplement existing solar panels.

In addition, we reviewed publicly available FEMA data for the same period, as available, to determine if there were any instances of utility-scale renewable energy projects not included in the data we received, and to identify any other inconsistencies with the data compared with those we requested from FEMA. We reviewed this data for accuracy and missing data and determined the data were sufficiently reliable to report a minimum number of projects funded by FEMA through hazard mitigation assistance programs relating specifically to wind and solar generation.

To determine what FEMA requires from applicants to demonstrate cost effectiveness of projects, we also reviewed relevant legal requirements, FEMA program policies and guidance, and prior GAO reports that describe eligible entities and project types as well as requirements for demonstrating cost effectiveness.⁹ The scope of our review did not include an examination of the extent to which the projects funded from fiscal years 2022 through 2024 demonstrated their cost effectiveness or involve assessing the quality of FEMA's benefit-cost analysis process. We reviewed and assessed FEMA's benefit-cost analysis process in prior work and made recommendations, some of which have been implemented.¹⁰

⁷We requested data on FEMA-funded renewable energy projects related to wind and solar. FEMA provided data from the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Congressionally Directed Spending, and Building Resilient Infrastructure and Communities program. In addition, the data that FEMA provided were queried with terms matching “renewable,” “wind turbine,” and “solar” in project titles and descriptions. FEMA noted that if projects were modified (i.e., scope of work change) prior to award or during the life of the grant, these modifications may or may not be reflected in the project descriptions in the systems of record. In addition, descriptions are summarized and may not contain complete descriptions of the projects' activities.

⁸U.S. Energy Information Administration, *Electricity in the United States, Monthly Energy Review* (Washington, D.C.: March 2025); and *Electric Power Monthly* (Washington, D.C.: January 2025).

⁹See GAO, Disaster Resilience: FEMA Should Take Additional Steps to Streamline Hazard Mitigation Grants and Assess Program Effects, [GAO-21-140](#) (Washington, D.C.: Feb. 2, 2021); Tornadoes: Agencies Promote Resilience but Actions Needed to Improve Access to FEMA Assistance, [GAO-25-107384](#) (Washington D.C.: Sept. 2, 2025); and Extreme Heat: Limited FEMA Assistance Highlights Need for Reevaluation of Agency's Role, [GAO-25-107474](#) (Washington, D.C.: Sept. 30, 2025). We made a total of 13 recommendations in these reviews, including recommendations that could help make demonstrating cost effectiveness easier. FEMA has implemented six of these recommendations, and seven remain open.

¹⁰See, for example, [GAO-21-140](#). Regarding benefit-cost analysis, we recommended that FEMA establish a plan to develop pre-calculated benefits for additional project types and publicly share pre-calculated benefits studies, such as by posting them to its website, among other things. FEMA has taken actions that satisfied the intent of these recommendations.

We also interviewed FEMA and Department of Energy officials and selected stakeholders knowledgeable about the role of renewable energy in hazard mitigation and relevant FEMA funding. This included conducting a non-generalizable site visit and interviews with officials from the National Laboratory of the Rockies; state officials; and industry representatives, such as a rural energy association, a national renewable energy association, and a utility energy supplier.¹¹ We selected stakeholders who had experience or knowledge related to our objective and represented different energy customers, based on our site visit location.

We conducted this performance audit from June 2025 to June 2026 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Renewable energy used by or purchased by electric utilities involves large-scale, utility-scale generation. Individual states have established Renewable Portfolio Standards requiring that a minimum percentage of electricity sold to customers within that state be produced by renewable sources.¹² Renewable energy generation can also be adopted by individual residential and commercial customers or municipalities. Specifically, distributed energy resources—such as solar technology, microgrids, and energy storage—can be located on the distribution system, any subsystem thereof, or behind a customer meter. These resources could help reduce customer bills or provide backup power during power outages.

Small-scale renewable energy resources, such as rooftop solar panels and microgrids, have been adopted by various communities to mitigate power outages to critical infrastructure, such as hospitals, during disasters. Microgrids are systems that can connect to and disconnect from the grid, depending on operating conditions. Specifically, microgrids can maintain power for a small area independent of the grid if the grid encounters service disruptions as a result of an extreme weather event, such as a hurricane. In such circumstances, the microgrid operates autonomously to provide power to customers. Microgrids can improve grid resilience by absorbing and withstanding the effects of extreme weather events and providing power to end users, including critical infrastructure such as hospitals, as we have previously reported.¹³ Microgrids can be powered using renewable energy sources such as solar or wind, or conventional sources such as diesel or natural gas, or a combination of both.¹⁴ See figure 1 for an example of a small-scale renewable energy resource.

