Northwest **Power** and **Conservation** Council

August 4, 2015

MEMORANDUM

TO: **Council members**

FROM: **Tom Eckman**

SUBJECT: **Discussion of Draft Seventh Plan Chapters**

BACKGROUND:

Presenter: Tom Eckman and Power Division Staff

Summary: Staff will review the key findings from the first ten chapters of the Draft Seventh Power Plan submitted to the Council for comment. Staff will also discuss any Council member comments on these chapters that are of a substantive, rather than simply editorial in nature. Staff views this agenda item as primarily as an opportunity for Council members to discuss the issues and findings contained in these draft chapters.

Relevance: Council members need to be satisfied that the draft plan accurately reflects the data and analysis used to develop it. This agenda item provides members with the opportunity gain that assurance.

Workplan: 1.B. Develop Seventh Power Plan and maintain analytical capability

Background: Staff submitted draft ten chapters for Council member review. These include:

Chapter 6: Power Act Requirements and the Power Plan
Chapter 7: Electricity Demand Forecast
Chapter 8: Electricity and Fuel Price Forecasts

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Chapter 9: Existing Resources and Retirements
Chapter 10: Operating and Planning Reserves
Chapter 11: System Needs Assessment
Chapter 12: Conservation Resources
Chapter 17: Model Conservation Standards and Surcharge Policy
Chapter 19: Environmental Methodology and Due Consideration for Environmental Quality and Fish and Wildlife
Chapter 20: Fish and Wildlife Program

More Info: Refer to draft chapters sent under separate cover via email from Chad Madron on:
July 2, 2015
July 29, 2015

Draft Chapters Key Findings

Summary of Major Findings from draft Chapters Release for Council Review

August 9-10, 2015

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Chapters 6, 17 & 20

- Chapters 6 - Power Act Requirements and the Power Plan
  - Informational chapter to provide context and background on the plan
- Chapter 20 - Fish and Wildlife Program
  - Required by statute, reference only
  - Chapter 17 – Model Conservation Standards
    - Discussed at July Power Committee
    - August Full Council Agenda Item

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Chapter 7
Electricity Demand Forecast (Pre-Conservation)

- Regional electricity demand is forecast to be between 21,000 to 24,000 average megawatts by 2035.
- Regional demand is expected to increase by between 2,200 aMW and 4,800 aMW between 2015 and 2035.
- This translates to an average increase of between 110-240 aMW per year or a growth rate of between 0.5-1.0 percent per year.
- Cost-effective efficiency improvements identified in the Seventh Power Plan are anticipated to meet most if not all of this projected growth
- Regional winter peak load, is forecast to grow from about 30,000 - 31,000 megawatts in 2015 to around 32,000 to 36,000 megawatts by 2035.
- Summer-peak demand is forecast to grow from 27,000-28,000 megawatts in 2015 to 31,000 – 34,000 megawatts by 2035.

Chapter 8
Electricity and Fuel Price Forecasts

- Prices for wholesale electricity at the Mid Columbia hub are forecast to remain relatively low for the planning horizon – primarily a result of:
  - Slow demand growth
  - Abundance of low variable-cost power sources such as hydro and wind
  - Low natural gas prices
- The average wholesale electricity price in 2014 at the Mid Columbia hub was $32.50/MWh, by 2035 prices are forecast to fall within a range of $33 to $60 in real dollars
- Since peaking in 2008, natural gas prices are forecast to remain relatively low across the planning horizon due to an abundance of supply
- Historically, natural gas prices have been volatile – starting with a price of $3.50/mmbtu in 2015, prices are forecast to fall within a range of $3 to $10 by 2035 in real dollars

Chapter 9
Existing Resources and Retirements

- Hydro
  - Provides 47% of the region's energy generating capability
  - Severs 67% of the region's load, on average

- Retirements since 2010: 2,620 MW
  - Boardman – 600 MW
  - Centralia 1 & 2 – 1,340 MW
  - North Valmy – 260 MW
  - Big Hanaford – 248 MW
  - Corrette – 172 MW

- Additions since 2010: 7,185 MW
  - Energy Efficiency – 1,050 aMW (~ 2,000 MW on peak)
  - Wind – 4,230 MW (total regional wind ~ 9,000 MW)
  - Gas – 520 MW (another 440 MW next year)

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Chapter 10
Operating and Planning Reserves

- Ancillary Services include frequency and voltage control, load following capability and outage protection

- Contingency Reserves
  - Set by the NW Power Pool
  - Larger of: 3% of load + 3% of generation OR single biggest component failure
  - GENESYS model checks each hour to make sure sufficient reserves on hand
  - Failure to maintain contingency reserves is counted as an outage

- Within-hour Balancing Reserves
  - Used to compensate for variations in load and in wind
  - Provide both up (INC) and down (DEC) capability
  - Currently model only BPA portion (900 MW INC and 1,100 MW DEC)

- Adequacy Reserve Margin
  - Similar to the planning reserve margin, used as target for future builds
  - Calculated using GENESYS based on 5% loss of load probability (i.e. adequate supply)
  - Fed to the Regional Portfolio Model as minimum build requirement

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Chapter 11
System Needs Assessment

- Load/Resource Balance
  - Energy surplus in all cases except in later years of high load
  - Capacity deficit in all cases except in first year low load
- Shift from "energy short, capacity long" to "energy long, capacity short" due to high amount of wind capacity (~9,000 MW)
- Capacity needs (based on 5% LOLP)
  - 0 to 3,000 MW by 2021
  - 4,300 to 10,600 MW by 2035
- Energy needs are very low, ranging from 55 to 800 aMW by 2035
- Adequacy Reserve Margin (ARM) is load/resource balance at 5% LOLP, calculated for both energy and capacity and fed to the RPM as minimum build requirement for adequacy
- Associated System Capacity Contribution (ASCC) is the effective capacity contribution for resources when added to the regional power system
- Using both ARM and ASCC in the RPM produces resource build outs that are adequate (i.e. LOLP is between 3% and 5%)

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Chapter 12
Conservation Resources

- There is about 5000 aMW of potential in 20-years, 3300 aMW in 2026
- About 3,500 aMW are less than $50/MWh (~roughly market price) in 20-years, 2,500 aMW in 2026
- Nearly half of the potential is in new measures not in previous plans
- Large capacity contribution from EE (~2x energy for winter peak, 1.2x for summer)

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Chapter 19
Environmental Methodology

- The Northwest Power Act's required elements for the Council's power plan is "a methodology for determining [the] quantifiable environmental costs and benefits" of electric generating and conservation resources.
- This chapter describes the methodology the Council is using to determine these quantifiable environmental costs and benefits. The methodology is consistent with past plans:
  - Identify environmental impacts
  - Quantify regulatory compliance cost and incorporate known costs into resource evaluation
  - Identify "residual impacts" that are not mitigated by current environmental regulations, especially CO2 emissions
- Implementation of the methodology is described in other chapters, particularly in the chapters on generating (Chapter 13) and conservation resources (Chapter 12).
- This chapter also describes how the Council is giving "due consideration" to "environmental quality" and "protection, mitigation, and enhancement of fish and wildlife and related spawning grounds and habitat, including sufficient quantities and qualities of flows for successful migration, survival, and propagation of anadromous fish" in crafting the resource strategy and "compatibility with the existing regional power system" of the new resources considered for development in its plan.

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