

2019 Integrated Resource Plan Work Plan

**Washington Utilities and
Transportation Commission**
March 28, 2018

INTRODUCTION

In compliance with the Washington Utilities and Transportation Commission's Integrated Resource Planning (IRP) rules (WAC 480-100-238), PacifiCorp submits this work plan for its 2019 integrated resource plan (2019 IRP). As required in the rule, PacifiCorp outlines the content of its 2019 IRP, the general method for assessing potential resources, and the anticipated timing and extent of public participation.

This work plan is based on the best information available to PacifiCorp at this time, and may change for reasons including:

- During the 2019 IRP public process, PacifiCorp will consider stakeholder input and may implement methodology changes, as appropriate, to support the 2019 IRP.
- Market or regulatory developments may prompt the need for additional system modeling or impact assessment.
- The Washington Utilities and Transportation Commission's current IRP rulemaking proceeding.
- The Washington Utilities and Transportation Commission's consideration of acknowledgment of the 2017 IRP.

CONTENTS OF THE 2017 INTEGRATED RESOURCE PLAN

The contents of the 2019 IRP are expected to be similar to the 2017 IRP, which included two volumes: a main document and supporting appendices. The main document, or Volume I, is expected to contain the following chapters:

- Executive Summary
- Introduction: This chapter summarizes any notable planning process improvements and modeling advancements implemented in the planning cycle, summarizes significant events and accomplishments including an overview of the public process, and lists the report contents.
- The Planning Environment: This chapter profiles major external influences that impact the PacifiCorp's long-term planning (market conditions and developments, legislative and regulatory events, etc.) and summarizes activities supporting resource procurement.
- Transmission Planning: This chapter describes PacifiCorp's long-term transmission planning initiatives, focusing on activities associated with the Energy Gateway Transmission projects and other regional planning efforts.
- Load and Resource Balance: This chapter presents PacifiCorp's load and resource balance, which characterizes PacifiCorp's capacity and energy positions on a system and control area basis for the next 10 years if no incremental future resource actions were taken.
- Resource Options: This chapter provides background information on the resources considered in the IRP, detailing cost and performance attributes and current market outlook. Resources covered include utility-scale generation technologies, demand-side management (DSM), energy storage technologies, and firm market purchases by market hub.

- **Modeling and Portfolio Evaluation Approach:** This chapter describes the modeling methods and portfolio evaluation techniques used to determine the relative portfolio cost/risk performance attributes and the overall portfolio selection process.
- **Modeling and Portfolio Selection Results:** This chapter summarizes the portfolio development and production cost modeling results, and presents PacifiCorp's preferred resource portfolio.
- **Action Plan and Resource Procurement:** This chapter presents PacifiCorp's action plan and an acquisition path analysis that describes how resource acquisition strategies will be modified in response to changing conditions as informed by the modeling process. Other resource risk management issues are also discussed.

Volume II is expected to contain technical data and supplemental analysis covering: (1) model results; (2) how the 2019 IRP complies with multiple state IRP requirements; (3) load forecasts developed for each state; (4) the public input process; (5) capacity planning reserve margin analysis; (6) a flexible resources for needs assessment, including an assessment of integration costs; (7) plant water consumption data; (8) resource adequacy analysis; (9) analyses of potential DSM resources and distributed generation; and (10) other supplemental analysis and data used to support the 2019 IRP planning cycle.

