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July 14, 2022

Re: H. 4524 and S. 2819

Dear Conferees:

I submit this letter on behalf of American Superconductor Corporation ("AMSC"), which is a publicly traded manufacturing company headquartered in the Town of Ayer. AMSC is one of a number of companies that manufactures products designed to provide enhanced "resiliency" to the electric power grid. We agree the legislature's climate and decarbonization goals require improvements to the Commonwealth's electric grid to enhance its resiliency in response to climate change and other potential factors such as cyber and terrorist attacks.

SECTION 17 of H. 4524 requires that resiliency factors be considered with regard to weather-related events, the facilitation of the electrification of buildings, and electric-sector transformation plans – but does not define what factors should be considered. I suggest that the legislature ought to define those policy objectives with a definition added to chapter 164. To be consistent with those legislative policies, I believe it also makes sense to require the consideration of resiliency factors with regard to the approval for the siting and construction of new electric grid infrastructure and therefore included references to §69J and §69J ¼. The attached language was taken from H. 3318, which has been before the Joint TUE Committee.

I have also enclosed the following background materials:

- The HTS Alternatives
- U.S. GAO Report
- U.S. DOE Building a Better Grid Initiative

Please let me know should you have any questions about the material submitted or need anything further.

Sincerely,

/s/ Kevin M. Considine
Kevin M. Considine

KMC/jv
Enclosures

SECTION 1. Section 1 of chapter 164 of the General Laws, as appearing in the 2018 Official Edition, is hereby amended by inserting after the definition of "residual value" the following:-

"Resiliency, the ability to prepare for and adapt to changing conditions caused by climate change and to withstand and recover rapidly from disruptions including the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."

SECTION 2. Section 69J of chapter 164, as so appearing, is hereby amended by inserting prior to the first paragraph the following:-

"When approving any facility or generating facility under this section, the board shall evaluate and make findings that the facility would (i) have a minimal negative impact on the environment; (ii) require a minimal usage of land that otherwise could be utilized for other public purposes, (iii) have a minimal impact on health and safety of individuals living in the surrounding area, especially if the facility or generating facility is located in an area within an environmental justice population, as defined in G.L. c. 30 § 62; (iv) allow for minimal disruption of roads and other public property; and (v) function to improve the overall resiliency, as defined in SECTION 1, of the electric grid."

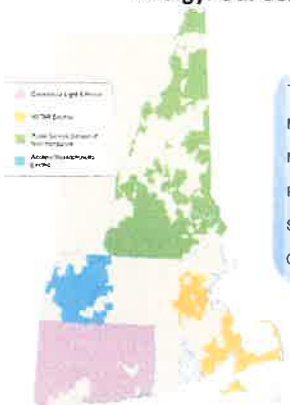
SECTION 3. Section 69J ¼ of chapter 164, as so appearing, is hereby amended by inserting at the end of the first paragraph the following: -

"In approving any petitions for construction of a generating facility under this section, the board shall evaluate and make findings that the facility will (i) require a minimal usage of land that otherwise could be utilized for other public purposes ; (ii) have a minimal impact on the health and safety of individuals living in the surrounding area, especially if the generating facility is located in an area with an environmental justice population as defined in G.L c.30 § 62; (iii) allow for a minimal disruption of roads and other public property; and (iv) function to improve the overall resiliency, as defined in SECTION 1, of the electric grid."

HTS Alternative to Traditional Infrastructure Solutions

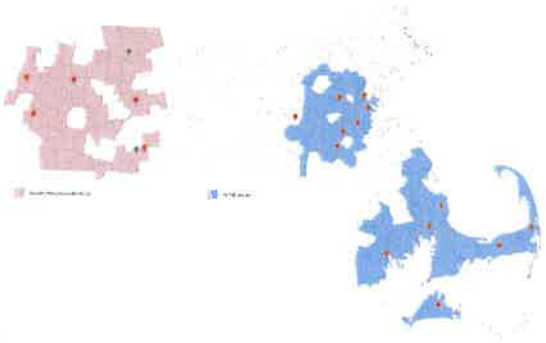
July 19, 2016

Eversource Energy: Our Service Territory



- Total square miles 13,220
- Miles of primary line - Overhead 51,998
- Miles of primary line – Underground 12,656
- Poles 1,808,608
- Substations 725
- Customers 3.1 million

Eversource Massachusetts



Eversource Massachusetts System Overview

- 1.4 million electric and gas distribution customers in over 100 communities across Massachusetts
  - Residential — 1 Million Customers
  - Commercial / Industrial — 100,000 Customers
  - Gas — 300,000 Customers
- Over the past 5 years, we have invested over $2B in our system and network infrastructure to support our:
  - Bulk Transmission:
    - 800 miles overhead
    - 200 miles underground
  - Bulk Distribution Centers:
    - 200 substations
    - 400 transformers
  - Distribution Lines:
    - 12,000 miles & 500,000 poles
    - 5,000 miles & 40,000 manholes
    - 1,500 circuits & 145,000 Distribution transformers

Boston Network Overview

- 6 Network Substations
- 128 Primary Feeders
  - Dedicated
  - 14.4kV
- 12 Secondary Grids
- 752 Network Vaults
- 1351 Network Units

*Data as of December 2005

Cambridge Network Overview

- 4 Network Substations
- 32 Primary Feeders
  - Non-Dedicated
  - 13.8kV
- 15 Secondary Grids
- 87 Network Vaults
- 93 Network Units

*Data as of December 2005

Network Substation vs. Conventional Substation

- Deployed in urban areas that are densely populated with high per capita energy requirements
- High distribution reliability design deployed in most large U.S. cities (i.e. New York City, Chicago, Boston, Los Angeles)
- Redundant distribution feeder design that permits several circuits to be out of service with no interruption
- Power transformer redundancy via twice the installed capacity vs. demand
- Meshed secondary system sharing customer load and distributing among all connected network transformers
- Self contained "island" that limits access to other substation supplies due to unique features of network operation

In Boston, six network electrical substations keep the power flowing in the city.

