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January 30, 2024

### MEMORANDUM

**TO: Council Members**

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

**SUBJECT: Preparation for the Ninth Plan**

### **BACKGROUND:**

Presenter: Jennifer Light

Summary: The Power Division is starting to prepare its models and data sets for the Council's next power plan. Jennifer will provide a high-level overview of what goes into a power plan, characterize the starting point for the analytics, and outline initial thinking on potential risk areas to explore through scenario modeling. This will be an opportunity for the Committee to discuss and provide feedback on this initial look.

Workplan: B. Preparation of Tools and Data for the Ninth Power Plan

Background: Per the Northwest Power Act, the Council's power plan "shall be reviewed by the Council not less frequently than once every five years." The Council's current power plan, the 2021 Power Plan, was adopted in February 2022. Recognizing the rapidly changing power system landscape, the Power Division is already starting to look forward to the development of its next power plan. This includes developing models, data sets, and initial inputs throughout this year, in preparation for officially kicking of the power planning exercise in early 2025.

To guide model and input development, the Council needs to have at least some early thinking on the starting point for the analysis and specific risk areas that will be explored through scenario analysis. Staff will present its initial thinking on these elements and seek Power Committee insight on additional considerations. The feedback from this discussion will be incorporated into a Ninth Plan Issue Paper, which staff will present to the full Council at its next meeting in March and release for public comment. Staff believes this issue paper will be an effective way of soliciting early stakeholder input to help frame the development of the next plan.

# Preparation for the Ninth Plan

February 6, 2024

# Presentation Overview

- Purpose is to provide some initial grounding on what goes into a power plan and seek feedback from Power Committee on staff's early thinking about the ninth power plan
- Topics:
  - High-level overview of what goes into a power plan
  - Framing out a potential starting point to the next plan
  - Identifying likely questions to be explored in scenario analysis

# Important Process Note!

Today

Late 2026/Early 2027

F&W Program Preparation and Official Process


Ninth Plan Preparation

Ninth Plan Development


We'll come back to this in more detail in a bit. But I want to be clear up front that we are not yet kicking off the next power plan. We are in a preparation phase. The actual kickoff will occur next year.

# **A Little History and a Little More Power Act**


# Brief History




1930s-1940s  
Development of Federal Dams




1950s-1960s  
Electricity Demand Grows Steadily



1960s  
Launching the Hydro-Thermal Power Program



1970s  
Collapse of the Hydro-Thermal Power Program



1970s  
Declines in salmon populations



1980  
Northwest Power Act

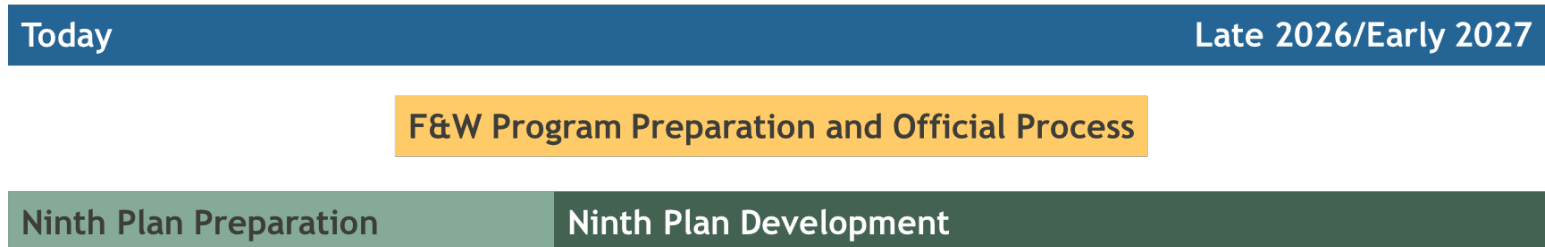
# Power Act: Developing a Power Plan

- Power Act identifies a clear role for the Council in power planning stating the Council must adopt and transmit to Bonneville a “regional conservation and electric plan” [Section 4(d)(1)]
- It also outlines clear purposes of the Council’s power planning and F&W work:
  - Encourage conservation and development of renewables [Section 2(1)]
  - Ensure an adequate, efficient, economical, and reliable power supply [Section 2(2)]
  - Provide for participation of states, local governments, consumers, utilities, fish and wildlife agencies and Tribes, and public [Section 2(3)]
  - Protecting, mitigating, and enhancing for fish and wildlife [Section 2(3)(A), Section 2(6)]
- Process for public engagement through advisory committees, public hearings, etc. is also outlined in several sections



