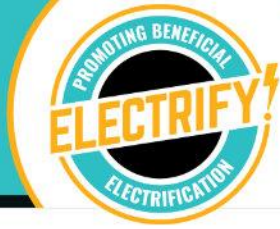




Beneficial Electrification

Beneficial Electrification League
Keith Dennis, President
kdennis@be-league.org

BEL's Mission and Vision



Vision

Our vision of the future is for beneficial electrification to be universally accepted as a necessary strategy to meet economic, consumer and environmental goals.

Mission

To increase understanding on the benefits of electrification by promoting the market acceptance of beneficial electrification, educate policy makers on the value, benefits and tools of Beneficial Electrification and serve as a conduit and facilitator of BE resources.

What is “Beneficial Electrification?”



Beneficial Electrification (BE) includes the application of electricity to end-uses where doing so satisfies at least one of the following conditions, without adversely affecting the others:

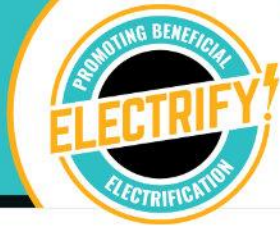
- Saves consumers money over time;
- Benefits the environment and reduces greenhouse gas emissions;
- Improves product quality or consumer quality of life;
- Fosters a more robust and resilient grid

Beneficial Electrification programs are a valuable opportunity to engage both electric utilities and environmental groups in the effort to identify solutions that work well for the end-use consumer, local communities and the environment.

NOT an “Electrify Everything” Concept

Follow The Beneficial Electrification League on LinkedIn

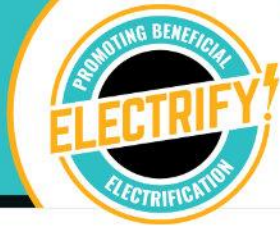
Beneficial Electrification



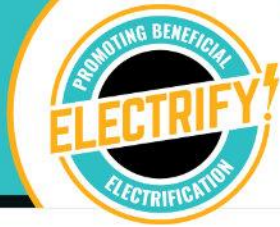
What's your favorite thing powered (or charged) by electricity?



What's Your BE Experience?



What's Your BE Experience?



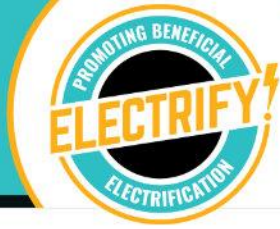
**Bigger, better,
replaceable,
rechargeable
batteries**



What's Your BE Experience?



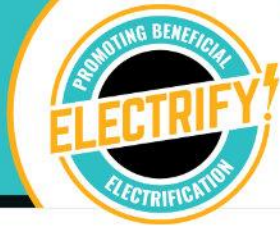
What's Your BE Experience?



Before
Beneficial
Electrification



What's Your BE Experience?



After
Beneficial
Electrification



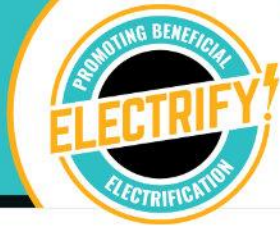
What's Your BE Experience?



AFTER
Beneficial
Electrification



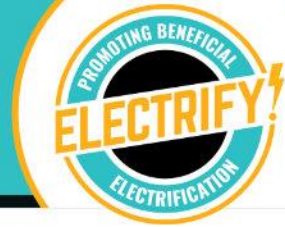
Technology Interest Beyond EVs



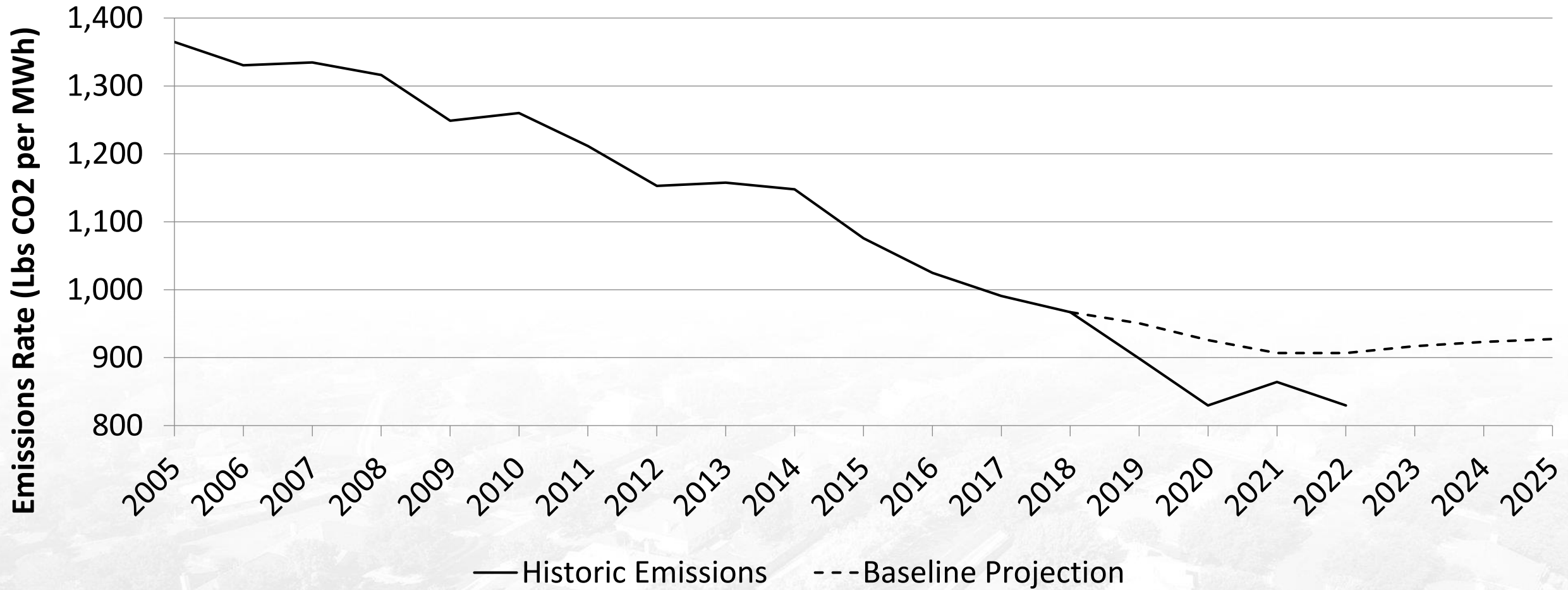
MORE MORE MORE!