Background

- As secondary network stations, there is no emergency transfer switching capability to adjacent network stations
- When the loading of station is approaching the station's firm capacity, "traditional approaches" require significant investments to support the load growth
  - Upgrade the Station with additional transformation
  - Construct new secondary network station
  - Transfer load to adjacent network station, if the station has spare transformer capacity

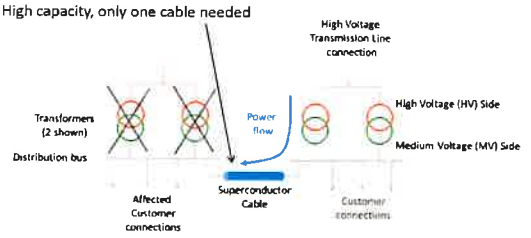
"its going to be a bad day... "

Installation of Jumpers

Station 492 Restoration

Superconducting cables present a practical solution for dealing with the loss of urban power grids.*

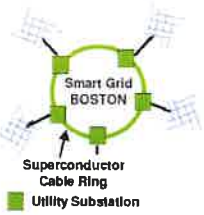
- Connect otherwise separate medium-voltage distribution grids with superconducting cable
  - Reduce reliance on any one or more transmission lines
  - Enable the sharing of transformers in case of equipment failure
  - High capacity, only one cable needed



* The use of superconducting cables for improved grid resiliency is not intended to mitigate the impacts of all natural or deliberate actions against urban electric grids and substations

Eversource and AMSC defined a project to reduce the risk of power outages in downtown Boston

- Builds on the *technical demonstration* project in New York
- The *application of HTS cables* will provide redundancy for catastrophic loss of urban grid infrastructure
- Initial phase would link two substations to enable sharing of power between medium-voltage grids islands
- Full build-out of an urban superconducting ring would provide for multiple redundancies and protection from power disturbance events

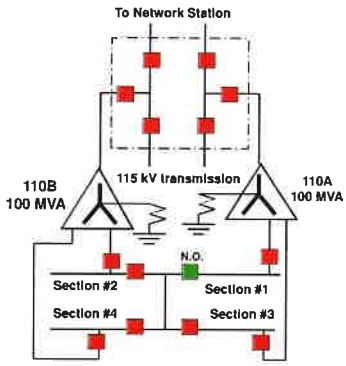


Solutions -- Traditional Approach

- Create new network station ($20M-$30M)
- Establish a new three transformer network station ($60M-$65M).
- Develop a second new network station at existing 14/4kV Station ($50M-$60M).
- Eversource's Cost:$130M - $155M

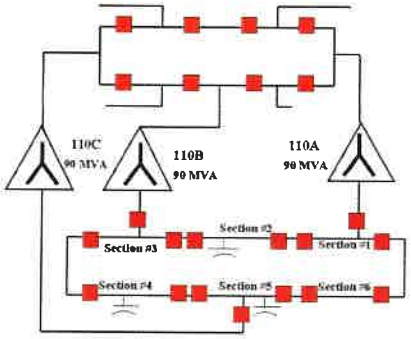
Rebuild of Existing Station to New Network

Conceptual Costs: $50-60 Million



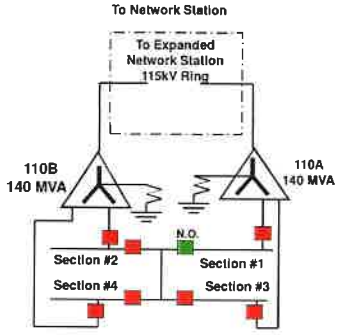
Expansion of Existing Network Station

Conceptual Costs: $60-65 Million



New Network Station
(Parking lot adjacent to existing Station)

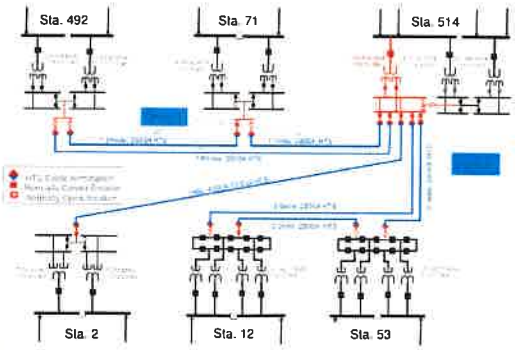
Conceptual Costs: $20-30 Million



HTS Solution

- Station #514N
  - Install 140 MVA 115/14kV transformer
  - 14kV switchgear in parking lot adjacent to Station #514T (Source to Superconductor cable).
  - Install HTSC terminations, Refrigeration Plant and Water Chiller Plant
- Station #71
  - Install HTS terminations, refrigeration plant, water chiller plant and 14kV switchgear
- Station #492
  - Install HTS terminations and 14kV switchgear on adjacent real estate parcel
- Install HTS cables between Station #514, #71 and #492

HTS Conceptual Solution



Cost Comparison

Scope	Total*
Traditional Approach	$130M -$155M
HTS Approach	$100M -- $120M

*Based on conceptual cost estimates

Direct Benefits – HTS Approach

- Asset sharing among three Downtown Boston 115/14kV Stations
  - Deferral of equipment build out or expansion of existing substations
  - Savings on Real Estate acquisition of new station sites
  - Defers Construction of future substations
  - Savings on Equipment procurement and O&M
  - Savings on Construction
- Increase in reliability for the supply to the areas of Downtown Boston supplied by three 115/14kV stations; protects for the loss of transmission
- Fault current limiting HTS cables overcome limitations of conventional cables for this application
  - Insufficient capacity
  - Right-of-way constraints
  - Risk of substation damage due to high levels of fault current

