

PUGET SOUND ENERGY

2017 INTEGRATED RESOURCE PLAN

WORK PLAN

July 14, 2016

IRP WORK PLAN REQUIREMENTS

Washington Administrative Code (“WAC”) Sections 480-90-238 (4) and 480-100-238 (4), the natural gas and electric Integrated Resource Plan (“IRP”) rules, specify requirements for the IRP Work Plan:

Not later than twelve months prior to the due date of a plan, the utility must provide a work plan for informal commission review. The work plan must outline the content of the integrated resource plan to be developed by the utility and the method for assessing potential resources.

Additionally, Section 480-90-238 (5) and 480-100-238 (5) of the WAC states:

(5) Public participation. Consultations with commission staff and public participation are essential to the development of an effective plan. The work plan must outline the timing and extent of public participation....

Purpose of the Integrated Resource Plan

Puget Sound Energy’s (“PSE”; “Company”) long-term resource planning process continues to inform and guide the Company’s resource acquisition processes, consistent with the letter and spirit of WAC 480-90-238 and WAC 480-100-238. PSE’s IRP analysis integrates demand-side and supply-side resources in a manner so as to find the lowest reasonable cost set of resources to meet the growing energy needs of our customers.

Section I: Public Participation Process and Anticipated Timing

Input and feedback in PSE’s planning process from external stakeholders has been fundamental to the success of PSE’s IRP process. The public participation process for the 2017 IRP will build on lessons learned in the 2015 IRP process. The 2017 IRP public participation process will improve transparency and meeting structures to make better use of stakeholder’s time while still gathering the necessary input to inform the IRP. To achieve this objective, PSE will be changing the way Technical Advisory Groups are used and managed.

Process Overview

PSE's public participation process for the 2017 IRP will build upon the basic structure of the 2015 process to include changes that create a more open, transparent and focused dialogue than previous processes. Those changes include:

- Technical Advisory Committees (TAC): Several topic-specific technical advisory committees will be formed. The purpose will be to bring technical experts in that can help PSE improve its planning processes, methods, and assumptions in groups that communicate efficiently. These meetings will be open, to help transparency, as long as this approach remains productive. Agendas for the meetings will be technical and dialogue will be kept focused on those specific technical issues in sufficient detail needed for the modeling efforts.
- IRP Advisory Group (IRPAG): These meetings will generally include broader-level discussions on topics such as scenarios and results of analysis, rather than the very detailed discussions in the TAC meetings. Dialogue with stakeholders provides PSE with broader perspectives about the future than PSE would have on its own, thereby improving PSE's planning process.

Appendix A shows the anticipated timing of the various TAC and IRPAG meetings during PSE's 2017 IRP cycle, which as note above, are open to the public.

Consultative, Open Stakeholder Process

PSE values the feedback, alternative views, and technical information received from stakeholders in prior IRP processes. PSE appreciates the advice from stakeholders and the time individuals take to provide such consultation, ideas, and advice, especially when stakeholders have no legal obligation to lend such assistance. The IRP stakeholder process is a consultative one, not a consensus process where majority voting will drive decisions. PSE bears full responsibility for filing an Integrated Resource Plan with the WUTC that complies with WAC 480-90-238 and WAC 480-100-238. Stakeholders need not be experts in compliance to provide helpful advice, but the IRP is ultimately a compliance filing for which PSE is responsible. Additionally, PSE bears the responsibility for demonstrating the prudence of its resource decisions that will be informed by the IRP; again, stakeholders need not be prudence experts to provide helpful advice in the IRP, but PSE will be required to demonstrate prudence in potentially highly contested cases in the future. Therefore, PSE will continue to use a consultative process while

improving transparency and communication, so all participants can derive greater value from PSE's IRP process.

Appendix B outlines the initial ground rules for PSE IRPAG and TAC meetings. These rules were discussed during the 2017 IRPAG kick-off meeting and agreed to that a good faith effort by all stakeholders to adhere to these ground rules will help to ensure a productive use of the meeting time.

Appendix C provides further description of the various advisory groups and committees that will help to inform the 2017 IRP process.

