



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

# Resource Adequacy in SPP

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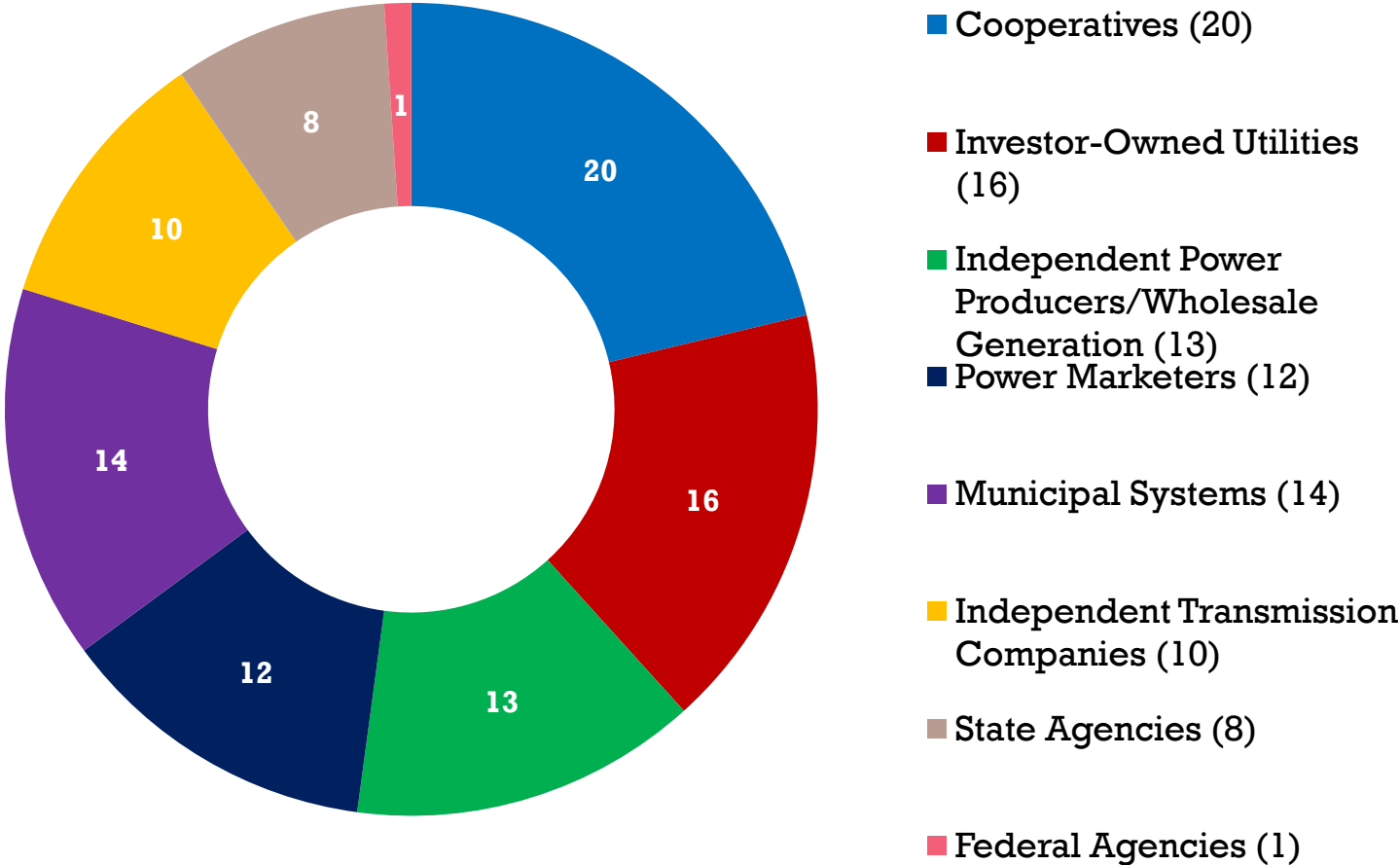
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Spring 2017 Joint CREPC-WIRAB Meeting

# Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs)



# SPP's 94 Members: Independence Through Diversity



As of April 7, 2017

# SPP's Regional State Committee

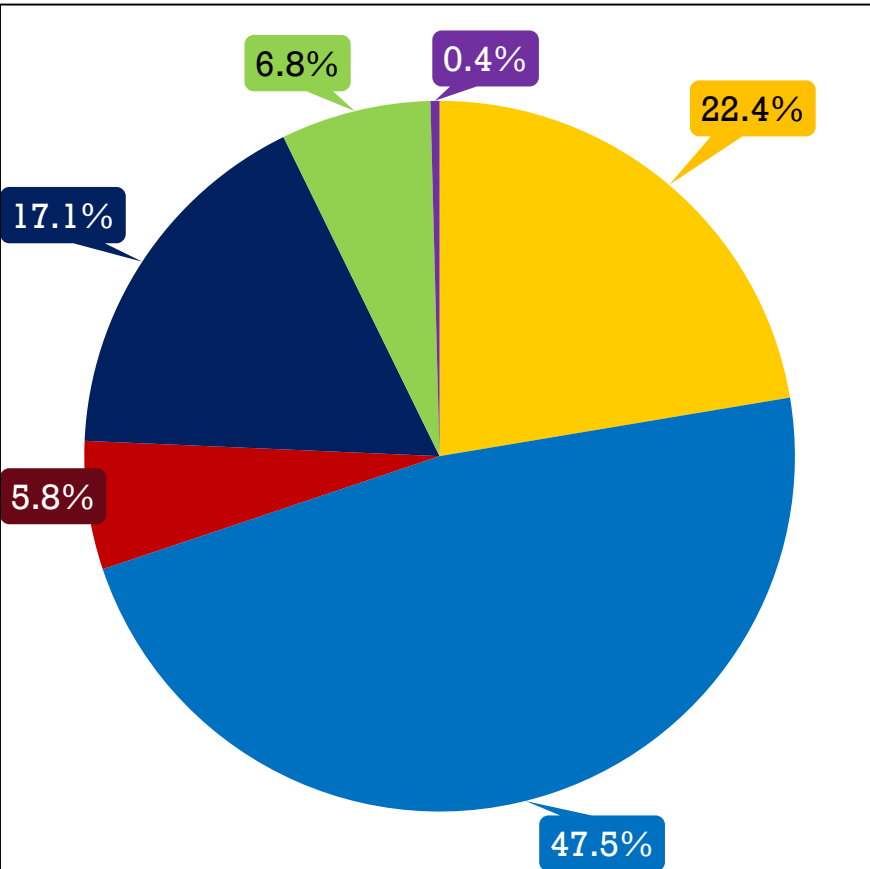
The SPP RSC is comprised of retail regulatory commissioners from agencies in:

- **Arkansas**
- **Kansas**
- **Iowa**
- **Missouri**
- **Nebraska**
- **New Mexico**
- **North Dakota**
- **Oklahoma**
- **South Dakota**
- **Texas**

