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BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET NO. UE-20_____

EXH. SJK-10

SCOTT J. KINNEY

REPRESENTING AVISTA CORPORATION

Program Scope Summary

Program Name: Energy Imbalance Market
Program Manager: Kelly Dengel
Business Case Name: Energy Imbalance Market
Expenditure Request (ER): 7141 – Energy Imbalance Market
Submit Date: TBD

1 Key Roles & Program Information

Program Sponsor(s):	Scott Kinney/ Mike Magruder	**Business Case Owner(s):**	Kelly Dengel
Business Program Manager:	Kelly Dengel	**Executive Steering Committee Members:**	Jason Thackston, Heather Rosentrater, Jim Kensok, Ryan Krasselt, Kevin Christie
Director Steering Committee Members:	Scott Kinney, Andy Vickers, Mike Magruder, Jim Corder, Hossein Nikdel, Adam Munson, Pat Ehrbar, Todd Colton	**Other Stakeholders:**	James Dykes, Robert Follini, Annette Brandon, Jacob Reidt, Kit Parker, Bob Weisbeck, Tom Dempsey, Alexis Alexander, Kristina Newhouse, Glen Farmer, Brad Calbick, Craig Figart, Rip Divis, Kenny Dillon, Mike Andrea, Glenn Madden, Randy Spacek, Lamont Miles, Brian Hoerner, Xin Shane, Jason Pegg, Carolyn Groome

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3 Executive Summary

In May 2019, Avista leadership approved the EIM Program Charter outlining the total estimated costs associated with joining the Western Energy Imbalance Market (EIM) operated by the California Independent System Operator (CAISO). The Charter estimated $26.6 million in integration costs and $3.5-$4 million in on-going annual expense, and were considered preliminary.

The Charter costs estimates drew from the 2018 Utilicast assessment results for technology and the metering/controls upgrades, and provided an initial picture of the work required by Avista to integrate into the market, along with estimates for on-going operations. For the remainder of 2019, Avista focused on high-level scope decisions, an initial integrated project schedule and completing the Request for Proposal (RFP) phase for EIM software. In October 2019, Avista also selected their System Integrator, Utilicast, and signed an Implementation Agreement for 2020-2022. Throughout 2019 and into 2020, Avista continually acquired more market operations knowledge and gained a better understanding of how Avista can meet market requirements, while balancing operational needs and financial constraints.

After a year into the EIM integration effort and acquiring a better understanding of the market operation support needs, Avista created a preferred employee resource plan (EIM Human Resource Plan) and the EIM Program Scope document. Together, the documents represent updates to Avista's EIM Program, incorporating updated software, metering and network project designs and schedules, the resources needed for integration and operations, and the overall cost estimates based on actual spend through August 2020 and remaining integration work. The updated EIM integration cost estimate is $32.1 million, and the on-going annual cost estimate is $3.9 million. Based on this information, an annual revenue of $7.8 million is needed to break even after 10 years of market operations. This annual revenue estimate is within the range of benefits determined by analysis performed by Energy and Environmental Economics (E3) in 2017. If Avista's actual EIM system benefits are closer to the potential upper bound of the $12 million as determined by E3 and experienced by other similarly situated EIM entities, then Avista customers will see positive revenue in a much shorter time period.

4 Program Charter vs. Scope Financial Estimates

When Avista created its Charter estimates, an attempt was made to provide a total cost of ownership to join the EIM. This included cost estimates for capital projects, expense for implementing the Program, including existing and incremental labor, non-labor and on-going incremental costs associated with new hires and software maintenance. The Charter estimates provided costs associated with a particular effort in multiple line items, rather than a single line item, representing a total anticipated cost. The Scope document presents the estimates for the particular effort, as a single line item, inclusive of all known costs. Where possible, a comparison of costs from the Charter to the Scope document have been made with references to the Charter line item estimates. In some cases, cost estimates have been re-assigned from one cost area to another, and a direct comparison is not available.

In terms of implementation, the effort to join the EIM requires both capital and expense activities. Specific to expense, the Charter estimates identified expense deliverables and provided a cost estimate by assuming a number of man hours needed to perform the task and multiplied it by $100 labor rate. It was primarily assumed these expense deliverables would be completed by existing employees across multiple business units. As of July 1, 2019, Avista began charging specific EIM expense projects across six business units. However, Avista did not create an individual expense project for each expense deliverable. Although Avista has worked on many expense efforts, such as completing the CAISO implementation agreements or documenting plant operation details for the Resource Data Template, the level of expense reporting by individual item (deliverable) is not tracked to this level of detail within Company financial records.

5 CAISO & Avista Program Scope Overview

The CAISO has developed an implementation structure for market participants that includes six program tracks. A description and the associated requirements of each of these six tracks is provided below along with an Avista preparation track shown as track zero.

Program Scope Summary

CAISO EIM Track	Avista Scope
Track 0 Avista EIM Program Preparation	
This track represents the body of work Avista must complete to be ready to join the CAISO schedule. It includes program planning, requirements gathering and design, System Integrator selection and software procurement.	Avista program structure, leadership, documentation, change management plan, internal project schedule, software procurement and contracting
	Select System Integrator
Track 1 Planning & Project Management	
This track will ensure project management and oversite coordination between CAISO and Avista. It includes developing planning documents, project schedule, status reports, issue and risk tracking, overall readiness checklists and any other planning and controlling documents, process and activities to support a successful implementation of the program.	Joint Avista-CAISO project plan and schedule
	Joint impact assessment document
	Avista go-live support plan document
	Joint checkpoint, next step, progress evaluation meetings, etc.
	Joint monthly project leadership meetings
	Joint quarterly executive meetings
Track 2 Policy, Legal, Support	
This track will ensure Avista reviews and signs the appropriate CAISO entity agreements – a combination of EIM Entity (Transmission System Operations) and EIM Participating Resource (Merchant) – based on a joint Avista-CAISO schedule. Changes to Avista's Open Access Transmission Tariff (OATT) will be accommodated within this track.	EIM Entity Implementation Agreement
	EIM Entity Agreement
	EIM Entity Scheduling Coordinator (EESC) Agreement
	EIM Participating Resource Scheduling Coordinator (PRSC) Agreement
	EIM Participating Resource Agreement
	Department of Market Monitor Filings
	Market Base Rate Study
	CAISO Implementation Milestone Payments
	CASIO Grid Management Charge
	Avista Open Access Transmission Tariff (OATT)
Track 3 Transmission & Generation Modeling	
This track ensures Avista's transmission and generation assets are integrated with several CAISO systems, specifically Avista's Transmission Full Network Model with the CAISO's Energy Management System (EMS) and the Master File. The Master File specifies many generation and intertie resources for the purposes of scheduling, bidding and settlements.	Transmission Full Network Model (FNM) creation & maintenance
	Integrate Avista Energy Management System (EMS) to CAISO EMS
	Master File / Generation Participation & Cost Modeling
	Major Maintenance Adders & Default Energy Bid logic
	Energy Transfer System Resource (ETSRs)
Track 4 System Integration & Testing	
	Acquire & configure Generation Outage Management software
	Acquire & configure Transmission Outage Management software

