BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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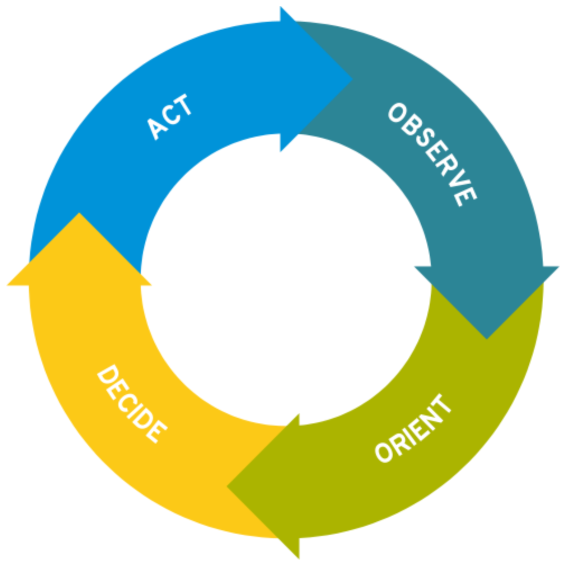
EXH. JDD-5

JOSHUA D. DILUCIANO

REPRESENTING AVISTA CORPORATION

2023 Avista System Planning Assessment Study Plan



System Planning
Avista Utilities
PO Box 3727, MSC-16
Spokane, WA 99220

TransmissionPlanning@avistacorp.com
DistributionPlanning@avistacorp.com

Version	Date	Description	Author	Review
A	3/14/2023	Draft	A Spacek/K Hausam	J Gross
0	6/21/2023	Final	A Spacek/K Hausam	J Gross

Table of Contents

1. Introduction

Development of Avista's annual System Planning Assessment (Planning Assessment) encompasses the following processes:

- The Avista Local Transmission Planning Process as provided in Attachment K, Part III of Avista's Open Access Transmission Tariff (OATT),
- The NorthernGrid transmission planning process as provided in the NorthernGrid Planning Agreement.
- The requirements associated with the preparation of the annual Planning Assessment of the Avista portion of the Bulk Electric System.

The Planning Assessment, or Local Planning Report, is prepared as part of a two-year process as defined in Avista's OATT Attachment K. The Planning Assessment identifies the Transmission System facility additions required to reliably interconnect forecasted generation resources, serve the forecasted loads of Avista's Network Customers and Native Load Customers, and meet all other Transmission Service and non-OATT transmission service requirements, including rollover rights, over a ten-year planning horizon. The Planning Assessment process is open to all Interested Stakeholders, including, but not limited to, Transmission Customers, Interconnection Customers, and state authorities. The Western Electric Coordinating Council (WECC) facilitates interconnection wide planning and development of wide area planning proposals.

Avista combines the results of all its Attachment K planning studies with the results of the annual Planning Assessment studies. Annually, a single document (the Avista System Planning Assessment) is issued documenting the results of the various Planning processes.

Avista's OATT is located on its Open Access Same-time Information System (OASIS) at http://www.oatioasis.com/avat. Additional information regarding Avista's System Planning work is in the Transmission Planning folder on Avista's OASIS. The annual Avista System Planning Assessment is posted on OASIS.

1.1. Point of Contact

A point of contact for questions regarding the Planning Assessment and the projects described within has been designated. Please contact the party named below for any questions:

Transmission Planning Department
PO Box 3727, MSC-16
Spokane, WA 99220
TransmissionPlanning@avistacorp.com

Distribution Planning Department
PO Box 3727, MSC-16
Spokane, WA 99220
DistributionPlanning@avistacorp.com

1.2. Access to Planning Data

The Transmission & Distribution System models used in the Planning Assessment can be provided within ten calendar days, via email or other media, to any WECC member that makes a request. Non-WECC members will be required to sign a confidentiality agreement with the WECC before any base cases can be shared. Once the WECC confirms a confidentiality agreement has been signed, the requested base case(s) can be provided within ten calendar days. Any additional information needed to replicate the technical study results of the Planning Assessment can be provided upon written request.

2. Process Overview

2.1. Phase 1 – Study Plan

Phase 1 includes establishing the assumptions and models for use in the technical studies, developing and finalizing a Study Plan, and specifying the public policy mandates planners will adopt as objectives in the current study cycle.

Any stakeholder may submit data to be evaluated for inclusion in the Study Plan[1]. Stakeholders may provide comments to the Study Plan at the Study Development Meeting, or during the 30 days following.

Deliverables
- Study Plan

Milestones
- Study Development Meeting - March 14th
- Finalize Study Plan - April 14th

2.2. Phase 2 – Planning Assessment

Phase 2 includes performing necessary technical studies and development of the Planning Assessment. Guided by the Avista document *TP-SPP-04 – Data for Power System Modeling and Analysis* and *NERC Standard MOD-032-1*, and with input from stakeholders, transmission system models will be developed. Customer load, demand resources, and generation data received from customers will be included as appropriate in the development of the transmission system models used to perform the studies identified in Section 3.3. The results of the technical studies are documented in the Planning Assessment. The Planning Assessment will include conceptual solutions to mitigate performance issues.

[1] Per Avista's OATT, Attachment K, Part III Section 2.2.3

Deliverables
- Transmission System models
- Planning Assessment

Milestones
- Posting Transmission System models - May 1st
- Posting Planning Assessment - June 15th

2.3. Phase 3 – Avista System Plan

Phase 3 includes providing the Avista System Plan report to stakeholders. The Avista System Plan will include documentation of the electrical infrastructure plan with preferred solution options. The resulting project list will include additional information regarding projects and system modifications developed through means other than the technical studies[2]. Stakeholders may provide comments at the Review of Study Results/Draft Transmission Plans Meeting or during the 30 days following. A final Avista System Plan will be posted and submitted to applicable regulatory entities and other entities participating in regional transmission system planning.

