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U.S. Department of Energy
SpeedtoPowerRFI@hq.doe.gov

RE: RFI Response – Accelerating Speed to Power

Information requested by RFI

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Company/institution's primary area of expertise or focus relevant to RFI:
Grid Infrastructure Constraints and use of DOE Funding, Financing, and Technical Assistance

GridLab appreciates this opportunity to provide input on the U.S. Department of Energy's (DOE) Accelerating Speed to Power Request for Information. GridLab is a non-profit, non-partisan, 501(c)(3) focused on identifying and overcoming the technical barriers to energy infrastructure deployment. GridLab applauds the DOE's effort to collect stakeholder input on ways in which the department can use its authority and funding programs to rapidly expand energy generation and transmission grid capacity. We have included several ideas for the DOE's consideration, and we are readily available to provide further consultation if the department seeks follow up on any of the solutions presented.

Over the past several years, GridLab has engaged with utilities, transmission owners, Regional Transmission Organizations (RTOs), Independent System Operators (ISOs), U.S. National Laboratories, Power Marketing Administrations, Equipment Manufacturers, and energy-focused Public Interest Organizations on methods and technologies to increase the speed at which the U.S. can expand access and the affordability of electricity. Through these efforts, GridLab has documented a series of opportunities to improve the cost and speed of U.S. grid expansion. However, each of these opportunities are burdened by bottlenecks that stall adoption. To present this data in an actionable way, GridLab has synthesized a list of opportunities combined with bottlenecks and possible solutions within the DOE's authority. The goal is to provide

clear actions that the DOE could take to accelerate the U.S.'s energy system expansion.[1]

Opportunity 1: High Performance Conductors

Cost-effective and rapid transmission system capacity expansion can be bolstered by reconductoring or rebuilding existing transmission lines using High Performance Conductors (HPCs).[2] Sometimes called "Advanced Conductors," composite core conductors (e.g. "ACCC," "AECC," "ACCR" etc.) and advanced steel supported ("ACSS") conductors are increasingly being deployed by many U.S.-based utilities and transmission owners to increase the capacity of existing transmission assets, often doubling the capacity without triggering need for new rights-of-way or permitting.

Bottleneck 1: There is no single body that approves new conductor technologies for use on the U.S. transmission system. Instead, all new technologies must be tested and approved for use by each individual utility or transmission owner. This unnecessarily slows adoption because while these technologies have been safely deployed in a variety of environments for over a decade, there remains hesitation among many entities, including Public Utilities, to use new conductor types without performing their own tests and adoption cycles. These cycles can take many years, which results in a long lag between when new infrastructure technologies are proven in the market versus when they are deployed in the U.S.

Solution 1: The DOE could direct its national labs to test and certify current and emerging HPC technologies for use on the U.S. transmission system. This certification would give U.S. transmission owners the peace of mind to adopt the technology faster. There has already been deep analysis of HPCs by Idaho National Laboratory that could be leveraged to kick-start this effort.[3]

Solution 2: The DOE could facilitate a convening among transmission line engineers from Public Utilities and Power Marketing Administrations to develop a method to standardize the adoption of emerging conductor technologies. This could include vendor due diligence, retooling requirements, training, procurement strategies, and other workstreams that are currently not standardized across these public entities today. This

[1] In an effort to provide concrete examples of the proposed solutions, specific manufacturers and products are mentioned. However, GridLab does not endorse any specific vendor or product. Specific vendors or products in these comments should be considered proxy examples of the solutions available on the market.

[2] Chojkiewicz, E., Umed Paliwal, Abhyankar, N., Baker, C., Ric O'Connell, Callaway, D., & Phadke, A. (2024). Accelerating transmission capacity expansion by using advanced conductors in existing right-of-way. Proceedings of the National Academy of Sciences, 121(40). https://doi.org/10.1073/pnas.2411207121

[3] Advanced Conductor Scan Report. (2023). Idaho National Laboratory. https://inl.gov/content/uploads/2024/10/23-50856_R12a_-AdvConductorsScanProjectReportCompressed.pdf

method could then be leveraged by private transmission owners to expedite their own technology adoption efforts.

Bottleneck 2: Many of the lines that could offer valuable capacity with reconductoring or rebuilding have aged structures that either no longer meet industry standards or are in such a state of disrepair that reconductoring the line with a HPC is technically infeasible.

