

A photograph of the Tacoma waterfront skyline. In the foreground, a wooden pier with several white mooring bollards extends into the water. A white motorboat is docked at the pier. In the background, a variety of buildings are visible, including a prominent blue, cone-shaped building on the left and several multi-story residential or commercial buildings in the center and right. The sky is a pale blue with some light clouds.

*Serving our customers*

# Integrated Resource Plan Public Workshop 1

**IRP Overview**

February 24, 2020

**TACOMA**  **POWER**  
TACOMA PUBLIC UTILITIES

# WELCOME!

We look forward to working with you.



- 1 Public Process
- 2 IRP Basics
- 3 Planning for Uncertainty
- 4 Major 2020 Focus Areas
- 5 Modeling Overview
- 6 Public Comment Period
- 7 Next Steps and Action Items

# Public Process

What can you expect?



## Objectives

- ✓ Listen and understand stakeholder objectives and concerns
- ✓ Provide a forum for productive stakeholder feedback
- ✓ Increase community understanding of Tacoma Power's planning process

## Working Group

- ✓ Selected to ensure commitment and balance of perspectives
- ✓ Four workshops to review inputs, analyses and recommendations

## Other Efforts

- ✓ All meeting materials posted on website
- ✓ Public comment opportunities inside & outside of workshops
- ✓ Occasional public surveys

## Opportunity for input on....

- ✓ What scenarios of the future we should include
- ✓ What resources we should consider
- ✓ Which portfolio should be the preferred portfolio
- ✓ What our action items after the IRP should be
- ✓ And more!

## Materials

- ✓ Materials to be posted one week before workshop
- ✓ Notes to be circulated 10 days after workshop

# IRP Basics

What is an IRP?



# What is an IRP?

## An integrated resource plan:

- ✓ Is a roadmap for providing reliable and low-cost power in an uncertain future
- ✓ Helps us make sure sufficient resource are available when needed and not before
- ✓ Ensures we meet environmental regulatory requirements cost-effectively
- ✓ Is required by Washington State law (19.280 RCW)
- ✓ Is a plan for meeting clean energy mandates



20-year time horizon



### States with Integrated Resource Planning or Similar Processes

Legend:

- State has an IRP rule and filing requirement (Blue)
- State has a filing requirement for long-term plans (Green)
- State is developing or revising an IRP rule and filing (Orange)
- State does not have filing requirements for long-term plans (White)

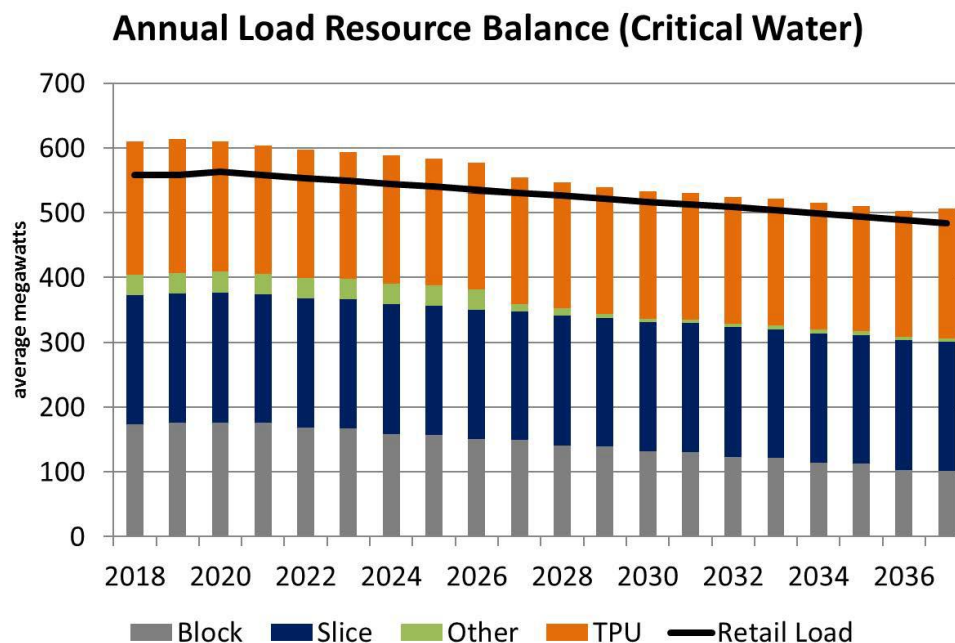
Source Regulatory Assistance Project (2013)

# Overview of IRP Process



# Key Findings from Last Time

1. Sufficient resources to meet load over next 20 years
2. Conservation is the only resource needed
3. State mandates for new renewables to be fulfilled through purchase of Renewable Energy Credits (RECs)



# Action Plan from Last Time

## 2017 Action Plan

Acquire 6.4 aMW of conservation  
in 2017-2019 biennium

Investigate future value of  
capacity

Explore expansion of IRP to  
include DER planning

Investigate resource planning  
tools and analysis methodologies

## 2017-2019 Actions

Acquired 8.4 aMW of  
conservation to date

Work began in 2018 and continues  
today

EV Study to understand charging  
patterns, DR potential study,  
downtown network deferral study

Updated modeling tools & analysis  
approach

# Planning for Uncertainty

How are we dealing with future unknowns?



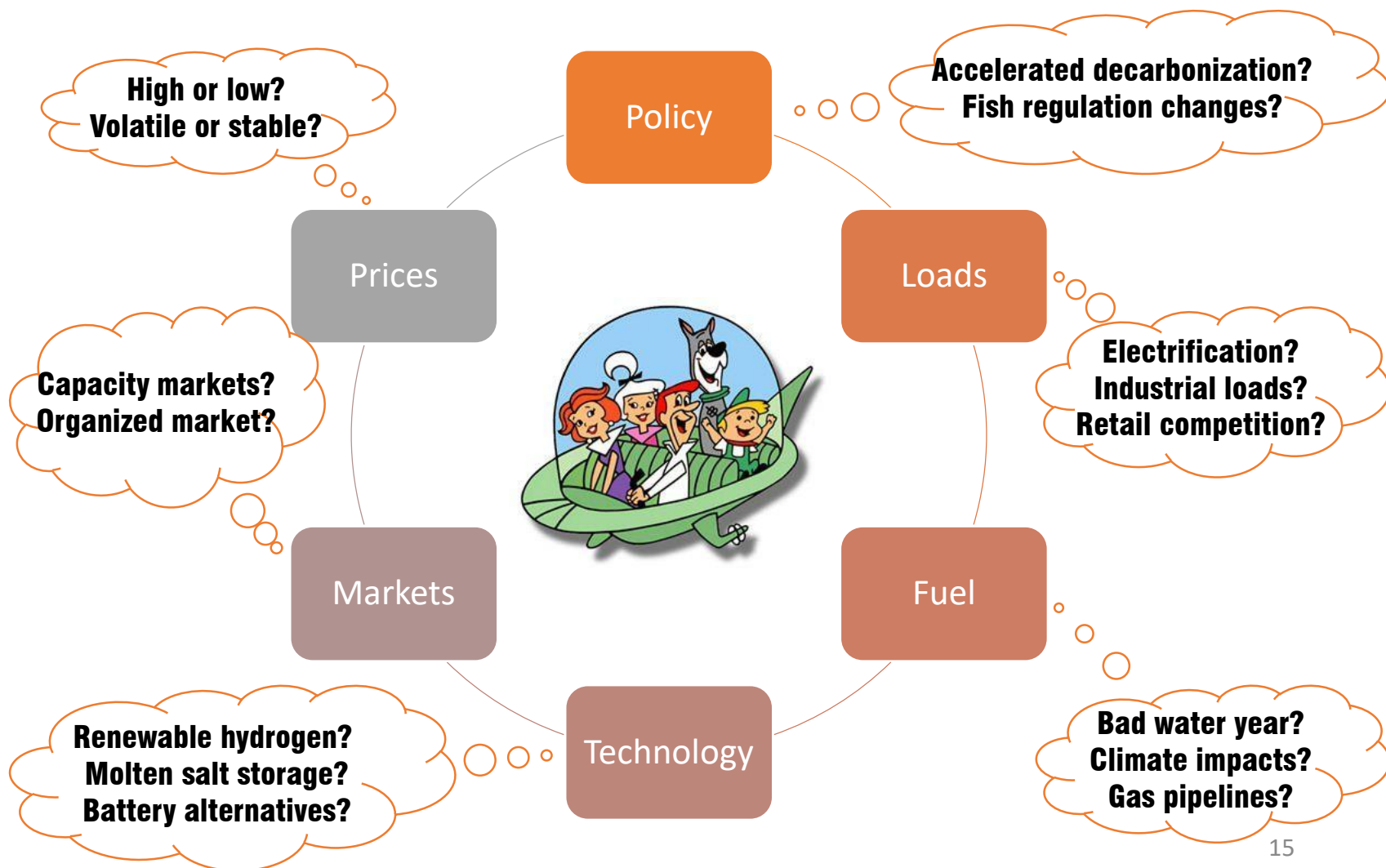
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If you are sure of tomorrow, there is  
no fool greater than you!

