FEMA

U.S. DEPARTMENT OF ENERGY

HMA Hazard Mitigation Assistance

# Mitigating Natural Hazard Risks in the Energy Sector: Innovative Projects that Help Build Resilient Communities

November 6, 2019

# Agenda

1. Overview of FEMA's Hazard Mitigation Assistance (HMA) Grant Programs

2. Fiscal Year 2019 Pre-Disaster Mitigation Grant Opportunity

3. Energy Lifeline Project Examples

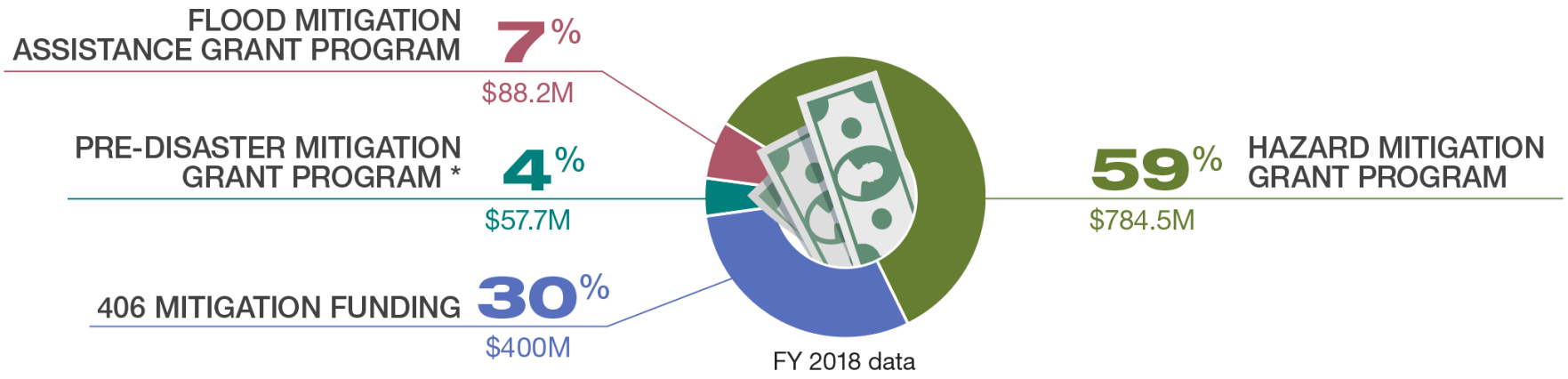
4. Blue Lake Rancheria Microgrid Lifeline Mitigation

5. DOE's Mitigation Projects for States and Territories

# Hazard Mitigation Assistance Programs

# FY2018 HMA Funding

**In FY 2018** more than **$1.3B** in pre- and post-disaster **Hazard Mitigation Assistance Grants** was delivered to states, tribes, and territories, resulting in mitigation actions that will **reduce risk**




* This figure includes legacy PDM program funding

# Pre-Disaster Mitigation Grants


# FY 2019

# $250M

# Pre-Disaster Mitigation Program (PDM)

- Authorized by Section 203 of the Robert T. Stafford Act.
- Goal is to reduce overall risk to the population and structures from future hazard events.
- Funds are awarded on a nationally competitive basis, state set-aside of $575,000 and tribal set-aside.
- PDM funds multi-hazard mitigation projects, infrastructure projects, and mitigation plans.
- Typically the PDM cost-share is 75% federal and 25% non-federal with the ability to increase to 90% federal for small impoverished communities.

# Eligible Applicants and Subapplicants

- Applicants
  - States and Territories
  - Federally-recognized Tribes

- Subapplicants
  - State Agencies
  - Federally-recognized Tribes (except where prohibited)
  - Tribal Agencies
  - Local governments/communities