This track ensures the required Avista's EIM-related software integrates with the CAISO systems and are functioning as designed to ensure the EIM runs successfully for existing and new participants. Prior to, and concurrent to this track, Avista will need to implement the various EIM-related software solutions, enhance in-house applications and build integrations. This currently includes implementing several new software solutions that impact Enterprise Technology, Generation Production and Substation Support, Transmission System Operations, Power Supply and Resource Accounting.	Acquire & configure Participating Resource Scheduling Coordinator (PRSC) bidding & scheduling software (merchant)
	Acquire & configure EIM Entity Scheduling Coordinator (EESC) scheduling software (transmission)
	Acquire & configure PRSC settlement software (merchant)
	Acquire & configure EESC settlement software (transmission)
	Acquire & configure reporting & analytics software
	Enhance & integrate Avista Decision Support System (ADSS)
	Acquire & configure Energy Accounting software
	Acquire & configure a E-Tagging solution
	Enhance Nucleus functionality
	Integrate EIM software systems
	Integrate EIM software with CAISO systems
	Pre-production testing with CAISO – Day in the Life phase
	Pre-production testing with CAISO – Market Simulation phase
	Pre-production testing with CAISO – Parallel Operations phase
Track 5 Metering & Settlements	
This track ensures various Avista metering activities are successful in the EIM for physical metering and meter data accuracy. Physical metering, associated with a market resource like a generation facility or an interconnection point, and the identification and classification of relevant metering components must meet existing CAISO metering standards and accuracy ratings. Meter data accuracy speaks to the validation of market resource configurations and related metering components in alignment with the market resources' physical characteristics and participation level within EIM.	Low-Side Metering (LSM) /unit level metering at generation plants
	High-Side Metering (HSM) installation at generation plants
	Current Transformer (CT) / Potential Transformer (PT) testing and applicable upgrades
	Installation of a Schweitzer Engineering Laboratories SEL-735 revenue quality meter at generation and substation/interconnection locations
	Interconnection meter upgrades at some substations
	Network and communications installations/upgrades
	Install new instance of Itron's MV90 xi for meter data collection
	Generation plant Programmable Logic Control (PLC) upgrades
	Creation, submission & approval of Settlement Quality Meter Data (SQMD) plans and metering portfolio to CAISO
Track 6 Operations Readiness & Training	
This track provides a series for training events throughout the EIM implementation time. This includes computer-based training, in-person training, EIM workshops, trainer visits to the CAISO and training support for phased steps to production: Day in the Life, Parallel Operations and Go-Live initiation.	Create internal EIM training plan
	Complete CAISO EIM computer-based training modules
	CAISO conducts hands-on training for Avista
	Develop internal operational EIM procedures
	File internal operational EIM procedures with CAISO
	Complete CAISO market readiness criteria worksheet
	CAISO provides planned go-live operations procedure documents
	Avista files market readiness certificate with FERC prior to go-live
	CAISO files market readiness certificate with FERC prior to go-live
	Develop & implement EIM operations & support model
	EIM Human Resource Plan
	EIM Transmission System Operations desk & remodel at BuCC
	EIM Transmission System Operations desk & remodel at Mission
	Noxon 230kV Switchyard CIP Compliance

6 Avista Scope by CAISO EIM Track

6.1 Track 0/Track 1 – Avista EIM Program / Planning & Project Management

System Integrator – Utilicast

6.1.1 EIM Program & Project Management Establishment

After announcing EIM entry and signing the Implementation Agreement, Avista began to organize the Program integration team across the impacted business units and established core team members who would be charged with implementing and managing the work. In February 2019, Avista hired the EIM Program Manager to establish the program structure and governance, gather financial estimates and identify work streams across the impacted business units. This also included identifying leadership roles, subject matter experts, project managers and engineers. The Program was also tasked with educating Avista teams about the organized market structure and what requirements Avista would need to fulfil in order to participate.

The Program Manager began communication with the CAISO project management office to aligning internal Avista milestones with CAISO-driven milestone dates. Monthly track calls have been established with the appropriate CAISO, Utilicast and Avista Subject Matter Expert representatives to understand deliverables and milestones, which have been progressively discussed and incorporated into Avista's overall Program schedule.

The Director Steering Committee began meeting in March of 2019, and the Executive Steering Committee met quarterly in 2019 and moved to monthly meetings in 2020. In December 2019, the first joint Avista/CAISO Executive meeting was held and are subsequently planned for quarterly updates through go-live. See Section 12 for information on the project governance structure.

6.1.2 Utilicast – System Integrator

Avista engaged with Utilicast in three phases, with the intent to progressively evaluate performance and value before signing additional EIM integration support agreements. Phase 1 in 2018 focused on the technology, metering and network model assessment, helping Avista understand the CAISO requirements and processes, and identifying the gaps to be filled. After soliciting responses for a System Integrator via a Request for Information (RFI) proposal, Avista agreed to a sole sourcing engagement with Utilicast in an effort to continue the partnership as their System Integrator. This led to a phase two agreement in 2019 that focused on metering and generation control requirements and design, generation bidding strategies, development of technology application requirements and RFPs and the evaluation/selection of EIM software vendors. The phase three engagement was signed in December 2019 and focused on the program implementation efforts through go-live of 2022.

Under this program implementation agreement, Utilicast will provide Subject Matter Experts to evaluate, design, implement and integrate EIM-related Commercial Off the Shelf (COTS) systems with current Avista systems. In addition, they will assist with evaluating business processes and providing recommended modifications to maximize efficiencies necessary to compile, analyze and deliver the necessary information effectively. Utilicast will also engage in all aspects of the EIM Program, provide project management expertise and are uniquely positioned to assist Avista with a successful market entry.

6.1.2.1 Utilicast Financial Summary Estimate

The 2018 Utilicast Assessments were completed in 2018 and were not included in the Program Charter estimates. The 2019 Technology RFP was reflected under Charter Line Item 10 "System Selection & Procurement" with a $500k expense estimate for Utlicast and $680k for Avista labor. Utilicast actuals for the Technology RFP are listed in Table 1 and Table 9. Estimates for Avista labor are listed in Table 9. The Utilicast agreement was signed with a do not exceed amount of $600k and we completed the SOW with an actual spend of $508k.

The 2020-22 Utlicast Implementation Agreement costs were included under Charter Line Item 9 "Program Leadership, Management & SMEs" at $3.2 million in capital. After further evaluation of market integration requirements, project management support, and subject matter expertise, the final Utilicast Implementation Agreement included estimated contract costs of $3.7 million capital and $1.6 million Operations and Maintenance (O&M) expense to support market integration efforts. Some of the increased Utilicast costs offset internal Avista labor.

Table 1 – Utilicast Agreements

Utilicast		Charter Estimates (as of 05/2019)		Scope Estimates (as of 08/2020)	
Agreement	**Year**	**Capital**	**Expense**	**Capital**	**Expense**
Technology RFP (Line 10)	2019	$ -	$ 500,000	$ -	$ 508,435
Implementation (Line 9)	2020-22	$ 3,200,000	$ -	$ 3,700,000	$ 1,150,000
	Totals	**$ 3,200,000**	**$ 500,000**	**$ 3,700,000**	**$ 1,658,435**
Actuals					

When the 2020-22 Implementation agreement with Utilicast was signed, each deliverable was assigned an expense or capital indicator, which allowed for an estimate of annual expense and capital charges by year. These estimates were not known at the writing of the Program Charter, as the Implementation Agreement was not signed until October 2019. In September 2020, the expense forecast associated with the Implementation Agreement was reduced by $450k based on the 2020 actual spend and a review of scheduled deliverables. The primary drivers for the Utlicast expense are associated with training, business process design and generation/interchange modeling.

6.1.2.2 Utilicast Implementation Agreement 2020-2022

At the time of the Charter, Avista estimated $3.2M of Utilicast capital labor to support the EIM implementation under the Charter capital Line Item 9 "Program Leadership, Management & SMEs." This line also contained $700k in Avista labor for capital efforts that have been included in the EIM software estimates. This Utilicast estimate did not include an estimate for O&M expense. The assignment of deliverables also corresponded with a CASIO project track and an Avista business unit. By grouping these deliverables, an estimate of capital spend by business unit and a total estimate of expense was projected. Although the Utilicast expense items may align with a specific business unit, the expense costs will be charged to the Power Supply business unit. The Charter estimates did not assign Utilicast labor to individual business unit estimates. In addition, Utilicast labor to support Avista's Decision Support System (ADSS) enhancements was included in the total Utilicast Implementation Agreement costs, but not be included in the EIM Program totals, as ADSS EIM enhancements were planned for funding under a different business case.