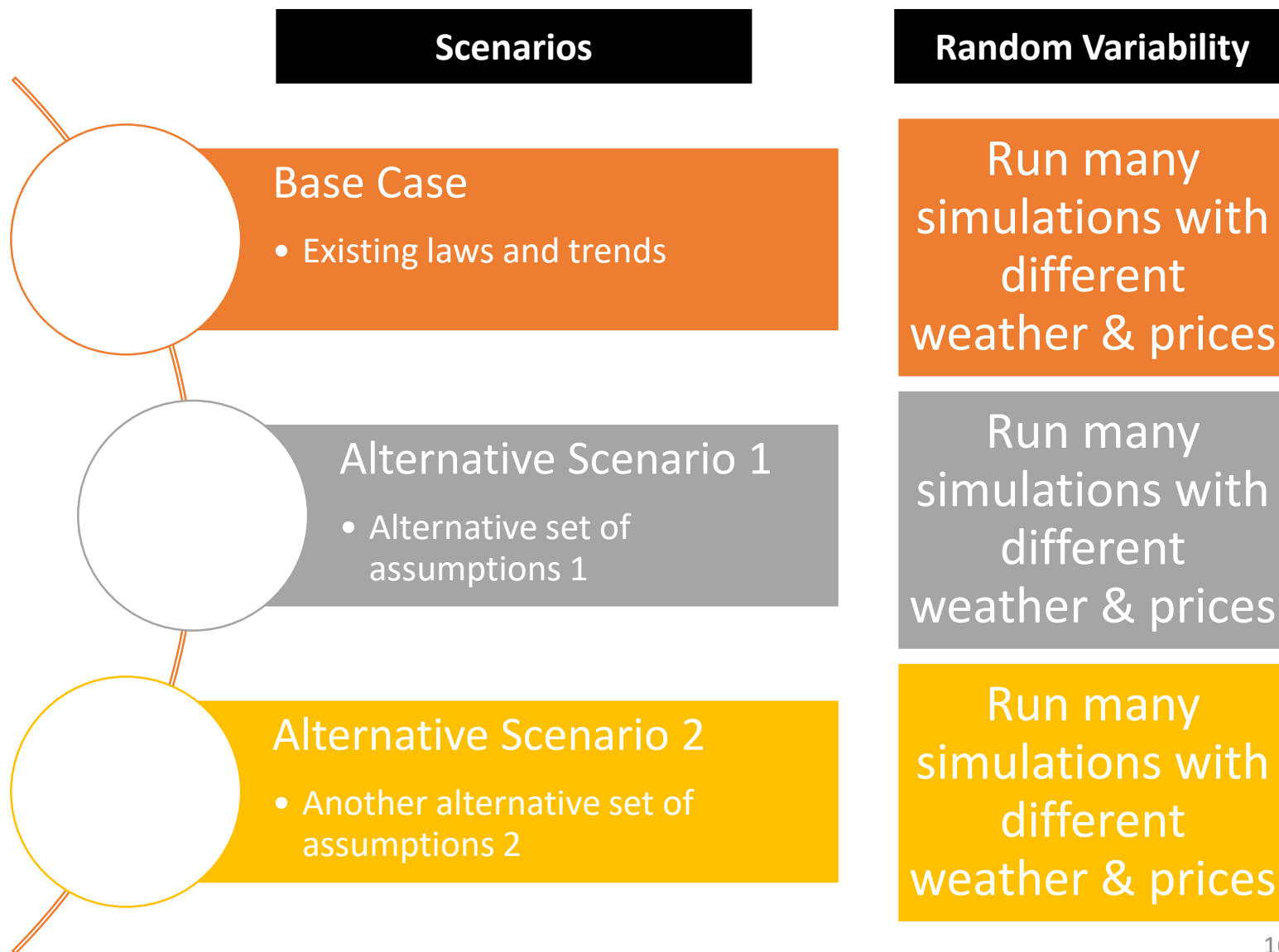
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**Mehmet Murat ildan**

# Who knows what the future holds?



# How IRP will address uncertainty





# Major Focus Areas of 2020 IRP

What are the major questions we need to answer this time?

What major changes have occurred since last time?



## Columbia Basin Hydro (CBH) Contract Renewal

- 5 Irrigation Canals
- ~27 aMW in months of March through October
- 3% of portfolio on average
- Staggered contracts expiring 2022-2026
- 2020 IRP will ***make a recommendation*** on whether or not to renew



## Key Questions

1. Should we renew the contracts?
2. If not, what resource (if any) will we need in order to replace them?

# Conduct Preliminary Analysis

## BPA Contract Renewal/Product Selection

- Federal Power Marketing Agency
- Power sold at cost
- Tacoma Power has been a BPA customer since 1940
- Over 50% of Tacoma's portfolio on average
- Current contract expires 2028
- 2020 IRP will conduct *preliminary analysis* on value of renewing current contract vs. alternative product selection



## Key Questions

1. Given current product offerings and expected policy framework, which product(s) seem likely to meet Tacoma's needs in the future?
2. Is there any potential value in a more diverse portfolio (i.e. complementing BPA contract with another resource)?
3. What do we need to know before conducting a more definitive analysis?