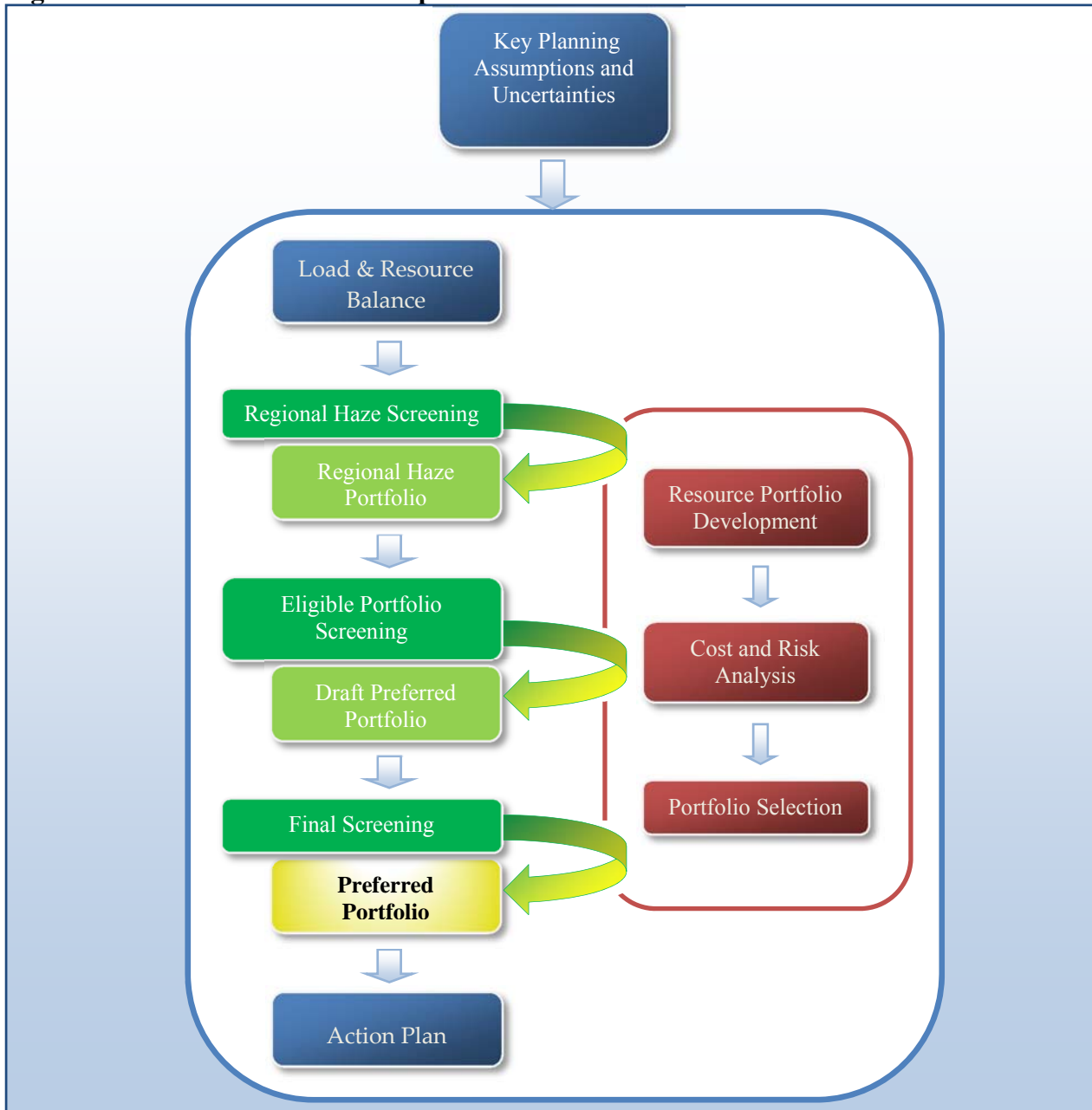
GENERAL METHOD FOR ASSESSING POTENTIAL RESOURCES

The main elements of the 2019 IRP work plan include the following:

1. Revisit strategic assumptions (resource adequacy, market depth, carbon dioxide regulatory scenarios and cost adders, etc.) and update model data appropriately.
2. Implement modeling and methodology enhancements to improve the IRP process and address new analytic requirements from the state commissions or in response to public stakeholder recommendations.
3. Use PacifiCorp's modeling systems to develop a diverse set of candidate portfolios that considers known and potential costs for environmental requirements and compliance alternatives, and perform risk analysis using a stochastic production cost model. PacifiCorp will use Present Value of Revenue Requirement (PVRR) as the main cost-effectiveness measure for comparing portfolios.
4. Apply an initial portfolio screening process that focuses on two key metrics—mean stochastic PVRR and upper-tail PVRR—followed by a final screening process based on measures such as risk-adjusted PVRR, carbon dioxide emissions, supply reliability, customer rate impact, and others.

Figure 1 summarizes the portfolio evaluation steps within the IRP process. The 2019 IRP will follow a similar approach with the potential for modifications. This plan is based on the use of two computer systems: System Optimizer (SO), a linear programming-based optimization program designed for automated development of portfolios, and the Planning and Risk (PaR) model, a production cost simulation tool integrated with the PROSYM chronological unit commitment/dispatch simulation engine and Monte Carlo modeling capabilities. Both modeling tools are proprietary software products from ABB.