Opportunity to Improve “Emissions Efficiency”

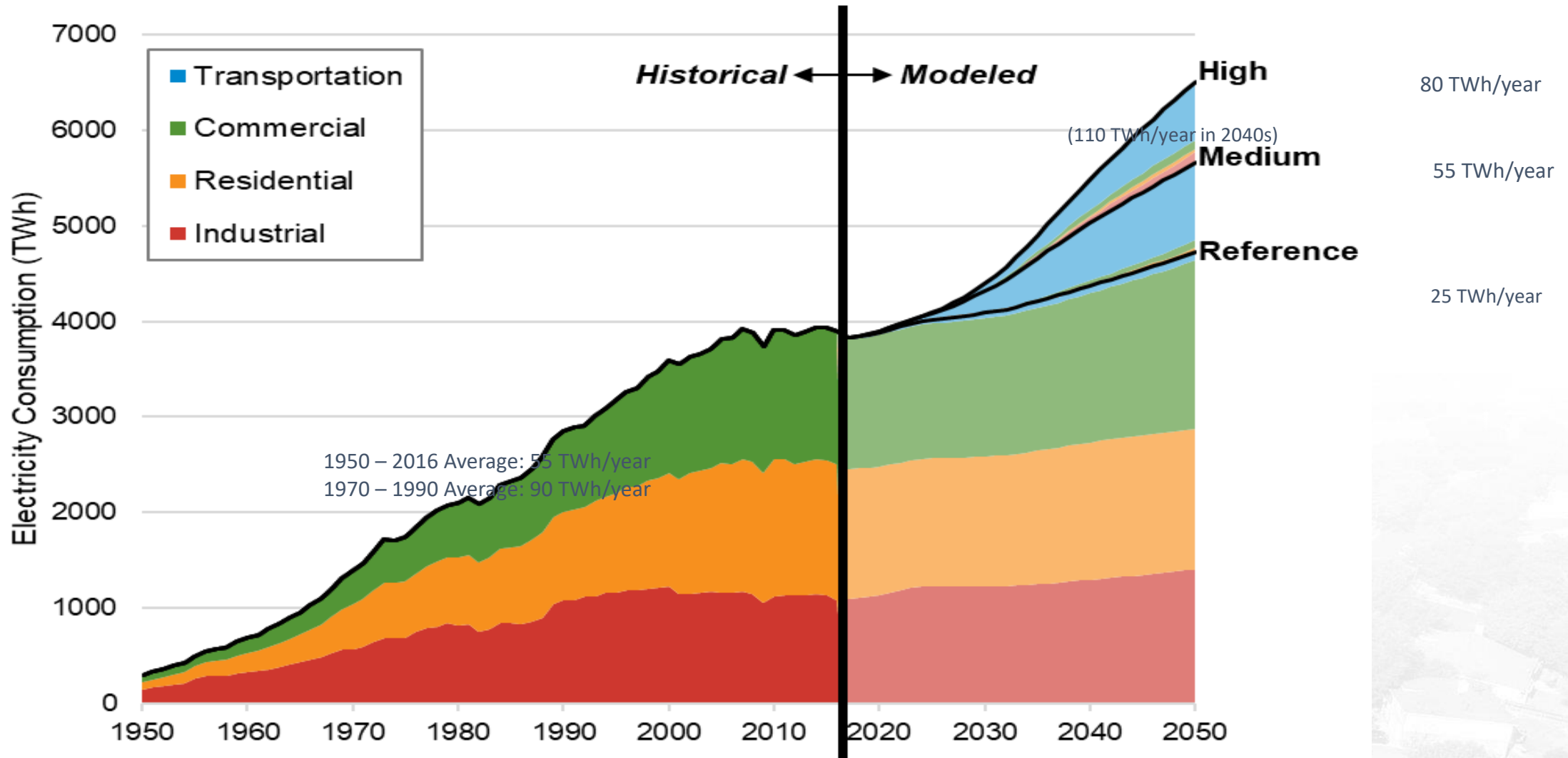
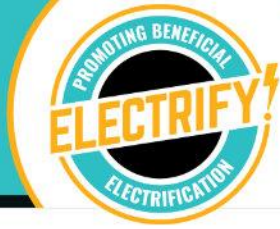


