



HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

Winter 2017-2018 Operations and Market Performance

10/19/2017

Bruce Rew – Vice President - Operations

BRew@spp.org

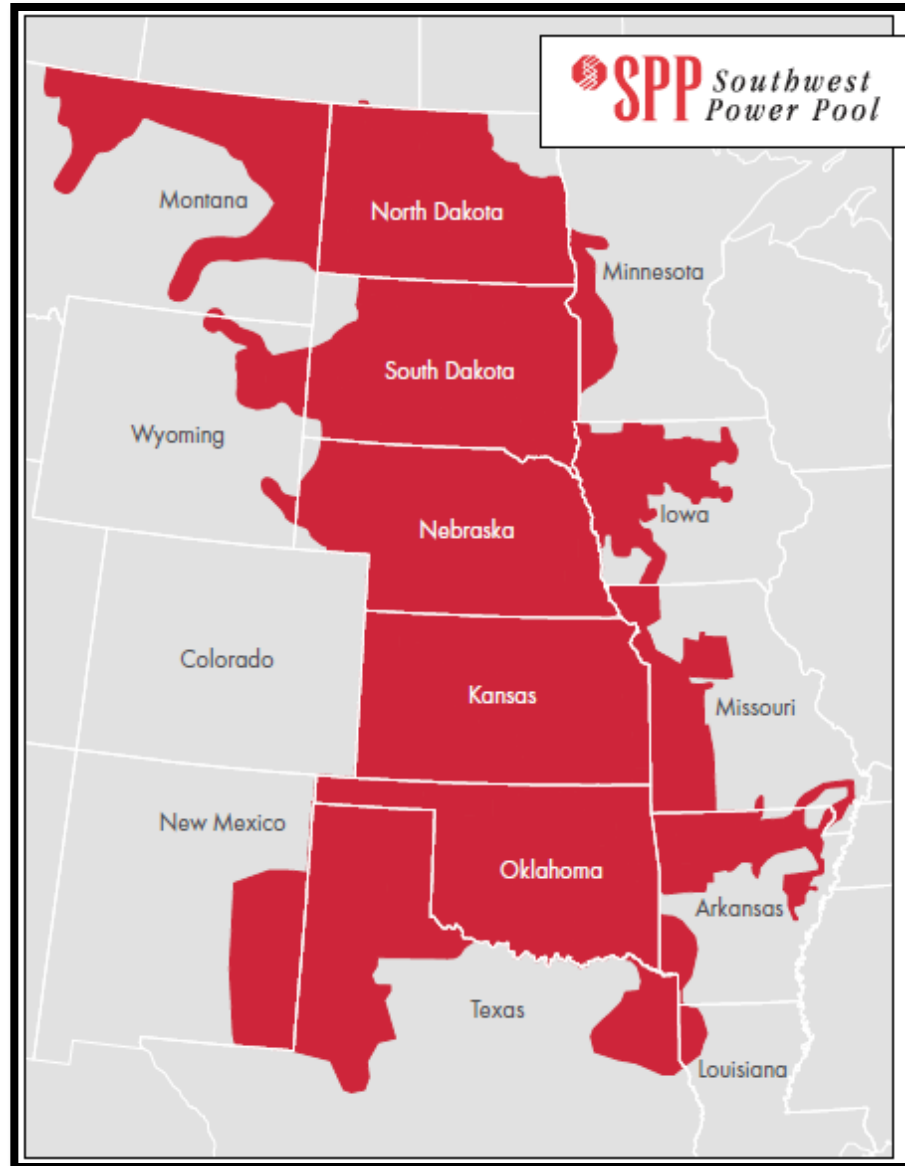
SPP Winter 2017-2018 Operations

- SPP's Overview
- Preparedness
- Challenges
- Overall Assessment

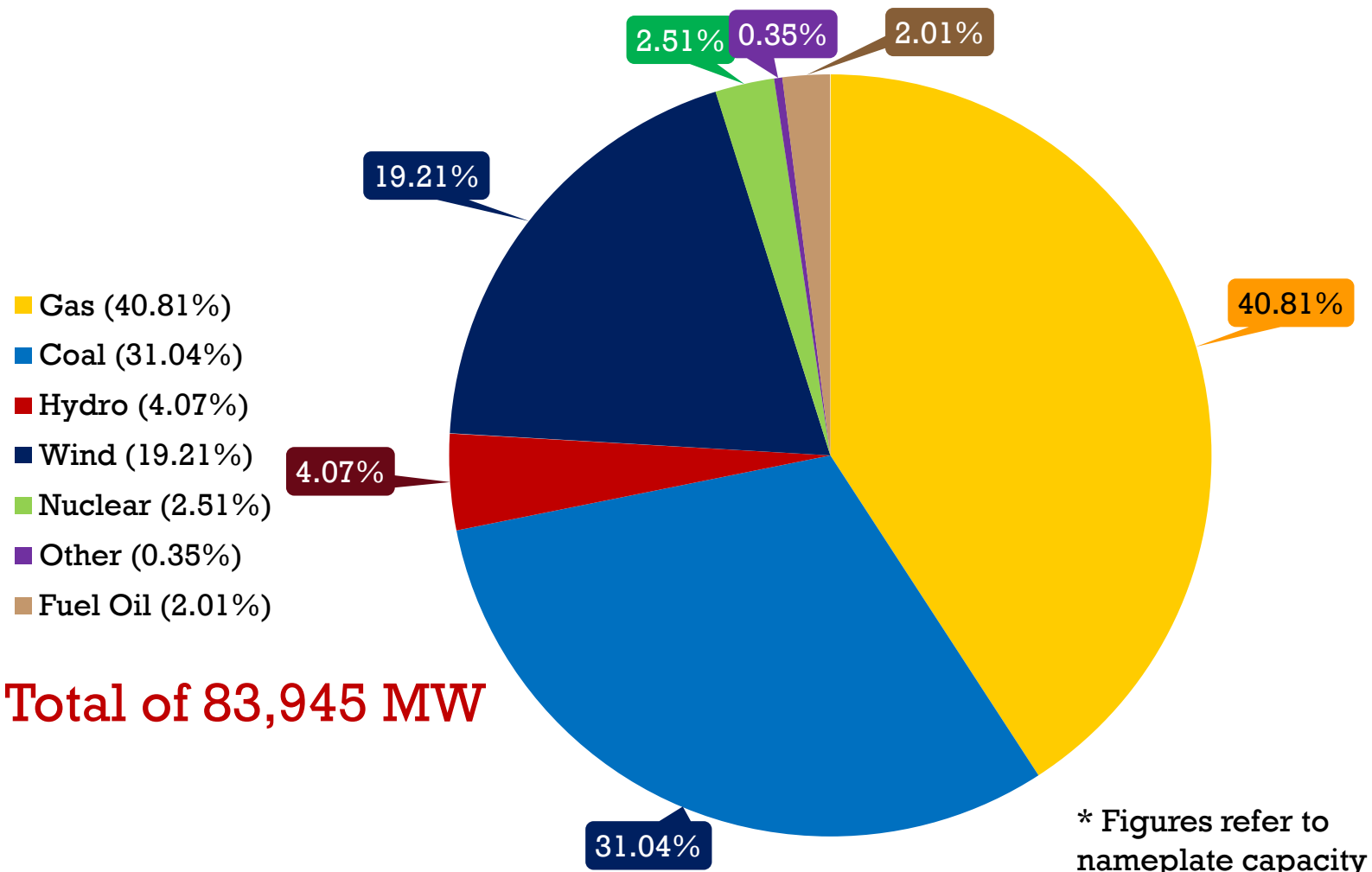


SPP's Footprint

- Footprint extends Canada to Texas
- Summer Peak 50,622 MW
- Winter Peak 40,434 MW
- Diverse weather patterns due to geographic region
- 29.7% summer reserve margin (12% required)



Generation Capacity* by Fuel Type



Total of 83,945 MW

* Figures refer to nameplate capacity as of 1/1/17

2016/17 Winter Highlights

- Winter peak load - 40,434 MW 12/19/16
 - Wind at time of peak: ~6,000 MW
- Fort Calhoun 478 MW nuclear unit was shutdown prior to Winter season
- Wind variation biggest challenge
 - Wind provided 26% of Energy
 - Penetration varied from 55%- 1%
 - MW Output: 13,342 MW – 346 MW
- 100° temperature difference on 12/17/16
 - 78 Degree's in Shreveport, LA
 - -22 Degree's in Williston, ND
- No major operational concerns experienced during the winter

