



Distribution System Planning

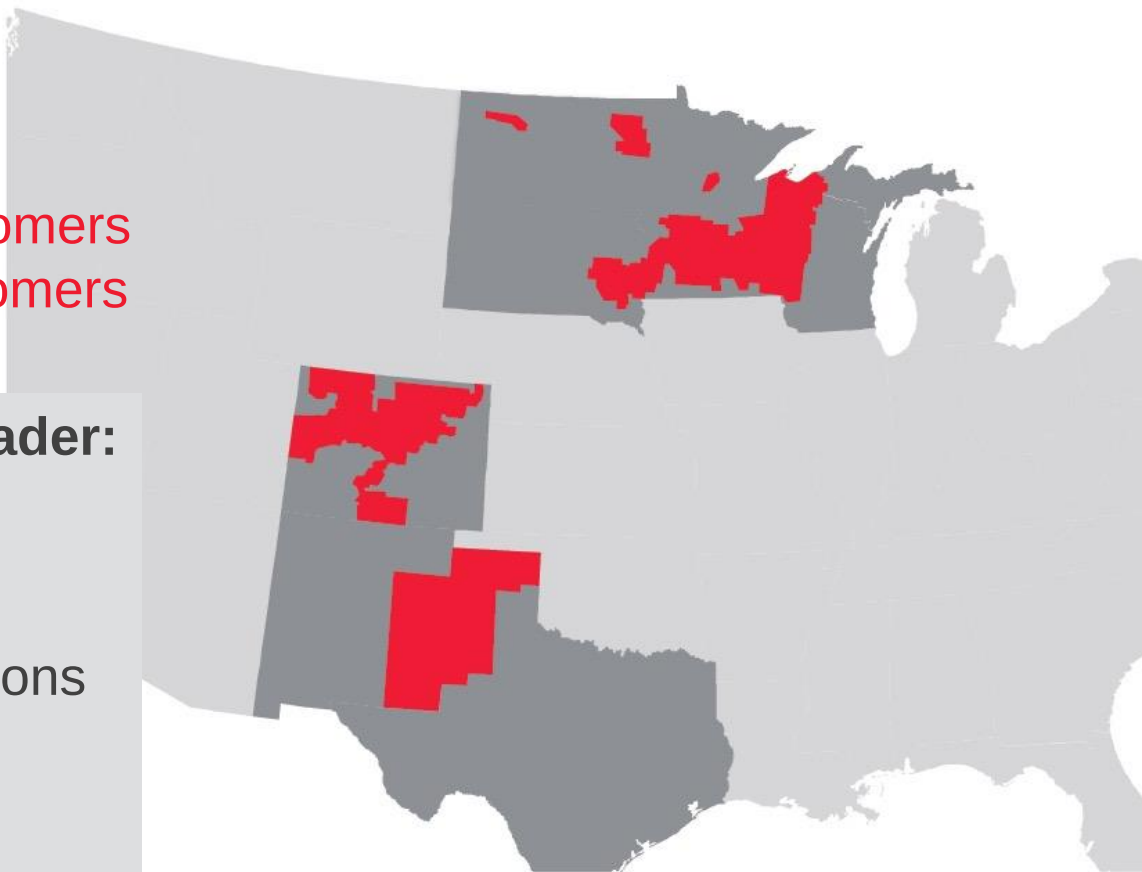
Xcel Energy

Serving eight states

- 3.6 million electricity customers
- 2 million natural gas customers

Nationally recognized leader:

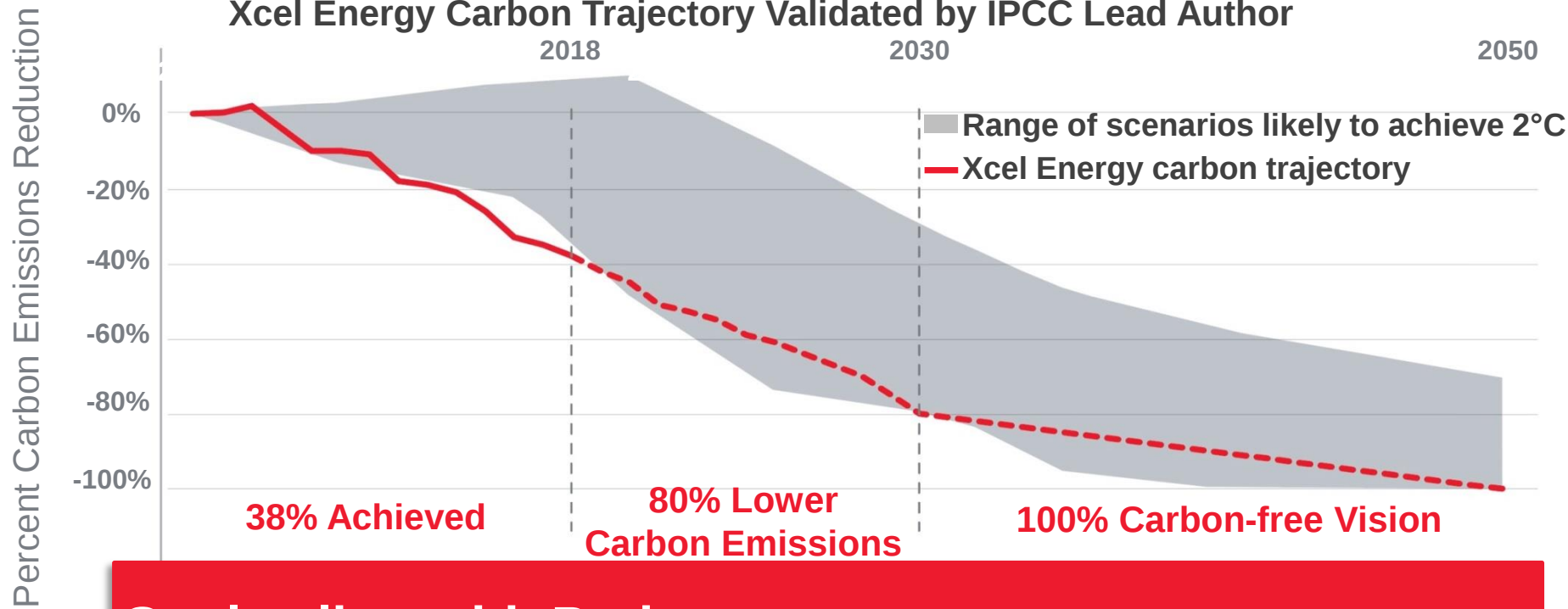
- Wind energy
- Energy efficiency
- Carbon emission reductions and reporting
- Innovative technology



