

# Nebraska Wind Conference

November 14, 2013

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# Overview

- Who is SPP
- Challenges with wind
- Transmission under construction

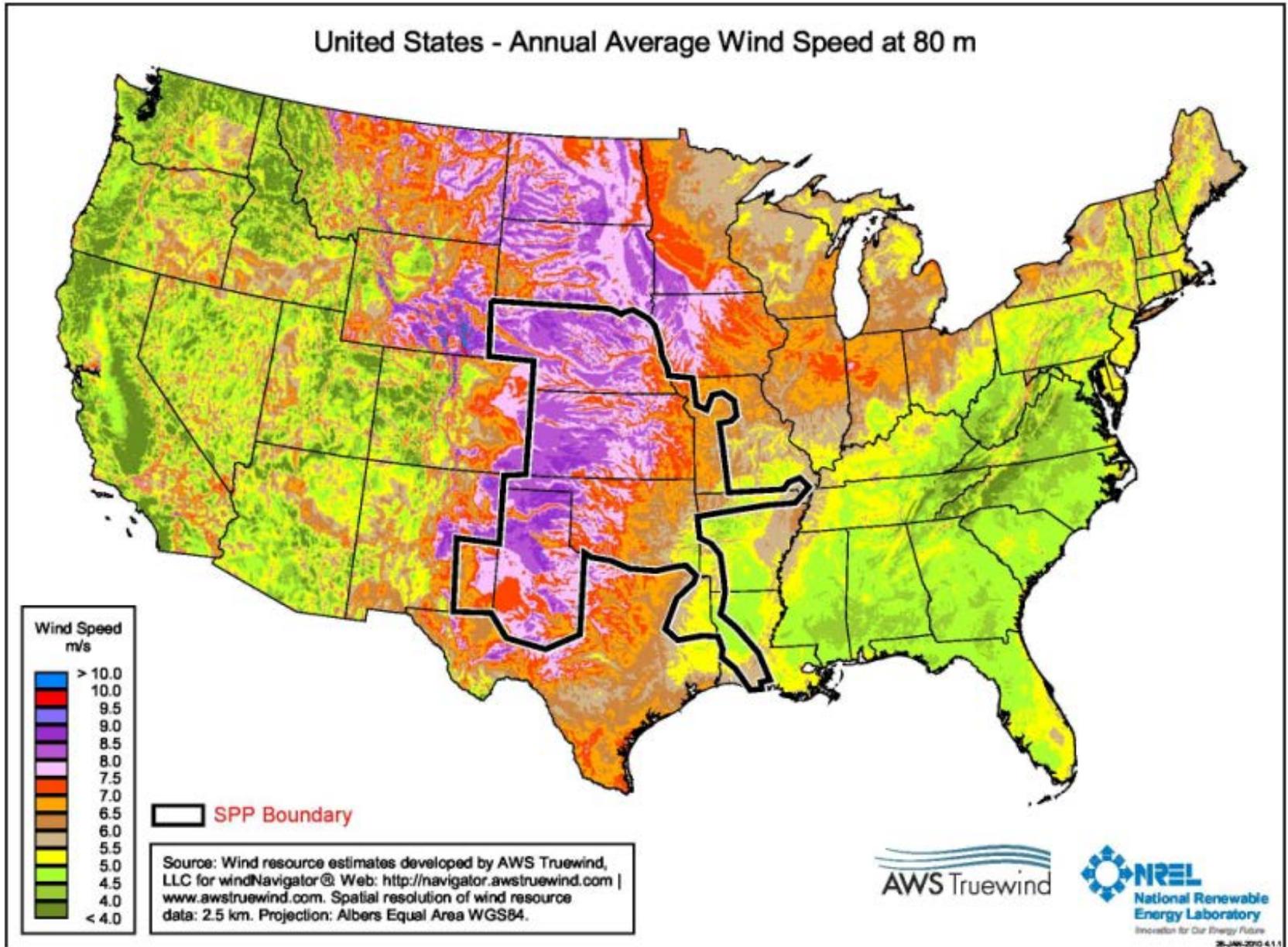


# SPP at a Glance

- Located in Little Rock
- > 550 employees
- \$152M operating budget
- 24 x 7 operation
- Full redundancy backup site