Table 2 – Utilicast 2020-2022 Implementation Agreement Estimates by Business Unit

Utilicast Implementation Agreement (signed 10/2019)		Implementation Agreement (as of 10/2019)		Scope Estimates (as of 08/2020)	
Business Units	**CAISO Track**	**Capital**	**Expense**	**Capital**	**Expense**
ET Applications	Track 4	$ 2,986,181		$ 2,986,181	
ET Network	Track 4 & 5	$ 67,060		$ 67,060	
GPSS	Track 5	$ 67,060		$ 67,060	
Substation	Track 5	$ 67,060		$ 67,060	
Transmission	Track 4	$ 40,000		$ 40,000	
Facilities	Track 6	$ -		$ -	
ADSS	Track 4	$ 472,639		$ 472,639	
EIM Program	All	$ -	$ 1,600,000	$ -	$ 1,150,000
	Utilicast Totals	**$ 3,700,000**	**$ 1,600,000**	**$ 3,700,000**	**$ 1,150,000**

6.2 Track 2 – Policy, Legal, Support

This track ensures Avista reviews and signs the appropriate CAISO entity agreements – a combination of EIM Entity (Transmission System Operations) and EIM Participating Resource (Merchant/Power Supply), conducts changes to the OATT, and completes the necessary studies and filings for market participation.

6.2.1 Summary

- **EIM Agreements:** In order to transact in the market, Avista needs to sign various CAISO Agreements to conduct operations as a Merchant Scheduling Coordinator and Entity Scheduling Coordinator. These agreements allow the Merchant and the Entity to transact in the market, while preventing the inappropriate sharing of information and adhering to FERC Standards of Conduct. This agreement submission also includes items such as financial forms, certifications, risk policies, and user and contact lists. A joint Avista-CAISO schedule for completing the agreements has been made. These items were planned under the Charter implementation Charter Line Item 13 "OATT, MBR & ISO Agreements" at $130k as Avista labor expense.

- **Open Access Transmission Tariff (OATT):** Avista must make significant changes to its OATT to accommodate transmission utilization in the EIM, change ancillary service charges and incorporate EIM financial settlement obligations due to operating in the EIM. These OATT changes are also affected by the need to conduct a new Market Base Rate analysis and submit the study findings to FERC for approval. These items were forecasted in Charter Line Item 13 "OATT, MBR & ISO Agreements" at $130k as expense.

- **Market Base Rate Study:** Market Based Rate (MBR) Authority represents permission granted by FERC to allow power to be sold at market rates, as opposed to a traditional cost of service rate (aka cost-plus). Sellers seeking market-based rate authority must prove to FERC that they have no ability to set market prices, or that there are proper mitigations in place if there is an opportunity to set the price. A new MBR study is required to be conducted and approved by FERC as part of the EIM registration process to ensure Avista doesn't have the ability to set the market price within the EIM. These items were planned under the Charter implementation Charter Line Item 13 "OATT, MBR & ISO Agreements" at $130k as Avista labor expense.

- **Professional Services:** The Program Charter provided an estimate for outside services to conduct the MBR study and legal review of OATT changes. These items were planned under the Charter implementation Charter Line Item 13 "OATT, MBR & ISO Agreements" at $105k of expense under the Solutions & Services column.

- **Department of Market Monitoring Filings:** Although the business logic and collection of operational inputs required to complete these documents are in Track 3 – Generation and Transmission Modeling, the negotiation and filing of the documentation is under Track 2. Avista will submit filings for Major Maintenance Adders (MMAs) and Default Energy Bids (DEB) by generation resource. The MMAs are one of the cost components in the CAISO's proxy cost calculation for start-up and minimum run hour load costs. The negotiated DEB is CAISO's process to mirror competitive market outcomes in the event that Avista is found to have an ability to unjustifiably increase electricity prices during certain time frames at certain locations. The Program Charter did not provide an estimate for this work, but it's assumed the filing procedures can be included in the estimates for the EIM Agreements, OATT, and MBR activities.

- **CAISO Milestone Payments:** As part of the EIM Implementation Agreement, CAISO outlined six milestone payments that align with CAISO's set implementation schedule. Each payment is $50k and payable upon meeting the milestone, for a one-time total implementation fee of $300k. Details of the milestone descriptions can be found in Section 7. This item was planned as implementation expense in the Charter under expense Line Item 18 "EIM Membership & Ongoing Fees" at $300k.

- **CAISO Grid Management Charge:** The CAISO charges EIM participants a Grid Management charge based on the amount of MWh transacted in the market. This estimate ($120k) was mislabeled in the Charter as CAISO Annual

Fee. This item was planned as expense in the Charter under on-going, annual expense Line Item 18 "EIM Membership & Ongoing Fees" at $120k.

6.2.2 Track 2 Policy, Legal, Support Financial Estimate Summary

With the exception of payment to CAISO for the filing of the scheduling coordinator agreements, a majority of the items estimated in the Program Charter have not changed. Although the Charter did not provide an estimate for the ISO Department of Market Monitoring filings, it's assumed these filings can be accommodated under the expense estimates for the EIM Agreements, OATT, and MBR activities. With the exception of the CAISO Grid Management Fee, the items represented as expense are a one-time O&M charge. Although there isn't a specific expense estimate for Utilicast under this track, the support effort is represented in the EIM Program line in cost estimate tables.

Table 3 – Policy, Legal, Support Financial Estimates

Track 2 - Policy & Legal	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
EIM Agreements (Line 13)	$ -	$ 130,000	$ -	$ -	$ 130,000	$ -
OATT (Line 13)	$ -		$ -	$ -		$ -
MBR (Line 13)	$ -		$ -	$ -		$ -
DMM Filings	$ -	$ -	$ -	$ -		$ -
Professional Services (Line 13)	$ -	$ 105,000	$ -	$ -	$ 105,000	$ -
CAISO Payments (Line 18)	$ -	$ 300,000	$ -	$ -	$ 300,000	$ -
CAISO Grid Management Fee (Line 18)	$ -	$ -	$ 120,000	$ -	$ -	$ 120,000
Totals	**$ -**	**$ 535,000**	**$ 120,000**	**$ -**	**$ 535,000**	**$ 120,000**
Utilicast	$ -	$ -	$ -	$ -	$ -	$ -
Grand Totals	**$ -**	**$ 535,000**	**$ 120,000**	**$ -**	**$ 535,000**	**$ 120,000**

6.3 Track 3 – Transmission & Generation Modeling

6.3.1 Existing State Prior to EIM

A vital step in every EIM implementation, is the integration the entity's detailed electrical system model into CAISO's region-wide model; this electric system model is called the Full Network Model (FNM). It's accompanied by the development of the Resource Data Templates (RDT). This information is critical, as it allows the market to accurately optimize resource dispatch, while respecting transmission reliability and contractual limits. It is each entity's responsibility to maintain a detailed model of their own system, and to provide timely updates to CAISO, including planned construction and outage activities. Failure to provide and maintain an accurate representation of Avista's electrical system within CAISO's model will lead to non-optimal market dispatches, which negatively impact market settlements.

Prior to EIM entry, Avista used off-line models and hosted third-party solutions to perform the necessary analysis for real-time operation of the electrical system. This was reasonable at the time, as maintenance of these real-time models was very labor and time intensive. Modern systems now enable entities to more easily exchange model information, thus reducing the labor and time required to manage the model. Avista will add the additional staffing and tools necessary to build, manage, and maintain its own network model for real-time operations.

6.3.2 Transmission & Generation Modeling Scope Summary

6.3.2.1 *Transmission Full Network Model Scope*

During the EIM Program planning stages, Avista was in the process of transitioning providers for the Reliability Coordinator (RC) function from Peak Reliability to RC West, operated by the CAISO. Avista began operations under RC West on November 1, 2019. While operating under Peak Reliability, Avista contracted with Peak to

provide hosted service and maintenance of the transmission network model, real-time state estimation, and real-time contingency analysis. Under RC West, the same services have been provided.

During this RC transition period, Avista started a project to bring these crucial reliability functions in-house – not only for RC purposes, but also for EIM. The development and integration of these tools into Avista's Supervisory Control and Data Acquisition Energy Management System (SCADA/EMS) is in flight and funded by the SCADA/SOO/BuCC BC. The Program Charter provided a capital estimate for Utilicast support of the FNM implementation under the Line Item 11 "Full Network Model for EIM" at $40k, which is still planned. Line Item 11 also had Avista FNM capital labor at $80k. The on-going labor expense associated with Line 11 is for a portion of a new FTE to support the FNM at $50k (the other funding is from SCADA). The new FTE planned to support the FNM implementation, and the associated on-going labor expense costs, are represented in Table 4 and also in Table 17.

