



2025 Electric Integrated Resource Plan
Technical Advisory Committee Meeting No. 1 Agenda
Tuesday, September 26, 2023
Virtual Meeting

Topic	Time	Staff
Introductions	8:30	John Lyons
CEIP Update	8:45	Kelly Dengel
TAC Process and Methods Proposals	9:15	James Gall
PLEXOS Overview and Back Cast Analysis	9:45	Mike Hermanson
Break	10:45	
Available Resource Options Discussion	11:00	Lori Hermanson
Work Plan	11:30	John Lyons
Adjourn	12:00	

Microsoft Teams meeting

Join on your computer, mobile app or room device

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Meeting ID: 294 629 977 632

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+1 509-931-1514,,307115655# United States, Spokane

Phone Conference ID: 307 115 655#

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2023 IRP TAC 1 Introductions

John Lyons, Ph.D.
Technical Advisory Committee Meeting No. 1
September 26, 2023

Meeting Guidelines

- IRP team is in office Monday - Wednesday and also available by email, phone and Teams for questions and comments
- Stakeholder feedback responses shared with TAC at meetings, in Teams and in Appendix
- Working IRP data posted to Teams
- Virtual IRP meetings on Teams, in person available for full day meetings
- Final TAC presentations, meeting notes and recordings posted on IRP page

Virtual TAC Meeting Reminders

- Please mute mics unless speaking or asking a question
- Raise hand or use the chat box for questions or comments
- Respect the pause
- Please try not to speak over the presenter or a speaker
- Please state your name before commenting for the note taker
- This is a public advisory meeting – presentations and comments will be documented and recorded

Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington* every other year
 - Washington now requires IRP every four years and update at two years
- Guides resource strategy over the next twenty years
- Current and projected load & resource position
- Develop alternative load/customer forecasts
- Resource strategies under different future policies
 - Generation resource choices
 - Energy efficiency / demand response
 - Transmission and distribution integration
 - Avoided costs
- Market and portfolio scenarios for uncertain future events and issues

Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants involved in all or parts of the process
 - Ask questions
 - Always looking for help with soliciting new TAC members
- Open forum while balancing need to get through topics
- Welcome requests for studies or different assumptions.
- Available by email or phone for questions or comments between meetings

Today's Agenda

- 8:30 Introductions, John Lyons
- 8:45 CEIP Update, Kelly Dengel
- 9:15 TAC Process and Methods Proposals, James Gall
- 9:45 PLEXOS Overview and Back Cast Analysis, Mike Hermanson
- 10:45 Break
- 11:00 Available Resource Options Discussion, Lori Hermanson
- 11:30 Work Plan, John Lyons
- 12:00 Adjourn



Clean Energy Implementation Plan

Biennial Report Update

September 26, 2023 – IRP TAC Meeting

Agenda

- CETA/ CEIP Background
- CEIP Biennial Update:
 - Energy Supply Specific Actions
 - Customer Benefit Indicators
 - Energy Efficiency & Demand Response Specific Actions
 - Named Communities Investment Fund
 - Public Participation
 - Conditions

CETA / CEIP Background



**Clean Energy Transformation Act
(CETA) Law – May 2019**



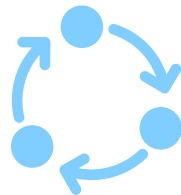
**Clean Energy Implementation
Plan (CEIP) – Every 4 Years**

Filed October 1, 2021, for 2022-2025 compliance period



**Clean Energy Progress
Report – Annually**

Filed June 29, 2023, for 2022 compliance period

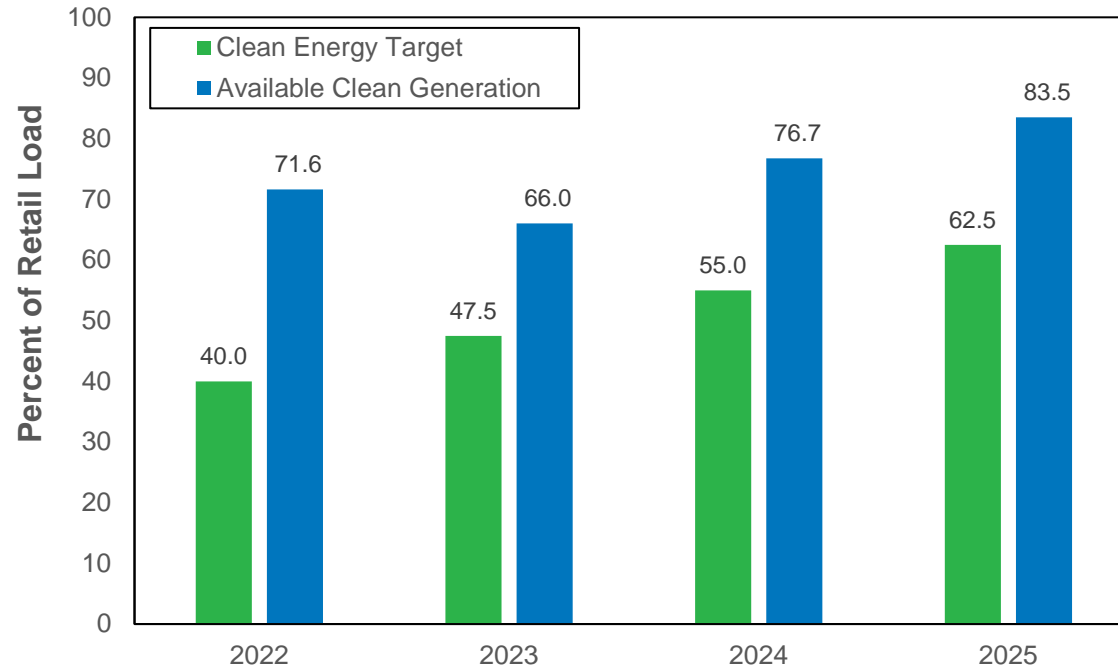


**Biennial CEIP – Every Two Years,
Except where a CEIP is required**

To be filed November 1, 2023

Energy Supply Specific Actions

Washington Clean Energy Targets



Notes:

- 1) Available generation through July 1, 2023, is actual generation;
- 2) Beyond July 1, 2023, assumes normal weather conditions;
- 3) Excess generation/ environmental attributes may be sold to reduce customer cost burden.
All excess 2022 environmental attributes were sold.

Energy Efficiency & Demand Response Specific Actions

- Demand Response Pilots for 2024-2025
- Small Business Lighting Direct-Install Program
- Avista-Spokane Tribe Energy Partnership
- Low Income Weatherization & Deferred Maintenance Pilot
- Named Communities Investment Fund



<https://www.myavista.com/energy-savings/rebate-overview>



Energy Smart Loans

Customer Benefit Indicators



Affordability

- Participation in Company Programs
- Households with High Energy Burden
- Residential Arrears & Disconnects



Energy Security & Resilience

- Energy Availability
- Energy Generation Location



Access to Clean Energy

- Methods/Modes of Outreach & Communication
- Transportation Electrification



Environmental

- Outdoor Air Quality
- Greenhouse Gas Emissions



Community Development

- Named Community Clean Energy
- Investments in Named Communities



Public Health

- Employee Diversity
- Supplier Diversity
- Indoor Air Quality

Named Communities Investment Fund

- Specific action dedicated to the *equitable distribution of energy and non-energy benefits and reduction in burdens* to Named Communities
- Funding is limited to 1% of retail revenue or ~ \$5.0 million annually

\$2M
Supplement
Energy Efficiency

\$1M
Investments in
Distribution Resiliency

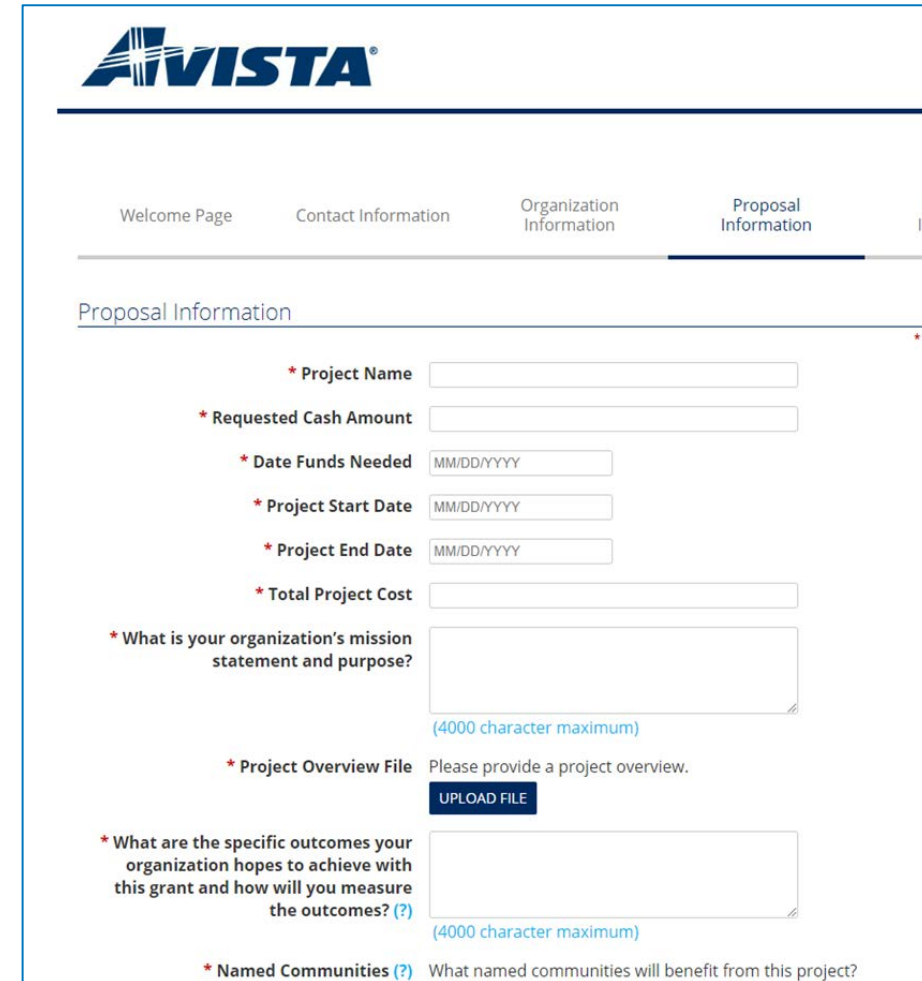
\$1M
Incentives & Grants
Customers/Third Parties

\$500,000
Outreach &
Engagement

\$500,000
Other Projects, Programs
or Initiatives

NCIF Application

- Open to government/community/non-profit agencies and organizations
- Establish a user ID and password
- Information about the applicant and proposal
- Application is open continuously
- Award decisions communicated within 45 days of submission



The screenshot displays the AVISTA logo at the top left. Below it is a navigation menu with the following items: Welcome Page, Contact Information, Organization Information, Proposal Information (which is highlighted with a blue underline), and an additional partially visible item. The main content area is titled "Proposal Information" and contains several required fields, each marked with an asterisk:

- * Project Name**: A text input field.
- * Requested Cash Amount**: A text input field.
- * Date Funds Needed**: A date input field with the format MM/DD/YYYY.
- * Project Start Date**: A date input field with the format MM/DD/YYYY.
- * Project End Date**: A date input field with the format MM/DD/YYYY.
- * Total Project Cost**: A text input field.
- * What is your organization's mission statement and purpose?**: A large text area with a blue note "(4000 character maximum)".
- * Project Overview File**: A section with the instruction "Please provide a project overview." and a blue "UPLOAD FILE" button.
- * What are the specific outcomes your organization hopes to achieve with this grant and how will you measure the outcomes? (?)**: A large text area with a blue note "(4000 character maximum)".
- * Named Communities (?)**: A section with the instruction "What named communities will benefit from this project?".