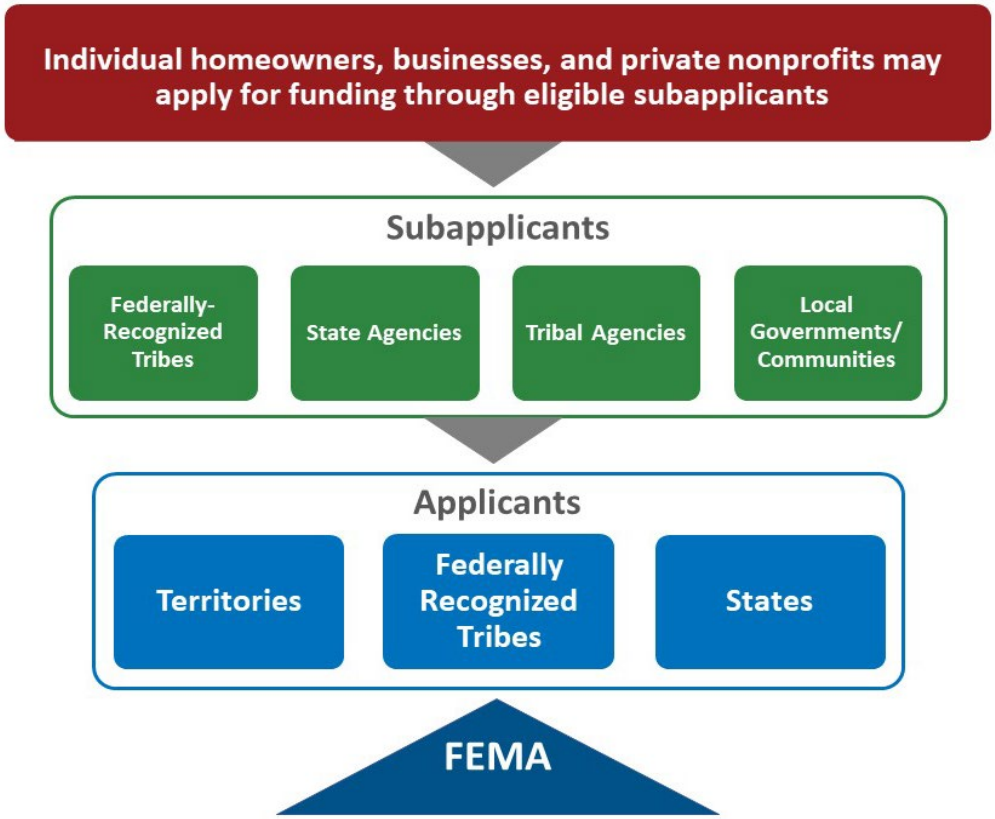
- Individuals and businesses are not eligible to apply directly to FEMA for HMA funds

# PDM Programmatic Requirements

- A subapplicant must:
  - Have a hazard mitigation plan
  - Participate in the National Flood Insurance Program (for projects located in the SFHA)
- A Project must:
  - Be feasible & effective
  - Be cost effective
  - Meet environmental planning & historic preservation compliance requirements
  - Be consistent with mitigation plans

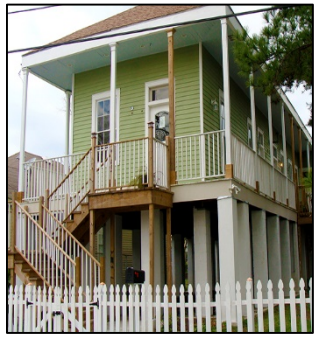
# Hazard Mitigation Assistance Application Process: Background

- The principle components of a subapplication are the Scope of Work (SOW), budget, and schedule.
- Subapplicants submit the project or planning subapplication to the Applicant (State) for review if they meet the program's requirements.
- States prioritize the applications for submittal to FEMA.
- FEMA receives the applications from the Applicant and begins conducting the eligibility and completeness review which makes sure the application has all the supporting documentation and necessary reviews (EHP, BCA).



# Eligible Mitigation Activities





FEMA has historically provided grant funding for the following mitigation project types:

- ✓ Property acquisition and structure demolition/relocation
- ✓ Structure elevation
- ✓ Mitigation reconstruction
- ✓ Dry floodproofing of historic residential structures
- ✓ Dry floodproofing of non-residential structures
- ✓ Generators
- ✓ Localized flood risk reduction projects
- ✓ Non-localized flood risk reduction projects
- ✓ Structural retrofitting of existing buildings
- ✓ Non-structural retrofitting of existing buildings/facilities
- ✓ Safe room construction
- ✓ Wind retrofit for one- and two-family residences
- ✓ Infrastructure retrofit
- ✓ Soil stabilization
- ✓ Wildfire mitigation
- ✓ Advance assistance