Electricity is Getting Cleaner Over Time



By virtue of being plugged into the grid, the environmental performance of electric devices improves over time. (Source EIA)

Electric Load Growth Significant, but Not Unheard of



1950 – 2016 Average: 55 TWh/year
1970 – 1990 Average: 90 TWh/year

Historical ← → Modeled

(110 TWh/year in 2040s)

High

80 TWh/year

Medium

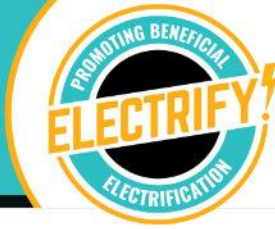
55 TWh/year

Reference

25 TWh/year

Source: NREL

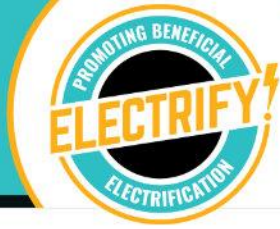
Infrastructure Investment and Jobs Act (IIJA)



- **SUMMARY OF THE ACT**
- **Division A – Surface Transportation; Title I – Federal-Aid Highways; Subtitle D – Climate Change**
- Section 11401: Grants for Charging and Fueling Infrastructure. \$7,500,000,00
- **Division D – Energy; Title I – Grid Infrastructure and Resiliency; Subtitle A – Grid Infrastructure Resiliency and Reliability**
- *Section 40101: Preventing Outages and Enhancing Resiliency of the Electric Grid. \$5,000,000,000*
- *Section 40103: Electric Grid Reliability and Resilience Research, Development, and Demonstration. \$5,000,000,000*
- *Section 40107: Deployment of Technologies to Enhance Grid Flexibility. \$3,000,000,000*
- **Division D – Energy; Title V – Energy Efficiency and Building Infrastructure; Subtitle B – Buildings**
- *Section 40511: Cost-Effective Codes Implementation for Efficiency and Resilience. \$225,000,000*
- **Division D – Energy; Title V – Energy Efficiency and Building Infrastructure; Subtitle D – Schools and Nonprofits**
- *Section 40541: Grants for Energy Efficiency Improvements and Renewable Energy Improvements at Public School Facilities. \$500,000,000*
- **Division D – Energy; Title V – Energy Efficiency and Building Infrastructure; Subtitle E –**
- *Section 40551: Weatherization Assistance Program. \$3,500,000,000*
- *Section 40552: Energy Efficiency and Conservation Block Grant Program. \$550,000,000*
- And on and on and on and on and on.....



Inflation Reduction Act – August 2022



Federal Funding Process



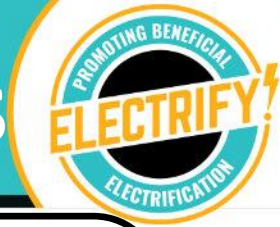
From this ↓



To this ↓



BEL Strategy – Ease Access and Leverage Funds



- \$5 Billion EPA (IIJA)
- Assist electric cooperatives, munis and school districts in awareness of the program and technology.



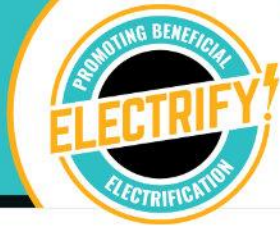
- \$3.5B DOE WAP (IIJA)
- \$4.5B IRA HOMES (IRA)
- \$4.5B IRA HEEHRA (IRA)
- Tax credits (IRA)
- Create a network of stakeholders that can leverage funding to achieve W/E together.
- Explore a national program to make it easier to implement opportunities



- EECBG, etc.
- GRIP
- State programs - 40101D, Rebates
- EPA planning/implementation grants
- USDA PACE, New ERA, REAP
- Seek to provide streamlined information and facilitate reduced application and reporting burden



Federal Rebate Program is Open Now



The EPA Clean School Bus 2023 Rebate Program is Open! It will be open from September 28, 2023 – January 31, 2024,

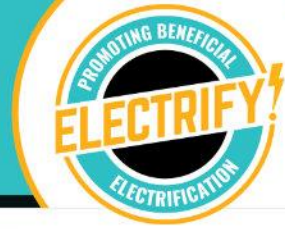
Our top three things to know about the program this year:

1. The rebates for priority school districts are up to \$345,000 per bus (\$200,000 per bus for non-priority)
2. The priority list has changed, so to see if a school in your area is on the priority list
3. There is a requirement for applicants to talk to their utilities before applying.

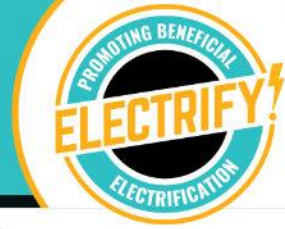
As part of a partnership with CoBank, we have helped several hundred rural electric cooperatives and municipal utilities understand the program and provide information and support to their school districts.

<https://be-league.org/buses/>

Why Weatherize and Electrify Together?