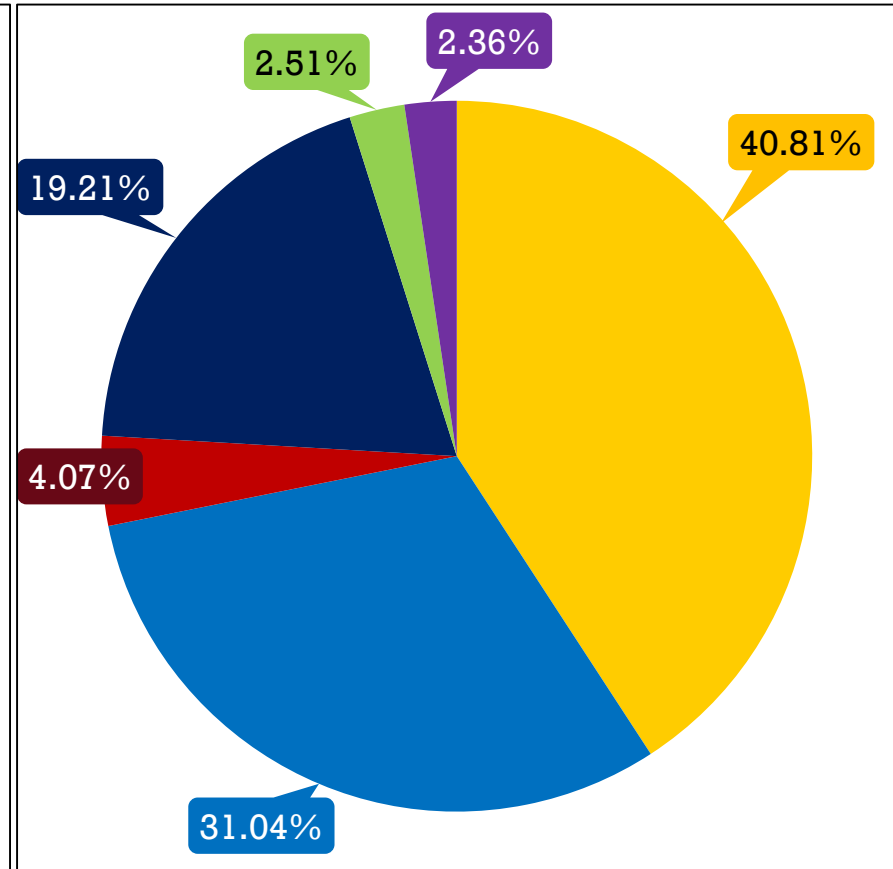
**State Oversight**

<b>4 Areas of Authority</b>	<b>Description</b>
<b>Cost Allocation</b>	Whether participant funding will be used for transmission enhancements & whether license plate or postage stamp rates will be used for the regional access charge
<b>Financial Transmission Rights (FTRs)</b>	FTR allocation, where a locational price methodology is used; and the transition mechanism to be used to assure that existing firm customers receive FTRs equivalent to the customers' existing firm rights
<b>Planning for Remote Resources</b>	Whether transmission upgrades for remote resources will be included in the regional transmission planning process and the role of transmission owners in proposing transmission upgrades in the regional planning process
<b>Resource Adequacy</b>	Determine the approach for resource adequacy across SPP. The states have the right to establish a reference level for planning reserves.

