HUD Sustainable Housing

ENERGY POLICY AND PRACTICE

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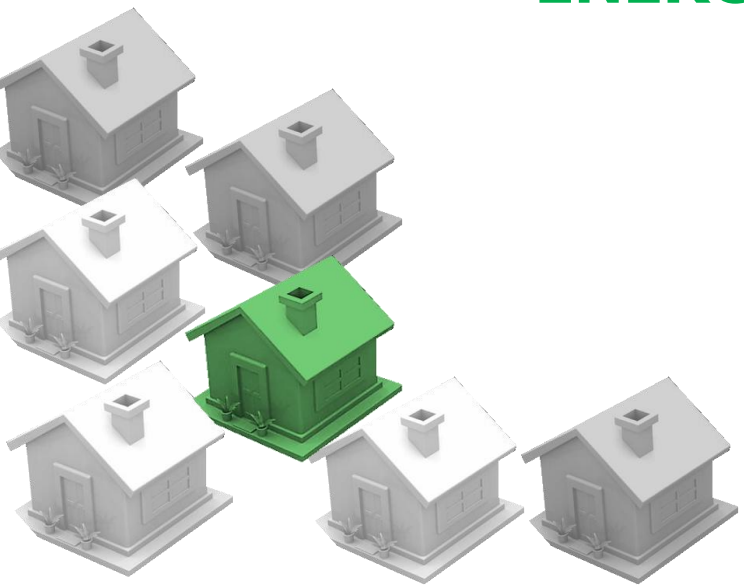
With Bob Groberg



Affordable Housing

Good for Environment

Good for Public Health

Sound Fiscal Policy

HUD ASSISTED
RENTERS AND OWNERS SPEND MORE THAN

$7 BILLION

A YEAR ON UTILITIES

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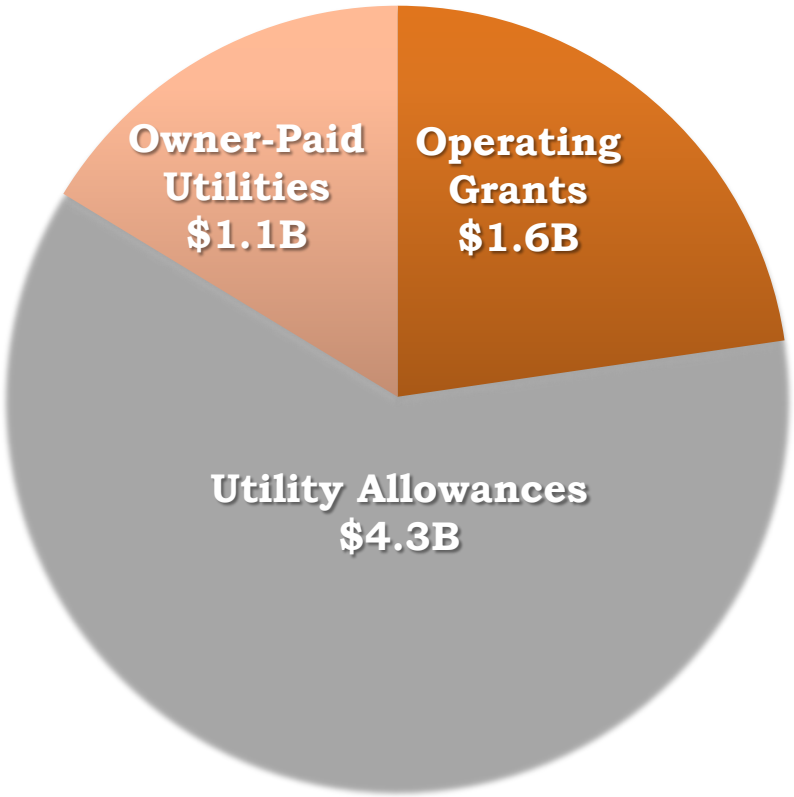


HUD estimates a modest reduction of 5% of energy usage could save $350 million a year, or $1.75 billion over 5

Folsom Dore Apartments
San Francisco, California

- 98-unit mixed-income building
- Offers permanent supportive housing for formerly and chronically homeless individuals and families
- Incorporated many green design elements in project; beat the minimum state energy-efficiency standards by 20%
  - high efficiency HVAC system
  - EnergyStar appliances
  - high-performing windows

- 73-unit senior housing project
- First NetZero, Fossil Fuel Free, LEED Platinum senior housing project in the U.S.
- Energy efficiency strategies:
  - passive systems
  - active mechanical systems
- Renewable energy systems:
  - solar and wind energy

Paisano Green Community
El Paso, Texas

- The Denver Housing Authority recently entered into a 20-year PPA
- 2.5 megawatt solar power plant
  - Over 10,000 solar panels
  - 387 affordable housing buildings
- Creation of dozens of jobs in the process for local solar installer, Namaste Solar.