Moving the U.S. electric grid into a more resilient state in major urban centers

- Benefits of a successful deployment include:
  - Continued supply of electricity to major urban population centers even after the effective loss of a substation
  - Ability to turn a national security event such as a terrorist attack into a non-event in terms of its impact on electricity supply
  - Greater efficiency of grid asset deployment
- Real grid application and case study
  - An HTS project that links multiple substations could serve as a case study for successful medium-voltage interties on urban grids
  - Reduce the risk of mass outages due to transformer failure - whether due to fire, storms, terrorist acts, or other catastrophic events

Any member appointed to fill a vacancy for a term of service not completed will serve for the remainder of the term of service of her/his predecessor. No member may serve for a period in excess of three consecutive terms. Members of the Committee will serve as Special Government Employees (SGEs), as defined in 18 U.S.C. 202(a). As SGEs, members are selected for their individual expertise, integrity, impartiality, and experience.

Nomination Process: Interested persons, stakeholders, or organizations (including individuals seeking reappointment by the Secretary of Education to serve on the NCFMEA) may nominate a qualified medical expert(s). To submit a nomination(s) or self-nominate for appointment to serve on the NCFMEA, please send a cover letter addressed to the Secretary of Education as follows: Honorable Miguel A. Cardona, Ed.D., Secretary of Education, U.S. Department of Education, 400 Maryland Avenue SW, Washington, DC 20202. In the letter, please note your reason(s) for submitting the nomination. Include a copy of the nominee's current resume/cv and contact information (nominee's name, mailing address, email address, and contact phone number). In addition, the cover letter must include a statement affirming that the nominee (if you are nominating someone other than yourself) has agreed to be nominated and is willing to serve on the NCFMEA if appointed by the Secretary of Education. Please submit your nomination(s) including the requested attachments to the U.S. Department of Education, Office of the Secretary, Committee Management via email to: *cmtemgmtoffice@ed.gov*. (Please specify in the email subject line "NCFMEA Nomination").

For questions, please contact Karen Akins, U.S. Department of Education, Committee Management Officer, Office of the Secretary, (202) 401–3677, or via email at *Karen.Akins@ed.gov*.

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Miguel A. Cardona,

Secretary of Education.

[FR Doc. 2022–00908 Filed 1–18–22; 8:45 am]

BILLING CODE P

DEPARTMENT OF ENERGY

Building a Better Grid Initiative To Upgrade and Expand the Nation's Electric Transmission Grid To Support Resilience, Reliability, and Decarbonization

AGENCY: Office of Electricity, Department of Energy.

ACTION: Notice of intent.

SUMMARY: In this notice, the Department of Energy (DOE or the Department) unveils its new Building a Better Grid Initiative focused on catalyzing nationwide development of new and upgraded high-capacity transmission lines. Under the Building a Better Grid Initiative, DOE will identify critical national transmission needs and support the buildout of long-distance, high-voltage transmission facilities that meet those needs through collaborative transmission planning, innovative financing mechanisms, coordinated permitting, and continued transmission related research and development. DOE commits to robust engagement on energy justice and collaboration, including with states, American Indian Tribes and Alaska Natives, industry, unions, local communities, and other stakeholders for successful implementation of the program.

FOR FURTHER INFORMATION CONTACT: Ms. Michelle Manary, Acting Deputy Assistant Secretary, Electricity Delivery Division, Office of Electricity, Mailstop OE–20, Room 8H–033, 1000 Independence Avenue SW, Washington, DC 20585; Telephone: (202) 586–1411 or *ElectricityDelivery@hq.doe.gov*. More information will also be available at *https://www.energy.gov/oe/office-electricity*.

SUPPLEMENTARY INFORMATION:

I. Background

A robust transmission system is critical to the Nation's economic, energy, and national security. However, the United States faces challenges as its electric grid infrastructure continues to age—studies from the past decade find that 70 percent of the grid's transmission lines and power transformers were over 25 years old.[1] [2] In addition, insufficient transmission capacity—especially transmission that facilitates transfer of power across regions—presents another critical challenge facing the grid. Upgrading and expanding the current transmission system will enhance grid reliability and resilience and enable the cost-effective integration of clean energy.

Modernizing, hardening, and expanding the grid will enhance the resilience of our entire electric system, and ensure that electricity is available to customers when it is needed most. Aging infrastructure leaves the grid increasingly vulnerable to attacks.[3] The increasing frequency of extreme weather events is leading to energy supply disruptions that threaten the economy, put public health and safety at risk, and can devastate affected communities all over the country. Investment in transmission infrastructure can help protect the grid against supply disruptions due to physical and cyber-attacks or climate-induced extreme weather, minimize the impact of supply disruptions when they happen, and restore electricity more quickly when outages do occur.

Expanding transmission capacity also improves reliability by creating stronger and more numerous energy delivery pathways, helping to ensure that consumers have a dependable source of electricity to power their homes, schools, and businesses. When one generation source is physically unavailable or uneconomic, transmission enables delivery from other generation sources, making the system better equipped to meet delivery requirements under the broader range of real circumstances and stresses seen in recent years.

Electric grid investment also spurs economic growth. Investment in the grid will create demand for well-paying jobs in construction and will drive innovation, commercialization, and deployment of energy technologies that can spur new businesses. Moreover, clean energy generation is increasingly the least-cost option in many parts of the country, and investment in transmission will play a critical role in unlocking the deployment of greater renewable energy generation.

Transmission is critical to addressing the climate crisis through the decarbonization of the power sector and electrification of transportation and other sectors. The climate crisis accelerates the need for the United States to modernize its electric grid. To

[1] *See* U.S. Dep't of Energy, Infographic: Understanding the Grid (Nov. 2014), *https://www.energy.gov/articles/infographic-understanding-grid*.