# Traditional Mitigation Project: Underground Utility

**Replaces overhead electrical distribution system**

**500** CONSUMERS AFFECTED

**20,000** OUTAGES MITIGATED

**2,000** FEET OF UNDERGROUND CONDUIT & INFRASTRUCTURE REPLACING AERIAL TRANSFORMERS & POLES

**15,000** FEET OF CONDUIT FROM NEW TRANSFORMERS TO BUILDINGS

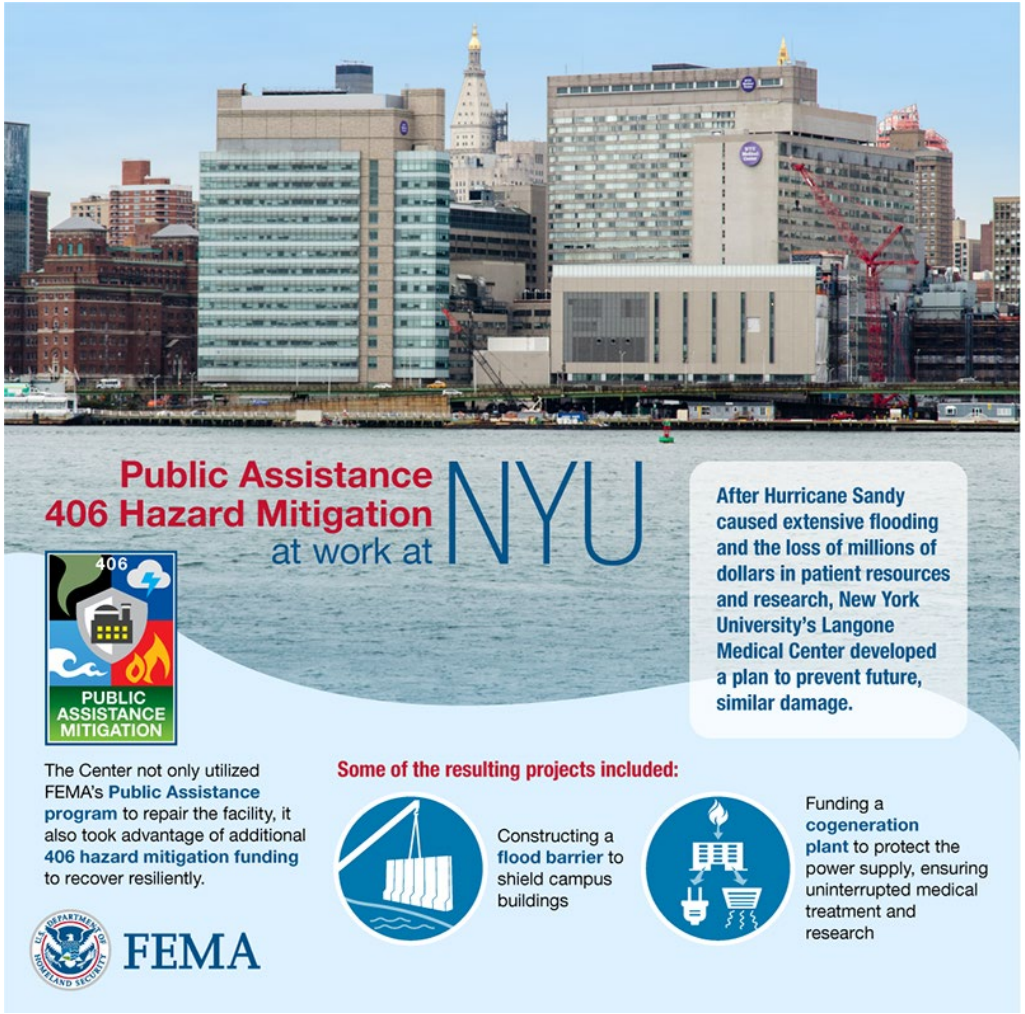
**$3.2M** FED SHARE

**+**

**$1M** NON-FED SHARE

# Lifeline Considerations

# Building Resilient Lifelines: Example



# Energy Lifeline Mitigation at Blue Lake Rancheria

Jana Ganion, Sustainability and Government Affairs Director

Prepared for U.S. Department of Energy and FEMA 11.06.2019

BLUE LAKE RANCHERIA

*A Federally Recognized Tribal Government*

# BLR Tribal Government Resilience Strategy

- Climate-smart infrastructure
  - **Energy** :: Water :: Food :: Transportation :: Communications/IT (the “lifeline sectors”)
  - Improved continuity of operations, community health, resilience (reliability + equity)
  - Economy-enabling infrastructure and investment; lower, predictable costs
- Zero-carbon solutions
  - Pairing climate mitigation + adaptation = net zero greenhouse gas emissions by 2030

# Low-carbon Microgrids at Blue Lake Rancheria

- Community scale – in operation since 2017
- Facility scale – in commissioning, full operation 11/2019
- Campus scale – in design, full operation by Q4 2020, will include residences
- Three nested / clustered microgrids allows for ongoing reliability studies

# Community Microgrid

- Public/private partnership
  - Blue Lake Rancheria, Schatz Energy Research Center, PG&E, Siemens, Tesla, CEC, CPUC, Idaho National Laboratory, others
  - Funded by the Tribe and a CEC EPIC R&D grant
- Powers a 6-building campus
  - Tribal government offices, economic enterprises
  - Critical infrastructure, lifeline sectors
  - Can seamlessly island and reconnect to grid
- Generation and storage
  - 420kW (AC) solar PV
  - 2MWh battery storage
  - Legacy gensets (only used in emergencies)

# Facility Microgrid “Solar+”

- Microgrid public/private partnership
  - Blue Lake Rancheria, Schatz Energy Research Center, PG&E,SunPower, Tesla, CEC, Lawrence Berkeley National Laboratory, others
- At fuel station / convenience store complex
- Solar PV (60kW) + battery storage (106kw/169kwh) – clean energy
- Can island from, and reconnect to, the larger grid
- Advanced building controls – efficiency, demand response, grid balance
- Creates a replicable, low-carbon ‘resilience package’
- In BAU: lowers costs, GHGs, improves COOP
- In emergencies:
  - Supply lifeline sectors to public; emergency responders
  - Important in areas where these facilities are the only community resource for lifeline sectors and critical infrastructure.