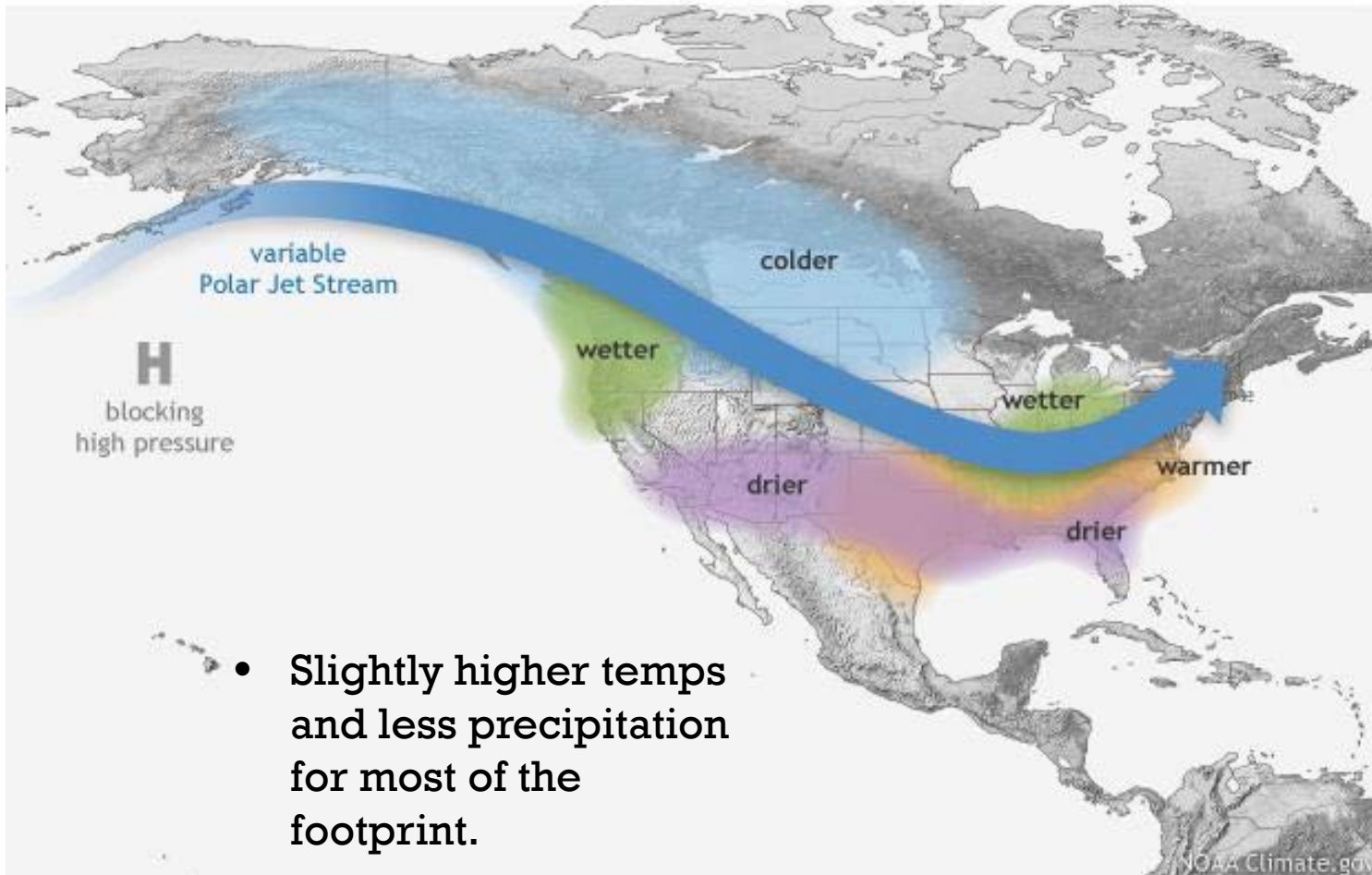
2017/18 Winter Preparedness

- Hosted SPP Winter Prep workshop on October 3, 2017
- Attendees included members of the Balancing Authority Operating Committee (BAOC) and Operating Reliability Working Group (ORWG)
- Review of congestion patterns of 2016/17 winter and plans for upcoming winter.
- Review 2017 Winter assessment methodology
 - Projected winter peak- 41,129 MW
- Met with market participants and reviewed the Conservative Operations and weather alert process
 - Seasonal preparedness language has been added to SPP's Emergency Operating Plan governing document.