[2] *See* Energy Information Agency, *Major utilities continue to increase spending on U.S. electric distribution systems*, (July 20, 2018), *https://www.eia.gov/todayinenergy/detail.php?id=36675*.

[3] *See* ICF International, *Electric Grid Security and Resilience: Establishing a Baseline for Adversarial Threats*, at 26 (June 2016), *https://www.energy.gov/sites/prod/files/2017/01/f34/Electric%20Grid%20Security%20and%20Resilience—Establishing%20a%20Baseline%20for%20Adversarial%20Threats.pdf*.

address the imminent threat of climate change, and capitalize on the economic opportunity of doing so, President Biden established ambitious goals: A carbon pollution-free power sector by 2035, and a net-zero greenhouse gas emissions economy by 2050.[4] Multiple pathways exist for the United States to meet these clean energy goals, but all require upgrading and expanding the Nation's transmission infrastructure.[5] In particular, they require deploying interstate high-voltage lines connecting areas with significant renewable energy resources to demand centers and linking together independently operated grid regions. The most cost-effective renewable resources are often located in remote geographic areas far from the areas with the biggest demand.[6] Therefore, accelerating the shift toward a clean power sector requires investment in critical enabling infrastructure such as transmission to increase access to these renewable energy sources.[7] Numerous studies conclude "that a reliable power system that depends on very high levels of renewable energy will be impossible to implement without doubling or tripling the size and scale of the [N]ation's transmission system."[8] A recent study found as the number of generation and storage projects proposed for interconnection to the bulk-power system is growing, interconnection queue wait times are increasing and the percentage of projects reaching completion appears to be declining, particularly for wind and solar resources.[9] Needed investments in transmission infrastructure include increasing the capacity of existing lines, using advanced technologies to minimize transmission losses and maximize the value of existing lines, and building new long-distance, high-voltage transmission lines.

Recognizing these challenges, Congress enacted and the President signed the Infrastructure Investment and Jobs Act (IIJA) on November 15, 2021. IIJA builds on existing Department of Energy authorities to provide substantial new tools and funding to the Department to accelerate the modernization, expansion, and resilience of the Nation's electric grid. DOE intends to coordinate the use of all authorities and funding focused on collaborative planning, innovative financing mechanisms, and coordinated permitting now at the disposal of the Department to resolve challenges and constrains facing the electric grid.

II. Transmission Deployment Program

For the reasons discussed previously, DOE intends to launch a coordinated transmission deployment program to implement both IIJA and previously enacted authorities and funding. Under the Building a Better Grid Initiative, DOE will engage in a collaborative initiative to encourage and enable investment in transmission infrastructure. DOE recognizes the importance of engaging with other federal agencies, state and local governments, American Indian Tribes and Alaska Natives, industry, unions, local communities, environmental justice organizations, and other stakeholders. Working with these partners, DOE aims to increase coordination and transparency; to employ available tools and resources to support the development of nationally-significant transmission projects; and to improve transmission siting, permitting, and authorization processes.

DOE's implementation of the Building a Better Grid Initiative will fall into five broad categories: Coordination; enhancing transmission planning to identify areas of greatest need; deploying federal financing tools to reduce project development risk; facilitating an efficient transmission permitting process; and performing transmission-related research and development.

A. Coordination

Early and collaborative engagement is an essential element of building a reliable, resilient, and efficient electric grid. DOE will consult and work collaboratively with government entities, including states, American Indian Tribes, and Alaska Natives, and other stakeholders throughout the process of evaluating and deploying the Department's tools and authorities to accelerate transmission deployment.

(1) *Regional Convenings.* In most of the country, the primary venue in which the future of the transmission grid is being planned is through regional and state-level processes led by transmission planning organizations such as independent system operators (ISOs)/regional transmission organizations (RTOs), state regulatory commissions, and utilities, with key involvement from transmission developers, independent power producers, consumer advocates, unions, public interest organizations, technology providers, and other stakeholders that contribute to the planning process to identify where and when new transmission lines are needed to ensure that the delivery of electricity remains reliable and affordable. In implementing the specific elements of the Building a Better Grid initiative described underneath, DOE intends to leverage existing regional venues where stakeholders are convened around transmission planning to identify nationally significant transmission lines, validate transmission modeling approaches, and provide technical analysis to states, American Indian Tribes and Alaska Natives, ISOs/RTOs, and utilities.

(2) *Offshore Wind Transmission Convening.* DOE is partnering with the Department of the Interior's Bureau of Ocean Energy Management (BOEM) to convene key stakeholders, government partners, and ocean users, including American Indian Tribes and Alaska Natives, state and local governments, ISOs/RTOs, utilities, wind energy developers, and non-governmental organizations, to elucidate the central transmission challenges associated with meeting the Biden Administration's goal—30 GW of deployed offshore wind (OSW) capacity by 2030 and to facilitate OSW development well beyond that goal—and identify potential solutions to those challenges. Later this year, DOE and BOEM will lead a series of convening workshops, in consultation with the Federal Energy Regulatory Commission (FERC) and other federal agencies, to develop a set of recommendations and associated action plan for addressing medium- and long-term OSW transmission challenges. These will include recommendations for OSW transmission development, transmission planning and permitting policies, as well as seeking to maximize benefits to the onshore transmission system by considering solutions that will reduce congestion and support system interconnection inclusive of

[4] *See* Executive Order 14008 of Jan. 27, 2021, Tackling the Climate Crisis at Home and Abroad, 86 FR 7619 (Feb. 1, 2021), *https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad; Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies* (Apr. 22, 2021), *https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.*

[5] *See North American Renewable Integration Study, Executive Summary, p. 9.*

[6] *See id.* at 4–5.