https://www.cybergrants.com/pls/cybergrants/quiz.display_question?x_gm_id=5440&x_quiz_id=11888

Equity Advisory Group's NCIF Prioritization

Rank	EAG NCIF Prioritized Initiatives
1	Focus efforts on improving energy efficiency (and EE awareness/education) for schools, community centers, and other places where Named Communities spend time
1	Focus efforts on improving energy efficiency for Spokane Tribe partners
2	Improve energy efficiency in multi-family and mobile home communities
3	Increase tree canopy and shade in Named Communities (consider tradeoffs with solar)
3	Increase access to energy efficient products and appliances for Named Communities
4	Increase awareness of and engagement in energy efficiency programs while also meeting whole-house needs through community-based partnerships and referrals to services
5	Set aside funds to match for energy efficiency grant applications for community organizations and tribal partners (could have higher feasibility)
6	Focus efforts on improving energy efficiency for community members without stable housing (consider including with other initiatives)

NCIF Requirements

Proposal assessments include:

- Serving Named Communities
- Equity Areas
- Customer Benefit Indicators



Customer Benefit Indicators

- Participation in Company Programs
- Number of households with a high energy burden
- Availability of Methods/Modes of Outreach & Communication
- Transportation Electrification
- Named Community Clean Energy
- Investments in Named Communities
 - Energy Availability
 - Energy Generation Location
 - Outdoor Air Quality
 - Greenhouse Gas Emissions
- Employee Diversity
- Supplier Diversity
- Indoor Air Quality

Named Communities Investment Fund Projects

Energy Efficiency

- Health & Safety for Mobile Homes
- EE for Affordable Housing
- EE for Homes in Malden, WA
- Lincoln County Fairgrounds Lighting
- Spokane Tribe Building Energy Audits
- EE for Spokane Tribe Buildings

Distribution Resiliency

- MLK Center – Solar & Battery Storage
- Town of Malden – Solar & Ground Source Heat Pump

Incentives & Grants

- Kids Making Sense – Air Monitors

Outreach & Engagement

- Public Participation Plan
- NCIF Online Application

Projects & Initiatives

- Medical Battery Back Up Pilot
- Christ Kitchen

Public Participation Updates

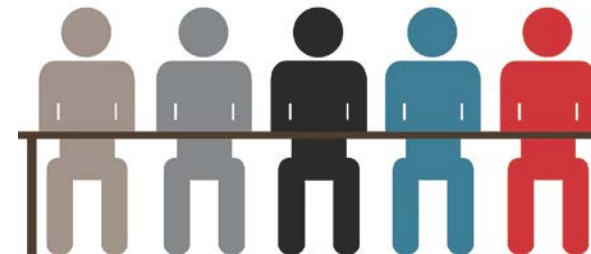


Avista's Public Participation Plan was filed May 1, 2023

- Mitigate public participation barriers
- Implement meaningful strategies to engage all customers including vulnerable populations and highly impact communities,
- Ensure the equitable distribution of energy and non-energy benefits

Public Participation Updates

- Multi-Language Strategy
- CEIP Newsletter
- Public Comment Form
- Frequently Asked Questions & Answers
- Public Participation Meeting
- Equity Advisory Group (EAG)



Conditions

38 Conditions across 11 categories

- Interim & Specific Targets
- Baseline Conditions
- Specific Actions
- Demand Response
- Distributed Energy Resources & Distribution Planning
- Energy Efficiency
- Customer Benefit Indicators
- Public Participation & Equity Advisory Group
- Incremental Cost of Compliance
- Integrated Resource Plan
- Cost Recovery



TAC Biennial CEIP Review

- Post on IRP Teams site October 1
- Deadline for comments/questions October 13, 2023
 - Contact Kelly Dengel, Kelly.dengel@avistacorp.com
- Include comments/questions in filing Biennial CEIP November 1, 2023

Thank You

www.myavista.com/ceta

ceta@avistacorp.com



Appendix

CEIP Conditions

Condition 1

Once the Commission has adopted final “use” rules in Docket UE-210183, in its Clean Energy Implementation Plan (CEIP) docket, if different than Table 2.1 on page 2-3 in the CEIP, Avista shall update its CEIP to reflect the percentage of retail sales of electricity supplied by non-emitting resources and renewable resources in 2020 within 30 days.

Condition 2

Avista will apply Non-Energy Impacts (NEIs) and Customer Benefit Indicators (CBIs) to all resource and program selections in determining its Washington resource strategy, in its 2023 Integrated Resource Plan (IRP) Progress Report and will incorporate any guidance given by the Commission on how to best utilize CBIs in CEIP planning and evaluation. Avista agrees to engage and consult with its applicable advisory groups (IRP Technical Advisory Committee (TAC) and Energy Efficiency Advisory Group (EEAG)) regarding an appropriate methodology for including NEIs and CBIs in its resource selection.

Condition 3

Regarding transparency of resource acquisitions, Avista will provide an update at its next IRP TAC meeting following the acquisition, of any material demand-side resource acquisition or utility scale resource acquisition with a term longer than 2 years.

Condition 4

While inclusion in the CEIP could factor into a prudence determination, Avista agrees not to rely solely on the 2021 CEIP to justify prudence of utility scale renewable resource acquisitions made on or after January 1, 2022. While the CEIP may include specific actions Avista may take to comply with CETA's clean energy targets, prudence determinations of utility scale renewable resource acquisitions will be made through the general rate case process.

CEIP Conditions

Condition 5

In its 2023 Biennial CEIP Update and in future CEIPs, Avista will include descriptions of quantitative (i.e., cost based) and qualitative (e.g., equity considerations) analyses that support interim targets to comply with the Clean Energy Transformation Act's (CETA) 2030 and 2045 clean energy standards.

Condition 6

In its 2023 Biennial CEIP Update and in future CEIPs, Avista will include quantitative and qualitative risk analysis, if risk is used to justify deviating from the lowest reasonable cost solution that complies with CETA.

Condition 7

Avista commits to the following minimum Interim Renewable Energy Targets for the 2022-2025 CEIP implementation period:

Year Interim Target

2022	40%
2023	47.5%
2024	55%
2025	62.5%

Condition 8

Avista in its IRP resource selection model for the 2023 IRP Progress Report will give the model the option to meet CETA goals with a choice between an Idaho allocated existing renewable resource at market price (limited to Kettle Falls, Palouse Wind, Rattle Snake Flats Chelan PUD purchase contracts 2 & 3) or acquiring a new 100% allocated Washington renewable resource for primary compliance. Further, the model will have the option to acquire new 100% allocated resource, market REC, or Idaho allocated REC (at market prices) to meet alternative compliance.

CEIP Conditions

Condition 9

Avista agrees to update and expand its Vulnerable Populations areas within its 2023 Biennial CEIP Update taking into account the additional criteria developed by the EAG and Energy Assistance Advisory Group (EAAG) and to ensure updates are in line with the definition of Vulnerable Populations outlined in RCW 19.405.020(40). Additional work is needed to develop a consistent methodology and data source identification. This additional work is primarily related to identifying a consistent data source(s) to evaluate each characteristic and then overlaying it onto a map.

Condition 10

By December 1, 2022, in collaboration with its EAG and EAAG and per WAC 480-100-640(5)(a) and (c), Avista agrees to identify at least one specific action that will serve a designated subset of Named Communities, to be funded by the Named Communities Investment Fund, and to identify and track all CBIs relevant to this specific action. The location identified for the specific action will be at the granularity of the designated Named Communities subset.

Condition 11

Avista will share and present the results, analysis, and conclusions of its pricing pilots with its EEAG, EAAG, and IRP TAC following the completion of the third-party evaluator's review of the pilots. If Avista develops pricing programs based on the results of its pricing pilots, it will work with its advisory groups to develop program targets.

Condition 12

When the Department of Commerce adopts a permanent standard for grid-enabled water heaters in WAC 194-24-180, Avista will develop a pilot demand response program. Avista will work with its EEAG on the pilot program implementation timing and how to incorporate results into its planning efforts.

CEIP Conditions

Condition 13

Avista will initiate its Distribution Planning Advisory Group (DPAG) no later than the end of 2022, and it must invite all existing advisory groups to participate in the new group. Avista acknowledges that stakeholders have limited resources and will consult between existing advisory groups and stakeholders regarding streamlining.

Condition 14

Avista will include a Distributed Energy Resources (DERs) potential assessment for each distribution feeder no later than its 2025 electric IRP. Avista will develop a scope of work for this project no later than the end of 2022, including input from the IRP TAC, EEAG, and DPAG. The assessment will include a low-income DER potential assessment. Avista will document its DER potential assessment work in the Company's 2023 IRP Progress Report in the form of a project plan, including project schedule, interim milestones, and explanations of how these efforts address WAC 480-100-620(3)(b)(iii) and (iv).

Condition 15

Avista agrees to evaluate the need for a targeted DER Request for Proposals (RFP) if a need is demonstrated as part of its DPAG process.

Condition 16

Avista will update its energy efficiency (EE) target no later than the 2023 Biennial CEIP Update, when the next Biennial Conservation Plan is due on November 1, 2023, based on continued discussion of its residential EE savings target and programs with its EEAG. Discussion will include program design elements which could promote more participation and additional uses of the Named Communities Investment Fund, if approved.

CEIP Conditions

Condition 17

As part of its CBI Participation in Company Programs, Avista agrees to track the number of residential appliance and equipment rebates provided to customers residing in Named Communities and the number of residential rebates provided to customers residing in rental units and commits to work to expand data availability during this CEIP period. Avista agrees to discuss programs to increase the number of participating households in Named Communities with its EEAG and move forward with feasible programs, if identified.

Condition 18

Avista agrees that the CBI – Number of Households with a High Energy Burden (>6%), will be separately tracked for all Avista electric customers, Known Low Income (KLI) customers and Named Communities. KLI customers are defined as those who have received energy assistance during the prior two years.

Condition 19

Avista agrees that for its CBI – Availability of Methods/Modes of Outreach and Communications, an additional metric will be identified to track increased availability of translation services by October 1, 2022. Once identified, a baseline for the metric will be established and the metric will be reported in the 2023 Biennial CEIP Update.

Condition 20

Avista agrees that for the CBI – Outdoor Air Quality, it will adopt a metric related to decreased wood use for home heating in its 2023 Biennial CEIP Update. The data included in this metric may include the data from the Company's wood stove replacement program offered in partnership with the Spokane Clean Air Agency, as well as data from other sources. Avista will work with its EEAG and other appropriate advisory groups to identify and evaluate additional wood stove usage metrics to be proposed in the 2023 Biennial CEIP Update, if applicable.

CEIP Conditions

Condition 21

Avista agrees that the CBI – Energy Availability will include a metric related to the frequency of customer outages for all customers, Vulnerable Populations, and Highly Impacted Communities.

Condition 22

Avista agrees to add the following CBI and metrics related to Energy Security:
CBI: Residential Arrearages and Disconnections for Nonpayment Measurement 1. Arrearages and 2. Disconnections

Condition 23

Avista must formally present and discuss any Joint Advocate or other stakeholder proposed CBI that was not included in the Company's filed CEIP and the final Commission approved CEIP with conditions, to its advisory groups, customers, and other interested stakeholders at a CEIP Public Participation Meeting(s) and at a separate joint advisory group meeting(s), to include the EEAG, EAAG, and EAG. Following these discussions and careful consideration of the feedback received, Avista will propose an updated set of CBIs and associated metrics in its 2023 Biennial CEIP Update.