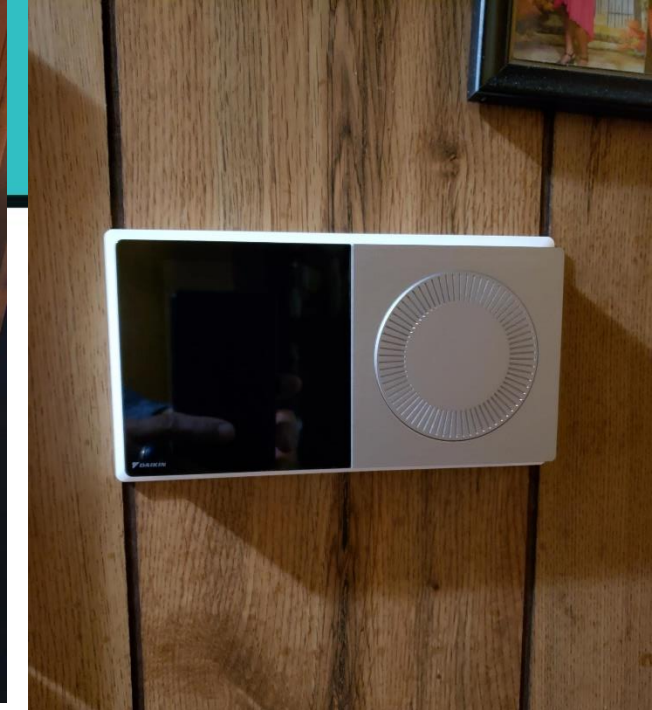


Why Weatherize and Electrify Together?



- Electrification without Weatherization = potential comfort issues and oversizing
- Weatherization without electrification = **missed** opportunity for assessment and BE/EE opportunities
- W/E Together = Reduced peak load (counterintuitive), increased comfort and multiple benefits
- ***Tackling upfront costs key to equity in energy transition***





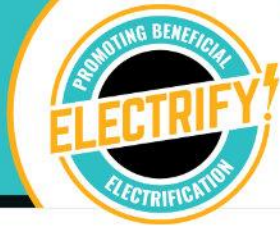
- Weatherization and wiring complete
- Window AC units removed (2)
- Heat pump installed
- Water heater installed
- Thermostat installed
- Stove installed

HOMES and HEEHRA



- Both programs are newly created and have over \$4B each set aside to flow to states for implementation
- Home Owner Managing Energy Savings (HOMES) Rebate Program allows for HP upgrades with a rebate of \$4,000 (\$8,000 for LMI homeowners)
- High-Efficiency Electric Homes Rebate Program is an income-qualified program with a cap of \$14,000 per home and \$8,000 for HP systems

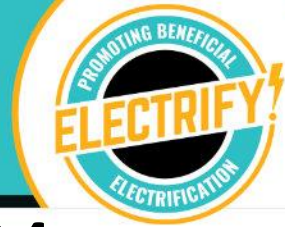
The Inflation Reduction Act: HEEHRA



Point-of-sale rebates
up to \$14,000 for
LMI households

- \$8,000 for heat pumps
- \$1,750 for heat pump water heaters
- \$840 for heat pump clothes dryers
- \$840 for electric or induction stoves
- \$4,000 for electrical panel upgrades
- \$2,500 for rewiring
- \$1,600 for basic weatherization

Clean Energy Production and EVs



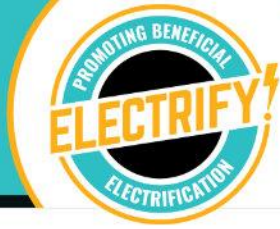
- Generation technology incentives are extended through 2024 and then pivot to a technology neutral approach
- New electric vehicles eligible for \$7,500 and used EVs for \$4,000
- The law is written in a way to spur domestic manufacturing of finish products and key components such as batteries
- (Does this impact whether we should plan ahead in buildings for EV charging?)