6.3.2.2 *Integration with CAISO Automated Dispatch System*

In the Program Charter, costs were estimated for integration of Avista's EMS SCADA with CAISO's Automated Dispatch System (ADS). The ADS provides the market Dispatch Operating Targets (DOTs) which the EIM entity uses to control its generation plants. In order to accommodate this, Avista will procure an add-in dispatch module from its SCADA software provider. This dispatch module will retrieve the dispatch targets in real-time from CAISO, and present them to the Avista EIM operator. Generation resources which are on full EIM control, will automatically be sent these operating targets. Plant control systems will follow the dispatch targets to achieve the targeted energy output. The dispatch module implementation estimate was included in Charter Line Item 1 "Vendor EIM Software Solution" with a capital estimate of $156k. This has been transferred to the Track 3, Table 4 financial estimates with an updated estimate of $160k.

6.3.2.3 *Master File / Generation Participation & Cost Modeling*

In the Charter, Avista provided estimates for an item labeled "Generation Participation & Cost Modeling," which included estimates for multiple items. One of these critical items is the RDT, which are inputs into the CAISO Master File (MF) for both generation and interconnection resources. The RDTs for generation describe to the market all the base physical and operational properties of each generation resource, which the market then uses for optimization and constraints. The RDTs for interconnection resources represent interchange schedules and market dispatch limits between Balancing Authorities Areas – for those in the EIM and those not participating. Separate RDTs must be prepared for PRs (Participating Resources) and NPRs (Non-Participating Resources). The decisions on what to include in the RDT will have impacts on the market solution. Some of the choices will be made based on tradeoffs, or with a plan about how manual dispatches or outages will be used to manage some condition that cannot be expressed in the RDT. The RDT also functions as an interface to the CAISO Master File, which then supplies the data to the market system. The other two items involved the collection of information and business logic to inform the DEB and MMA. These items need to be coordinated and aligned with the FNM and the engineering teams conducting the metering upgrades. This collective work was labeled under the Charter under Line Item 12 "Generation Participation & Cost Modeling" at $200k in capital. As there is no asset planned for installation, this work has been reclassified as expense.

6.3.2.4 *Energy Transfer System Resource (ETSR)*

An Energy Transfer System Resource (ETSR) is the representation of how the market facilitates the transfer of energy from one EIM Balancing Authority (BA) to another EIM BA for the purposes of tracking, tagging and settlements. As part of the implementation, Avista must define the physical location of the ETSR and negotiate ETSR limits with neighboring EIM Entities. Although the ETSR values will be configured in the EIM software, the business process definition and discussion are considered expense. The Charter did not include estimates for this work; however it's believed the effort will be accommodated within the existing expense estimate.

6.3.3 Track 3 Financial Estimate Summary

The estimates below include the following updates and additional costs:

- The Charter provided a capital estimate for Utilicast support of the FNM implementation under the Line Item 11 "Full Network Model for EIM" at $40k and a portion of the Avista FNM capital labor at $80k. The portion of the

on-going labor expense at $50k associated with Line 11 is for a new the FTE to support the FNM. The new FTE planned to support the FNM implementation, and the associated on-going labor expense costs, are represented in Table 4 and also in Track 6.

- The dispatch module implementation estimate was included in Charter Line Item 1 "Vendor EIM Software Solution" with a capital estimate of $120k. This has been transferred to the Track 3 financial estimates with an updated estimate of $160k.
- The Charter Line Item 12 "Generation Participation & Cost Modeling" had estimates for the creation of the Master File through RDT collection, the MMA and the DEB, and was planned as capital ($200k). As there is no asset planned for installation, so this work has been reassigned as one-time expense cost.
- With the exception of the Utilicast support for the FNM, there isn't a specific expense estimate for Utilicast under this track, as the support effort is represented in the EIM Program line in cost estimate tables.

Table 4 – Transmission & Generation Modeling Estimates

Track 3 - Transmission & Generation Modeling	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
FNM Creation*	$ -	$ -	$ -	$ -	$ -	$ -
FNM EIM Support (Line 11)	$ 80,000	$ -	$ 50,000	$ 80,000	$ -	$ 50,000
EIM Dispatch Module (Line 1)	$ 156,000	$ -	$ -	$ 160,000	$ -	$ -
Master File / Gen Cost Modeling (Line 12)	$ 200,000	$ -	$ -	$ -	$ 200,000	$ -
Totals	**$ 436,000**	**$ -**	**$ 50,000**	**$ 240,000**	**$ 200,000**	**$ 50,000**
Utilicast	$ 40,000	$ -	$ -	$ 40,000	$ -	$ -
Grand Totals	**$ 476,000**	**$ -**	**$ 50,000**	**$ 280,000**	**$ 200,000**	**$ 50,000**

* Funded by SCADA business case

6.4 Track 4 – System Integration & Testing

Enterprise Technology Software Selection

6.4.1 Existing State Prior to EIM

Avista has primarily relied on Nucleus, an in-house application, to perform a myriad of business functions that are typically satisfied with multiple, independent systems supporting Risk, Gas Supply, Power Supply, Resource Accounting and System Operations. At one point, Nucleus was a commercial application and Avista purchased the source code – thus customizing the application over many years to meet different business needs. Although Nucleus was briefly considered for EIM use, the plan quickly shifted to understanding what functions would be impacted or duplicated in the new systems needed for EIM operations. Where possible, Avista intended to avoid further integration with Nucleus and allow the application to support existing operations.

In terms of outage management for generation and transmission, Avista knew their existing internally developed Generation Outage Coordinator (GOC) application and manual submission processes would not be acceptable for market use. Avista planned to implement an Outage Management System (OMS) that would satisfy both the Transmission and Generation outage management processes internally for Avista and externally for EIM.

Avista has developed an internal generation optimization application called Avista Decision Support System (ADSS) and believe it will be integral for EIM operations, as there isn't a commercial application that specializes in hydro optimization. Avista chose to enhance the ADSS application for EIM use and integrate with the purchased OMS and Scheduling applications.

In June 2017, Avista implemented a Power Costs, Inc. (PCI) application for participation in CAISO's Market Redesign and Technology Upgrade (MRTU). The MRTU is a market operated by the CAISO, with governance provided by the California Public Utilities Commission (PCUC). The market's intent is to improve energy efficiency, transparency, reliability and prevent market manipulation within CAISO. Avista used the application to submit market bids and perform settlements calculations at the CAISO tie lines – locations that intersect Avista's contracted transmission path with CAISO

transmission grid. This was a limited installation of PCI's GenManager application, as prior to EIM, Avista did not have a business need for an extensive scheduling, bidding or settlement application.

6.4.1.1 EIM Software – RFP & Selection

In June of 2019, Avista engaged with Utilicast to define the system requirements for various EIM software applications, while assuming some internal applications would be modified for EIM. During requirements gathering, it was determined that Avista's Oracle Meter Data Management (MDM) application for residential meters would not be suitable for EIM metering activity. The assumption in the original charter assumed the MDM could be used for this functionality. Avista issued two technology-based RFPs. The first RFP was issued in August 2019 for a Generation and Transmission Outage Management System. The second RFP was issued October 2019 for the Bid to Bill EIM suite, including the PRSC and EESC for scheduling, the PRSC and EESC for settlements, Energy Accounting and an Analytics/Reporting application. A common scoring matrix and logic was used for both RFPs. The scoring matrix was based on a combination of the vendors scoring themselves and Avista's scoring. The vendors provided a self-score based on their ability to meet the functional and non-functional requirements. During the product demonstrations, Avista reviewed and adjusted the vendor provided score based on the product performance. Avista also scored on the areas of industry expertise, references, demonstration scenarios and customer service. A total score of 100 was achievable. The evaluation of software costs were not included in the scoring matrix, but were considered in the overall evaluation process, as some vendors provided pricing for standalone systems, while others provided bundled suite pricing. The primary drivers for software selection were centered on functionality and vendor relationships, as Avista knew the financial aspect would be influenced by software bundling options and contract negotiations.

