1. The stakeholder process
2. Resource adequacy constraint
3. The scope of resource alternatives
4. The multiple uncertainties; and
5. The competitive resource procurement process
• **Commission Comment:** 2015 Plan failed to adequately engage stakeholder

• **NorthWestern Response:** We agree we need to do more
  - NorthWestern commits to working with ETAC more effectively
  - Steps taken
    - Hired a new facilitator
    - Schedule meetings

• **Commission Comment:** Seems to expand ETAC to all interested parties

• **NorthWestern Response:** Limited agreement
  - Role of ETAC
    - ETAC’s purpose is to provide technical planning, modeling, and regulatory advice
    - ETAC should not be a referendum or popularity vote on resources
    - NorthWestern provides confidential information to the ETAC
  - ETAC should be a balance of stakeholder perspectives
    - NWE is frustrated with ETAC makeup and interaction
    - Seems like parties most willing to participate are strong advocates, need more customer representation
    - We have worked to expand the membership, but have received very little interest in participation from other areas
    - NorthWestern and customers would benefit from some discussion during meetings
• **Commission Comment: Access to modeling software**

• **NorthWestern Response:**
  – NorthWestern continues to offer access to the Ascend modeling software
    • NorthWestern is willing to discuss a structure under its contract to MCC and MPSC
Resource Adequacy Constraint

- **Commission Comment:**
  - Not clearly defined capacity types and needs
  - NorthWestern has not completed a system optimization study with its entire fleet of resources.

- **NorthWestern Response: Agree and disagree**
  - We have defined capacity types and needs
    - Chapters 7, 11, & 12
  - The fleet was optimized under the economically optimal portfolio modeling
  - We determined the need under CPS2, the reliability requirement then in effect
    - Modeling was completed in January 2016
    - NorthWestern participation in RBC trials did not begin until March 2016 – there was insufficient data
  - Basic math - the sum capacity of the entire fleet of resources is short of the capacity need for resource adequacy
  - Additional needs for ancillary services and other requirements increase the needs of the portfolio above the resource adequacy requirements
  - In addition, NorthWestern is continuing to evaluate needs and the most cost effective use of NorthWestern portfolio as changes occur
NorthWestern Energy
2017 Resource Mix
(Including contracted and pending final order)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Nameplate Capacity</th>
<th>Capacity Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>514 MW</td>
<td>3.4%</td>
</tr>
<tr>
<td>Hydro</td>
<td>466 MW</td>
<td>51%</td>
</tr>
<tr>
<td>Coal</td>
<td>222 MW</td>
<td>93%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>202 MW</td>
<td>95%</td>
</tr>
<tr>
<td>Thermal QF</td>
<td>84 MW</td>
<td>58%</td>
</tr>
<tr>
<td>Solar</td>
<td>31 MW</td>
<td>9.6%</td>
</tr>
</tbody>
</table>

Table:
- Total Nameplate Capacity: 1,546 MW
- Total Capacity Contribution: 694 MW
- 2017 Peak Load: 1,200 MW
• **Commission Comment:** 2015 Plan provides no analysis justifying a resource adequacy standard based solely on a NorthWestern specific LOLP
  – Region-wide capacity shortage, “A utility-specific measure of capacity need as the yardstick for the solution...is incongruous”.
  – NorthWestern’s peak load is not coincident with the region’s.

• **NorthWestern Response:** We disagree though we may not have highlighted it effectively
  – The regional shortage and individual requirements were discussed in Chapter 7 of the Plan
    • Key regional planning bodies forecast capacity shortages
    • Inconsistent with NERC reliability requirement
  – NorthWestern load is coincidental with regional winter peaks
  – Likely to be even shorter capacity – Colstrip 1 & 2
Resource Adequacy

Planning Reserve Margins

- NERC Reference Margin
  - WECC NWPP-US
    Reference Margin = 16.6%

- Comparison of Select Regional Utilities
  - NorthWestern has no planning reserve margin and is actually negative
• Reserve Margin Requirement:
  – WECC–NWPP = 16.6%