# Power Act: Power Plan Timing

- Timing of power plan development is informed by the power act and connected to the Fish and Wildlife Program Amendment process
  - Plan needs to be “reviewed” by the Council at least every five years [Section 4(d)(1)]
  - Act also requires that the Council call for recommendations to amend the fish and wildlife program (and triggering the amendment process) prior to review of the plan [Section 4(h)(2)]
- Requirements relate to our current timing: we are in a preparation phase now and working towards starting official review in the 5-year window



Again, more on this later!

# Power Act: Developing Strategy for New Resource Acquisition

- Plan should give priority to cost-effective resources, with conservation given the highest priority, then renewables, third generating resources utilizing waste heat or with high efficiency, then other resources [Section 4(e)(1)]
- Plan should provide a scheme for “implementing conservation measures and developing resources” pursuant to Section 6 of the Act “... to reduce or meet the Administrator’s obligations\* with due consideration” for:
  - Environmental quality
  - Compatibility with the existing system
  - Protection, mitigation, and enhancement of fish and wildlife
  - Other criteria set forth in the plan[Section 4(e)(2)]

*\*Obligations includes both meeting or reducing power sales obligations and assisting in implementation of fish operations*

# Power Act: Other Major Plan Elements

- Section 4(e)(3) of the Power Act outlines other critical elements to be included in a plan, including:
  - Council’s Fish and Wildlife Program
  - Energy conservation program and model conservation standards
  - Demand forecast of at least 20 years
  - Forecast of power resources estimated to meet Bonneville’s obligation
  - Analysis of reserve and reliability requirements, including cost-effective methods for providing reserves to ensure adequacy
  - Methodology for determining quantifiable environmental costs and benefits
  - Recommendations for research and development
  - Methodology for calculating a surcharge (as related to the model conservation standards)

# Power Act: Some Key Definitions

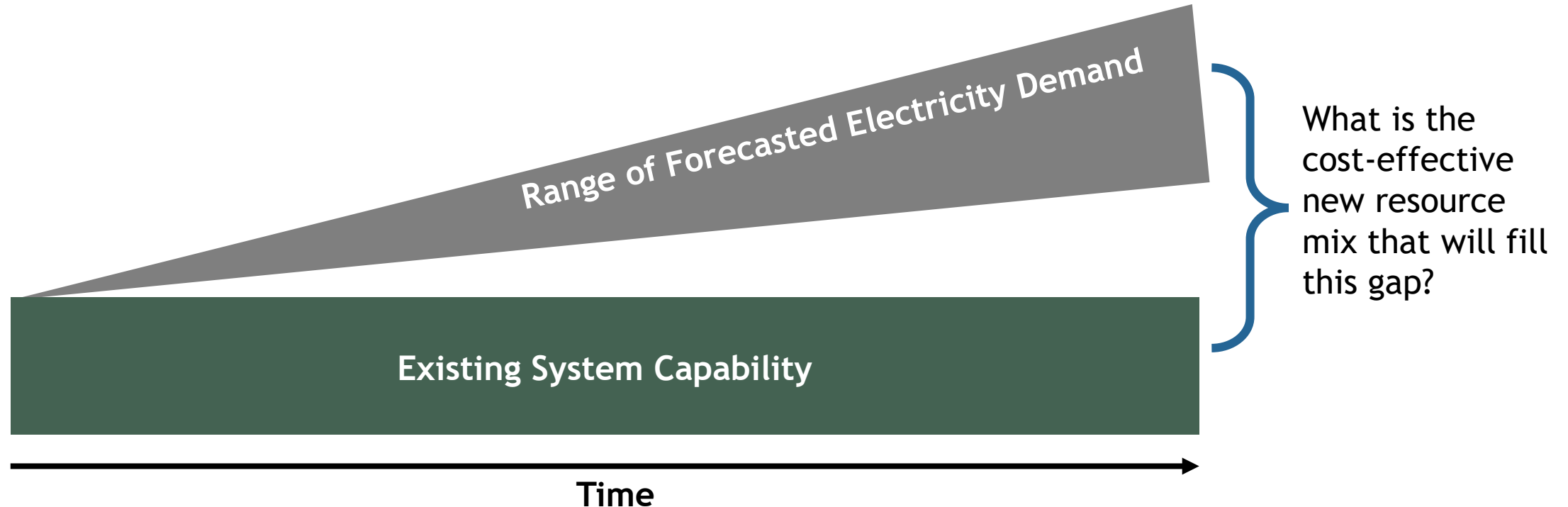
- **Cost-Effective:** Measure or resource that is forecast to be “reliable and available” and meet or reduce power demand “at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative measure or resource” [Section 4(A)]
- **System Cost:** “Estimate of all direct costs of a measure or resource over its effective life, including, if applicable, the cost of distribution and transmission ... waste disposal costs, end-of-cycle costs, and fuel costs ..., and such quantifiable environmental costs and benefits ... directly attributable to such measure or resource” [Section 4(B)]

