Variable Energy in Operation
• No. 1 utility wind provider
• Top-ten utility for solar capacity
• Leader in emission reductions
• Nationally recognized in energy efficiency
• Member of the Dow Jones Sustainability Index
Xcel Energy Wind Generation Growth (current)
• Obligations and resources are maintained in balance at all times
• Expand focus to all hours of the year to manage uncertainty (Apr/Oct).
• Spread between daily high/low loads increase. Timing of ramps uncertain.
• New paradigm: Flexible and Informed Grid
LOADS AND RESOURCES – A NEW PARADIGM

VER forecasts ignored in commitment
VERs are must-take in dispatch
VERs penalized in resource planning process
Current reserves are sufficient

VER forecasts integrated into planning
VERs are dispatchable
VERs married with flexible resources
Reserve products tailored for VERs

Traditional Utility Paradigm (w/ some RE)

High Penetration Portfolio
PSCO WIND PENETRATION
PERCENT OF OBLIGATION LOAD

11/1/14 12:00 AM: 61.1%
11/11/15 3:00 AM: 86.4%

Xcel Energy®