## Clean Energy Transformation Act (CETA)

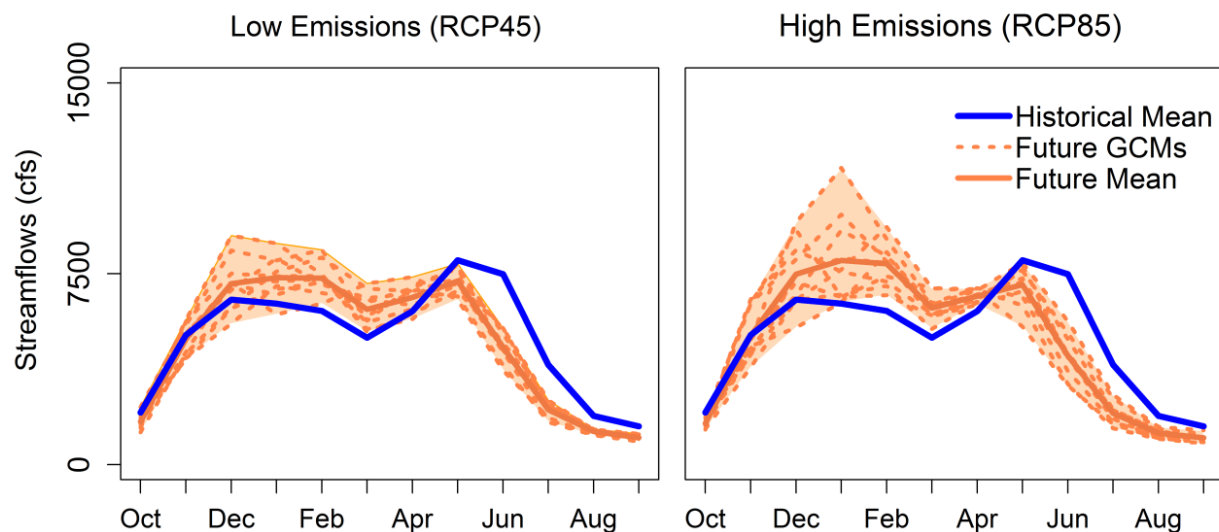
- ✓ **100% of load met by non-emitting resources or alternative compliance 2030-2044 (up to 20% from alternative compliance)**
- ✓ 100% of load met by non-emitting resources by 2045
- ✓ **Incorporate Social Cost of Carbon into planning and resource decisions**
- ✓ 10-year Clean Energy Action Plan by 2020
- ✓ 4-year Clean Energy Implementation Plan by 2022
- ✓ Ensure equitable distribution of benefits and reduction of burdens to vulnerable populations and highly impacted communities
- ✓ Many details TBD in rulemaking



**Initial analyses suggest  
current portfolio will comply  
With 2030-2044 mandate**

## Climate Change Impacts on Tacoma

- ✓ Slightly higher temperatures (+1.8°F to +4.3°F), especially in summer
- ✓ Little change in total inflows
- ✓ More water in winter, less in summer
- ✓ Higher peak flows, lower low flows
- ✓ Impacts on Columbia River system (BPA) less extreme



# Other Changes

## New Modeling Tools

- Discussed next

## New Portfolio Performance Metrics

- Discussed next time

## Regional Resource Adequacy Program

- Its existence/absence could impact future prices and opportunity to buy and sell capacity products

## Tacoma Participation in CA Energy Imbalance Market

- Not modeled in 2020 IRP but is likely to increase value of highly flexible resources

## Transportation Electrification Plan

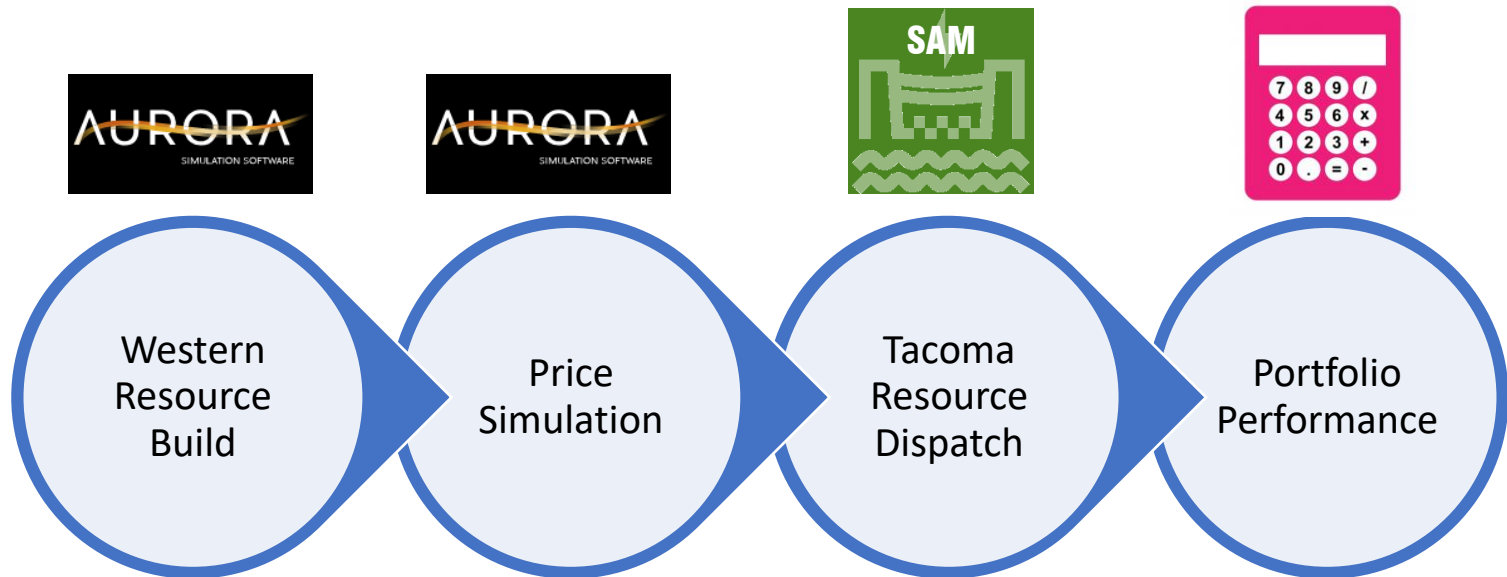
- Could impact expectations for future loads

# Modeling Overview

What modeling tools are we using?

How do they fit together?







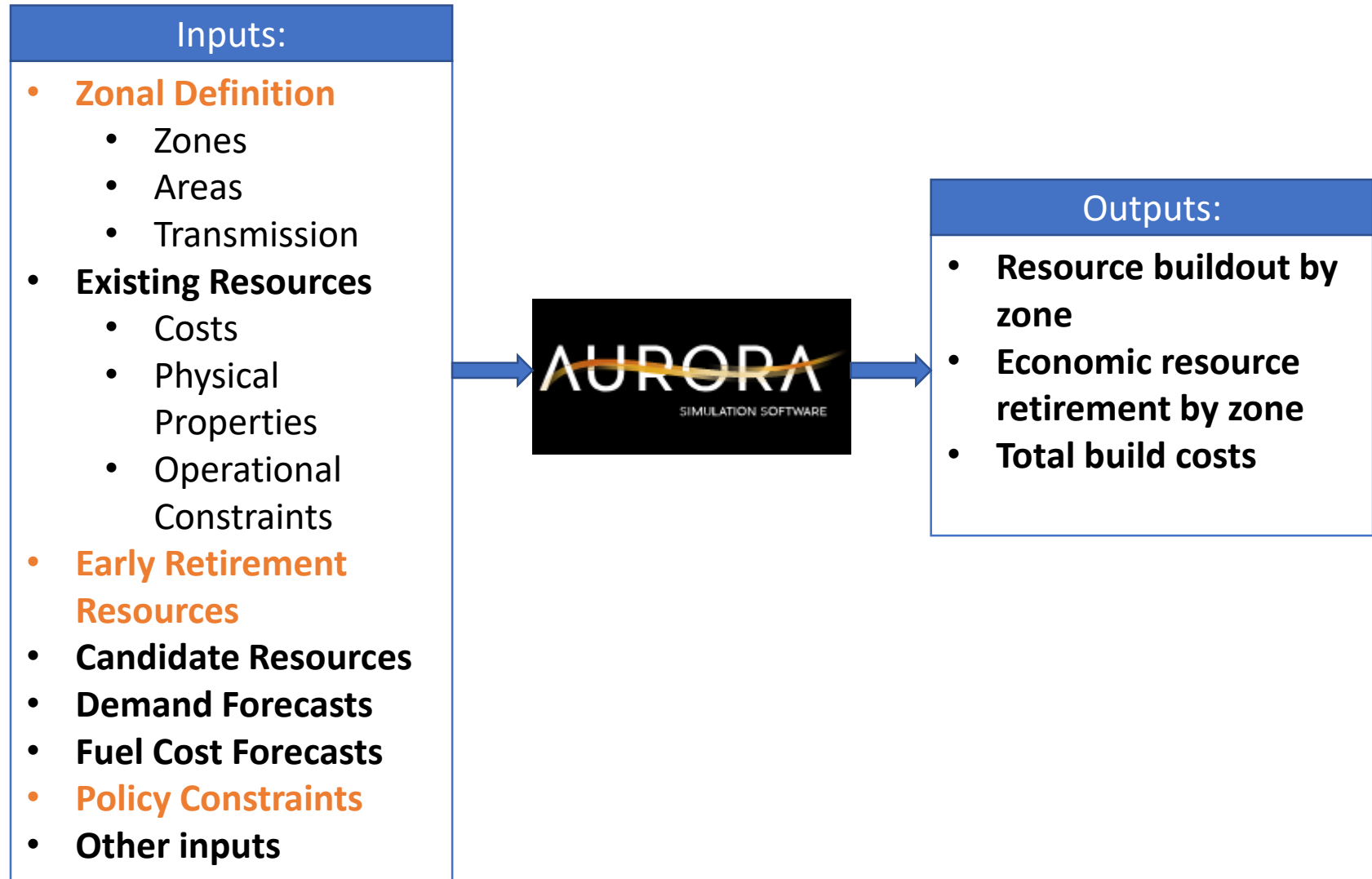
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How does Aurora work and what are the key inputs we use?