Solution 1: The DOE could prioritize Grid Resilience and Innovation Partnership (GRIP) applications that aim to replace or rehabilitate aging infrastructure while reconductoring to simultaneously address structural resiliency risks while increasing system capacity. These opportunities could fall under the funding allocated to the Grid Resilience Assistance program, and would provide benefits beyond hardening against extreme weather and natural disasters. There are emerging techniques for rehabilitating structures[4] as well as new structure designs[5] and materials[6] that would benefit from federal grants to bring these solutions to scale, expand access, and increase transmission owner familiarity.

Solution 2: The DOE could request NERC (via FERC) to catalog the age of structures as reported in the Transmission Availability Data System (TADS) and identify circuits with statistically high outage rates. These circuits could be prioritized for funding to facilitate replacement and uprating either through the use of HPCs or other capacity increasing methods (voltage uprating, double-circuiting, HVDC conversion, etc.)

Bottleneck 3: It remains difficult to complete reconductoring projects for a variety of reasons including taking lines out of service during construction, sourcing terminal equipment including new transformers, relays, and breakers, and training skilled tradespeople on using the new conductors.

Solution 1: Several transmission owners have used or are investigating the use of “live-line” or “energized” reconductoring.[7,8] This work requires highly skilled linemen and construction tradespeople who are in short supply. The DOE could investigate how they could leverage their Registered Apprenticeship Programs (RAPs) or develop additional partnerships with the Department of Labor to expand this high demand skillset and promote high paying jobs for American workers.

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[4] Energized Tower Raising & Grid Solutions - Tower Raising | Ampjack. (2025, October 7). https://www.ampjack.ca/

[5] BOLD® Transmission. (2024, November). https://www.boldtransmission.com/

[6] Leading Utility Pole Manufacturers | Resilient Structures. (2025, April 3). https://www.resilient-structures.com/

[7] Record Energized Reconductor Project Brings Reliable Power to South Texas. (2016). https://www.quantaenergized.com/wp-content/uploads/2015/05/EEI-Energy-Biz_pages.pdf

[8] Energized Services PAR Electric. (2020, June 8). Parelectric.com. https://www.parelectric.com/capabilities/energized-services/

Solution 2: The DOE could coordinate with the North American Transmission Forum (NATF) to evaluate opportunities to fund the expansion of their Regional Equipment Sharing for Transmission Outage Restoration (RESTORE) Program.[9] This program has facilitated coordination among its transmission owning members for purchasing and sharing long-lead time equipment to expedite restoration efforts. A similar program could be developed for coordinating purchases of terminal equipment among members in a region to expedite and derisk project delivery.

Opportunity 2: Advanced Transmission Technologies (ATTs)[10], Grid Enhancing Technologies (GETs)[11], and/or Flexible AC Transmission Systems (FACTS)[12]

Beyond HPCs, over the last two decades technologists have developed an entire portfolio of advanced tools that aim to provide cost-effective and rapid electric system expansion. Several U.S. National Laboratories have been diligently evaluating these emerging technologies and working to establish the opportunity to deploy them on the U.S. grid. Staffing for these programs should be expanded as feasible as the field is evolving rapidly and no industry entity can provide the technical breadth and depth of the national lab network to properly evaluate these innovations. In addition to supporting the continued work of the labs, there remain several bottlenecks to deployment that DOE could address:

Bottleneck 1: Utilities and Transmission Owners are by design conservative in their approach to technology adoption both because they are charged with ensuring reliable service and are regulated by entities that scrupulously audit their expenditures. A failed technology deployment on the grid could be catastrophic, both for public safety and a transmission owner's finances and reputation. As a result, there is broad industry aversion to adopting a new tool

[9] The RESTORE Program is member supported and focused on pooling assets among members to expedite restoration of critical infrastructure following major disruptive events like extreme weather. While this program is not directly aligned with providing terminal equipment for capacity expansion, the program does provide a template for developing coordination of supply chains and equipment standardization among members in different regions. More information is available on the North American Transmission Forum Website: https://www.natf.net/programs