2017/18 NWS Winter Forecast

- 55 to 60% Chance of La Niña

Wintertime La Niña pattern



2017/18 Winter Preparedness

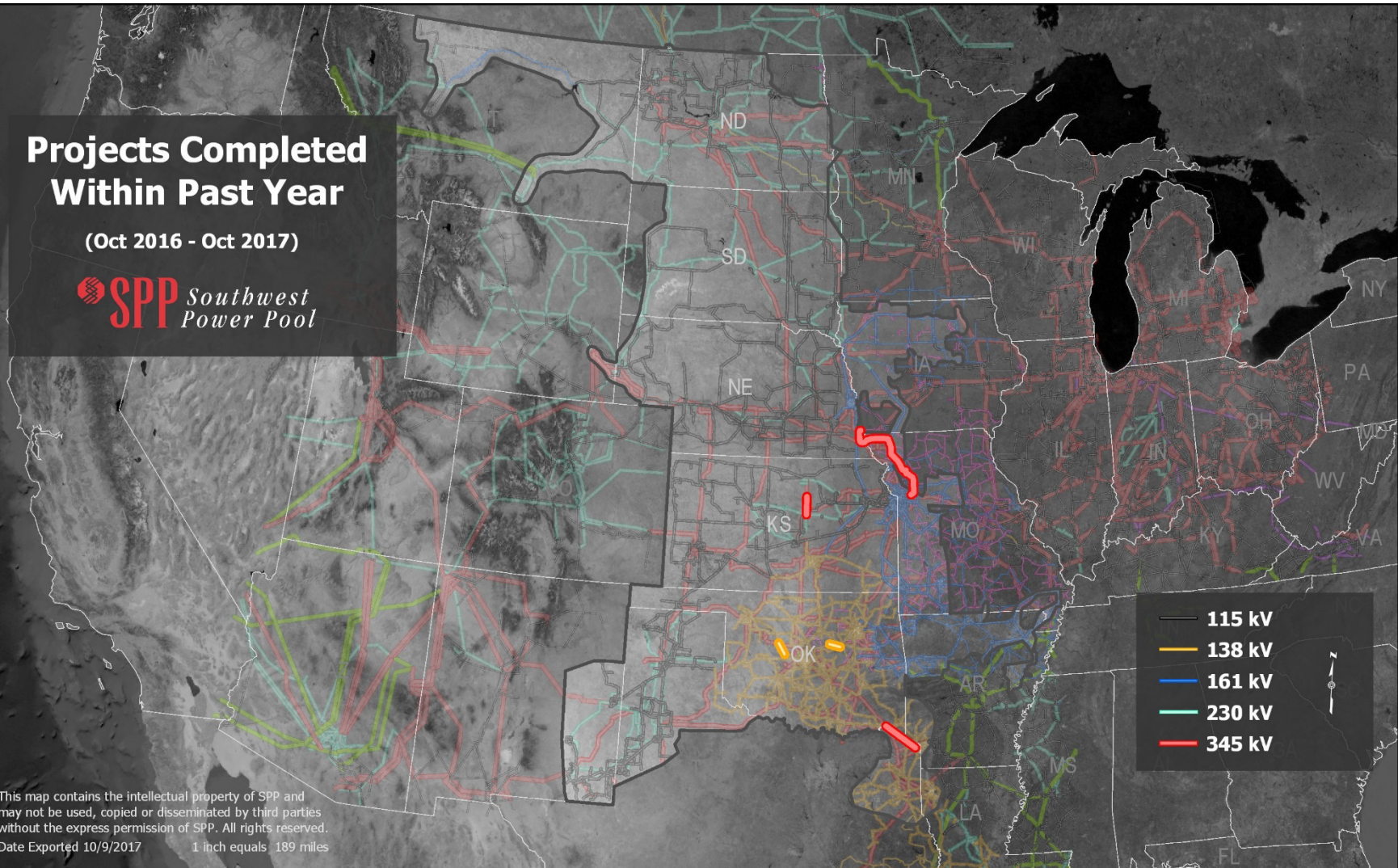
- Enhanced reliability studies with extreme conditions to determine scarcity (ramping, energy, regulation, etc).
 - Extreme outages
 - High loading
 - Drastic temperature swings
- Continue to refine our icing forecast on windfarms.
 - Icing forecast gives us bandwidth of impact to prepare for potential scenarios of generation lost looking forward 3 days
- Market-to-Market improvements will be implemented in December to increase control of the reciprocal coordinated flowgates
- No major SPP market design changes since last winter
- Enhanced operational voltage studies

New transmission added

- **Six new transmission lines:**
 - Elm Creek-Summit 345 kV
 - Nebraska City – Maryville 345 kV
 - Sibley – Maryville 345 kV
 - Valliant - Northwest Texarkana 345 kV
 - Gypsy-Stroud City 138 kV
 - Darlington Rd.- Roman Nose 138 kV

Projects Completed Within Past Year

(Oct 2016 - Oct 2017)



— 115 kV
— 138 kV
— 161 kV
— 230 kV
— 345 kV

This map contains the intellectual property of SPP and may not be used, copied or disseminated by third parties without the express permission of SPP. All rights reserved.
Date Exported 10/9/2017 1 inch equals 189 miles



Other Considerations

- Extreme winter weather on windfarms
 - Installed wind capacity up to 19 GW
 - Penetration and output levels expected to increase
 - Fossil fuel response due to wind variability (ramp)
- Gas/Electric Coordination
 - Gas pipeline segments incorporated into situational awareness interactive transmission map
 - Coordination with pipelines on delivery concerns and environmentally restricted resources
- 2014 Polar Vortex to Current
 - Integrated Marketplace start on March 1, 2014 and incorporated into early processes and procedures
 - Stronger Emergency Operating Plan

Overall 2017/18 Winter Assessment

- Forecasted for a slightly higher winter peak load
- Generation Reserve Margins remain high
- Additional 3,000 MW of wind capacity has been installed since last winter and has been factored into our studies
- Additional transmission lines added will provide more robustness to the grid
- Overall Studies indicate SPP is prepared for 2017/18 winter season

Questions?

Bruce Rew

BRew@spp.org