The OMS RFP was issued to, and responses received from, Sunnet, Open Access Technologies, Inc. (OATI), PCI and MCG Energy Solutions. On-site demonstrations of each OMS product were held in mid-September 2019 with a cross-section of business and technology users, as well as Utilicast members. Excluding the Sunnet product, which focuses primarily on transmission outages, the OMS scoring was competitive. Knowing there was a desire to select a vendor who could fulfill multiple software needs, Avista delayed their OMS decision in favor of selection after the Bid to Bill software evaluation process. Table 5 below provides the scoring for each vendor.

Table 5 – OMS Vendor Scoring

Vendor	OMS Score
MCG Energy	87.7
PCI	87.1
OATI	83.3
SUNNET	74.0

The Bid to Bill Suite was issued to OATI, PCI, Power Settlements and MCG Energy Solutions. Although MCG Energy provides organized energy market solutions, their EIM Market-share representation is minimal and Avista did not believe their product would meet EIM needs. The on-site software demonstrations were held in the month of November 2019 with representation from PCI, OATI and Power Settlements. PCI and OATI bid the entire suite, while Power Settlements did not bid for Energy Accounting and did not have a fully developed scheduling solution (PRSC & EESC). Although a common scoring matrix was used, a different group of business users were engaged in the evaluation process. Each of the solutions within the Bid to Bill suite was scored individually, with a roll up score for each vendor listed in Table 6 below.

Table 6 – Bid to Bill Vendor Scoring

Vendor	Bid to Bill Score
PCI	77.3
OATI	71.1
Power Settlements	70.0

After all scores were collected, meetings were held with all the evaluation team members to discuss the merits of choosing a single vendor versus integrating a "best of breed" model with various multiple vendors. Trade-offs would be present as no single vendor could fully excel in each functional requirement area across eight software solutions. The evaluation team made a recommendation to choose PCI for PRSC/EESC scheduling, Energy Accounting, Transmission OMS and Generation OMS, and Power Settlements for PRSC/EESC settlements and Reporting/Analytics. Even though Power Settlements had a lower overall score for Bid to Bill because of not having a mature scheduling solution, the evaluation team felt they had a superior settlement and reporting/analytics solution.

After the EIM Director Steering Committee approved the recommendation in November 2019, the recommendation was reviewed and approved by the Executive Steering Committee in December 2019. Although the cost estimates presented to the leadership team exceeded the original Program Charter estimates, they reflected a baseline negotiation point and Avista believed additional savings could be negotiated with PCI and Power Settlements.

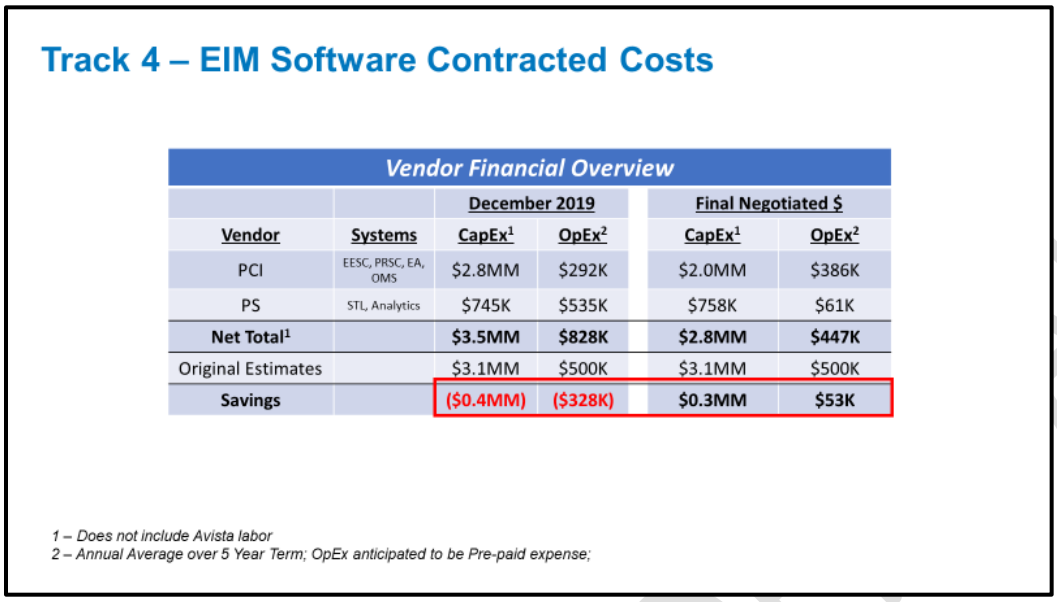
6.4.1.2 EIM Software – Negotiated Contract Costs

After the Executive Steering Committee approval, Avista engaged with PCI and Power Settlements to negotiate the terms and conditions of the agreements, as well as the implementation costs (capital) and on-going operating expense (expense), for the following EIM systems:

- **Power Costs, Inc.**
  - **Asset Operations**
    - Generation Outage Management System (GOMS) – Performs functions to submit planned and unplanned outages to CAISO for the generation units.
    - Transmission Outage Management System (TOMS) – Performs functions to submit planned and unplanned outages to CAISO for the transmission lines.
  - **GenManager Front Office**
    - PRSC Bidding & Scheduling System – Performs Merchant functions to submit bids and base schedules to CAISO for participating resources.
    - EESC Scheduling System – Performs Entity (Balancing Authority) functions to submit base schedules for both participating resources and non-participating resources.
  - **Energy Accounting**
    - Energy Accounting System – Performs meter verification, estimation and editing (VEE) for generation and interchange metering to produce and share Settlement Quality Meter Data (SQMD) with CAISO.
- **Power Settlements**
  - **SettleCore**
    - PRSC Settlement System – Performs Merchant settlement functions for the participating resources and activities.
    - EESC Settlement System – Performs Entity settlement functions for non-participating resources and transmission resources.
  - **Visual Analytics**
    - Performance & Analytics System– Performs a near real-time market analytic functions in a visual display.

In March 2020, Avista concluded the negotiations with PCI and executed an amendment to the existing Master Service Agreement (MSA). In May 2020, Avista concluded the negotiations with Power Settlements. The slide below, shown at the May 2020 Director and Executive Steering Committee meetings, summarizes the initial vendor costs presented in December 2019 and the vendor costs after negotiations, which resulted in a savings of $300k in implementation capital costs and annual average savings of $53k in expense costs over the five-year contracted agreement compared to the original vendor costs. These savings were attributed to Avista choosing an on premise deployment of Power Settlements, thus removing the hosting services.

Slide 1 – Negotiated Software Costs



Track 4 – EIM Software Contracted Costs

Vendor Financial Overview					
		December 2019		Final Negotiated $	
Vendor	Systems	CapEx[1]	OpEx[2]	CapEx[1]	OpEx[2]
PCI	EESC, PRSC, EA, OMS	$2.8MM	$292K	$2.0MM	$386K
PS	STL, Analytics	$745K	$535K	$758K	$61K
Net Total[1]		**$3.5MM**	**$828K**	**$2.8MM**	**$447K**
Original Estimates		$3.1MM	$500K	$3.1MM	$500K
Savings		**($0.4MM)**	**($328K)**	**$0.3MM**	**$53K**

1 – Does not include Avista labor
2 – Annual Average over 5 Year Term; OpEx anticipated to be Pre-paid expense;

6.4.1.3 EIM Software – Vendor Financial Estimate Summary

The Charter estimates for the software vendor costs were considered preliminary and included a financial range for each EIM system, and the estimates assumed the low range of the costs. They included software license costs, professional services and travel expenses for vendors. They were reflected under Charter Line Items 1 and 1a "Vendor EIM Software Solutions" at $1.26 million in capital, $840k in working expense and $500k in re-occurring annual maintenance expense. The capital and working expense estimates should have been combined into one capital estimate at $2.1 million. The Charter estimates assumed a hosted SaaS solution for all EIM applications, with internal Avista labor estimates for Oracle MDM customizations and reporting.