[10] Advanced Transmission Technologies. (2020). U.S. Department of Energy. https://www.energy.gov/sites/prod/files/2021/02/f82/Advanced%20Transmission%20Technologies%20Report%20-%20final%20as%20of%2012.3%20-%20FOR%20PUBLIC.pdf

[11] Grid-Enhancing Technologies: A Case Study on Ratepayer Impact. (2022). U.S. Department of Energy. https://www.energy.gov/sites/default/files/2022-04/Grid%20Enhancing%20Technologies%20-%20A%20Case%20Study%20on%20Ratepayer%20Impact%20-%20February%202022%20CLEAN%20as%20of%20032322.pdf

[12] On the Road to Increased Transmission: Flexible Alternating Current Transmission Systems | NREL. (2025). https://www.nrel.gov/news/detail/program/2024/on-the-road-to-increased-transmission-flexible-alternating-current-transmission-systems

with “serial number 1” (the first of its kind). Instead, transmission owners will often run “pilot projects” as a means of containing the risk of a new technology to a small subset of the system. While this strategy made sense under modest load growth assumptions, it merits re-thinking if the U.S. is to expand the grid fast enough to meet projected demands.

Solution 1: The DOE could work with the Power Marketing Administrations and Public Utilities to develop a research and development forum with national labs for evaluating new grid technologies using real-world applications and derisk experimentation. In addition to the responsibility to keep the grid operating, these entities have the added pressure of ensuring that their grid investments are balanced out by their revenues. This creates an asymmetrical situation where there is little reward for taking risks on new technologies and yet large consequences if the attempt fails. The DOE could provide either national lab expertise or funding to reduce the risk of experimentation and communicate successes to the broader industry.

Solution 2: The DOE could increase support for participation of the national lab staff in industry conferences including IEEE, EPRI, the Energy Systems Integration Group (ESIG), and others to ensure that national lab knowledge and tools are being shared widely. Many of these conferences include manufacturers, transmission owners, generator owners, regulators, and academic researchers who all share information about what is working and how to replicate it. The national labs can provide a key voice connecting these various groups to expedite technology adoption.

Solution 3: The DOE could expand the State Technical Assistance Program to provide high fidelity technical support to state regulatory staff on emerging grid technologies. The recently released report “Regulatory Sandboxes and Other Processes to Expedite Utility Adoption of Advanced Grid Technologies”[13] from Lawrence Berkeley National Lab provides a framework for this type of assistance and the DOE could prioritize providing this resource in states that have introduced requirements for their utilities to investigate ATTs.[14]

Bottleneck 2: There is a lack of standardization among utilities and transmission owners on their asset management systems, design standards, and procurement processes. This creates deployment friction for ATT providers who need to

[13] Relf, G., Whiting, M., Schwartz, L. C., & Cappers, E. (2025). Regulatory Sandboxes and Other Processes to Expedite Utility Adoption of Advanced Grid Technologies | Energy Markets & Policy. LBNL. https://emp.lbl.gov/publications/regulatory-sandboxes-and-other

[14] State Resources. (2025, March 13). WATT Coalition - Working for Advanced Transmission Technologies. https://watt-transmission.org/resource-library/states/

customize their solutions for each potential customer or limit their market to a small subset of power providers. It also decreases the ability for neighboring entities to share equipment or best practices.

Solution 1: If the Power Marketing Administrations and/or Public Utilities find a technology that is particularly helpful, they could be asked to develop equipment standards and common specifications that could increase the speed at which the industry can adopt the solution. The Power Marketing Administrations and Public Utilities network spans many different environments and risk profiles in the U.S. and can provide helpful information about technology performance to a broad audience in industry.

Solution 2: The national labs can continue to provide openly available cutting edge research into new technologies including GETs, FACTs, HVDC, and other power electronics. The speed and security provided by this research is unparalleled in industry and provides a strategic advantage for the U.S. power grid. While the research provided by the national labs is far too voluminous to discuss here, it cannot be understated how critical this open information is to U.S. grid planners and operators.

