



# Renewable Development Fund

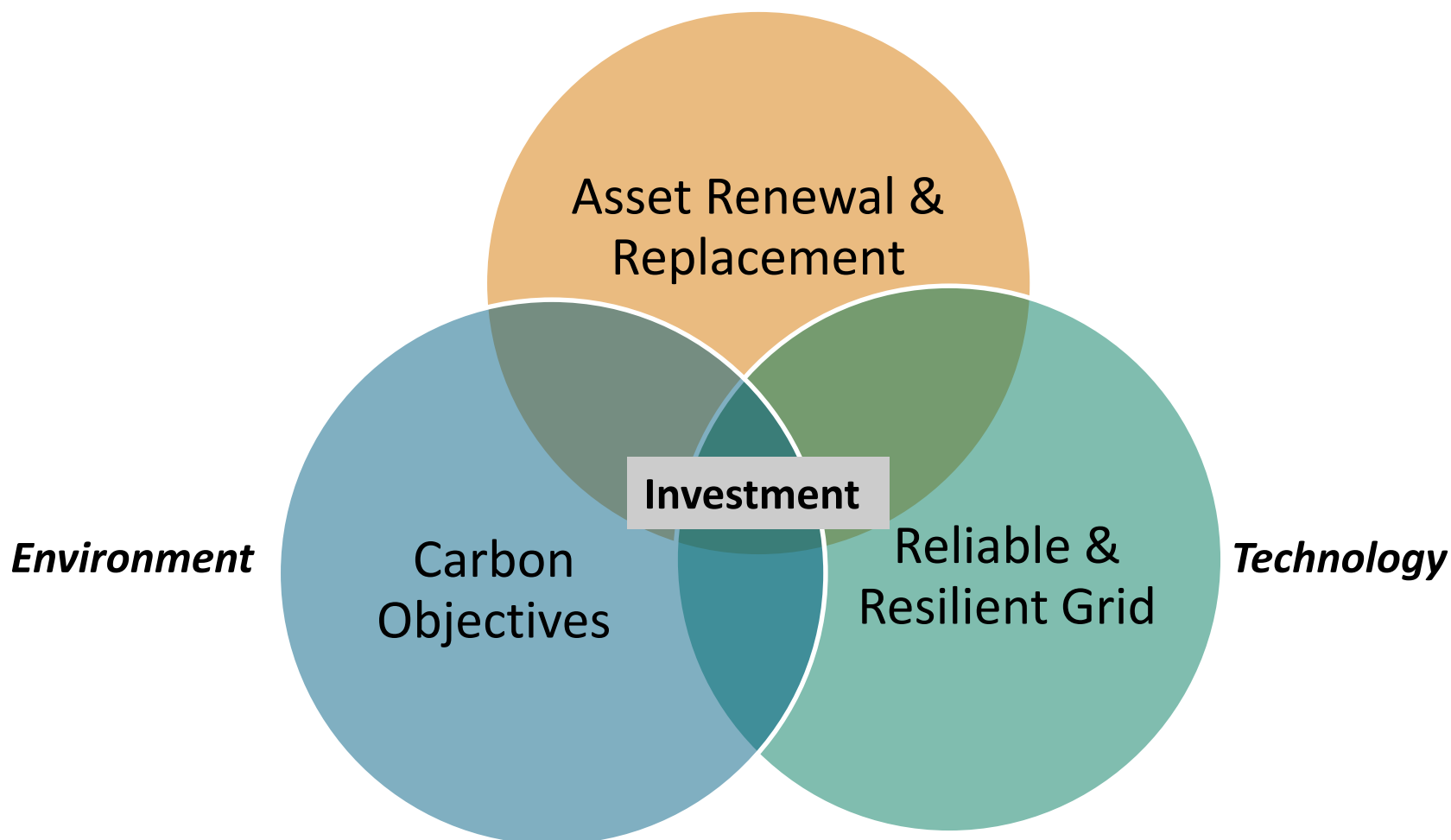
## Minnesota Renewable Energy Roundtable