Condition 24

Avista must engage collaboratively with its advisory groups (EAG, EEAG, EAAG) to create a metric for Indoor Air Quality and submit formal metric for evaluation no later than in its 2023 Biennial CEIP Update.

Condition 25

Avista agrees that in its 2023 Biennial CEIP Update and future CEIPs and CEIP updates, CBIs will be categorized by statutory benefit area.

CEIP Conditions

Condition 26

For the CBI – Named Community Clean Energy Avista agrees to eliminate the current metric on “percent non-emitting renewable energy located in Named Communities,” and instead measure the following in Named Communities: (1) total MWh of distributed energy resources 5 MW and under; (2) total MWs of energy storage resources 5 MW and under; and (3) number (i.e., sites, projects, and/or households) of distributed renewable generation resources and energy storage resources.

Condition 27

Avista's EAG shall not be responsible for the designation of Highly Impacted Communities and the Company's advisory groups should be facilitated such that this designation is not under consideration.

Condition 28

Avista will include a publicly available and regularly updated list of its EAG members and their organization or community affiliations on its website and in future Biennial CEIP Updates and CEIPs.

Condition 29

Avista agrees that all future EAG meetings will be fully open to the public.

CEIP Conditions

Condition 30

On or before October 1, 2022, Avista must file with the Commission:

- a. A progress report on what actions have been taken since October 2021 to reduce barriers to public participation (e.g., steps taken to reduce barriers including but not limited to non-English speaking customers).
- b. An update to the Company's customer engagement plan it will implement during the 2022-2025 timeframe and provide a progress report of this plan in the 2023 Biennial CEIP Update.

Condition 31

On or before October 1, 2022, Avista agrees to provide in its CEIP docket a report on the changes regarding the EAG Equity Lens Sessions discussed and made with the EAG in March 2022, the facilitator, and the Company.

Condition 32

Avista will participate in any further discussions and/or workshops regarding incremental cost calculations and incorporate any changes necessary to their methodology.

Condition 33

Avista agrees to model a scenario in the 2025 Electric IRP meeting the minimum level of primary compliance requirements beginning in 2030 that will create the glide path to 2045. If the results of this modeling differ from the Company's PRS and Clean Energy Action Plan, it must explain why.

CEIP Conditions

Condition 34

For its 2023 IRP Progress Report, Avista commits to reevaluate its resource need given acquisitions the Company has made since its 2021 IRP (e.g., Chelan PUD hydro slice contracts) and include those proposed changes in its 2023 Biennial CEIP Update.

Condition 35

Avista recognizes that not all CBIs will be relevant to resource selection (for example, some CBIs pertain to program implementation). For its 2023 IRP Progress Report, and future IRPs and progress reports, Avista should discuss each CBI and where the CBI is not relevant to resource selection, explain why.

Condition 36

For its 2023 IRP Progress Report, Avista will:

- a. At the September 28, 2022, Electric IRP TAC meeting, present draft supply side resource cost assumptions, including DERs. The Company commits to revising said cost assumptions if TAC stakeholder feedback warrants changes. Avista will update its 2023 Electric IRP Work Plan (UE-200301) to reflect the date of this TAC meeting.
- b. Use the Qualifying Capacity Credit (QCC) for renewable and storage resources from the Western Power Pool's Western Regional Adequacy Program (WRAP), if available, or explain why the WRAP's QCCs are inappropriate for use.
- c. Update its load forecast to include the baseline zero emission vehicle (ZEV) scenario from its Transportation Electrification Plan.

CEIP Conditions

Condition 37

In order to provide a means of recovery of prudently incurred costs associated with implementing this CEIP and associated conditions, the Company will file a separate accounting petition to address deferred accounting for such costs until they are reviewed and deemed prudent for recovery or not by the Commission.

Condition 38

Avista must choose at least two of its current CBIs which it will track for at least five subsets of Named Communities, at a granularity to be determined by agreement with Staff, stakeholders, and the Company's Equity Advisory Group. Avista will incorporate relevant updates in its 2023 Biennial CEIP update.



IRP TAC Process Change Ideas and Modeling Change Ideas

James Gall
Technical Advisory Committee Meeting No. 1
September 26, 2023

TAC Communication

Propose to use Microsoft Teams for primary TAC communication

- Advantages
 - File sharing ease
 - Open communication via chat function on files or questions to Avista or other TAC members
 - Eliminates email traffic for passive TAC members
 - TAC meeting recordings and chat messages are retained
- Avista will still post TAC meetings and slides on website
 - Documents/files shared with the TAC will be on Teams
 - Only “final” documents will be posted on website
- Avista will direct new interested TAC members to sign up to join the “Teams site”
- TAC meeting invites will come through Teams and email
- Electric and Natural Gas TAC members will have access to both “channels” on Teams

New IRP TAC Teams Site

The screenshot shows a Microsoft Teams interface. At the top, there is a search bar and a user profile icon. The left sidebar contains navigation icons for Activity, Chat, Teams, Calendar, Calls, Viva Engage, Files, and Apps. The main area displays the 'Electric' team chat. A message from 'Gall, James' at 11:24 AM says 'Welcome to the Avista Electric IRP Technical Advisory Committee'. Below the message is a 'Reply' button. In the center, there is an illustration of two people talking, with a speech bubble and an '@' symbol. Below this, the text reads 'Let's get the conversation started' and 'Try @mentioning people you want to collaborate with, or add some tabs to customize your space.' At the bottom, there are icons for 'Polly', 'Freeha...', 'Matter', and 'Add tab'. A 'New conversation' button is located at the bottom center. The bottom left corner has a 'Join or create a team' button and a 'Help' icon.



WUTC Notice on Electric IRP's



- Commission is discontinuing its practice of issuing acknowledgment letters for electric utility IRPs in all cases.
- Under CETA, the CEIP must be “consistent with the utility’s long-range integrated resource plan” and “informed by the investor-owned utility’s clean energy action plan,” which is developed as part of an electric IOU’s IRP. Therefore, any issues that interested parties may have related to an IRP can be litigated and decided by the Commission as part of a CEIP proceeding.
- As part of the Commission’s effort to reduce unnecessary administrative burden and duplicative processes, we are discontinuing our practice of issuing acknowledgment letters for electric IRPs in all cases.

Action Item Update

- Incorporate the results of the DER potential study where appropriate for resource planning and load forecasting.
- Finalize the Variable Energy Resource (VER) study. This study outlines the required reserves and cost of this energy type. Results of this study will be available for use in the 2025 IRP.
- Study alternative load forecasting methods, including end use load forecast considering future customer decisions on electrification. Avista expects this Action Item will require the help of a third-party. Further, studies shall continue the range in potential outcomes.
- Investigate the potential use of PLEXOS for portfolio optimization, transmission, and resource valuation in future IRPs.
- Continue to work with the Western Power Pool's WRAP process to develop both Qualifying Capacity Credits (QCC) and Planning Reserve Margins (PRM) for use in resource planning.
- Evaluate long-duration storage opportunities and technologies, including pumped hydro, iron-oxide, hydrogen, ammonia storage, and any other promising technology.
- Determine if the Company can estimate energy efficiency for Named Communities versus low-income.
- Study transmission access required to access energy markets as surplus clean energy resources are developed.
- Further discuss planning requirements for Washington's 2045 100% clean energy goals.

Plexos Introduction

- PLEXOS is a production cost model developed by Energy Exemplar
- The model benefits from a mixed integer-based design
- Avista plans to use the technology for portfolio modeling in the 2025 for resource valuation and market risk analysis
- Why did Avista bring in Plexos?
 - More sophisticated hydroelectric modeling capability than Aurora
 - Allows for proper valuation of energy storage benefits and needs, along with reserve costs associated with VERs due to mixed-integer logic
 - Capable of modeling transmission system detail
 - Potential PRiSM replacement- includes capacity expansion function
 - Potential use for combining power and natural gas IRPs

Load Forecast Update

- Avista has brought on Applied Energy Group (AEG) to conduct a long-term forecast of customer loads (Natural Gas & Electric)
- End use load forecast technique to better understand how loads will change due to electrification potentials
- Forecast will be consistent with DER potential study focusing on on-site solar and vehicle electrification
- AEG will provide three scenarios (expected case, low, and high)
- Process should enhance demand response and energy efficiency potential assessments

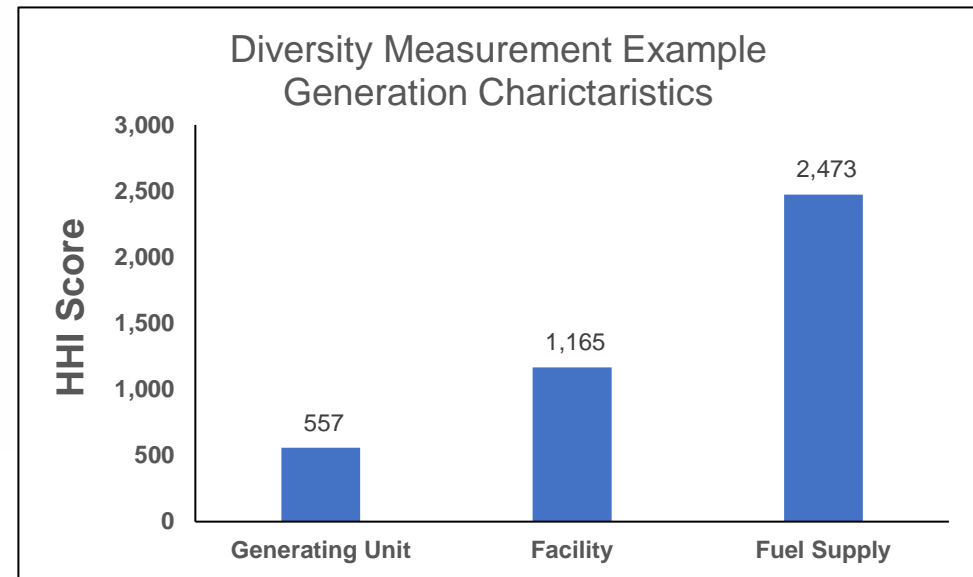
PRiSM Update

- Avista plans to continue to use PRiSM in the 2025 IRP
- Avista will test PLEXOS and compare results for potential replacement in the 2027 IRP
 - Why not now?
 - Time to build/test models
 - Energy efficiency modeling
 - Speed
- Testing Natural Gas IRP in PRiSM
 - Co-optimize natural gas system and electric capacity expansion to electrification choices are dynamic

Resiliency

- How should we include resiliency?
 - Feeder or customer level seems out of scope for an IRP
 - Generation sources and delivery seems plausible
- Can resource diversification measure resiliency?
- Quantification can indicate risks and could lead to different resource choices during acquisition.
 - Herfindahl – Hirschman Index
 - Measures whether or not a population is too heavily dependent on one component
- Any other resiliency ideas?

- Potential Metrics
 - Seasonal plant & unit (shaft risk)
 - Location fuel source
 - Transmission path
 - Wildfire risk level areas
 - Load diversity?