Denver Housing Authority Solar Project
Denver, Colorado

Danbury Housing Authority

- Energy Performance Contract
- Combined Heat and Power
- Electricity reduced from 1.25 million to 200,000 kWh
- Energy cost reduced by $40,000 annually
- No initial costs to the Housing Authority or HUD

President's Better Buildings Challenge

Residential partners will pledge a 20 percent reduction in energy intensity for their portfolio by 2020 (or within 10 years).

- Expands the Challenge to the multifamily sector, including market rate and affordable private owners, as well as Public Housing Agencies.
- HUD and DOE will commit to deploying technical assistance, overcoming policy barriers, sharing successful strategies, and developing replicable models for cutting energy waste in homes.
- More than 50 Multifamily Partners joined to date– representing over 1 million units.

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

Renewable Energy Target for Federally Subsidized Housing

100 megawatts of installed renewable capacity on-site at federally subsidized housing by 2020

- ✓ expand the renewable energy sector
- ✓ promote climate resilience and cost effective distributed generation in low income housing
- ✓ curb carbon emissions
- ✓ tools like Power Purchase Agreements make it possible

The Denver Housing Authority recently entered into a 20-year PPA to allow the installation of a 2.5 megawatt solar power plant with over 10,000 solar panels on 387 affordable housing buildings, creating dozens of jobs in the process for local solar installer, Namaste Solar.

Photo credit: Namaste Solar

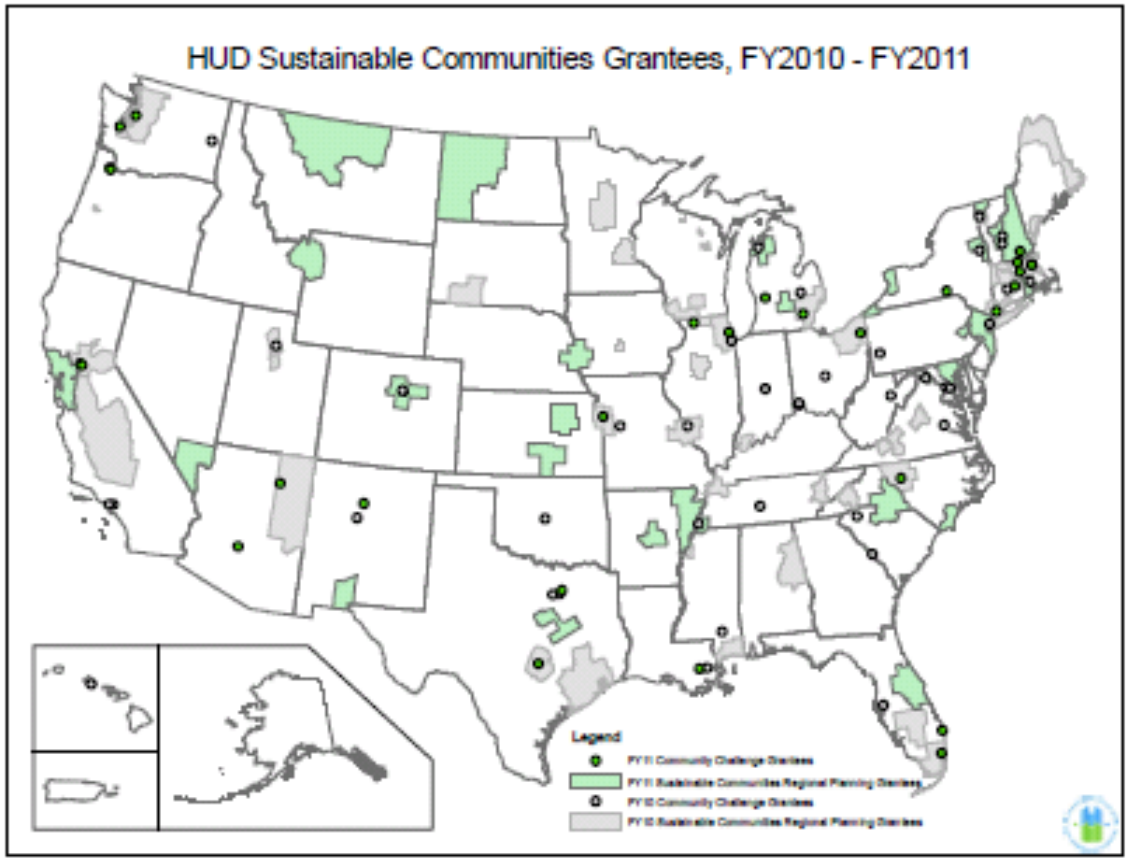

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
DEPARTMENT OF ENERGY UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

