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

February 4, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Jennifer Light, Director of Power Planning**

SUBJECT: **Ninth Power Plan Kickoff Discussion**

BACKGROUND:

Presenter: Jennifer Light

Summary: The power division is transitioning from power plan preparation to its official power plan review. This transition marks a point at which staff will start asking Council members to provide feedback and direction in support of locking down scope, data and assumptions to support the modeling effort. At this meeting, staff will walk through the overall power plan development process, with a focus on the near-term scoping steps required to guide future analysis and modeling. Key elements that staff is seeking to "lock in" as part of this discussion include the global assumptions, environmental methodology, and scope of the resource and transmission risk scenario. Please come prepared with questions and comments.

Relevance: Over the past year, the power division has been preparing for the Council's next power plan by soliciting regional perspective on scope, preparing modeling tools for analysis, gathering and preparing assumptions for new resources and loads. With the Council's call for recommendations to the Fish and Wildlife Program, the power plan is entering a more formal phase of development during which the division will finalize scope and early input assumptions and begin power system modeling.

Workplan: B. Development of Ninth Power Plan

More info: Staff have presented several of these elements to the Council over the past year to get early input and guide scoping. These are available for reference:

- Issue Paper to the region on the Ninth Plan (Released March 2024)
- Presentation on comments on the Issue Paper (June 2024)
- Presentation on Global Assumptions (September 2024)
- Presentation on Environmental Methodology (September 2024)
- Presentation on approach to climate change data in plan (October 2024)

Ninth Power Plan Kick Off

Jennifer Light

February 11, 2025

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

Presentation Overview

- Kicking Off the Review of the Council's Power Plan
- Power Plan Development Process
- Key Topics to be Explored in the Ninth Power Plan
- Crosscutting Modeling Assumptions
- Proposed Approach to New Resource and Transmission Risk Scenario
- Next Steps

Kicking Off the Review of the Council's Power Plan

Power Plan Review

- Power Act tells the Council to “review” the power plan at least every five years, and to request recommendations to amend the Fish and Wildlife Program before undertaking the power plan review
- With the Council’s decision last month to issue the request for program amendment recommendations, this is an appropriate time to now also start the formal review of the plan
- Council will need to sync the amendment of the Fish and Wildlife Program with the power plan
  - To complete the Fish and Wildlife Program, the Council will need to understand the program’s implications for power supply before being able to complete all the resource analysis and develop a strategy
  - Regardless, it is appropriate to being the formal review at this time

The 9th Northwest Power Plan

Power Plan Review (cont.)

- The formal power plan review effort builds off the work over the past year to develop a proposed scope, refine and test our modeling framework, preparing data and analysis for loads and resource assumptions, etc.
- At this point, we will need to “lock in” assumptions for several pieces of analysis to inform modeling and meet timelines

The 9th Northwest Power Plan

The Road We've Traveled

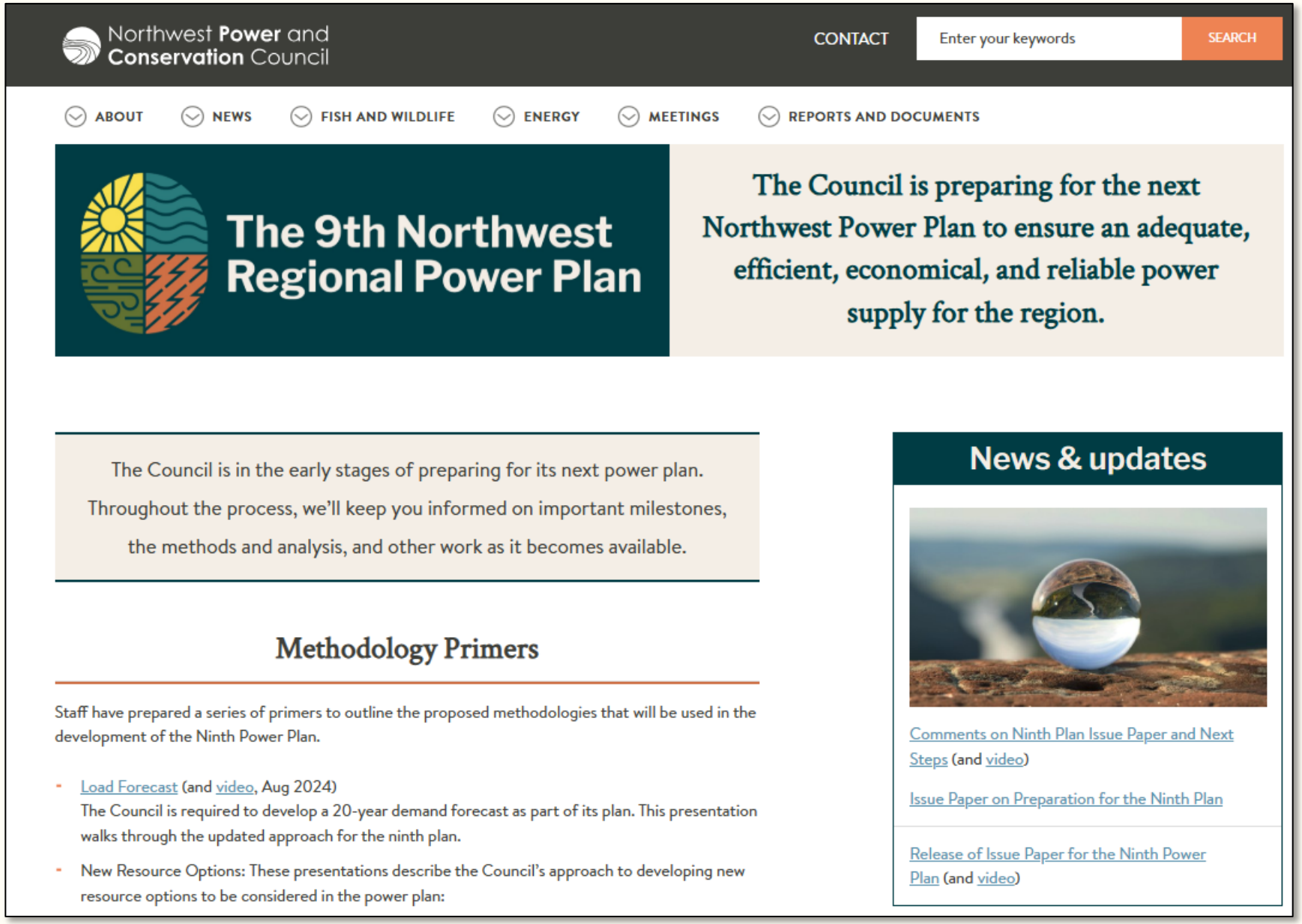
Meeting	Topic
February 2024	First discussion with Power Committee on plan
March 2024	Release of Issue Paper on Ninth Plan for public comment
June 2024	Summary of comments on Issue Paper
July 2024	Primer: Conservation methodology
August 2024	Primer: Distributed solar methodology Primer: Generating resources methodology Primer: New load forecast model and approach
September 2024	Primer: Demand response methodology Primer and **Proposal: Environmental methodology** Primer and **Proposal: Global assumptions** **Proposal: Discount rate assumption**

