



Accelerating a Clean Energy Future

Grid Enhancing Technologies (GETs) and Advanced Conductors (ACs) unlock capacity to improve the reliability, safety, and efficiency of the transmission grid



Transmission Grid Challenges



Serving Load Growth

Electrification, data center, and manufacturing sector growth: 4,000 MWs needed regionally for data centers alone.



Interconnection Backlog

BPA operates 75% of Transmission lines in Oregon and has a 30,000 MW interconnection backlog.



Aging Infrastructure

Over 70% of lines nationally are approaching the end of their useful life.



Grid Expansion

Significant growth in regional transmission capacity is needed by 2035; the PNW does not have a Regional Transmission Organization to coordinate this expansion.



Grid-Enhancing Technologies (GETs):

hardware or software that increases the capacity, efficiency, and/or reliability of transmission facilities



Dynamic Line Ratings

Measure the true capacity of transmission lines based on ambient conditions



Advanced Power Flow Control

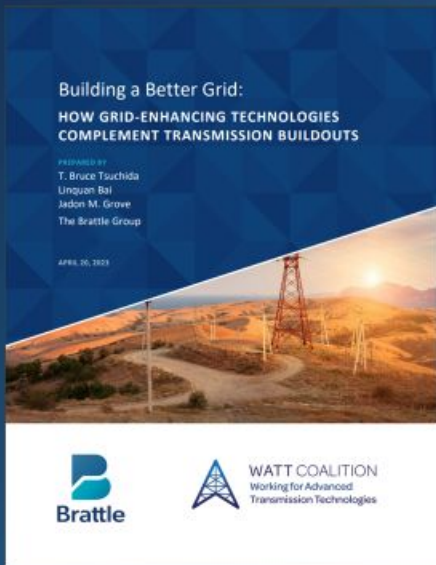
Reroutes power from congested to underutilized lines



Advanced Topology Control

Identifies grid reconfigurations to reroute flows around bottlenecks

GETs and New Transmission - Better Together

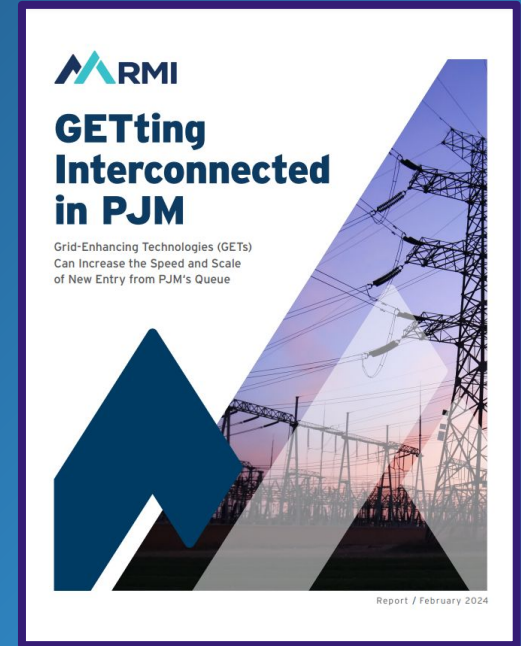


Timing	Target Lines	Benefit
Before Construction	Congested lines, including lines scheduled for upgrade	40%+ congestion cost reduction
During Construction	Parallel/Contingent lines	40%+ reduction in outage-driven congestion
After Construction	Upstream & downstream constraints	16% increase in utilization on new/upgraded lines

“These technologies are highly complementary to transmission expansion through new lines. They can magnify the cost effectiveness and capabilities provided by new transmission investments. They provide short-term solutions to temporary operational challenges, such as during transmission outages or the construction of new lines, and bridge gaps until permanent expansion solutions can be put in place.”

