

Integrated Distribution System Planning

Status, Challenges, and Approaches

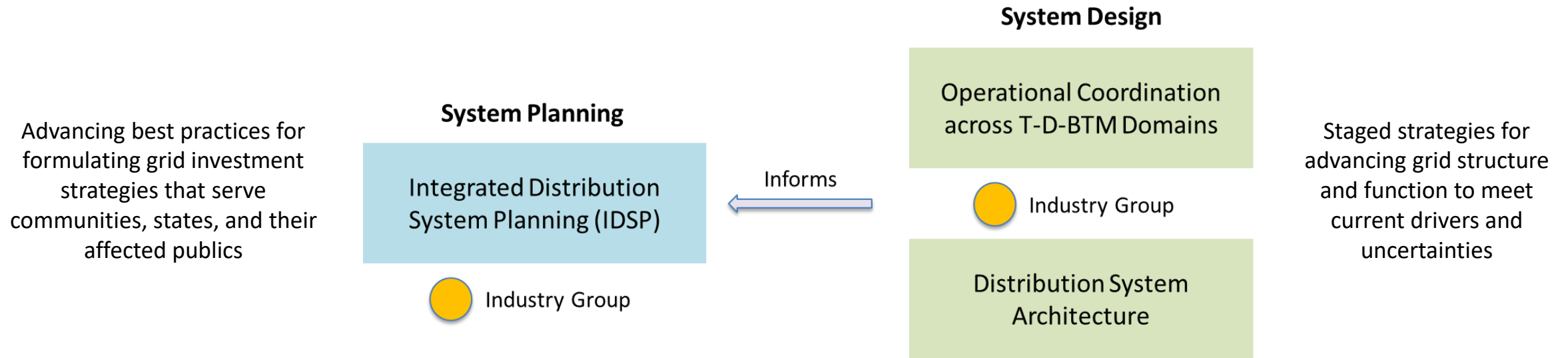
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IDSP Program Strategy

We need to address technological and institutional issues to formulate rational and forward-looking investment strategies



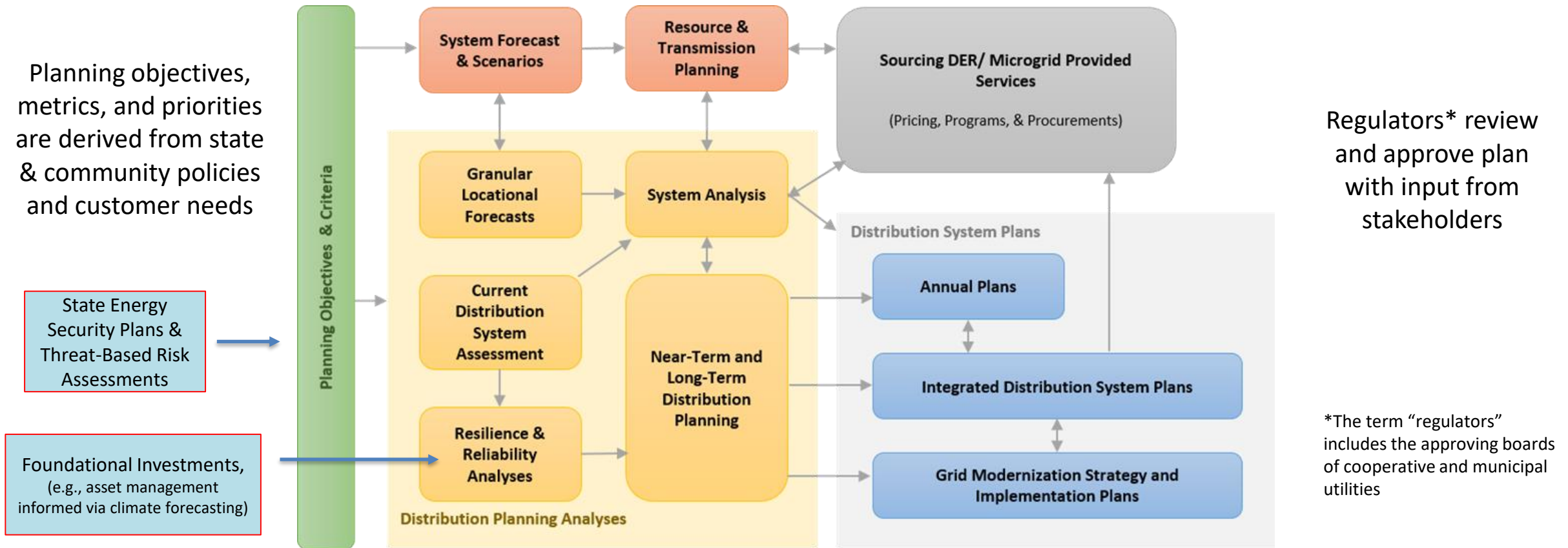
Partners:

Internal – Joint OE/EERE (e.g., Grid Solutions Program) for DER integration and GDO for resilience planning

External – NARUC, NASEO, NGA, NCSL, NRECA, APPA, RAP, ESIG, EPRI, IEEE, EEI

Objectives-Based Planning

Creating a shared understanding among stakeholders of strategies for incorporating objectives and priorities into current planning practices is essential. Without clear objectives, it becomes difficult to assess whether resulting plans are responsive and if key stakeholders will accept them.