• Resource Adequacy Advisory Committee (RAAC)
  – Provided a report that shows the region being short in 2021

• PNUCC Annual forecast affirms our concern about winter capacity
Capacity Planning / Resource Adequacy

- Shift in Resource Planning Priorities
  - NWPCC – First Plan to recognize and place priority on capacity planning.
    - Energy planning no longer “good enough”
    - Peak and flexibility need to be considered
    - No renewable resources beyond RPS

- Regional Coal Plant Closures
  - 2015 J.E. Corette 175 MW
  - 2020 Centralia Unit One 670 MW
  - 2021 Boardman 550 MW
  - 2025 Centralia Unit Two 670 MW
  - 2025 North Valmy 552 MW
  - Total: 2,617 MW
RAAC identifies resource adequacy concerns in 2021
- Resource retirements
- Increased intermittent resource integration needs
- Increases in Winter Peaks

Comparison to Past Assessments

<table>
<thead>
<tr>
<th>Year Analyzed</th>
<th>Operation Year</th>
<th>LOLP</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2015</td>
<td>5%</td>
<td>Was part of the Council's 6th Power Plan</td>
</tr>
<tr>
<td>2012</td>
<td>2017</td>
<td>7%</td>
<td>Imports decreased from 3,200 to 1,700 MW, load growth 150 aMW per year, only 114 MW of new thermal capacity</td>
</tr>
<tr>
<td>2014</td>
<td>2019</td>
<td>6%</td>
<td>Load growth 0.6%, over 600 MW new generating capacity, increased imports by 800 MW</td>
</tr>
<tr>
<td>2015</td>
<td>2020</td>
<td>5%</td>
<td>Lower load forecast, 350 MW of additional EE savings</td>
</tr>
<tr>
<td>2015</td>
<td>2021</td>
<td>8.3%</td>
<td>Early estimate (BPA INC/DEC only) Loss of Boardman and Centralia (1 ~ 1,330 MW)</td>
</tr>
<tr>
<td>2016</td>
<td>2021</td>
<td>10%</td>
<td>2021 loads lower than last year's forecast (~ 1,500 aMW) but winter peaks are higher (~ 3,000 MW), using regional INC/DEC reduces hydro peaking by as much as 2,000 MW</td>
</tr>
</tbody>
</table>
Summer peak picture more comfortable...

301 MW surplus in 2021 (with 16% planning margin)

February 2017, draft

August, critical water, Northwest utility firm resources only. 12% planning margin in 2018 that grows 1% per year.
Winter peak has capacity deficit

3,224 MW deficit in 2021 (with 15% planning margin)

February 2017, draft

January, critical water, Northwest utility firm resources only. 12% planning margin in 2018 that grows 1% per year.
NorthWestern Energy Load hours and PNW Region load hours 2006 through 2015 (highest 10% of On-Peak load hours)

NorthWestern 3596 hours
Region 3596 hours

1489 hours (41%)

Winter 68%
Summer 12%
Resource Adequacy Constraint

- **Commission Comment:** The Plan provides little analysis and documentation that supports its selected capacity acquisition rate produces “minimal resource adequacy” by 2028.

- **NorthWestern Response:** We agree regarding the rate of acquisition
  - Ascend did perform an optimal expansion Plan and presented it to ETAC but did not include it in the Plan
  - Unconstrained, the model would have selected to build 500 MW immediately
  - We took a more conservative approach recognizing several factors, and as such, believe it represents prudent utility management
    - Rate effects on our customers
    - Technology changes over time
    - Regional retirements
    - Non financial hedge to a reasonable incremental balance approach recognizing future plans will help guide the future approach
  - Even with our more conservative approach;
    - EOP is more cost effective than the existing resource and market forecasts
Regional deficiency and Plant timing

Announced Retirements of coal-fired generation facilities - 3,231 MW total
Commission Comment: The 2015 Plan falls short of providing a thorough analysis of the capacity contributions of various resource alternatives, particularly large scale wind and solar resources.