# How Does the Power Plan Guide New Resource Acquisition?

- Council's Power Plan identifies new resource development needs in the region
- Only legal requirement connected to resource acquisition is with Bonneville
  - Resource decisions must be consistent with the Council's plan [Sections 4(D)(2) and 6(A), 6(B), and 6(C)]
- For others, the Power Act can be influential to inform resource needs and guide analytical decisions including methodologies, data and inputs, etc.
  - Note: In Washington, I-937 creates a statutory connection for WA utilities to the Council's methodologies for conservation

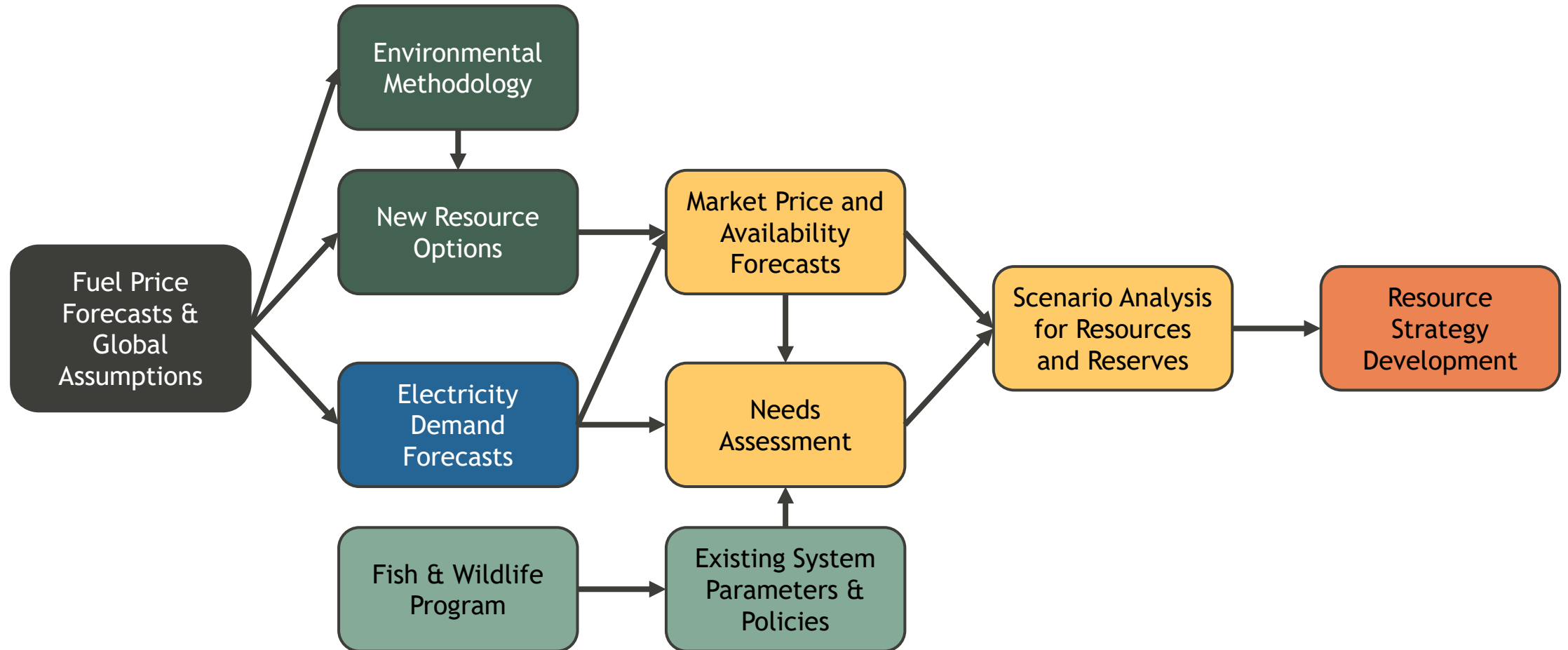
# **What Goes Into a Power Plan?**

# Super Simplified Description of a Power Plan



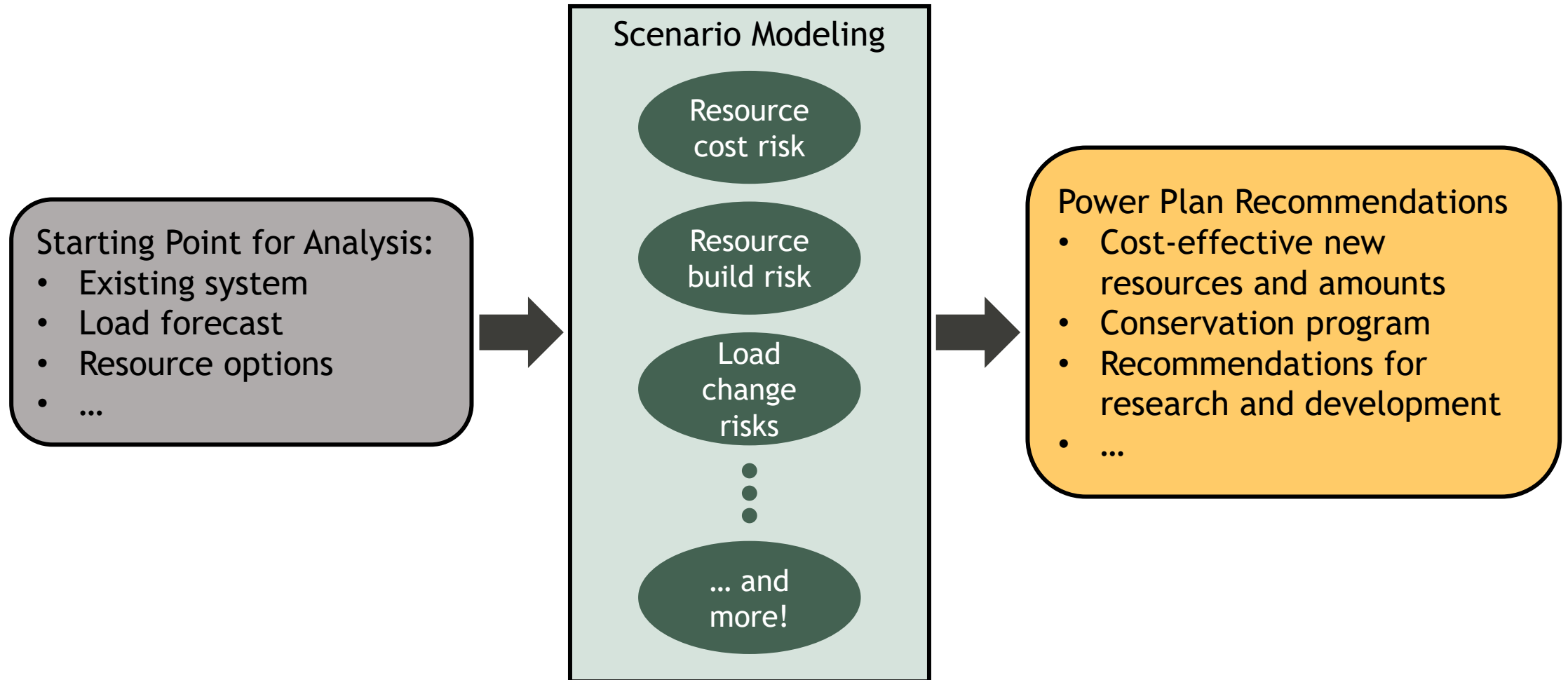
Note: Existing system capability might change over time due to planned retirements announced by resource owners or policy requirements, such as changes to river operations for F&W requirements

