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Transmission, Innovation, & Grid Modernization: GDO's Toolbox

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“To realize the full benefit of the nation’s goal of 100% clean electricity by 2035, we need to more than **double** our grid capacity.”

Secretary Jennifer Granholm

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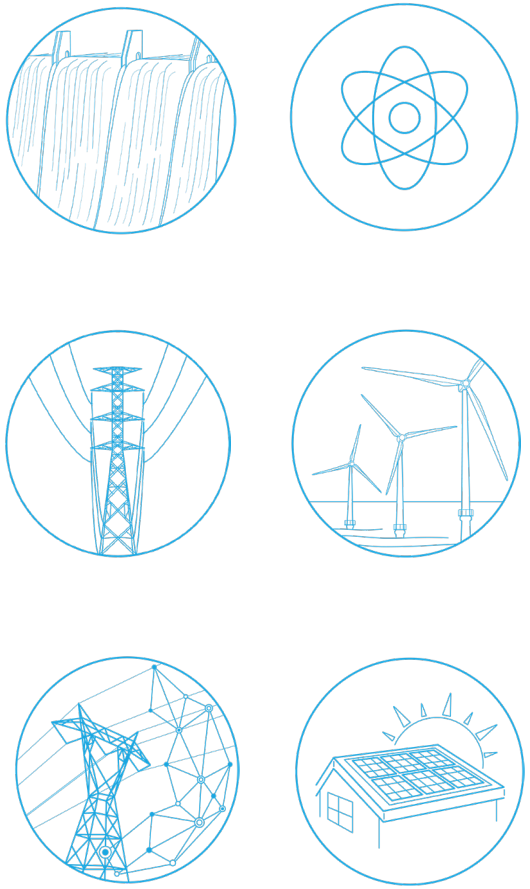
DOE's Grid Deployment Office



The **Environmental Reviews, Permitting, and Resource Adequacy Division** works to ensure resource adequacy, expand and enhance electricity markets, and implement DOE's permitting authorities.

The **Transmission Division** fully utilizes DOE's unique tools and authorities for coordination, planning, and financing to drive transmission investment.

The **Grid Modernization Division** oversees activities that prevent outages and enhance the resilience of the electric grid.

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Extreme events

- Less predictable
- Increasingly frequent
- Significantly impact the electric system

More and longer power outages

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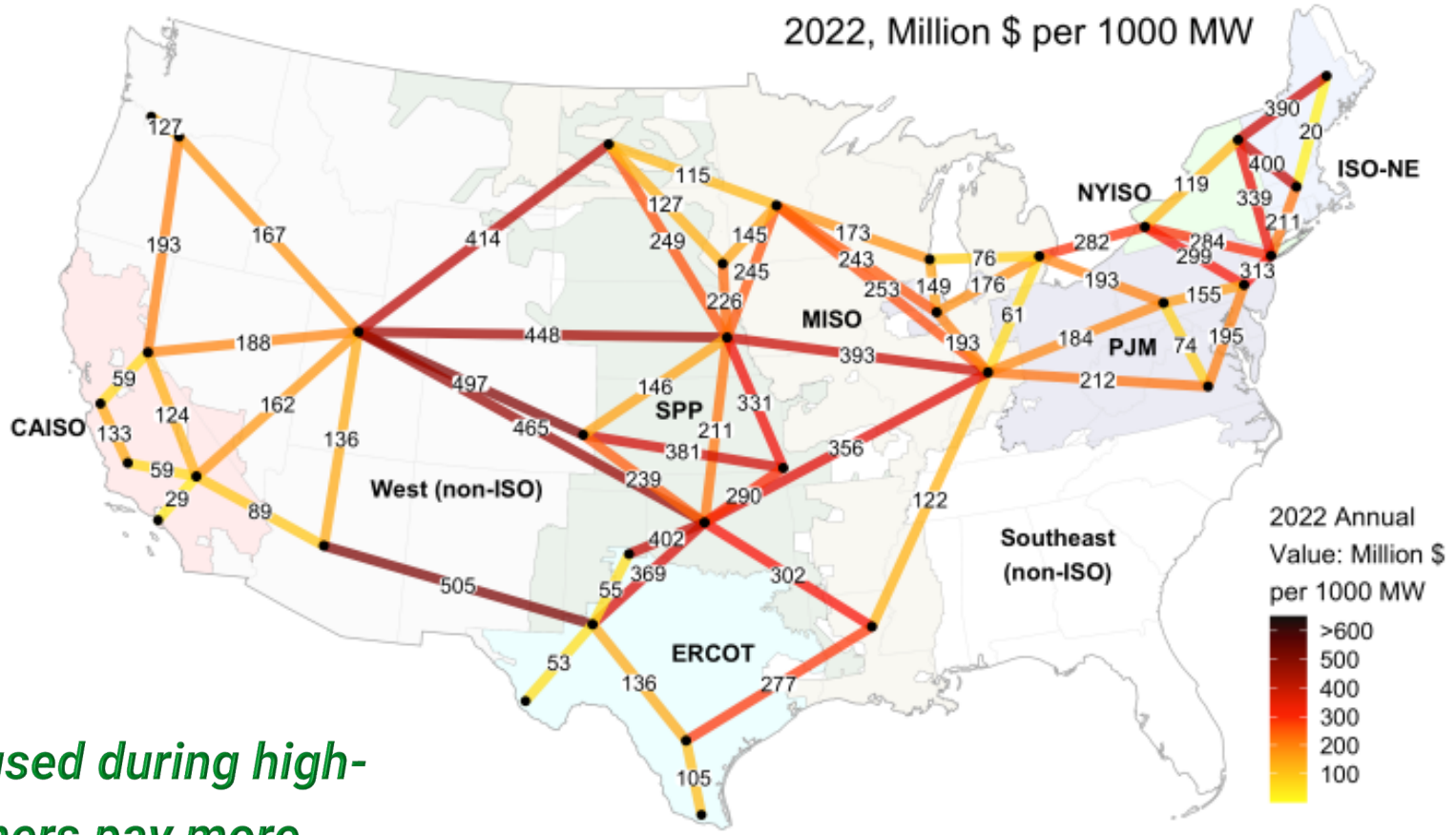
Lack of transmission drives up consumer costs



Lower-cost power that could be used during high-need times is trapped, so consumers pay more.