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**Aurora WECC Model**

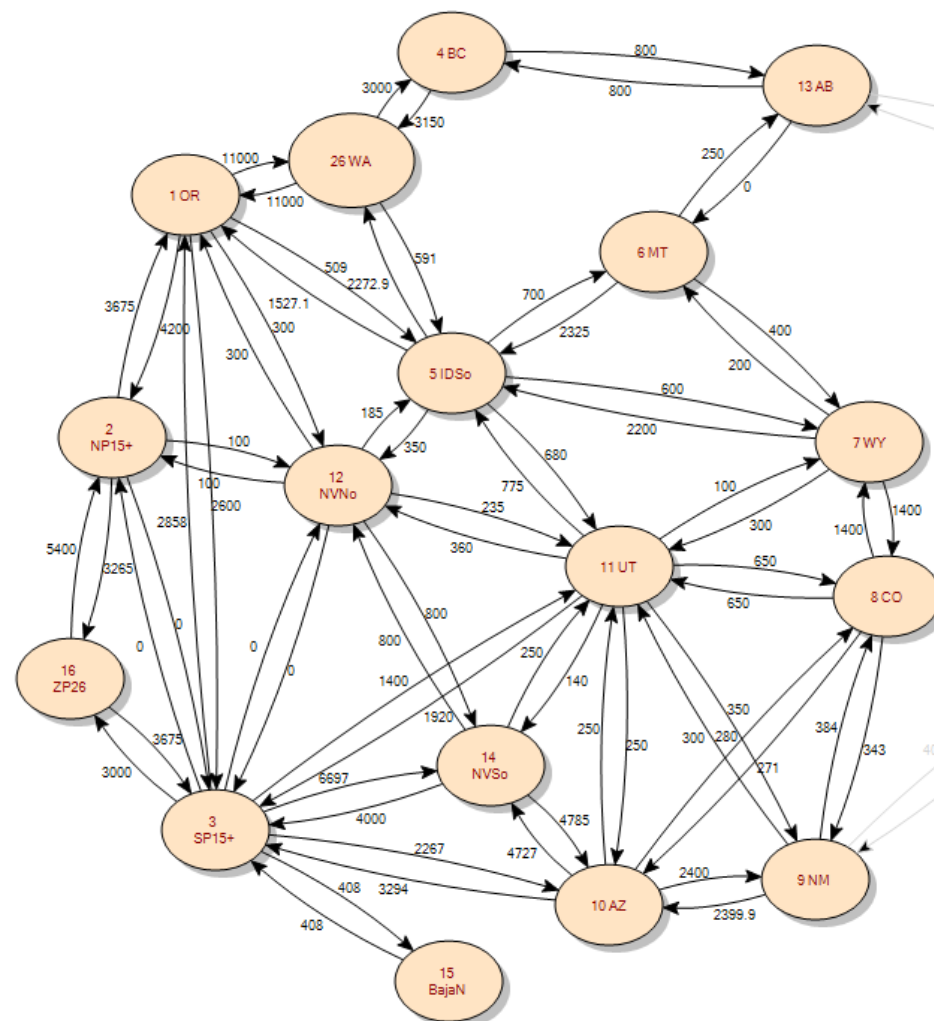
# Aurora: Capacity Expansion



# Aurora: Capacity Expansion Model

## Changes to AURORA's Database:

- Separated "OWI" zone into separate "OR", "WA", and "ID" zones.
- Updated Early Coal Retirements
- Updated WECC RPS constraints
- Added CETA constraint