[7] *See* Eric Larson, et al., *Net-Zero America: Potential Pathways, Infrastructure, and Impacts,* at 13–14 (Dec. 15, 2020), *https://netzeroamerica.princeton.edu/img/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf.*

[8] ESIG Report at 10 (providing a summary of six studies at Appendix B); also, see *Net Zero America* (previous footnote).

[9] *See* Joseph Rand, et al., *Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2020,* Briefing at 6 (May 2021), *https://eta-publications.lbl.gov/sites/default/files/queued_up_may_2021.pdf.*

potential onshore transmission upgrades.

B. Planning

Building a cost-effective transmission network that offers access to a diversity of energy resources within and across geographic regions, and that supports reliability and resilience through robust inter-regional transfer capability, requires deliberate planning and a different approach than has been used traditionally. Transmission planning processes have not generally been designed to identify long-term (beyond 10-year planning cycles), flexible, and inter-regional solutions that will meet national interests by enhancing electric system resilience across regions. Modernizing transmission planning can provide greater certainty to drive investment to the highest-need transmission projects and enable development of the projects with the largest long-term benefit for consumers. DOE intends to consider the following actions to facilitate transmission planning:

(1) *National Transmission Needs Study.* DOE intends to identify high-priority national transmission needs—specifically, to identify where new or upgraded transmission facilities could relieve expected future constraints and congestion driven by deployment of clean energy consistent with federal, state, and local policy and consumer preferences; higher electric demand as a result of building and transportation electrification; and insufficient transfer capacity across regions—by conducting a Transmission Needs Study. Consistent with authority provided by the Energy Policy Act of 2005 [10] and the IIJA, this study will evaluate current and expected future electric transmission capacity constraints and congestion that could adversely affect consumers. DOE will consult with affected states, American Indian Tribes and Alaska Natives, and appropriate regional entities. The results of this needs assessment can inform the prioritization of the DOE financing authorities described in Section II.C of this document; designation of national interest electric transmission corridors (National Corridors), as described in Section II.D of this document, and regional transmission planning processes.

(2) *National Transmission Planning.* In addition to the Transmission Needs Study, DOE is leading a national-scale, long-term (a 15- to 30-year) transmission planning analysis to identify transmission that will provide broad-scale benefits to electric customers; inform regional and interregional transmission planning processes; and identify interregional and national strategies to accelerate decarbonization while maintaining system reliability. In partnership with the Pacific Northwest National Laboratory (PNNL) and the National Renewable Energy Laboratory (NREL), DOE will work with stakeholders to help identify viable future grid realization pathways to a large-scale transmission system buildout that would accomplish clean energy goals. Robust stakeholder engagement will help define new scenarios for analysis to reach grid decarbonization goals cost effectively and under new high-stress conditions. As part of this process, DOE intends to work with the Department of Transportation, the Department of the Interior, the United States Forest Service, other federal and state agencies, and utilities as appropriate, to integrate existing rights-of-way into the National Transmission Planning Study, including existing rail and highway rights-of-way; the Bureau of Land Management's (BLM) West-wide Energy Corridors; and other existing federal land and utility rights-of-way.

(3) *OSW Transmission Analysis.* To inform the integration of OSW, DOE will conduct supportive analyses to identify transmission pathways and develop transmission strategies to integrate offshore wind, consistent with the Administration's goal of 30 GW of OSW by 2030 and to set the stage for a more ambitious 2050 OSW deployment target. In November 2021, DOE launched the Atlantic Offshore Wind Transmission Study, a 2-year study led by NREL and PNNL. Through robust engagement with diversified stakeholder groups, this work evaluates coordinated transmission solutions to enable offshore wind energy deployment along the U.S. Atlantic Coast, addressing gaps in existing analyses.[11]

(4) *Transmission Planning Technical Assistance.* DOE will continue to develop and leverage modeling tools and capabilities to provide technical analysis to states and regions, and other agencies, where appropriate. This includes the research and capabilities created as part of the National Transmission Planning and the OSW Transmission Analysis above. The technical analysis and assistance aim to aid in long-term energy planning, policy implementation, and regulatory rulemaking, informed by core transmission planning precepts and in alignment with current federal and state public policy goals. The IIJA requires states to incorporate transmission planning as a mandatory feature of their energy plans and is supported with $500 million in increased funding for the State Energy Program.

C. Financing

Financial risk poses a significant barrier to pursuing large scale, multi-region transmission projects. Transmission projects require large, upfront investments. For regulated utility projects, returns are ultimately collected over long periods through rates charged to end-use customers, but it is difficult for such utilities to recover costs for transmission projects that cross multiple service territories and planning regions. Merchant transmission developers face challenges securing transmission customers before a project is built, but customer commitments are often needed to reduce investment risk. The IIJA provided critical new authorities and appropriations that the Department can use to help reduce financing challenges project sponsors may face and catalyze private investment in transmission. DOE intends to deploy these authorities while also continuing to make available existing financing tools.

New Programs Authorized in IIJA:

(1) *Transmission Facilitation Program.* The IIJA establishes a new $2.5B revolving fund to facilitate the construction of high capacity new, replacement, or upgraded transmission lines.[12] This program will prioritize projects that improve resilience and reliability of the grid, facilitate inter-regional transfer of electricity, lower electric sector greenhouse gas emissions, and use advanced technology. DOE is authorized to do so through three separate tools.

- DOE is authorized to serve as an anchor customer on new and upgraded transmission lines in order to facilitate the private financing and construction of the line. Under this authority, DOE would buy up to 50 percent of planned capacity from the developer for a term of up to 40 years. A purchase of capacity will not be considered a "major federal action" that would trigger environmental review pursuant to the National Environmental Policy Act (NEPA). DOE will then market the capacity it has purchased to recover the

[10] Federal Power Act (FPA) section 216(a); 16 U.S.C. 824p(a).