PLEXOS Overview and Back Cast Analysis

Mike Hermanson, Senior Power Supply Analyst
Technical Advisory Committee Meeting No. 1
September 26, 2023

Power Supply Modeling in the IRP Process

- Analytical framework to determine the long-run economic and operational performance of alternative resource portfolios
- Modeling is used to simulate the integration of new resource alternatives within our existing resource mix, thereby informing the selection of a preferred portfolio judged to be the most cost-effective resource mix after considering:
 - Risk
 - Supply reliability
 - Uncertainty
 - Government energy resource policies
- Avista utilizes multiple models in the IRP Process:
 - Aurora: Electric Price Forecast
 - Plexos: Dispatch of resources to meet projected load demands
 - PRiSM: Selection of new resources

Plexos

- Plexos is a widely used energy modeling software suite designed for electricity market analysis and power system optimization. It is used to make informed decisions about energy production, transmission, and distribution. Key aspects of the model include:
 - **Market Simulation:** allows users to simulate and analyze electricity markets, considering various factors such as supply, demand, pricing, and market rules. This provides insight into market dynamics and energy trading optimization.
 - **Power System Optimization:** optimizes power system operations including generation scheduling, unit commitment and dispatch. Multiple objectives such as minimizing cost, maximizing reliability, or reducing emissions can be set as targets.

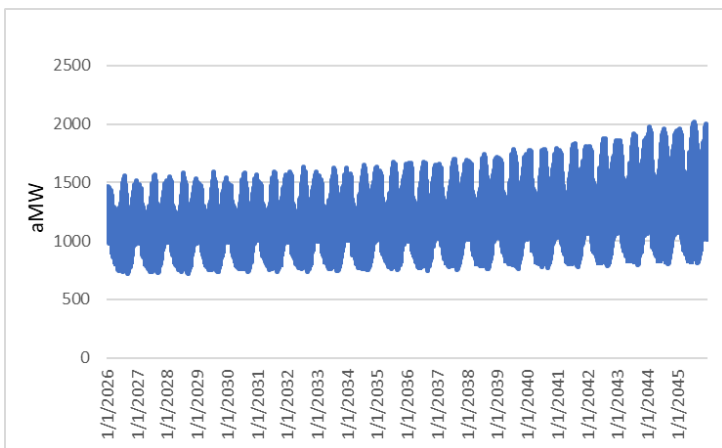
Plexos

- **Integration of Renewable Energy:** Plexos can incorporate renewable energy sources like wind and solar, assisting planners to assess the impact of variable generation on the power grid.
- **Transmission Planning:** It supports transmission system planning and expansion studies allowing the inclusion of transmission upgrade costs associated with potential resource additions.
- **Hydro Modeling:** Storage Hydro is modeled utilizing water inflow and reservoir sizes. Operational aspects such as scheduled maintenance, forced outages, minimum flows, maximum reservoir movement are all modeled. This is in comparison to the monthly energy values utilized in Aurora.

Plexos Implementation of Avista System

- The Plexos IRP model is a 20-year simulation to meet native load and contractual obligations with Avista owned generation, contracted generation, and market purchases.

Hourly Native Load



We are currently working with a consultant on a load forecast.

Some considerations include:

- Climate change impacts on load,
- Variability and uncertainty in EV load forecasts
- Penetration of electrification efforts

Avista owned & contracted generation



Generation considerations include:

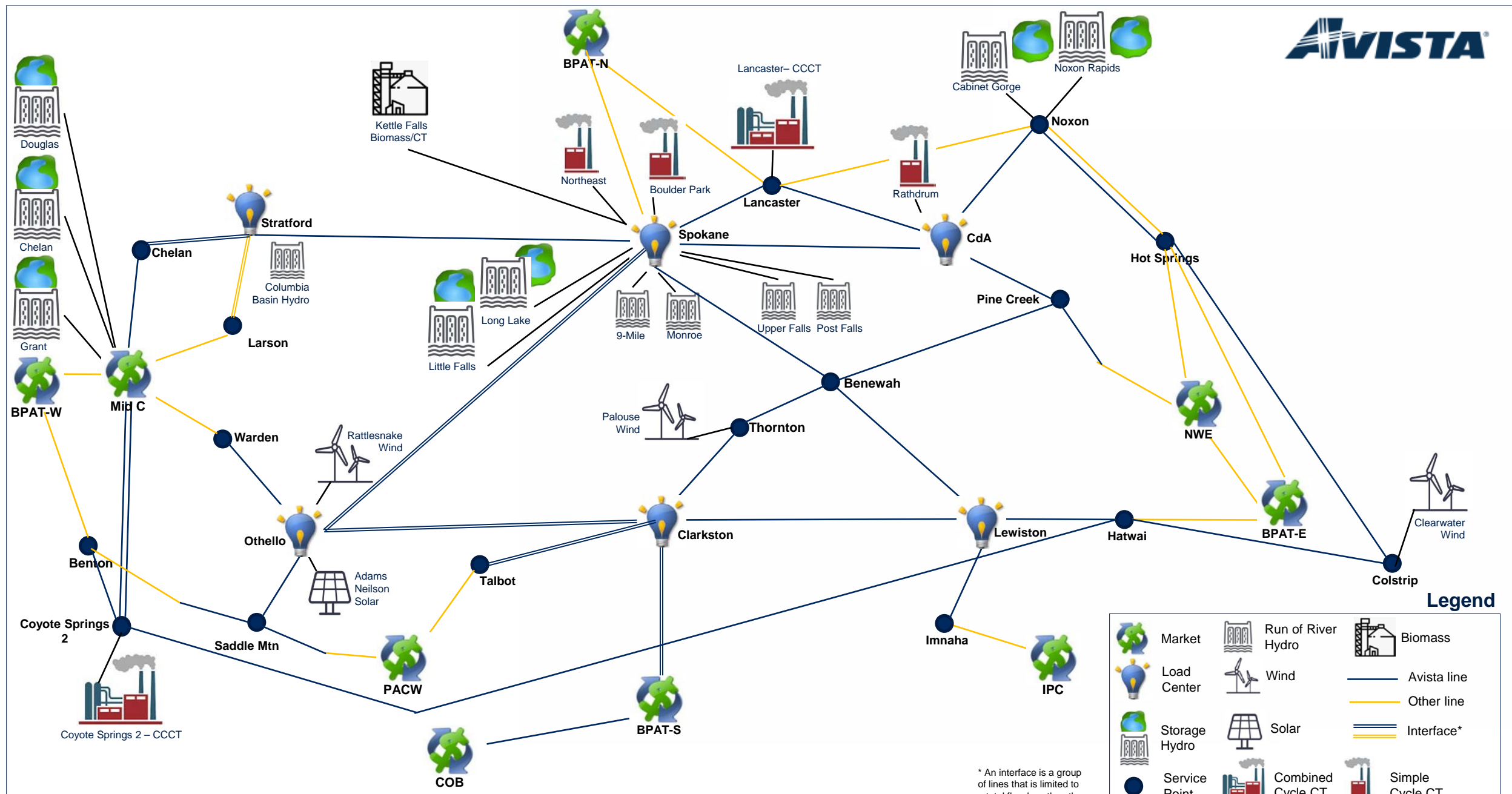
- Regular scheduled maintenance and forced outages
- Timing and quantity of hydro and impact of climate change throughout the planning horizon
- Provision of ancillary services/reserves
- VER production
- Fuel cost

Market Purchases/Sales



Market Purchases are driven by Mid-C hourly price and any transmission constraints

Native load + contractual obligations = generation + market purchases and sales every hour



Legend

	Market		Run of River Hydro		Biomass
	Load Center		Wind		Avista line
	Storage Hydro		Solar		Other line
	Service Point		Combined Cycle CT		Interface*
			Simple Cycle CT		

* An interface is a group of lines that is limited to a total flow less than the sum of all individual max line flows

Plexos Representation of Transmission System & Generation

Plexos Implementation of Avista System

The screenshot shows the PLEXOS 9.100 R04 x64 Edition software interface. The left sidebar displays a tree view of system components under 'Avista_Base_Hydro_Model (9.100 R04)_base_model 6_14_23_volume'. The main window displays a table of properties for 'Clark Fork River'.

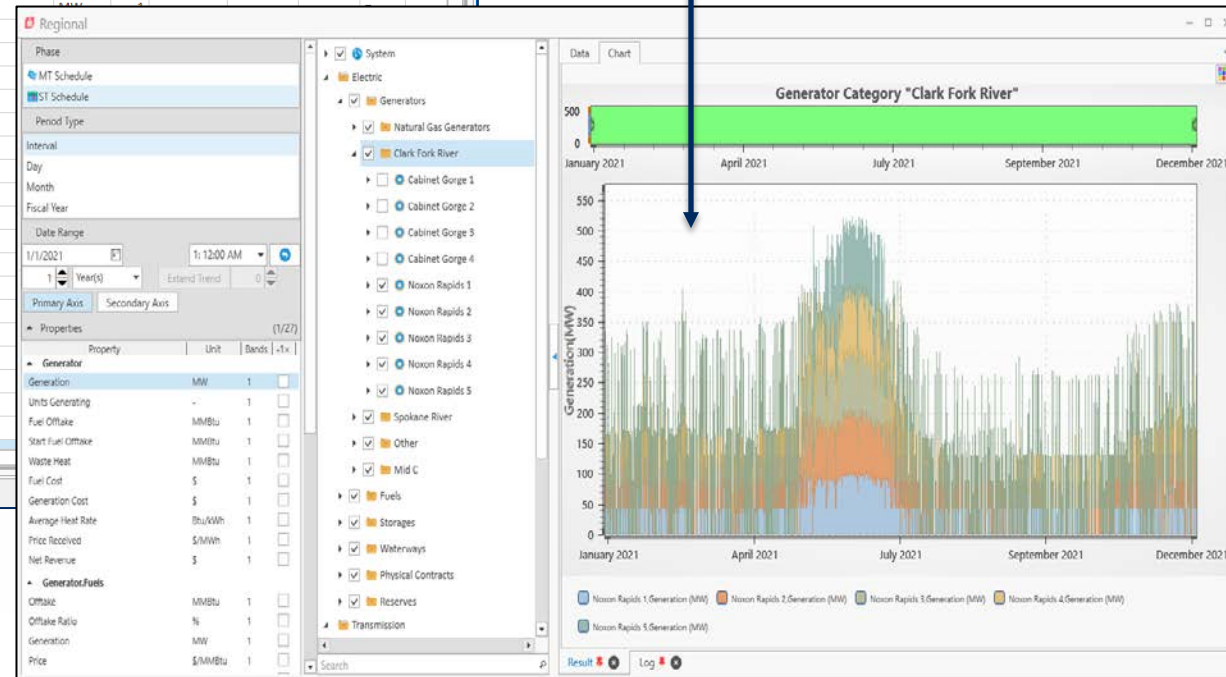
Category	Template	Heat Input	Fuels	Start Fuels	Head Storage	Tail Storage	Power Station	Nodes	Compa...	Maintenances
Clark Fork River			Hydro		Noxon	Cabinet		AVA_Sys	Avista	

Collection	Parent Object	Child Object	Property	Value	Data File	Units	Band	Date From	Date To	Timeslice	Action	Expres
Generators	System	Noxon Rapids 1	Units	1		-	1				=	
Generators	System	Noxon Rapids 1	Max Capacity	108.4								
Generators	System	Noxon Rapids 1	Min Stable Level	45.7								
Generators	System	Noxon Rapids 1	Load Point	45.7								
Generators	System	Noxon Rapids 1	Load Point	90.3								
Generators	System	Noxon Rapids 1	Load Point	108.4								
Generators	System	Noxon Rapids 1	Rating Factor	95								
Generators	System	Noxon Rapids 1	Efficiency Base	105								
Generators	System	Noxon Rapids 1	Efficiency Incr	157.3								
Generators	System	Noxon Rapids 1	Efficiency Incr	157.3								
Generators	System	Noxon Rapids 1	Efficiency Incr	100.4								
Generators	System	Noxon Rapids 1	Units Out	1								
Generators	System	Noxon Rapids 1	Outage Rating	0								
Generator.Constraints	Noxon Rapids 1	Generation Reserves	Generation Coefficient	-0.03								
Reserve.Generators	Frequency response	Noxon Rapids 1	Max Response	9								
Reserve.Generators	Non Spinning-Gen	Noxon Rapids 1	Max Response	100								
Reserve.Generators	Non Spinning-Load	Noxon Rapids 1	Max Response	100								
Reserve.Generators	Regulation	Noxon Rapids 1	Max Response	100								
Reserve.Generators	Regulation Down	Noxon Rapids 1	Max Response	100								
Reserve.Generators	VERs	Noxon Rapids 1	Max Response Factor	100								

System Components

Properties of each component

Results



Plexos Implementation of Avista System

- Modeling challenges
 - Model has perfect foresight
 - Difficult to capture the myriad of constraints on a hydro storage system.
 - For example, management of a reservoir that is used for recreation and has residences on much of the shoreline
 - Balance between model complexity and runtimes
 - Difficult to capture the dynamics of trades that happen at different time steps, for example, day ahead, hour a head, EIM.
 - How to integrate forecast error in modeling
- Model will almost always have lower production cost than actual.