17 Zones

36 Transmission Links

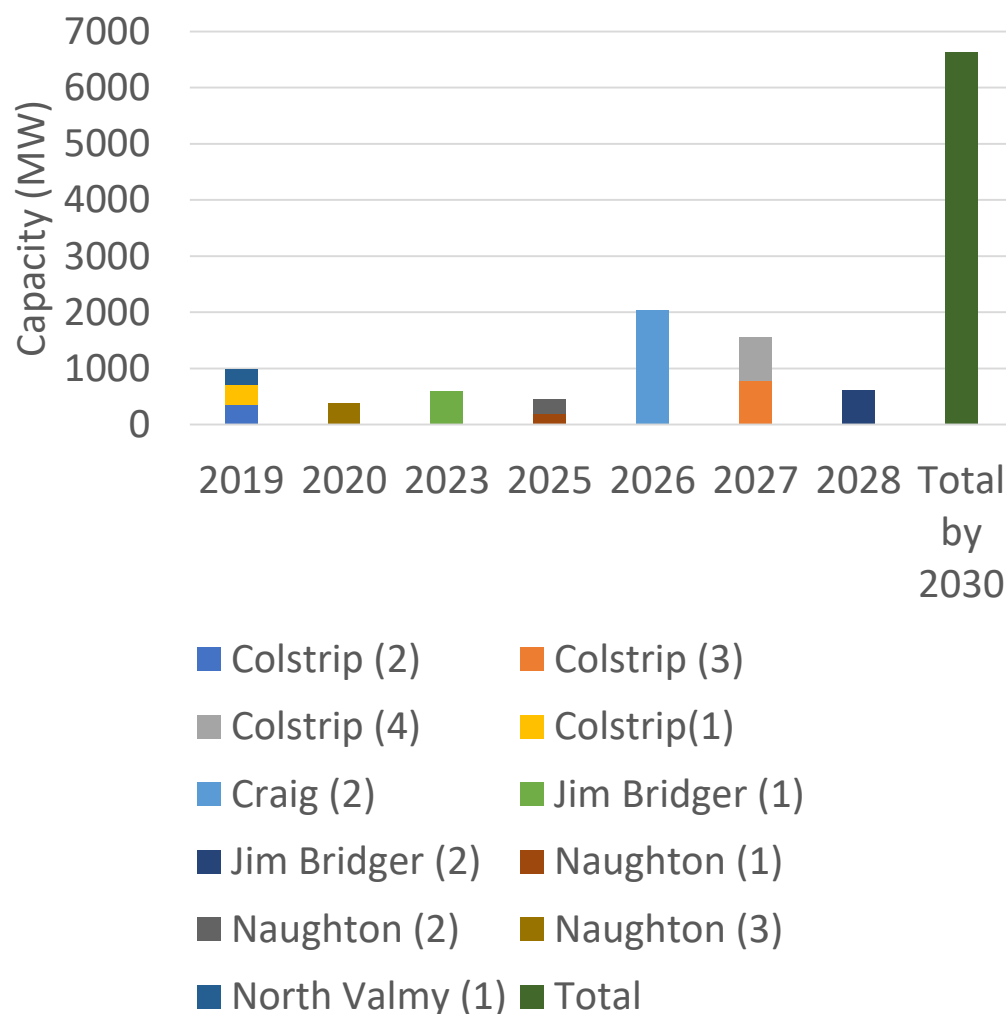
5700 Power Plant Units w/Properties

# Aurora: Capacity Expansion Model

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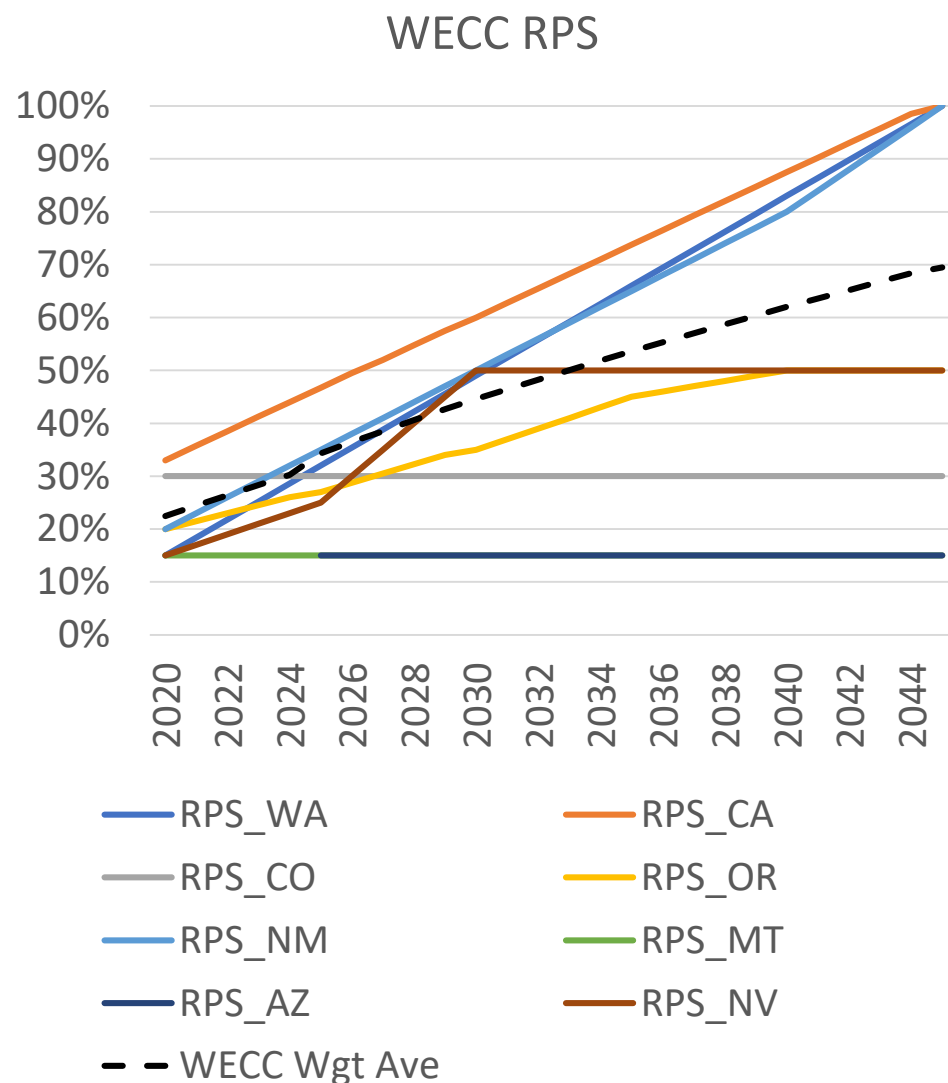
## Announced Early Coal Retirements



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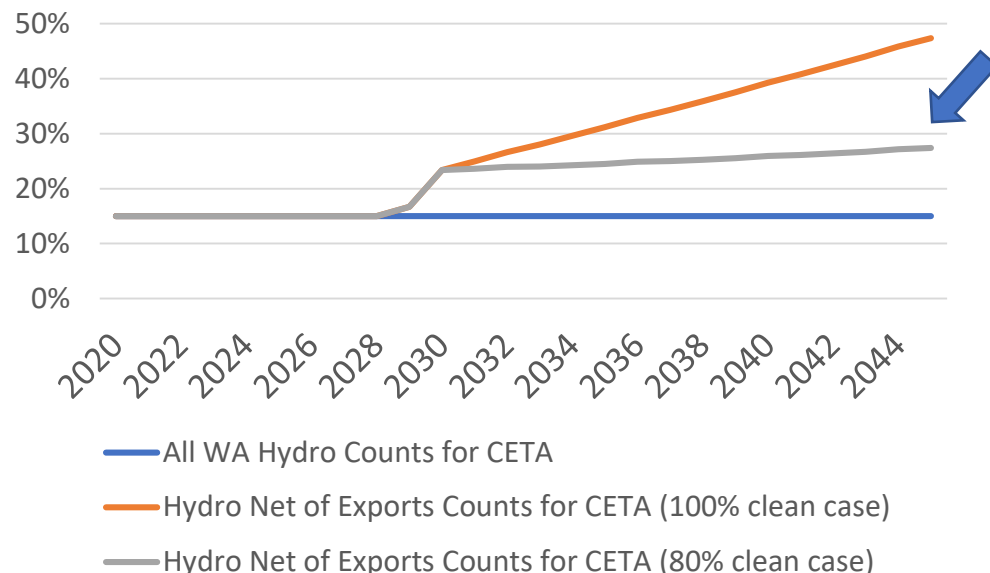