[11] *See* Atlantic Offshore Wind Transmission Study, NREL. *https://www.nrel.gov/wind/atlantic-offshore-wind-transmission-study.html.*

[12] In addition, eligible projects include those that would connect an isolated microgrid to an existing transmission, transportation, or infrastructure corridor located in Alaska, Hawaii, or a U.S. territory.

costs it has incurred once the project's long-term financial viability is secured.

- DOE is authorized to make loans for the cost of carrying out eligible transmission projects.
- DOE is authorized to enter into public-private partnerships to co-develop projects that are located in a National Corridor or that are necessary to accommodate an increase in demand for interstate transmission, among other criteria. Such co-development can entail the design, development, construction, operation, maintenance, or ownership of a project.

DOE intends to establish procedures for the administration of this program and for solicitation and selection of project applications. Further guidance will be forthcoming for this program.

(2) *Enhancing Grid Resilience.* DOE will provide formula grants, competitive grants, and competitive awards across a number of provisions of the IIJA that allow for upgrading transmission infrastructure. DOE intends to issue solicitations for applications by states, American Indian Tribes, local communities, and industry. Further guidance and solicitations will be forthcoming for these programs.

- Preventing Outages and Enhancing the Resilience of the Electric Grid—The IIJA authorizes DOE to make grants for supplemental hardening activities to reduce risks of power lines causing wildfires, and the likelihood and consequence of impacts to the electric grid due to extreme weather, wildfires, and natural disasters. This program is split between $2.5 billion in matching grants for industry and $2.5 billion in formula grants for states and American Indian tribes.
- Program Upgrading Our Electric Grid and Ensuring Reliability and Resiliency—The IIJA authorizes DOE to provide $5 billion in competitive financial assistance to states, local governments, and American Indian tribes. This financial assistance must support electric sector owners and operators with projects that demonstrate innovative approaches to hardening and enhancing the resilience and reliability of transmission, storage, and distribution infrastructure.
- Energy Improvement in Rural and Remote Areas—DOE is authorized to provide competitive grants to small cities, towns, and unincorporated areas to improve resilience, safety, reliability, and availability of energy; and that provide environmental protection from adverse impacts of energy generation.

(3) *Deployment of Technologies to Increase Capacity and Enhance Flexibility of the Existing Grid.* The IIJA provides DOE with $3 billion to provide matching grants for the deployment of advanced grid technologies to enhance grid flexibility. Building on the success of the Smart Grid Investment Grant Program, this program now includes advanced transmission technologies such as dynamic line rating, flow control devices, advanced conductors, and network topology optimization, to increase the operational transfer capacity transmission networks. Further guidance and solicitations will be forthcoming for this program.

Existing DOE Programs:

(4) *Loan Programs.* DOE's Loan Programs Office (LPO) administers a number of programs that can provide loan guarantees to help deploy large-scale energy infrastructure projects in the United States, some of which have already been utilized to issue over $300 million in Conditional Commitment for the construction and energization of a new transmission line. Under the Title 17 Innovative Energy Loan Guarantee Program and the Tribal Energy Loan Guarantee Program, the Department is authorized to provide loan guarantees to projects that will expand and improve the transmission grid. Through these programs, LPO can offer borrowers access to debt capital, flexible financing customized for the specific needs of borrowers, and valuable expertise in energy infrastructure project development. LPO can also reduce the risk of investment in long-distance transmission projects by providing financing support for projects that analysis shows are likely to support repayment of the loan, even if those projects have not yet secured pre-construction agreements for transmission service for their full capacity.

(5) *Transmission Infrastructure Program* (TIP). The Western Area Power Administration (WAPA) administers a unique federal infrastructure development assistance and financing program. TIP manages WAPA's statutory $3.25 billion borrowing authority to provide debt financing and development assistance for qualifying transmission projects with at least one terminus in WAPA's 15-state service territory and that facilitate delivery of renewable energy. The program leverages WAPA's transmission project development expertise and WAPA's borrowing authority, partnering with private and other non-federal co-investment to support the development of critical transmission and related infrastructure in the West.

D. Permitting

The siting and permitting of interstate and inter-regional high-voltage transmission generally requires action by many different authorities governing the federal, state, local, and Tribal lands, as well as private lands, that facilities will pass through. Projects involving multiple agencies are subject to a wide array of processes and procedural requirements for compliance with legal mandates and multiple authorizations. The time required to meet these legal mandates can be reduced through effective planning processes that take advantage of existing rights-of-way, which as outlined previously, DOE intends to incorporate into its planning activities. As an example, DOE is coordinating with BLM as the agency updates its designated West-wide Energy Corridors. But where such rights-of-way are not available, siting and permitting processes can significantly slow development and should be conducted efficiently, with clear expectations and predictable timelines and processes. These aims should occur without sacrificing important analysis, protection of environmental, cultural, and other important values, or robust public engagement. DOE intends to coordinate with states and with federal permitting agencies to help facilitate the siting and permitting process, including through consideration of the following actions:

(1) *Federal Permitting Coordination.* The Federal Permitting Improvement Steering Council (FPISC), established pursuant to Title 41 of the Fixing America's Surface Transportation Act ("FAST–41"), and made permanent by IIJA, facilitates coordination and oversight procedures for federal environmental review and permitting process related to eligible large-scale infrastructure projects. IIJA provided additional authority to FPISC to include projects on the permitting dashboard. DOE will work with relevant agencies to evaluate and recommend whether to include nationally-significant transmission projects on the dashboard. In addition, DOE works with interagency partners to bolster pre-application planning for transmission projects through its Integrated Interagency Pre-Application Process, which allows transmission project developers a mechanism for early coordination and information sharing with permitting agencies.[13] DOE intends to encourage developers to take advantage of the pre-application process in order to streamline federal permitting action.