GETs like DLR unlock transmission capacity at a fraction of the time and cost

- **The problem: The U.S. needs to double its regional transmission capacity by 2035, per DOE**
 - Capacity constraints and costly system upgrades delay or prevent interconnection of new generating resources and large loads
 - Congestion costs are high and rising, increasing costs to ratepayers
- **Solution: GETs are a key tool in the toolbox to increase the grid's capacity, reduce congestion, and improve the efficiency and reliability of the grid**
 - Affordable bridge solution that can defer/avoid investments or provide interim relief until more costly, time-intensive investments are made
 - Increase visibility into the grid, enhancing reliability and operational flexibility
 - Complement and enhance new transmission system investments
 - Portable- can be deployed where needed on the grid quickly and without outages
- **DLRs measure true capacity of transmission lines to make full use of existing infrastructure.**
DLR specifically can:
 - Add an average of 30% more capacity on existing lines
 - Be up and running in ~3 months from approval
 - Cost a fraction (about 1/20th) of the cost of building new transmission lines



[Link to Report](#)

DLR sensors can deliver comprehensive grid monitoring, equipping every circuit mile with visibility

Wildfire Threat Mitigation & Response

- Data Driven PSPS Decision-Making
- Rapid Fire/Smoke Detection

Liability Reduction

- Ensure Asset Physical Security
- Evidence of Safe Operational Status
- Categorize Events as Acts of God
- Identifying or Approximating Origin Retroactively

Digitized Field Operations

- Realtime Remote Inspection
- Fault triage



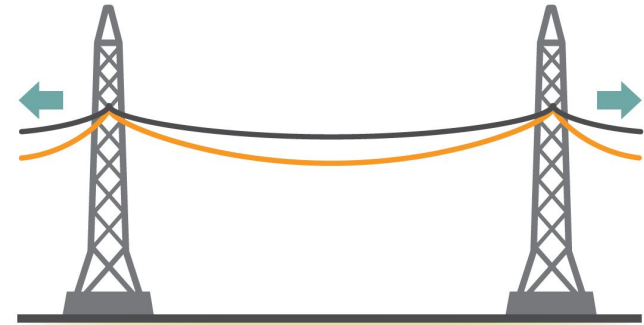
Advanced Tower Raising and Rehabilitation

- Power lines are most often limited by their “sag”
- Raising or strengthening towers can **increase capacity 10-40%**
- New technologies and techniques allow towers to be raised while energized

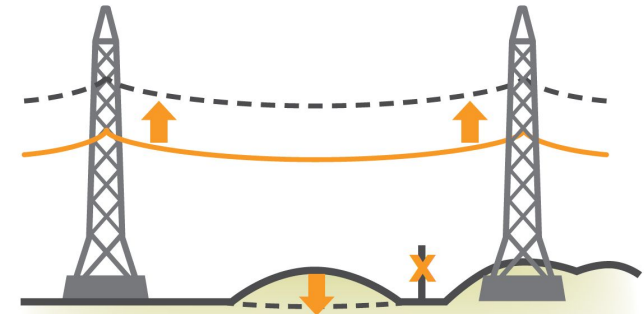
Traditional Lifting Method
(costly cranes and heavy footprint)



AMPJACK® Raise Method
(no cranes and minimal footprint)