SECTION II: METHODS FOR ASSESSING RESOURCES

Overview of Analytical Approach

PSE's demand-side and supply-side resource analyses are well integrated, as are the Company's electric and gas resource planning efforts. Common assumptions and similar analytical approaches are used in our electric and gas planning efforts. Appendix D is a diagram that illustrates how PSE plans to perform the quantitative analysis for this 2017 IRP. Appendix D also includes a table summarizing the different parts of the Company that contribute to the IRP process.

Uncertainty will be addressed in two ways, consistent with PSE's resource plans dating back to 2003: 1) Potential futures will be reflected in scenarios that will have different fuel prices, carbon costs, resource costs, environmental policies, etc.. 2) Sensitivities will also be used. Sensitivities are similar to scenarios, but focus on impact of one variable; i.e., sensitivity analyses examine implications of key variables "all else equal" such as changing natural gas prices or the resource additions in a portfolio. Understanding how different potential futures and factors affect resource strategies, costs, emissions, and cost risks is the focus of this analysis.

Stochastic analysis will be used in addition to deterministic scenario and sensitivity analysis. Stochastic analysis is helpful to understand the impact on the risk and volatility of costs that different resource types may have on the Company's long term portfolio.

SECTION III: 2015 IRP-CONTENT OUTLINE

The following is a draft outline of the 2015 IRP. This draft is based on PSE's 2013 IRP, modified based on early discussions with stakeholders. Organizational structure of the final IRP may be revised based on results of analysis and feedback received through the planning process.

1. Executive Summary
 - a. Electric Resource Plan
 - b. Gas Sales Resource Plan
 - c. Action Plans
2. Developing the Plan
 - a. Electric Plan
 - b. Electric: Results Across Scenarios/Sensitivities
 - c. Other Considerations
 - d. Gas Plan
 - e. Gas Results Across Scenarios
3. Planning Environment
 - a. Economic Environment
 - b. Policy Requirements and Influences
 - c. Resource Considerations
4. Key Analytical Assumptions
 - a. Key Inputs
 - b. Scenarios/Sensitivities
 - c. Stochastic Assumptions
 - d. Input Matrices
 - e. Summary Table of Scenarios and Sensitivity Assumptions
5. Load Forecasts
 - a. Overview
 - b. Methodology: Electric and Gas, Energy and Peaks
 - c. Key Assumptions
 - d. Results: Load Forecasts
 - e. Sensitivities to Normal Energy Forecasts Examined—Possible Impacts of Climate Change
6. Electric Analysis
 - a. Resource Needs
 - b. Resource Alternatives
 - c. Analytic Methodologies
 - d. Results
 - e. Key Findings and Insights
7. Gas Analysis
 - a. Gas Resource Needs
 - b. Existing Resources
 - c. Resource Alternatives
 - d. Analytic Methodologies
 - e. Results & Key Findings

8. Delivery System Infrastructure Planning
 - a. System Overview
 - b. Infrastructure Investment Drivers
 - c. Planning Process
 - d. 2013-2023 Infrastructure Plans
 - e. Challenges and Opportunities