¹¹The National Renewable Energy Laboratory changed its name to the National Laboratory of the Rockies in 2025.

¹²According to the Database of State Incentives for Renewables & Efficiency operated by the N.C. Clean Energy Technology Center at North Carolina State University, as of March 2026, 27 states and the District of Columbia have established a renewable portfolio standard, and seven have renewable portfolio goals.

¹³[GAO-21-274](#).

¹⁴See GAO, *Tribal Energy: Federal Assistance to Support Microgrid Development*, [GAO-24-106278](#) (Washington, D.C.: July 22, 2024).

Figure 1: Residential Rooftop Solar Panels



Source: Studio Harmony/adobe.stock.com. | GAO-26-108470

FEMA Obligated about \$13.6 Million for 14 Renewable Energy Projects Through Hazard Mitigation Assistance Programs

FEMA provided \$13.6 million for 14 renewable energy projects through hazard mitigation assistance programs from fiscal years 2022 through 2024. These projects included small-scale energy generation, such as rooftop solar panels, microgrids, or solar generators for backup power for communities or public buildings, including hospitals. Specifically, according to our analysis of FEMA data, three assistance programs funded 14 projects that included renewable energy for fiscal years 2022 through 2024.¹⁵ See table 1 for number of projects and funding by program.

¹⁵For the purposes of our analysis, renewable energy projects included solar energy or wind energy in the project description to report a minimum number of projects funded by FEMA through hazard mitigation assistance programs. We requested fiscal year 2025 data for this review; however, due to unavailability of the data at the time of the request and to a lapse in appropriations during this review, among other things, FEMA was unable to provide data for fiscal year 2025. FEMA advised us that the limitations of its data included that some data were self-reported by program applicants and some of the project descriptions may be summarized and incomplete. Projects may be excluded from this review if key terms were omitted from their descriptions.

Table 1: Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Funding for Renewable Energy Projects, Fiscal Years 2022–2024

FEMA program	Eligibility	Number of projects	Total obligated funding (in millions)
Hazard Mitigation Grant Program	Provides funding to state, local, tribal, and territorial governments to reduce, or mitigate, future disaster losses. This funding may only become available following a presidentially declared major disaster.	3	\$1.6
Pre-Disaster Mitigation Congressionally Directed Spending	Provides congressionally directed federal funds to state, local, tribal, and territorial governments to plan for and implement cost-effective measures designed to reduce the risk to individuals and property from future natural hazards, while also reducing reliance on federal funding for future disasters.	5	\$9.2
Building Resilient Infrastructure and Communities (BRIC) program ^a	The BRIC program supports states, local and territorial governments, and federally recognized Tribal Nations as they work to reduce hazard risks. FEMA launched BRIC in fiscal year 2020. BRIC is a pre-disaster, natural hazards mitigation grant program that seeks to upgrade and modernize the nation's infrastructure to promote resilience with respect to natural hazards. The program funds and prioritizes projects that reduce the cost of future disaster response and recovery.	6 ^b	\$2.9
Total	na	14	\$13.6

Source: GAO analysis of FEMA data and documentation. | GAO-26-108470

Note: Totals may not sum due to rounding. According to FEMA officials, the fiscal year for the BRIC program and Pre-Disaster Mitigation Congressionally Directed Spending correspond with the fiscal year in which the program funding opportunity was released, and funding was associated with that opportunity. According to FEMA officials, the fiscal year for the Hazard Mitigation Grant Program reflects the fiscal year in which the disaster was declared.

^aIn April 2025, FEMA announced that it was ending the BRIC program. In July 2025, 20 states challenged FEMA's action in court, and in December 2025, the court ordered FEMA to reverse its termination of the BRIC program and prohibited the agency from taking any further actions to cancel or suspend the program. *Washington v. FEMA*, 1:25-cv-12006 (D. Mass. July 16, 2025). In March 2026, FEMA issued a Notice of Funding Opportunity for the program for fiscal years 2024 and 2025.