Deliverables
- Avista System Plan
- Stakeholder Comment Feedback

Milestones
- Review of Study Results/Draft Transmission Plans Meeting - September 15
- Post Avista System Plan - October 30

2.4. Phase 4 – Refine Preferred Plan

Phase 4 comprises most of the second year in the two-year process and includes refining the preferred plan of service. Conceptual projects identified in Phase 2 which have not been fully developed in Phase 3 will be addressed in Phase 4.

Deliverables
- Avista System Plan Revision

Milestones
- Local Transmission Plan Update Meeting - September 15
- Post Avista System Plan Revision - October 30

[2] Such other means may include, for example, generation interconnection or transmission service request study processes under the OATT, or joint study team processes under NorthernGrid.

2.5. General Timeline

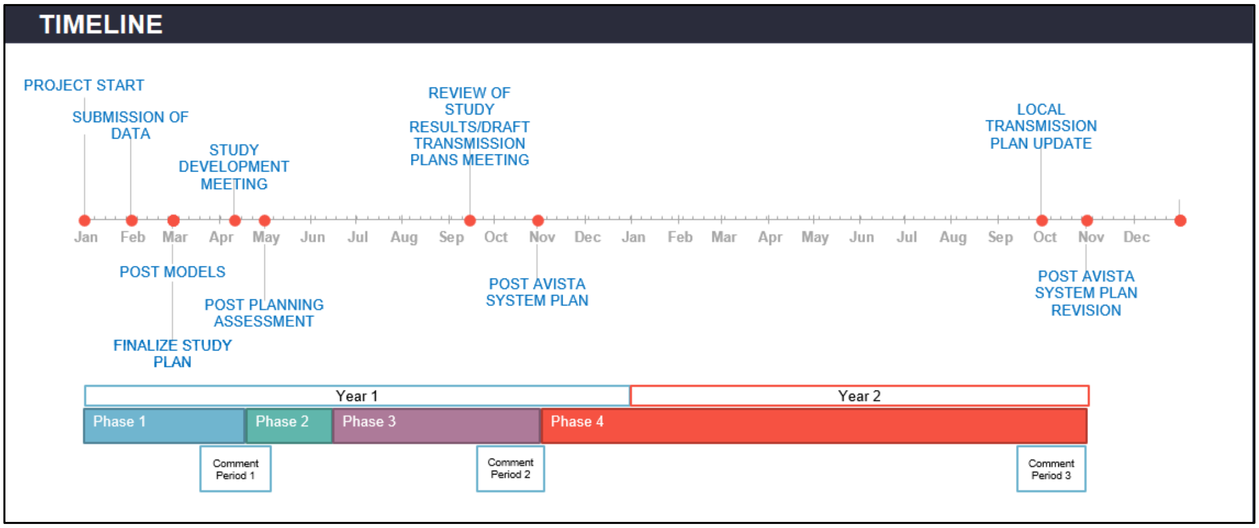


Figure 1: System Planning Assessment Timeline

2.6. Special Requests

2.6.1. Economic

Customers or stakeholders may submit a request for an Economic Planning Study to evaluate potential upgrades or other investments that could reduce congestion or integrate new resources and loads on an aggregated or regional basis.

2.6.2. Enhanced Reliability Upgrades

Customers may request upgrades not identified through technical studies. Such requests shall be constituted Enhanced Reliability Upgrades.[3]

[3] Per Avista's OATT, Attachment K, Part III Section 10

3. Transmission Planning

3.1. Data collection

The following data sources have been identified as inputs to the Planning Assessment.

Data Source	Description	Owner	Development Process	Applicable Standard
Avista Master Case	Data submission in accordance with MOD-032 is compiled into a centralized database	Avista Planning Coordinator	TP-SPP-04	TPL-001-5, R1.1.1 & MOD-032
WECC Base Cases	Interconnection-wide steady state and dynamic models representing various system conditions	WECC	WECC Base Case Compilation Schedule	
Outages List	List of known outages of Transmission Facilities with a duration of at least six months	Avista Transmission Operator		TPL-001-5, R2.1.4, R2.4.4
Engineering Roundtable Project List	List of transmission and station projects with target in-service dates	Avista Transmission Owner	Engineering Roundtable Charter	TPL-001-5, R1.1.2, FAC-002-2
Avista Load Forecast Spreadsheet	Spreadsheet including projected load forecasts and generation resource dispatch	Avista Transmission Planning	TP-SPP-07	TPL-001-5, R1.1.3 & R1.1.5
Generator Interconnection Applications Queue	List of Generator Interconnection Applications and projected in-service dates	Avista Transmission Service Provider	OATT	
Transmission Service Queue	List of transmission service requests	Avista Transmission Service Provider	OATT	TPL-001-5, R1.1.4

Table 1: Data Sources

3.2. Assumptions

The initial assumptions used in the technical studies are listed in the following sections.