Appendices

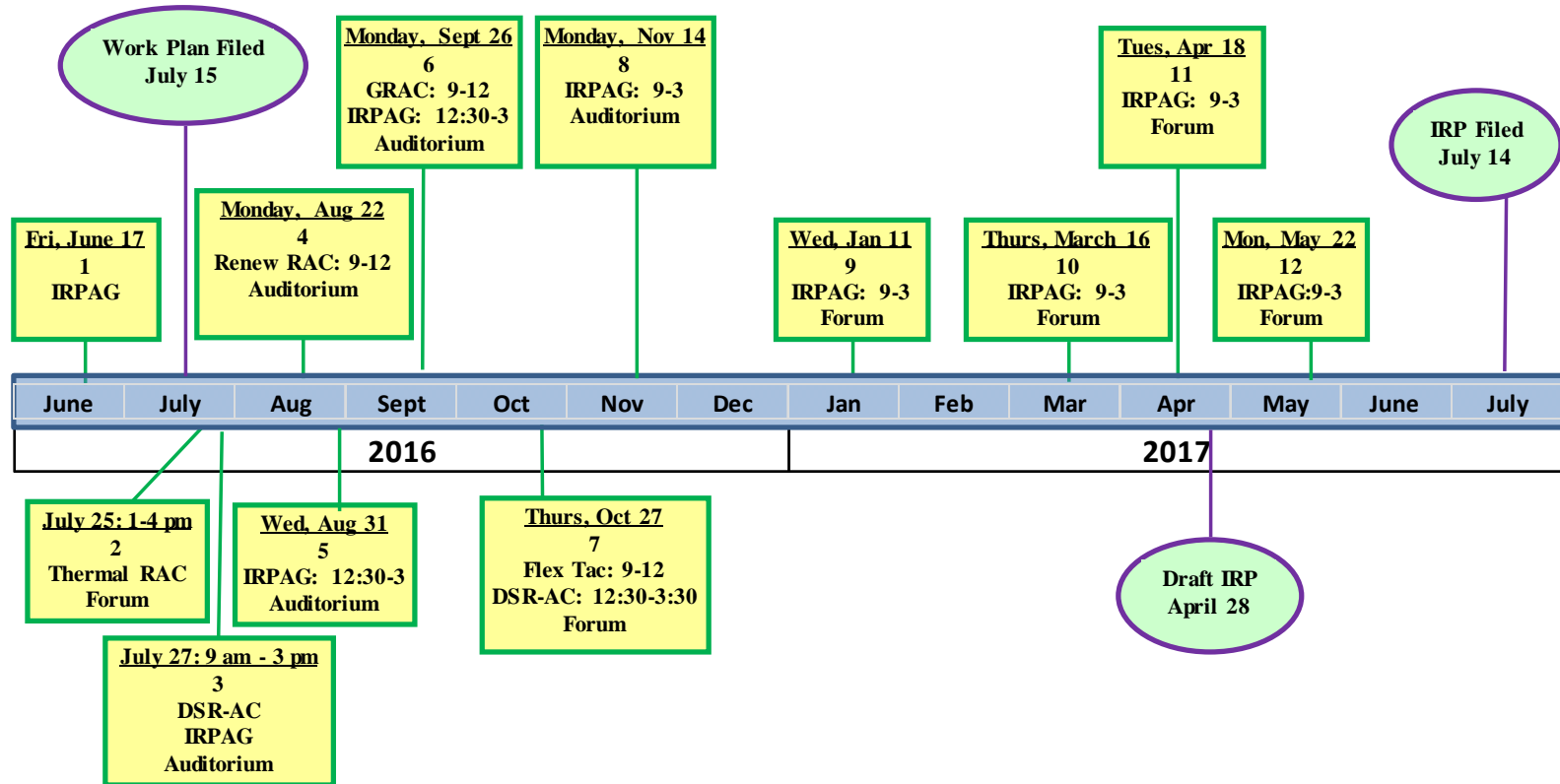
- A. Public Participation
- B. Legal Requirements & Other Reports
- C. Environmental and Related Regulatory Matters
- D. Electric Resource Alternatives
- E. Demand Forecasting Models
- F. Regional Resource Adequacy Studies
- G. Wholesale Market Risk
- H. Operational Flexibility
- I. Regional Transmission Resource
- J. Demand-Side Resources
- K. Colstrip
- L. Electric Energy Storage
- M. Distributed Solar
- N. Electric Analysis

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Appendix A Anticipated Timing of IRP Advisory Group and Technical Advisory Committee Meetings

Proposed 2017 IRP Meeting Schedule--July 11, 2016



Summary Agenda for IRP Meetings

1: Friday, June 17, 2016—IRP Advisory Group

- Review WUTC Letter on 2015 IRP
- Process and Ground Rules for 2017 IRP Public Participation Process

DSR-AC: Electronic distribution of measures list. This will be in preparation for the meeting on July 27.

2: Monday, July 25, 2016—Thermal Generation RAC

- PSE has worked with Black and Veech on thermal plant acquisition and development work for some time. They have been the primary source of plant cost assumptions for IRPs in the past.
- They, along with others, will be available to discuss updates to their detailed cost assumptions.
- The focus is on details needed for portfolio modeling, not levelized cost screening.