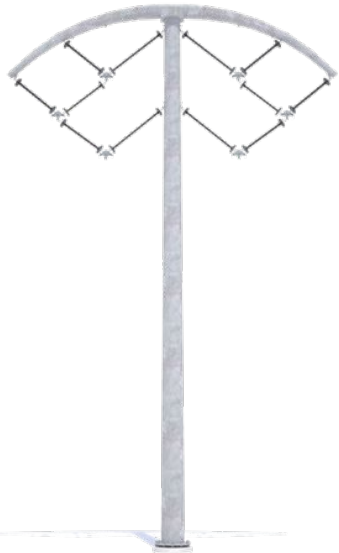


RE-TENSIONING

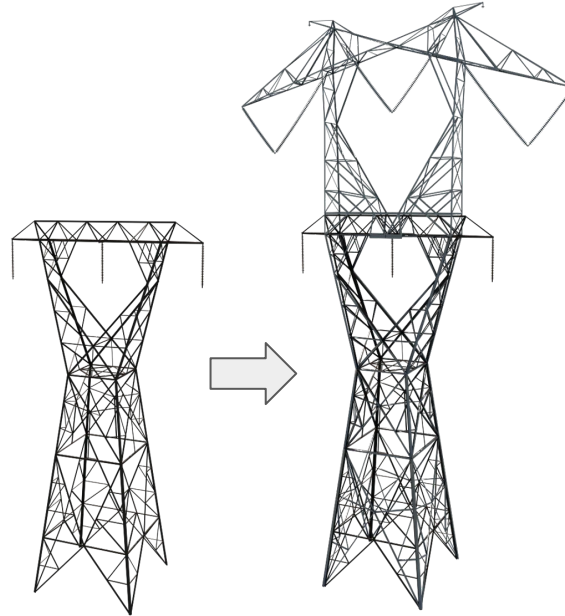


SPAN-SPECIFIC CLEARANCE ENHANCEMENT

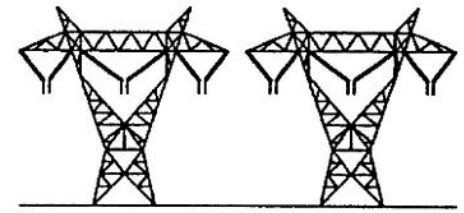
Advanced Tower Design



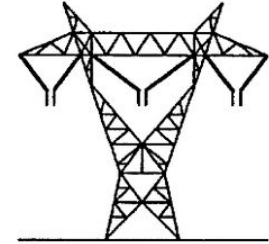
BOLD^(R) Structure



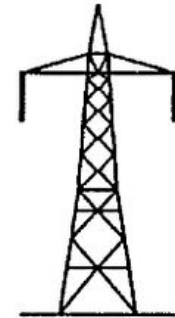
“ExoGrid”™ Structure



2 x 500 kV AC



800 kV AC



± 500 kV DC

HVDC Conversion

High Performance Conductors (a.k.a. “Advanced Conductors”)

Conventional Conductor

“Aluminum Conductor
Steel Reinforced”
(ACSR)



High Performance or Advanced Conductors



“ACSS”
Trapezoidal
Wire



3M “ACCR”



2-3x Capacity



Reduce Losses 10-40%



Increase Resiliency



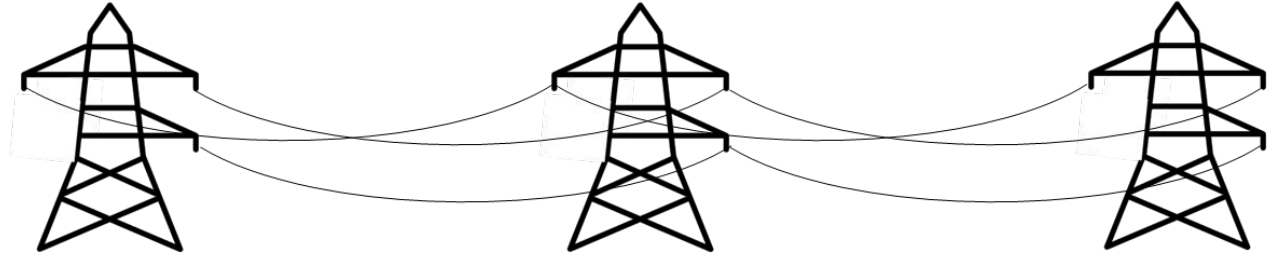
CTC Global
“ACCC”