3.2.1. System Conditions (TPL-001-5, R1.1.1)

3.2.1.1. Summary

- Planning Cases are developed from WECC approved cases
- Planning Cases represent a P0 (all lines in service) condition with associated operating procedures

3.2.1.2. Narrative

Avista's Transmission Planning Department develops a set of transmission system models (Planning Cases) biannually to model its Transmission Planner and Planning Coordinator areas as well as the regional Transmission System. The Planning Case development process outlined in the internal document *TP-SPP-04 – Data Preparation for Steady State and Dynamic Studies* outlines the use of WECC-approved base cases and the modification of steady state and dynamic data as required to represent existing facilities for the desired scenario. The resulting Planning Cases represent a normal system condition (P0). All established pre-contingency operating procedures are represented. Manual application of each operating procedure is followed in the process of developing each Planning Case. Table 2: Transmission Case Description identifies the scenarios to be used in the Transmission technical studies. Section 3.2.6 identifies the generation dispatch modeling assumptions to be used in each of the indicated scenarios.

Scenario	Description (likelihood or "return time")	1 Year (2024)	5 Year (2028)	10 Year (2033)	TPL
Heavy Summer	Loads 1 in 20*, Generation per Generation Dispatch**	X	X	X	R2.1.1, R2.2.1, R2.4.1, and R2.5
Heavy Winter	Loads 1 in 20*, Generation per Generation Dispatch**		X		R2.1.1, R2.2.1, R2.4.1 and R2.5
Heavy Spring	Sensitivity to high load during the spring		X		R2.1.3 and R2.4.3 sensitivity for R2.1.2 and R2.4.2
Light Spring	Loads 1 in 2*, Generation per Generation Dispatch**		X		R2.1.2 and R2.4.2
HS 5-Year Projects	Sensitivity to Proposed 5-Year Projects during Heavy Summer***		X		R2.1.3 and R2.4.3 sensitivity for R2.1.1 and R2.4.1
High E-W Transfer	Sensitivity to light load, high generation, and high system transfers		X		R2.1.3 and R2.4.3 sensitivity for R2.1.2 and R2.4.2

*	All monthly historical peaks during indicated season used to calculate median monthly peak value. For loading 1 in 20, during any given year, 5% of the time the seasonal peak will be above indicated loads, and 95% of the time the seasonal peak will be below.
**	Generation units are placed on or off using the Generation Dispatch sheet according to the season indicated.
***	Scenario will assume planned projects are not constructed therefore representing the existing transmission system facilities.

Table 2: Transmission Case Description

Each scenario in the above table is created to represent a specific state of the system. The Heavy Summer scenario represents the expected day-time peak load that occurs yearly between June and August. The Heavy Winter scenario represents the expected day-time peak load that occurs yearly between December and February. The Light Spring scenario represents the expected early morning minimum load that occurs yearly between April and May.

3.2.2. Outages (TPL-001-5, R2.1.4, R2.4.4)

3.2.2.1 Summary

- Known outages of generation or transmission facilities in the Near-Term Planning Horizon are assessed.
- Selection of known outages follows a technical rationale.

3.2.2.2 Narrative

Known outages are identified by reviewing the outage coordination system and coordinating with the Transmission Operator in conjunction with the Reliability Coordinator. Known outages are selected to be assessed in future technical studies using the methodology provided in TP-SPP-01 – Transmission System Performance Version 7. Known outages and their potential impacts on the transmission system are not explicitly listed by System Planning in documentation which may be shared publicly to uphold the intent of FERC Standards of Conduct.

3.2.3. Projects (TPL-001-5, R1.1.2)

3.2.3.1 Summary

- Project target in-service dates are used to evaluate the expected performance of the transmission system.

3.2.3.2 Narrative

Technical studies are performed assuming transmission projects previously identified are constructed according to their expected in-service date as listed in Table 3. Sensitivity studies may be performed to determine the impact to the performance of the transmission system if projects are delayed or not constructed.

ERT #	Project Name	Driver	Scope	Status	Included in Model		
					1-year	5-year	10-year
12	Carlin Bay Station	Performance & Capacity	Construct new distribution station to include single 20MVA transformer and three feeders. Transmission integration to include constructing a new radial transmission line from O’Gara Station to Carlin Bay. The second phase of the project includes rebuilding the existing O’Gara Station to a switching station. New microwave communication paths will be established to O’Gara Station.	Budgeted		X	X
26	Sunset Station Rebuild	Mandatory & Compliance	Rebuild the existing Sunset Station as breaker and a half configuration.	Complete	X	X	X
38	Metro Station Rebuild	Asset Condition	Rebuild existing substation at new location. 115kV bus to be a 6-position ring: 2 – 30MVA xfmrs, 2 – 115kV UG lines from PST, 2 – 115kV OH lines; switchgear on the 13kV side, both Network and Distribution feeders	Construction		X	X
53	Flint Road Station	Performance & Capacity	New distribution station located west of Spokane along the Airway Heights - Sunset 115kV transmission line. Two new 30MVA	Complete	X	X	X