Opportunity 3: Flexible Interconnection

There has been a growing body of research over the past two years demonstrating the fact that the troublesome grid congestion we see is often only observed during a small subset of hours during peak demand conditions. Researchers at Duke University introduced a concept of “curtailment enabled headroom” where new large loads accept a small level of curtailment in exchange for being able to connect to the grid faster and less expensively.[15] The work found a first-order estimate that this headroom could allow the U.S. grid to host an additional 100 GW of future electricity demand without any new major capacity upgrades. A recent analysis of the Nevada system, which is projecting dramatic load growth for new datacenters, found that “just a few dozen hours of load flexibility in a given year could cut the total capacity needed by two-thirds.”[16] On the generation side, researchers at UC Berkeley found that the U.S.’s continental grids could add up to 800 GW of new renewable energy resources by sharing the interconnection points of existing thermal plants.[17] This arrangement, called Surplus

[15] Norris, T., Profeta, T., Patino-Echeverri, D., & Cowie-Haskell, A. (2025, February 11). Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in U.S. Power Systems. Nicholas Institute for Energy, Environment & Sustainability. https://dukespace.lib.duke.edu/items/bb350296-d7a1-4d8f-acb0-2fba9b1f03de

[16] Cox, C., Schwartz, A., & Stenclick, D. (2025, September 25). Data Center Flexibility - NV Energy case study. GridLab. https://gridlab.org/portfolio-item/data-center-flexibility-nv-energy-case-study-report/

[17] Paliwal, U., Chojkiewicz, E., Abhyankar, N., & Phadke, A. (2024). Existing fossil fuel plants sharing grid access with renewables can rapidly and cost-effectively double U.S. generation capacity. Working Paper. Goldman School of Public Policy, University of California, Berkeley; https://gspp.berkeley.edu/assets/uploads/page/Surplus_Interconnection.pdf

Interconnection Service, is already allowed in most regions under FERC Order 845 (2018). There is mounting evidence that there is significant opportunity to rapidly add new electricity demand and the generation needed to serve it if the U.S. can re-think how it plans and operates the system.

Bottleneck 1: Large load customers often are unwilling or unable to accept regular curtailment unless properly compensated.

Solution 1: The recent Advanced Notice of Proposed Rulemaking (ANOPR) aimed at establishing rules for the interconnection of large electricity loads to the transmission system can be a forum to negotiate realistic expectations for load flexibility. Many of these discussions are hampered by the commercial sensitivity of the industry and the inability to share the art of the possible. While there has been some public information about companies offering datacenter load flex solutions,[18,19] there is no consensus around what utilities and transmission owners can expect and how to ensure that these performance requirements are upheld. NERC,[20] ESIG,[21] EPRI[22] and other organizations are already hosting Large Load/Datacenter Task Forces aimed at characterizing the risks posed by large loads and developing mitigation strategies. The DOE could leverage the information already gathered through these task forces to capture much of the opportunity for load flexibility.

Bottleneck 2: RTO/ISO market design limits the value of new resources connected via Surplus Interconnection Service. Typically, existing resources have limited capacity rights based on what was originally studied that is less than their interconnection rights. While a new resource could interconnect using Surplus Interconnection Service under the interconnection agreement, it often will have little or no capacity rights on the system, limiting its commercial viability.

Solution 1: NREL could partner with academic researchers and leverage its Sienna energy systems model to identify the nationwide opportunity to rapidly connect new generation facilities using Surplus Interconnection

[18] The infrastructure behind the infrastructure. (2025). Emerald AI. https://www.emeraldai.co/#technology
[19] Terrell, M. (2025, August 4). How we're making data centers more flexible to benefit power grids. Google. https://blog.google/inside-google/infrastructure/how-were-making-data-centers-more-flexible-to-benefit-power-grids/
[20] Large Loads Task Force (LLTF) Scope Document. (2024). NERC. https://www.nerc.com/globalassets/who-we-are/standing-committees/rstc/lltf/lltf-scope.pdf
[21] Large Loads Task Force. (2025, April 16). Energy Systems Integration Group (ESIG). https://www.esig.energy/large-loads-task-force/
[22] Data Center Flexible Load Initiative. (2025, September 5). Electric Power Research Institute (EPRI). https://www.epri.com/research/products/000000003002031004

Service.[23] Several organizations, including GridLab and RMI[24], have studied the opportunity using Capacity Expansion Modeling, but to-date there has not been sufficient research into the deliverability of these resources during peak grid conditions. This research is needed to demonstrate how much opportunity there is for surplus interconnected resources to provide capacity, which is increasingly the cause of rising bills for U.S. energy consumers. This analysis will require AC Powerflow analysis, a highly-technical modeling exercise that the national labs can perform.