# Power Plan Elements and Analytical Flow





# Developing a Cost-Effective Resource Strategy



# Advisory Committee Engagement

- Power Act requires the Council to ensure widespread involvement by the public and by specific entities [Sections 4(c)(8) and 4(g)]
- Act also requires the Council establish at least one “scientific and statistical advisory committee” to assist in the development of the plan; Council may establish more [Sections 4(c)(11) and (12)]
- Committees **advise** the Council on scope, assumptions, and analysis
- Staff chair and facilitate committee meetings
- Council members are welcome to participate
- All committee meetings are open to the public

## Existing Advisory Committees:

Conservation Resources (CRAC)  
Demand Forecasting (DFAC)  
Demand Response (DRAC)  
Generating Resources (GRAC)  
Fuels (FAC)  
Resource Adequacy (RAAC)  
System Analysis (SAAC)  
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Regional Technical Forum (RTF)  
RTF Policy (RTF PAC)

# **Ninth Power Plan**

# Rough Timeline

Today

Late 2026/Early 2027

F&W Program Preparation and Official Process

Ninth Plan Preparation

Ninth Plan Development

# Rough Timeline: Plan Preparation

Today

Late 2026/Early 2027

## Ninth Plan Preparation

- This phase will take us through this year and into early 2025
- Main goals are to:
  - Scope out the analytical questions and develop methodologies
  - Develop and test tools in preparation for future scenario analysis
  - Start preparing plan inputs to support model this, which will also enable more streamlined analysis once the official plan review starts
  - Early engagement with advisory committees around scope and methodologies