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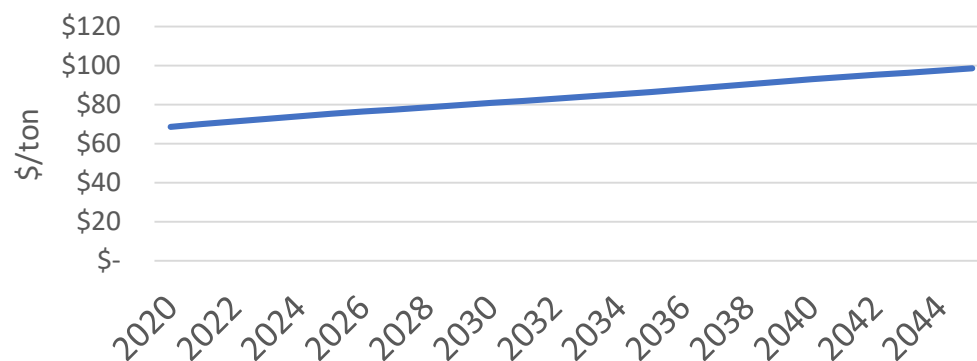
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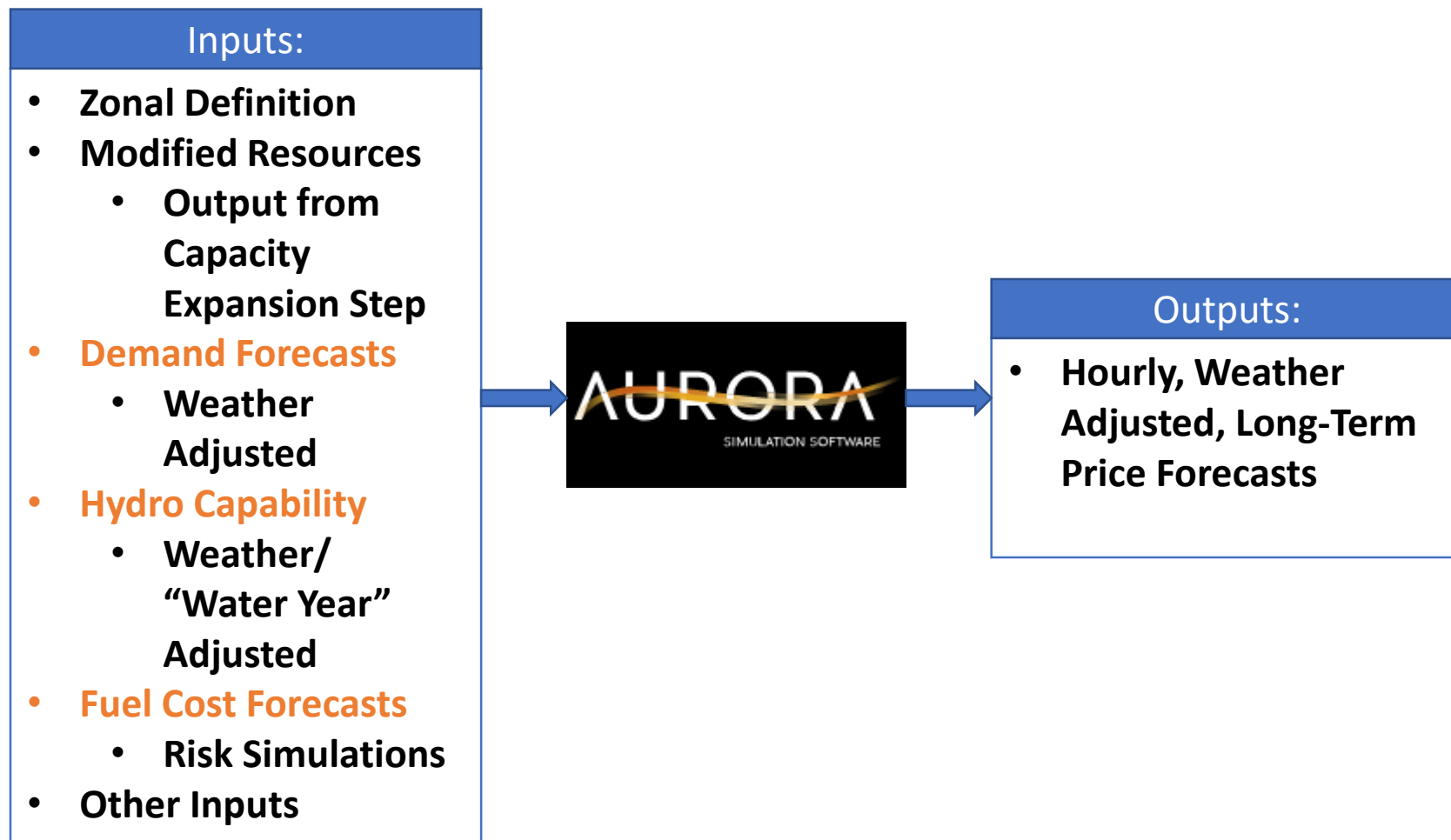
CETA "Effective RPS"



Social Cost of Carbon (applied in WA for LT only)



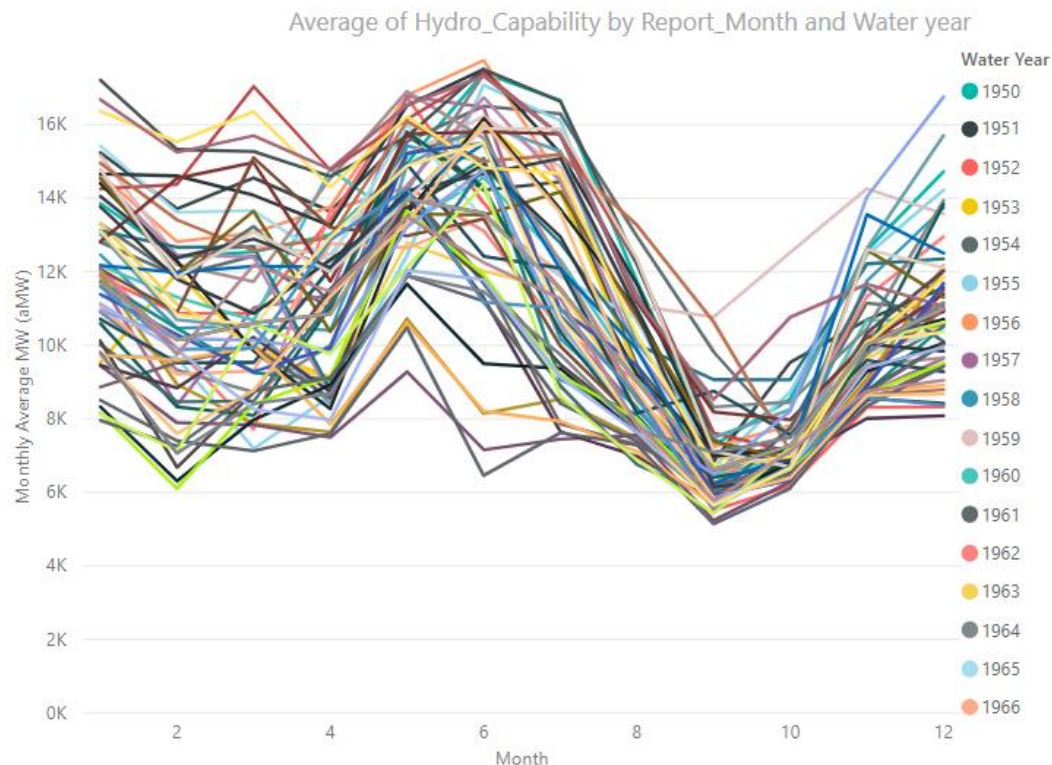
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- Simulated 5 natural gas risk iterations
- Adjusted demand forecasts to 1950-2007 water years