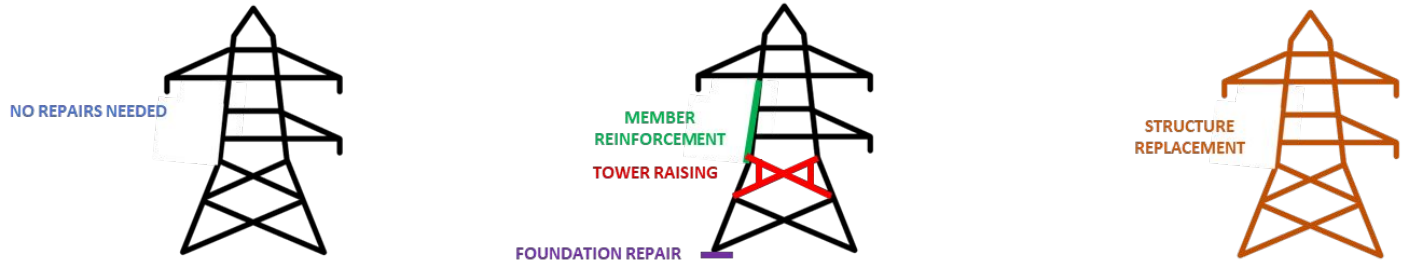
TS Conductor

Advanced Reconductoring

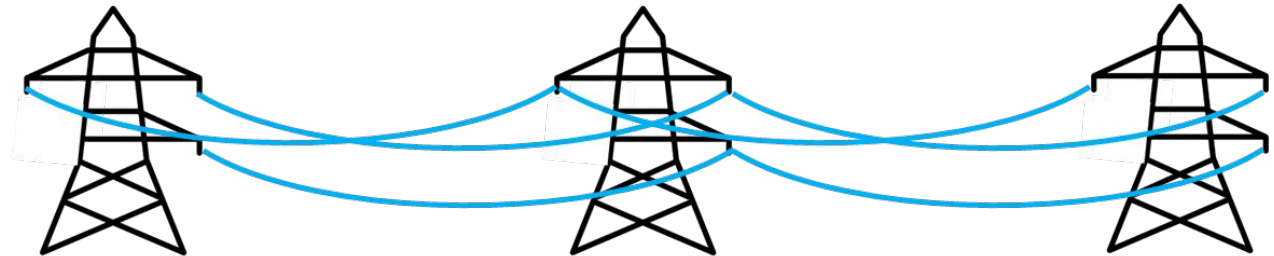
Existing
powerline



Remove
Conductor,
repair/replace
structures



Install High
Performance
Conductor
2x capacity
in same footprint



Barriers to Deployment

- High **upfront costs**
- Utilities are incentivized towards major infrastructure projects, upgrades and improvements on existing infrastructure are less attractive
- Utilities are intentionally **slow to adopt** new technologies to avoid risks on cost recovery
- Operational and engineering **changes are required**
- Different technologies are needed for different situations
 - No technology is a fix-all solution, BUT **there are many technologies not being used**

GETs and HPCs are gaining momentum across the U.S.

→ Legislators and regulators can play a key role to capture the benefits of GETs/HPCs:

- Empower regulators to require utilities to evaluate GETs/HPCs in Integrated Resource Plans (IRPs) or transmission planning proceedings
- Require utilities to include the multiple benefit streams of transmission in IRPs including savings, resiliency, reliability evaluated over 20+ years
- Require energy offices/transmission authorities to study GETs/HPCs implementation
- Provide incentives or shared savings mechanisms to encourage rapid transmission expansion
- Establish an energy efficiency standard or congestion limits for transmission lines
- Provide expedited permitting for increasing transmission capacity inside existing rights of way

→ State legislative developments:

- AZ, CA, CO, VA, NY, ME, MT, MN legislatures have all passed new GETs bills in 2023/2024 requiring utility and/or regulator evaluation of GETs/HPCs

→ Federal developments:

- States and utilities have won significant GRIP funding that will result in the worlds' largest GETs deployments to date
- FERC has required GETs be incorporated into long-term transmission planning (Orders 2023 and 1920) and is considering a mandate to deploy DLR
 - The White House has committed to upgrading 100,000 miles of transmission lines with GETs and ACs

Appendix

Example Legislation

Montana H.B.729 (Enacted 2023)

Enables the State's PUC to **approve cost-effectiveness criteria** for Advanced Conductor projects.

Minnesota S.F.4942 (Enacted 2024)

Requires **transmission owners to identify areas of congestion** and its implications, and to implement GETs where feasible and cost effective.

Utah S.B.191 (Passed Senate 2024)

Requires that during transmission expansion or improvement, distribution companies must conduct **cost-effectiveness and timetable analyses of GETs integration**, and report to the PUC.

Virginia H.B.862 (Enacted 2024)

Requires utilities to include an **assessment of GETs and advanced conductors** in grid planning and, if applicable, explain why they are not included in the plan.

Example Legislation

Arizona HB 2003 (Enacted 2024)

Allows replacement **of a cable or wire on a transmission line without seeking a new certificate of environmental compatibility.**

New York A.8808C (Enacted 2024)

Transfers jurisdiction of transmission siting from the Public Service Commission to the Office of Renewable Energy Siting (ORES); requires ORES to adopt uniform permits; **exempts lines in existing ROWs from siting application.**

California SB 1006 (Pending Governor's signature):

Require utilities to **conduct a study on the cost savings and efficiencies that may result from using reconductoring** and GETsto improve grid reliability.

Federal Funding Opportunities

Transmission Siting and Economic Development Grants Program | Department of Energy

Grid Resilience and Innovation Partnership Program | Department of Energy

Transmission Facility Financing Program

Transmission Facilitation Program