# SPP's 2016 Energy & Capacity Mix



Energy Consumption

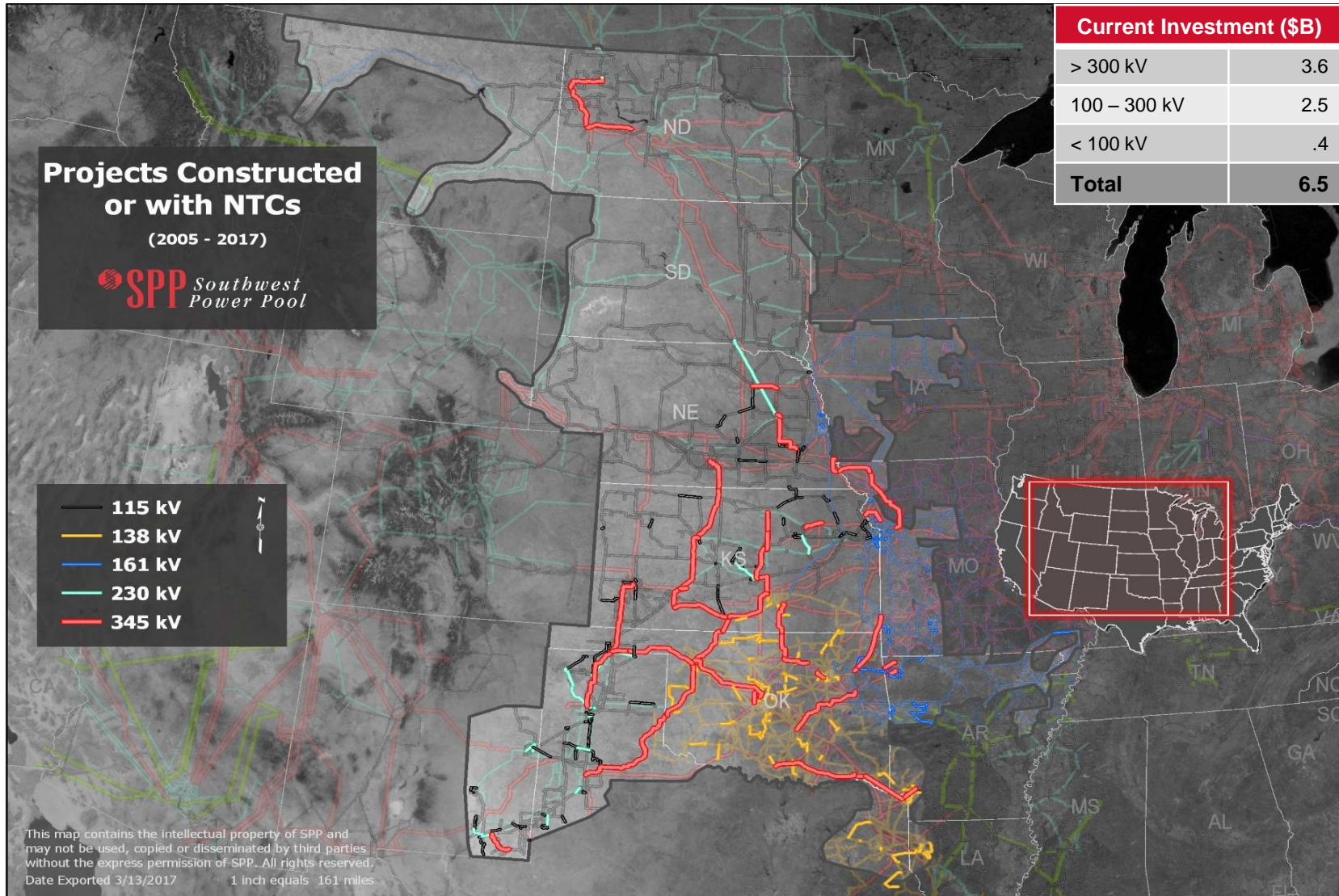


Installed Capacity

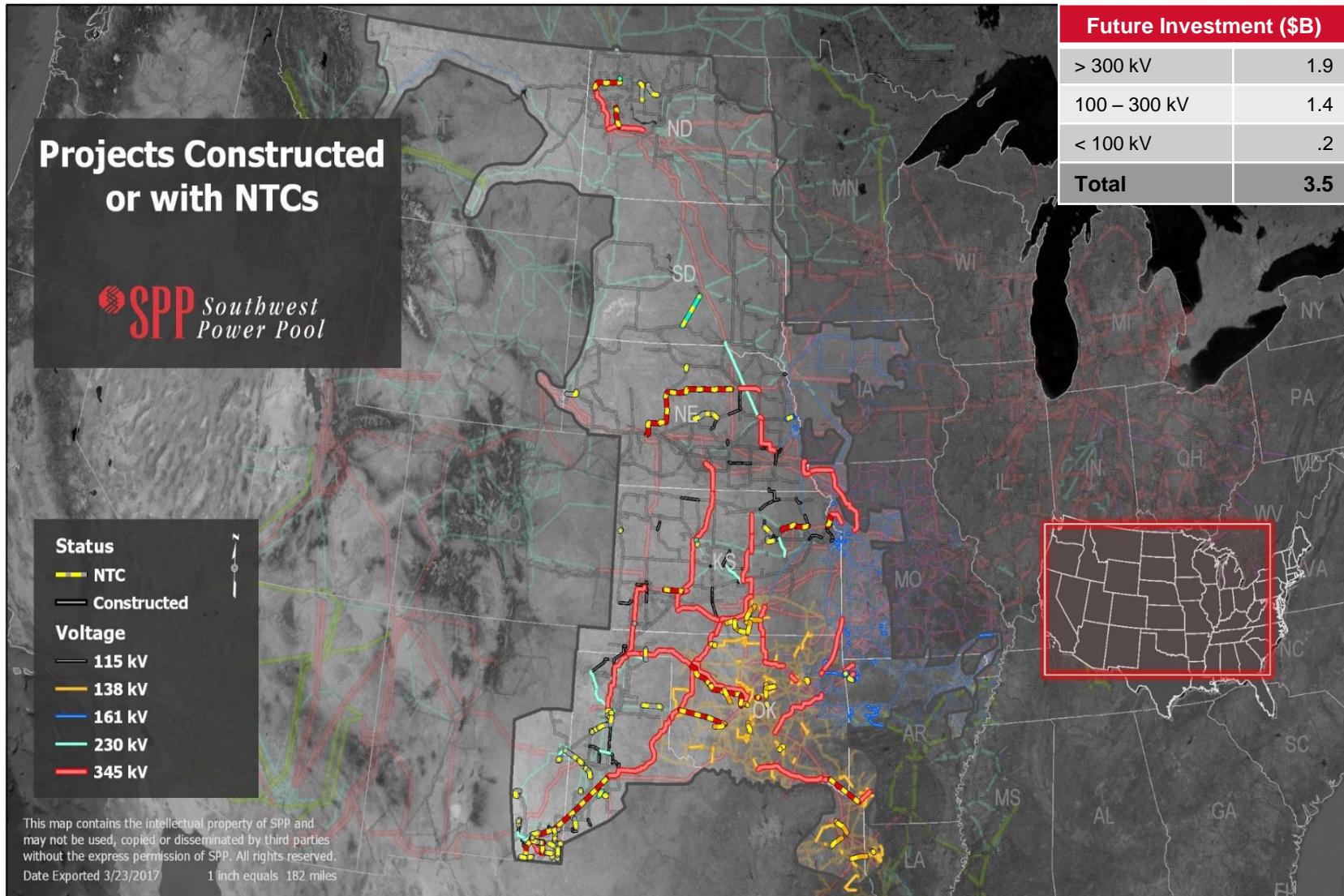
■ Gas (22.36%)   ■ Coal (47.48%)   ■ Hydro (5.84%)  
■ Wind (17.07%)   ■ Nuclear (6.83%)   ■ Other (0.41%)

■ Gas (40.81%)   ■ Coal (31.04%)   ■ Hydro (4.07%)  
■ Wind (19.21%)   ■ Nuclear (2.51%)   ■ Other (2.36%)