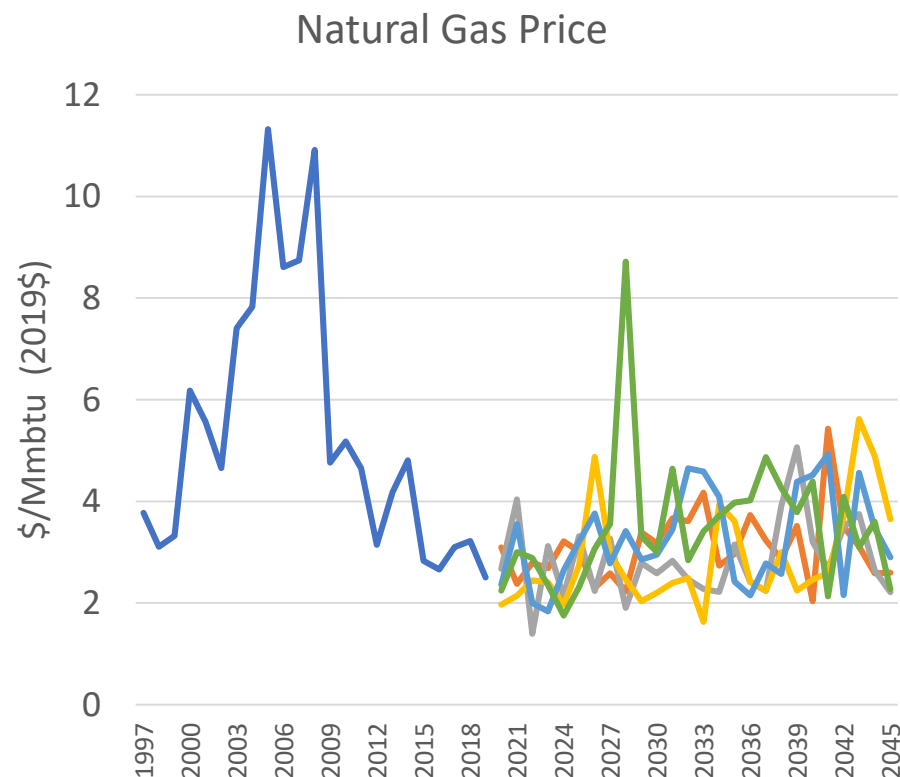




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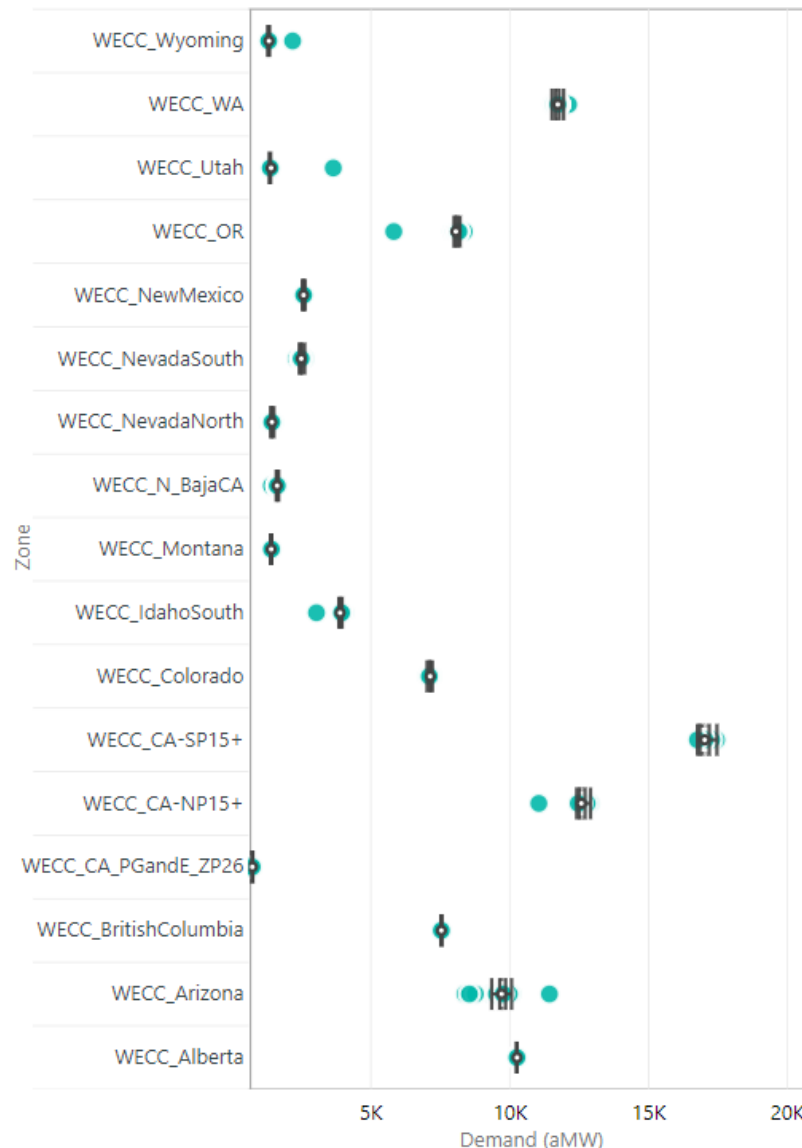


# Aurora: Production Cost Model

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Distribution of Weather Adjusted Demand (2020)



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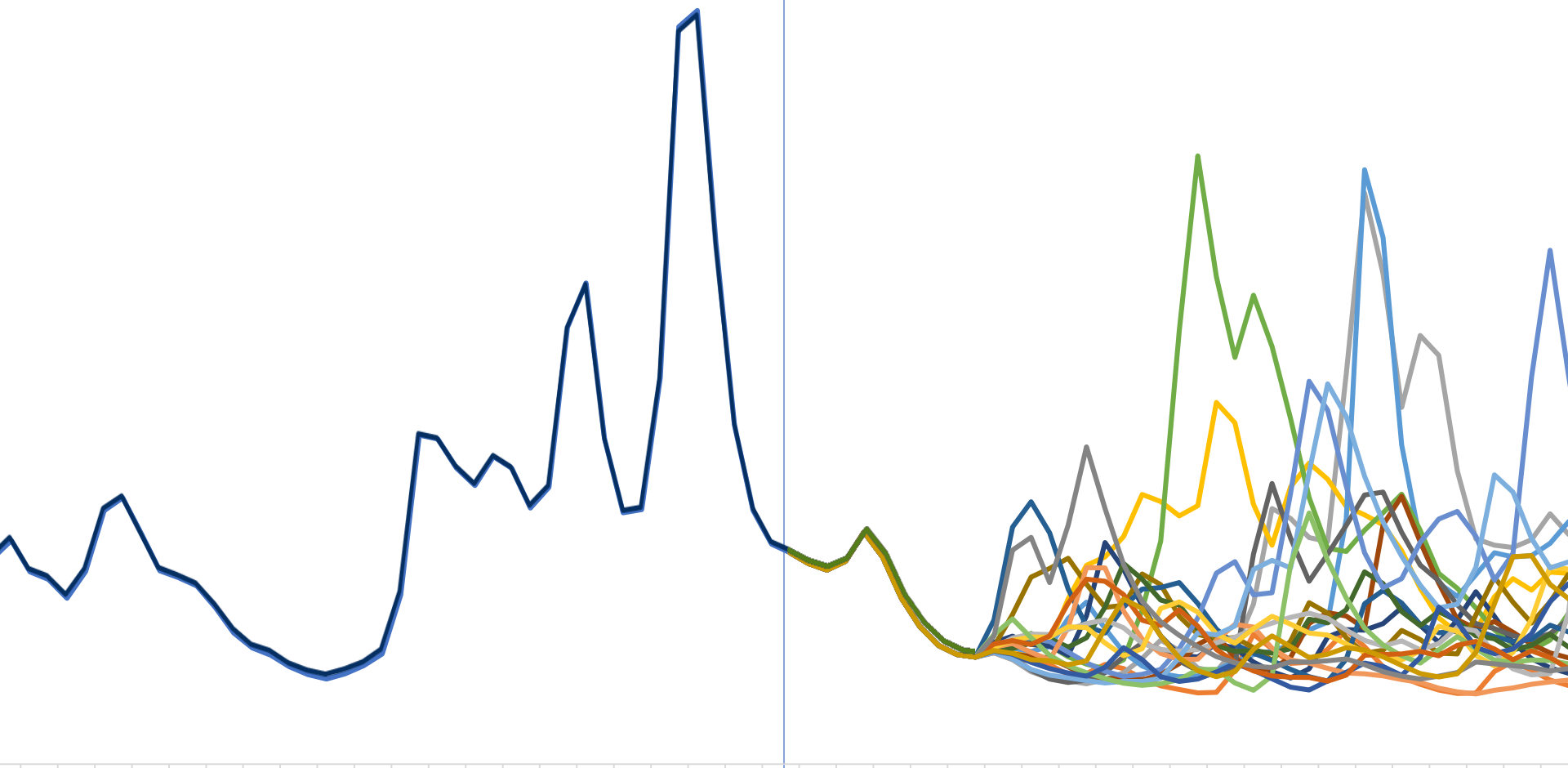
How will Tacoma's system operate for a given weather simulation and market scenario?