^bAccording to our analysis of FEMA data, 10 additional projects—totaling approximately \$4.7 million—included scoping or planning activities to scope and plan projects, and in some cases prepare applications to obtain future FEMA funding. These projects did not include any funding of energy infrastructure.

According to FEMA officials and to our analysis of FEMA data, the 14 funded projects provided secondary or backup power to critical facilities to maintain essential services during a disaster. For example, projects included solar panels at a hospital, a sheriff's office, and a recreation center to provide backup power during outages. In addition, FEMA provided funding through the BRIC program to 10 additional applicants, including tribal governments, to scope and plan projects and, in some cases, prepare applications to obtain future FEMA funding for solar or wind projects.

In addition to FEMA's hazard mitigation assistance programs, the agency's Public Assistance program can also fund eligible hazard mitigation activities as part of the repair and replacement of damaged public facilities after a disaster. This could include projects that include renewable energy; however, FEMA does not track Public Assistance program funding for projects that include renewable energy. We found four small-scale projects in Public Assistance program data that included solar or wind energy in project titles for fiscal years 2022 through 2024.¹⁶

Our analysis of data provided by FEMA did not identify any hazard mitigation funding for utility-scale renewable energy or electric utilities. FEMA officials told us that FEMA does not fund utility-scale renewable energy generation projects, noting that doing so may result in a duplication of programs. Federal law requires that FEMA ensures that no entity receives assistance for any loss for which it has received financial assistance from any other source. As part of its responsibility for preventing such duplication of benefits, FEMA evaluates whether another federal agency has the primary authority to fund a project to avoid providing financial assistance to entities that have received assistance for the same purpose from another program, insurance, or source.¹⁷ According to FEMA officials, as most energy generation projects fall under the Department of Energy's programs, FEMA funds only smaller-scale projects that address secondary power needs for critical facilities during a disaster. These officials also commented that FEMA can also fund eligible activities to mitigate public and privately-owned utility infrastructure from natural hazard damages. For example, FEMA mitigation assistance programs can fund undergrounding utility lines to prevent damages during wildfires and other extreme events.¹⁸ FEMA officials also told us that the agency has not obligated funding for any projects under the Inflation Reduction Act of 2022, section 70006—which authorizes FEMA to provide financial assistance for costs associated with low-carbon materials and incentives that encourage low-carbon and net-zero energy projects, such as renewable energy.¹⁹

¹⁶We searched public data available on the FEMA website and limited our search to category F grant funds. FEMA processes Public Assistance program funding according to the type of work the applicant undertakes. Specifically, there are two "Emergency Work" categories—A, debris removal, and B, emergency protective measures—and five "Permanent Work" Categories—C through G. Category F of FEMA's Public Assistance program "Permanent Work" covers publicly owned utilities. According to FEMA officials, the fiscal year associated with disaster assistance is the fiscal year in which the disaster was declared.

¹⁷42 U.S.C. § 5155; 44 C.F.R. § 206.434(f).

¹⁸Electric utilities that may be eligible for FEMA's hazard mitigation assistance programs include publicly owned, private not-for-profit electric utilities, and rural electric cooperatives. These entities served about 28 percent of all electricity customers in 2024, according to the U.S. Energy Information Administration. The remaining customers are generally served by private, investor-owned utilities. Moreover, public utilities and rural electric cooperatives procure most of their renewable energy through power purchase agreements rather than direct ownership. Electric cooperatives own or purchase about 10 percent of renewable capacity in the U.S., and cooperatives have numerous community solar programs.

¹⁹An Act To provide for reconciliation pursuant to title II of S. Con. Res. 14, Pub. L. No. 117-169, § 70006, 136 Stat. 1818, 2087 (2022) (commonly known as the Inflation Reduction Act of 2022).