(2) *Public-private partnership projects.* The previously-described Transmission Facilitation Program,

[13] FPA section 216(h); 42 U.S.C. 824p(h).

enacted as part of IIJA, includes authority for the Secretary to enter into public-private partnerships for the design, development, construction, operation, maintenance, and ownership of transmission facilities. In addition, the Secretary, acting through the Administrators of the Southwestern Power Administration (SWPA) or WAPA, has the authority to design, develop, construct, operate, maintain, or own, alone or in partnership with third parties, transmission system upgrades or new transmission lines and related facilities within states in which WAPA and SWPA operate.[14] In exercising these authorities, DOE can help facilitate transmission development in areas where state or local permitting requirements would otherwise make a project difficult or impossible to complete. In carrying out either type of project, the Secretary may accept and use contributed funds from another entity, such as a transmission developer, to carry out the Department's work on upgrades or on new projects. DOE may solicit interest in these public-private partnership projects, with a particular focus on projects that would fulfill transmission needs identified by the transmission planning actions outlined previously.

(3) *Designation of Route-Specific Transmission Corridors.* The Federal Energy Regulatory Commission (FERC) has authority, clarified by the IIJA, to issue permits for the construction or modification of electric transmission facilities in National Corridors designated by the Secretary of Energy.[15] IIJA also clarified that National Corridors can be any area experiencing or expected to experience electricity transmission capacity constraints or congestion that adversely affects consumers.[16] DOE can designate a National Corridor after taking into consideration the Transmission Needs Study discussed previously and other information. In order to facilitate the efficient consideration of projects seeking a FERC-issued permit, DOE intends to provide a process for the designation of National Corridors on a route-specific, applicant-driven basis. DOE intends to give particular consideration to proposed National Corridors that, to the greatest degree possible, overlap with or utilize existing highway, rail, utility, and federal land rights-of-way. Further, in order to enable effective use of both DOE's route-specific National Corridor process and FERC's permitting process, DOE and FERC intend to work together, as appropriate, to establish coordinated procedures that facilitate efficient information gathering related to the scope of activities under review pursuant to these authorities. By harmonizing, to the greatest extent practicable, pre-filing and application processes, DOE and FERC can work with applicants to identify and resolve issues as quickly as possible; share information in a timely fashion; and expedite reviews conducted pursuant to these authorities, the National Environmental Policy Act, and other requirements.

E. Transmission Research, Development, and Demonstration (RD&D)

DOE continues to conduct RD&D to further develop and reduce the costs of technologies that enable the transmission system to be used more efficiently, including grid enhancing technologies, improved transmission conductors, and grid-related energy storage facilities. The National Laboratories' research programs, in partnership with industry, are investing in the next generation of components and systems. DOE's FY22 budget request prioritizes solicitations to support transmission technology development including transformers, high voltage direct current converter stations, and storage.

DOE is also developing and improving analytical tools to more effectively support transmission deployment. DOE, in collaboration with several National Laboratories, is developing the North American Energy Resilience Model (NAERM), a national-scale energy planning and real-time situational awareness tool. DOE is working to enable and expand NAERM's capabilities to facilitate effective transmission planning. Currently deployed transmission planning tools include the Energy Zones Mapping Tool, an online mapping tool that can be used to identify potential energy resource areas and energy corridors, and the Transmission Resilience Maturity Model that enables utilities to measure the maturity of their transmission resilience programs and identify improvements to increase the resilience of their transmission systems.

Moving forward, the Department will keep the public informed of its planned activities and progress related to this Building a Better Grid Initiative to expand and improve the Nation's electric transmission grid. DOE is committed to robust engagement and collaboration with states, American Indian Tribes and Alaska Natives, industry, unions, local communities, environmental justice organizations, and other stakeholders. For additional information, interested parties may reach out to DOE's Office of Electricity using the contact information provided in this Notice.

[14] Energy Policy Act of 2005 section 1222; 42 U.S.C. 16421.

[15] FPA section 216(b); 16 U.S.C. 824p(b).

[16] Section 216(a) of the FPA; 16 U.S.C. 824p(a).

Signing Authority

This document of the Department of Energy was signed on January 11, 2022, by Jennifer M. Granholm, Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document on publication in the **Federal Register**.

Signed in Washington, DC, on January 12, 2022.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

[FR Doc. 2022–00883 Filed 1–18–22; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Environmental Management Site-Specific Advisory Board, Northern New Mexico

AGENCY: Office of Environmental Management, Department of Energy.

ACTION: Notice of open virtual meeting.

SUMMARY: This notice announces an online virtual combined meeting of the Consent Order Committee and Risk Evaluation and Management Committee of the Environmental Management Site-Specific Advisory Board (EM SSAB), Northern New Mexico. The Federal Advisory Committee Act requires that public notice of this online virtual meeting be announced in the **Federal Register**.

DATES: Wednesday, February 16, 2022; 1:00 p.m.–4:00 p.m.

ADDRESSES: This meeting will be held virtually via WebEx. To attend, please contact Menice Santistevan by email, *Menice.Santistevan@em.doe.gov*, no later than 5:00 p.m. MT on Friday, February 11, 2022.

FOR FURTHER INFORMATION CONTACT: Menice Santistevan, Northern New Mexico Citizens' Advisory Board

GAO United States Government Accountability Office

Electricity Grid Resilience

September 2021

Presidential Policy Directive 21 established national policy on critical infrastructure and resilience in February 2013. The directive defines resilience as the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions. Such disruptions include naturally occurring threats or incidents, deliberate attacks, and accidents.

This brief draws from recent GAO reports on natural and human-caused risks to the electricity grid. It also highlights GAO recommendations that had not been implemented as of September 2021.

Context and Federal Role

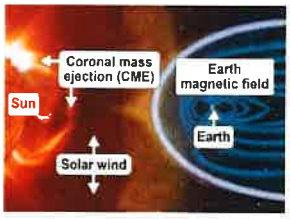
The nation's grid delivers electricity that is essential for modern life. However, the grid faces risks from events that can damage electrical infrastructure (such as power lines) and communications systems, resulting in power outages. These outages can threaten the nation's economic and national security. They can also disproportionately affect low-income groups, in part because such groups have fewer resources to invest in backup generators and other measures to minimize the impact of outages.