The Road We've Traveled

Meeting	Topic
October 2024	Primer: Representing markets in modeling Primer: Climate change data in plan
November 2024	**Proposal: T&D deferral assumptions**
December 2024	**Proposal: Cost treatment of resources** - Included a refresher of proposed environmental methodology
January 2024	Briefing on Northwest Power Act framework for plan **Proposal: Existing policies for starting point** Primer: Extreme weather captured in existing data Primer: Operational risk of wildfires approach ~~Primer: Hydrogen approach~~

What Does this Mean?

- Not seeking final decisions from the Council:
  - Nothing is “final” until the Council adopts a final power plan
  - No formal Council “decisions” are needed until release of the draft power plan for public comment and adoption of the final power plan
- We do need guidance and informal approval to allow staff to lock-in assumptions for modeling
  - Using a range of futures and scenario analysis will allow us to consider the variability and uncertainty of many assumptions
- If something big changes that is not captured, the Council can choose to make that update
  - This may require cutting other elements of analysis to stay on timeline or, alternatively, shifting back timelines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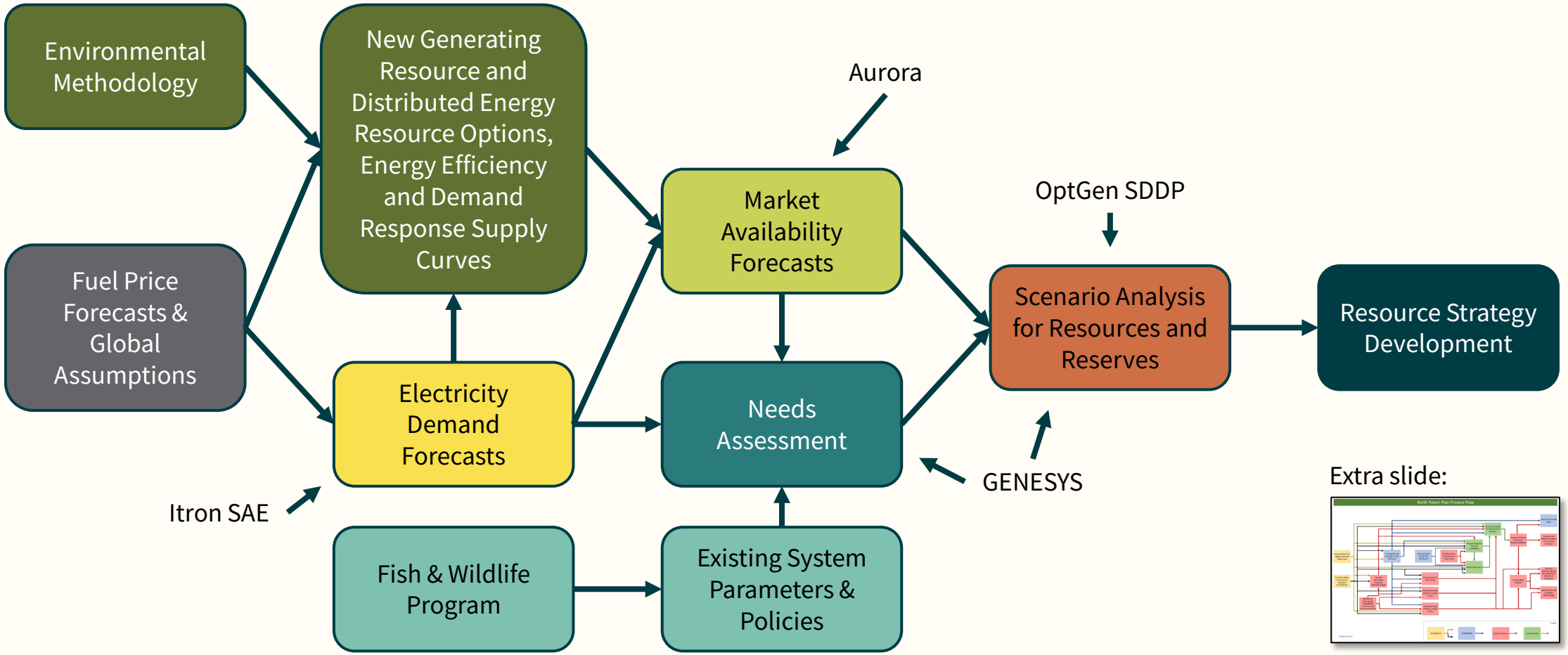
The 9th Northwest Regional Power Plan
The Council is preparing for the next Northwest Power Plan to ensure an adequate, efficient, economical, and reliable power supply for the region.
The Council is in the early stages of preparing for its next power plan. Throughout the process, we'll keep you informed on important milestones, the methods and analysis, and other work as it becomes available.
Methodology Primers
Staff have prepared a series of primers to outline the proposed methodologies that will be used in the development of the Ninth Power Plan.
Load Forecast (and video, Aug 2024)
The Council is required to develop a 20-year demand forecast as part of its plan. This presentation walks through the updated approach for the ninth plan.
New Resource Options: These presentations describe the Council's approach to developing new resource options to be considered in the power plan:
News & updates
Comments on Ninth Plan Issue Paper and Next Steps (and video)
Issue Paper on Preparation for the Ninth Plan
Release of Issue Paper for the Ninth Power Plan (and video)