https://emp.lbl.gov/news/latest-market-data-show-potential

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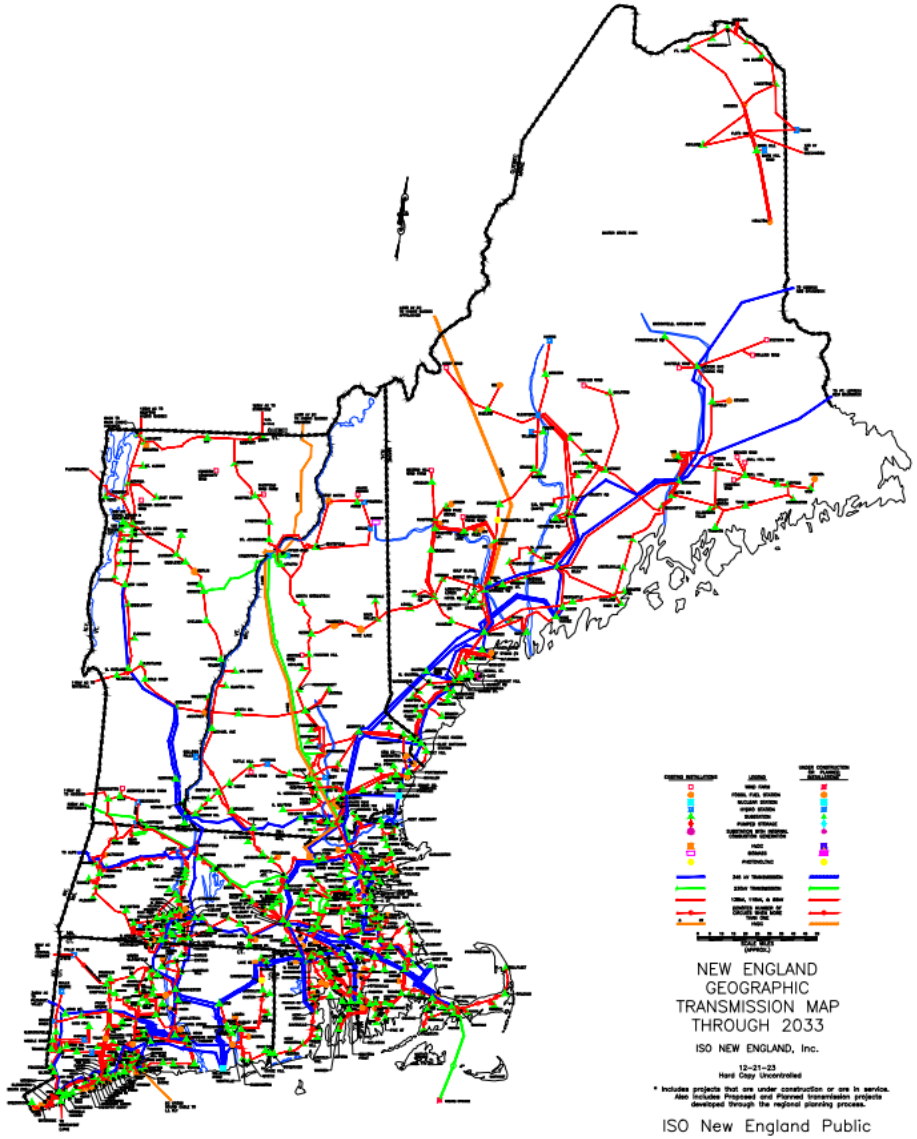
Maximizing capacity in existing ROW is a crucial lever



https://www.iso-ne.com/static-assets/documents/2020/04/new-england-geographic-diagram-transmission-planning.pdf

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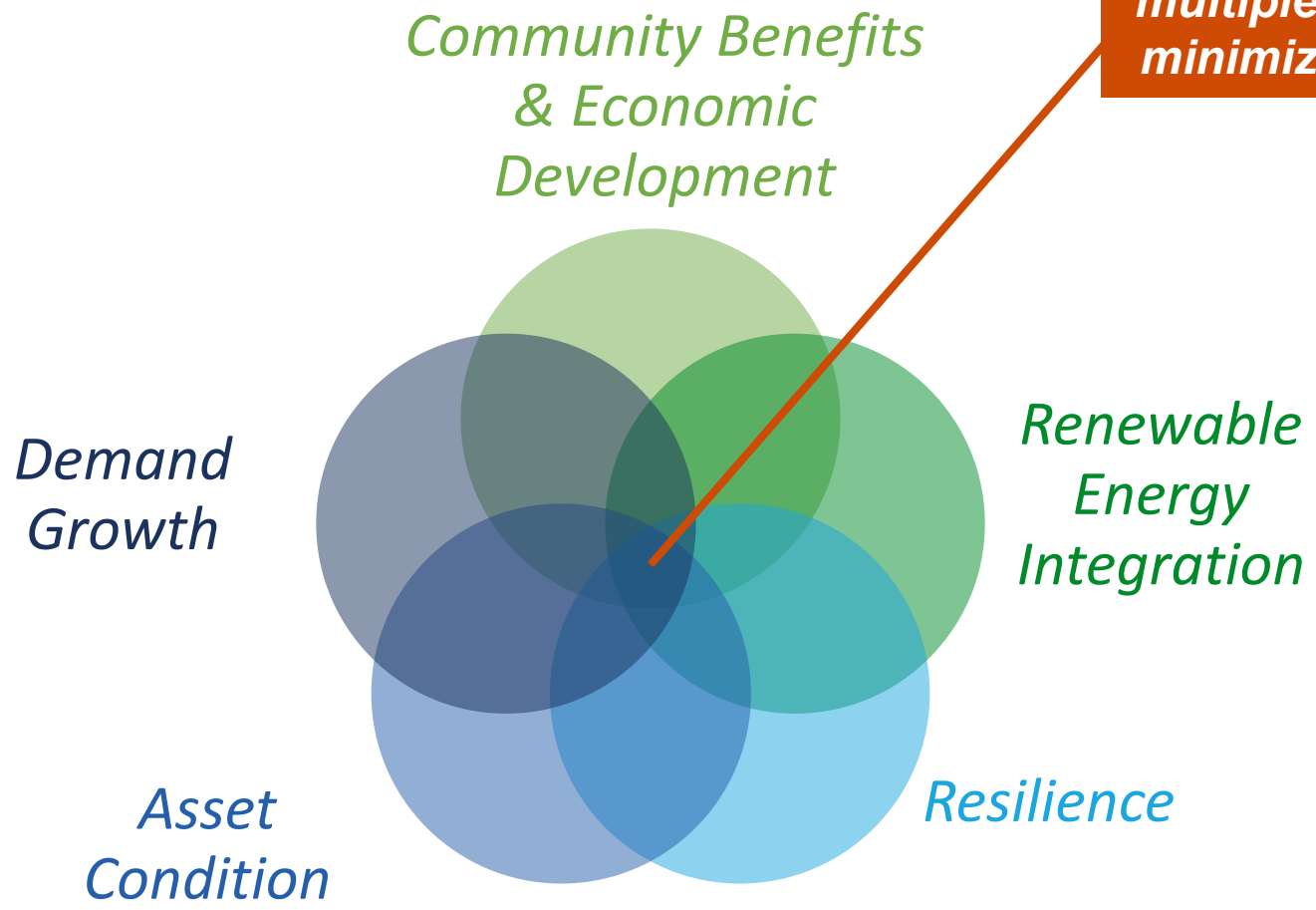
Multi-Value Projects