HUD Sustainable Communities Planning Grantees

Supporting work in 48 states and D.C.

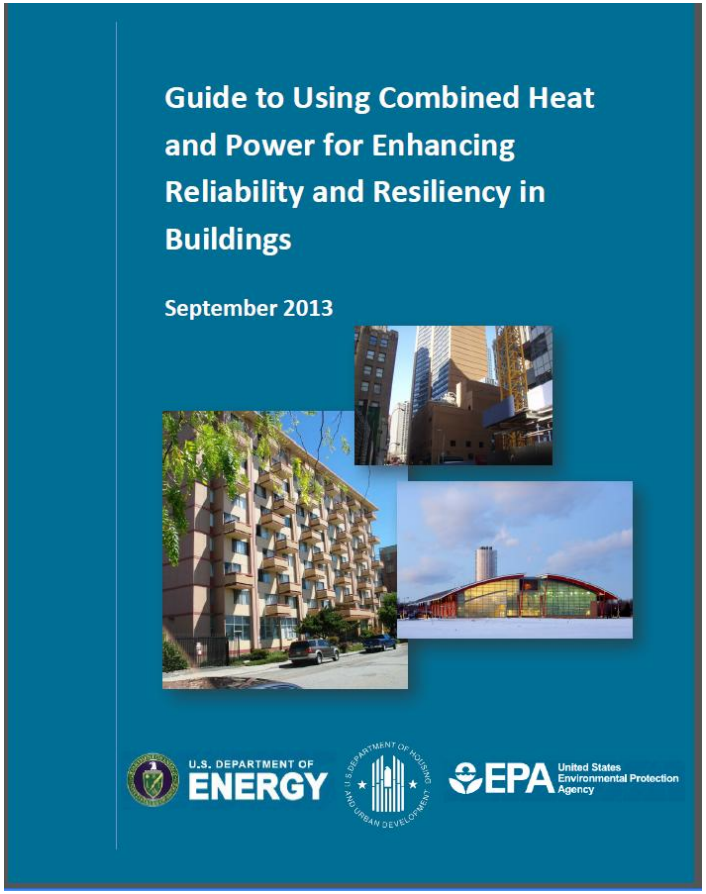
More than 133 million Americans who live in grantee regions and communities.

A total federal investment of $240 million is *leveraging* an additional $253 million in private and local commitments.



HUD Resource on CHP for Enhancing Building Reliability and Resiliency

- HUD identified need to include CHP in post-Hurricane Sandy funding opportunities
- EPA/DOE provided expertise and technical support
- Released in September and responds to Hurricane Sandy Task Force Strategy and its recommendations
- Focuses on CHP's role in disaster preparedness and energy resilience
- Broader applicability for enhancing building performance where necessary and desirable



Key Components of CHP Guide

- Makes the case for CHP as a reliability/resiliency strategy
- Spells out requirements and costs associated with a CHP system that can run independently of the grid
- Assists program implementers and project developers in determining whether CHP is a good fit and comparing it to other options (e.g., back-up generation)
- Provides information on financing options and a list of CHP resources (e.g., on project development, resiliency/reliability)
- http://portal.hud.gov/hudportal/HUD?src=/program_offices/sustainable_housing_communities/chpguide

CHP As Reliability/Resiliency Strategy

- CHP systems can allow facilities to remain functional in a disaster, and for non-critical loads, to resume functionality as quickly as possible
- CHP systems can effectively contribute to State and local planning efforts to build resiliency for both critical infrastructure and other facilities, including multifamily housing.
  - NYC – issued a plan in June 2013 to improve building and other codes to enable increased use of CHP for emergency power
  - NJ improving energy resilience through the NJ Energy Master Plan - funding to assist in improving grid reliability through CHP
  - TX and LA - adopted laws stating that all critical government buildings must evaluate installing CHP in new buildings or during major retrofits of existing buildings
- CHP systems have to be specially configured to operate in “island mode”