# 2005- 2017 Transmission Expansion



# Future Transmission Expansion

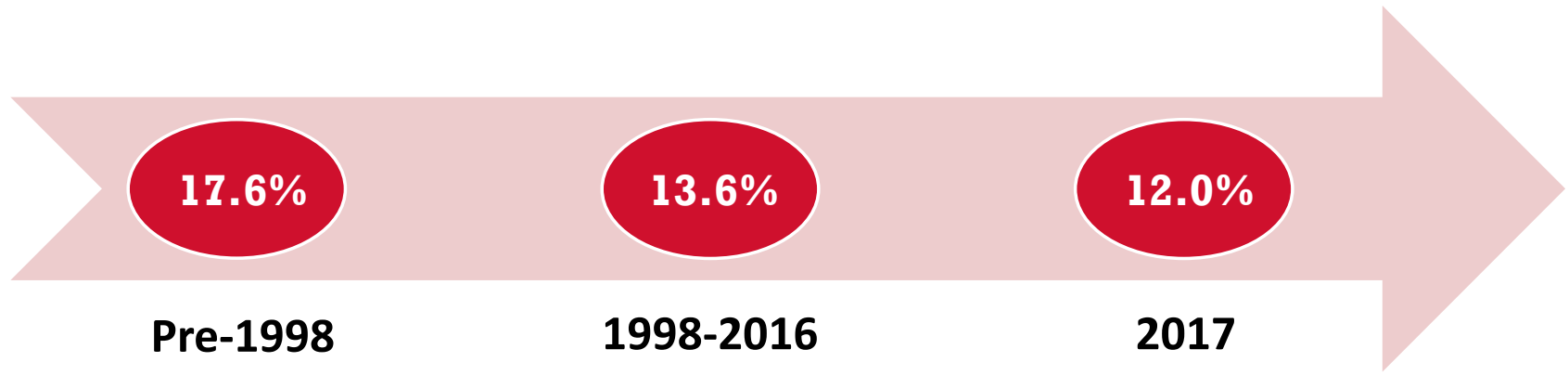




# SPP's Resource Adequacy Approach

- Resource adequacy requirements imposed on entities responsible for serving load
- Regional requirements for resource adequacy
  - Resource capacity accreditation criteria
  - Planned capacity must exceed load by a minimum reserve margin (PRM)
- Bilateral capacity market
- Compliance measured through annual resource and load data submission
- PRM requirement established through biennial Loss of Load Expectation (LOLE) analyses
  - Must not exceed 1 day-in-10 year LOLE

