



## Eligibility of Generators as a Fundable Project by the Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program

### Background

Generators are emergency equipment that provide a secondary source of power to a facility. Generators and related equipment (e.g., hook-ups) are eligible provided that they are cost effective, contribute to a long-term solution to the problem they are intended to address, and meet all other program eligibility criteria.

**PDM:** A generator that is a stand-alone project can be considered for PDM funding if the generator protects a critical facility. Generators and/or related equipment purchases (e.g., generator hook-ups) are eligible when the generator directly relates to the hazards being mitigated and is part of a larger project.

**HMGP:** A generator that is a stand-alone project can be considered for regular HMGP funding if the generator protects a critical facility. Critical facilities may include police and fire stations, hospitals, and water and sewer treatment facilities. A generator that is a component of a larger project (e.g. elevation of a lift station) is also eligible for regular HMGP funding and the use of aggregation is permitted. Portable generators are eligible provided that they meet all HMGP requirements as described in 44 CFR Section 206.434.

### Frequently Asked Questions

#### General Eligibility and Application Development

##### How does the information in this Job Aid differ from current practice?

This Job Aid, along with the 2015 Hazard Mitigation Assistance (HMA) Guidance, establishes that the purchase and installation of generators for the protection of critical facilities is an eligible, stand-alone project type under the Hazard Mitigation Grant Program (HMGP) as well as the Pre-Disaster Mitigation Program (PDM), and is no longer limited to the 5 Percent Initiative under HMGP. Generators that constitute a functional portion of an otherwise eligible mitigation solution (critical or not) remain eligible.

##### Are generators still eligible under the 5 Percent Initiative?

Yes. If there is insufficient data to evaluate a generator project using a standard, HMA-approved Benefit-Cost Analysis (BCA) method the project may be eligible under the 5 Percent Initiative, as described in current HMA Guidance. To perform this evaluation a narrative description of the project's cost-effectiveness must be provided in lieu of a BCA. However, when data is available to perform a standard HMA-approved BCA the standard method must be used.

##### Are eligible critical facilities limited to those listed in this Job Aid?

No. The critical facilities listed in this Job Aid are not exhaustive. Eligible critical facilities are generally meant to include, but not be limited to, facilities such as hospitals, fire stations, police stations, and water and waste water treatment plants.

##### Is the purchase of generators for residential structures an eligible activity?

No. The purchase of a generator for the singular purpose of maintaining power for a single residential structure is not an eligible activity.

#### **If a generator is required by code, is the purchase of a generator for these facilities eligible?**

Yes, provided that the generator project meets all HMGP and PDM requirements as described in **44 CFR Section 206.434, Eligibility** and as outlined in the HMA Guidance.

#### **What size generator is appropriate for a facility?**

This will vary by facility and usage. It is not always necessary for the generator to support facility operations to their full capacity, but it should be sized appropriately to ensure the facility is able to provide uninterrupted critical functions in the event of future power outages.

#### **Is there a National Emergency Management Information System (NEMIS) code for generators as a stand-alone project type?**

Yes. The new NEMIS code for stand-alone generator projects is **601.2 – Generator Regular**. The NEMIS code for generator projects as part of the 5 percent discretionary allowance is **601.1 – Generator**.

### **Cost-effectiveness**

#### **Will FEMA develop a separate BCA module for generators?**

No. A separate module is not necessary to perform the analysis. The Damage Frequency Assessment (DFA) module is able to perform this analysis for multiple hazards and project types. If you experience problems using the DFA module, contact the BC helpline at [bchelp@fema.dhs.gov](mailto:bchelp@fema.dhs.gov) or at 1-855-540-6744.

#### **What are the key elements of a BCA for generator projects?**

Key inputs required are:

- **Project Useful Life:** According to OMB Circular A-76, *Performance of Commercial Activities*, the useful life for generators or generator sets is 19 years. This value can be used as the default useful life value when performing the BCA. It may be altered based on manufacturer warranty or other documentation that can demonstrate that the generator may be able to provide service for longer than 19 years. Analysts should use the 19-year project useful life first.
- **Project Costs:** The cost of generators varies by size, installation, and purpose. The generator's size and specifications should be reasonable, appropriate, and necessary to continuing critical functions of the facility. The exact costs for generators, installation, and components should be provided by the subapplicant and included in the costs when performing the BCA.
- **Facility and Value of Service:** For potable water, waste water, police station, fire station, and hospital facilities, analyses can be quickly performed using FEMA's BCA toolkit and the DFA module, which provide service values for these facilities. To use these values the analyst will need some information regarding the population served by the facility. For example, if a generator is to be installed at a waste water treatment plant, the analyst will need to know how many customers are served by the facility as well as how many days the facility was inoperable because of power failure. These values can typically be obtained from the facility manager and can be provided on official letterhead for documentation purposes.