Power Plan Development Process

Power Plan Elements and Analytical Flow



Ways of Accounting for Uncertainty

Range of Forecasts

Modeling with a range of futures to account for uncertainty, with the full range informing each run

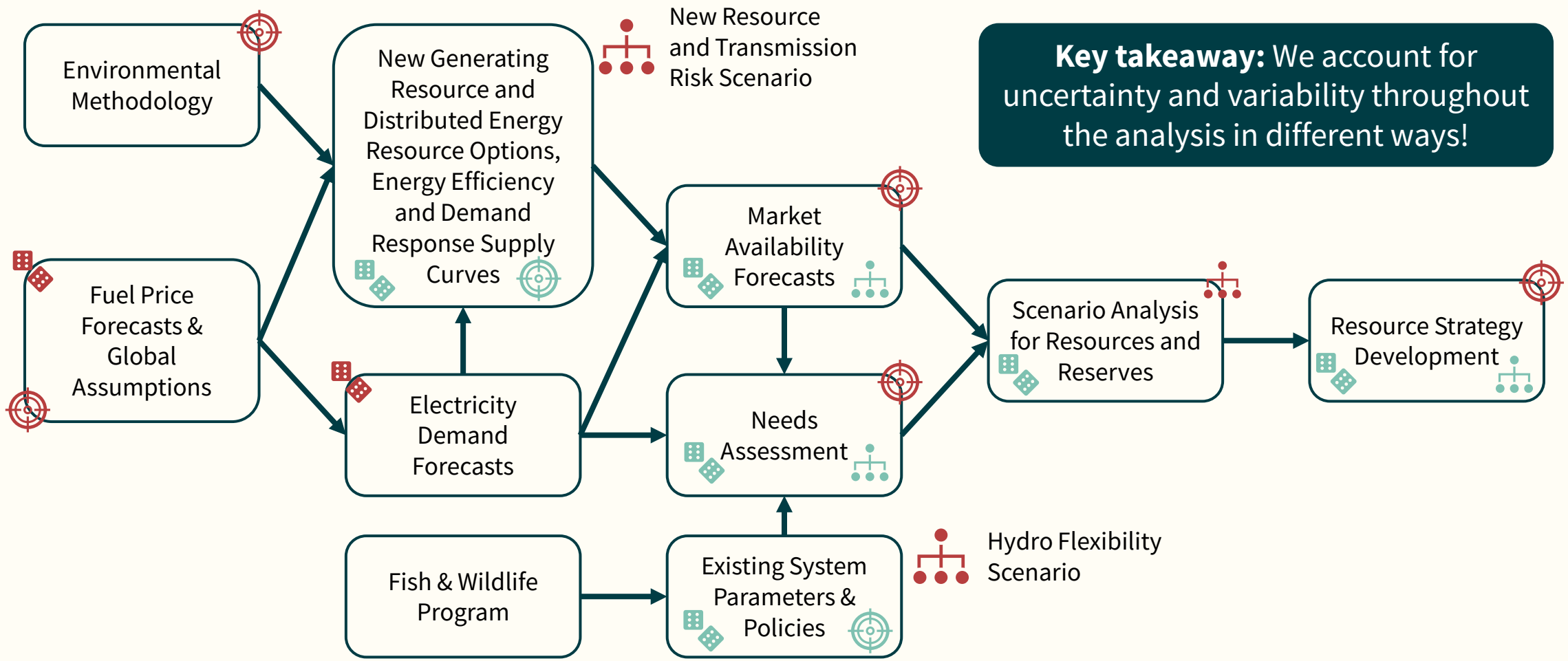
Scenarios

Conducting scenario analysis to explore impacts of changing key assumptions

Best Estimates

Using single estimates for other assumptions not likely to drive significant changes

Quick Accounting of Uncertainty in Analysis



Power Plan Timeline

Jan-Mar 2025
- Global assumptions
- Scope of new resource and transmission risk scenario
- Natural gas and other fuels price forecast
- Generating resource reference plants

Apr – Jun 2025
- Demand forecast and trajectories
- Demand side resource supply curves (energy efficiency, demand response, other distributed energy resources)

Jul – Sep 2025
- Market assessments
- Needs assessment
- Scope of hydro flexibility scenario

Oct – Dec 2025
- Scenario modeling
- Other analysis needed to inform potential plan recommendations

Jan-Mar 2026
- Continue scenario modeling

Apr – Jun 2026
- Developing draft power plan

Jul – Sep 2026
- Release of draft power plan and initiating public comment process