# Annual Average Wind Speed - 80 meters



# Wind Energy Development

- Wind “Saudi Arabia”: Kansas, Oklahoma, Texas Panhandle, New Mexico, Nebraska
  - 60,000-90,000 MW potential
  - In November and December 2012 Wind Energy produced over 11% of the energy consumed
- 7.6 GW capacity of in-service wind
- New **RECORD** output for RTO footprint – 6,816 MWs @17:31 10/10/13
- Record market wind penetration – 33.4% on 4/6/13



# SPP and Intermittent Resources

- SPP and its stakeholders have been working on methods to improve the integration of Intermittent Resources into the footprint, specifically during times of congestion
  - Proposals for systematic curtailment of Non-Dispatchable Resources (Resources in Intermittent, Testing, Start-Up/Shut-Down statuses) in the EIS Market have been considered to improve efficiency
    - PRR 211, 240, and 242 were filed at FERC
  - Even though manual curtailments will continue there will be additional improvements coming in the Integrated Marketplace March 1, 2014.

# EIS Market and Intermittent Resources

- **SPP dispatches Non-Dispatchable Resources to the echo of the resource output every 5 minutes**
  - **If congestion develops on the system that requires curtailment of the NDRs, SPP uses two methods:**
    1. **Systematic Curtailment through the Market System and Curtailment Adjustment Tool based on transmission priority**
      - New as of March 19, 2013 as a result of three years of stakeholder processes and FERC approval of PRR 240
    2. **Manual Curtailment through Reliability Directives based on IDC threshold of 5% and the generation shift factors to Market Load**

# Improvements Coming in Marketplace

- **Integrated Marketplace will provide Intermittent Resources more flexibility for participation in the market**
  - **Allows Intermittent Resources to be included in the Market solution, if registered as Dispatchable Variable Energy Resources**
    - **Uses the offer curve, ramp rate details, output, and forecast to help determine the optimal dispatch for the resource and the market, together**
- **SPP continues to look for way to apply manual curtailments more efficiently**

# Marketplace and Intermittent Resources

- **Dispatchable Variable Energy Resource (DVER):**
  - A Variable Energy Resource that is capable of being incrementally dispatched down by SPP
  - Eligible to offer Regulation-Down, if qualified
- **Non-Dispatchable Variable Energy Resource (NDVER):**
  - A Variable Energy Resource that is not capable of being incrementally dispatched down by SPP
- **All VERs must register as a Dispatchable VER except for VERs with an interconnection agreement executed prior to May 21, 2011 that were commercially operational before October 15, 2012.**
  - VER: Resource powered solely by wind, solar energy, run-of-river hydro or other unpredictable fuel source that is beyond the control of the resource operator

# Dispatch of VERs in Marketplace

- **In the Real-Time Balancing Market (RTBM), VERs will be dispatched to their echo every 5 minutes when there is no congestion on the system**
  - **For DVERS:**
    - **When there is congestion on the system:**
      - SPP will use the offer curve of the DVER and Market Participants will be sent a follow signal to lower output
    - **When congestion is over:**
      - SPP will dispatch DVER up at the submitted ramp rate until max limit (lesser of submitted max limit or SPP's output forecast) is reached
  - **For NDVERs**
    - **If SPP needs a NDVER to curtail, the SPP RC will issue a Directive/OOME to curtail the resource down similar to the EIS Market manual process**

# SPP and Intermittent Resources

- For both the EIS Market and Marketplace SPP continues to look for way to improve processes to help integrate wind
  - More transparency
  - Less dependency on manual process
- All stakeholders are welcome at member working groups to help propose ideas and participate in policy decisions
  - Go to [SPP.org](http://SPP.org) to learn more about meetings and opportunities to participate
    - Market Working Group
    - Operations Reliability Working Group
    - Regional Tariff Working Group



*“Someone's sitting in the shade today  
because someone planted a tree a long  
time ago.” — Warren Buffett*