



AN ALLETE COMPANY

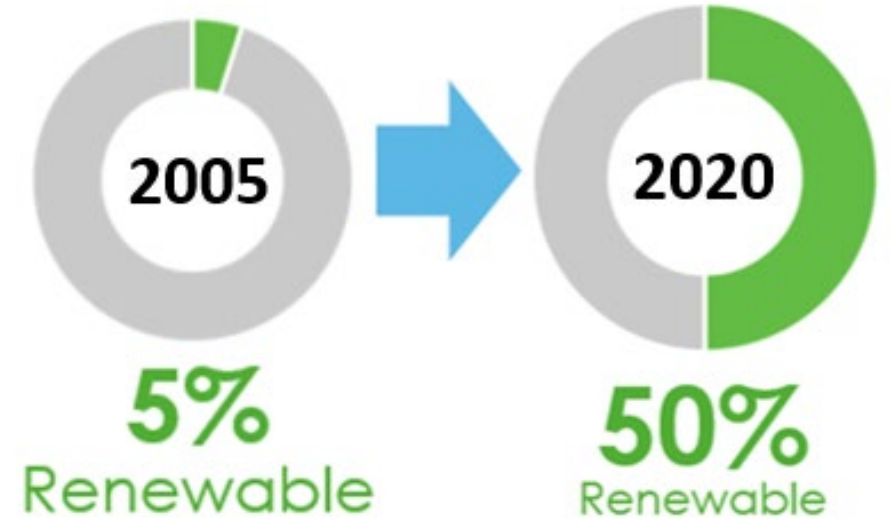
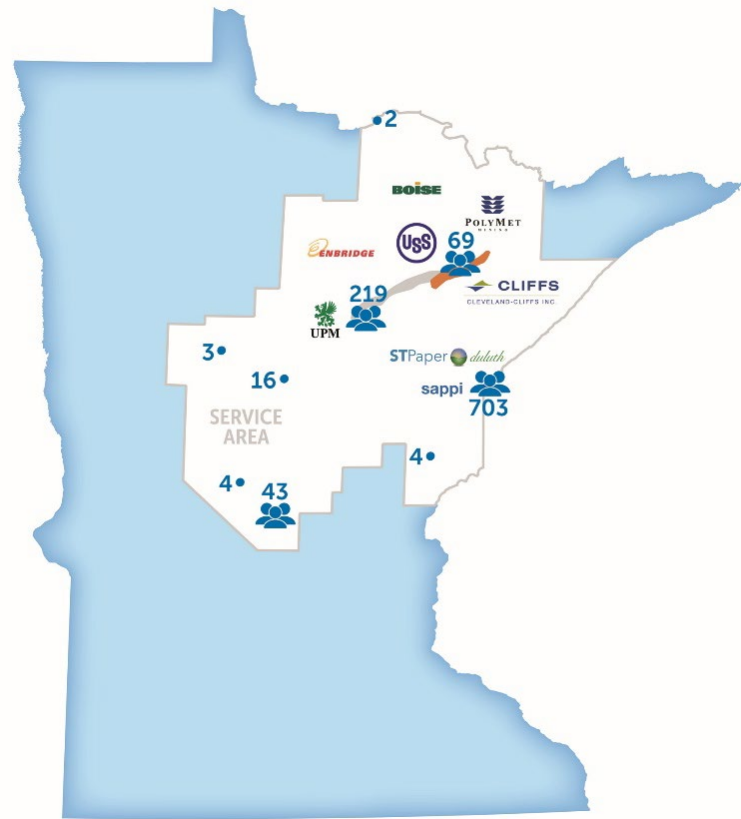
IECA – ELECTRICITY PANEL