Oct – Dec 2026
- Developing and releasing final power plan

Key Topics to be Explored in the Ninth Power Plan

Reminder of Themes Identified in Issue Paper

Uncertainty around resource and transmission	Priority scenario identified by staff in the Issue Paper; commenters also emphasized the importance of this scenario
Uncertainty around future hydro operations	Priority to analyze hydro system flexibility and its implications based on 2021 Plan; commenters raised a range of perspectives and suggested additional considerations around operations for fish or because of the Columbia River Treaty developments
Uncertainty around future load growth	Identified in the issue paper primarily with a focus on west-wide decarbonization loads; commenters provided some insights on approach and also identified risk of data center loads
Exploring Impacts of Extreme Weather	Identified in the Issue Paper as a key area of risk to explore; commenters agreed and provided suggestions on the approach
Exploring Operational Flexibility of Non-Hydro Resources	Identified as a potential scenario based on 2021 Plan findings; some commenters provided support while another cautioned that the economic realities do not support this

Proposed Plan Scenarios and Analysis

Priority Scenarios

New Resource and Transmission Risk Scenario

Broad scenario to explore uncertainty around resource availability, resource costs, and transmission availability

Hydro Operations Flexibility Scenario

Exploring the implication for resource needs with varying hydro operations impacting the flexibility of the hydro system

Other Analytical Interests

Extreme Weather Analysis

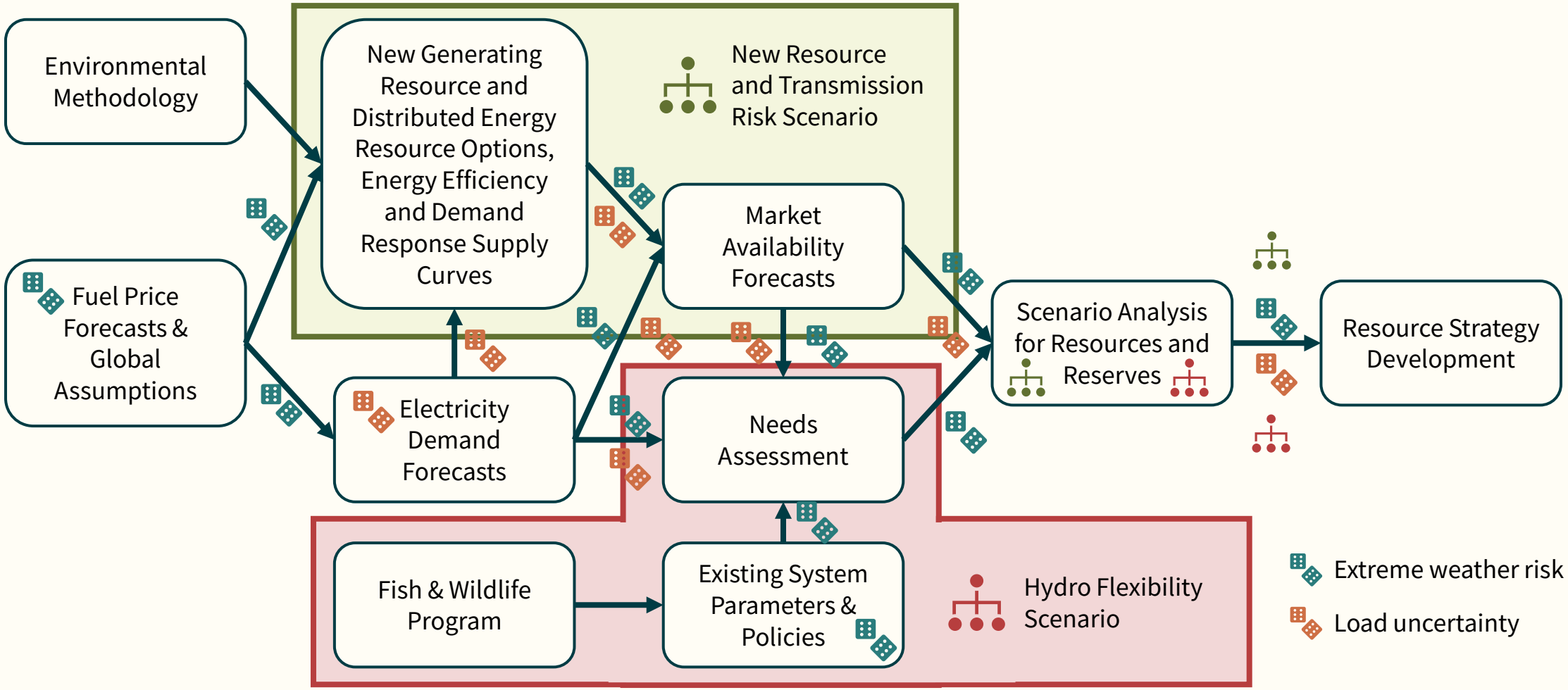
Include extreme weather futures across all scenarios and using the results for focused exploration of this risk area

Load Growth Uncertainty Analysis

Include high load futures across all scenarios to inform risks of this uncertainty (including data centers, decarbonization loads, etc.)