Spectrum of Resilience Measures

Utilities are beginning to apply forecasts of climate parameters to inform their asset management strategies. Plus, application of more advanced grid functions are required to apply technology and DERs, e.g., emergency response tools and microgrids, to improve reliability and resilience

Less sophisticated,
yet foundational

More sophisticated,
requires advanced
grid capabilities

- Hardening infrastructure
- Ensuring adequate emergency management capabilities
- Back-up provisions (e.g., fuel)

Robust Asset Management:

- Asset monitoring
- Failure prediction
- Data analysis (GIS)

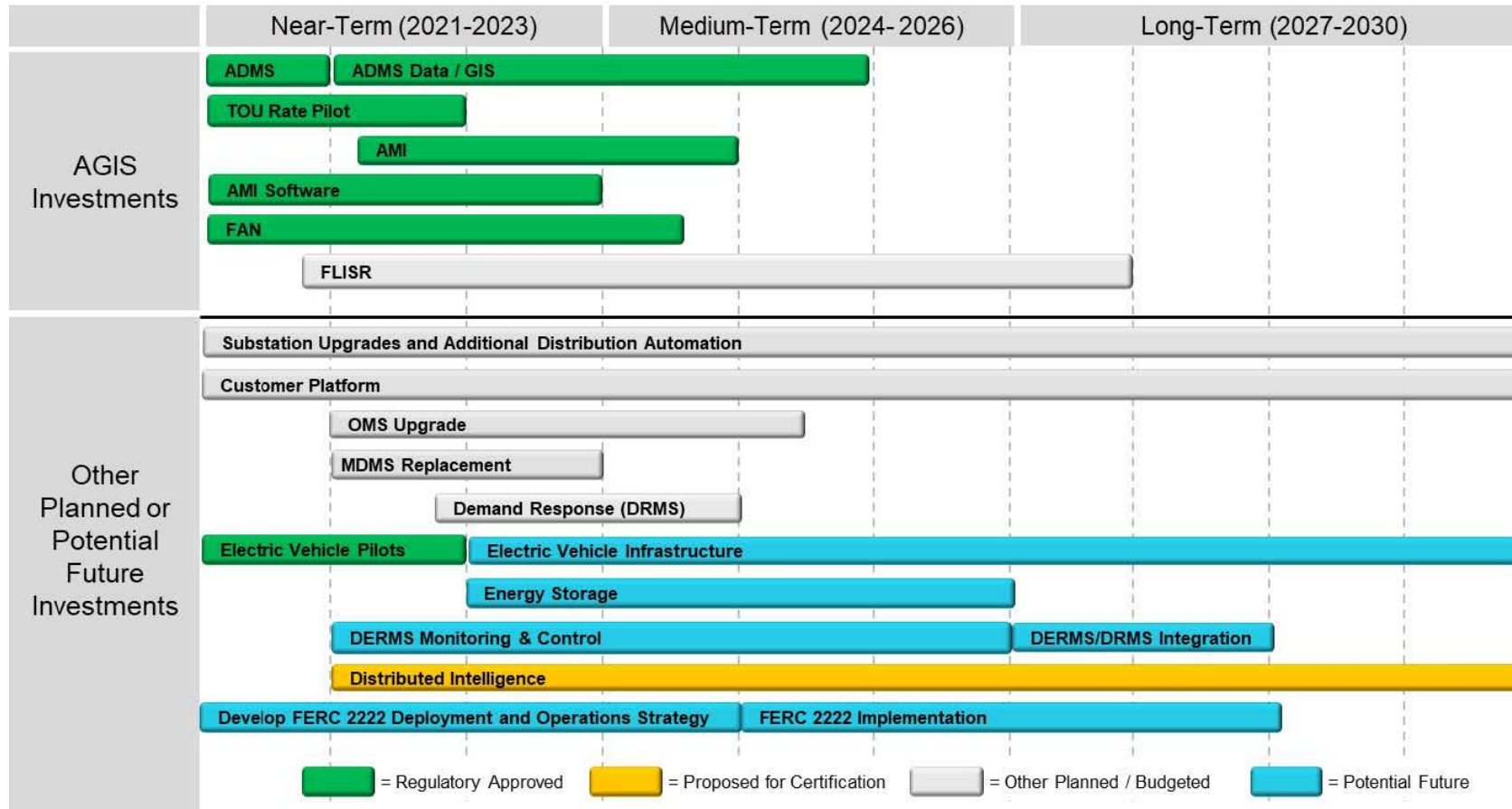
Monitoring and control of system state to enable adaptive response capabilities in real-time and for predictive analysis (modeling, simulation, and analytical platforms)

Real-time control and coordination of system assets, including inverter-based resources (DERs) and microgrids to adapt to emergency situations



Xcel Energy 10-Year Grid Modernization Roadmap (2021)

Xcel Energy's roadmap reflects a staged and proportional technology deployment strategy based on need



Source: [Integrated Distribution Plan 2022-2031](#), Northern States Power Company, Xcel Energy, November 1, 2021



Thank You