Even though most of the electricity grid is owned and operated by private industry, the federal government plays a key role in enhancing grid resilience.

- The Department of Homeland Security (DHS) is responsible for coordinating the overall federal effort to promote the security and resilience of the nation's critical infrastructure sectors.
- The Department of Energy (DOE) leads federal efforts to support electricity grid resilience, including research and technology development by national laboratories.
- The Federal Energy Regulatory Commission (FERC) reviews and approves standards developed by the North American Electric Reliability Corporation, the federally designated U.S. electric reliability organization.

Key Issues

The electricity grid faces multiple risks that can cause widespread power outages.

Risk	Example
Extreme weather and climate change 	More frequent and intense extreme weather and other risks due in part to a changing climate, can affect electricity generation, transmission, and distribution. For example, in February 2021, extreme cold weather that spread from the Canadian border as far south as Texas caused record winter demand for electricity and left about 4.5 million customers in Texas, along with about 376,000 customers in Louisiana and Oklahoma, without power. In September 2017, Hurricanes Irma and Maria caused widespread power outages in Puerto Rico and the U.S. Virgin Islands. As a result, the chronically ill often did not have access to electricity to power their medical devices, such as ventilators (see GAO-21-346 and GAO-21-274).
Cyber- and physical attacks 	The electricity grid is vulnerable to cyberattacks, particularly on the systems that control electric power generation, transmission, and distribution. These systems were once isolated from the internet but now are increasingly connected, which poses opportunities for attackers. In March 2019, a cyberattack on an electric utility serving parts of California, Utah, and Wyoming resulted in a communications outage that prevented utility staff from monitoring and controlling the system. A cyberattack could also seek to disable a security system to facilitate a physical attack (e.g., damaging electric grid components) against a utility's infrastructure (see GAO-21-81, GAO-19-332 and GAO-11-117).
Electromagnetic events 	Electromagnetic events, which can result from natural phenomena (e.g., geomagnetic disturbances from solar storms) or a weapon that creates an electromagnetic pulse, can disrupt computers and harm electronics. They can also cause significant damage to critical electrical infrastructure, such as transformers, which facilitate the efficient transfer of electric power. For example, in 1989, an extreme solar storm caused wide-scale damage to the Hydro-Quebec power system in Canada. Although such effects are rare, the damage left 6 million customers without power for up to 9 hours (see GAO-19-98, GAO-18-67, and GAO-16-243).

Sources: Prior GAO work (text); Federal Emergency Management Agency (top image); Song_about_summer/stock.adobe.com (second photo from top); National Aeronautics and Space Administration (bottom image). | GAO-21-105403

Key Opportunities

Agencies have implemented several of GAO's recommendations for improving electricity grid resilience. For example, in March 2016, we recommended that DHS designate roles and responsibilities within the department for addressing electromagnetic risks, which DHS did in 2017. However, as of September 2021, agencies had not yet implemented a number of GAO recommendations that represent key opportunities to mitigate risks in the following areas.

Risk	Key opportunities
Extreme weather and climate change 	**Prioritize efforts and target resources effectively.** DOE should develop a department-wide strategy to enhance the resilience of the grid to climate change, as we recommended in GAO-21-346. Such a strategy could help DOE better prioritize its climate resilience efforts to ensure that resources are targeted effectively. **Enhance grid resilience efforts.** DOE should create (1) a plan to guide development of resilience-planning tools and (2) a mechanism to better inform utilities about grid resilience efforts at its national laboratories, as we recommended in GAO-21-274. **Better manage climate-related risks.** FERC could better manage climate-related risks to the grid by identifying, assessing, and planning for these risks, as we recommended in GAO-21-346.
Cyberattacks 	**Assess all cybersecurity risks.** DOE should develop a plan to implement the federal cybersecurity strategy, as we recommended in GAO-19-332. The plan, which DOE is now working on, should include a full assessment of all cybersecurity risks to the grid. Such a plan could help guide decision makers in allocating resources to address cybersecurity risks. **Address risks to distribution systems.** DOE should ensure its plans being developed to implement the federal cybersecurity strategy more fully address risks to the grid's distribution systems—which carry electricity to consumers—as we recommended in GAO-21-81. **Consider changes to current standards.** FERC could address current and projected cybersecurity risks, and more fully align its cybersecurity standards with leading practices, by considering changes to its standards, as we recommended in GAO-19-332. **Evaluate potential risks of a coordinated attack.** FERC should evaluate the potential risks to the grid from a coordinated attack on geographically distributed targets, as we recommended in GAO-19-332. Doing so could provide FERC assurance that the approved threshold for mandatory compliance adequately responds to that risk.

Sources: Prior GAO work (text); Federal Emergency Management Agency (top image); Song_about_summer/stock.adobe.com (second image from top). | GAO-21-105403

Key Issues (continued)

In addition to the risks described in the prior page, the electric utility industry faces complex challenges and transformations, including

- aging infrastructure;
- adoption of new technologies, such as information and communication systems to improve the grid's efficiency; and
- a changing mix of power generation.

The traditional model of large, centralized power generators is evolving as retiring generators are replaced with variable wind and solar generators, smaller and more flexible natural gas generators, and nontraditional resources. Such resources include demand-response activities which encourage consumers to reduce their demand for electricity when the cost to generate electricity are high, and various technologies (e.g., solar panels) that generate electricity at or near where it will be used—known as "distributed generation."

Selected References

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- National Academies of Sciences, Engineering, and Medicine. *Enhancing the Resilience of the Nation's Electricity System*. July 2017.
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