Note: After more staff discussion, our proposal is to ensure appropriate model tuning to reflect other elements of operational flexibility

How These Questions Flow in Our Analysis



Cross Cutting Modeling Considerations

Cross Cutting Modeling Assumptions

- Common set of assumptions used across the scenario modeling to ensure consistency in approach and provide the best representation of the known elements of the existing system

Global assumptions	Consistent treatment of costs	Environmental methodology	Existing system resources and transmission	Existing policies and goals

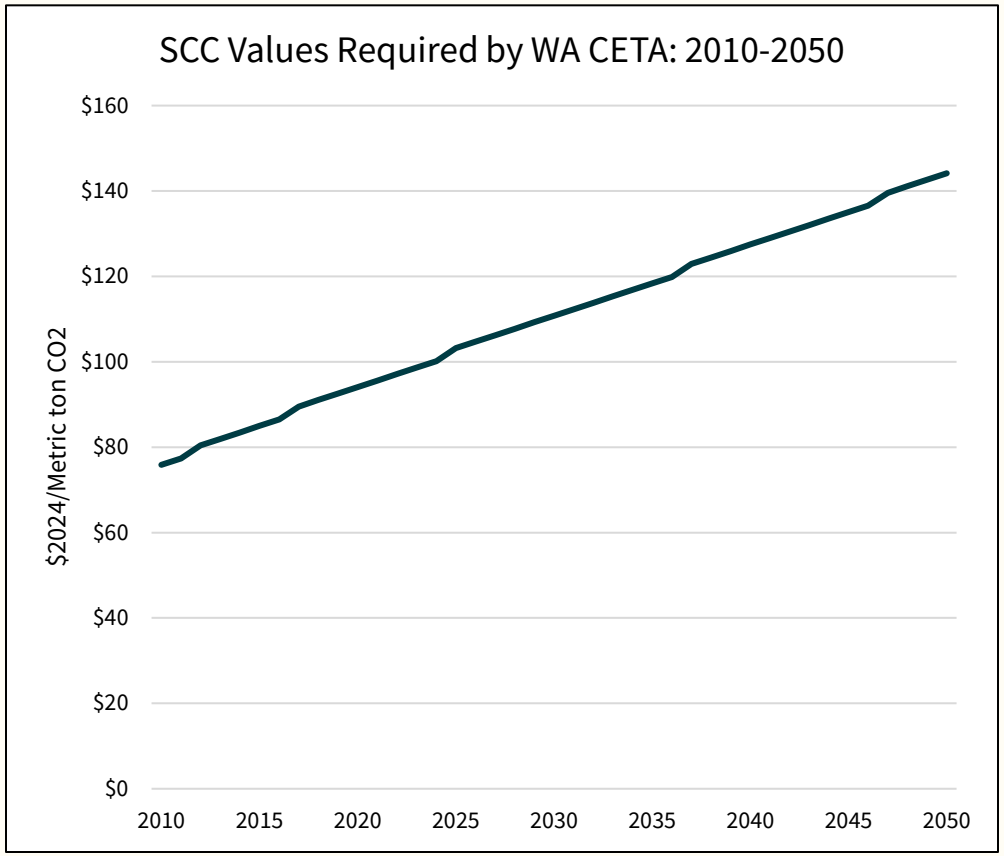
- Variability, uncertainty, and risk are explored through providing a range of futures to the models and conducting scenario modeling
- Seeking a head nod from the Council on these elements today

Reminder: Global Assumptions

Forecast period	Real base year and inflation source	Climate change data and weather locations	Transmission and distribution deferral assumptions
September 2024 Council Meeting	September 2024 Council Meeting	October 2024 Council Meeting	October 2024 Council Meeting
Resource profiles	System peak definition and line loss approach	Discount Rate	Social cost of carbon
January 2025 Council Meeting	November 2024 CRAC Meeting	September 2024 Council Meeting	Today

Social Cost of Carbon

- Council used the social cost of carbon (SCC) in the 2021 Power Plan to inform resources decisions
  - Part of due consideration for environmental quality
  - Used SCC consistent with WA Clean Energy Transformation Act requirements
- Staff propose to continue this treatment in the ninth plan by applying the SCC of carbon to regional emissions
  - Alternative approach would be to only apply the SCC to those loads required to use it by existing policies



Reminder:
Consistent Treatment of Costs for Resources

- Guided by the Power Act, staff strive to ensure that there is consistent treatment of costs across all new resource options
- System cost is "… an estimate of all **direct costs of a measure or resource over its effective life**, including, if applicable, the cost of **distribution and transmission** to the consumer and, among other factors, **waste disposal costs, end-of-cycle costs, and fuel costs** (including projected increases), and such **quantifiable environmental costs and benefits** as the Administrator determines, on the basis of a methodology developed by the Council as part of the plan, or in the absence of the plan by the Administrator, are directly attributable to such measure or resource."
  [Section 3(4)(B)]

Reminder: Methodology to Quantify Environmental Costs and Benefits of New Resources

Cost of compliance with existing regulations	Council planning assumes all resources will meet existing regulations, and therefore, we use the cost of compliance (when quantifiable) as the primary way of accounting for environmental costs.
Environmental effects beyond regulatory controls, if case-by-case to quantify	This category includes both residual effects beyond regulations and unregulated effects. Typically, these are not quantified. Quantification is challenging and data are rarely available. There is also risk of skewing the analysis towards effects quantified, rather than considering all.
Cost of compliance with proposed environmental regulations	Council has dealt with this on a case-by-case basis depending on the environmental effect and the data. We are not aware of any proposed regulations to potentially consider for this power plan.
Quantifiable environmental benefits	Several difficulties in quantifying environmental benefits related to available data, double counting, skewing towards some effects for which costs are available and not others, etc. Therefore, these are typically dealt with qualitatively.