Multi-value projects provide solutions to multiple challenges while minimizing rate pressure



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Keys to Unlocking Multi-Value Projects

Innovation

- Market-ready technologies
- Enhanced planning
- Permitting coordination

Coalition-Building

- Community engagement
- Strategic partnerships
- Financing

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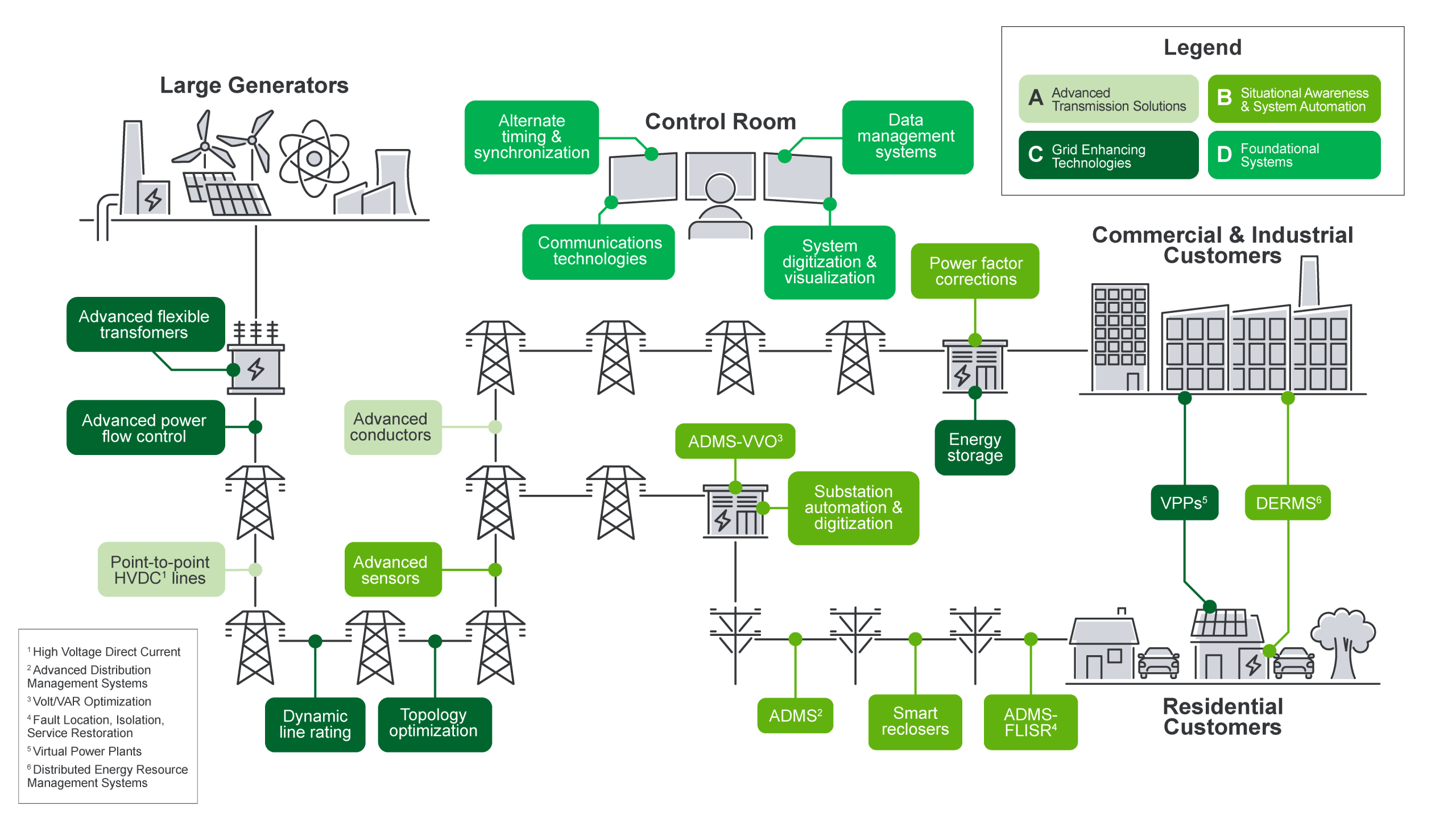
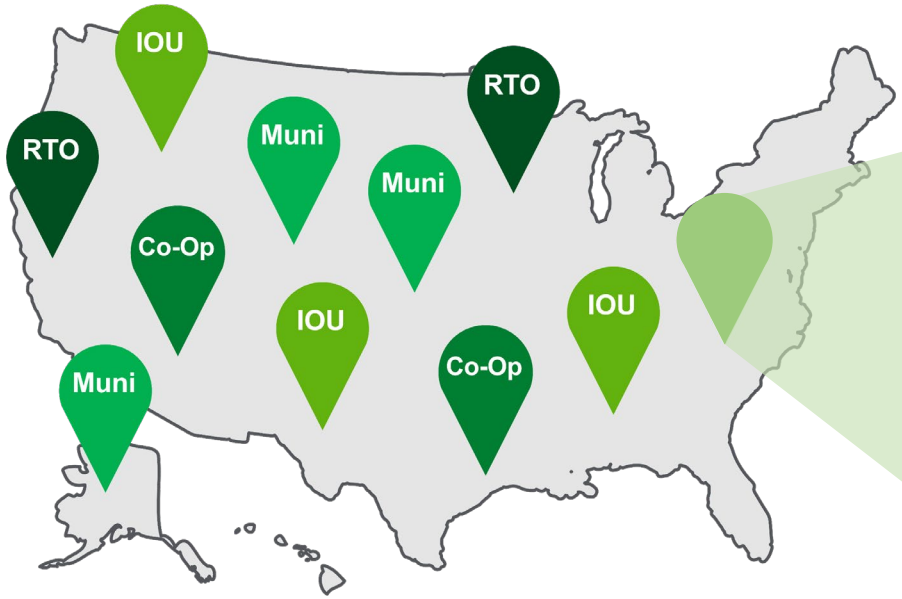