# Climate-smart energy infrastructure is working

- Public Safety Power Shutoff 10/9/19
- Served ~10,000 people (~10% of County)
- Supplied general public & response agencies
  - Fuel, ice, water, food, internet access, device charging, ATMs
    - Fuel for local clinic to keep medicines cold; fish hatchery to keep fish alive
  - Electric Vehicle (EV) charging
- Provided critical medical housing in hotel
  - Credited with saving four lives
- Community Support Center
- The PSPS did its job – no wildfires
- The microgrids did their job – regional support

# How do we mitigate the energy lifeline?

- **Climate crisis is causing chronic emergency conditions and social/economic disruptions**
  - Disadvantaged and vulnerable communities are often impacted first and worst
- Out of time for "bridge" energy – subsidize only zero-emission solutions
  - Zero emissions in operation; ideally zero net carbon emissions per lifecycle analysis
- Continue solar and wind at all scales
  - Job creation is unparalleled, important in rural environments
    - U.S. Bureau of Labor Statistics forecasts the two fastest growing U.S. jobs through 2026 are solar installer (105% growth) and wind technician (96% growth) https://www.bls.gov/ooh/fastest-growing.htm
  - Relatively inexpensive, lower immediate environmental impacts, ability to lower GHGs dramatically
  - Solar lifecycle analysis – very low or zero/negative carbon as of ~2018
    - https://www.theatlantic.com/science/archive/2016/12/the-solar-industry-has-paid-off-its-carbon-debts/510308/
  - Offshore wind – world-class resource and high capacity factor on the North Coast of California

# How do we mitigate the energy lifeline?

- Support zero-emission microgrids for stacked benefits
  - Microgrids create jobs, reduce climate change and pollution, increase regional resilience
- Need to work on how microgrid resilience is valued
  - In business as usual:  lower costs, cleans the grid and electrified transportation
  - In emergencies:  pockets of critical infrastructure can hold up entire regions, reduce economic and social impacts
  - Funding streams and economic incentives (e.g., specific microgrid rate tariffs?) to spur cost-effective development and rapid implementation
- Need analysis of how to best manage microgrids
  - Regional expertise capacity, safety, interconnect with/benefit larger grid
- Need microgrid knowledge transfer
  - To avoid inappropriate technology, increase standardization, lower capital and O&M costs


- Conclusion
  - Mitigate Energy Lifeline
    - Energy, transportation, telco
    - Emergency preparedness
    - Climate mitigation
    - Private sector is joining
  - Bold, climate-smart actions are needed and are already successful
  - jganion@bluelakerancheria-nsn.gov

