

NCSL Webinar

Briefing on Renewable Integration


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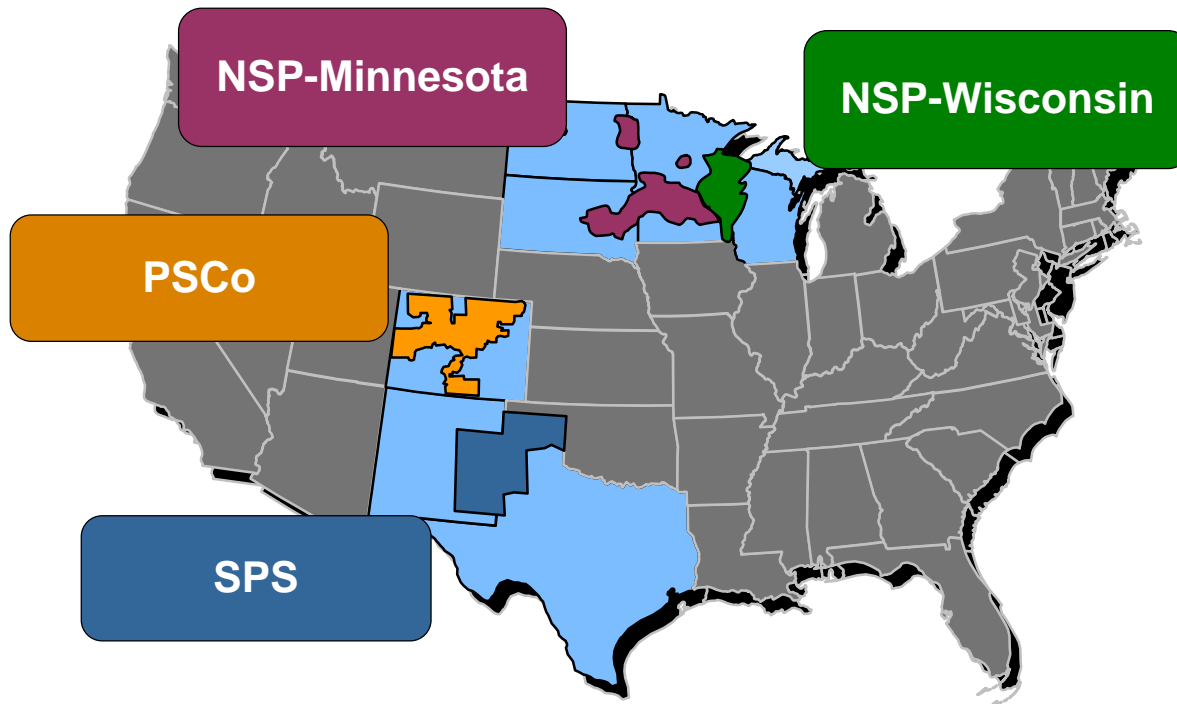
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Outline

- **Who we are: renewable integration leader**
 - **Our renewable integration experience**
 - **Legislative & policy examples**
 - **Thoughts on the future**
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Who We Are...



- 26,000+ MW of Generation
- Operating in 8 states
- No. 1 wind energy provider
- ~6,570 MW of wind
- Top 10 solar provider

Customers:
3.4 million electric
1.9 million gas

Xcel Energy Renewable Integration

	NSP	PSCo	SPS	XCEL
Name Plate Capacity (MW)	2,217	2,567	1,586	6,370
Max Hourly Generation (MW)	1,899	2,424	1,468	5,060
Date/Time Occurred	10/28/15 9:00 PM	11/11/15 3:00 AM	11/10/15 11:00 PM	11/3/15 9:00 PM
Max Hourly % Load	53.38%	66.42%	60.29%	51.77%
Date/Time Occurred	11/9/15 2:00 AM	11/11/15 3:00 AM	11/11/15 1:00 AM	11/4/15 12:00 AM
Max Daily % Load	41.28%	54.30%	50.83%	39.01%
Date/Time Occurred	November 8, 2015	October 2, 2015	November 15, 2015	November 8, 2015
Max Monthly % Load	21.40%	26.40%	26.70%	23.18%
Month/Year	November, 2015	April, 2014	November, 2015	Nov-15

Renewable Integration Experience

- Reduce renewable curtailments
- Improve wind forecasts
- Improve wholesale electricity markets
- Strengthen the electric grid
- Manage coal and gas generator cycling
- Address backup supply issues

Legislative & Policy Examples

- **Legislative and public policy influence on electricity portfolio evolution**
 - **State-level Renewable Portfolio Standards**
 - MN 30% annual energy for NSP
 - CO 30% annual energy for PSCo
 - **Conversion of coal-fired plants to natural gas fuel**
 - Colorado “Clean Air, Clean Jobs”
 - Minnesota “Metro Emissions Reduction Program”
- **Regional wholesale electricity markets**
- **Regional grid developments**

Thoughts on the future

- **Going beyond 30% annual energy creates new challenges and economic signals:**
 - **Renewable curtailment issues**
 - **Cycling of fossil thermal plants**
 - **Grid congestion & uncertainty**
 - **Technical changes to grid reliability performance**
- **These impacts must be properly considered to make good public policy that addresses the environment, reliability and efficiency**



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