Solution 2: The DOE could recommend FERC action to allow for more flexible market designs for generator compensation. A new design that properly accredits and compensates hybridized resources and allows for flexibility in capacity rights sharing could support faster and less expensive interconnection of a large amount of generation.

Solution 3: The DOE, through its use of Federal Power Act's section 202(c)'s Emergency Authority, can require the temporary connection of facilities to meet emergencies and serve the public interest. When this authority is used to extend the life of a retiring generation asset, it often triggers high costs to the hosting region.[25] To counter this impact, the owner could be asked to evaluate using the Grid Deployment Office's (GDO) Energy Dominance Financing Program to fund repowering or copowering opportunities to use Surplus Interconnection Service to rapidly connect new storage assets or generation.[26] The new storage plant and/or generation can be operated in tandem with the existing plant to provide additional redundancy while hedging against large price fluctuations.

Bottleneck 3: Regions that are not part of an RTO or ISO are dominated by bilateral transmission agreements. These "Long-Term Firm" agreements lock up transmission capacity for years even if they are not needed or used. While this unused capacity can be sold by the rightsholders under short-term agreements, this market is opaque and does not easily allow large loads or load serving entities to develop more sophisticated and flexible energy procurement strategies. An approach focused more on real physical transmission congestion

[23] Sienna | Energy Systems Analysis . (2025). NREL. https://www.nrel.gov/analysis/sienna

[24] Siegner, K., & Engel, A. (2024, January 16). Clean Repowering: A Near-Term, IRA-Powered Energy Transition Accelerant. RMI. https://rmi.org/clean-repowering-a-near-term-ira-powered-energy-transition-accelerant/

[25] Howland, E. (2025, August 14). $3.1B annual cost estimated for fossil fuel plants DOE won't allow to retire. Utility Dive. https://www.utilitydive.com/news/doe-mandate-fossil-fueled-power-plants-emergency/757653/

[26] Massie, A., & Tully, O. (2025, July 16). Reinvesting at Coal Plant Sites with Clean Energy Upgrades Supports both Reliability and Affordability. RMI. https://rmi.org/reality-check-reinvesting-at-coal-plant-sites-with-clean-energy-upgrades-supports-both-reliability-and-affordability/

rather than managing bilateral contractual transmission rights could open up opportunities for loads to seek energy from a more diverse set of suppliers.

Solution 1: In 2022, FERC approved Arizona Public Service Company's tariff revisions to allow for "flow based" calculation of Available Transmission Capacity.[27] This methodology was aimed at opening up available transmission capacity that was previously unavailable to APS customers by using the actual line flows to inform transmission reservations. The DOE could work with FERC to investigate the success of this program and promote wider adoption throughout non-RTO/ISO regions in the U.S.

Solution 2: The DOE could convene public utilities in non-RTO/ISO regions to evaluate the opportunities to adopt new methods for managing transmission reservations. A recent analysis of the Bonneville Power Administration's transmission system found that the network is much less physically constrained than it is contractually constrained.[28] This region has been identified as a key location for datacenter load growth and increasing Available Transmission Capacity through adopting a new reservation methodology could be the fastest and least expensive way to add hundreds of MWs of load serving capacity to the system.

Opportunity 4: Energy Storage as a Grid Asset (SAGA)

Storage can be deployed faster than most generation or transmission assets and can provide novel grid services that allow the system to quickly and cost-effectively serve new demand. Storage can flexibly inject power into the system during critical periods and address some of the growing costs facing energy consumers. One analysis GridLab sponsored found that PJM could have saved $3.5 billion in the most recent Base Residual Auction by expediting interconnection of 10% of the storage and renewables in its queue.[29]

Bottleneck 1: In the U.S., Energy Storage is treated as a unique version of power generation. It must go through the generator interconnection queue and is limited to the services it can provide based on market rules. However, energy storage is neither generation (it does not add new energy to the system) nor is it transmission (it does not move energy from one location to another). The current construct for storage is not fit for purpose and has slowed adoption in most

[27] Order Accepting Tariff Revisions, Subject to Condition, and Denying Waiver Request. (2022, December 15) FERC. https://www.ferc.gov/media/e-3-er22-2476-000