Legend
A Advanced Transmission Solutions
B Situational Awareness & System Automation
C Grid Enhancing Technologies
D Foundational Systems
Large Generators
Control Room
Alternate timing & synchronization
Data management systems
Communications technologies
System digitization & visualization
Power factor corrections
Commercial & Industrial Customers
Advanced flexible transfomers
Advanced power flow control
Advanced conductors
ADMS-VVO3
Energy storage
Substation automation & digitization
VPPs5
DERMS6
Point-to-point HVDC1 lines
Advanced sensors
Dynamic line rating
Topology optimization
ADMS2
Smart reclosers
ADMS-FLISR4
Residential Customers
1 High Voltage Direct Current
2 Advanced Distribution Management Systems
3 Volt/VAR Optimization
4 Fault Location, Isolation, Service Restoration
5 Virtual Power Plants
6 Distributed Energy Resource Management Systems

Achieving Liftoff within 3-5 years

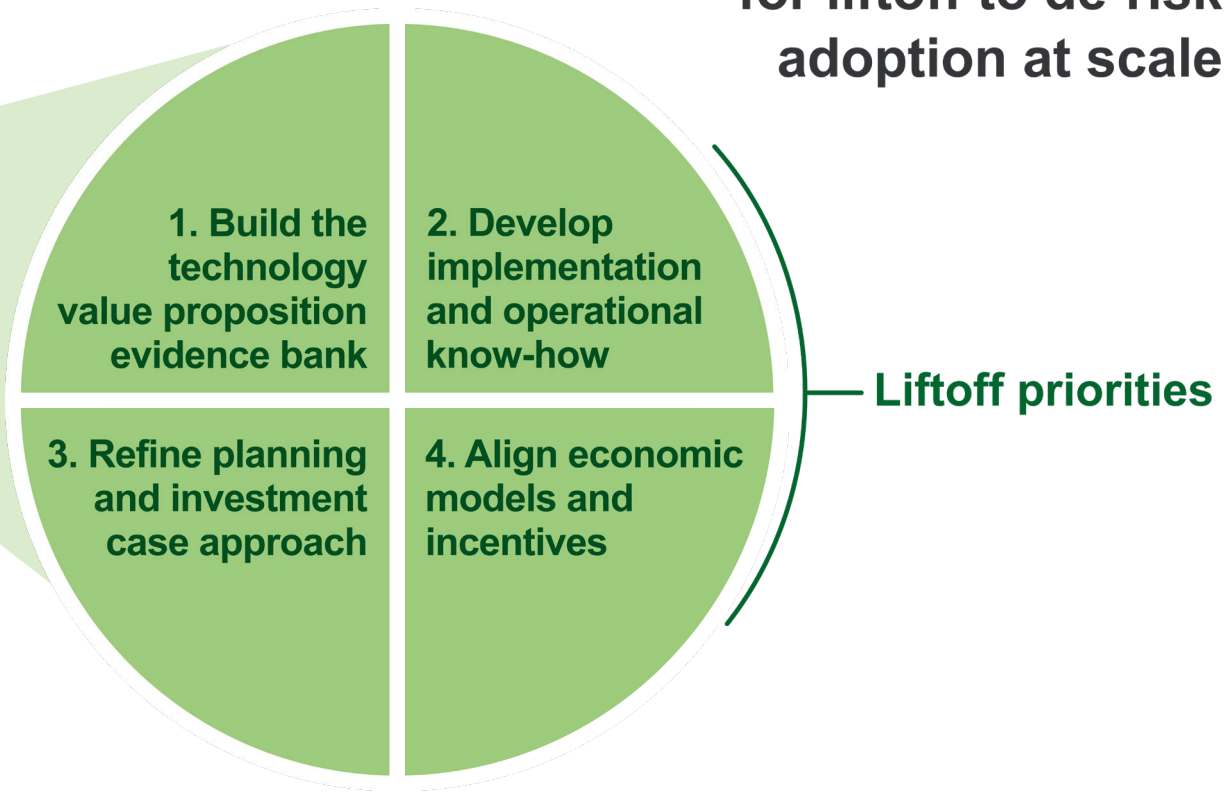
Deploy no regrets solutions today...



6-12 large, in-field deployments

completed for each solution individually or in combination that holistically address Liftoff priorities across a diverse set of grid contexts

...that simultaneously address four priorities for liftoff to de-risk adoption at scale



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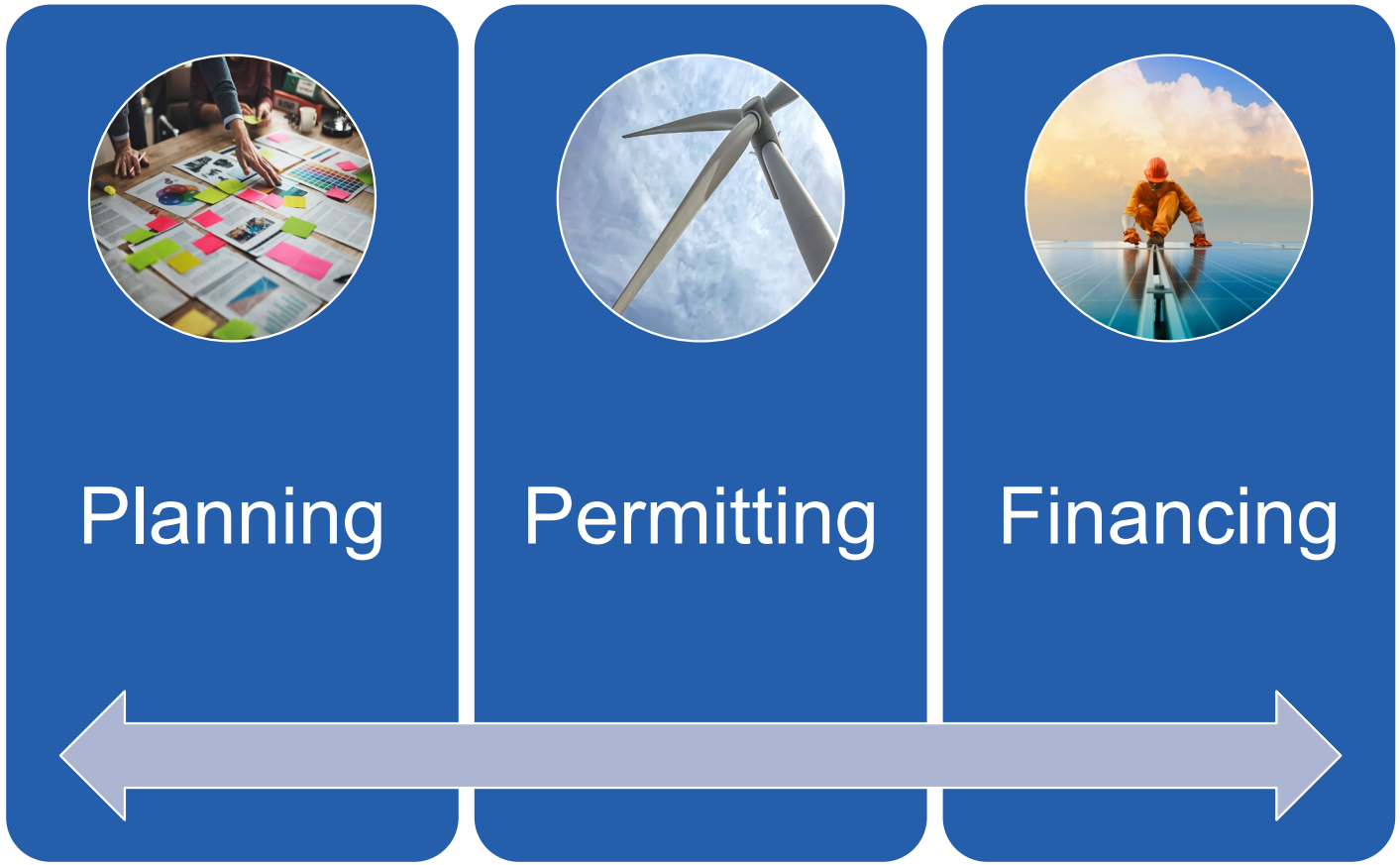
GDO has tools to help achieve liftoff