Figure 1 – Portfolio Evaluation Steps within the IRP Process



Using existing resources and a representation of PacifiCorp’s transmission system as the starting point, the company will perform SO model runs with a set of new resource options (supply-side, demand-side, energy storage, and transmission). The resource selections may be based on specific planning strategies to be developed incorporating public input. The key input variables will include, but are not limited to, regional haze compliance, state policies, natural gas/electricity prices, and load forecasts. PacifiCorp will also develop additional CO₂ and renewable portfolio standard regulatory compliance scenarios. The purpose of the alternative future scenario analysis is to determine how portfolios and their associated resources perform under a variety of input assumptions, serving as an indicator of portfolio robustness.

Once portfolios are developed, the PaR model will be used to implement Monte Carlo sampling of load, electricity price, natural gas price, hydro availability, and thermal unit availability input variables. Portfolio costs are calculated as the mean PVRR of the Monte Carlo iterations. This mean cost, along with bad-outcome (or upper-tail) costs and supply reliability risk measures, constitute the main metrics for determining comparative portfolio risk performance profiles.

PacifiCorp will also evaluate the preferred portfolio and associated resource acquisition strategies in the context of potential changes to planning assumptions and procurement risks, referred to as acquisition path analysis.

PLANNED MODELING ENHANCEMENTS AND ANALYSIS PROJECTS

PacifiCorp's 2019 IRP work plan accounts for the following key modeling and analysis projects that are planned or underway:

- Update the DSM resource supply curves based on a new conservation potential assessment to be completed in 2018.
- Update the private generation study. This will incorporate costs and penetration levels for distributed resources, along with sensitivities.
- Update the storage study examining commercially viable storage technologies.
- Provide an updated flexible resource need assessment, including estimates of integration costs.
- Complete an updated loss of load probability study and planning reserve margin analysis.
- Complete an updated wind and solar capacity contribution study using loss of load probability principals.
- Evaluate the portfolio marginal stochastic costs of alternative planning reserve margin levels.
- Complete analysis of compliance alternatives for near-term significant emission control installation decisions applicable to certain coal generating facilities.

ANTICIPATED TIMING AND PUBLIC PARTICIPATION

The estimated timeline for the 2019 IRP public meetings is shown in Table 1. The 2019 IRP meeting schedule consists of a combination of general public meetings and may include status report conference calls, if needed. PacifiCorp is also planning to set up state-specific stakeholder meetings during late June and into July 2018 to discuss topics of regional interest—a practice used since the 2008 IRP. The first general public meeting will be scheduled no later than July 2018 and will kick-off the 2019 IRP process. The kick-off meeting will cover the 2019 IRP schedule, public process, modeling and analysis objectives, lessons learned from the 2017 IRP process, and highlights of the 2017 IRP Update. An email announcement for the kick-off meeting will be sent to IRP stakeholders once meeting dates and locations are identified.

Table 1 also shows the high-level 2019 IRP development schedule. Filing the 2019 IRP is scheduled for April 1, 2019 (note, March 31, 2019 falls on a Sunday in 2019). PacifiCorp will provide draft 2019 IRP analysis throughout the public process for stakeholder input.

Table 1 – 2019 IRP Public Meeting and Development Schedule

Milestone	Date
PacifiCorp preparation (assumptions, model maintenance, supporting studies)	April 2018 – September 2018
IRP Stakeholder Meetings (including state meetings in late June – July 2016)	June 2018 – February 2019
Portfolio Development	October 2018 - December 2018
Portfolio Risk Analysis	October 2018 – December 2018
Sensitivity Analysis	November 2018 – February 2019
Preferred Portfolio Selection	March 2019
Commission Filing	April 1, 2019

CONCLUSION

PacifiCorp’s 2019 IRP work plan represents its current view of the processes and activities needed to file its IRP by April 1, 2019, that meets state IRP standards and guidelines and aligns with PacifiCorp’s 2019 business plan and procurement activities. As discussed above, this work plan is based on the best information available to PacifiCorp at this time, and subject to change for reasons identified in the Introduction section above.

PacifiCorp encourages Washington stakeholders to attend public meetings and actively be involved in this planning process. To join the 2019 IRP participants’ list, please send an email request to IRP@PacifiCorp.com or call the PacifiCorp IRP phone line at (503) 813-5245.