Reminder: Representation of the Existing System

Generating resources:

- Resources known to be in operation or under construction at the start of the plan period
- Owner-announced planned retirements or conversions of existing resources

Demand-side resources:

- Existing resources are captured in the frozen efficiency demand forecast

Transmission:

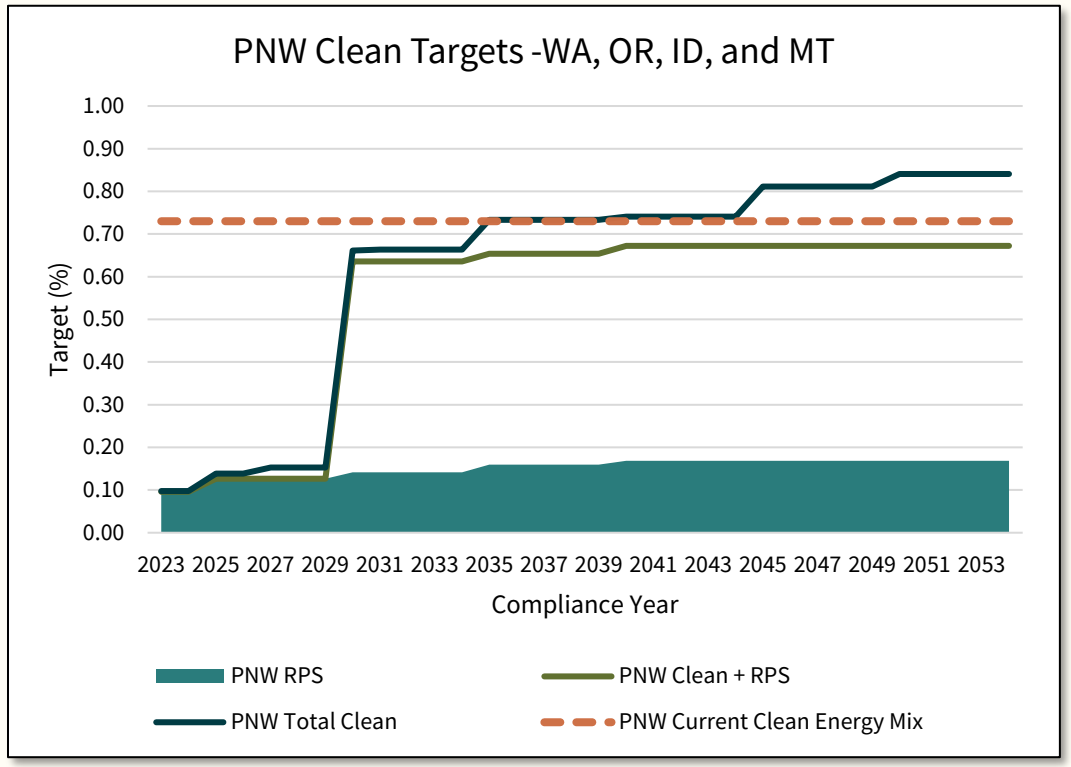
- Existing transmission
- Transmission that under construction or near-construction (e.g. B2H)

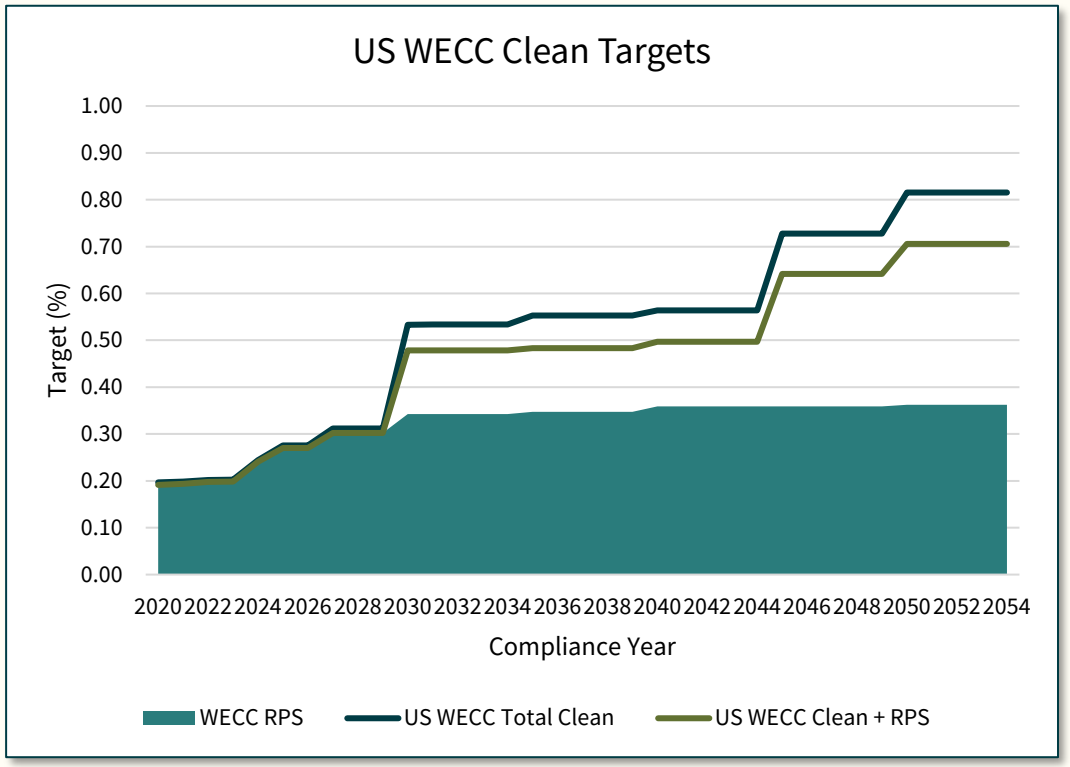
Hydro operations:

- Current operations including the most recent changes from the Columbia River Treaty Agreement in Principle and the operations in the Resilient Columbia Basin Agreement
- Any changes to operations identified in the Fish & Wildlife Program amendment process

