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Office of Electricity Delivery & Energy Reliability



Grid Transformation

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Modernizing the Energy Delivery System for Increased Sustainability (MEDSIS) Workshop
Washington, DC



Grid Transformation

Technology Availability

- Information/Communication Technology
- Electric Vehicles
- Solar and Wind
- Energy Storage
- Residential/Commercial Energy Management Systems
- Microgrids

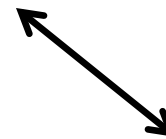
Emerging Markets:

- Residential and buildings systems
- DER service providers
- Utility analytics
- Smart cities



New Market Entrants

- Generation and Management of Electricity by Customers and 3rd Parties



Federal, State and Local Policies

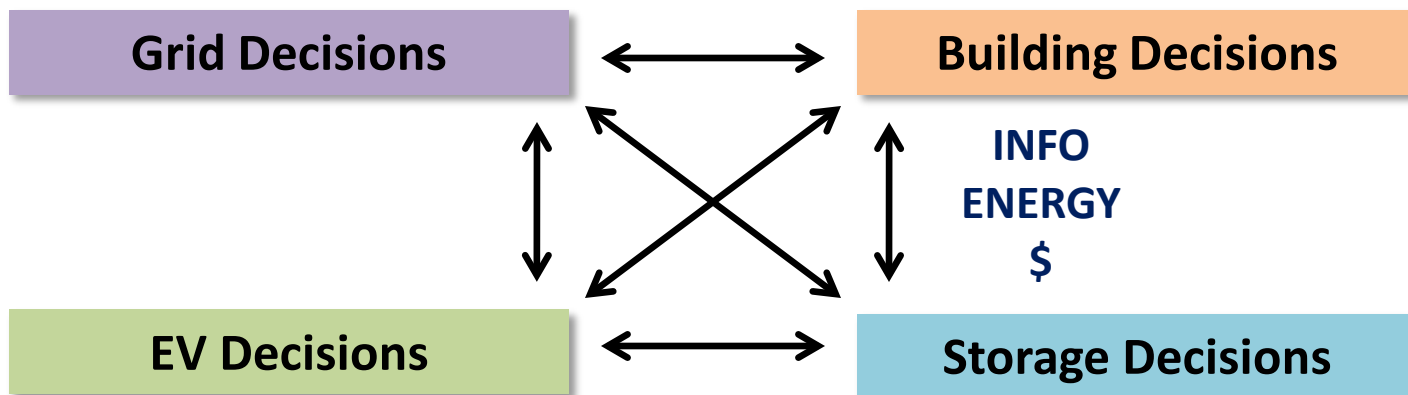
- Renewable and Efficiency Portfolio Standards
- Carbon Dioxide Reduction
- Reliability and Resilience
- Integration of Distributed Energy Resources





Emerging Grid Complexity

The potential of high penetrations of mixed DERs presents an entirely new problem in control, coordination and value-determination within distribution systems



Considerations:

- Structures: electric infrastructure, ICT, control, industry, regulatory
- Optimization: local & system, centralized & distributed control
- Convergence: grid/ICT/buildings/transportation/city infrastructure
- Markets: open access networks, platforms



Integrated Resource Planning

Considerations:

- **Open process with greater transparency and visibility allowing all parties to provide cost-effective solutions**
- **Contemplation of a grid architecture to support the multiplicity of structures and interactions (to manage complexity and risk)**
- **Probabilistic forecasting to determine future DER deployment scenarios (including load growth, DER diffusion, changes in load shape)**
- **Hosting capacity (thermal and voltage limits) and required improvements to the distribution grid for accommodating DERs**
- **Determination of the locational and temporal value of DER-grid interactions (in both directions)**
- **Interconnection requirements**
- **Determination of tariffs, contracts or other mechanisms for deployment of DERs**
- **Integrated transmission and distribution system planning**
- **Analysis to describe how the proposed plan meets resource adequacy, cost-effectiveness, environmental and other policy objectives.**



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