2021 Backcast – Plexos vs Actual Dispatch

- To verify that our model represented our system operation and dispatch we utilized 2021 inputs and compared the output of Plexos to actual 2021 data. In the model we utilized:
 - 2021 Hourly Load
 - Hourly hydro inflows
 - Hourly run-of-river generation
 - Hourly Mid-C Electric Price
 - Daily Gas Prices
 - Hourly renewable generation
 - Actual scheduled and forced outages
 - Reserves, including FRR, Non-Spin, Reg up and down, and VERs

2021 Backcast Dispatch Comparison (aMW)

Facility	Actual Gen	Plexos Gen	Difference
Noxon Rapids	179.8	178.5	-1.3
Cabinet Gorge	113.8	112.4	-1.4
Long Lake	54.6	54.4	-0.2
Little Falls	23.7	23.2	-0.5
Mid Columbia	135.7	138.9	3.1
Coyote Springs 2	175.2	172.2	-2.9
Lancaster	207.8	205.2	-2.6
Rathdrum	20	18.1	-1.9
Boulder Park	7.9	7.7	-0.2
Kettle Falls GS	37	37.1	0.1
Kettle Falls CT	0.4	0.5	0.1
Colstrip	173.7	174.1	0.4
TOTAL	1,130	1,122	-7

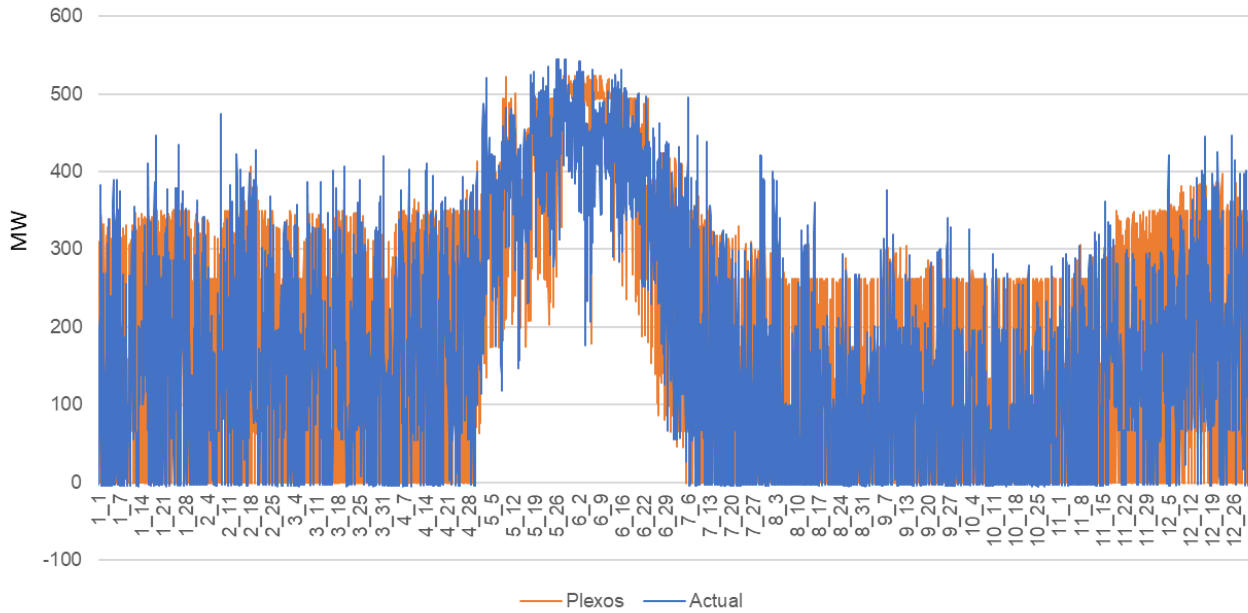
Production Cost Comparison

0.96% difference between mark to market of generation subtracting fuel costs

2021 Backcast Dispatch Comparison

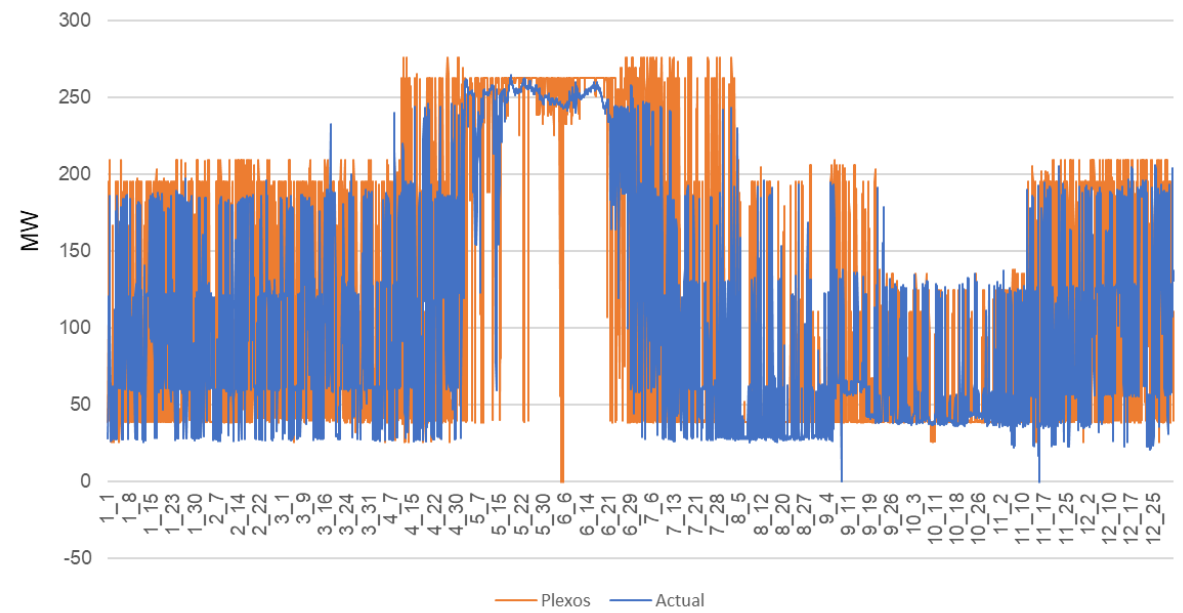
Average Generation:
Plexos - 178.5 aMW
Actual - 179.8 aMW

Noxon 2021 Hourly Generation Comparison



Average Generation:
Plexos - 112.4 aMW
Actual - 113.8 aMW

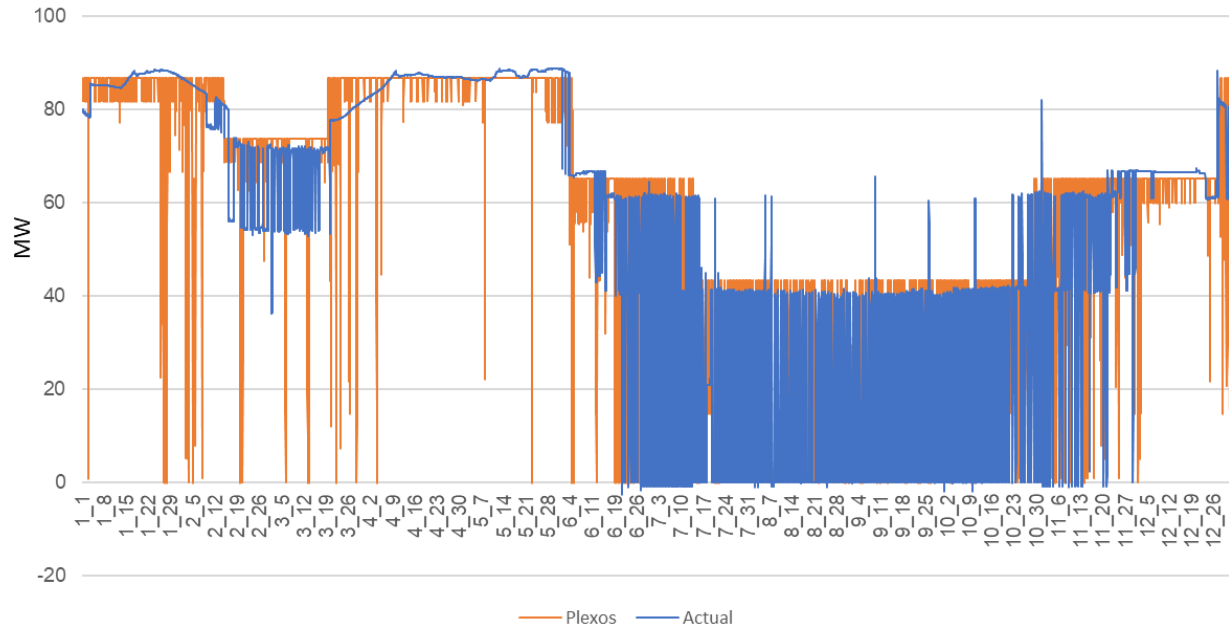
Cabinet 2021 Hourly Generation Comparison