ERT #	Project Name	Driver	Scope	Status	Included in Model 1-year	5-year	10-year
			transformers with four distribution feeders will be the initial configuration.				
58	Westside Station Rebuild	Performance & Capacity	Replace the existing Westside 230/115kV Transformer 2 and construct necessary bus work and breaker positions. Reconstruct 230 and 115kV buses to double bus double breaker 3000/2000 Amp standard. Phase 4: Complete bus work to double bus, double breaker on both the 230kV and 115kV buses	Construction	X	X	X
60	Ninth & Central - Sunset 115kV Transmission Line Upgrade	Performance & Capacity	Replace the 795 AAC and ACSR conductor on the Ninth & Central – Sunset 115kV transmission line with 795 ACSS with E3X coating to match the rest of the line.	Construction		X	X
62	Lolo Transformer Replacement	Performance & Capacity	Replace Lolo #1 230/115kV transformer with 250MVA rated transformer. Replace Lolo #2 230/115kV transformer with 250MVA rated transformer. 115kV circuit breakers, bus work and other capacity-limiting elements will be replaced. Circuit switchers at Clearwater, Lolo, and Sweetwater stations will be replaced.	Construction		X	X
75	Saddle Mountain Integration	Performance & Capacity	Construct a 3-position 230kV DBDB arrangement with space for two future positions at the line crossing of the Walla Walla – Wanapum 230kV and Benton – Othello 115kV Lines Construct a 4-position 115kV breaker and a half arrangement with space for four future positions Install 1-230/115kV transformer rated at 250MVA. Reconstruct Othello SS – Warden #1 115kV transmission line to minimum 205MVA including upgrades to terminal equipment at both stations. Reconstruct Othello SS – Warden #2 115kV transmission line to minimum 205MVA including upgrades to terminal equipment at all stations. Construct 11 miles of 115kV line with a minimum summer rating of 205MVA from Saddle Mountain Station to the new Othello City station with a N/O tap to existing S. Othello Station. Reconstruct Othello Station to a 3-position breaker and a half with 2 – 30MVA transformers at new property.	Complete	X	X	X
96	Kettle Falls Protection System Upgrades	Mandatory & Compliance	Upgrade existing protection schemes on the Addy – Kettle Falls and Colville – Kettle Falls 115kV transmission lines. New relays at Kettle Falls Station and a new communication path from Kettle Falls to Mount Monumental are required.	Construction	X	X	X
100	Melville Station	Performance & Capacity	Scope not complete. New switching station near existing tap to Four Lakes Station off the South Fairchild Tap 115kV transmission line. Construct new transmission line from Airway Heights to Melville including passing through Russel Road and Craig Road distribution stations. Requires new transmission line terminal at existing Airway Heights Station.	Budgeted			X

ERT #	Project Name	Driver	Scope	Status	Included in Model 1-year	5-year	10-year
131	Garden Springs Station	Performance & Capacity	Construct new 115kV portion of Garden Springs Station at the existing Garden Springs switching location. New station will terminate Airway Heights – Sunset and Sunset – Westside 115kV transmission lines including the South Fairchild Tap. Construct new 230kV portion of Garden Springs Station including two 250MVA nominal 230/115kV transformers. Construct new 230kV transmission line from Garden Springs to a new switching station, Bluebird, at an interconnection point on the BPA Bell – Coulee #5 230kV transmission line.	Budgeted			X
N/A	Boulder-Irvin #1 115kV Transmission Line Upgrade	Performance & Capacity	Project updates the existing Boulder-Ivin #1 115kV Transmission Line from Boulder to SIP. Remaining replacements are existing 556AAC on Barker Road and approximately a ¼ mile section just east of SIP, currently delayed by easement dispute. Replacements will be made with 795 ACSS.	Construction	X	X	X

Table 3: Avista System Plan project list

3.2.4. Native and Network Loads (TPL-001-5, R1.1.3)

3.2.4.1. Summary

- Most recent Integrated Resource Plan (IRP) will be used for native load forecast
- Balancing Authority Area (BAA) load combines native load and Network Load
- Projected spot customer growth is not included in the forecast

3.2.4.2. Narrative

Load forecasts incorporating all BAA load are developed according to the process outlined in the internal document *TP-SPP-07 – Loads and Resources Data for Steady State and Dynamic Studies, Version 5*. Spot customer growth and the associated new distribution stations are not included in the technical studies. The BAA load forecast includes Avista's native load forecast and Network Loads represented by the Bonneville Power Administration. Figure 2 provides the BAA load forecast, calculated using the 2023 load forecast calculator, to be used in the technical studies.