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**IRP System Model (SAM)**

PAST

FUTURE



## Plug and Play Resources

Hydro-  
Electric

Solar

Wind

Natural  
Gas

Pumped  
Hydro

Battery  
Storage

BPA Slice  
Contract

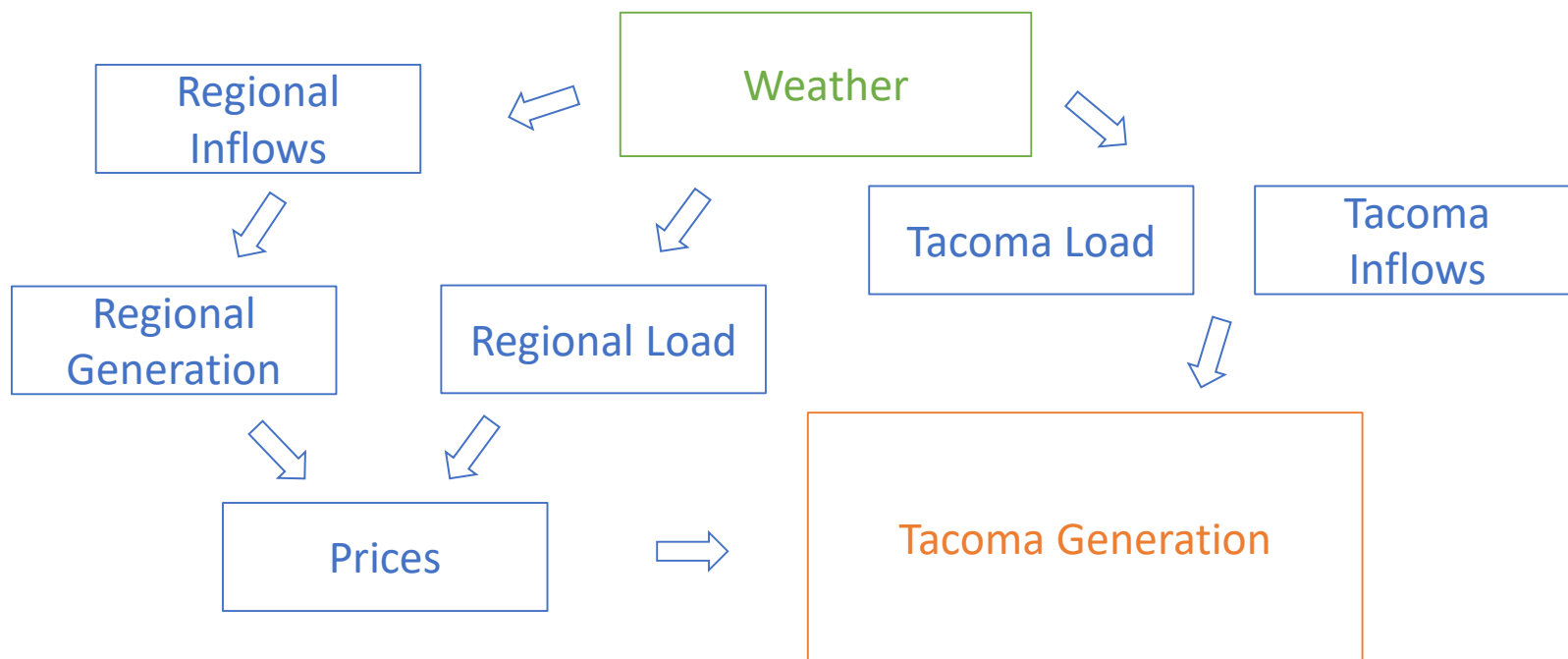
BPA Block  
Contract

Other  
Contracts

## Plug and Play Resources

- Each Resource has set a parameters that define its constraints and determine its dispatch
- A resource scenario consists of a set of resources and their resource parameters
- For a given run the resource scenario defines Tacoma Generation

## Model Dispatches Tacoma Generation



## Model Dispatches Tacoma Generation

### INPUTS

Resource  
Scenario

Weather

Prices

### OUTPUTS

**Hourly Dispatch for each  
Resource**

Meets all Resource  
Constraints

Meets all System  
Constraints



# Public Comment Period



# Next Steps and Action Items

What are we covering next?



# Workshop Plan



## Workshop 1

IRP Overview



## Workshop 2

Present key inputs

Present and discuss metrics

Present and discuss scenarios



## Workshop 3

Review current situation

Present and discuss resource alternatives



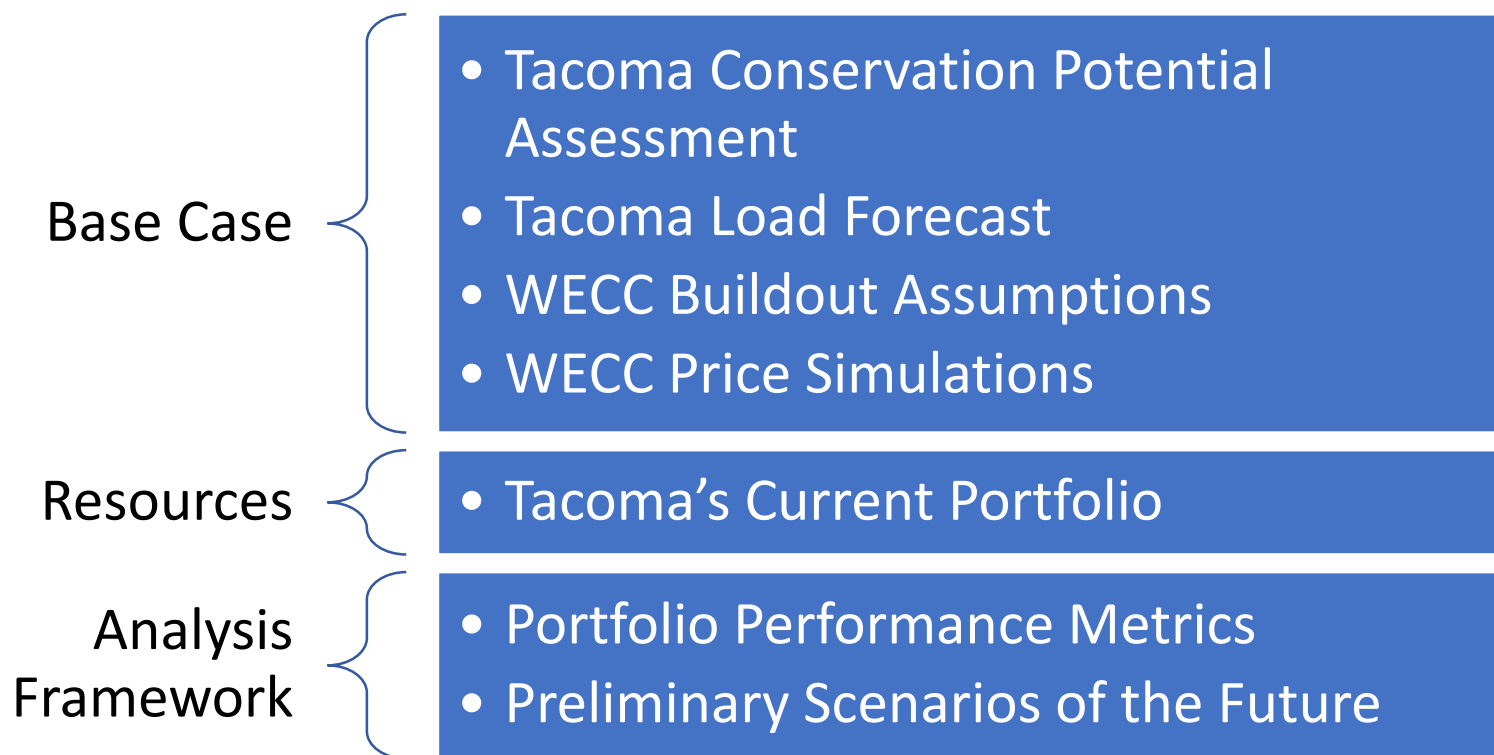
## Workshop 4

Present analysis results

Present and discuss preferred portfolio

Discuss action items

## Key Inputs and Assumptions



**Please complete our online survey to weigh in on scenarios of the future!**