[28] Hart, E. (2025, March). Toward a more holistic and adaptive treatment of BPA transmission rights in Northwest utility planning and procurement processes. Sylvan Energy Analytics, GridLab. https://gridlab.org/portfolio-item/renewables-transmission-rights/

[29] PJM 2026/27 BRA: Price impact of additional renewable & BESS supply. (2025, October). Aurora Energy Research, GridLab. https://gridlab.org/portfolio-item/price-impact-of-additional-renewable-bess-supply/

regions except for the CAISO and ERCOT markets.[30] There are different reasons for the successful deployment of storage in these two distinct regions, but the ERCOT example provides insights to the opportunities for the DOE to promote energy storage as an essential tool to allow the U.S. grid to rapidly add new electricity demand.

Solution 1: The DOE could work with FERC to determine if the 2017 FERC Policy Statement on Cost Recovery by Electric Storage Resources[31] should be revisited, perhaps up to and including a FERC rulemaking to establish separate interconnection and market rules for energy storage. ERCOT's rapid interconnection of storage was permitted due to ERCOT's unique "connect and manage" approach to generator interconnection. While a nationwide adoption of connect and manage interconnection for all generator types may not be feasible or desirable, in the case of energy storage it could be a pathway to expedite development.

Bottleneck 2: There is not yet a framework to incentivize storage colocated with new large loads as a means to increase load flexibility.

Solution 1: The recent ANOPR aimed at establishing rules for the interconnection of large electricity loads to the transmission system could investigate this issue and develop rules that incentivize storage deployment at new large load facilities. The DOE can leverage a recent roadmap published by the Duke University Nicholas Institute for Energy, Environment & Sustainability to navigate the jurisdictional complexities and develop a rule that can promote techniques like colocating storage.[32]

Opportunity 5: Integrated System Planning

Integrated System Planning or Integrated Network Planning is the practice of co-optimizing generation, transmission, and distribution planning. The national labs, and in particular LBNL, have done deep work in characterizing the benefits and pathways for

[30] Micek, K., & Dlin, S. (2025, September 17). US Battery Storage: ERCOT surpasses CAISO in Q2 for most operating battery storage capacity in US. S&P Global Commodity Insights. https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/091725-us-battery-storage-ercot-surpasses-caiso-in-q2-for-most-operating-battery-storage-capacity-in-us

[31] Docket No. PL17-2-000 Item No. E-2 Policy Statement

[32] Walsh, S., M. Farmer, A. Zevin, K. Smaczniak, G. Daly, N. Lobel, A. Clements, Y. Guo, and T. Profeta. 2025. How DOE's Proposed Large Load Interconnection Process Could Unlock the Benefits of Load Flexibility. NI PB 25-03. Durham, NC: Nicholas Institute for Energy, Environment & Sustainability, Duke University. https://nicholasinstitute.duke.edu/publications/how-doesproposed-large-load-interconnection-process-could-unlock-benefits.

this practice.[33,34] As the U.S. aims to quickly add GWs of new energy demand on the system, integrating the disparate planning workstreams of generation, transmission, and distribution owners will uncover the fastest and most cost-effective means of expanding grid capacity. However, this effort is not straightforward and will require different implementations across different regions and companies. One example from the Southwest Power Pool that could provide a template for other regions is the proposed High Impact Large Load (HILL) policy.[35] This policy aims to establish a 90-day study-and-approval process for interconnecting large loads that will be paired with new generation (either on-site or nearby). This type of planning by definition is integrated and could provide a roadmap for future analysis methods.

Bottleneck 1: Commercially available grid modeling tools either do not have the capability to co-optimize across the various domains or the modeling is too computationally intensive to be feasible.

Solution 1: The DOE could expand training opportunities to states and grid planners for open software tools like Sienna, GenX[36], and GridPath.[37] The DOE already provides technical assistance to states under the State Technical Assistance Program and this program could be expanded to include zero or low cost tools for states to perform independent energy modeling.

Solution 2: There are emerging commercial software solutions that have found novel ways to perform integrated system planning.[38] The DOE could use their national labs to test, benchmark, and broaden the use of these powerful tools. The DOE can also inform FERC of the capabilities of these tools to inform future rulemakings that may require transmission planners to implement more integrated planning methods under long range transmission planning efforts like those conducted under FERC Orders 1000 and 1920.