The Scope estimates in Table 7 include the following changes and combined allocations of funds:

- When the decision was made to purchase a COTS solution for Energy Accounting, instead of enhancing Avista's existing MDD application, the funds were reallocated. Charter Line Item 5 "Other Avista Software Enhancements – MDM" at $800k was reassigned with $400k allocated to software licensing and $400k allocated to Avista labor for software projects.
- The removal of the SaaS hosting costs for the PRSC/EESC Settlement system.
- The EMS Dispatch Module estimates at $120k under the Charter Line Items 1 and 1a "Vendor EIM Software Solutions" reassigned to Track 3, Table 4.
- The Charter estimates did not account for software hosting and maintenance fees that could be capitalized during project delivery, which lead to an additional $454k in capital.

Avista signed agreements with PCI and PS to implement the software and five years of application support after market entry. The Scope expense estimates in Table 7 include a capital cost assignment by EIM application, implementation expense for vendor software training and an on-going annual expense estimate over a five-year term. The Charter estimates did not specifically include an assumption for the software support term.

Table 7 – EIM Vendor Software & Licensing Estimates

Vendor	Track 4 - EIM Vendor Software	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
		Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
	Vendor EIM Software Solutions (Line 1)	$ 1,260,000	$ -	$ 500,000	$ -	$ -	$ -
	Vendor EIM Software Solutions (Line 1a)	$ 840,000	$ -		$ -	$ -	$ -
	Software Enhancements MDM (Line 5)	$ 400,000	$ -	$ -	$ -	$ -	$ -
	EMS Dispatch Model to Track 3 (Line 1)	$ (120,000)	$ -	$ -	$ -	$ -	$ -
	EIM Software Vendor Allocation	**$ 2,380,000**	**$ -**	**$ 500,000**	**$ -**	**$ -**	**$ -**
PCI	EESC Scheduling	$ -	$ -	$ -	$ 355,297	$ 10,152	$ 100,395
PCI	PRSC Bidding & Scheduling	$ -	$ -	$ -	$ 355,297	$ 10,152	$ 100,395
PCI	OMS (Gen / Trans) Phase 1 & 2	$ -	$ -	$ -	$ 513,307	$ 13,699	$ 84,961
PCI	Energy Accounting	$ -	$ -	$ -	$ 322,380	$ 8,122	$ 100,395
PS	PRSC & EESC Settlement	$ -	$ -	$ -	$ 725,500	$ 22,500	$ 64,637
PCI	Hosting & Maintenance	$ -	$ -	$ -	$ 444,117	$ -	$ -
PS	Maintenance	$ -	$ -	$ -	$ 10,000	$ -	$ -
	Totals	**$ 2,380,000**	**$ -**	**$ 500,000**	**$ 2,725,898**	**$ 64,625**	**$ 450,783**

6.4.1.4 EIM Software – Avista Labor Summary

The Charter estimates detailed various technology labor items to support the EIM software implementations. Table 8 outlines the Charter estimates by line item and presents a total Avista labor allocation that was applied to the EIM software projects. These estimates also include half of Charter Line Item 5 "Other Avista Software Enhancements – MDM" at $400k for Avista software project labor. This estimate assumed existing labor for project delivery and did not include estimated costs associated with the new EIM FTEs contributing to the capital software projects.

Table 8 – EIM Software Internal Labor

Track 4 - EIM Software Internal Labor	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Vendor EIM Software Solutions (Line 1)	$ 900,000	$ -	$ -	$ -	$ -	$ -
Internal Integration Effort (Line 3)	$ 820,000	$ -	$ -	$ -	$ -	$ -
Custom Reporting Allowance (Line 4)	$ 200,000	$ -	$ -	$ -	$ -	$ -
Avista Software Enhancements MDM (Line 5)	$ 400,000	$ -	$ -	$ -	$ -	$ -
Dedicate Security & Architecture (Line 6)	$ 330,000	$ -	$ -	$ -	$ -	$ -
PgM Leadership Labor (Line 9)	$ 350,000	$ -	$ -	$ -	$ -	$ -
EMS Dispatch Model to Track 3 (Line 1)	$ (36,000)	$ -	$ -	$ -	$ -	$ -
EIM Software Internal Labor	$ -	$ -	$ -	$ 2,964,000	$ -	$ -
Totals	**$ 2,964,000**	**$ -**	**$ -**	**$ 2,964,000**	**$ -**	**$ -**

6.4.1.5 EIM Software – Total Project Financial Estimate Summary

The Program Charter estimates included the vendor estimates, estimates for internal labor, and professional services associated with a System Integrator. However, they were shown in different line items and not consolidated. The updated total project capital estimates in Table 9 represented total estimated costs for the EIM software implementation, with the following details:

- Avista's RFP software selection and procurement effort with Utlicast and internal Avista labor. The 2019 Technology RFP with Utilicast was reflected under Charter Line Item 10 "System Selection & Procurement" with a $500k expense estimate for Utilicast and $680k for Avista labor. Utilicast actuals for the Technology RFP are listed in Table 1 and Table 9.
- Summarized vendor software allocation from Table 7
- Summarized internal labor allocation from Table 8
- The OMS project separated into two phases – Phase 1 for pre-EIM entry and Phase 2 for EIM go-live
- Utilicast labor allocated based on deliverables included in 2020-2022 Implementation Agreement (Table 2)
- The removal of SaaS hosting costs for the PRSC/EESC Settlement system

- The addition of hardware costs associated with the on premise deployment of the EESC & PRSC Settlement system at $77k.
- Nucleus enhancements estimates for EA and Settlements
- The PRSC Settlements & EESC Settlements applications combined into a single project, with the inclusion of the Advanced Analytics module.
- The addition of training expense as provided by the EIM software vendor.

Table 9 – EIM Software Projects Costs

Vendor	Track 4 - Software Projects Total	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
		Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
	System Selection & Procurement	$ -	$ 680,000	$ -	$ -	$ 680,000	$ -
	EIM Software Vendor Alloc. (Table 7)	$ 2,380,000		$ 500,000	$ -	$ -	$ -
	EIM Software Internal Labor (Table 8)	$ 2,964,000	$ -	$ -	$ -	$ -	$ -
PCI	EESC Scheduling	$ -	$ -	$ -	$ 973,816	$ 10,152	$ 100,395
PCI	PRSC Bidding & Scheduling	$ -	$ -	$ -	$ 1,105,816	$ 10,152	$ 100,395
PCI	OMS (Gen / Trans)	$ -	$ -	$ -	$ 880,774	$ 13,699	$ 84,961
PCI	OMS (Gen / Trans) Phase 2				$ 234,094		
PCI	Energy Accounting	$ -	$ -	$ -	$ 1,212,899	$ 8,122	$ 100,395
PS	PRSC & EESC Settlement	$ -	$ -	$ -	$ 1,660,400	$ 22,500	$ 64,637
PS	Visual Analytics	$ -	$ -	$ -			
	Totals	$ 5,344,000	$ 680,000	$ 500,000	$ 6,067,799	$ 744,625	$ 450,783
	Utilicast	$ -	$ 500,000	$ -	$ 2,986,181	$ 508,435	$ -
	Grand Totals	**$ 5,344,000**	**$ 1,180,000**	**$ 500,000**	**$ 9,053,980**	**$ 1,253,060**	**$ 450,783**

Table 9 provides an estimate of software costs without Utilicast costs assigned to individual projects.
Table 10 provides an estimate of software costs by project with Utilicast costs included.