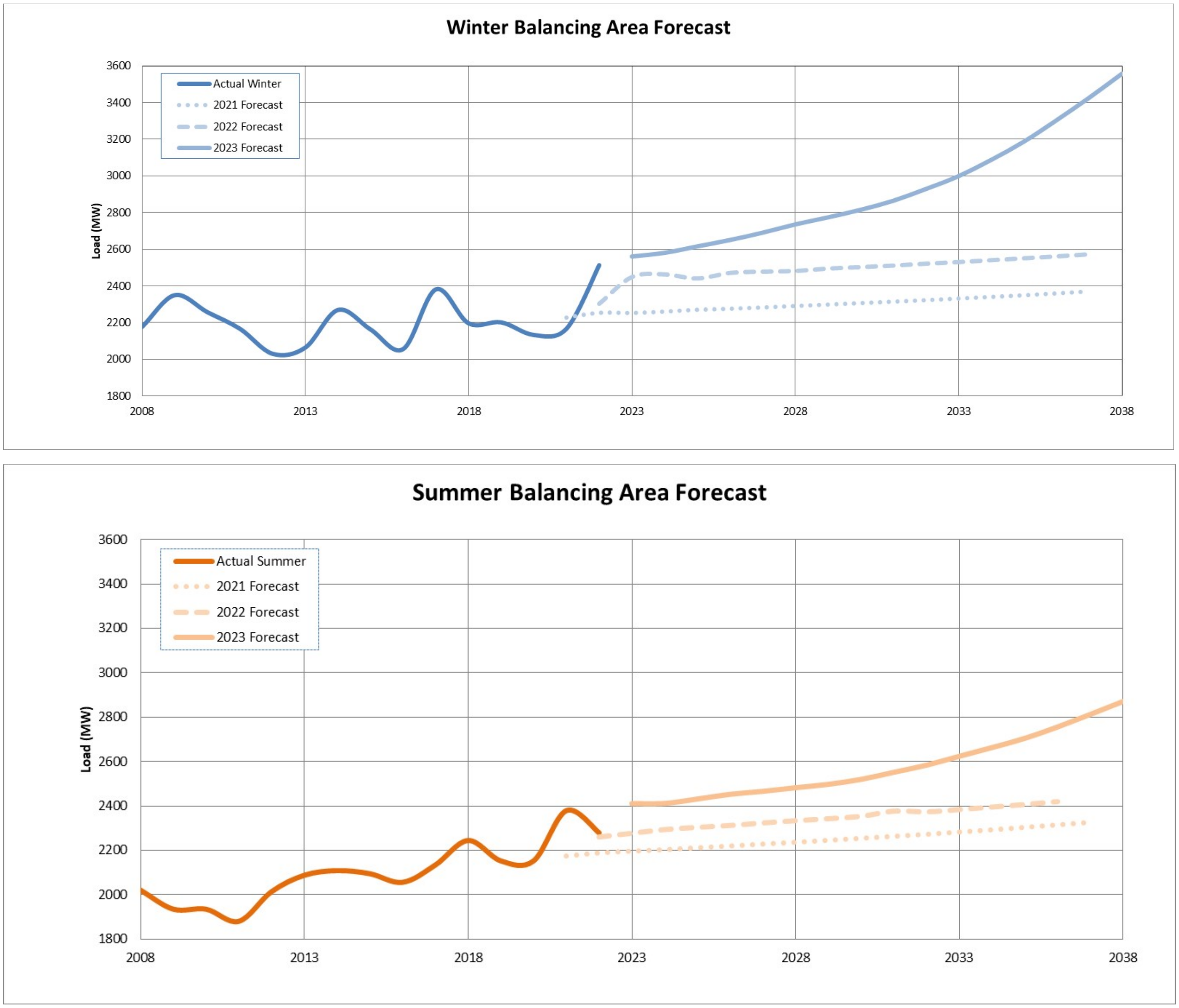


Figure 2: Actual and Forecasted Peak Balancing Authority Area Load

3.2.5. Additional Transmission Uses (TPL-001-5, R1.1.4)

3.2.5.1. Summary

- No Transmission Service requests will be included in the 2023 technical studies.

3.2.5.2. Narrative

Any known commitments for Firm Transmission Service and interchange are included in the technical studies. Developing sensitivity cases with WECC Rated Paths at their limits represents scenarios with all existing known commitments modeled. Future commitments that may exceed the limit of a WECC Rated Path are not studied. Avista's current queue of Transmission Service requests is used to identify potential future commitments.

3.2.6. Resources (TPL-001-5, R1.1.5)

3.2.6.1. Summary

- Seven future generation resources are included in the 2023 technical studies.
- Resource dispatch is based on historical data.

3.2.6.2. Narrative

Generation dispatch scenarios are developed according to the process outlined in the internal document *TP-SPP-07 – Loads and Resources Data for Steady State and Dynamic Studies Preparation*. Each dispatch scenario is developed based on historical data and is intended to represent typical operating conditions. Table 4 provides the resource dispatch assumptions to be used in 2023 technical studies.

	Hydro																			Thermal					Bio or Process				Wind		Solar
	Albeni Falls[c]	Boundary[c]	Box Canyon[b]	Cabinet Gorge	Dworshak[c]	Hungry Horse[c]	Libby[c]	Little Falls	Long Lake	Main Canal Headworks[c]	Meyers Falls[a]	Monroe Street	Nine Mile	Noxon Rapids	Post Falls	Post Street (Upper Falls)	Smith Falls[b]	Summer Falls[c]	Upriver[a]	Boulder Park	Coyote Springs 2	Lancaster[a]	Northeast	Rathdrum	Kettle Falls	Plummer Forest Products[a]	Potlatch Forest Clearwater[a]	Waste to Energy[a]	Palouse Wind[a]	Rattlesnake Flats[a]	Lind Solar[a]
Units on in Case	BPA	SCL	POPD	AVA	BPA	BPA	BPA	AVA	AVA	GCPH	HTS	AVA	AVA	AVA	AVA	AVA	IPP	GCPH	SPO	AVA	AVA	BPA	AVA	AVA	AVA	PFP	CEC	W2E	FWND	FWND	LIN
Heavy Winter	1	1-4	1-3	1-3	1	1	1	1-3	1-3	off	off	1	**1-3**	1-3	3-5	1	off	off	1&4	**1-4**	1&2	1&2	off	**1-2**	1	1	3&4	1	**15%**	**15%**	off
Light Winter	1	1	1-3	1	1	1	1	off	off	off	off	1	**1-2**	off	1-3	1	off	off	1&4	off	1&2	1&2	off	off	1	1	3&4	1	**15%**	**15%**	off
Heavy Spring	1&2	2-6	**1-4**	1-4	1-2	1-3	1-4	1-4	1-4	1	1&2	1	1-4	1-5	1-5	1	1	1&2	1-5	off	**1&2**	**1&2**	off	off	**1**	**1**	3&4	1	**90%**	**90%**	**90%**
Light Spring	1&2	2-6	**1-4**	1-4	1-2	1-3	1-4	1-4	1-4	1	1&2	1	1-4	1-4	1-5	1	1	1&2	1-5	off	**1&2**	**1&2**	off	off	**1**	**1**	3&4	1	**90%**	**90%**	off
Heavy Summer	1	1-3	1&2	1&3	1-3	1&3	1&2	1-3	1-3	1	1&2	33%	1	1-3	1	33%	off	1&2	1&4	**1-4**	1&2	1&2	off	**1-2**	1	1	3&4	1	**15%**	**15%**	**15%**
Light Summer	1	1	1&2	1	1-3	1&3	1&2	off	off	1	1&2	33%	1	off	1	33%	off	1&2	1&4	off	1&2	1&2	off	off	1	1	3&4	1	**15%**	**15%**	off
Heavy Autumn	1&2	1-5	1-3	1&3	1	1	1	1&3	1&3	1	1&2	1	1&3	1-3	1-3	1	off	1	1&4	off	1&2	1&2	off	off	1	1	3&4	1	**15%**	**15%**	**90%**
Light Autumn	1&2	1	1-3	1	1	1	1	off	off	1	1&2	1	1&3	off	1-3	1	off	1	1&4	off	1&2	1&2	off	off	1	1	3&4	1	**15%**	**15%**	off
High Transfer	1-3	1-6	1-4	1-4	1-3	1-3	1-5	1-4	1-4	1	1&2	1	1-4	1-5	1-6	1	1	1&2	1-5	1-6	1&2	1&2	1	**1&2**	1&2	1	3&4	1	**90%**	**90%**	**90%**
MW Output for each unit																															
Unit 1	14	150	20	55	100	90	**120**	8	21	24	1.2	14	7	100	**2.5**	9	35	45	1.5	4	160	165	55	70	45	4.5	-	16	100	144	19.2
Unit 2	14	150	20	65	100	90	**120**	8	21		0.2		7	100	**2.5**			45	1.5	4	100	65		70	7		-				
Unit 3	14	150	20	65	240	90	**120**	8	21				7	100	**2.5**				1.5	4							28				
Unit 4		150	20	55		90	**120**	8	21				7	100	**2.5**				5	4							22				
Unit 5		175					**120**							**120**	**2.5**				5	4											
Unit 6		175													3.25					4											