Solution 3: The DOE could fund the creation of publicly available Geographic Information Systems (GIS) tools to allow states, tribes, and other grid stakeholders to proactively identify locations where grid

[33] Biewald, B., Glick, D., Kwok, S., Takahashi, K., Carvallo, J. P., & Schwartz, L. C. (2024, November). Best Practices in Integrated Resource Planning: A guide for planners developing the electricity resource mix of the future | Energy Markets & Policy. Energy Markets & Planning; Berkeley Lab. https://emp.lbl.gov/publications/best-practices-integrated-resource

[34] Integrated Distribution System Planning | Energy Markets & Policy. (2025). Energy Markets & Planning; Berkeley Lab. https://emp.lbl.gov/projects/integrated-distribution-system-planning

[35] Southwest Power Pool board approves accelerated pathway for large load connection. (2025). Southwest Power Pool. https://www.spp.org/news-list/southwest-power-pool-board-approves-accelerated-pathway-for-large-load-connection/

[36] GenX. Energy.mit.edu; MIT Energy Initiative, Princeton University. https://energy.mit.edu/genx/

[37] Analysis of Resource Adequacy across the Eastern Interconnection: An open-source case study using GridPath. (2025, July). Telos Energy, GridLab. https://gridlab.org/gridpath_ei/

[38] SAInt - An Integrated Systems Modeling Platform | encoord. (2025). https://www.encoord.com/saint

expansion could help meet the economic development and reliability goals of the region. This effort could support integrated planning by providing grid planners a more focused solution set to select from when testing grid expansion options. Using geography to inform infrastructure solutioning can improve model runtime and address the computational issues facing full integrated system modeling. A recent long-term 20-year transmission planning exercise in the western U.S. pioneered a cost-surfacing method that helped optimize transmission line siting.[39] This method could be replicated if a public GIS dataset were created to support it.

Solution 4: The DOE could convene grid stakeholders under the Grid Modernization Initiative to develop total cost of ownership (TCO) analysis methods for grid assets. These techniques encourage utilities and transmission owners to select solutions that offer better long term net benefits for customers and provide optionality for future system expansion. These methods could then be adopted by system planners prior to the integrated co-optimization modeling to expedite the computations.

Bottleneck 2: The skilled labor needed to perform Integrated System Planning is in short supply

Solution 1: The DOE could partner with the Department of Education or Department of Labor to provide funding for power system engineering programs at public universities and community colleges. There may also be opportunities under the RAP program to train technicians and analysts that can support grid planning engineers.

Bottleneck 3: In RTOs/ISOs, Integrated System Planning blurs the line between the authorities of RTO/ISOs, Independent Power Producers, and Load Serving Entities. Transmission operators are reluctant to optimize future generation portfolios when designing transmission expansion because it is beyond their scope and authority. This prevents technically optimal combinations of transmission and generation expansion from being proposed.

Solution 1: The DOE can request the FERC to clarify the authority for RTO/ISOs to co-optimize generation and transmission in a way that respects open access while still identifying economical solutions for grid expansion. This type of effort can simply start as cooperation and better data sharing, rather than full planning integration.[40]

Solution 2: The DOE can provide technical support to states, tribes, and grid stakeholders to develop energy pathways for their region that can

[39] Connected West; A plan to reliably and cost-effectively help serve the growing energy needs in the West. (2024). GridWorks, GridLab. https://connectedwest.org/

[40] Right-Sizing Future Electric Transmission Systems; Strategies for Improving Coordination Between Resource Planning and Transmission Planning. (2025, July). GridLab. https://gridlab.org/portfolio-item/right-sizing-future-electric-transmission-systems/

then be tested by the RTO/ISOs to determine the potential grid needs to support those energy pathways. ESIG has developed a series of deep dives into integrated planning that leverage real-world experiences from grid modelers to provide guidance on lessons learned and best practices.[41] These materials discuss the various barriers to integrated planning in all regions and could be a foundation for expanding DOE technical support on integrated system planning.

Opportunity 6: Enhanced Demand-Side Management and Distribution Optimization

Leverage demand side management resources and the distribution grid to reduce peak demand, enhance grid reliability, and defer expensive infrastructure upgrades, which directly addresses affordability for consumers.