# SPP's PRM Requirements



# LOLE Data Inputs

Generation Capacity Data

Variable Generation Shapes

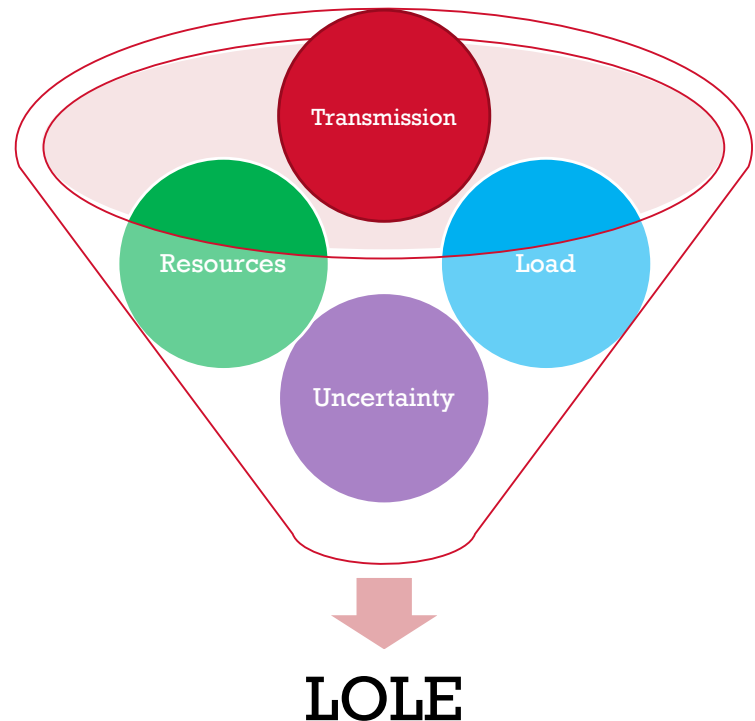
Transmission Constraints

Area Load Shapes

Purchases and Sales

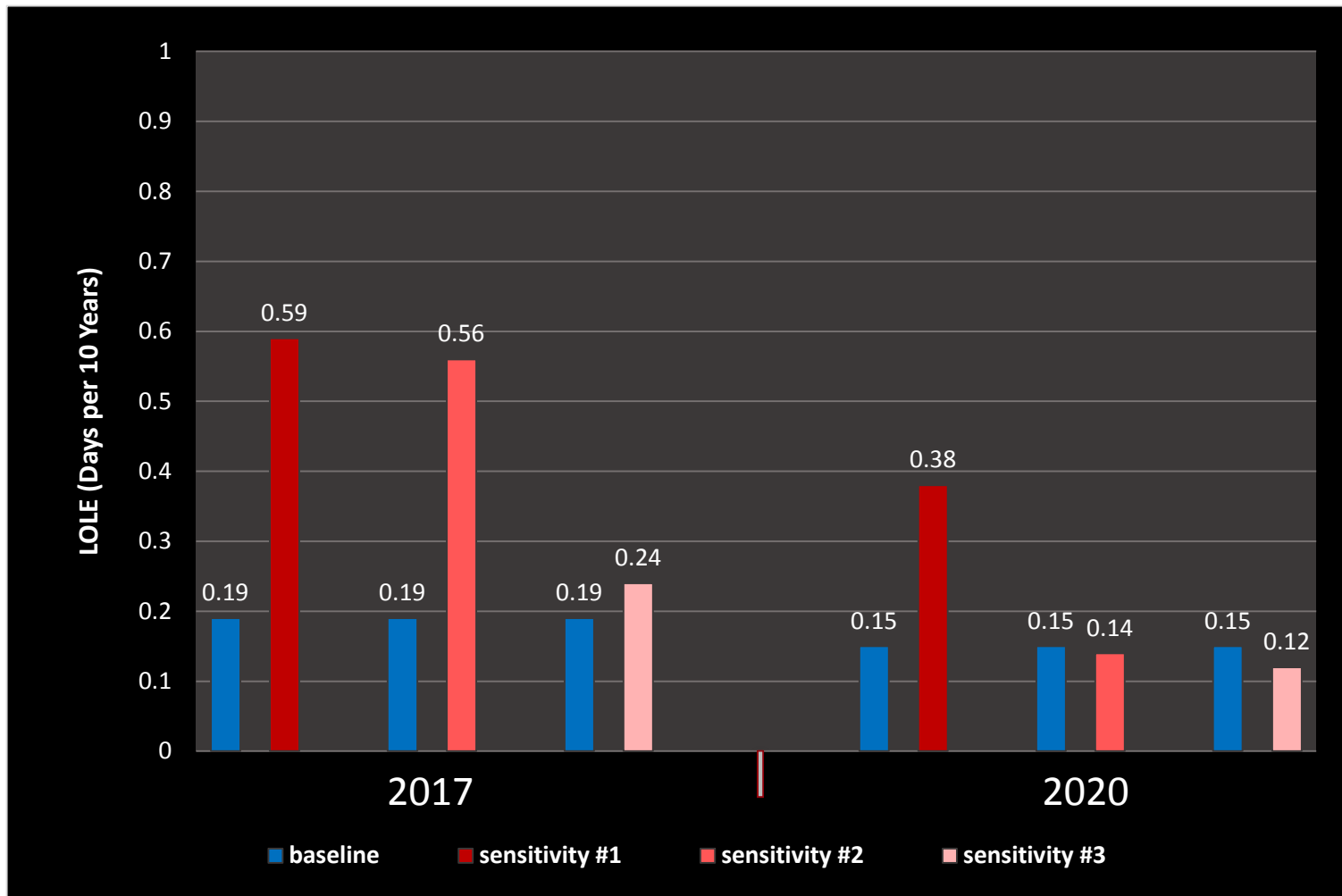
Forced Outage Rates

Load Uncertainty Data



# Sensitivity of LOLE to Inputs

(From SPP's Most Recent Analysis)



## Baseline

- 3.95% max load uncertainty
- 5-year average load & wind shapes
- Monitor 230 kV & above transmission