Notes:

1	Thermal unit capacity and normal running MW level are based on summer conditions for all seasons
2	High Transfer is a sensitivity case for high east to west transfers on MT-NW and WOH, using the Light Spring case (ID-NW is checked using the Heavy Summer case)
	System Operating Limits: WMH < 1650 MW, Libby/Horse < 910 MW HLH (860 MW LLH) and Horse < 310 MW ~ Clark Fork RAS arms at 1650 MW
a	In Avista Balancing Area ~ Dispatch set, in the model, by AVA - not owned by Avista, for reference only
b	In Avista Balancing Area ~ Dispatch set, in the model, by others - not owned by Avista, for reference only
c	Not in Avista Balancing Area ~ Dispatch set, in the model, by others - not owned by Avista, for reference only
	Solar and Wind assumed at minimum during summer or winter peak hours
*	**Updated values, since last revision, are in blue and bold**

Table 4: Generation Dispatch modeling Assumptions

Potential generation projects in Avista's queue of generation interconnection requests that have executed an Interconnection Agreement are modeled (with corresponding upgrades) in the base cases for technical studies. Table 5 contains a list of projects with executed interconnection agreements and will be represented in the models. Potential renewable generation will be dispatched like existing wind and solar generation facilities. The preferred resource strategy from the 2021 Avista IRP is not represented in the technical studies.

Queue #	Requested COD	MW Output	Type	County	State	POI
46	12/31/2025	126	Wind	Adams	WA	Saddle Mt 230kV Station
60	9/1/2025	150	Solar/Storage	Asotin	WA	Dry Creek 230kV Station

Queue #	Requested COD	MW Output	Type	County	State	POI
63	3/1/2028	26	Hydro	Kootenai	ID	Post Falls 115kV Station
66	7/1/2026	71	Wood Waste	Stevens	WA	Kettle Falls 115kV Station
80	9/30/2025	19	Solar/Storage	Spokane	WA	South Fairchild Tap 115kV
84	1/1/2024	5	Solar/Storage	Stevens	WA	Chewelah 13kV
97	12/31/2025	100	Solar/Storage	Nez Pierce	ID	Lolo 230kV Station

Table 5: Generation interconnection resources with interconnection agreements

3.2.7. Performance Criteria (TPL-001-5, R5, R6)

3.2.7.1. Summary

- NERC Standard TPL-001-5 provides the baseline performance criteria.
- Emergency ratings **<u>are not used</u>** in the planning horizon.
- Operating procedures (applied in the pre-contingent case) may be evaluated to achieve performance criteria.

3.2.7.2. Narrative

The criteria used in evaluating the performance of the Transmission System are the current North American Electric Reliability Corporation (NERC) Reliability Standards, WECC regional criterion and internal Avista policies, including the following:

- TPL-001-WECC-CRT-3.2 – Transmission System Planning Performance
- TPL-001-5 – Transmission System Planning Performance Requirements
- TP-SPP-01 – Transmission System Performance

3.2.8. Identification of Analytical Tools

The following analytical tools will be used to perform technical studies:

- PowerWorld Simulator Software – PowerWorld Simulator is an interactive power systems simulation package designed to simulate high voltage power systems operation on a time frame ranging from several minutes to several days. The software contains a highly effective power flow analysis package capable of efficiently solving systems with up to 250,000 buses using mathematical calculations based on system impedances, load levels and generation output. PowerWorld provides the user with a variety of sophisticated study tools such as an automated contingency processor, an Available Transfer Capability (ATC) tool, an Optimal Power Flow tools, various voltage stability tools such as PV and QV tools, a Geomagnetically Induced Current (GIC) tool, and a Transient Stability Analysis tool.

