GRID TRANSFORMATION

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RADIAN GENERATION

NAVIGATING THE UNCERTAINTY AND COMPLEXITY IN A GRID BEING DOMINATED BY IBR

- ❑ Integration of Inverter-Based Resources (IBR)
- ❑ Decarbonization Pressures
- ❑ Natural Gas Reliance
- ❑ Planning Under Uncertainty
- ❑ Insights for Addressing These Challenges

INTEGRATION OF INVERTER-BASED RESOURCES (IBR)

- ❑ Key IBR Challenges
  - ✓ IBR reduces grid inertia
  - ✓ Grid strength and stability
  - ✓ Different output (Balancing supply and demand in real-time becomes more complex as the share of IBR increases.)

DECARBONIZATION PRESSURES

- ❑ Federal and state clean energy mandates continue to prioritize IBRs due to:
  - ✓ Pressures to retire fossil generation
  - ✓ Reliance on IBR resources to achieve sustainability goals
  - ✓ Goals to achieve decarbonization

All while balancing aggressive IBR goals with overall system reliability considerations to ensure a sustainable path forward.

DYNAMIC RELIANCE ON NATURAL GAS

- ❑ Gas remains a critical firm capacity and ramping resource but has long-term considerations:
  - ✓ Gas system constraints:
    - ➢ Supply
    - ➢ Pipeline availability
    - ➢ Weather events
  - ✓ Rising costs
  - ✓ Risk of over-reliance as other thermal resources retire

PLANNING UNDER UNCERTAINTY

- ❑ Variability of renewable generation
  - ✓ Keeping pace with the IBR adoption while other resource types may phase out
  - ✓ Need to plan for intermittent resources and allow for flexibility planning tools
  - ✓ The need to maintain a resilient and diverse grid to ensure reliable operations

INSIGHTS FOR ADDRESSING THESE CHALLENGES

- ❑ Advanced forecasting and modeling tools:
  - ✓ Data analysis
  - ✓ Machine learning
  - ✓ AI-driving tools for an accurate forecast
  - ✓ Digital twins and EMT simulators
- ❑ Develop Grid Flexibility:
  - ✓ Deploy BESS with PV/Wind
- ❑ Grid-forming inverter technology
  - ✓ Mimic synchronous generators
  - ✓ Providing inertia and voltage support
  - ✓ The overall benefit is to improve grid stability

THANK YOU!

Questions?

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