Table 10 – EIM Software Projects Costs with Utilicast*

Vendor	Track 4 - Software Projects Total with Utilicast	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
		Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
PCI	EESC Scheduling	$ -	$ -	$ -	$ 1,599,004	$ 10,152	$ 100,395
PCI	PRSC Bidding & Scheduling	$ -	$ -	$ -	$ 1,731,003	$ 10,152	$ 100,395
PCI	OMS (Gen / Trans)	$ -	$ -	$ -	$ 1,421,499	$ 13,699	$ 84,961
PCI	OMS (Gen / Trans) Phase 2				$ 459,591		
PCI	Energy Accounting	$ -	$ -	$ -	$ 1,586,342	$ 8,122	$ 100,395
PS	PRSC & EESC Settlement	$ -	$ -	$ -	$ 2,256,541	$ 22,500	$ 64,637
PS	Visual Analytics	$ -	$ -	$ -			
	Totals	**$ -**	**$ -**	**$ -**	**$ 9,053,980**	**$ 64,625**	**$ 450,783**
	Utilicast	$ -	$ -	$ -	$ -	$ 508,435	$ -
	Grand Totals	**$ -**	**$ -**	**$ -**	**$ 9,053,980**	**$ 573,060**	**$ 450,783**

**Excludes System & Software Selection Utilicast implementation costs*

6.4.1.6 EIM Software – Miscellaneous

- **EIM MV90:** Beyond the EIM Bid to Bill software provided by PCI and PS, Avista also needed a meter head-end system to collect interval meter data for market submission. Avista had a choice to use an existing MV90 installation used for commercial customers or install a new MV90 specifically for EIM meter collection. Avista decided to install a new instance of MV90, as the existing installation is out of maintenance and support warranty and the existing meters are on a long-term transition to another enterprise customer billing system.

Any meters that can't be transitioned to the enterprise billing system, will be migrated to the new instance of MV90 and the existing installation will be retired.

The project to install the EIM MV90 xi application offered by Itron started in Q2 2019 and the project completed in Q1 2020. As revenue quality SEL-735 meters are installed or reconfigured to support market entry, they'll send daily meter data to this collection system. The Charter did not include a single line item for the MV90 project, but instead provided estimates for bodies of work associated with network improvements, continuation of third-party meter data access, and hardware and software licensing costs. These estimates were presented in various line items in the Charter, which were later consolidated or reassigned to the EIM MV90 project. The EIM MV90 project had a total spend of $438,166, with on-going O&M expense estimated at $20k.

- **Miscellaneous Hardware and Software:** Although the Charter planned for a SaaS EIM solution, not all EIM-related applications would follow this deployment method. This estimate accommodated hardware and software costs for associated EIM applications that would be on premise at Avista, such as the MV90 meter headend application. The estimate in Charter Line Item 7 "Miscellaneous Software & Hardware Costs" at $330k for capital and $25k of on-going annual maintenance expense were assigned to the MV90 project.

- **MV90 Network:** As a component of the EIM MV90 installation project, the Charter provided a financial estimate to route MV90 data securely through the SCADA network, and allow secure third-party interchange access to the meter data. The estimate in Charter Line Item 23 "Network – MV90 (2, 7)" at $55k for capital was originally labeled as a service, but should have been labeled as Avista labor. These labor estimates were assigned to the MV90 project.

- **MV90 / Migrate BPA Meters:** At 12 interconnection locations, BPA requires Avista provide MV90 access for energy scheduling and accounting purposes. The meters are accessed both through Avista's MV90 and BPA's MV90. With the decision to replace interchange meters at these locations and the NERC Critical Infrastructure Protection (CIP-003) requirement to provide secure communications, a secure Virtual Private Network (VPN) connection was established for BPA's MV90. The scope to develop the BPA to Avista VPN connection has been accommodated under the interchange substation projects, and the scope to commission the individual communications to each meter will be included in each project. The estimates in Charter Line Item 25 "Stand Up MV90 & Migrate Existing BPA Meters" at $215k for capital and $18k of on-going services expense were reallocated to Avista's EIM MV90 project.

Table 11 – MV90 Project

Track 4 - MV90	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Misc. Hardware / Software (Line7)	$ 330,000	$ -	$ 25,000	$ -	$ -	$ -
MV90 Network (Line 23)	$ 55,000	$ -	$ -	$ -	$ -	$ -
MV90 / Migrate BPA Meters (Line 25)	$ 215,000	$ -	$ 18,000	$ -	$ -	$ -
MV90 EIM Project				$ 438,166	$ -	$ 20,000
Total	**$ 600,000**	**$ -**	**$ 43,000**	**$ 438,166**	**$ -**	**$ 20,000**

- **Variable Energy Resources (VER) Forecast:** In order to adequately forecast Variable Energy Resources (VER) generation output, Avista needs to acquire a single VER forecast solution that will provide a five-minute generation forecast based on weather conditions for all VER facilities in Avista's BA. Avista currently has two (Meteologica and Vaisala) forecast providers that provide hourly values. Avista needs a singular forecast to integrate into EIM software and a service that can expand as additional VER resources are brought online in the BA. Avista intends to operate a pilot trial period with forecast providers before selecting and implementing the

service for EIM. These costs were not planned in the Charter. A capital estimate ($200k) and on-going expense estimate ($15k) have been updated.

- **Current Transformer (CT) Analyzer:** In order to support the transformer accuracy testing efforts at substation and generation locations, Avista purchased software called "CT Analyzer" offer by Omicron. These costs were not planned in the Charter, but the application was required to test the accuracy of CTs to verify they met CAISO market requirements. If the CT accuracy did not meet the CAISO standard then they were either replaced, or a correction factor was calculated which may result in market penalties. These costs were not planned in the Charter and the actual cost was $11k.

- **OATI Tag Forwarding:** In order to adequately support the EESC Settlement solution, tag data is to accurately analyze the billing determinates provided by CAISO. Additionally, the tag data is required for the EESC Scheduling solution. Avista originally planned to leverage OATI's webData solution to provide the tag data to the EESC Scheduling solution. However, during the planning phase of the project, it was determined that the software vendors preferred methodology was to receive the tag data via OATI's Tag Forwarding service. This service is required to meet the tag data requirements for both the EESC Settlement and EESC Scheduling solutions. These costs were not planned in the Charter and the capital estimate ($27k) and on-going expense estimate ($27k) have been updated.

- **PCI E-Tag Forwarding:** In order to adequately support the EESC Settlement solution and the EESC Scheduling solution, tag data is required (see above). Given the fact that the tag data is needed for two EIM systems, and OATI's Tag Forwarding service can only provide tag data to one system, a "pass through" tag data solution was devised. PCI's E-Tag Forwarding solution was surfaced for this "pass through" and Avista will pursue this solution. These costs were not planned in the Charter and the capital estimate ($30k) and on-going expense estimate ($19k) have been updated.

- **Avista Decision Support System (ADSS) Enhancements**: When Avista conducted the EIM software RFP, it was planned that Avista's internal optimization application – ADSS – would perform EIM bid calculation and other EIM requirements. Avista estimated $1 million in internal Avista labor to perform the ADSS enhancements, but that estimate did not include estimates for professional services related to development or implementing the functionality, or full data integration with other EIM applications because the specific interfaces were not known at the time the original estimate was created. The estimated $1 million was not included in the EIM Program BC or Charter, but rather in the 2020 ADSS enhancement BC under productivity funding.

  The ADSS EIM enhancement effort began in Q1 2020 and has led to greater understanding of the business functions needed to support EIM operations and integration with the EIM software. Enhancements for EIM include bidding configuration, changes to the scratch pad feature, a market dashboard and the creation of an economic balancing stack of Avista's resources. Integration of these features is planned for PCI's Outage Management software and the PRSC/EESC software. The new estimate to complete the ADSS enhancements was increased by $2.0 million to $3.46 million total including Utilicast support.

  The updated ADSS forecast of $3.46 million is inclusive of updated labor estimates, professional services, Utilicast costs and full integration costs. Avista's Project Accounting Department recommended that all ADSS EIM enhancement costs be moved to the EIM project and removed from productivity funding based on the new scope and performed work. In July 2020, the Executive EIM Steering Committee approved the transfer of the EIM ADSS effort to the EIM BC, with funding covered by the Program contingency. The labor estimate below includes Avista and contract labor (non-labor), while the professional services estimate includes support from Sixth Man for user experience design and Abermod for bidding calculation logic.