Reminder:
Existing Policies and Goals

- Assume that all existing policies and goals are met





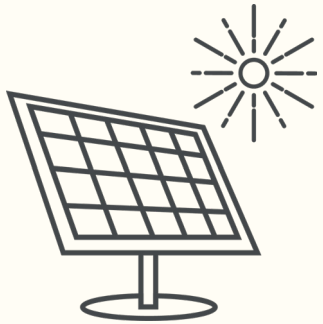
Proposed Approach to New Resource and Transmission Risk Scenario

New Resource and Transmission Risk Scenario

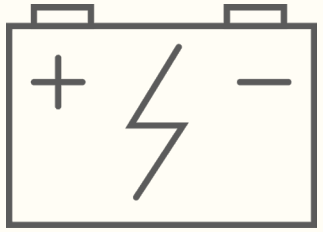
- Priority scenario in the power plan to explore how new resource selection changes as you alter the availability and cost of resources, as well as the transmission picture
- Staff has identified six sensitivities we recommend including in this scenario to represent a range of uncertainty and risk
  - Want enough sensitivities to cover the range of uncertainty
  - Want to avoid sensitivities that do not provide actionable information
- As a reminder, each sensitivity will be tested against the range of futures reflecting load uncertainty, gas prices, and hydro conditions

Resource Assumptions

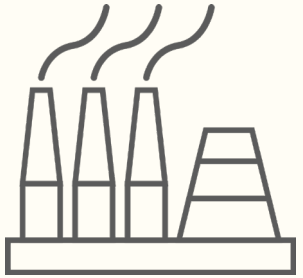
- Each sensitivity will include a mix of:
  - "Initial Assumptions" for each resource based on best available data and professional judgement (informed by our advisory committees)
  - Changing Assumptions around resource cost, availability, or both of specific resources that are the focus of that sensitivity
- Each sensitivity will have all the potential resource options available



Renewables

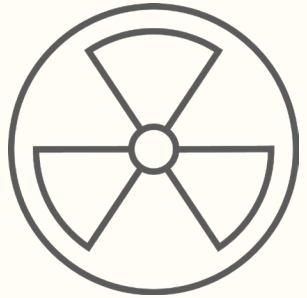


Storage



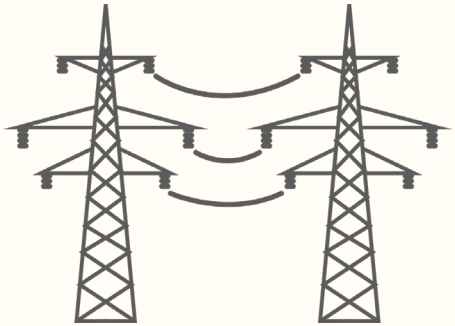
Natural Gas

Demand Side



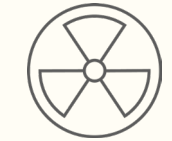
Emerging Tech

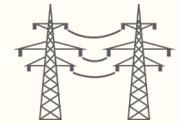
Transmission Assumptions



- Each sensitivity will also include a different suite of transmission assumptions, which we are categorizing as the following (for the purposes of this presentation):
  - "Existing Transmission"
  - "Transmission Plus" – additional transmission informed by priority projects from WestTEC
  - "Transmission Max" – even more transmission, informed by additional projects that might be further out in timeline or priority of the WestTEC or in other analyses
- Reminder: each sensitivity will be tested against the range of futures reflecting load uncertainty, gas prices, and hydro conditions

Constrained New Resource and Transmission Options





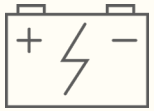
Explores the resource buildout when there is limited transmission and emerging technology availability

Resources:

- Assumption Changes
  - Emerging tech: Assumes availability is delayed by 10-years, with no changes to costs
- Initial Assumptions
  - Renewables, storage, natural gas, demand-side: No changes

Transmission: Existing

Evolving Federal Policy Landscape



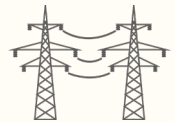
Explores the resource buildout under anticipated changes in Federal policies and potential ongoing supply change challenges. Changing federal policies are anticipated to increase costs of many resources and impact natural gas prices

Resources:

- Assumption Changes
  - Renewables, storage, emerging tech: Increase costs as a result of removing IRA incentives
  - Natural gas: Increase natural gas price forecast in the near-term to reflect the impact of tariffs
- Initial Assumptions
  - Demand-side: Minimal to no change (generally not impacted by incentives)

Transmission: Transmission Plus

Changing Transmission Availability



Explores how the resource buildout changes with different transmission system outlooks

Resources:

- Assumption Changes: n/a
- Initial Assumptions
  - Renewables, storage, natural gas, demand-side, emerging tech: No changes

Transmission: Multiple looks, and potentially a delay if needed

- Transmission Plus
- Transmission Max

Changing Emerging Tech Resource Assumptions

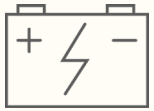
Explores how the buildout changes with different assumptions around the emerging tech resources

Resources:

- Assumptions Changes
  - Emerging Tech: Increase costs by some percent; decrease costs by some percent
- Initial Assumptions
  - Renewables, storage, natural gas, demand-side: No changes

Transmission: Transmission Plus

Limited Short-Duration Storage Availability



Explore how the resource buildout changes if short-duration storage (i.e. lithium-ion batteries) are limited in availability due to broad interest in this technology and/or challenges with materials

Resources:

- Assumption Changes
  - Storage: Limiting the near-term (5-year) availability of Li+ batteries
- Initial Assumptions
  - Renewables, other storage, natural gas, demand-side, emerging tech: No changes

Transmission: Transmission Plus

Slower Demand Side Availability

Explore how the buildout changes if there is limited availability in demand-side resources

Resources:

- Assumption Changes
  - Demand-side: Limit availability by using slower ramp rate assumptions
- Initial Assumptions
  - Renewables, storage, natural gas, emerging tech: No changes

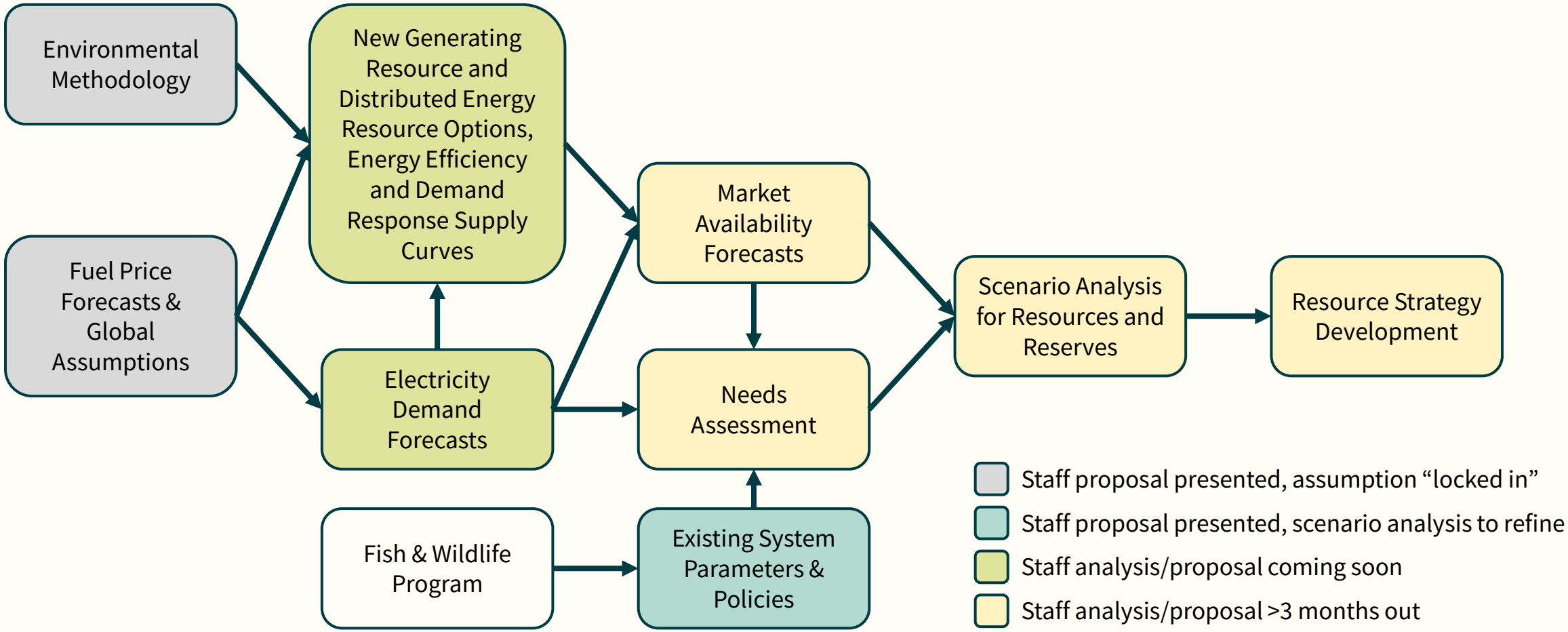
Transmission: Transmission Plus

Summary of Proposed Sensitivities

Constrained New Resource and Transmission Options	Exploring resource selection in a world with limited new transmission and significantly delayed/limited emerging tech resources
Evolving Federal Policy Landscape	Exploring implications of increase cost on supply side resources (changes to tax credits, tariffs) and some near-term delays in resource availability due to ongoing supply chain challenges
Changing Transmission Availability	Exploring changes in resource selection with more transmission availability (potentially two looks)
Changing Emerging Tech Resource Assumptions	Exploring changing to resource solutions with differing assumptions on emerging tech resource costs (increase and decrease) and delayed availability
Limited Short-Duration Storage Availability	Exploring resource selection in a world where short-duration storage is limited in the near-term
Slower Demand Side Resource Availability	Exploring resource selection if demand side resources have reduced availability

Next Steps

Where We Are in the Process



What's Coming Up?

Month	Council meeting agenda item
February (Portland, OR)	Power Plan Kickoff (2 hr) Proposed Natural Gas and Other Fuels Price Forecast (1 hr) Proposed Reference Plants for the Ninth Plan – Part 1 of 2 (1 hr)
March (Portland, OR)	Proposed Reference Plants for Ninth Plan – Part 2 of 2 (1.5 hr) Proposed Ninth Plan Demand Forecast – Part 1 of 2 (1 hr) Proposed Conservation Supply Curve – Part 1 of 3 (1 hr) Primers on Needs Assessment and WECC-Wide Buildout Study (1.5 hr)
April (Portland, OR)	Proposed Ninth Plan Demand Forecast – Part 2 of 2 (1-1.5 hr) Proposed Adequacy Metrics and Thresholds for Ninth Plan (45 min) Proposed Distributed Energy Resources (1 hr) Outside the Northwest Load and Resources Assumptions (1 hr) Primer on OptGen/SDDP Model (45 min)
May (Pasco, WA)	Proposed Conservation Supply Curve – Part 2 of 3 (1-1.5 hr) Proposed Demand Response Supply Curve (1 hr)
June (Missoula, MT)	Proposed Conservation Supply Curve – Part 3 of 3 (1 hr) West-Wide Market Build Out – Initial Results (1 hr)

Additional Questions?

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

More Detailed Analytical Flow