NorthWestern Response: We disagree, especially concerning wind and solar resources:
- NorthWestern capacity contribution for wind and solar provided in the Plan is consistent that presented in multiple dockets.
- Wind and Solar were included in the capacity planning module and were not selected as a cost effective resource.
- Wind and solar do not provide any other type of capacity service.
- Other technologies have limited data that would translate directly to NorthWestern that identify how they specifically could contribute to capacity.
- Under the RFP process, bidders will provide their location and project specific services that can be evaluated to fulfill the NorthWestern need.
Summer Peak - Wind and Solar Contribution

2013 Retail Load Shape (MW) (Including losses)

Heavy Load Hours: Hour Ending 7 through 22 (Pacific Prevailing Time)
Monday through Saturday excluding NERC Holidays

Load (MW)

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300

Hour Ending

80 MW Solar Summer Pk Day
M1 Wind 205 MW Summer Pk Day

NorthWestern Energy
Delivering a Bright Future
Winter Peak - Wind and Solar Contribution

2013 Retail Load Shape (MW) (including losses)

Heavy Load Hours: Hour Ending 7 through 9 (Pacific Prevailing Time)
Monday through Saturday excluding MLK Holidays

- Winter Peak Day (Load)
- 80 MW Solar Winter Pk Day
- M1 Wind 2013 MW Winter Pk Day
• Commission Comments: The 2015 Plan falls short of an “evaluation of the full range of cost-effective supply and demand-side management options”

• NorthWestern Response: We are talking past each other. The Plan uses more conventional generation
  – Conventional – strong amount of data that substantiate operation characteristics and costs
  – Many alternative resources below do not provided the needed information. They are:
    • Site specific
    • Technology specific
    • Generic numbers for these types of resources would be meaningless and hypothetical
  – The RFP should eliminate the Commission concerns
    • The plan states that we will, and we have issued a competitive solicitation
    • What does an RFP bring you,
      – It brings you the most accurate data to evaluate resources
Commission Comment: Sources of Uncertainty

- **Resource Cost and Capacity Contributions**
  - Wind and Solar

- **Transition to RBC Regulation**
  - Agree
  - Due to timing of RBC, this information was not available for the Plan
  - An evaluation will be completed for the next Plan

- **Wind and Solar Integration Requirements**
  - Agree
  - Due to timing of RBC, this analysis was not available for the Plan
  - An evaluation will be completed for the next Plan

- **Load Forecast - High end of region’s projections**
  - As identified in a Berkley study, NorthWestern had the best forecast of the group reviewed
    [https://emp.lbl.gov/sites/all/files/lbnl-1006395_0.pdf](https://emp.lbl.gov/sites/all/files/lbnl-1006395_0.pdf)
  
- **Natural Gas Forecast and CO2 Regulations**
  - We agree that these inputs do contain risk
  - These and other risks were evaluated in PowerSimm for each option under the Risk Premium

- **Regional EIM Participation & ISO development**
  - We are evaluating costs and benefits of EIM participation and monitoring ISO development
• **Commission Comment: Does not identify that resources will be procured through an open, fair, and competitive process**
  – Does not explain steps it will take to ensure integrity
  – Prudent to consult with the advisory committee and potential bidders

• **NorthWestern Response: Disagree**
  – Brought in an Independent Evaluator (IE) for RFP
    • Oversee the integrity of the competitive solicitation process
    • The IE has met separately with the Commission and Staff
    • ETAC members were invited
    • IE has offered additional meetings
  – Bidders and interested parties have also commented on structure
RFP Focus – Flexible Capacity Need and Resources

Flexible Capacity Need vs. Resources

- Within-hour INC
- Additional Contingency Reserves
- Basin Creek

- Contingency Reserves
- Additional INC
- Owned Hydro

- Regulation
- DGGS
- Colstrip 4
NorthWestern Energy
RPS Compliance Forecast
Current Portfolio + CREP + Contracted (Greycliff and WKN)
NorthWestern Energy
RPS Compliance Forecast
Current Portfolio + CREP + Contracted (Greycliff and WKN) + Crazy Mtn + One new 80MW Wind