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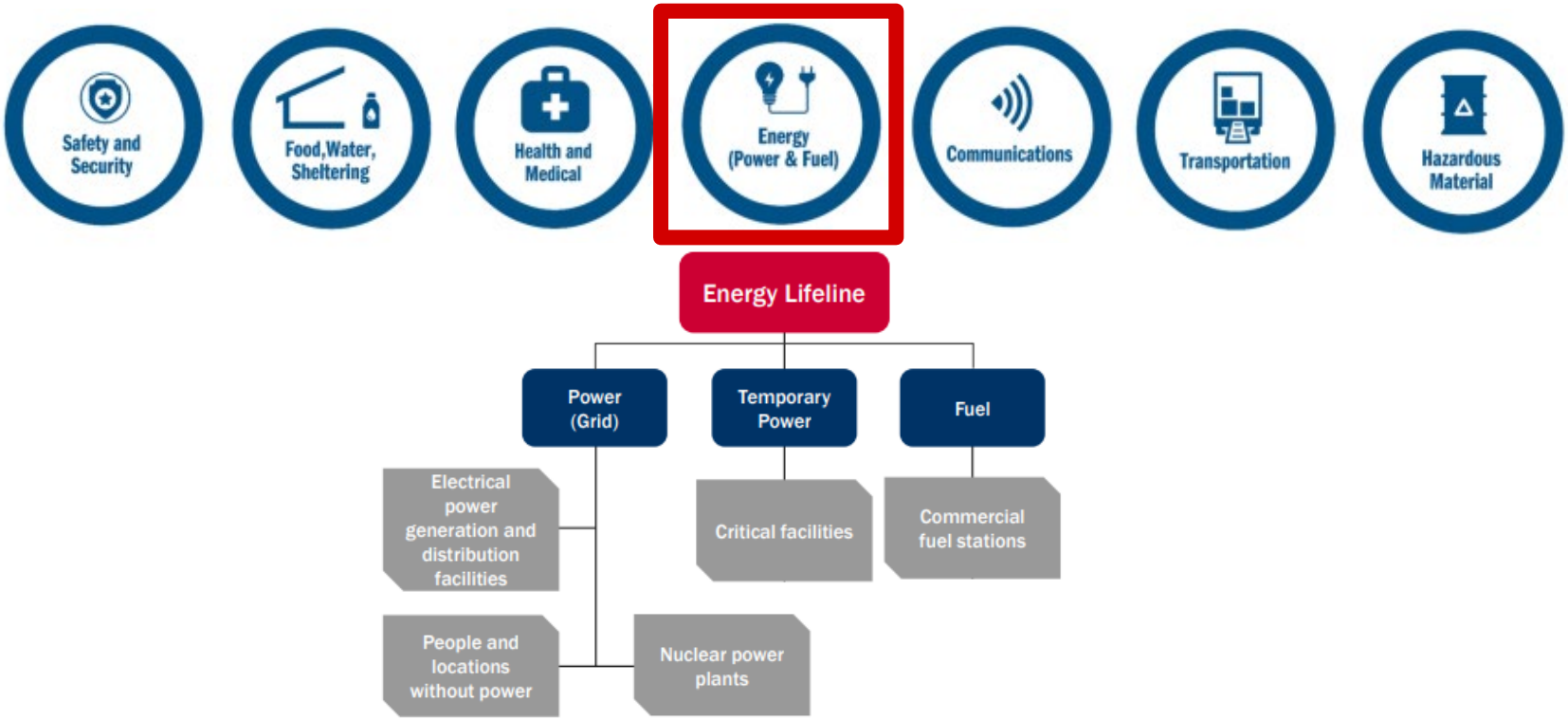
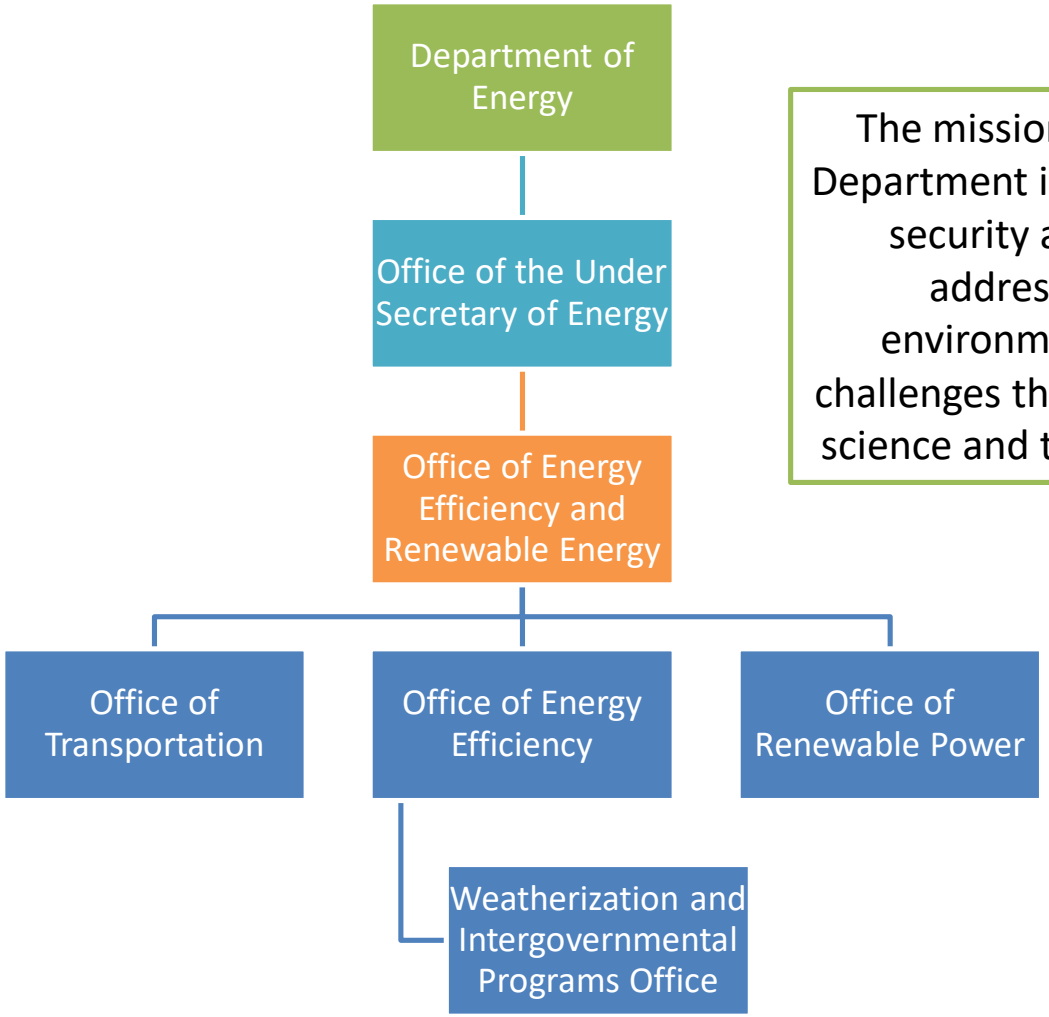
# U.S. Department of Energy's Energy Mitigation Projects for States and Territories

