Helping our members work together to keep the lights on... today and in the future
SPP’s 2013 Energy Consumption and Capacity

Total Capacity
66 GW
Total Peak Demand
49 GW

12% annual capacity margin requirement
SPP’s Operating Region

Current
- 77,366 MW of generating capacity
- 46,136 MW of peak demand
- 48,930 miles transmission:
  - 69 kV – 12,569 miles
  - 115 kV – 10,239 miles
  - 138 kV – 9,691 miles
  - 161 kV – 5,049 miles
  - 230 kV – 3,889 miles
  - 345 kV – 7,401 miles
  - 500 kV – 93 miles

Future (October 2015)
- Adding 3 new members (WAPA, BEPC, and HCPD)
- + 5,000 MW of peak demand
- + 7,600 MW of generating capacity
- 50% increase in SPP’s current hydro capacity
SPP’s Current Coal Status for 2018

<table>
<thead>
<tr>
<th>State</th>
<th>Derated Capacity</th>
<th>Retired Capacity</th>
<th>Remaining Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebraska</td>
<td>3,950 (MW)</td>
<td>210 (MW)</td>
<td>320 (MW)</td>
</tr>
<tr>
<td>Iowa</td>
<td>1,518 (MW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kansas</td>
<td>5,127 (MW)</td>
<td>285 (MW)</td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>3,072 (MW)</td>
<td>680 (MW)</td>
<td></td>
</tr>
<tr>
<td>Oklahoma</td>
<td>5,000 (MW)</td>
<td>122 (MW)</td>
<td>1,431 (MW)</td>
</tr>
<tr>
<td>Arkansas</td>
<td></td>
<td>78 (MW)</td>
<td>1,100 (MW)</td>
</tr>
<tr>
<td>Texas</td>
<td>3,641 (MW)</td>
<td>528 (MW)</td>
<td></td>
</tr>
<tr>
<td>Louisiana</td>
<td></td>
<td></td>
<td>638 (MW)</td>
</tr>
</tbody>
</table>

Total Generation and Losses of Coal Units by 2018

- Total Generation: 890 (MW)
- Total Losses: 2,958 (MW)
- Total Remaining: 22,863 (MW)
2030 Goals for States in SPP

Fossil Unit CO2 Emission Rate Goals and Block Application (lbs/MWh)

<table>
<thead>
<tr>
<th>SPP State</th>
<th>Average 2012 Rate = 1,699</th>
<th>Average 2030 Rate = 1,045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montana</td>
<td>1,771</td>
<td>1,499</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>1,783</td>
<td>1,479</td>
</tr>
<tr>
<td>Wyoming</td>
<td>1,714</td>
<td>1,544</td>
</tr>
<tr>
<td>Kansas</td>
<td>1,499</td>
<td>1,048</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>2,256</td>
<td>1,798</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2,162</td>
<td>1,722</td>
</tr>
<tr>
<td>Missouri</td>
<td>2,010</td>
<td>1,562</td>
</tr>
<tr>
<td>New Mexico</td>
<td>1,798</td>
<td>1,533</td>
</tr>
<tr>
<td>Arkansas</td>
<td>1,722</td>
<td>1,533</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1,562</td>
<td>1,420</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1,533</td>
<td>1,420</td>
</tr>
<tr>
<td>Texas</td>
<td>1,420</td>
<td>791</td>
</tr>
</tbody>
</table>

*Includes Future States with IS Generation in SPP (N. Dakota, S. Dakota, Montana, and Wyoming)
% Emission Reduction Goals for States in SPP

Total CO₂ Emission Reduction Goals (%)

*S. Dakota*  |  *Arkansas*  |  *Texas*  |  *Oklahoma*  |  *Louisiana*  |  *New Mexico*  |  *Kansas*  |  *Nebraska*  |  *Montana*  |  *Wyoming*  |  *N. Dakota*  |  *Missouri*

Average of SPP States = 38.5%

*Includes Future States with IS Generation in SPP (N. Dakota, S. Dakota, Montana, and Wyoming)*
NGCC Capacity Factors
(For SPP and Select Neighboring States)
EPA’s Renewable Energy Assumptions
(For SPP and Select Neighboring States)
SPP’s CPP Impact Assessments

- Initial analysis requested by SPP’s Strategic Planning Committee
  - Reliability analysis
  - Use existing ITP 2024 models
  - Model EPA’s projected EGU retirements
  - Replace retired EGUs with a combination of increased output from existing CCs, new CCs, Energy Efficiency, and increased renewables (with input from member utility experts)
  - Assessment underway, initial results expected week of August 18th

- SPP’s Regional State Committee requested analysis comparing both individual state and regional approaches
  - Will discuss approach during their August 25th conference call
EPA Projected 2016-2020 EGU Retirements
(For SPP and Select Neighboring States)

*Extracted from EPA IPM data
**THESE RETIREMENTS ARE ASSUMED BY EPA – NOT SPP!
EPA’s Projected 2016-2020 EGU Retirements

*Excludes committed retirements prior to 2016

**Extracted from EPA IPM data

***THESE RETIREMENTS ARE ASSUMED BY EPA – NOT SPP!
SPP Reliability Impact Assessment Results

• Before considering the impacts of contingencies, preliminary results indicate increased thermal overloads and low voltages due to EPA’s assumed retirements

• Summer peak cases are not solving under single contingency
  • Indicative of significant low voltages due to lack of reactive support

• Remaining steps to be taken
  • Continue to take steps to get all cases to solve and note what steps were required
  • Determine the amount of reactive support required to maintain reliable voltages
  • Identify the number and significance of overloads and low voltages that would have to be solved to comply with NERC Standards
SPP Reserve Margin Assessment

• Used current load forecasts supplied by SPP members, currently planned generator retirements, currently planned new generator capacity with GIAs, and EPA’s assumed retirements

• SPP’s minimum required reserve margin is 13.6%

• By 2020, SPP’s anticipated reserve margin would be 5.0%, representing a capacity margin deficiency of approximately 4,500 MW

• By 2024, SPP’s anticipated reserve margin would be -3.8%, representing a capacity margin deficiency of approximately 10,000 MW

• Out of 14 load serving members assessed, 9 would be deficient by 2020 and 10 by 2024
State Plans Need to Consider the Following

• SPP is responsible to FERC and NERC
  – Required to ensure reliability and perform in accordance with tariff
  – Rules, behavior, pricing, and revenue distribution are subject to FERC approval
  – Penalties may be levied by FERC/NERC for failure to comply (up to $1 MM/day/violation)

• SPP operates regional security-constrained, economically dispatched markets
  – Considers both reliability and economics
  – Generation dispatch provides reliable and economic solutions to needs over a multi-state area

• SPP plans and directs regional transmission construction
  – Addresses expected reliability, economic, and public policy needs
  – Generator interconnection and transmission service must be requested of SPP and processed by SPP
  – Takes up to 8.5 years to perform applicable planning processes and construct transmission upgrades
Transmission Build Cycle

Transmission Planning Process

Planning Study (12-18 mo.)
NTC Process (3-12 mo.)
Construction (2-6 yr.)

GI Study (12 mo.)
TS Study (6 mo.)
NTC Process (3-12 mo.)
Construction (2-6 yr.)

3 ¼ yr.
3 ½ yr.
8 ½ yr.
8 ½ yr.
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