Investment Tax Credit



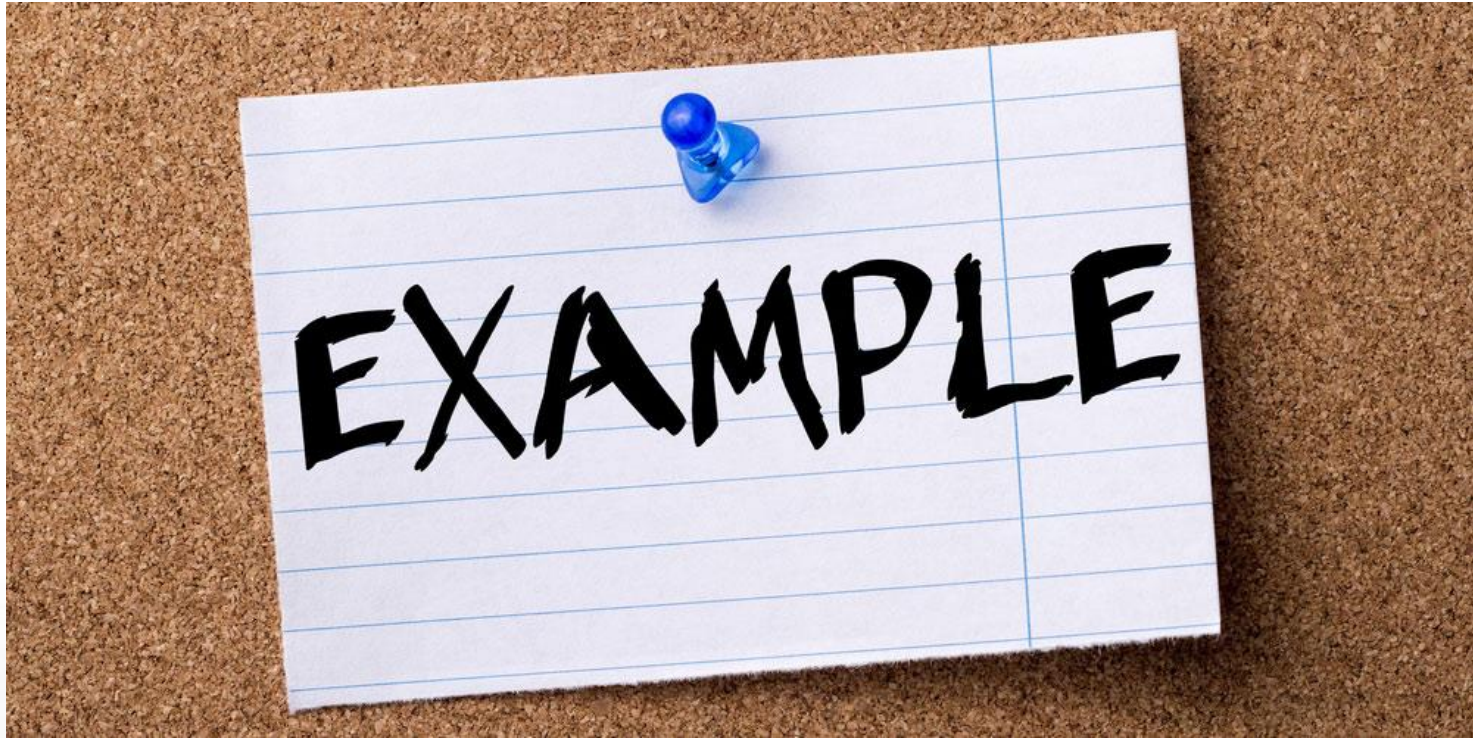
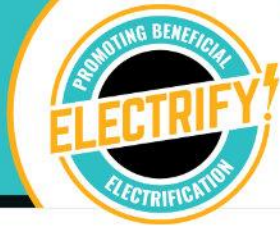
- A completely new approach for the ITC aimed at driving trade union participation in clean tech industries
- Base and bonus rates – 6% or 30% if prevailing wage and apprenticeship requirements are met on project > 1MW
- Geo Heat Pumps made equal with solar at 6%/30%
- Domestic content and energy communities bonus credits

Residential Energy Tax Credit



- Formerly the Residential Energy Efficient Property Credit (IRC Section 25D)
- Applies to geothermal heat pumps, solar panels, fuel cells, biomass stoves, small wind turbines, solar thermal, and now includes home battery arrays
- Extended through 2032 at 30% with an additional two year phase-out

What is it like to Apply for a Federal Grant?



Let's Use this Example From OCED



https://www.energy.gov/oced/funding-notice-distributed-energy-systems-demonstrations-program



ENERGY.GOV

Newsroom Careers Energy.gov Offices National Labs Search Energy.gov



Office of
CLEAN ENERGY DEMONSTRATIONS

ABOUT OCED

FUNDING

PORTFOLIO

RESOURCES

CAREERS

Funding Notice: Distributed Energy Systems Demonstrations Program

Office of Clean Energy Demonstrations

[Office of Clean Energy Demonstrations](#) » Funding Notice: Distributed Energy Systems Demonstrations Program

Office: Office of Clean Energy Demonstrations

FOA Number: DE-FOA-0003139C

Access the FOA: [OCED eXCHANGE](#)

FOA Amount: \$50M

Background on this Grant



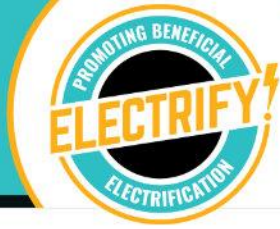
The FOA will fund demonstrations that prove out the operations and the financial value of connected energy systems with high amounts of renewable generation, (megawatts and various assets like electric vehicles), commercial and industrial facilities, and smart buildings and homes.

The DES Program aims to fund 2-4 projects at \$10M-\$25M each, focused on the following requirements:

- Using a distribution grid with at least 20MW peak load
- Utilizing a distributed energy resources (DER) with an aggregated capacity of at least 25% of the grid system peak load
- Ensuring at least 50% of distributed energy resources are in place and/or enrolled at the application stage

DOE anticipates that funds will primarily support system planning, enhancements to sensing, communications and control infrastructure, control software, with a limited portion of funds supporting deployment of distributed energy assets.

The FOA – It is Your MAP!