3: Wednesday, July 27, 2016—DSR-AC and IRP Advisory Group

- DSR-AC: 9 am to noon. Navigant is replacing Cadmus in consulting on conservation resource potential assessments. Representatives will be here to walk through the details of how they will be approach that work.
- IRPAG: 12:30 to 3:30 pm. Focus on discussing scenarios and sensitivities for both electric and gas. While there may be overlap in some areas, we will discuss scenarios that will be different.

4: Monday, August 22, 2016—Renewable RAC

- Renewable Resources: 9 am – 12:30 pm. PSE has worked with RES on renewable resource acquisition and development for some time. RES has been the primary source of plant cost assumptions for IRPs in the past and will be available to discuss updated assumptions.
- Energy Storage: 1 pm to 3 pm. Focus on energy storage with several developers joining us in person or via web. Will include RES energy Storage and a few others.

5: Wednesday, August 31, 2016—IRP Advisory Group

- Continue discussion of Scenarios and Sensitivities.
- Focus on how PSE will approach each of the issues identified.

6: Monday, September 26, 2016—GRAC and IRP Advisory Group

- *Gas Resource Advisory Committee*: 9 am to 11 am. Discuss details of supply-side natural gas resources for modeling, including timing, costs, and what expansions would be contingent on different market participants.
- *IRPAG*: review results of scenarios to date and review final electric resource cost assumptions.

7: Thursday, October 27, 2016—Flex TAC and DSR-AC

- *Flex TAC*: 9 am to noon. Present results of modeling and framework to date.
- *DSR TAC*: 12:30 to 3:30. Results of conservation resource potential with Navigant.

8: Monday, November 14, 2016—IRP Advisory Group

- Update on analysis to date.

9: Wednesday, January 11, 2017—IRP Advisory Group

- Review draft results of base-case electric portfolio analysis, including flexibility values, if available.
- Review draft base case gas portfolio analysis.
- Review draft results of scenarios, as available.

10: Thursday, March 16, 2017—IRP Advisory Group

- Review draft result of electric resource plan scenarios and sensitivities.
- Review draft results of gas resource plan scenarios and sensitivities.

11: Tuesday, April 18, 2017—IRP Advisory Group

- Review final draft electric resource plans and results of portfolio analysis including flexibility.
- Review draft results of scenarios and sensitivities that will be presented in draft IRP.
- Review final draft gas resource plans.

12: Monday, May 22, 2017—IRP Advisory Group

- Feedback on draft IRP.

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Appendix B Initial Meeting Ground Rules

Meeting / Process Ground Rules

This list of ground rules was initially discussed at the IRP Advisory Group meeting on June 17, 2016. The first draft of ground rules was revised, based on dialogue during that meeting. These represent the initial ground rules and may be revised as needed to enhance the overall efficiency of the process:

- Revise these ground rules as needed to ensure they support the IRP process.
- Start and end on time.
- Those participating by phone will sign in with their full names.
- All are to avoid acronyms or explain them when they use them.
- Be fully present.
- Stick to the agenda and purpose of each meeting. All discussions must be IRP focused.
- Use Parking Lot to track issues off-topic issues to address at a later time.
- Respect the direction of the facilitator in asking questions, responding to questions, and instructions to move on.
- Allow for open, inclusive, and balanced participation and information sharing.
- Ask questions and listen to increase understanding.
- No side bars or interruptions.
- Cell phones on “stun.”
- Have fun.
- Take a break approximately half way through the meeting (~5 minutes).
- Facilitator to provide high-level “draft” meeting notes (capture general discussion and use attribution only by exception or if requested).
- Draft meeting notes will be sent to attendees for comment before being posted (with edits) as final for public review.
- Be clear about next steps (who is doing what by when).
 - List Action Items at the top of the first page of the meeting notes.
- PSE will email slides of presentations two days in advance. Note any last minute edits or additions on the day of the meeting.
- PSE will respond to written *questions* within two days. This may include a direct response, an estimate of when a direct response will be provided, or an explanation of why such response will not be forthcoming.
- Questions submitted need to be specifically related to the Integrated Resource Plan analytical process, assumptions, or

conclusions, not broad policy questions or issues that require legal counsel. This is intended to help provide clarity, not to create a new discovery process for a regulatory filing that is still in development.

