Dual Fuel and Storage Demand Management Strategies

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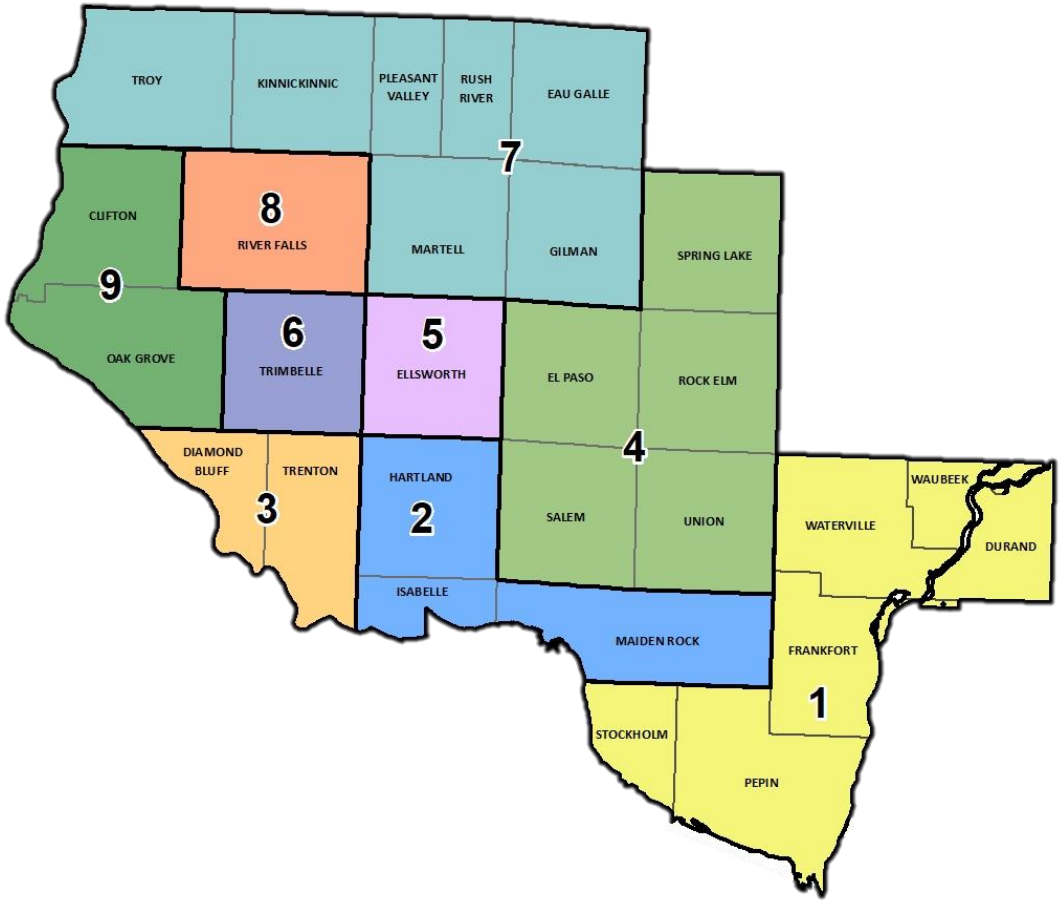
Pierce Pepin Cooperative Services

- Rural electric distribution cooperative
- Pierce, Pepin, and portions of St Croix and Buffalo Counties in Western Wisconsin
- Incorporated1937
- Rural residential – low density
- 1,345 miles of lines, 53% underground
- 7,000 members and 10,000 meters
- 36 employees