# Rough Timeline: Power Plan Review

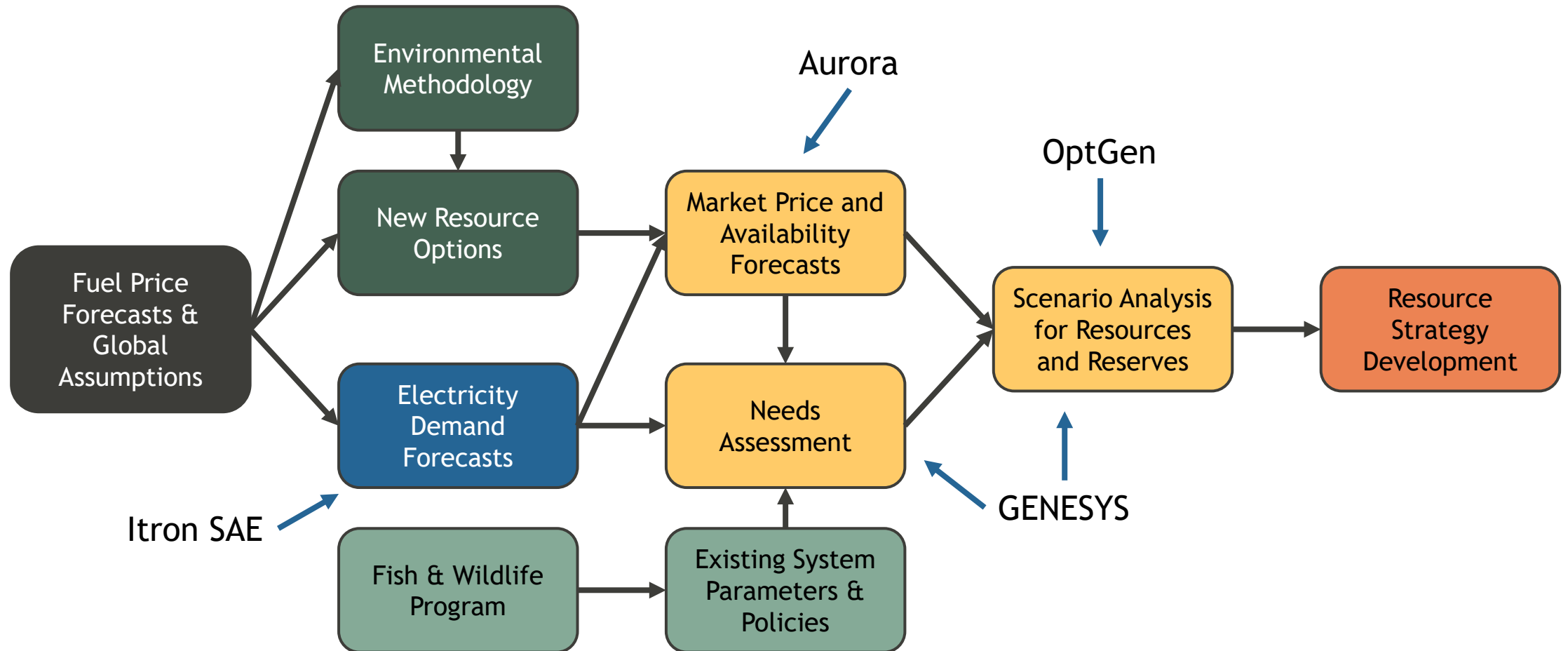
Today

Late 2026/Early 2027

## Ninth Plan Development

- Official kickoff in early 2025; a goal to complete by late 2026 or very early 2027
- This is when we will:
  - Develop final input assumptions for modeling, including adjusting assumptions around existing system capabilities to account for the Fish and Wildlife Program
  - Conduct and discuss modeling of market prices, needs assessment, and scenarios
  - Conduct and discuss scenario modeling and other analysis
  - Develop recommendations of cost-effective new resource needs and more
  - Draft power plan materials, release a draft for public comment, hold public hearings, and finalize the plan

# Modeling Ecosystem



# Enhanced Modeling Ecosystem

## Itron SAE

- **Purpose:** Load forecasting for demand-side resource analysis and feeding other models
- **Development:** New model for the ninth power plan
- **Highlighted Enhancements:**
  - Forecasts by 13 balancing areas
  - Provides both monthly and hourly forecasts
  - Improved modeling of dynamic changes in load (such as transportation, hydrogen production)

## GENESYS

- **Purpose:** Evaluate hourly system operation in region and to assess adequacy
- **Development:** Redeveloped for 2021 Plan, plus new enhancements
- **Highlighted Enhancements:**
  - Model 17 regional zones and 13 out-of-region zones, with interconnected transmission
  - Hourly dispatch of individual hydro projects, with hourly and monthly constraints
  - Understanding of market fundamentals
  - Dynamic reserves accounting

## OptGen

- **Purpose:** In-region capital expansion and portfolio optimization
- **Development:** New model for the ninth power plan
- **Highlighted Enhancements:**
  - Model 17 regional zones with interconnected transmission
  - Hourly and sub-hourly dispatch of resources
  - Dynamic peak and energy contribution over time
  - Dynamic reserves accounting and advanced risk modeling



# Why Does this Matter?

- Enhancements across these models will allow the staff to better reflect the existing dynamics in the power system, for example:
  - Dynamic understanding of energy and peak contributions, reserve needs, fuel accounting
  - Trade-offs between loads and resource development
- Ability to model at the sub-regional level with dynamic transmission modeling will support improved analysis around transmission constraints and trade-offs between resource development and transmission
- Synergies between GENESYS and OptGen will streamline staff work in preparing models, allowing more time for analysis and discussion