Bottleneck 1: Many utilities and grid operators underutilize or inadequately value customer-sited resources like Demand Response (DR), distributed energy resources (DERs) (rooftop solar, residential storage), and energy efficiency (EE). The existing system often defaults to supply-side solutions even when alternatives are more cost effective. Reducing peak demand is the most direct way to lower the wholesale cost of electricity, as the system's most expensive and least efficient resources are typically run only during these few peak hours.

Solution 1: The DOE could work with State Utility Commissions (via the State Technical Assistance Program) to promote the adoption of Performance-Based Ratemaking (PBR) models that incentivize Demand-Side Management adoption.

Solution 2: Standardize and expand DR and DER participation in Wholesale Markets. Ensure the implementation of FERC Orders like Order 2222 to ensure that DERs can provide services like capacity, energy, and ancillary services on a level playing field with traditional generation. The DOE could advocate for or support FERC in accelerating the standardization of how DR and DER aggregations can participate in wholesale electricity markets.

Bottleneck 2: The distribution system is increasingly hosting large amounts of DERs, yet many utilities have not leveraged flexible grid connection approaches, which, in their simplest form, do not require additional communications or control infrastructure from the utility (i.e., “static” flexible grid connection). Utilities could extract even more capacity effectively with “dynamic” flexible grid connection methods, but it would require investments in Distributed Energy Resource Management Systems (DERMS) in most cases. Without these tools, there is a

[41] Integrated Planning. (2025). Energy Systems Integration Group (ESIG). https://www.esig.energy/integrated-planning/

lack of visibility and control at the distribution level which limits the scale at which DERs can contribute to affordability and resilience.

Solution 1: The DOE could encourage national laboratories to collaborate with utilities to implement and evaluate flexible grid connection opportunities that can support both load growth as well as DERs.

Solution 2: The DOE could fund regional efforts through the GDO to develop and standardize the Distribution System Planning process. This would empower states to require transparent, public modeling of the distribution system's capacity hosting limits to help DER developers and large customers identify the least costly locations to connect. This would reduce interconnection study costs and speed up deployment of new energy resources.

Opportunity 7: Permitting Reform

Permitting reform is likely the most impactful action the federal government can take to expedite the construction of energy infrastructure in the U.S.. The DOE has already taken steps towards alleviating the bottlenecks posed by federal permitting[42] and efforts like this should be continued. In addition, the DOE has the opportunity to expand the National Interest Electric Transmission Corridor (NIETC) designation process in parallel with the current effort. While the current NIETC process is seeking public engagement on three corridors[43], the scale of transmission buildout needed in the U.S. necessitates consideration of additional NIETCs or re-evaluation of the remaining seven corridors that did not proceed to Phase 3. In particular, the 2024 DOE National Transmission Planning Study found outstanding value in interregional corridors between the eastern and western interconnections that would be exceptional candidates for NIETC designation.[44] These types of projects are not regularly evaluated by RTO/ISOs or transmission owners, and the DOE could be a catalyzing agent to spark interest in these critical corridors. The DOE can also advise federal lawmakers on the public benefit that could be captured by expanding FERC's electric transmission siting authority. Examples of how congressional action could expand this authority are included in the proposed H.R. 4776 "SPEED Act" and H.R. 3600 "Speed and Reliability Act of 2025."

GridLab commends the DOE in its efforts to identify and act on strategies to expand the U.S. energy system, and we appreciate the opportunity to share these comments.

[42] DOE NEPA Categorical Exclusion Rulemaking. (2024). U.S. Department of Energy. https://www.energy.gov/nepa/doe-nepa-categorical-exclusion-rulemaking-2024

[43] National Interest Electric Transmission Corridor Designation Process. (2025, April 25). U.S. Department of Energy. https://www.energy.gov/gdo/national-interest-electric-transmission-corridor-designation-process

[44] U.S. Department of Energy, Grid Deployment Office. 2024. The National Transmission Planning Study. Washington, D.C.: U.S. Department of Energy. https://www.energy.gov/gdo/national-transmission-planning-study.

GridLab would also like to underscore its enthusiastic readiness to provide any additional information that it can to help support the DOE's efforts.

Thank you,

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