# FEMA's Energy Lifeline & DOE Role



# U.S. Department of Energy Organizational Chart




The mission of the U.S Energy Department is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.

# Weatherization & Intergovernmental Programs (WIP) Office

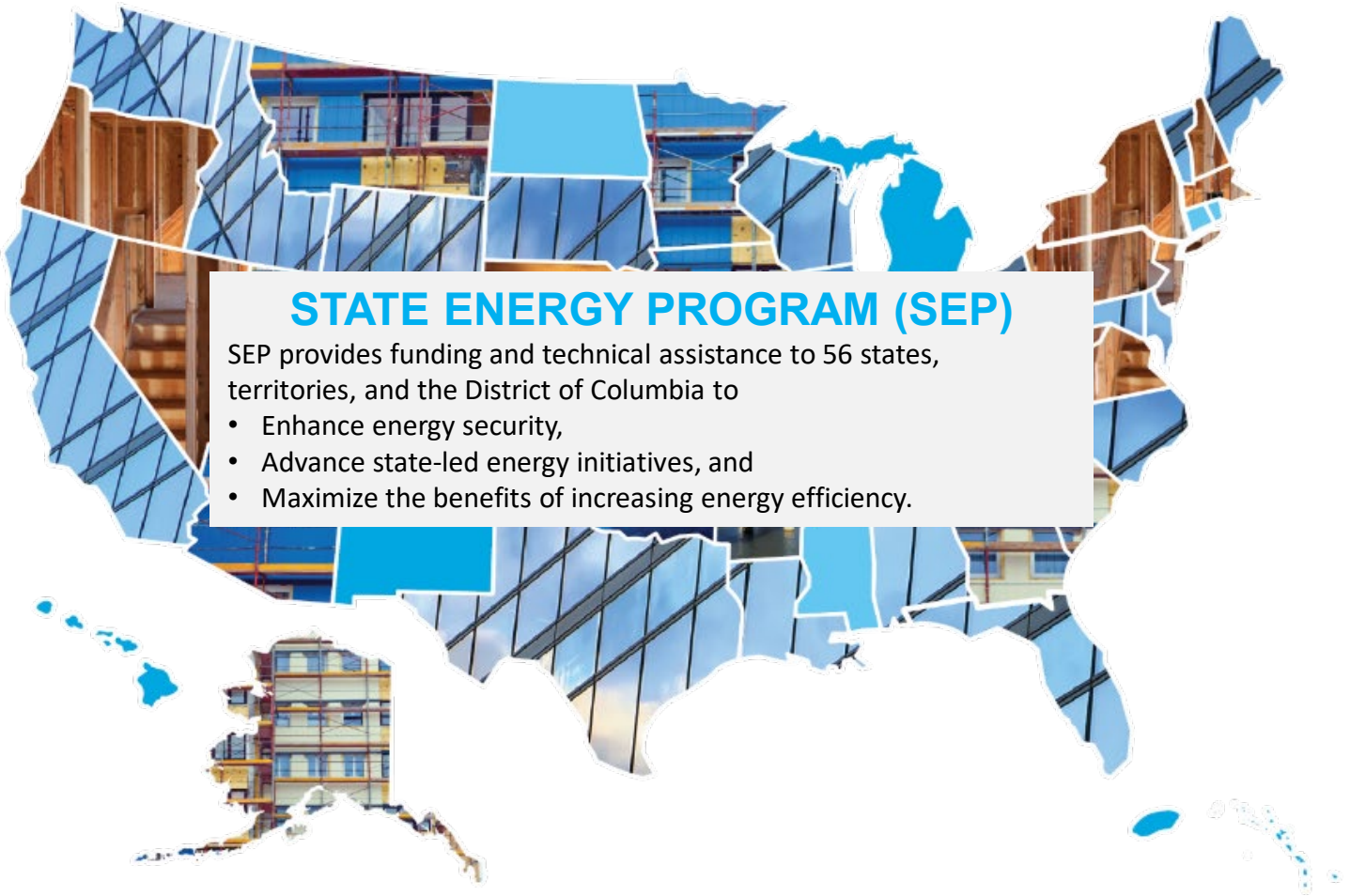
# Weatherization & Intergovernmental Programs (WIP) Office