# **Starting to Prepare for the Council's Ninth Power Plan**

# Starting Point for Power Plan Modeling

- Council plans under uncertainty
- Need a starting point for analysis to create a common set of assumptions from which different uncertainties or risk can be tested
- Intentionally referring to this as the “starting point” to be clear it’s just the beginning and not intended to reflect an “expected case”
- Council will leverage information from all the model runs (and other analysis) to inform the next plan’s recommendations



# Quick Orientation of Upcoming Slides

## In Scope

- Outlines staff's current thinking on elements to be included in the starting point

## Out of Scope

- Identifies elements that are specifically excluded from the starting set of assumptions
- Does not mean that these elements will be excluded from the power plan in entirety!
- Some of these elements may be explored in scenario modeling

Big Question: Highlighting a current area of staff uncertainty

← Note: Additional caveats to highlight now...

# Starting Point: Existing System

## In Scope

- 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 captured in the frozen efficiency load forecast
- Transmission:
  - Existing transmission
  - Planned transmission that has a high likelihood of getting completed (e.g. B2H, Gateway West)
- Hydro Operations:
  - Current hydro operations, including the updates in the U.S. Commitments

## Out of Scope

- Resources:
  - Proposed resources that are not under construction and not committed
  - Unplanned/unannounced retirements or conversions of existing resources
- Transmission:
  - Other transmission projects, including proposed projects
- Hydro Operations:
  - Past hydro operations or proposed future changes

Note: Scenario analysis can explore impacts of timing of these projects (i.e. delayed or faster)

Note: These will be updated, as needed, to reflect operations required by the Fish & Wildlife Program and BiOp.

# Starting Point: Policies and Regulations

## In Scope

- In-Region
  - Existing state regulations (e.g. CETA, CCA, OR HB 2021, etc.)
  - Existing utility goals (e.g. Idaho Power's)
  - Existing county and city goals (e.g. Portland's 100% renewables by 2035)
- Federal Regulations
  - Regulations pertaining to environmental methodology (e.g. Clean Water Act, NEPA, ESA, etc.)
  - Federal incentives (e.g. IRA, BIL)
- Out of Region/West-Wide
  - Follow in-region guidelines, although in less detail

## Out of Scope

- All Jurisdictions
  - Proposed state regulations
  - Proposed Federal regulations

**Big Question:** Staff is still thinking through how to treat company/corporation goals (e.g. META, Google)

# Starting Point: Weather/Climate

## In Scope

- Climate change informed loads
- Climate change informed resources
  - Hydro conditions
  - Wind profiles
  - Solar profiles
  - Batteries
  - Natural gas generation
  - Energy efficiency and demand response (in-region only)

## Out of Scope

- Historical weather/climate
- Extreme weather/climate beyond what is captured in the climate data

Note: We will focus on updates to profiles where it matters

**Big Question:** Staff is exploring how well the existing climate data captures extreme events to inform whether additional scenario testing is needed

# Starting Point: New Resource Options

## In Scope

- Resources:
  - Commercially available resources and conversions
  - Resources reasonably assumed to be available within the planning horizon
- Transmission:
  - Proposed options for which we can get sufficient information

## Out of Scope

- Resources:
  - Resources not reasonably assumed to be available within the planning horizon
- Transmission:
  - Proposed options for which we cannot get enough information to sufficiently include in the modeling



# Starting Point: Markets and Similar Groups

## In Scope

- Any market(s) that is in place in time for modeling
- Other groups that such as the WRAP, balancing reserve groups, etc.