2021 Backcast Dispatch Comparison

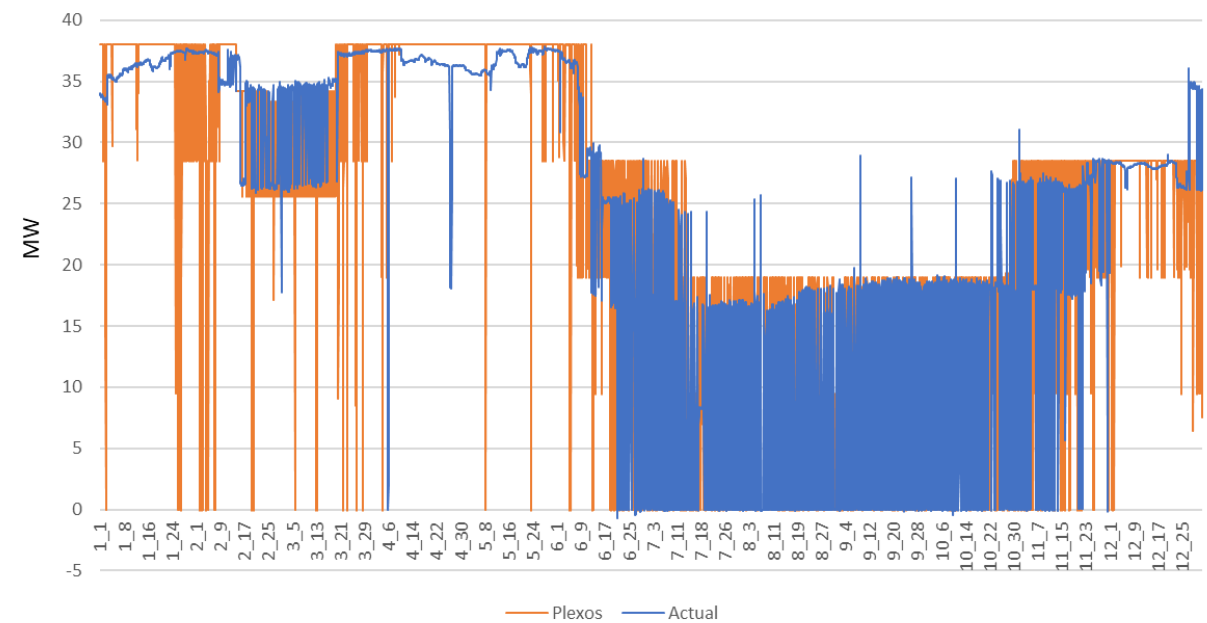
Average Generation:
Plexos - 54.4 aMW
Actual - 54.6 aMW

2021 Long Lake Hourly Generation Comparison



Average Generation:
Plexos - 23.7 aMW
Actual - 23.2 aMW

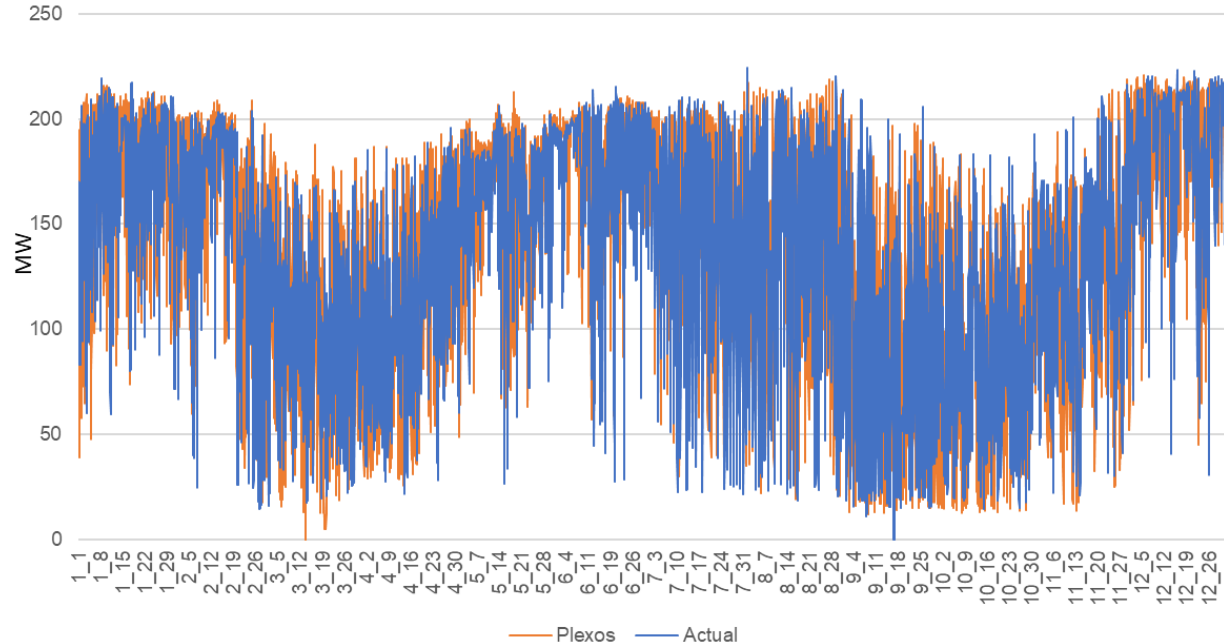
2021 Little Falls Hourly Generation Comparison



2021 Backcast Dispatch Comparison

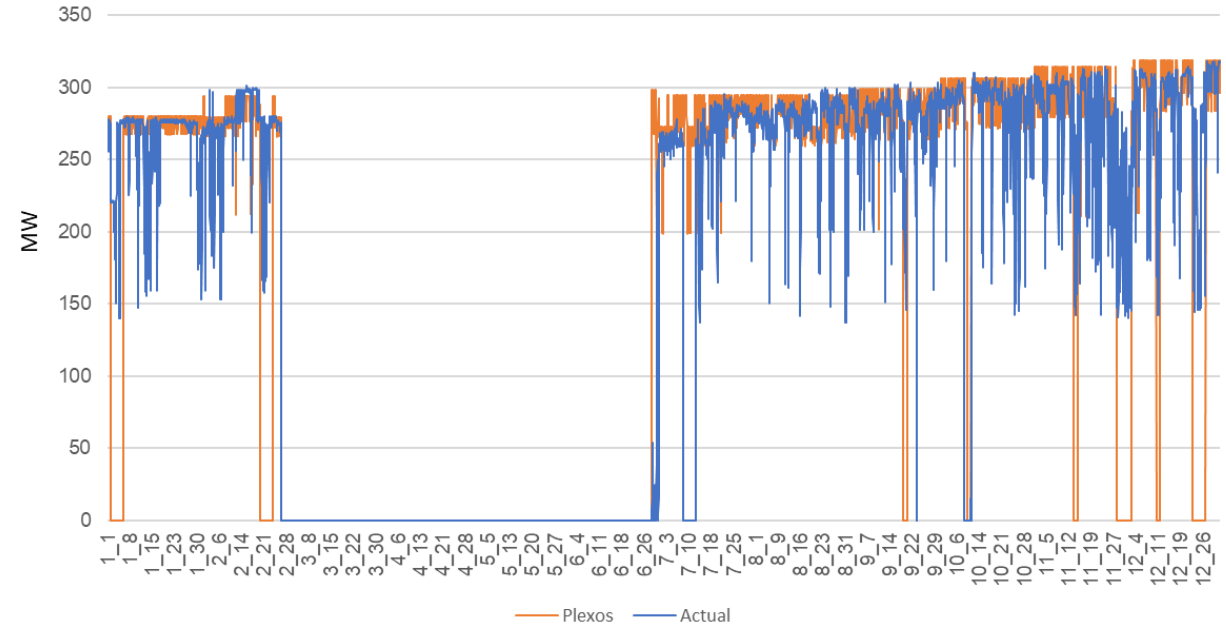
Average Generation:
Plexos - 135.7 aMW
Actual - 138.9 aMW

2021 Mid Columbia Hourly Generation Comparison



Average Generation:
Plexos - 172.2 aMW
Actual - 175.2 aMW

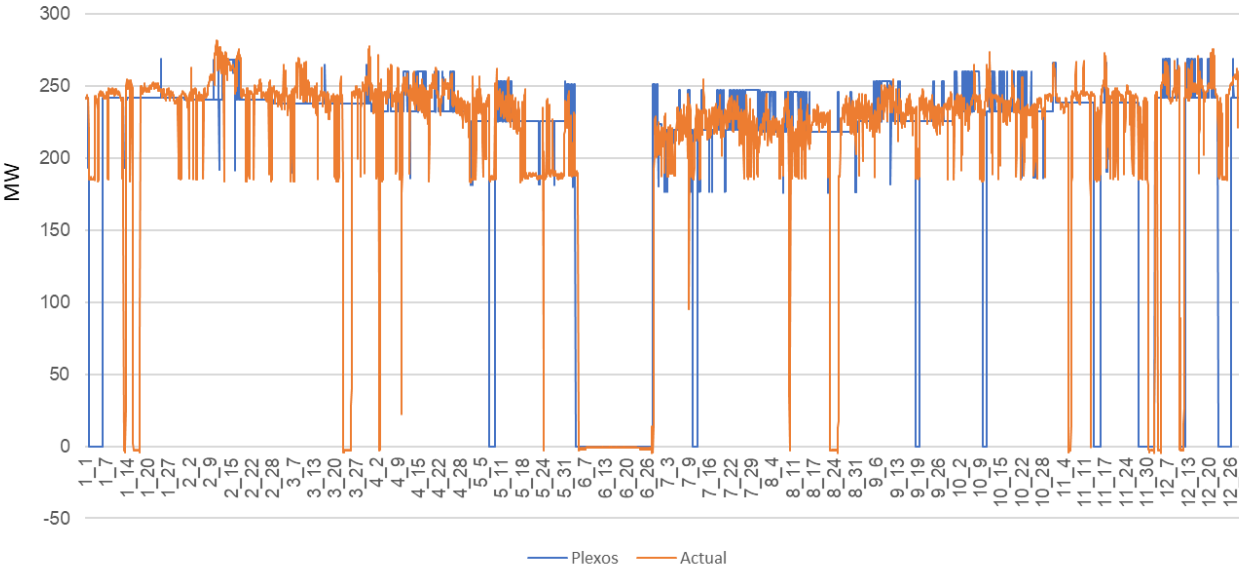
2021 Coyote Springs 2 Hourly Generation Comparison



2021 Backcast Dispatch Comparison

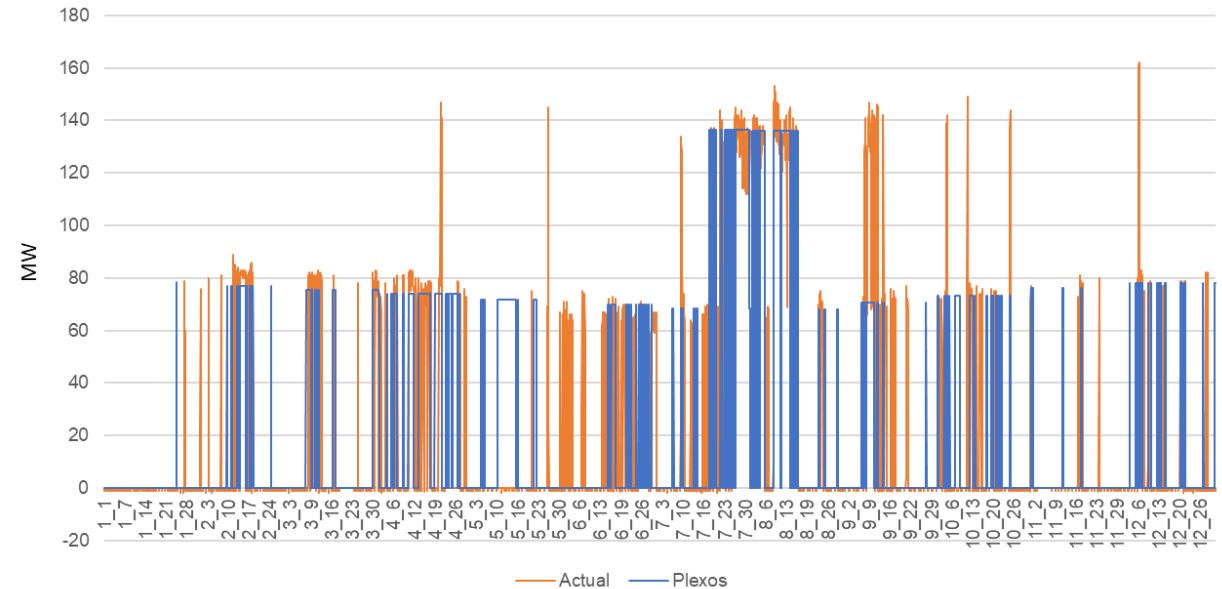
Average Generation:
Plexos - 207.8 aMW
Actual - 205.2 aMW