FEMA Requires Hazard Mitigation Assistance Applicants to Demonstrate Project Cost Effectiveness

Under federal law and FEMA policy, only cost-effective hazard mitigation activities are eligible for funding from FEMA's Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities program, Pre-Disaster Mitigation Congressionally Directed Spending, and Public Assistance program.²⁰ Applicants for FEMA funding can demonstrate cost effectiveness through conducting a benefit-cost analysis—a quantitative analysis comparing the project's avoided future damage to the costs over the project lifetime.²¹

The Office of Management and Budget Circular A-94 states that benefit-cost analyses should count benefits and costs to society, not just benefits or costs accruing to government and private entities.²² FEMA provides applicants with a benefit-cost analysis toolkit to assist applicants with conducting their benefit-cost analysis.²³ Under certain conditions, FEMA will accept a streamlined benefit-cost analysis in which the applicant is not required to conduct its cost effectiveness assessment using FEMA's benefit-cost analysis toolkit.²⁴

According to FEMA officials, more complex secondary power projects, such as microgrids that use solar or wind power generation, come with a higher project cost than more traditional generator projects. These officials said that higher costs reduce the ratio of benefits to cost, increasing the risk of a project being found not cost effective.

We conducted several past reviews of FEMA's benefit-cost analysis for hazard mitigation assistance and reported on the challenges of performing a benefit-cost analysis.²⁵ In these reports, state and local officials told us at the time that the benefit-cost analysis for hazard mitigation assistance was a challenge due, in part, to the amount of resources and data needed. According to some of these officials, demonstrating revenue and environmental benefits can be difficult to calculate and may require hundreds of pages of data or technical project information. Other government officials and subject matter experts told us that in addition to calculating project benefits, measuring costs, such as the impact of extreme heat, was also challenging. In addition, state officials told us that conducting a benefit-cost analysis for siren warning systems—a type of hazard mitigation equipment—is extremely difficult. We also reported that communities with smaller populations often cannot reach FEMA's required cost-effectiveness thresholds. For example, rural communities struggle to compete against larger urban areas for tornado mitigation assistance, according to local officials we interviewed.

²⁰See 42 U.S.C. § 5170c(a) for Hazard Mitigation Grant Program, 42 U.S.C. § 5133(f)(1) for BRIC program and Pre-Disaster Mitigation Congressionally Directed Spending, and 44 C.F.R. § 206.226(e) for Public Assistance program.

²¹The scope of our review did not include an examination of the extent to which the projects funded from fiscal years 2022 through 2024 demonstrated their cost effectiveness or involve assessing the quality of FEMA's benefit-cost analysis process.

²²Office of Management and Budget, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, OMB Circular No. A-94 (Washington, D.C.: Oct. 29, 1992).

²³"Benefit-Cost Analysis," Federal Emergency Management Agency.

²⁴FEMA will accept a streamlined benefit-cost analysis when a building to be acquired qualifies as substantially damaged and is located in a Special Flood Hazard Area, the total project costs are less than \$1 million, or the project type is eligible for pre-calculated benefits. See Federal Emergency Management Agency, *Hazard Mitigation Assistance Program and Policy Guide* (Washington, D.C.: Jan. 20, 2025).

²⁵See [GAO-21-140](#), [GAO-25-107384](#), and [GAO-25-107474](#).

We reported that although challenges continue to exist, FEMA was taking steps to make completing benefit-cost analyses easier for state and local jurisdictions. Specifically, FEMA updated its benefit-cost analysis toolkit in 2019 to reduce some data entry requirements. In addition, FEMA officials at the time told us the agency had introduced the use of pre-calculated benefits that allow applicants to forgo performing a detailed benefit-cost analysis for projects whose benefits have been previously calculated. For example, FEMA issued a pre-calculated benefit-cost analysis on hospital generators in 2021. Under certain conditions, FEMA also allows Hazard Mitigation Grant Program applicants, through FEMA's 5 Percent Initiative, to provide a narrative description of the project's cost-effectiveness in lieu of a formal benefit-cost analysis for projects representing up to 5 percent of their award.

Agency Comments

We provided a draft of this report for review and comment to FEMA. FEMA provided us with technical comments, which we incorporated, as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Homeland Security, and other interested parties. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at mckelveyj@gao.gov. Contact points for our Offices of Congressional Relations and Media Relations may be found on the last page of this report.

In addition to the contact named above, Frank Rusco (Director), Janice Ceperich (Assistant Director), Allen Chan (Analyst in Charge), Joel Aldape, Adrian Apodaca, Katherine Chambers, John Delicath, Tracey King, Susan Murphy, Lola Ostrander, Norma-Jean Simon, Deirdre Sutula, and Linda Tsang made key contributions to this report.

//SIGNED//

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