Pierce Pepin Cooperative Services



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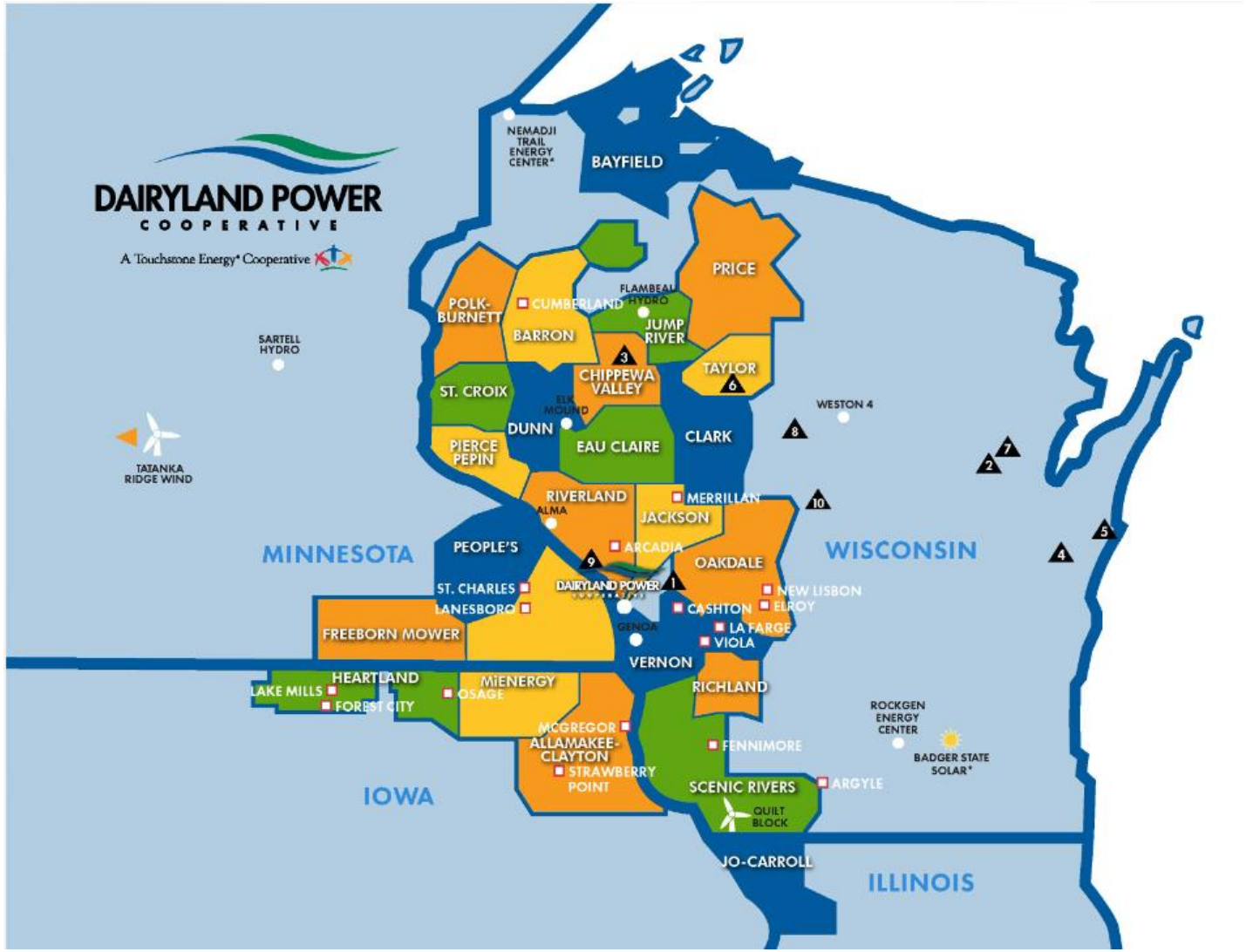
Dairyland Power Cooperative