OCED
Office of Clean Energy Demonstrations

OCED Funding Opportunity Exchange

Funding Opportunity

Funding Archive

Login

Register

Manuals

Questions & Answers

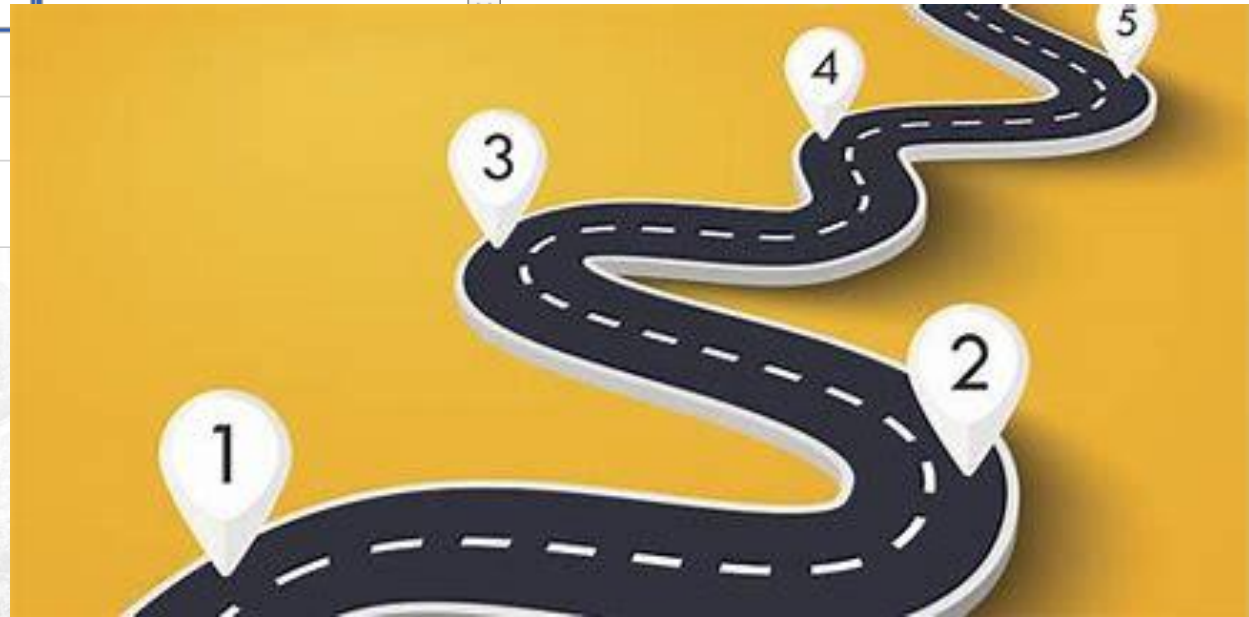
Teaming Partners

OCED FUNDING OPPORTUNITY ANNOUNCEMENTS

Jump to a FOA:

| FOA Number | FOA Title | Announcement Type |
|--------------------------------|--|-------------------|
| DE-FOA-0003139 | Distributed Energy Systems Demonstrations | |
| DE-FOA-0003187 | Demand-side RFP for Independent Entity | |
| DE-FOA-0003138 | Notice of Intent to Issue Funding Opportunity Announcement No. DE-FOA-0003139 - Distributed Energy Systems Demonstrations Funding Opportunity Announcement | |

ONLY 66 PAGES!!!



Pre-Requisite – ORGANIZATION Eligibility



Eligible Applicants:

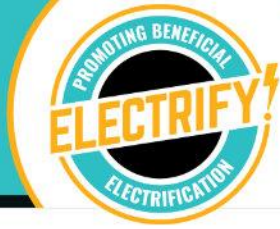
The following types of entities are eligible to participate as prime recipients:

1. Utilities, including Municipal, Cooperative and Investor-Owned Utilities.
2. For-profit entities **currently** engaged in grid service provision via an **established portfolio** of aggregated distributed energy resources.

The following types of entities are eligible to participate as subrecipients: institutions of higher education; National Laboratories/FFRDCs, non-profit entities; for-profit entities; Tribal Nations; state and local governmental entities; community choice aggregators; incorporated and unincorporated



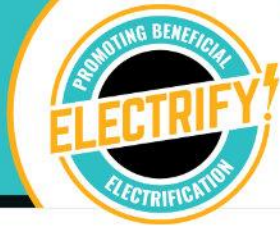
Pre-Requisite – Eligible ACTIVITIES



Projects should accomplish the maximum practicable number of the following objectives:

- Demonstrate reliable operations and financial value of distribution grids that leverage high levels of variable renewable generation and flexible load assets to the distribution grid operators and end-users.
- Demonstrate interoperability and coordinated control of generation, grid, storage, transportation, industrial and/or building energy systems.
- Demonstrate reliable grid service provision from diverse DER mixes and grid configurations.
- Support the development of best practices for planning, execution, and operation of similar projects.
- Ensure sharing of best practices and key learnings on grid reliability at high levels of penetration utilizing diverse asset mixes with system operators to ensure replicability and extensibility of control approaches.
- Share electricity usage and system performance data with relevant communities (geographic communities and communities of practice) to accelerate adoption and replication of successful solutions.
- Integrate with and expand grid operator training programs.
- Accelerate the incorporation of these solutions into utility planning processes.
- Reduce the cost of capital for implementation of similar, subsequent projects.
- Reduce barriers to participation and access to grid service financial value for a diverse group of energy asset owners and disadvantaged communities (DAC).
- Engage in providing grid services to Independent System Operators/Regional Transmission Organizations (ISO/RTO) through FERC Order 2222.

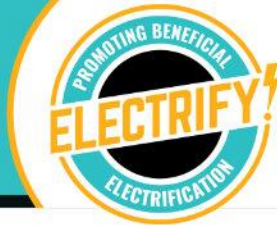
Align Program Goals / Legislative Origins



Projects should accomplish the maximum practicable number of the following objectives:

- Demonstrate reliable operations and financial value of distribution grids that leverage high levels of variable renewable generation and flexible load assets to the distribution grid operators and end-users.
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Key Technical Issues – Page Length, Font, etc.