Frank Frederickson

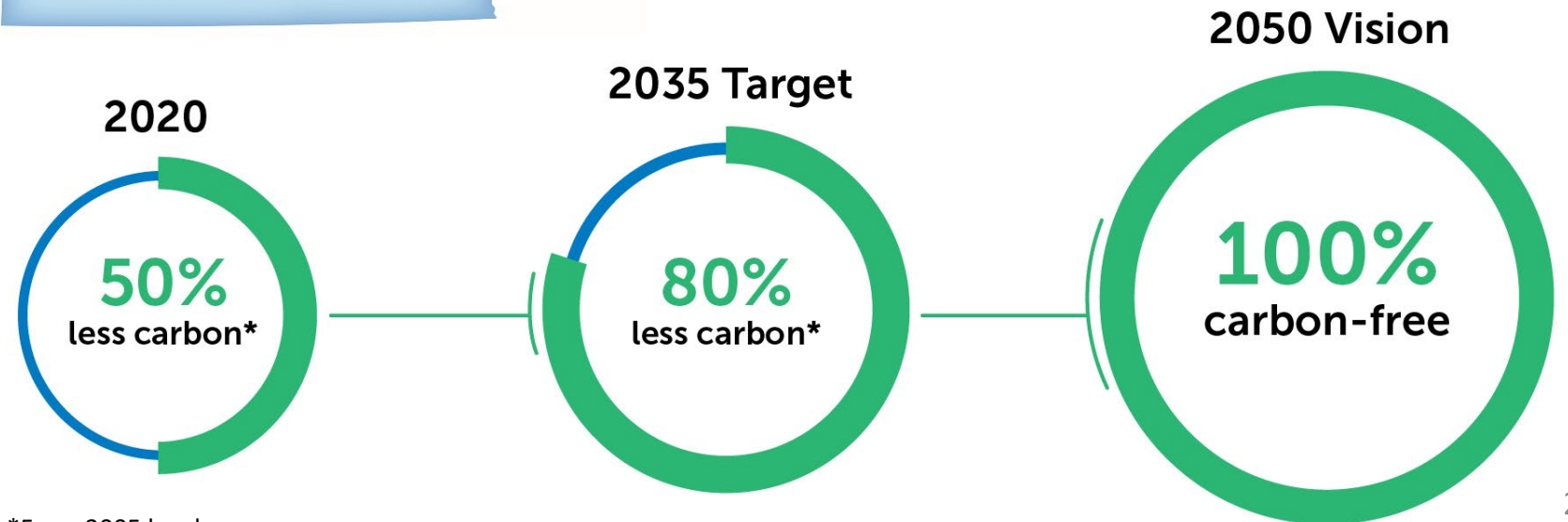
Vice President – Customer Experience & Engineering Services

November 8, 2023

Currently
50% Renewable,
Growing to over
70% by 2030



2050 Vision
100% Carbon Free
...
New MN Legislation
100% Carbon Free
by 2040

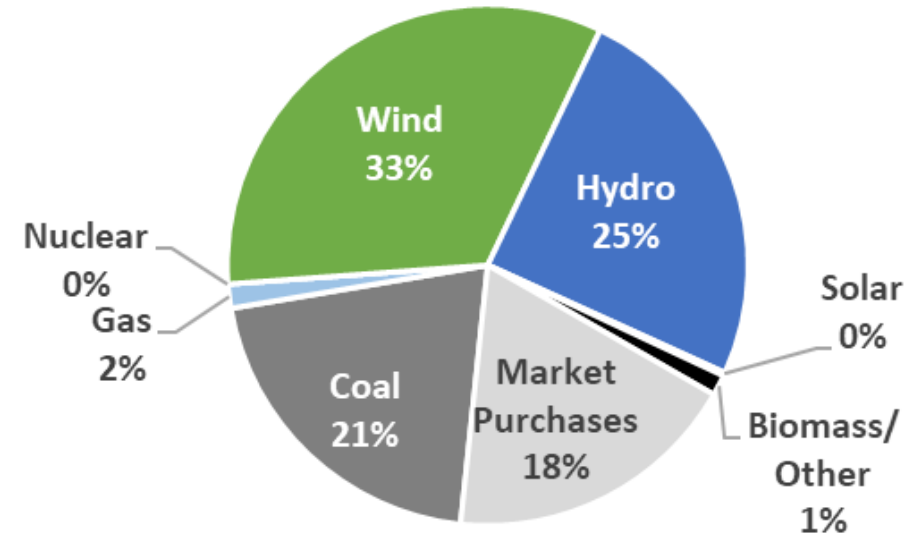
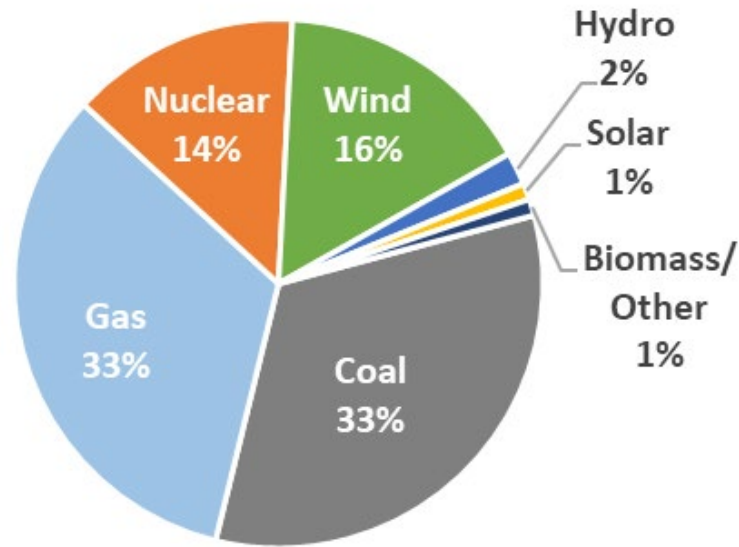


