



# Applied Grid Transformation Solutions (AGTS): Perspectives and Updates

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The Office of Electricity leads the Department of Energy's research, development, and demonstration programs to strengthen and modernize our nation's power grid so that our nation maintains a reliable, resilient, and secure electricity delivery infrastructure.

# **Power System Trends**

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- Changing energy supply and resource mix
- Significant load growth
- Increased control points and system complexity
- Increased uncertainty and faster system dynamics
- Growing threats and system vulnerabilities





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### **Key Challenges and Needs**



### **Institutional Decision-Making**

Institutional processes that align policies, customer expectations, and grid investment strategies, including bridging the gap between technology development and adoption

### **Planning and Analysis**

Modeling, simulation, and analytical tools to support holistic planning and system design (scenarios, options, architectures)

### System Operations & Coordination

Operations with real-time situational awareness, analytics, control, and coordination under varying system conditions, configurations, and market schemes

### **Infrastructure Systems & Components**

Modular electrical systems and components with fast dynamics (e.g., power electronics) and increased temporal flexibility (e.g., energy storage), including secure, high-bandwidth, low-latency digital infrastructure



# **Applied Grid Transformation Solutions (AGTS) Program**

Mission: Accelerate adoption of advanced grid technologies and solutions needed to transform the electricity delivery infrastructure vital to a clean energy economy.

- Applied Grid Enhancements and Network Transformation (AGENT) Toolkit
  - Information and best practices (e.g., conductor scan, ESIG GETs WG)
  - Decision making tools and resources (e.g., REFA)
- Grid Publicly Accessible Consortia of Testbeds (PACT)
  - Federating and enhancing capabilities (e.g., SuperLab)
  - Testing and validation (e.g., advanced conductors, vouchers)
- Strategic Pilots and Evaluation to Enhance Deployment (SPEED)
  - Field demos and pilots (e.g., GETs FOA, FITT FOA)
  - Systematic evaluations (e.g., grid architectural framework)





## **Near Term: Accelerating Deployment of Commercial Solutions**



**Innovative Grid Deployment - Pathways** to Commercial Liftoff (energy.gov)



### Longer Term: Supporting Increased Role of Power Electronics





dc transmission / distribution



## **Perspective: Grid Architecture and Structural Relationships**



TE Framework (gridwiseac.org)

Architecture Team Structure and Key Principles (pnnl.gov)



# Thank you