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Grid Resilience State/Tribal Formula Grant Program

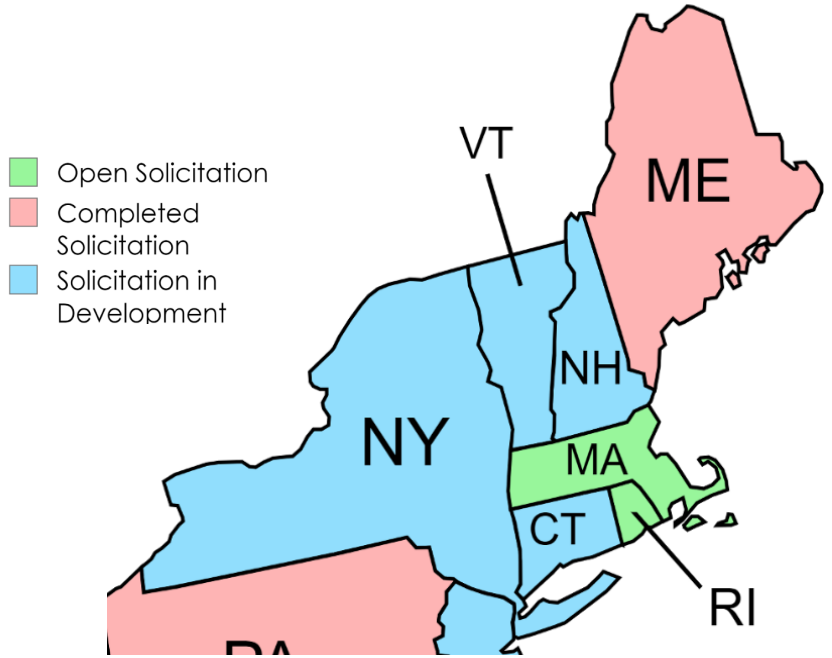
What is it?

- $2.3 billion in **formula grants** to:
  - Prevent outages and enhance the resilience of the electric grid
  - Demonstrate measurable improvements in energy resilience to hazards
  - Mitigate the impact of extreme weather
  - Invest in modernized grid infrastructure

Who is eligible?

- States, territories, and Indian tribes

As of August 2024, GDO awarded 48 states, more than 100 tribal entities, three territories, and the District of Columbia a combined total of more than $800M for FY22/FY23 grants



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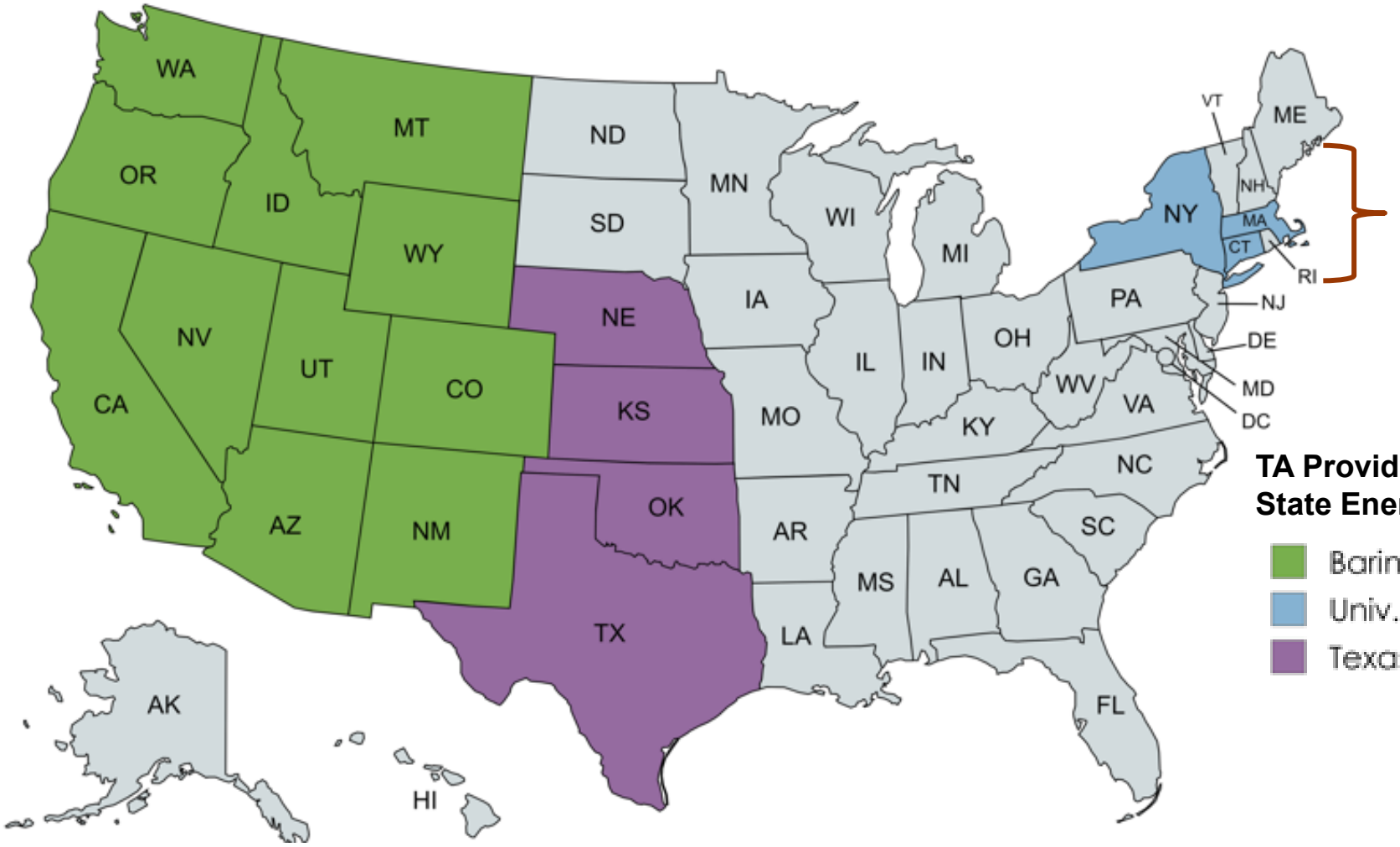
Grid Resilience Technical Assistance