- PSE will “make full use of existing provisions to manage confidential information” but that process is limited by the Commission’s statutory authority to protect information outside of a contested case. There is actually very little information that must be treated as confidential. If access to confidential information is necessary by some stakeholders, PSE will work with those parties to try and overcome the specific barriers, to the extent feasible.
- PSE will develop reasonable inputs and results.
- PSE will ensure they use sufficient font size on PowerPoint presentations that they are easily legible on handouts and when viewed from the back of the room.
- Supplement IPR Planning Process with Technical Advisory Committee (TAC) Meetings to delve into complexities of analyses:
 - The aim of TACs is to get through detailed technical information with key stakeholders in an effective and efficient manner.
 - TAC Meetings are open to all as long as detail technical review can be effectively accomplished.
 - PSE to share highlights / notes from TAC meetings at IRPAG meetings.

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Appendix C Advisory Groups and Committees

Technical Advisory Committees

The following is the initial list of Technical Advisory Committees that correspond to the meeting schedule, included in Appendix A. Additional Technical Advisory Committees may be added during the process, as needed.

Demand Side Resource-Advisory Committee “DSR-AC”

Review and discuss the detailed methodology for developing demand-side resource alternatives, along with the cost and performance assumptions of these resources. This TAC will review gas and electric codes and standard changes, energy efficiency electric demand response and other related items.

Thermal Resource Technical Advisory Committee “Thermal TAC”

Review and discuss the detailed assumptions for thermal generation plants used in the electric IRP. This TAC will focus will be on details needed to properly model thermal generation for estimating revenue requirements including fixed and variable costs and operating parameters. This TAC will not a focus on levelized costs.

Renewable Resource Technical Advisory Committee “Renew TAC”

Review and discuss detailed assumptions for renewable generation plants and energy storage used in the electric IRP. Focus will be on details needed to properly model renewable resources and storage for estimating revenue requirements, including fixed and variable costs and operating parameters. This TAC will not a focus on levelized costs.

Gas Resources Technical Advisory Committee “GRAC”

Review and discuss detailed assumptions for natural gas supply-side alternatives. This will include storage alternatives and pipeline alternatives. Focus will be on the timing, cost, and exogenous factors influencing both timing and cost of alternatives.

Electric Flexibility Technical Advisory Committee “Flex TAC”

