



Advanced Transmission Technologies in Utah: Modernizing the electric grid to meet energy needs

Utah's energy needs are increasing

Demand for energy in Utah is expected to increase as the state's population and economy grows. In 2023, the Western Electricity Coordinating Council (WECC), estimated that the need for electricity in the Western United States will increase approximately 17% by 2033 – that's about twice what (WECC) predicted in 2022.¹ This jump in energy demand from data center and business growth will put pressure on the Utah electricity grid. To ensure the state's continued energy security and economic competitiveness, Utah's policymakers and grid operators should consider efficient ways of expanding the capacity of its existing electricity transmission system.

Advanced transmission technologies (ATTs) are a suite of software & hardware technologies that:

- boost the ability of transmission lines to carry more power,
- reduce costs to consumers by enabling the use of lower-cost energy, and
- upgrade the grid faster and for less than traditional transmission infrastructure.

Modernizing the grid with advanced transmission technology

Investing in new high-voltage transmission lines is critical but can take an average of ten years to go from design to completion². On the other hand, advanced transmission technologies (ATTs) are a promising near-term solution to the problem of expanding electricity demand that can be deployed in as little as three months and in general less than three years³, depending on the technology. ATTs include advanced conductors and grid-enhancing technologies. Advanced conductors replace conventional transmission lines with those that have more efficient and resilient materials that can carry 50-110% more energy. An example of a grid-enhancing technologies is dynamic line rating systems, which use sensors to calculate the transmission wire capacity based on real-time weather conditions, allowing grid operators to safely boost the amount of power on the line.

Benefits of ATTs

Across the country, states like Montana and Virginia are encouraging the deployment of ATTs for several reasons:

- **Consumer savings:** Congestion happens when the grid is bottlenecked and cannot accommodate the flow of certain forms of electricity. It is often lower cost generation

¹ [https://www.wecc.org/sites/default/files/documents/meeting/2024/2023 Western Assessment](https://www.wecc.org/sites/default/files/documents/meeting/2024/2023%20Western%20Assessment)

² <https://www.utilitydive.com/news/doe-study-transmission-clean-energy/646589/>

³ https://liftoff.energy.gov/wp-content/uploads/2024/05/Liftoff_Innovative-Grid-Deployment_Final_5.2-1.pdf

sources that are impacted by grid congestion, which cost consumers \$20.8 billion nationally in 2023⁴. ATTs are quick-to-deploy, cost-effective improvements that boost transmission line capacity, which helps alleviate congestion. A study of the benefits of a specific type of ATT within the PJM transmission region found a 30-50% reduction in congestion costs.⁵

- **Improved grid efficiency:** ATTs can give grid operators more control by allowing for real-time adjustments based on actual weather conditions – like temperature and wind speed – rather than using inefficient fixed assumptions, which is how the current system operates.⁶
- **Increased power capacity:** The deployment of ATTs can increase the amount of electricity that transmission lines can carry. Advanced conductors, specifically, are stronger than conventional wires and carry 50% to 110% more power than conventional wires.⁷
- **More energy generation:** Experts estimate that there is a backlog of more than 2,600 gigawatts of power nationwide available from projects that cannot connect to the grid.⁸ ATTs allow for the more effective operation of the transmission system, increasing grid efficiency and capacity, which in turn will allow more energy production facilities to come online.
- **Decreased wildfire risks:** Advanced conductors are more resilient to high temperatures and mitigate the risk of wildfires due to substantially reduced line sag and less electricity loss.⁹
- **Reduced land use:** ATTs can reduce the need to construct new transmission lines by enhancing power capacity within existing rights-of-way.¹⁰

Facilitating the deployment of ATTs will allow Utah to maintain its energy competitiveness by squeezing more out of the existing electric grid. With energy needs rising in Utah, now is the time for decisionmakers to consider policies to deploy these cost-effective technologies.

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⁴ https://gridstrategiesllc.com/wp-content/uploads/2023/07/GS_Transmission-Congestion-Costs

⁵ https://www.brattle.com/wp-content/uploads/2021/05/16192_transmission_topology_optimization.pdf

⁶ https://www.energy.gov/sites/default/files/2022-04/Grid_Enhancing_Technologies

⁷ https://www.2035report.com/wp-content/uploads/2024/04/GridLab_2035-Reconductoring-Technical-Report.pdf

⁸ <https://www.utilitydive.com/news/grid-interconnection-queue-berkeley-lab-lbnl/712926/>

⁹ <https://www.2035report.com/wp-content/uploads/2024/04/Supporting-Advanced-Conductor-Deployment-Barriers-and-Policy-Solutions.pdf>

¹⁰ <https://www.energy.gov/articles/biden-harris-administration-invests-22-billion-nations-grid-protect-against-extreme>