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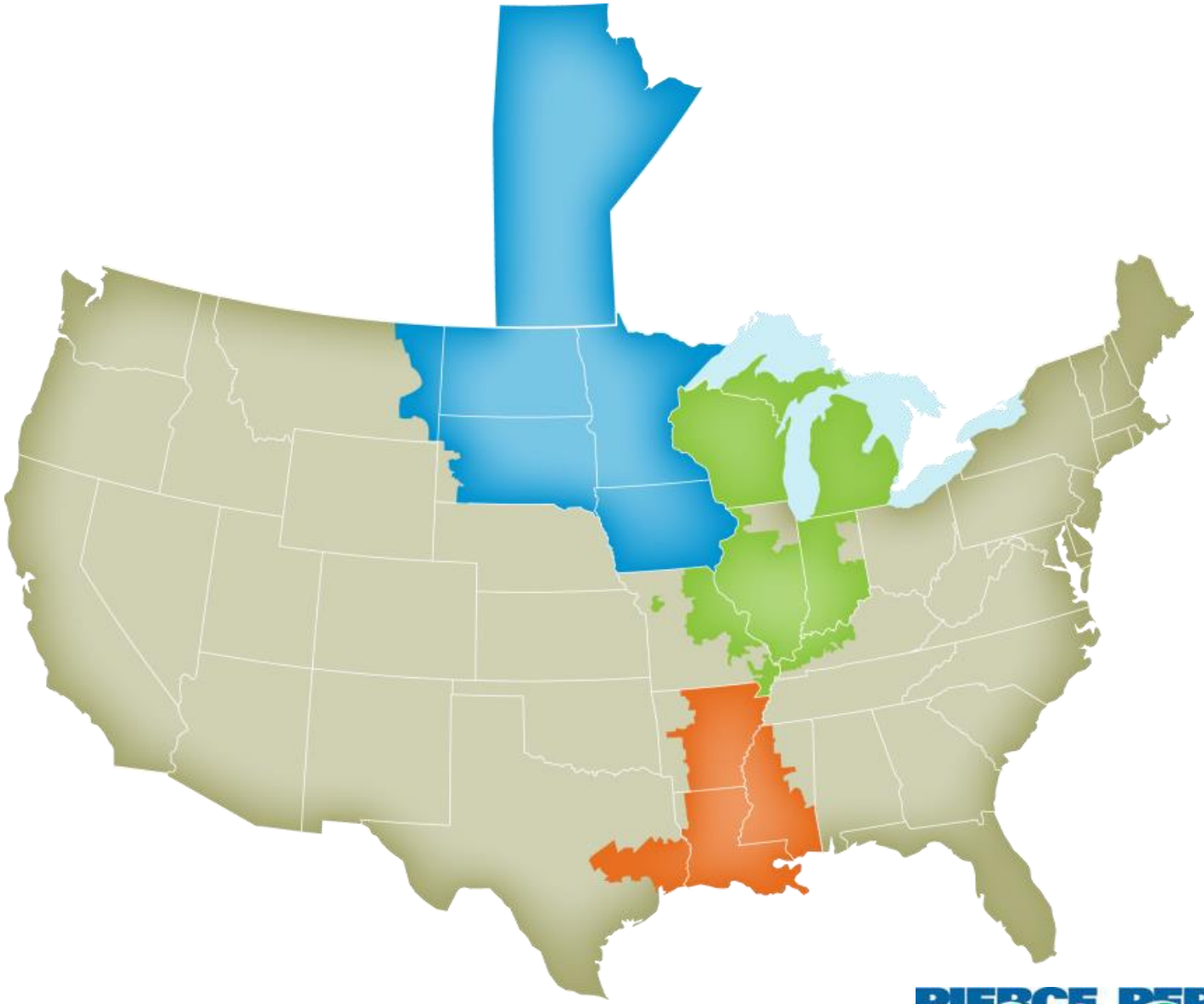
MISO
Midcontinent
Independent
System Operator



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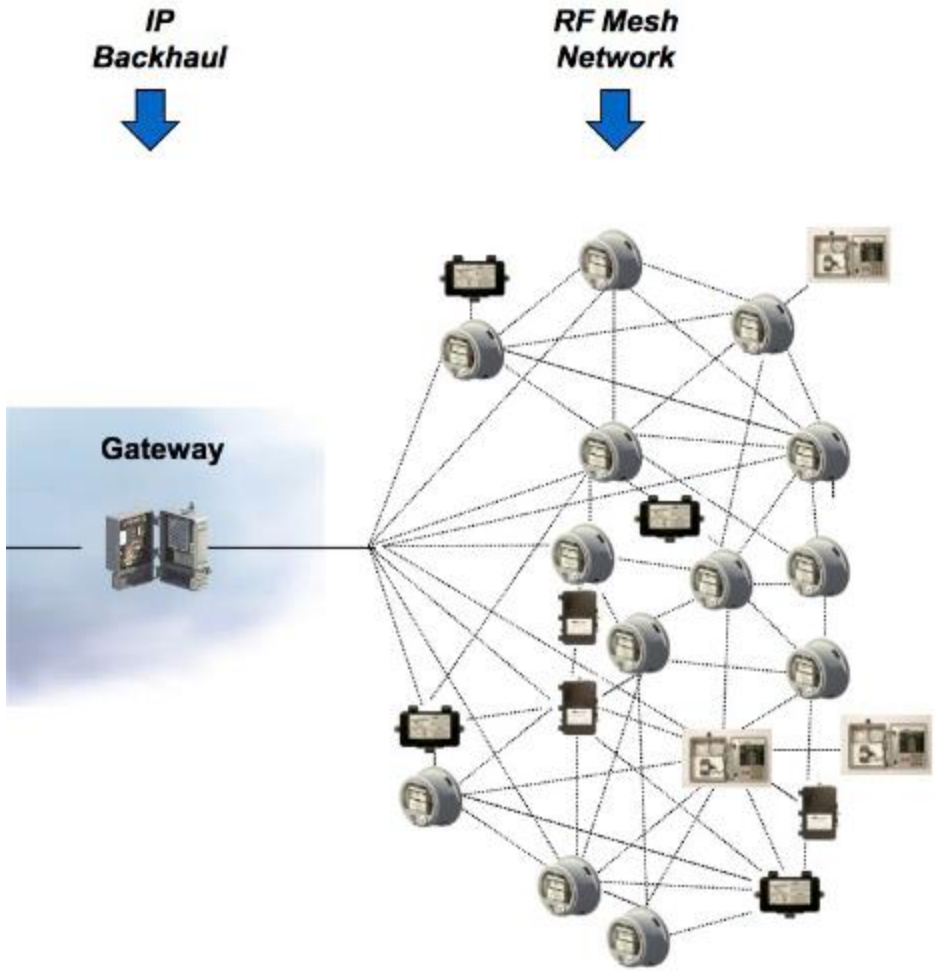
Demand Response System