5.0 Application and Submission Information

5.1 Application Package

All submissions in both the Concept Paper and Full Application phases must conform to the form and content requirements described below, including maximum page lengths:

- Each must be submitted in Adobe PDF format unless stated otherwise;
- Each must be written in English;
- All pages must be formatted to fit on 8.5 x 11-inch paper with margins not less than one inch on every side. Use Calibri typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10-point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement;
- A **control number** will be issued when an applicant begins the OCED eXCHANGE application process. The control number must be included with all application documents. Specifically, the control number must be prominently displayed on the upper right corner of the header of every page and included in the file name (i.e., *Control Number_Applicant Name_Application*);
- Page numbers must be included in the footer of every page; and
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

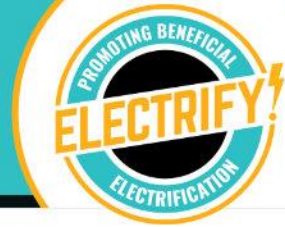
Exceptions: Templates provided by DOE or other government forms may be used in the native formatting of those documents.

NOTE: The maximum file size that can be uploaded to the OCED eXCHANGE website is 50MB. Files exceeding 50MB cannot be uploaded and hence cannot be submitted for review. If a file exceeds 50MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

ProposalContent_Part_1
ProposalContent_Part_2

DOE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.

- Naming the files
- Choosing the right margins
- Choosing the right font
- Checking page length for each area of the FOA



4.2 Cost Sharing

Applicants are bound by the cost share proposed in their applications if selected for award negotiations. The cost share must be at least **50% of the total project costs.**^{30,31} The cost share must


come from non-federal sources unless otherwise allowed by law, such as project participants, state or local governments, or third-party financing. Cost share may be provided in the form of cash or cash equivalents, or in-kind contributions.

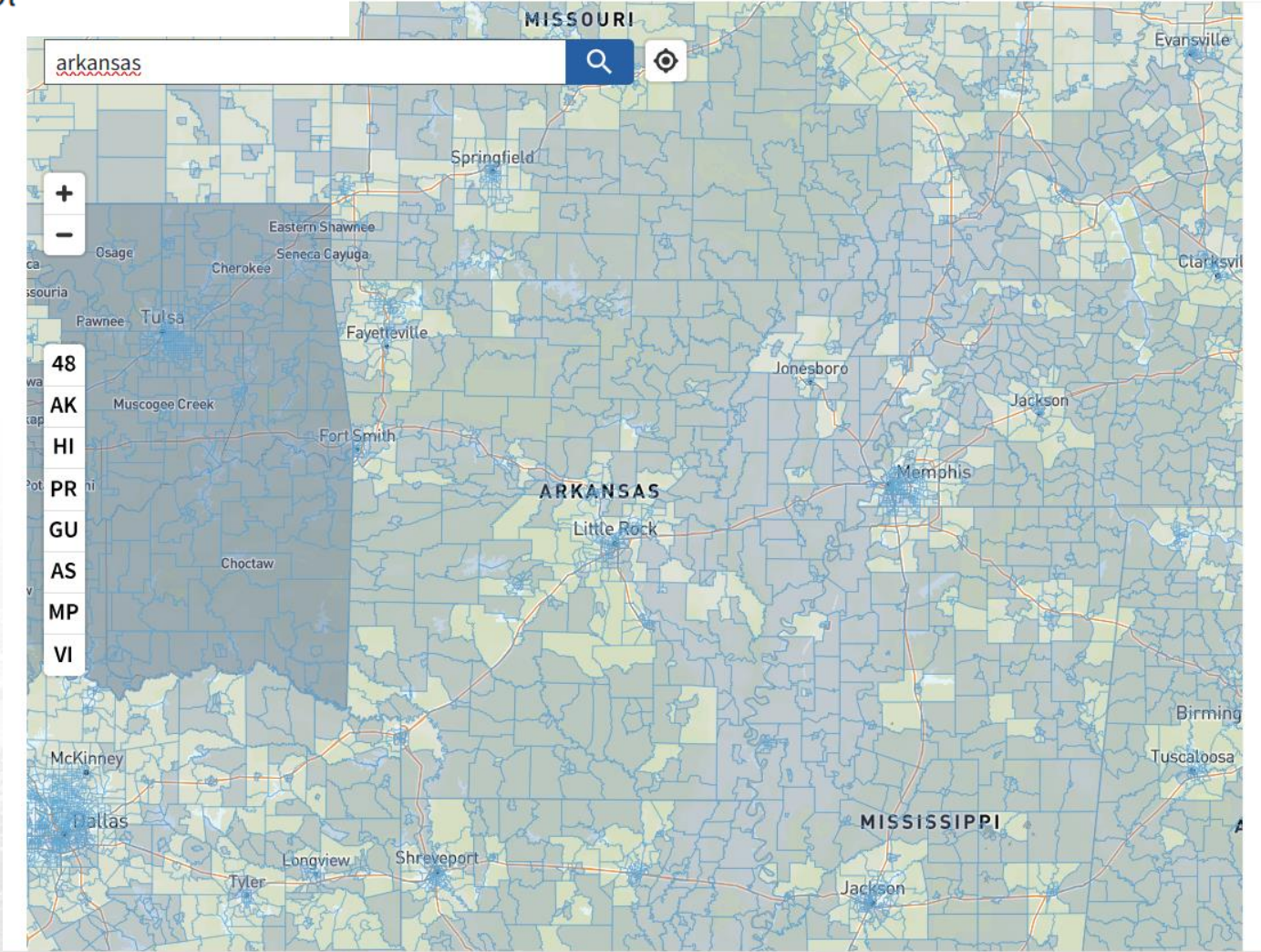
Federal financing, such as DOE Loan Guarantees, cannot be leveraged by applicants to provide the required cost share or otherwise cover the same scope that is proposed in the application. Also, in general, deferred or avoided costs such as tax credits may not be used as cost share.