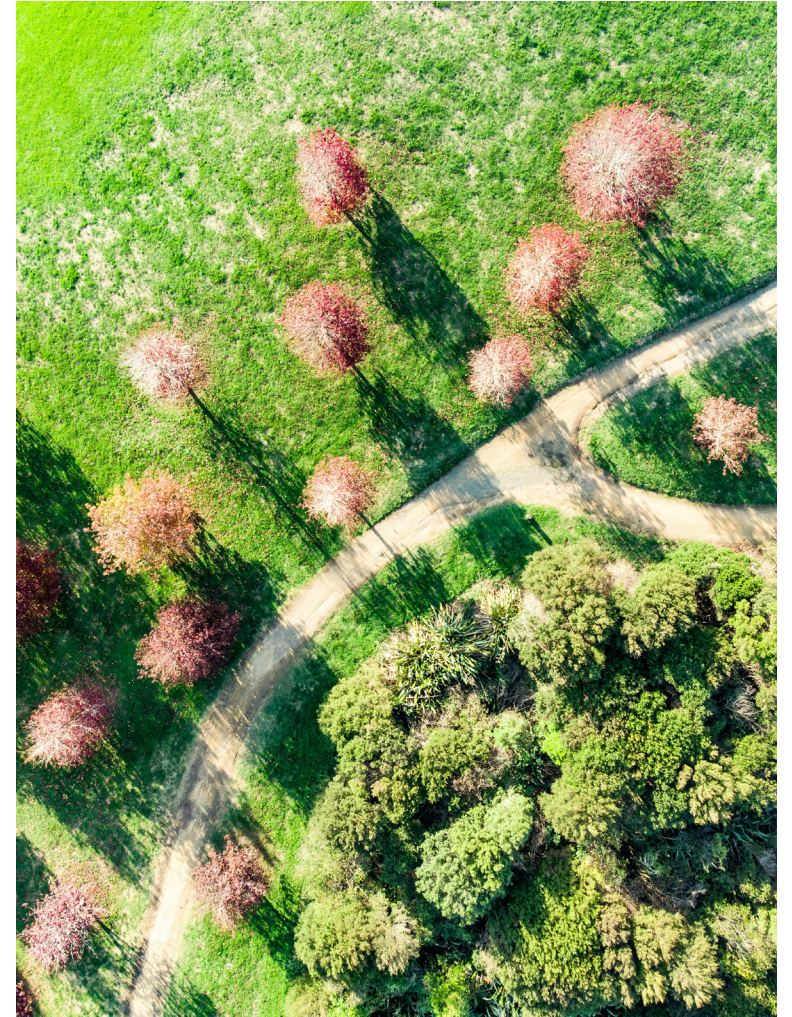
## Out of Scope

- Proposed market footprints or other groups that are not established in time for modeling

# Scenario Modeling

# Scenario Analysis

- Starting point for models and inputs isn't necessarily the future
- Scenario analysis allows the Council to explore different futures
- Understanding and comparing the results will support the Council in developing a robust set of recommendations for the region's future resource acquisition
- Staff recommends focusing on a small set of studies that provide the most information for the analysis



# Staff High Priority Scenarios

## Resource and Transmission Risk

Understanding resource decisions with different cost risk testing, build-out constraints, resource options, etc.

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## Hydro- Flexibility Trade-Offs

Informing different resource decisions with a more or less constrained hydropower system, particularly as this relates to daily-ramping

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## Bonneville Portfolio

Informing robust recommendations on Bonneville resource acquisition, under a variety of scenario questions

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# Other Potential Scenarios Identified by Staff

## System Operations

Potentially exploring ramp focused dispatch, markets or other operation; will want determine based on market decisions and what are biggest risk areas

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## Extreme Weather Stress Tests

Potentially explore resource decisions under extreme weather tests; will want to wait to understand how the climate data already captures extreme events

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## Explorations Around Decarbonization

Potentially explore resource decisions under different decarbonization or electrification pathways; will want to assess where changes are significant enough to test

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# Next Steps and Discussion

# Next Steps for Staff

- **Now to March:** Incorporate feedback from today's discussion into an Issue Paper
- **March 12-13:** Present material to full Council and seek release of the Issue Paper for a 45-60 day comment period
- **May or June Council Meeting:** Present comments received and recommended path forward
- **Ongoing:** Continue to discuss methodologies and preparation of models and inputs

# Further Discussion