System Requirements for CHP in “Island Mode”

- **Black start capability**: Electrical signal from battery or backup generator located on-site to allow CHP system to start operating when grid experiences an outage
- I**ndependent operation from utility grid**: Synchronous generators only option for “island” mode, need additional safeguards to ensure no power export to “downed” grid
- **Ample carrying capacity**: Size of CHP system must be matched to critical loads in the facility
- **Parallel utility interconnection and switchgear control**: When CHP system disconnects from utility grid in an outage, appropriate switchgear and controls are required to transition to serve critical loads without overloading generator capacity

Is CHP a Good Fit for Your Building?

Financial Considerations:

- Up-front capital investment required to install CHP or replace an existing boiler (may also include the additional features that enable islanding and black start capability)
- Anticipated operations and maintenance (O&M) costs
- Monetary savings from not paying for electricity and separate thermal energy
- Monetary and other benefits from maintaining critical operations during grid disruptions
- Meeting organizational financial targets (e.g., rate-of-return, return-on-investment)
- Availability of State, local, utility or Federal financial incentives for CHP

Environmental and Compliance Considerations:

- Compliance with air quality requirements (through permitting)
- Compliance with local ordinances (e.g., building codes, fire regulations)
- Achievement of organizational sustainability/climate change goals
- State policies and requirements governing utility actions that impact CHP system operation (e.g., interconnection standards, standby charges)

Feasibility Analysis Tools for Multifamily Buildings

- **Footnote 46 - Takes you to CHP on the HUD web:** http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/library/energy **where you will find the CHP for Sandy Guide plus three HUD CHP Guides.**
- **One introduces multifamily building owners to CHP.**
- **The second deals with the ORNL Software linked in Footnote 32 that enables a rough analysis of the economic feasibility for a specific building.**
- **A third guide enables more advanced analysis after preliminary findings are made.**

CHP Compared to Other Resiliency Options

CHP vs. Natural Gas Boiler

With similar steam and thermal outputs, CHP has much higher upfront costs, but over time, substantial savings accrue due to "free" self-generated electricity so CHP becomes better longer-term investment

CHP vs. Back-up Generators

	CHP	Backup Generators
System Performance	• Designed and maintained to run continuously • High performance reliability	• Only used during emergencies
Fuel Supply	• Natural gas infrastructure typically not impacted by severe weather	• Limited by on-site storage
Transition from Grid Power	• May be configured for "flicker-free" transfer from grid connection to "island mode"	• Lag time may impact critical system performance
Energy Outputs	• Electricity • Thermal (heating, cooling, hot/chilled water)	• Electricity
Emissions	• Typically natural gas fueled • Achieve greater system efficiencies (80%) • Lower emissions	• Commonly burn diesel fuel

Examples of CHP Success Stories

Brevoort Co-op, Greenwich Village, New York

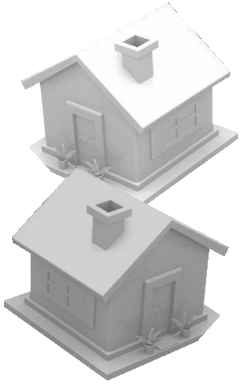
During Hurricane Sandy, the Brevoort Co-op was the only building on lower Fifth Avenue able to provide energy and full service to its residents thanks to its 400 kilowatt (kW) CHP system. The building has 277 units, and typically houses 720 residents. However, those numbers swelled to 1,500 after the storm as Brevoort residents took in friends and family members without power.

Greenwich Hospital, Greenwich, Connecticut:

The area surrounding Greenwich Hospital lost power due to Hurricane Sandy for seven days. The transition from using grid power to operating solely on the 2.5 MW CHP system went smoothly. The entire process took about 5 minutes for the system to shut down and restart in island mode, while power was supplied to the hospital by backup generators. The CHP system allowed the hospital to continue normal operations throughout the storm and admit additional patients that could not be seen at other facilities.

Salem Community College, Carney's Point, New Jersey:

During Hurricane Sandy, the 300 kW CHP system operated continuously for almost 48 hours. The American Red Cross opened a disaster relief shelter in Davidow Hall, one of the main campus buildings. The CHP system was the only source of power for Davidow Hall during the storm, and operations ran flawlessly, providing shelter to 85 people.



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Office of Sustainable Housing and Communities
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