*From 2005 levels

2022 Actual Energy Mix

2022 Renewable Percentages:

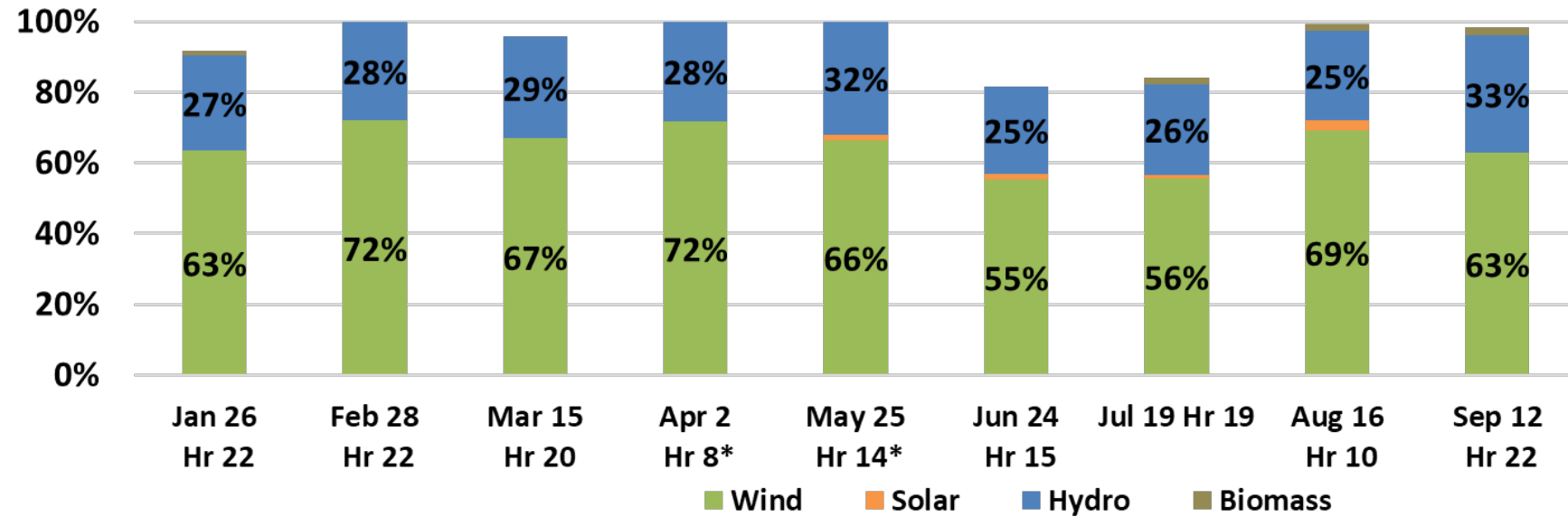
- US: 22%
- MISO: 19%
- Minnesota Power: 59%



Increased
renewables

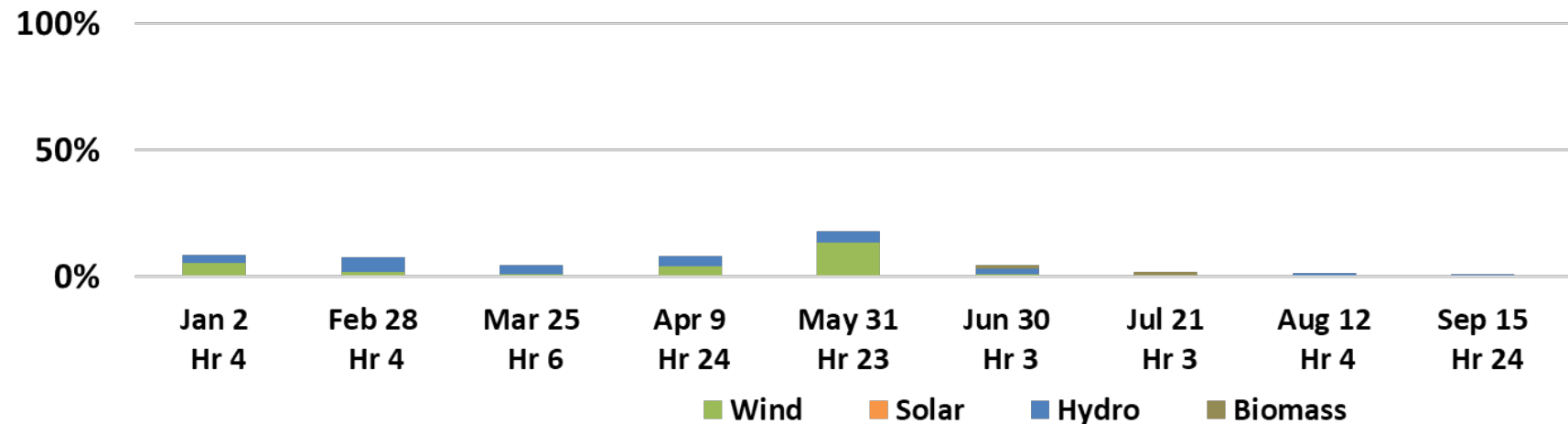
...Results in
increased
variability in
energy supply

Highest Hour of Renewable Generation by Month



*Occurred for More Than One Hour That Month

Lowest Hour of Renewable Generation by Month



Typical month
includes significant
energy supply swings

...currently balanced
in regional grid

...creates
opportunities for
customers with
flexible load

April 2023 Generation, Purchases, and Load