A contingency reserve will also be required for all Phase 3 and 4 activities. More information on contingency reserves can be found in [Section 3.0](#). Contingency funds may not be included as cost share in the applicant's budget.

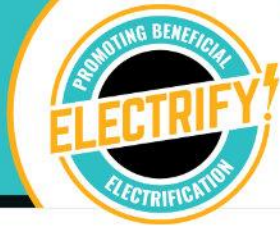
Community Benefits – DACs, EJ 40, Letters



 Climate and Economic Justice
Screening Tool



FOCUS on Scoring – It Matters



Criterion 1: Technical Approach and Impact (20%)

This criterion involves consideration of the following factors:

- Degree to which the proposed approach enables reliable grid operations utilizing distributed energy resources to provide grid services and functionality.

Criterion 2: Financial and Market Viability (25%)

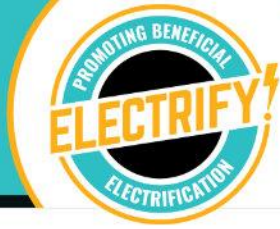
This criterion involves consideration of the following factors:

- Degree to which the applicant assesses and demonstrates potential market competitiveness and sustainability for the proposed project, technology, and operational approach-- including specific grid services to be provided--through market analysis and offtake agreements.
- Adequacy of the details in the preliminary techno-economic analysis to justify viability and feasibility of the project and the value proposition and timeline of the technology to be replicated.
- Availability, credibility, and risk/terms of non-federal cost share sources and funds necessary to meet ongoing cost share needs. This includes the ability to leverage DOE financial assistance funding from this FOA with state and local incentives and private financing.
- Degree to which the applicant addresses each key participating organization's financial commitment to the proposed project including overall financial strength and financial capability to implement the proposed plan.



ETC...ETC...ETC....

Register and Submit Early!



5.2.3 FedConnect

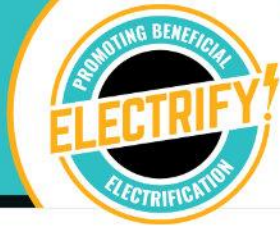
Register in FedConnect at <https://www.fedconnect.net>. To create an organization account, the applicant's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.

5.2.4 Grants.gov

Register and subscribe in Grants.gov (<http://www.grants.gov>) to receive automatic updates when modifications to this FOA are posted. However, please note that Concept Papers and Full Applications will not be accepted through Grants.gov.

As applicable, modifications to this FOA will be posted on the OCED eXCHANGE website and the Grants.gov system. However, the applicant will only receive an email when a modification is posted if registered for email notifications for this FOA in Grants.gov. OCED recommends that the applicant register and subscribe in Grants.gov as soon as possible after the release of the FOA to ensure receipt of timely notice of any modifications to this FOA.

Direct Pay Tax Credits – Alternative to Grants



Extends existing and new tech-specific PTC/ITC to projects placed into service before 12/31/2024

Production Tax Credits (PTC)

- Extended: Wind, solar, biomass, geothermal, waste, marine, hydrokinetic, fuel cells, CHP
- New: Carbon capture, clean hydrogen, hydropower, existing nuclear

Investment Tax Credits (ITC)

- Solar, wind, fuel cells, CHP, geothermal, stand-alone storage, biogas, interconnection property, electrochromic glass, linear generators



*Technology-Neutral Tax Credits (2025-2032) also available.

Finding Funding - Success in Challenging Conditions



Omnivores dilemma:

DOE ERA – 659 applications for 59 spots

DOE EECBG – two BEL assisted state teams selected to apply (MA and VT)

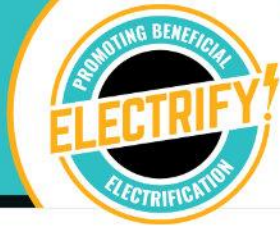
USDA PACE:

- 9 projects, including 1 statewide project
- 500M in LOI funding requests. 135M received application requests thus far

USDA New ERA:

- 4000 MW Solar
- 2000 MW Wind
- 2000 MW Storage
- \$13B of total cost
- 6+ fossil plant retirements
- Annual GHG Reduction 22M+ tons
- Total GHG Reduction at least a half a billion tons

Thank You Stakeholders for the Relationship!



“Thanks to the BEL Team for all their support. Keith and his team were very helpful and insightful into the opportunities, and as a sounding board for ideas and strategy.”

Director of Transmission and Project Services, Florida Cooperative

“We are grateful for the support and guidance provided by the Beneficial Electrification League. Their assistance was instrumental in enabling us to successfully apply for and secure electrification funds.”

CEO, Massachusetts Municipal Utilities