- 4,500 load management devices deployed at homes and businesses
- Used to shift from critical peak periods to off peak period
- Intent is for minimal impact on lifestyle/comfort
- Interruptible loads are controlled by utility
- Each load type can be independently controlled
- Devices are part of our RF AMI Network

RF AMI Network



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Reduced Rate Electric Metering Program

- 23% of PPCS meters are reduced-rate
- Incentive to participate in demand response program

- Dual Fuel rate 43% more affordable than regular rate
- Storage rate 56% more affordable than regular rate
- All loads on reduced rates are connected to utility load control system

Dual Fuel Load Management Strategies

- Resistance heat, heat pumps, boilers
- Residential electric water heaters
- Requires automatic backup heating system. Typically, fossil fuel backup but electric options –ETS
- LM Periods based on system peak demand
- Smart thermostat program

Dual Fuel Load Types

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Dual Fuel Backup Heat

Dual Fuel Load Management Strategies

Typical dual fuel control scenario –Winter Season

- Load forecasts indicate peak demand is likely
- Advance warning communication to affected members
- Control event initiated
- Primary electric heat source is curtailed, backup heat maintains house comfort during event
- After 4–6-hour control period, primary electric heat comes back on

Dual Fuel Load Management Strategies

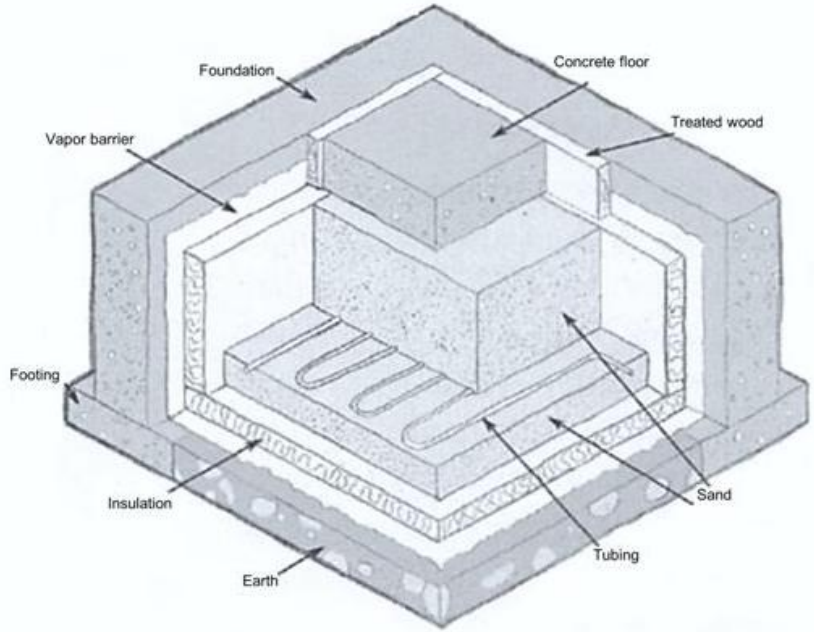
Typical dual fuel control scenario- summer season

- Load forecasts indicate peak demand will occur
- Advance warning communications to affected members control event initiated
- Heat pumps and AC used for cooling are reduced to 50% run time
- After 4–6-hour control period, cooling loads are restored

Storage Load Management Strategies

- Includes interruptible electric loads capable of up to 14 hours a day of control.
- Typical system charge 10 hours a day (10pm-6am, 1pm-3pm)
- No requirements for backup heat. System capable of heating home while “off”.
- LM periods are scheduled and occur daily
- No prior LM notice required
- Electrical Thermal Storage- ETS
- Large electric water heaters 100+ gallons

Storage Load Management Strategies



STEFFES

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