3.3. Technical Studies

3.3.1. Steady State Contingency Analysis (TPL-001-5, R2.1, R3)

Transmission system steady state contingency analysis will be performed following the study methodology outlined in TP-SPP-01 – Transmission System Performance. The studies will measure the system performance against criteria which is also defined in TP-SPP-01 – Transmission System Performance. The criteria include monitoring for system instability such as Cascading, uncontrolled islanding, and voltage instability.

3.3.2. Spare Equipment Analysis (TPL-001-5, R2.1.5, R2.4.5)

An analysis of transmission system performance will be conducted for the outage of equipment which cannot be put back into service within a 12-month timeline. The study methodology is outlined in TP-SPP-01 – Transmission System Performance. The analysis conducted in 2023 will evaluate performance in the 2028 Heavy Summer scenario. Heavy summer has historically been the most constraining scenario as documented in previous System Assessments. Other scenarios will be studied if additional sensitivities are appropriate based on the results.

3.3.3. Short Circuit Analysis (TPL-001-5, R2.3)

A short circuit analysis will be performed to determine whether circuit breakers have interrupting capability for faults that they will be expected to interrupt. The study methodology is outlined in TP-SPP-01 – Transmission System Performance. Equipment identified as having bus fault duties in excess of 80% of their rating will be further analyzed, in cooperation with the Avista Protection Engineering group, to determine the actual breaker requirement and the values reported.

3.3.4. Stability Contingency Analysis (TPL-001-5, R2.4, R4)

Transmission system stability contingency analysis will be performed following the study methodology outlined in TP-SPP-01 – Transmission System Performance. The studies will measure the system performance against criteria which is also defined in TP-SPP-01 – Transmission System Performance. The criteria include monitoring for system instability such as Cascading, uncontrolled islanding, and voltage instability.

3.3.5. Voltage Stability Analysis

Steady state analysis techniques are used to evaluate the voltage stability performance of the transmission system. A Load Ramp PV Curve analysis will be performed for each load area in Avista's Transmission Planner area using the 2024 Heavy Summer scenario. Transfer Path PV Curve analysis will be conducted on the scenarios representing WECC paths operating at their limits. QV analysis will then be performed with the identification of critical buses from the PV analysis. The study methodology is outlined in TP-SPP-01 – Transmission System Performance.

3.3.6. Known Outage Analysis (TPL-001-5, R2.1.4, R2.4.4)

Known outages of generation or Transmission Facilities planned in the Near-Term Planning Horizon are selected to be assessed. The selection of known outages to be assessed and the study methodology is outlined in TP-SPP-01 – Transmission System Performance.

3.3.7. Protection System Failure Analysis (TPL-001-5, Table 1 Category P5)

Protection system failure performance impacts on the transmission system will be evaluated in 2023 using studies conducted in 2022. The results from 2022 studies identified protection system failure performance criteria violations for extreme events. The 2023 study effort will finalize the study procedure using detailed data provided by Avista' Protection Engineering group. The study methodology is outlined in TP-SPP-01 – Transmission System Performance.

4. Distribution Planning

4.1. Assumptions

4.1.1. System Conditions

Distribution system models are used to analyze the expected system performance in the near and long-term planning horizons. The models represent a normal switched state prior to contingent system configurations. Specific seasonal and loading scenarios are represented within the models and are used to evaluate if the system will meet the performance criteria defined in DP-SPP-02 – Distribution System Performance V5. When analysis indicates an inability of the system to meet the performance criteria for the scenarios listed in Table 6, project(s) will be developed addressing how the performance criteria will be met. Additional sensitivity scenarios may be studied in addition to those listed in Table 6.

Scenario	Description	Ambient Temperature Represented[12]
Heavy Summer	Day-time peak load occurring between June and August with loads representing a 1 in 10 probability	40°C (104°F)
Heavy Winter	Day-time peak load occurring between December and March with loads representing a 1 in 10 probability	-28.9°C (-20°F)
Heavy Summer Sensitivity	Same scenario as Heavy Summer with loads representing the highest summer temperature on record	42.8°C (109°F)

Table 6: Distribution System Scenarios

Historical weather data was reviewed to select the scenarios listed in Table 6. DP-SPP-02 – Distribution System Performance V5 outlines the methodology and data for Table 6.

4.1.2. Projects

Projects are modeled in their scheduled years to analyze the feeder performance and capacity contributions. Projects in Table 7 are budgeted, under construction or near completion.

ERT #	Project Name	Driver	Scope	Status
12	Carlin Bay Station	Performance & Capacity	Construct new distribution station to include single 20MVA transformer and three feeders. Transmission integration to include constructing a new radial transmission line from O'Gara Station to Carlin Bay. The second phase of the project includes rebuilding the existing O'Gara Station to a switching station. New microwave communication paths will be established to O'Gara Station.	Budgeted
26	Sunset Station Rebuild	Mandatory & Compliance	Rebuild the existing Sunset Station as breaker and a half configuration.	Complete
32	Davenport Station Rebuild	Asset Condition	Rebuild existing distribution station at nearby greenfield site. Initial construction will include single 20MVA transformer with three feeders.	Construction
38	Metro Station Rebuild	Asset Condition	Rebuild existing substation at new location. 115kV bus to be a 6-position ring: 2 – 30MVA xfmrs, 2 – 115kV UG lines from PST, 2 – 115kV OH lines; switchgear	Construction