We enable
**STRATEGIC INVESTMENTS**
in energy efficiency and renewable energy technologies through the use of **INNOVATIVE PRACTICES** across the United States and a wide range of stakeholders, in **PARTNERSHIP** with state and local organizations and community-based nonprofits.

## RESULTS:

- Saving taxpayer dollars
- Making full use of domestic energy resources
- Cutting energy waste
- Improving energy independence and security
- Furthering the development of energy infrastructure

# U.S. Department of Energy's State Energy Program (SEP)

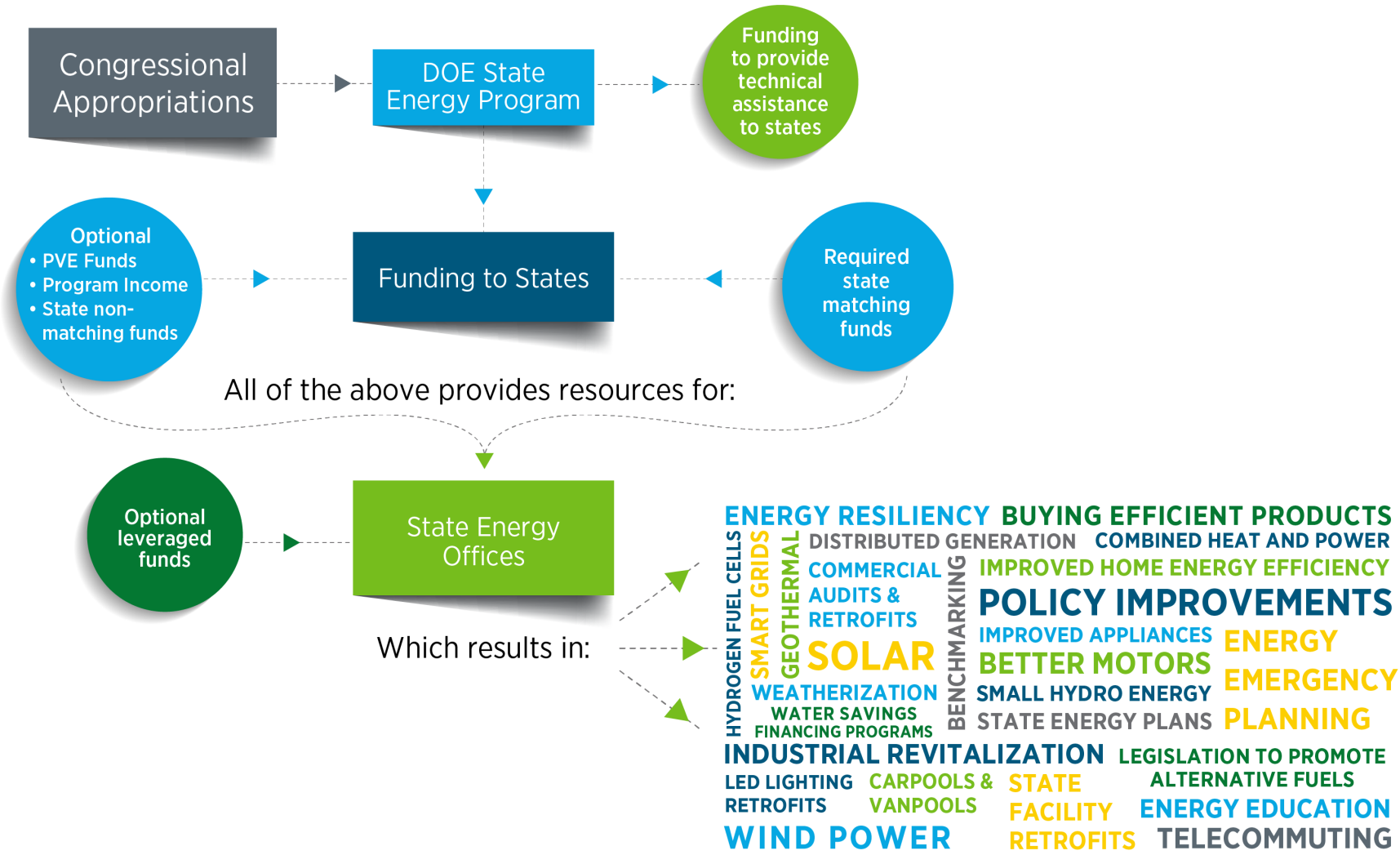


## STATE ENERGY PROGRAM (SEP)

SEP provides funding and technical assistance to 56 states, territories, and the District of Columbia to

- Enhance energy security,
- Advance state-led energy initiatives, and
- Maximize the benefits of increasing energy efficiency.