October 27, 2016

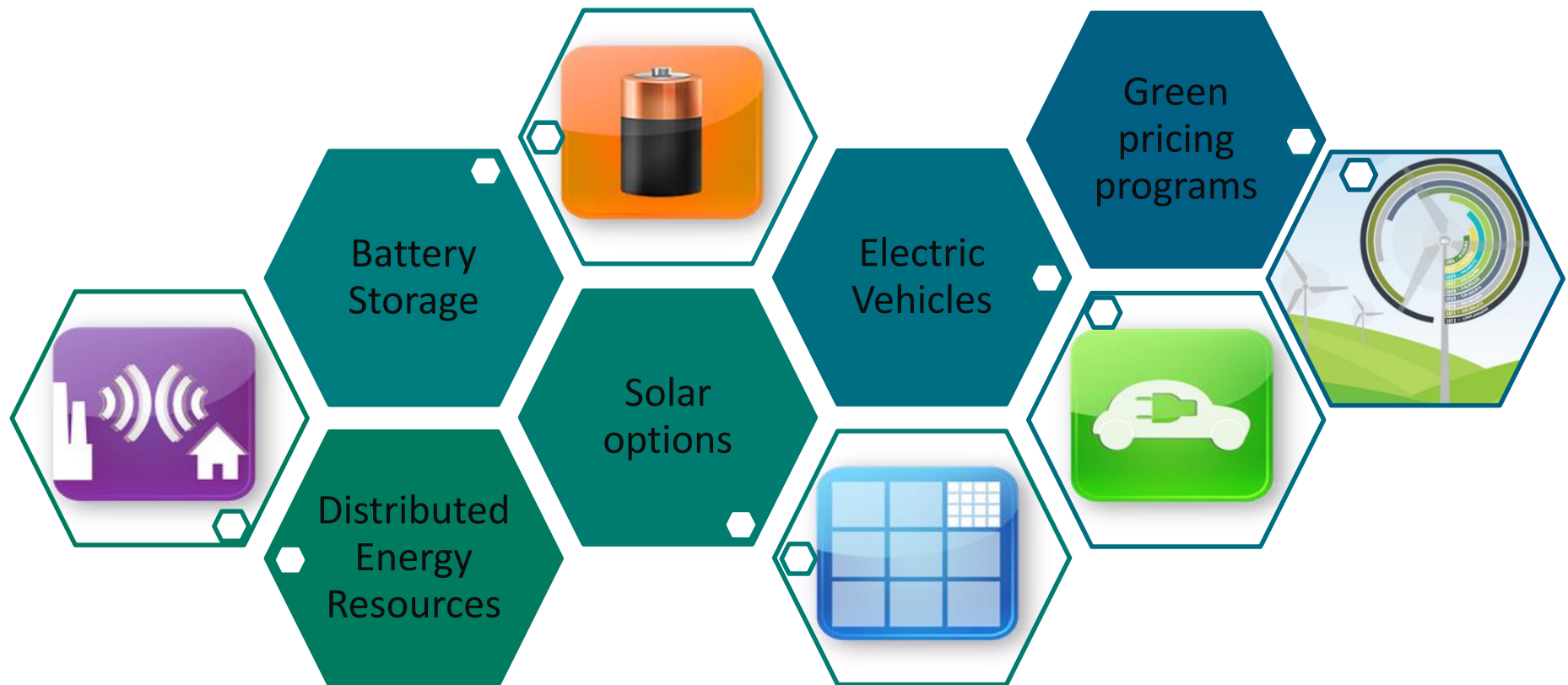


# INDUSTRY Drivers

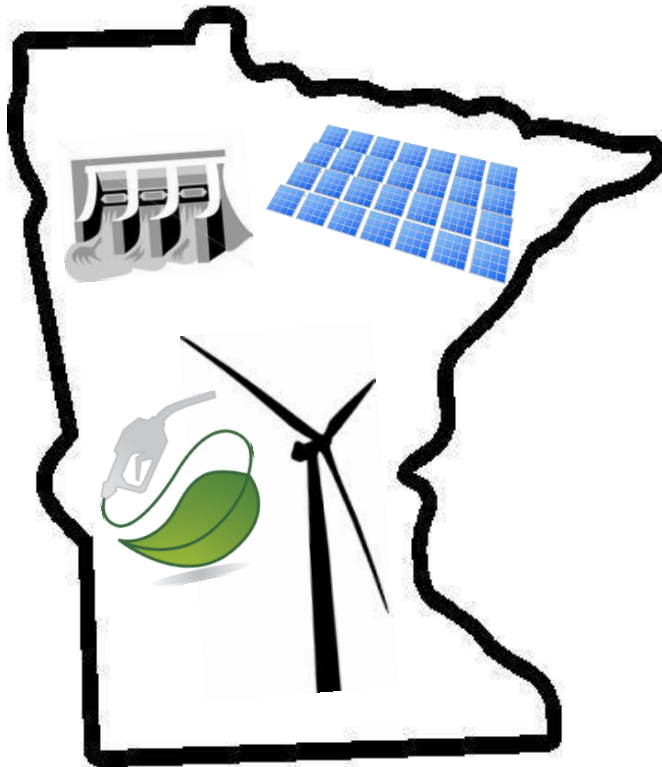
*Aging Infrastructure*



# Emerging Technologies – opportunities for new approaches



# RDF's Statutory Mission



- Increase renewable electric energy market penetration
- Promote the start-up, expansion and attraction of projects
- Stimulate research and development
- Develop near-commercial and demonstration scale projects
- Provide benefits to Minnesota citizens, business and Xcel Energy electric ratepayers

# Only Utility-managed Fund in the Country

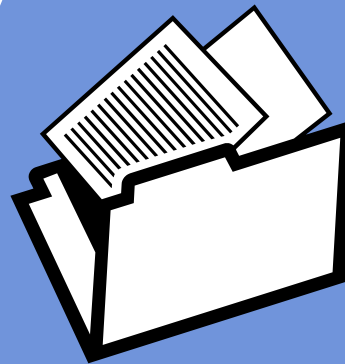
Authorized by Minnesota Legislature in 1994



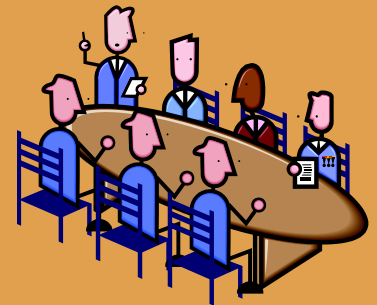
Funding from  
NSP Minnesota  
and NSP Wisconsin  
electric customers