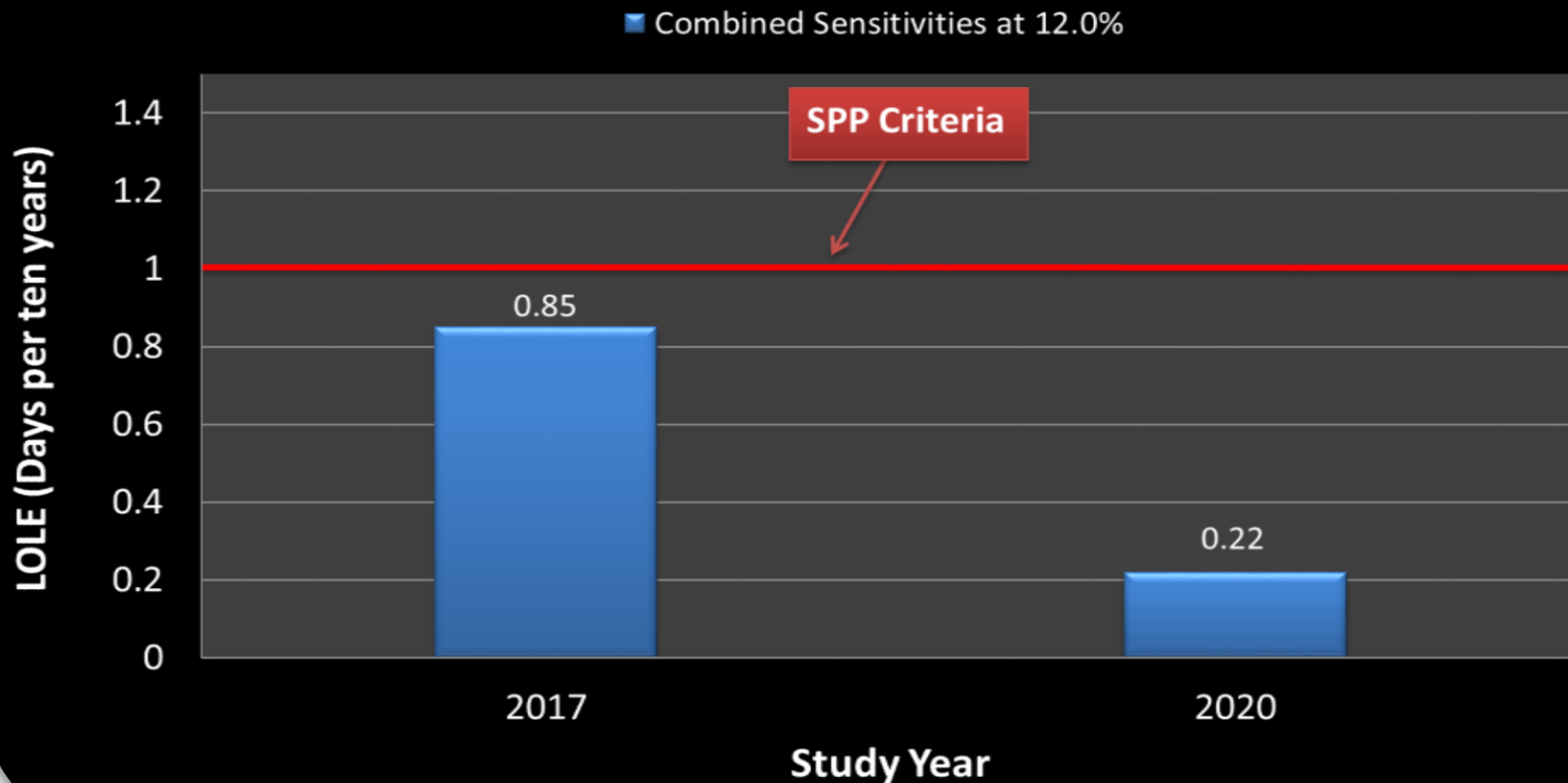
## Sensitivity

1. 9.0% max load uncertainty
2. 2011 load & wind shapes
3. Monitor 100 kV & above transmission

# SPP's Most Recent LOLE Results

- Reduction of LOLE from 2017 to 2020 are a direct impact of approved future transmission expansion

## Sensitivity Impacts at 12.0% Reserve Margin



# Benefits of Diversity and Expansion

- PRM requirement reductions have reliably been reduced due to increased load and resource diversity facilitated through regional transmission planning and market operation
- Regional footprint expansion has created further opportunities to reduce PRM requirements