# State Energy Program Formula Funding



# DOE State Energy Program: Puerto Rico PV & Storage Energy Resiliency Project

Project Year: 2018

SEP Project Cost: $239,000

Goal: To increase residential energy resiliency and reduce energy consumption from the grid.

- **20 homes** were chosen for **PV and battery storage** based on the following criteria:
  - Previously weatherized to reduce energy consumption
  - Energy grid vulnerability (after Hurricane Maria event)
- Total 54kw of PV solar installed (2.7kw per home)
- Total battery cycling capacity 80 hours per home

*A PV and battery storage system installed in Puerto Rico as part of this project*

GOBIERNO DE PUERTO RICO
Departamento de Desarrollo Económico y Comercio

# DOE State Energy Program: Puerto Rico PV & Storage Energy Resiliency Project

**Impacts:**

- Participating home energy use has decreased by an average of 10–15 kWh.
- Participants feel more safe and confident in having electricity when there is an outage.
- Passive survivability has increased for participating home residents.

*A PV and battery storage system installed in Puerto Rico as part of this project*

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Departamento de Desarrollo Económico y Comercio

# DOE SEP Project: Florida SunSmart Schools and Emergency Shelters

Project Year: 2009

SEP Project Cost: $9.84 million with ~$900,000 in matching funds from Florida Utilities

Goals: Reduce energy costs for schools and increase community resilience.

- Florida outfitted **117 schools with solar systems** that double as emergency shelters with 10 kW bimodal photovoltaic (PV) arrays with battery back-up.
- Installed more than a megawatt of solar that produce an average of 12.8 MWh annually.
- Educational kits for teachers:
  - STEM (science, technology, engineering, and math) content was designed for students to learn about renewable energy
  - Workshops for teachers and facility managers

*The SunSmart Program has installed solar power systems at schools designated as emergency shelters throughout Florida. Photo by Amy Kidd, SEP Team Lead*
https://www.energy.gov/eere/wipo/articles/sep-success-story-floridas-sunsmart-program-helps-provide-power-schools-when

# DOE SEP Project: Florida SunSmart Schools and Emergency Shelters

**Impacts:**

- The systems have been activated during four hurricanes: Hermine, Matthew, Irma, and Michael.
- There were 40 SunSmart Schools E-shelters activated during Hurricane Irma:
  - 32 of the 40 schools lost power from the electric grid and utilized the battery system for backup power.
- Annual savings of approximately $133,346 for the entire project or $1,258 per school.
- Over 450 Florida teachers and 50,000 students have received education in the science and use of renewable energy technologies.

*Map of Florida SunSmart Schools and Emergency Shelters*

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# Department of Energy Resources

- Weatherization and Intergovernmental Programs Office (WIP) Fact Sheet: https://www.energy.gov/sites/prod/files/2019/08/f65/EERE_WIP_Overviewv6.pdf
- State Energy Program Fact Sheet: https://www.energy.gov/sites/prod/files/2019/06/f64/wip-sep-factsheet-0619.pdf
- Energy Efficiency and Renewable Energy Resources for State and Local Leaders: https://www.energy.gov/sites/prod/files/2019/07/f64/Summer2019-SLSC-resource-guide.pdf
- DOE's Better Buildings Initiative's resilience webpage: https://betterbuildingsinitiative.energy.gov/resilience
- How Distributed Energy Resources Can Improve Resilience in Public Buildings: Three Case Studies and a Step-by-Step Guide: https://www.energy.gov/eere/slsc/downloads/how-distributed-energy-resources-can-improve-resilience-public-buildings-three
- Energy Efficiency and Distributed Generation for Resilience: Withstanding Grid Outages for Less: https://www.energy.gov/sites/prod/files/2019/06/f64/EEDG-Resilience.PDF

# FEMA Resources

- FEMA Hazard Mitigation Assistance (HMA): https://www.fema.gov/hazard-mitigation-assistance
- FY19 Pre-Disaster Mitigation (PDM) General Information: https://www.fema.gov/pre-disaster-mitigation-grant-program
- FY19 PDM Notice of Funding Opportunity (NOFO) and Fact Sheet: https://www.fema.gov/media-library/assets/documents/182171
- Community Lifelines Implementation Toolkit: https://www.fema.gov/media-library/assets/documents/177222

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# Thank you!

## Question & Answer