2021 Lancaster Hourly Generation Comparison

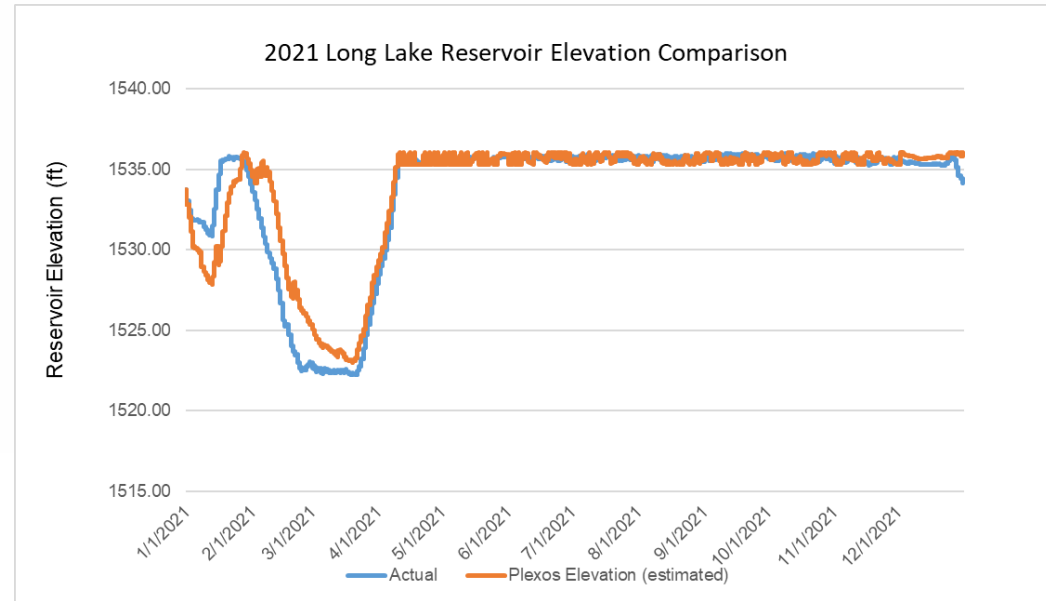
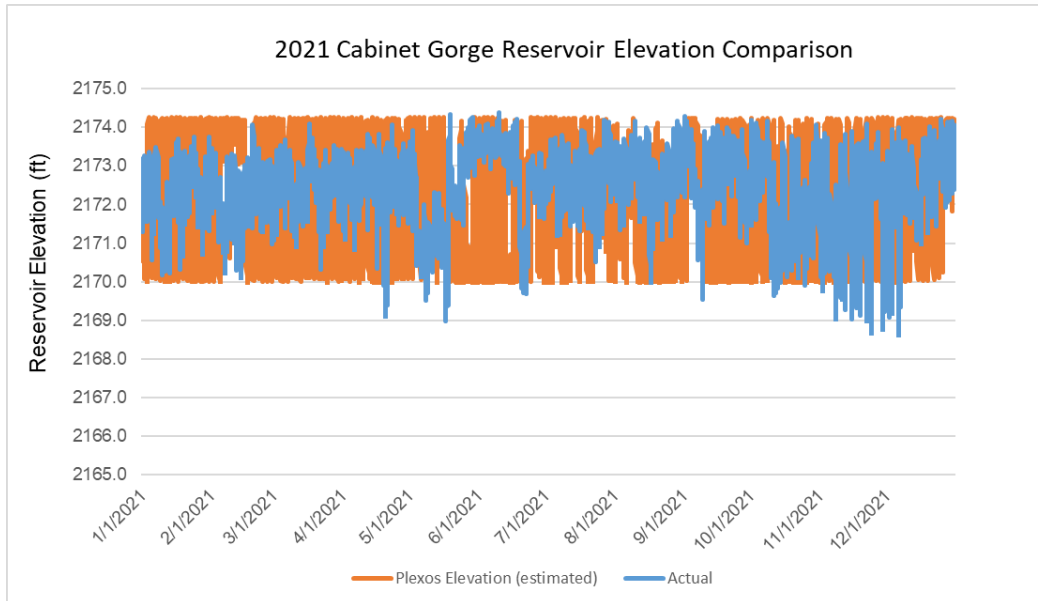
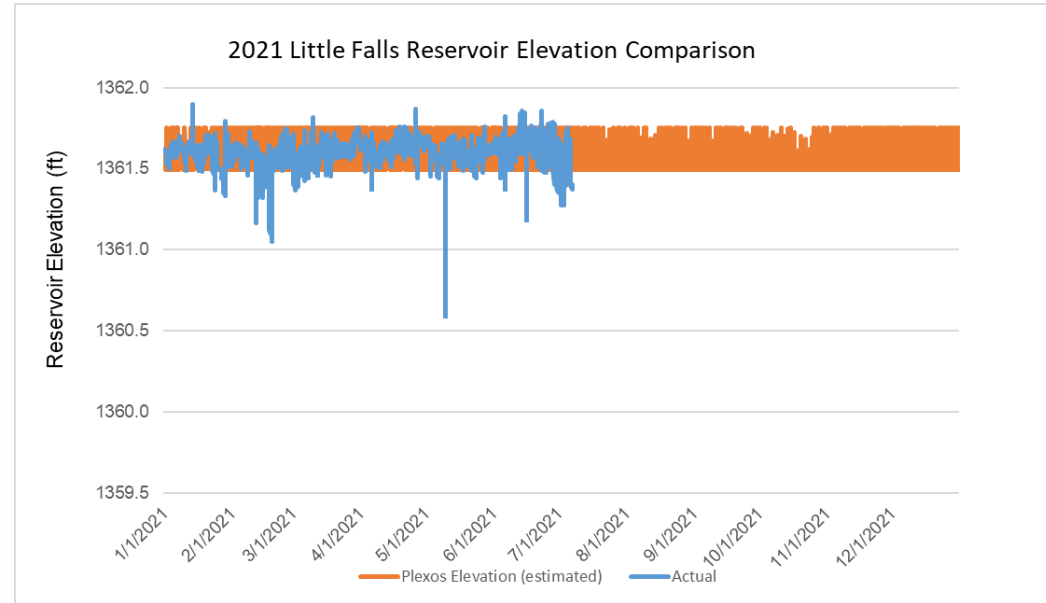
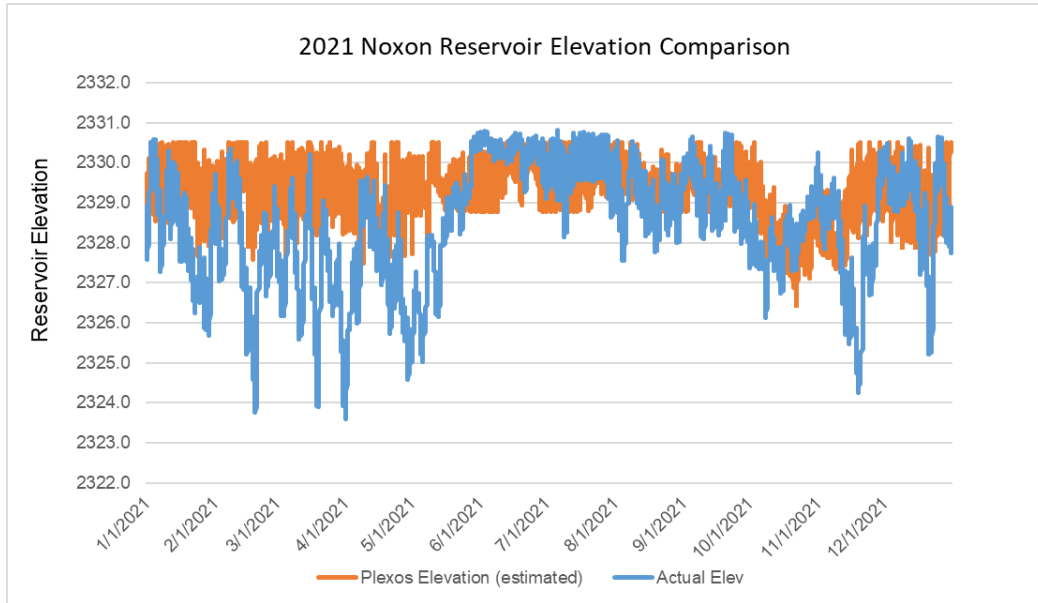