Through GDO's GRACI awards, universities and industry work directly with states and utilities to enhance grid resilience investment decision-making.



POINTERRA

Utilities	Universities
National Grid	Cornell
Eversource	SUNY Albany
Avangrid	Univ. of CT

TA Providers for Direct Assistance to State Energy Offices

- Baringa
- Univ. of CT & SUNY Albany
- Texas A&M

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Grid Resilience and Innovation Partnerships (GRIP) Program

*$10.5 billion in **competitive grants** to enhance grid flexibility and improve the resilience of the power system*

Grid Resilience Utility & Industry Grants (BIL 40101c - Topic Area 1)

- $2.5 billion for resilience projects that reduce the likelihood and consequence of impacts to the electric grid due to extreme weather, wildfire, and natural disaster
- Grid operators, storage operators, electricity generators, transmission owners/operators, distribution providers, fuel suppliers

Smart Grid Grants (BIL 40107 - Topic Area 2)

- $3 billion for innovative and ambitious uses of cutting-edge, market-ready technologies
- Institutions of higher education, for-profit entities and non-profit entities, state and local governmental entities, tribal nations

Grid Innovation Program (BIL 40103b – Topic Area 3)

- $5 billion for high-impact, innovative projects that improve grid reliability and resilience on the local, regional, and interregional scales
- States or a combination of states, tribal nations, unit of local government, public utility commission

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GRIP Selections To Date

- The first round of GRIP funding totals nearly $3.5 billion for **58 projects in 44 states** across the U.S.
  - This is the largest single direct investment in critical grid infrastructure in U.S. history.

- In total, GRIP 1 will catalyze **$8 billion in public and private investment** to enhance the nation's ability to deliver affordable, clean energy to American communities, prepare for extreme weather, and meet clean energy goals.

- **GRIP 1 will enable the addition of 35 GW of renewable energy, expanding U.S. renewable energy capacity by 10.5%.**

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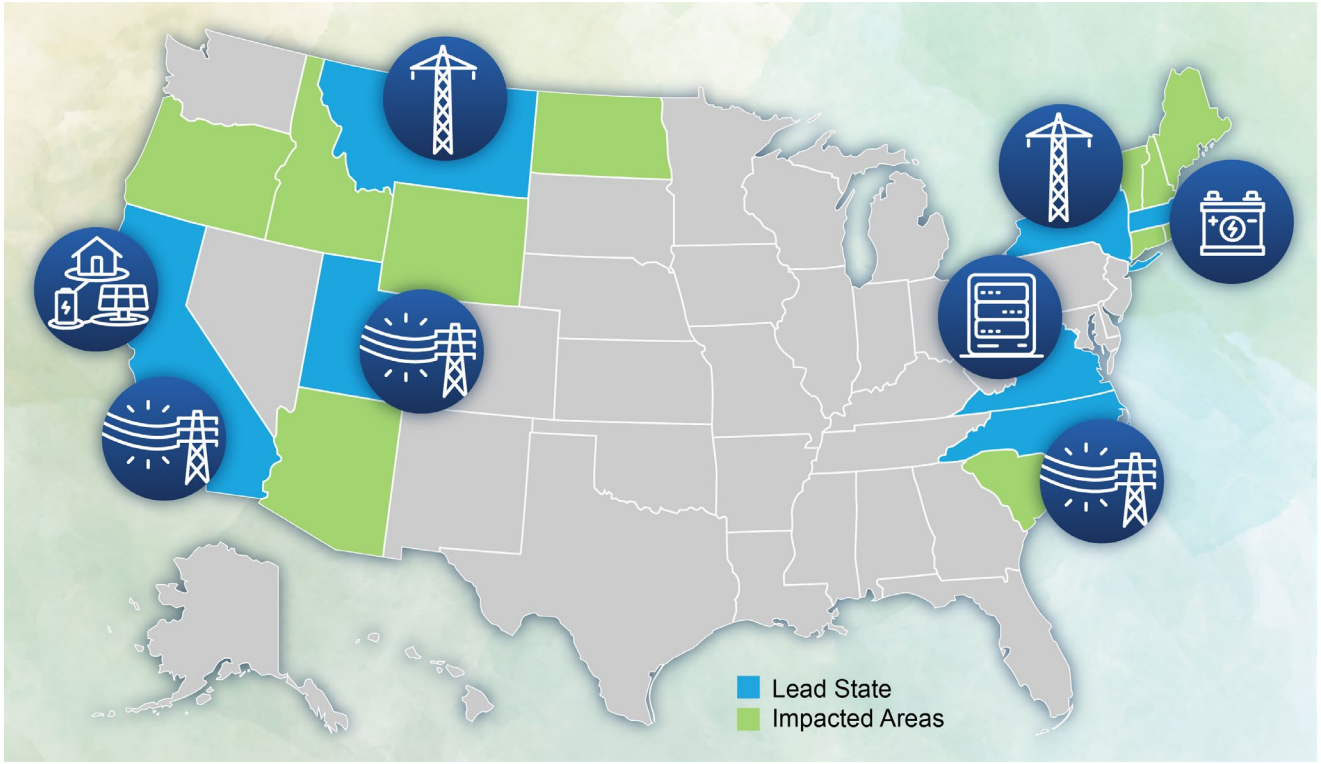
GRIP 1 Project Highlight: Georgia Environmental Finance Authority

- **Coalition**:
  - Georgia electric cooperatives
  - Investments in rural communities
- **Innovation**:
  - Battery storage
  - Microgrids
  - Advanced grid control systems
- Improved resilience and clean energy development through comprehensive smart grid infrastructure upgrade program, including investments in battery storage, local microgrids, and grid reliability, while implementing new transmission lines to link communities.