- **Recurrence Determination:** Recurrence information used in the analysis may vary by location or by cause of power failure, such as wind or flood.
- **Other Benefits:** Other benefits (or costs avoided) may be included if they are addressed by the generator project

### What information is needed to perform a BCA for generator projects?

Information needed for performing the BCA will vary by facility. However, the following inputs are **required** to run the BCA module. For **all BCAs** performed, the subapplicant must provide all of the following:

- The total project cost
- Useful life (19 years for generators)
- Estimated yearly maintenance costs
- The frequency of the event used in the analysis that would cause a power failure demonstrating the need for a backup power source (generator)
- The number of days that service was affected (without power)

In order to calculate the value of services (benefits to society) the following inputs **must** be included for each specified facility type:

- For Water or Waste Water Services the subapplicant must provide the following:
  - The number of customers affected by the power outage at the treatment plants
- For Hospitals the subapplicant must provide the following:
  - The number of people served by the hospital
  - The distance in miles between the hospital being analyzed and the hospital that would treat these people in the event the hospital was inoperative
  - The number of people normally served by the alternate hospital
- For Police Stations the subapplicant must provide the following:
  - The type of station (metropolitan, city, or rural)
  - The number of people served by the police station
  - The number of officers that work at the station and would serve the same area if the station were shut down as a result of a disaster
- For Fire Stations the subapplicant must provide the following:
  - The number of people served by the station
  - The type of area served by the fire station (urban, suburban, rural, wilderness)
  - The distance in miles to the nearest fire station that would provide protection for the area normally served by the fire station affected
  - If applicable, emergency medical services provided by the fire station

### How is a recurrence interval developed for an event requiring the use of a generator?

The recurrence interval used in the analysis will depend on the hazard that caused, or is anticipated to cause, the facility to lose power. For example, in the New York City metropolitan area winds of 85 miles per hour could equate to a 25-year recurrence interval. For other hazards such as extreme snow fall the information about prior snow fall totals could be validated to estimate the recurrence interval. Recurrence interval data can be obtained from a number of sources including the National Weather Service for rainfall and ice storms, and the U.S. Geological Survey for floods. If three or more past events resulted in power failure the DFA module can calculate the recurrence interval based on the years of the events.

Generally two events are required to perform the analysis. Subapplicants are encouraged to provide as much historical damage information as they can. Projects submitted with one frequency will be considered acceptable.

### What resources are available to determine recurrence interval values?

Recurrence intervals may be determined by using some of the tools provided below:

- If the facility lost power as a result of wind damage to power lines feeding the facility, the analyst can utilize the Advanced Technology Council Wind Speed Tool available at <http://www.atcouncil.org/windspeed/index.php> to determine the frequency of the coastal wind event.
- If power outages are attributed to flooding, recurrence information for the flooding event should be used in the analysis. The National Weather Service provides the Precipitation Frequency Data Server at <http://hdsc.nws.noaa.gov/hdsc/pfds/> which can be utilized to establish a frequency for various precipitation events.
- U.S. Geological Survey stream gauge data can also be used to extrapolate frequency information for flood events, details of which can be found in the Supplement to the Benefit-Cost Analysis Reference Guide in the FEMA library at <http://www.fema.gov/library/viewRecord.do?id=4830>.
- National Snow and Ice Data Center (National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, National Science Foundation) at <http://nsidc.org/data/search/data-search.html>.
- Insurance claims, BureauNet information, damage repair records, data from a State/local agency, or local government newspaper accounts citing credible sources (other than anecdotal accounts) could be used in conjunction with the DFA module's unknown frequency calculator. Using this method may require more time as three events are required to complete the analysis.

### Are the benefits limited to damages avoided to the facility?

No, benefits are not limited to just damages avoided. The value of service for critical facilities can be used to demonstrate cost-effectiveness. The value of services for critical infrastructure and facilities are included in the BCA toolkit, which is available at <http://www.fema.gov/benefit-cost-analysis>.

Additional losses can be included in the BCA if those losses are a direct result of interrupted power service that a generator would have mitigated. All costs associated with power failure that would be mitigated by a generator should be considered. For example, a waste water treatment plant sometimes requires additional costs to bring the facility back to operating status after an extended power failure. This may include removal of sludge in equipment or additional man hours needed to bring the facility back to operational status. Those additional costs can be included above and beyond the value of service costs if a generator would have prevented those additional costs.