Average Generation:
Plexos - 18.1 aMW
Actual - 20.0 aMW

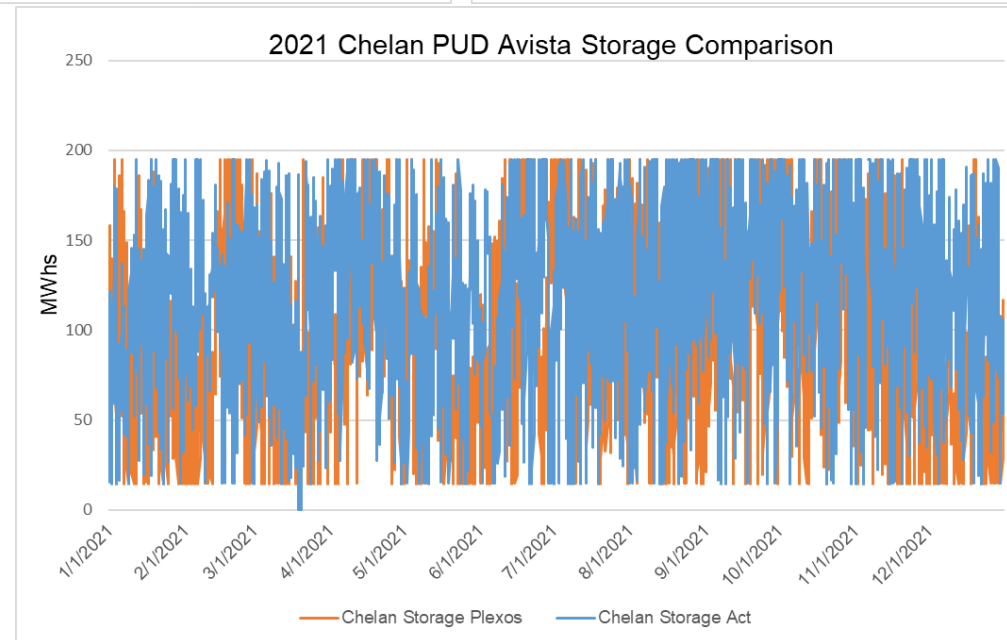
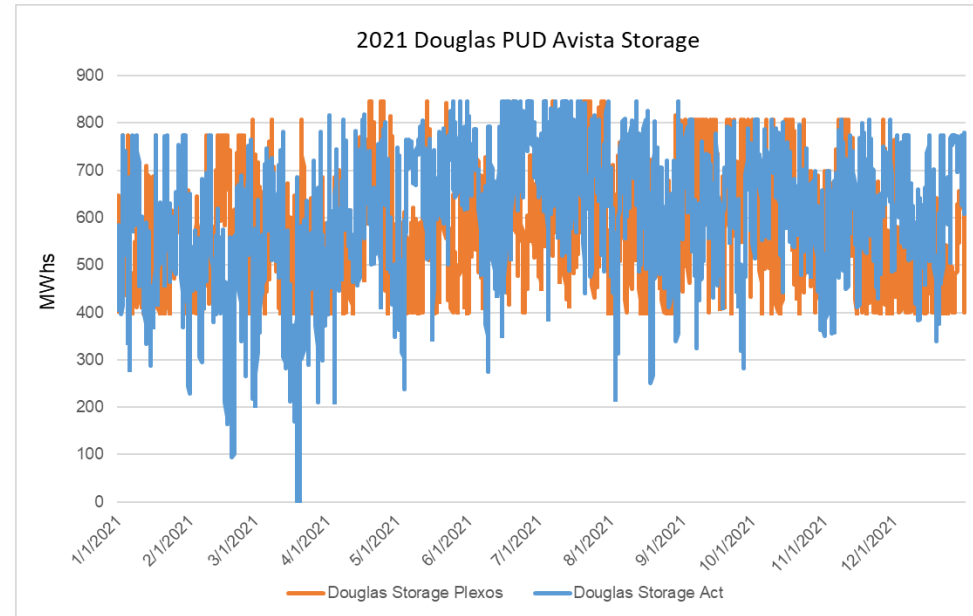
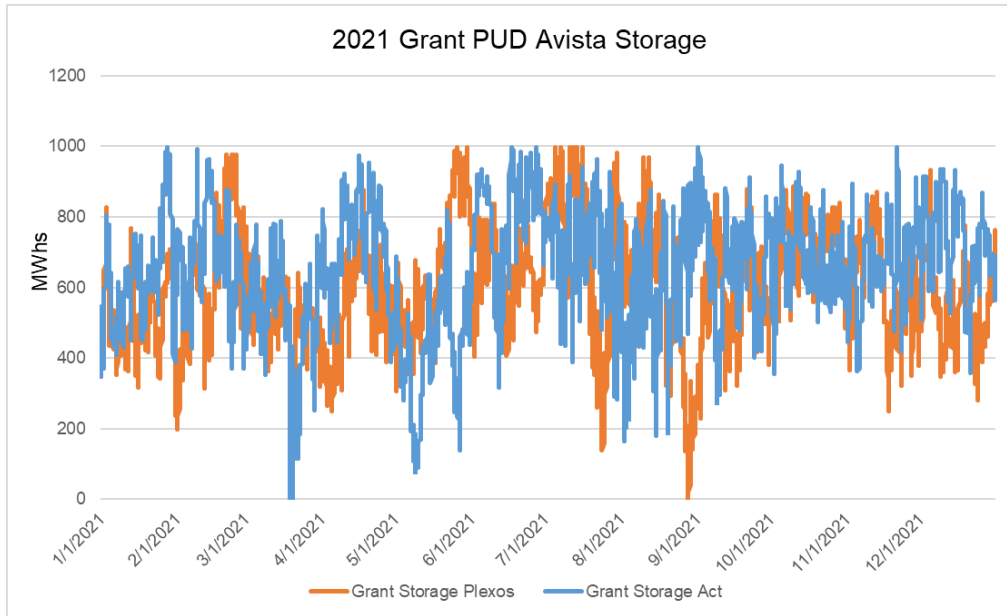
2021 Rathdrum Hourly Generation Comparison



2021 Backcast Reservoir Elevation Comparison



2021 Backcast Reservoir Elevation Comparison





Available Resource Options

Lori Hermanson
Technical Advisory Committee Meeting No. 1
September 26, 2023

Turbine Resource Options

Peakers

- Simple Cycle Combustion Turbine (CT)
 - CT Frame
 - 180 MW (2 units)
- Reciprocating Engines
 - 185 MW (10 units)

Baseload

- Combined Cycle CT (CCCT)
 - 312 MW (1x1 w/DF)

Fuels

- Natural gas
- Renewable natural gas
- Hydrogen
 - Ammonia
 - Synthetic natural gas

- Natural gas turbines are modeled using a 30-year life with Avista ownership
- Will continue to evaluate non-natural gas fueled resources in Washington and all fuel types in Idaho
- Will continue to evaluate potential upgrade opportunities on existing facilities

Renewable Resource Options – Solar and Wind

All Purchase Power Agreement (PPA) Options

Solar

- Residential (6 kW AC) – w/ and w/o battery
- Commercial (1 MW AC) – w/ and w/o battery
- Fixed PV Array (5 MW AC) – w/ and w/o battery
- Single Axis Tracking Array
 - With and w/o 100 MW 4-hour lithium-ion battery
 - With 100 MW 2-hour lithium-ion battery
 - With 50 MW 4-hour lithium-ion battery

Wind

- Wind (100 MW)
- Montana wind (100 MW)
- Offshore wind (100 MW)
 - Share of a larger project

Other “Clean” Resource Options

- Geothermal PPA (20 MW)
 - Off-system
- Biomass (58 MW)
 - i.e. Kettle Falls 3 or other
- Nuclear PPA (100 MW)
 - Off-system share of a mid-size facility
- Fuel Cell (25 MW)

Storage Technologies

Lithium-Ion

- Assumes: 86% round trip efficiency (RTE), 15-year operating life
- Assumes Avista ownership
- 5 MW Distribution Level
 - 4 hours (20 MWh)
 - 8 hours (40 MWh)
- 25 MW Transmission Level
 - 4 hours (100 MWh)
 - 8 hours (200 MWh)
 - 16 hours (400 MWh)

Other Storage Options

- Assumes Avista ownership
- 25 MW Vanadium Flow (70% RTE)
 - 4 hours (100 MWh)
- 25 MW Zinc Bromide Flow (67% RTE)
 - 4 hours (100 MWh)
- 25 MW Liquid Air (65% RTE)
 - 8 hours (400 MWh)
- 100 MW Iron Oxide (65% RTE)
 - 100 hours
- 100 MW Pumped Hydro
 - 24 hours (2,400 MWh)
- 100 MW Pumped Hydro
 - 10 hours (1,000 MWh)

Resource Option Currently Being Researched

- Carbon capture and storage
- Fusion reaction (no real costs yet)
- Organic Solid Flow energy storage – proprietary nonflammable mixture of solid and water-based electrolytes
- Molten salt heat storage (using existing steam turbines)
- New hydro
- Regional hydro PPAs
- Others?



2023 IRP Work Plan

John Lyons, Ph.D.
Technical Advisory Committee Meeting No. 1
September 26, 2023

2025 IRP Work Plan

- IRP regulations require an IRP to be filed in Idaho by June 1, 2025, and an IRP in Washington on January 1, 2025.
- Work Plan shows process and timing of key IRP events
- Overview discussion
- TAC meetings and topics
- Document outline by chapter
- Timeline of major assumptions – market price assumptions and forecasts, third party studies, study requests from TAC, etc.

2025 IRP Work Plan – Modeling

- PLEXOS will be used to model resource dispatch, resource option valuation, and market risk analysis.
- PRiSM will be used for resource selection.
- Continue to use Aurora for electric market price forecasting, will evaluate other options for the 2027 Progress Report/IRP.
- Applied Energy Group (AEG) will develop energy efficiency and demand response potential studies, a long-term energy and peak load forecast using end use techniques, and a distribution energy resource (DER) potential study
- Intend to use generic resource assumptions from a variety of sources based on likely generation sites

Tentative 2025 Electric IRP TAC Schedule

- **TAC 1 (Tuesday, September 26, 2023):** Washington CEIP Biannual Update; available resource options discussion; PLEXOS overview and backcast analysis; TAC feedback on changes to process methods and assumptions; and 2025 IRP Work Plan IRP Process Review.
- **TAC 2 (March 26, 2024):** Natural gas market overview and price forecast; wholesale electric price forecast, Variable Energy Resource Integration Study results; future climate analysis update; and TAC scenarios feedback.
- **TAC 3 (April 2024):** Economic forecast and five-year load forecast; long run forecast (AEG), Conservation Potential Assessment (AEG); Demand Response Potential Assessment (AEG); and reviewed planned scenario analysis.

Tentative 2025 Electric IRP TAC Schedule

- **TAC 4 (May 2024):** IRP Generation Option Transmission Planning Studies; Distribution System Planning within the IRP & DPAG update; transmission and distribution modeling in the IRP; Load & Resource Balance and methodology; and new resource options costs and assumptions.
- **TAC 5 – Technical Modeling Workshop (June 2024):** PLEXOS tour, PRiSM tour, and New Resource Cost Model.
- **TAC 6 (July 2024):** Preferred Resource Strategy results, Washington Customer Benefit Indicator Impacts, resiliency metrics, portfolio scenario analysis, market risk assessment, and QF avoided cost.
- **Virtual Public Meeting – Natural Gas & Electric IRPs (September 2024):** recorded presentation, daytime and evening comment and question sessions.

2025 Electric IRP Draft Outline

Executive Summary

1. **Introduction, Stakeholder Involvement, and Process Changes**
2. **Economic and Load Forecast**
 - Economic Conditions
 - Avista Energy & Peak Load Forecasts
 - Load Forecast Scenarios
3. **Existing Supply Resources**
 - Avista Resources
 - Contractual Resources and Obligations
 - Customer Generation Overview
4. **Long-Term Position**
 - Regional Capacity Requirements
 - Energy Planning Requirements
 - Reserves and Flexibility Assessment

2025 Electric IRP Draft Outline

5. Distributed Energy Resource Options

- Energy efficiency potential
- Demand response potential
- Generating and energy storage resources options and potential
- Named Community Actions
- Distributed Energy Resources Study Conclusions

6. Supply-Side Resource Options

- New Resource Options
- Avista Plant Upgrade Opportunities
- Non-Energy Impacts

7. Transmission Planning & Distribution

- Overview of Avista's Transmission System
- Transmission Construction Costs and Integration
- Merchant Transmission Plan
- Overview of Avista's Distribution System

2025 Electric IRP Draft Outline

8. Market Analysis

- Wholesale Natural Gas Market Price Forecast
- Wholesale Electric Market Price Forecast
- Scenario Analysis

9. Preferred Resource Strategy

- Preferred Resource Strategy
- Market Exposure Analysis
- Avoided Costs

10. Portfolio Scenarios

- Portfolio Scenarios
- Market Scenario Impacts

2025 Electric IRP Draft Outline

11. Washington Clean Energy Action Plan (CEAP)

- Decision Making Process
- Resource Need
- Resource Selection
- Customer Benefit Indicators

12. Action Plan

Major 2025 Timeline

Exhibit 1: Major 2025 Electric IRP Assumption Timeline

<u>Task</u>	<u>Target Date</u>
Market Price Assumptions CCA/Other GHG Pricing Assumptions	December 2023
Natural gas price forecast Regional resources and roads forecast	
Electric price forecast	March 2024
New Resource Options Cost & Availability	March 2024
AEG Deliverables Final Energy & Peak Load Forecast Energy Efficiency and Demand Response Potential Assessment Locational Energy Efficiency and Demand Response Potential	April 1, 2024
Transmission & distribution studies complete	April 2024
Due date for study requests from TAC members	March 20, 2024
Determine portfolio & market future studies	May 2024
Finalize resource selection model assumptions	June 1, 2024

2025 Electric IRP Draft and Submission Dates

- Draft IRP will be available to the public on August 30, 2024, for comment
- Comments from TAC members due by November 15, 2024, or through Washington's public comment timeline
- IRP team will be available for conference calls or email to address comments with individual TAC members or with the entire group if needed
- IRP filed with Idaho and Washington Commissions on January 2, 2025