Leading the Clean Energy Transition

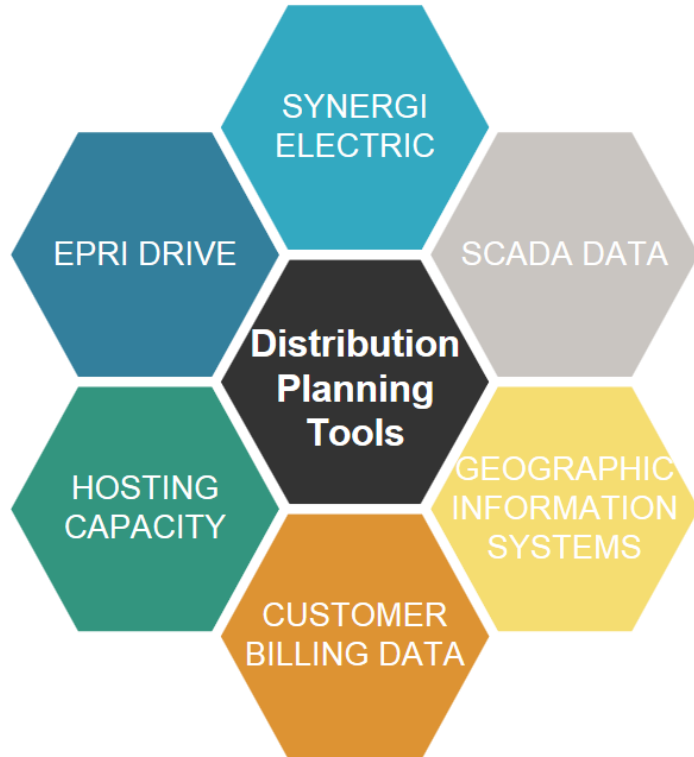
A bold vision for a carbon-free future

Xcel Energy Carbon Trajectory Validated by IPCC Lead Author



Goals align with Paris agreement temperature targets

Current State of Distribution Planning



Renewable Choices



Renewable*Connect



Windsource®



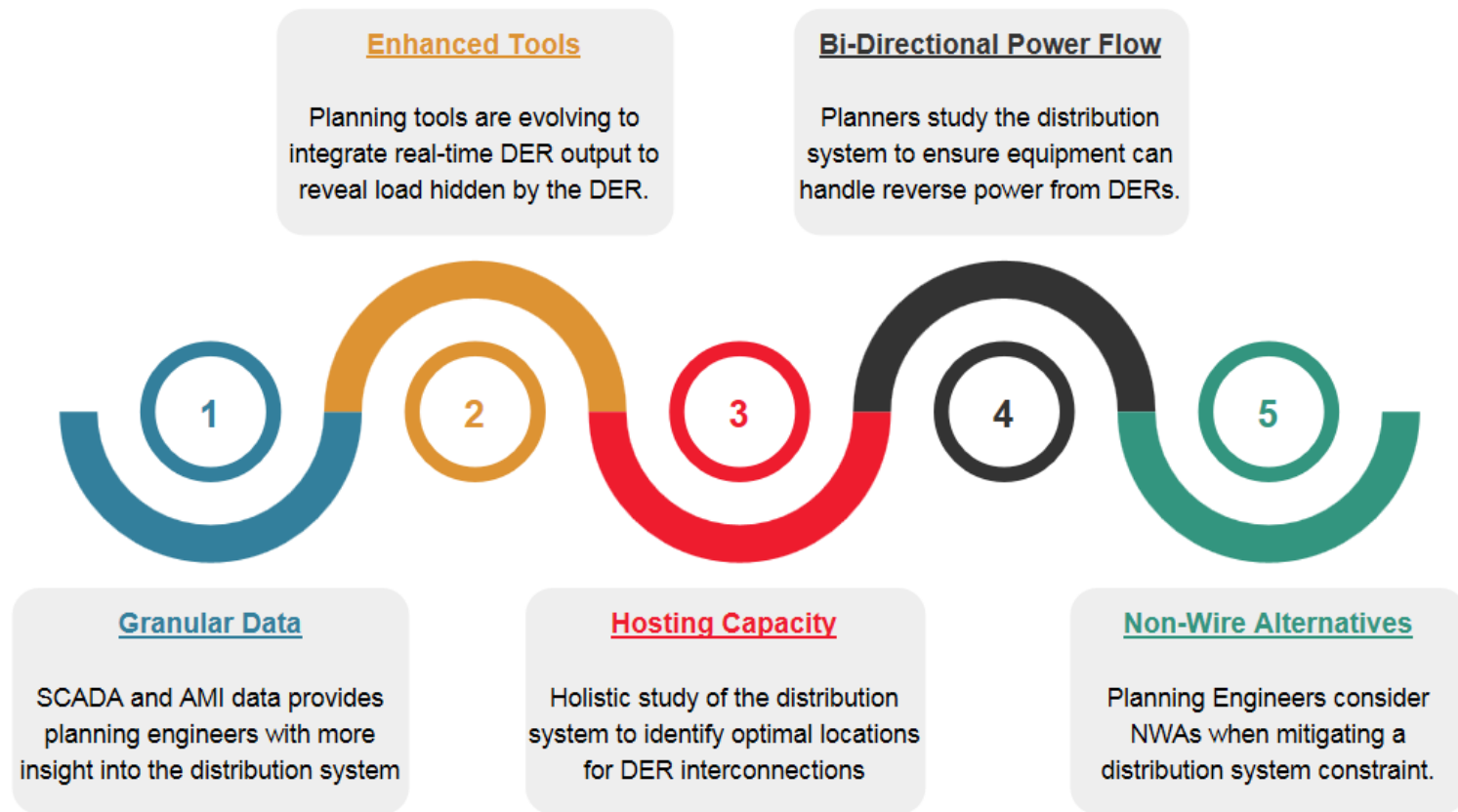
Solar*Rewards



Solar*Connect Community

Solar*Rewards Community

Distribution Planning Evolution



Advanced Grid Intelligence and Security System



Advanced Distribution Management System

Xcel is deploying an ADMS system to allow for better distribution system management while making it easier for emerging technologies to be integrated into the distribution system.

ADMS



Integrated Volt-VAR Optimization

IVVO is an automated control scheme that dynamically optimizes the power flow on the distribution system to minimize line losses and improve power quality.

IVVO



Field Area Network

The Field Area Network communications platform will enable new AMI meters and smart devices to communicate back Xcel's ADMS system to real time grid operations.

FAN



Fault Location, Isolation and System Restoration

FLISR systems allow the distribution system to automatically reroute power to minimize the amount of customers impacted.

FLISR



Advanced Metering Infrastructure

New smart meters will customers to track their energy usage in near real-time and make adjustments to keep energy costs low.

AMI

Future State of Distribution Planning

- Integrated Distribution System Planning
 - Expand transparency
 - Provide for meaningful stakeholder input
 - Incorporating EV, DER, strategic electrification
- Continued grid modernization
 - Access to data
- DERMS, other nascent & emerging technologies

Demonstration Projects

- Innovative Clean Technology Program
 - Panasonic and Stapleton Battery Projects
 - Charging Perks
- Residential Battery Demand Response
- DSM Geotargeting
- EV Charging
- DER Penetration Modeling

Community Resiliency Projects

- **Solar plus Storage Microgrids**
- Community partner defines “critical infrastructure”
- Xcel Energy provides battery storage and back-up capabilities
- Solar and other generation provided by the site

Benefits:

- Improves resiliency
- Demonstrates use of grid assets on the distribution system
- Provides grid benefits
- Provides clean energy jobs