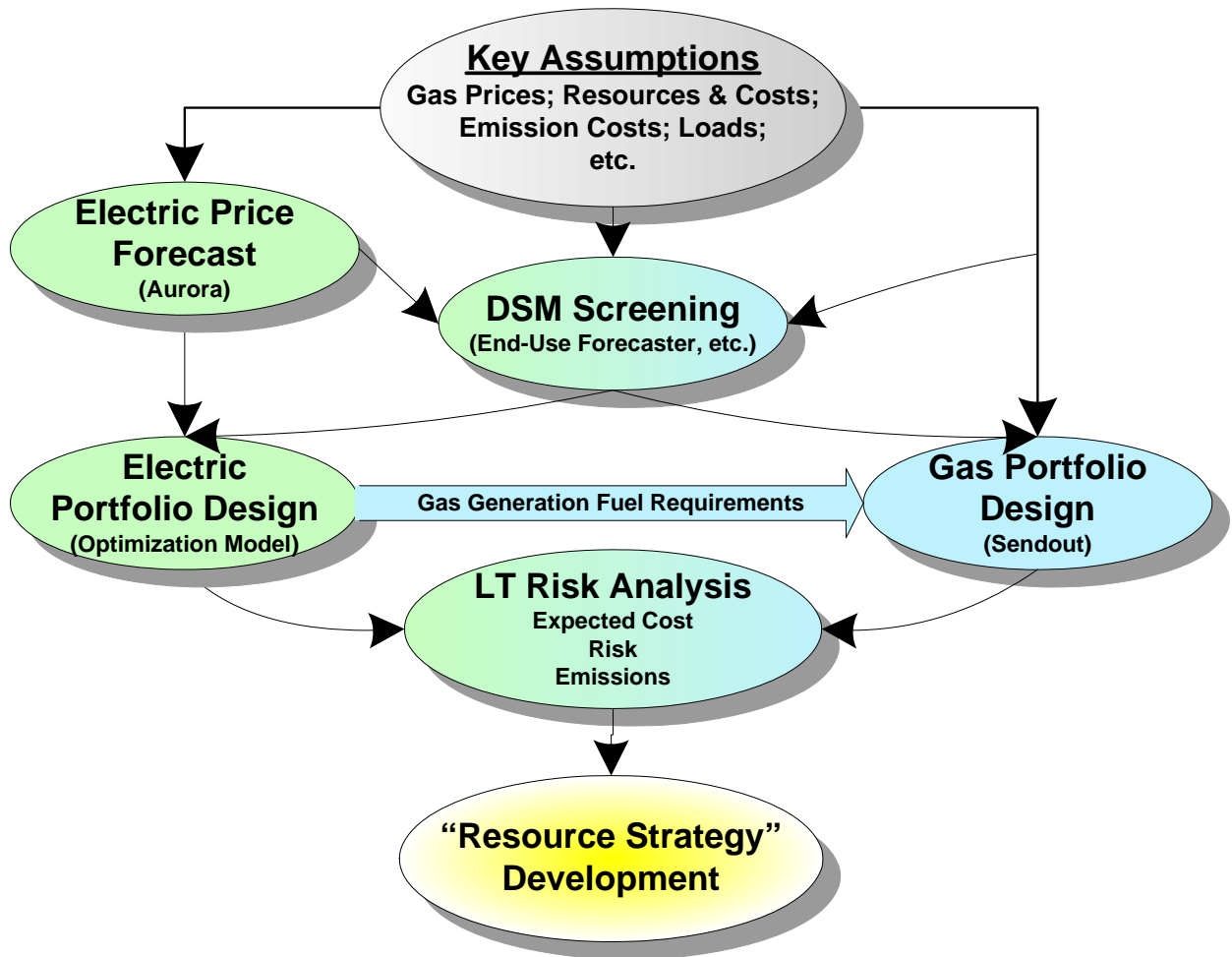
Review and discuss methodologies and frameworks for integrating sub-hourly flexibility modeling into long-term decision making. This will include a discussion of the models used to examine sub-hourly changes in economic dispatch of electric generation and how to incorporate that information into PSE’s planning models.

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Appendix D Resource Planning Process

Resource Planning Portfolio Analysis Process



Work Groups Contributing to the Integrated Resource Plan

Work Group	Information Provided
Resource Planning & Analysis	Resource needs and portfolio analysis to assess costs, cost risks, and least-cost combinations of resources.
Load Forecasting	Long-term customer, energy, and peak load forecasts for electric and gas retail customers.
Energy Efficiency	Review and feedback on electric and gas conservation supply curves, including costs, feasibility, and timing and review and feedback on results.
Resource Acquisitions and Emerging Resources	Costs, operational characteristics, and commercial availability of supply-side electric resources and review of inputs, outputs, and conclusions.
Customer Renewable Energy Programs	Cost forecasts for customer-owned generation, market penetration forecasts, and green power program information.
Natural Gas Resources	Costs, operational characteristics, and commercial availability of supply-side gas resources.
System Planning	Specific information on electric transmission and gas and electric distribution planning issues.
Energy Delivery	BPA transmission contract information and intra-hour resource flexibility analysis.
Transmission Contracts	PSE transmission capacities and constraints and regional transmission issues.
Power and Gas Supply Operations	Input on market issues and review of assumptions and results.
Thermal Resources	Operational and performance information on PSE's existing thermal generation.
Hydro and Wind Resources	Operational and performance information on PSE's existing hydro and wind generation.
Government Affairs	State and federal energy policy activity at legislative and executive branches.
Energy Resource Compliance	Emission information, emission accounting, and emission related policy trends.
State Regulatory Affairs	Regulatory compliance guidance.
Government Affairs	State and federal energy policy activity at legislative and executive branches.