Round 2 Grid Innovation Program Selections

- 8 projects impacting 18 states
  - $2.2 billion federal investment
  - Nearly $10 billion combined public and private investment

- **More than 1,000 miles of transmission** upgraded:
  - 600+ miles of **new transmission lines**
  - **Reconductoring** or adding **grid-enhancing technologies** to 400+ miles of existing Tx lines to increase grid capacity



- GRIP 2 projects will enable the addition of nearly **13 GW of grid capacity,** including 4.8 GW of OSW

- **5,000+ new, good-paying jobs**.

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GRIP 2 Project Highlight: Reliable Electric Lines - Infrastructure Expansion Framework (Project RELIEF)

- **Coalition**:
  - Utah Office of Energy Development (lead)
  - States of Arizona, Idaho, Oregon, Utah, and Wyoming
  - PacifiCorp
  - Garkane Energy Cooperative
  - Utah State University
- **Innovation**: Project will deploy high-temperature, low-sag advanced conductors on over **250 miles** of transmission lines, **doubling existing capacity**.
- The project will create **~500 new jobs** while investing **$12 million** in workforce training.

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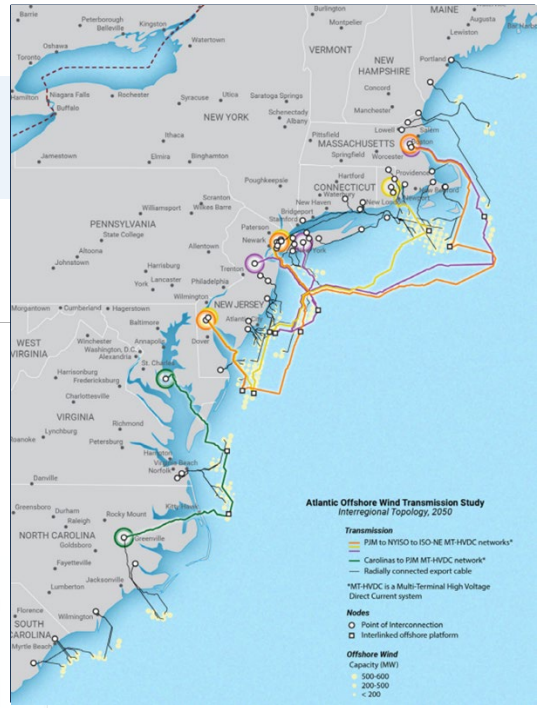
GRIP 2 Project Highlight: Power Up New England

- **Coalition**:
  - New England states (led by Massachusetts Department of Energy Resources)
  - ISO New England
  - Public utilities
  - Emerging technology developers
- **Innovation**: An integrated portfolio of replicable, grid-benefitting technologies across the region
  - New and upgraded POIs for offshore wind
  - Long-duration energy storage
- Increase electric reliability and resilience, diversify New England's resource mix, accelerate the region's clean energy transition, reduce energy burden on consumers, and deliver innovative models for further investments in New England and other regions.

Offshore Wind Transmission Planning



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What is a NIETC?

National Interest Electric Transmission Corridor

An area of the country where inadequate transmission harms consumers (currently or in the future) and that DOE has designated as a NIETC

These consumer harms can include:

- Economic harms;
- Harms to Reliability;
- Harms to Resilience; and
- Inability to access to a clean, diverse, and affordable electricity supply.

What does NIETC have to do with siting and permitting?

Federal Power Act 216(a)

National Transmission Needs Study & NIETC Designation

Department of Energy

Federal Power Act 216(b)

FERC Siting & Permitting in NIETCs

Federal Energy Regulatory Commission

After DOE designates a NIETC, **FERC has the authority** to issue permits within a NIETC in certain circumstances, such as **where states lack authority to site the project, have not acted on an application after more than one year, or have denied an application.**

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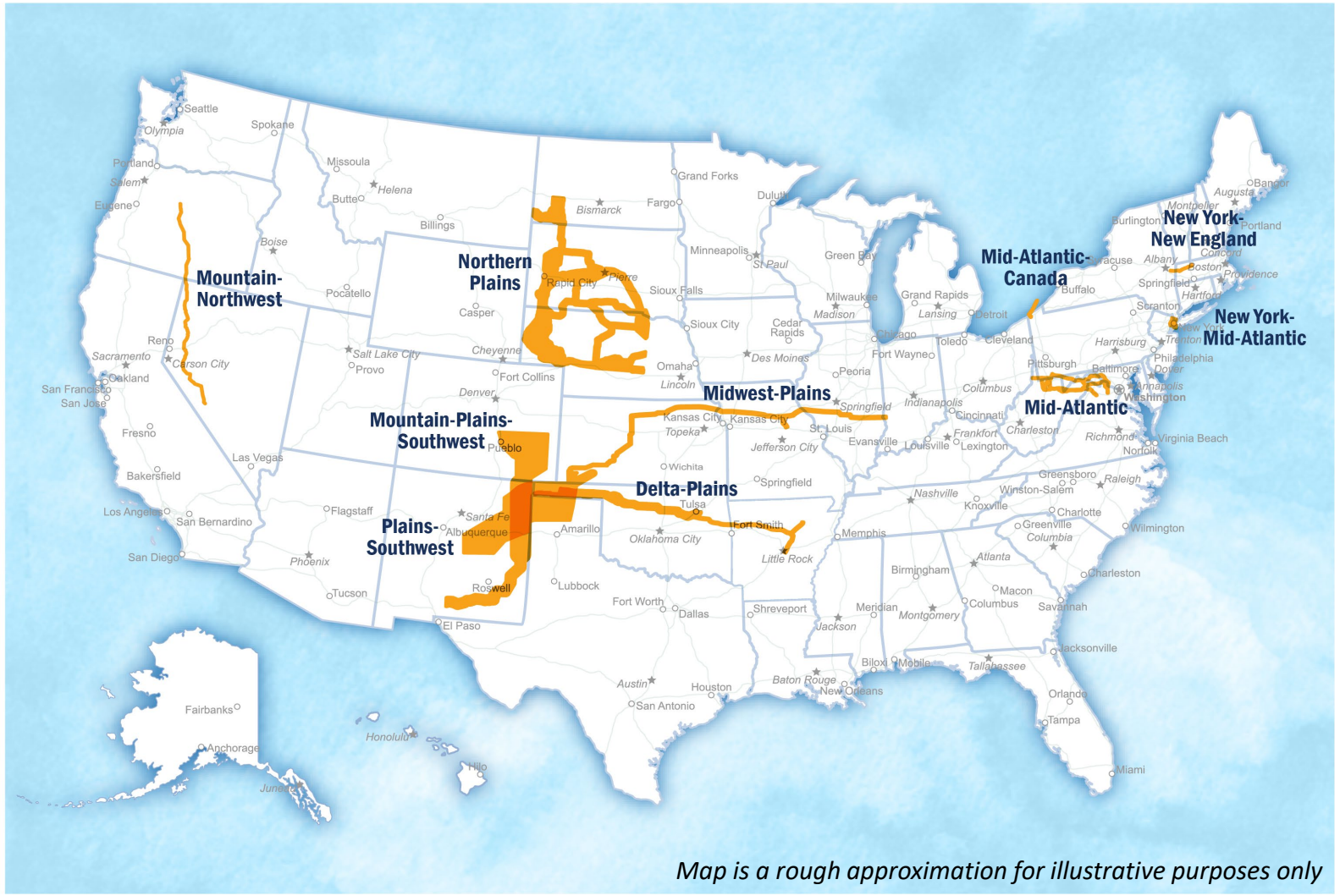
Preliminary NIETCs