Oversight by the  
Minnesota Public  
Utilities Commission

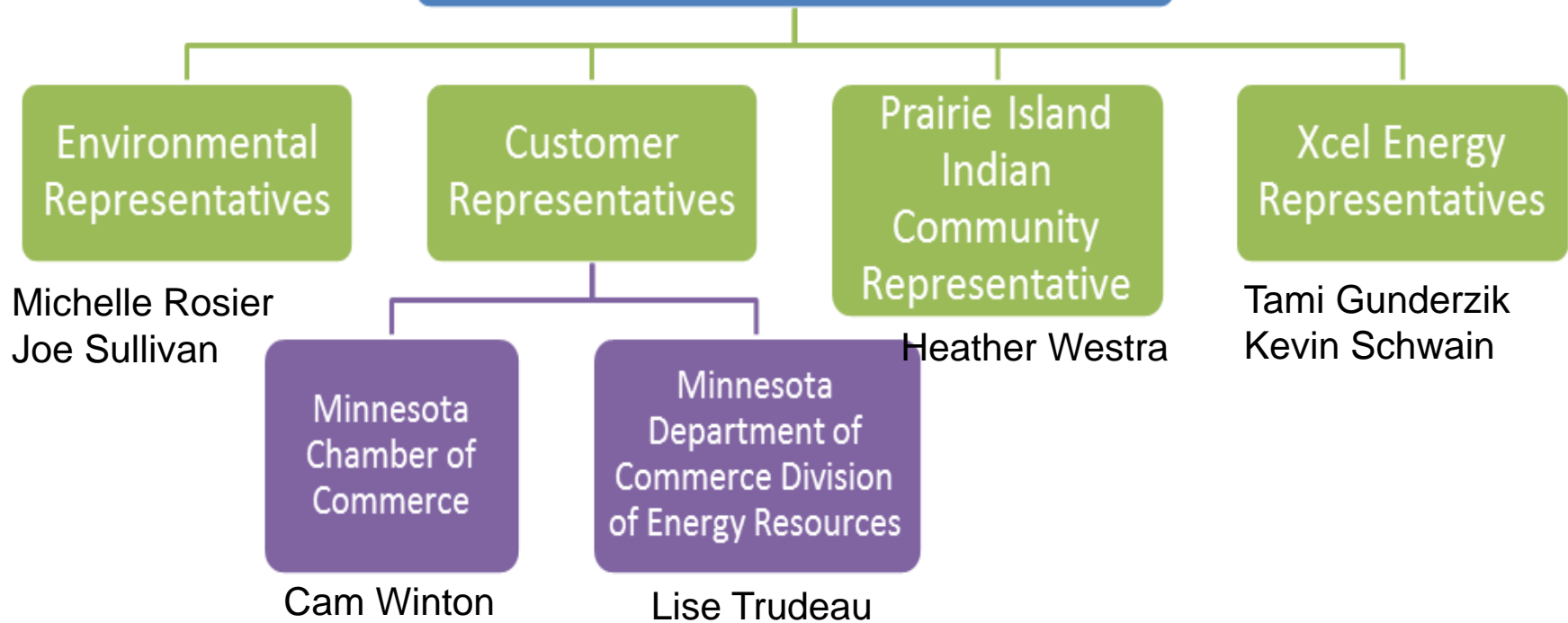


Administered by  
Xcel Energy



Independent  
advisory group  
provides funding  
recommendations

# RDF Advisory Group



# Historic Trends in RDF Funding

- Grants vs. Legislative Programs
  - Legislative programs focus on energy incentives
  - Grants allow for research/demonstrations
- Grant Awards: Energy Production vs. R&D vs. Higher Education Block Grants
  - Performance-based contract ensure grantees are meeting project milestones before getting grant monies
  - Shift in R&D away from early stage research
  - Funding to university research programs in Cycle 4

# Energy Storage/Delivery



Smart Grid SMS™  
Storage Management System

**2** Projects, both R&D

**\$1.5 Million** awarded

Battery Storage and  
Anti-Islanding Detection



# Biomass

A photograph of a biomass energy plant. A tall, light-colored smokestack rises from a complex of industrial buildings. In the foreground, there are large, circular, orange-colored storage tanks. The background shows a city skyline with various buildings under a cloudy sky.

**\$42.6 Million** awarded

**300 kW** Capacity Installed  
**1,900 MWh** Produced

**36 Projects:**

- **4** Energy Production
- **32** R&D

# Wind Power



**15** Projects:

- **5** Energy Production
- **10** R&D

**\$10.9 Million** awarded

**10 MW** Capacity Installed  
**186,600 MWh** Produced



# Solar Power

A large array of solar panels is shown in a field under a clear blue sky. The panels are mounted on metal frames and are tilted towards the sun. The foreground shows dry grass and gravel.

**33** Projects:

- **25** Energy Production
- **8** R&D

**\$36.9 Million** awarded

**6.5 MW** Capacity Installed  
**19,300 MWh** Produced





**THANKS  
QUESTIONS?**