**Can multiple hazards be considered in the BCA?**

Yes. Multiple hazards may disrupt power supply. The subapplicant will need to provide the frequency of each hazard used in the analysis.

**For a wastewater treatment plant, is the cost of providing temporary water or other emergency protective measures considered a future cost avoided?**

Yes. If the generator will negate the need for temporary water in the future, those costs should be included in the analysis.

**Are environmental benefits included in the BCA?**

To the extent they can be captured and justified, environmental costs associated with raw sewage discharge can be included in the BCA for waste water treatment plants. FEMA does not have a default value for these associated costs and these costs will vary by location. The subapplicant should include all reasonable costs that will be mitigated by having a backup generator installed at a facility.

**How should emergency operations centers (EOCs) be evaluated for inclusion in the BCA toolkit?**

Finding the value (in loss of service terms) of a State Emergency Operations Center to prove cost-effectiveness of a generator project is difficult. FEMA will allow reasonable and justified “loss of service” costs for State and local EOCs that are identified by the subapplicant to be entered into the DFA module to evaluate cost-effectiveness of an EOC generator project. An additional option is to investigate the costs of remobilizing an EOC to an alternate / continuity of operations location that could be avoided should the EOC be supplied with an uninterruptible power source such as a generator.

## Generator Scenarios

Different power failure scenarios at various facilities are outlined below. For analysis purposes each facility was reviewed using 4 days of lost service due to power failure at the 25-year recurrence interval. The 25-year recurrence interval for the test cases is based on observed wind speeds and the frequency was extrapolated using the Advanced Technology Council Wind Speed Tool for the New York metropolitan area. Other project locations should use the appropriate recurrence intervals for the hazard being mitigated. Analysis was performed using the DFA module in the BCA Toolkit.

These scenarios are for demonstration purposes only. Dollar amounts and frequency intervals were chosen for comparison purposes only. Analysts should use the appropriate values for the facility being examined. For those performing the analysis assistance is available through the benefit-cost helpline at [bchelp@fema.dhs.gov](mailto:bchelp@fema.dhs.gov) or at 1-855-540-6744. The helpline is not allowed to perform or review analyses but can provide answers to specific questions regarding methodologies.

When performing the BCA, inputs used in the module should be documented. Documentation sources may include, but are not limited to: correspondence with facility or site managers, data available from the county or facility Web site, information from other government Web sites, media releases, engineering analyses, and letters from the facility manager. Discussion of data documentation is available in the BCA training materials available at FEMA.gov. There are no special or extraordinary data documentation requirements for this project type. The following scenarios are included to illustrate general assumptions and the resulting benefit cost ratios.

**Scenario 1: The Purchase and Installation of a Generator at an Urban Police Station**

## Assumptions:

- The police station has 119 officers who serve up to 27,000 residents
- The police station loses power and the efficiency of the police station drops to 50 percent (assumes 50 percent of the force are working out of other facilities or within the community)
- The power is not fully restored for 4 days
- The project useful life for the generator is 19 years
- The project cost is \$50,000

## Benefit-Cost Ratio:

- The resulting benefit-cost ratio (BCR) is 1.23

**Scenario 2: The Purchase and Installation of a Generator at an Urban Fire Station**

## Assumptions:

- The fire station has 119 firefighters who serve up to 27,000 residents
- The fire station loses power and the efficiency of the fire station drops to 50 percent
- The power is not fully restored for 4 days
- The project useful life for the generator is 19 years
- The project cost is \$50,000

## Benefit-Cost Ratio:

- The resulting BCR is 0.80

**Scenario 3: The Purchase and Installation of a Generator at an Urban Hospital**

## Assumptions:

- The hospital serves up to 27,000 residents
- The power is not fully restored for 4 days
- The project useful life for the generator is 19 years
- The project cost is \$200,000

## Benefit-Cost Ratio:

- The resulting BCR is 1.0

**Scenario 4: The Purchase and Installation of a Generator at a Rural Area Water Treatment Plant (Potable Water)**

## Assumptions:

- The water treatment plant serves up to 15,000 customers
- The plant loses power for 3 days
- A 100-year recurrence interval is used
- The project cost is \$200,000

## Benefit-Cost Ratio:

- The resulting BCR is 1.05

### **Scenario 5: The Purchase and Installation of a Generator at an Urban Area Waste Water Treatment Plant**

Assumptions:

- The waste water treatment plant serves up to 500,000 residents
- The waste water treatment plant loses power and there is no service
- The power is not fully restored for 4 days
- The project useful life for the generator is 19 years
- The project cost is \$1,500,000

Benefit-Cost Ratio:

- The resulting BCR is 24.8