Map is a rough approximation for illustrative purposes only

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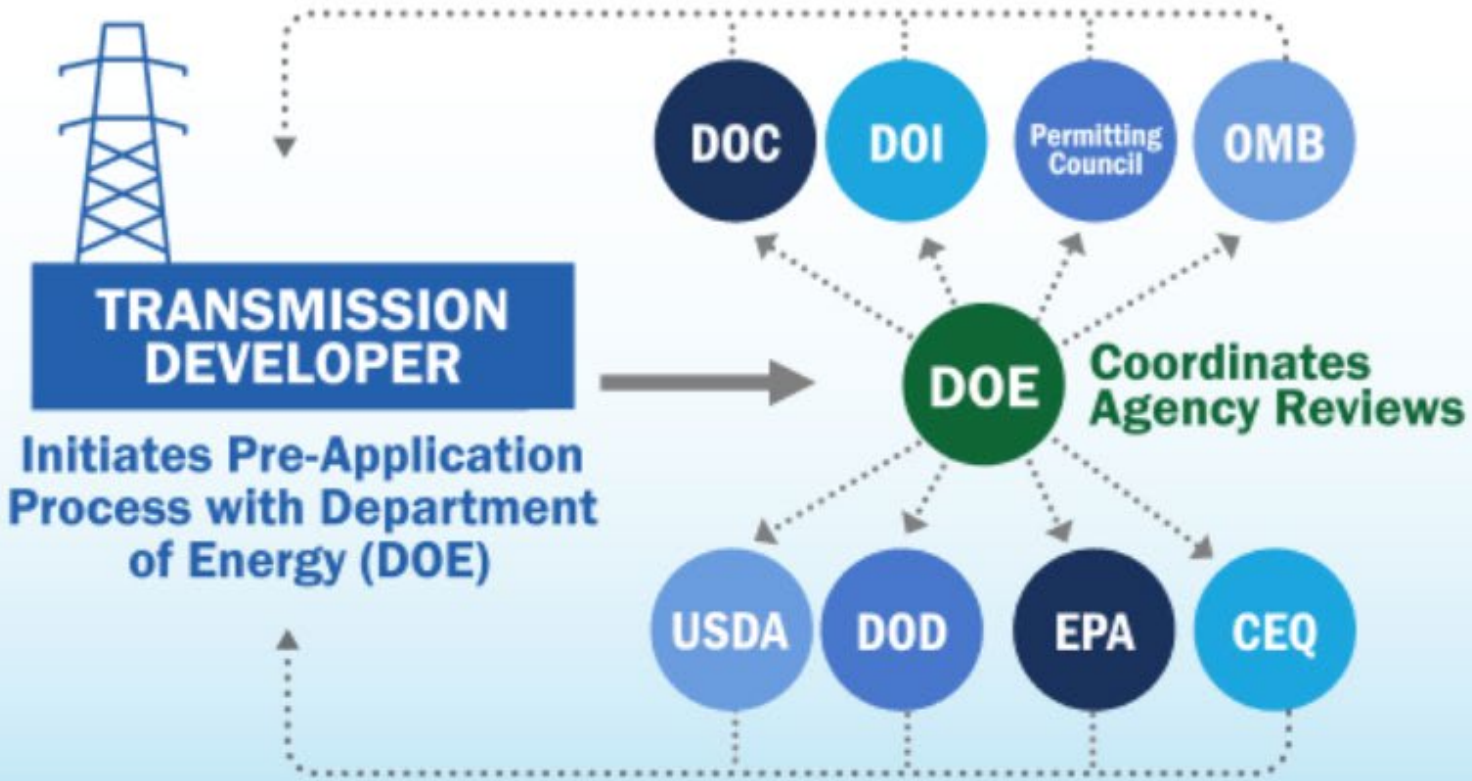
Coordinated Interagency Authorizations and Permits (CITAP) Program



*Source: Contextualizing electric transmission permitting: data from 2010 to 2020, Niskanen Center, 2024

Average time to site and permit a transmission project is almost cut in half

Transmission Powers Communities

Transmission is needed to power the needs of growing communities.

Public approval follows from early and meaningful engagement, including consideration of ***community needs and preferences***.

Transmission Siting and Economic Development (TSED)

$760 million competitive grant program
to strengthen and accelerate state and local siting and permitting processes + support economic development for communities impacted by interstate and offshore transmission

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TSED Round 1 Selections

- 20 projects
- 16 states
- Up to $371 million

DOE expects to release the second TSED funding opportunity in Fall 2024.

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Ways We Can Work Together

- Find opportunities to support multi-value projects.
- Seek technical assistance.
- Stay connected.
- Share your feedback with us.

Thank You