ERT #	Project Name	Driver	Scope	Status
			on the 13kV side, both Network and Distribution feeders	
46	Poleline (Prairie) Station Rebuild	Performance & Capacity	Scope not complete. Construct new distribution station to replace Avista facilities at existing Prairie Station. New station to include two 30MVA transformers, four feeders, and looped-through transmission without circuit breakers.	Budgeted
53	Flint Road Station	Performance & Capacity	New distribution station located west of Spokane along the Airway Heights - Sunset 115kV transmission line. Two new 30MVA transformers with four distribution feeders will be the initial configuration.	Complete
75	Saddle Mountain Integration	Performance & Capacity	Construct a 3-position 230kV DBDB arrangement with space for two future positions at the line crossing of the Walla Walla – Wanapum 230kV and Benton – Othello 115kV Lines Construct a 4-position 115kV breaker and a half arrangement with space for four future positions Install 1-230/115kV transformer rated at 250MVA. Reconstruct Othello SS – Warden #1 115kV transmission line to minimum 205MVA including upgrades to terminal equipment at both stations. Reconstruct Othello SS – Warden #2 115kV transmission line to minimum 205MVA including upgrades to terminal equipment at all stations. Construct 11 miles of 115kV line with a minimum summer rating of 205MVA from Saddle Mountain Station to the new Othello City station with a N/O tap to existing S. Othello Station. Reconstruct Othello Station to a 3-position breaker and a half with 2 – 30MVA transformers at new property.	Complete
80	Huetter Station Expansion	Performance & Capacity	Add new 30MVA transformer and two distribution feeders to the existing Huetter Station. Scope includes a new panel house and rerouting the transmission line to the east side of the station. 13kV bus tie switch and a 115kV bus tie switch located on transmission structures outside the substation will be added.	Construction
111	Lyons & Standard Station Expansion	Customer Requested	Add new feeder to existing Lyons & Standard Station.	Construction
140	Bunker Hill Customer Capacity	Customer Requested	Install new 20MVA transformer to replace existing transformer and construct new dedicated customer distribution feeder.	Budgeted
143	Waikiki Capacity Mitigation	Performance & Capacity	Add new 20MVA transformer and two feeders to existing Indian Trail substation.	Budgeted
148	Barker Capacity Mitigation	Performance & Capacity	Add new 30MVA transformer and three feeders to existing Greenacres substation.	Budgeted

Table 7: Avista System Plan project list

4.1.3. Load Forecast

Multi-year load-flow analysis is used to evaluate system performance over multiple years with representation of anticipated system changes. Annual growth rates from load forecasting are applied to portions of the system. Annualized load growth rates are based on the percentage of historic measured substation and feeder growth. New large customers and developments can be modeled based on the most relevant information at the time the models are compiled. The annualized load growth rate will be used for years 1-10.

4.1.4. Generation/Resources

Small generation facilities are included in the model. Generation output is set using historic and seasonal data.

Net metered generation is modeled to analyze non-wire alternatives to system enhancement projects. These modeled loads can be turned on or off to show the effect of DER's on the distribution system.

Potential generation projects in Avista's queue of generation interconnection requests that have executed an Interconnection Agreement are modeled (with corresponding upgrades) in the base cases for technical studies. Table 8 contains a list of projects with executed interconnection agreements and will be represented in the models. Potential renewable generation will be dispatched similar to existing wind and solar generation facilities. The preferred resource strategy from the 2021 Avista IRP is not represented in the technical studies.

Queue #	Requested COD	MW Output	Type	County	State	POI
120	12/1/2022	1	Solar/Storage	Spokane	WA	Third & Hatch 13.2kV Feeder

Table 8: Generation interconnection resources with interconnection agreements

4.1.5. Performance Criteria

The performance criteria used in evaluating the performance of the distribution system is outlined in DP-SPP-02 – Distribution System Performance V5 Table 1. Proposed projects intend to meet these criteria.

4.1.6. Identification of Analytical Tools

The following tools are used to model and perform technical studies:

- Synergi
- PI Database
- Transformer Peak Load Report
- Distribution Feeder Report
- Short Term Forecaster
- CurveSlayer MR Analysis Tool
- Demands Manager
- AFM
- Google Earth
- Other tools developed by the System Planning team

4.2. Technical Studies

4.2.1. Load Forecast Development

Distribution planning models are developed biannually to model the distribution system. A separate model is used for summer and winter analysis.

The dataset used is imported from the PI database. Load data is filtered to remove abnormal line conditions such as switching and outages. The demand values are correlated to a temperature value and adjusted to heavy summer and heavy winter conditions interpolated on a linear temperature curve. Load growth is calculated using multiple regression analysis using filtered demand data. Some feeder datasets are insufficient for the multiple regression analysis and growth rates are set to the transformer growth rate. All negative calculated growth rates are set to 0. Known development data is used to validate growth rates and modelling forecasts.

4.2.2. Multi-Year Load-Flow Analysis

An analysis of the distribution system performance will be performed following the study methodology outlined in DP-SPP-02 – Distribution System Performance V5. The studies will measure the system performance against criteria which is also defined in DP-SPP-02 – Distribution System Performance V5. The study results will show anticipated feeder and transformer loading over the ten-year planning horizon. The analysis is repeated with planned system enhancement projects.

4.2.3. Contingency Analysis

An analysis of the distribution system's ability to meet applicable performance criteria with equipment taken out of service will be performed. The methodology is described in DP-SPP-02 – Distribution System Performance V5. The mechanics of performing the study is under development in 2023.

4.2.4. Auto-Transfer Analysis

An evaluation of the distribution system's ability to meet applicable performance criteria with the operation of auto-transfer switches will be performed as described in DP-SPP-02 – Distribution System Performance V5.

4.2.5. Short Circuit Analysis

Evaluation of fault interrupting device's ability to detect and isolate faults will be performed using a short circuit analysis as described in DP-SPP-02 – Distribution System Performance V5. The mechanics of performing the study is under development in 2023.