Table 12 – ADSS EIM Estimates

Track 4 - ADSS EIM	Scope Capital Estimates (as of 08/2020)			
	2020	2021	2022	Total
Labor	$ 1,332,312	$ 1,174,795	$ 315,421	$ 2,822,528
Professional Services	$ 128,966	$ 36,000	$ -	$ 164,966
Utilicast	$ 163,484	$ 154,117	$ 155,035	$ 472,636
Totals	**$ 1,624,762**	**$ 1,364,912**	**$ 470,456**	**$ 3,460,130**

6.4.1.7 EIM Software – Miscellaneous Software Financial Summary

The Charter did not include a single line item for the EIM MV90 project, but instead provided estimates for bodies of work associated with network improvements, continuation of third-party meter data access, and hardware and software licensing costs. These have been summarized in the below chart. In addition, the Charter estimates did not include funding for ADSS EIM enhancements and integration, a new VER forecast provider or the purchase of CT testing software. The Utilicast charges reflected below are only associated with the ADSS EIM effort. The software maintenance expense estimates below include an on-going annual estimated amount.

Table 13 – Miscellaneous Software Estimate Update

Track 4 - Miscellaneous Software	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
MV90 (Table 11)	$ 600,000	$ -	$ 43,000	$ 438,166	$ -	$ 20,000
VER Forecast	$ -	$ -	$ -	$ 200,000	$ -	$ 15,000
CT Analyzer	$ -	$ -	$ -	$ 11,004	$ -	$ -
OATi Tag Forwarding	$ -	$ -	$ -	$ 27,600	$ -	$ 27,600
PCI eTag Forwarding	$ -	$ -	$ -	$ 29,850	$ -	$ 18,750
ADSS Enhancements	$ -	$ -	$ -	$ 2,987,494	$ -	$ -
Totals	$ 600,000	$ -	$ 43,000	$ 3,694,114	$ -	$ 81,350
Utilicast	$ -	$ -	$ -	$ 472,639	$ -	$ -
Grand Totals	**$ 600,000**	**$ -**	**$ 43,000**	**$ 4,166,753**	**$ -**	**$ 81,350**

6.4.1.8 EIM Software – Annual Upgrades & Enhancements

Avista has forecasted costs to implement the solutions and on-going vendor costs associated with maintenance and licensing. Avista also recognizes the need to forecast costs for future annual upgrades and enhancements to expand capabilities and increase efficiencies. Additionally, the CAISO releases annual market enhancements which affect EIM software and may cause subsequent internal integration changes. Avista has forecasted $500k annually for EIM upgrades and enhancements to support operations. These estimates are preliminary and will be refined as Avista gains operational market experience.

6.5 Track 5 – Metering & Settlements

Generation Production & Substation Support, Interchange & Network Infrastructure

6.5.1 Existing State Prior to EIM

Within the Metering & Settlements Track, Avista grouped upgrades for generation and substation interchange metering, generation controls and network infrastructure. In order to appreciate why Avista pursued a specific scope path, it's important to understand Avista's existing state prior to EIM. Across a majority of the generation and substation sites, Avista has relied on non-revenue quality meters with no ability to securely retrieve 5-minute revenue quality interval meter data required for market participation. The most extreme unsuitable EIM meter is at the Post Falls Hydro Electric Dam, which has antiquated electro-mechanical meters with a manual hourly meter collection process. Most of Avista's

generation sites did not have revenue class Current Transformers (CTs) or Potential Transformers (PTs) that allow for accurately measuring generation output. Avista also has very limited Automated Generation Control (AGC) systems and associated Programmable Logic Control (PLC) at its generation plants – both of which are required for a resource to receive and follow a Market dispatch signal. Although there is a network presence at most of these generation sites, not all generation meters are capable of connecting to the network for retrieval of 5-minute interval data. However, the current state of Avista's meters, generation controls and associated network connectivity was acceptable, as Avista traditionally operated in a bi-lateral hourly market.

Throughout the substation interconnection sites, Avista does meet the revenue quality meter requirement with JEMStar meters and accurate CTs/PTs. Although Avista considered reprograming these meters to collect 5-minute interval data with an associated memory upgrade, these meters are at least 12 years old, require dial up communications to retrieve this interval data and are unable to connect via Internet Protocol (IP) communications. Considering the age of the meters and the fact that Avista should not rely on dial up communications alone, the decision was made to replace the meters with a SEL-735 meter capable of 5-minute interval data and multiple connectivity options.

Due to limited field support of dial up communications and lack of monitoring capabilities, Avista decided to replace dial up communications in favor of IP communications installations wherever cellular installations are feasible – this aligns with Avista's preferred communication protocol and long-term operational plan. For the purposes of EIM, the IP communications migration will be limited to MV-90, engineering access, and metering communications, but eventually could include migration of SCADA as part of a future project if the new IP communications circuits are deemed reliable. Migration to IP communications for SCADA and metering has been a long-term evolution for Avista, and one without a strong business need prior to EIM.

Avista does collect hourly interchange meter data, but it's done at most substations by non-revenue meters with varying capabilities, with various network protocols, manual processes and supplemented with information from PI (Plant Information) and SCADA averages. This process and the associated data are not scalable or reliable for accurate 5-minute interval EIM metering and settlements.

6.5.2 Generation Production & Substation Support – Scope Summary

In 2018, Utilicast and Avista partnered to conduct a site by site metering assessment to document Avista's metering and controls infrastructure, highlighting where existing assets were insufficient for EIM entry. Sites were divided into two categories: market dispatch and non-dispatch. Initially, it was determined that all market dispatch resources would need to be equipped to bid at the unit-resource and at the plant aggregate-resource levels. Components at dispatch plant sites would be revenue grade, and all controls would need to be upgraded to accommodate both Avista internal dispatch and market dispatch requests. While non-dispatch sites would also adhere to CAISO requirements, flexibility, redundancy, and accuracy were of lesser priority for resources that would not be bid into the market. Avista intended to retain existing CTs and PTs at non-dispatch sites. These sites were planned for correction factors, thereby minimizing project scope and cost. With these general guidelines in mind, the Metering Assessment Summary Report was developed, project scope was identified for each site, and costs were assigned at a very rough order of magnitude.

In the first quarter of 2019, Generation Production & Substation Support (GPSS) was asked to review and refine estimated EIM metering and controls costs. Because Avista was still gathering participation requirements and market strategy information, scope was not yet highly defined. Thus, project cost refinements conducted in early 2019 were considered preliminary and assigned plus or minus 50% accuracy, per the standards of the Association for the Advancement of Cost Engineering (AACE). As a starting point, each market dispatch location was assigned new high-side meters (HSM) and EIM PLC. In order to provide an initial HSM cost assessment, the Noxon Rapids, Cabinet Gorge, Coyote Springs 2, and Little Falls locations were individually assessed. Then, Rathdrum, Lancaster, Boulder Park, Kettle Falls, and Long Lake HSM projects were assigned HSM cost estimates based on which assessed location they most resembled. A single EIM PLC project cost was estimated and applied to all dispatch locations. At non-dispatch locations, the goal was to achieve CAISO metering requirements while minimizing project costs. Low-side generation meters (LSM) needed to be compliant SEL-375s, but CTs and PTs

did not need to be revenue grade. Instead, an estimated cost for transformer accuracy testing was applied to all CTs and PTs in order to account for the cost of accuracy measurements and correction factor calculations. In March of 2019, teams completed new estimates for HSM and PLC dispatch sites, and LSM and CT/PT measurement costs for non-dispatchable sites.

Since March 2019, Avista's market understanding and participation strategy for each site has matured. Pilot HSM, LSM and PLC projects began at Noxon Rapids in the summer of 2019. In January of 2020, GPSS conducted Resource Participation Strategy Workshops by plant to finalize detailed project scope at each generation site. Avista leaned on Utilicast's expertise, interdepartmental meetings, and economic studies to further understand the best strategy for preparing Avista's assets for EIM entry. Because of these additional learnings, scope changed and project costs increased beyond the estimates developed in March 2019. Scope changes included transferring third-party generation metering and control upgrades to Substation projects, changing some locations from dispatch to non-dispatch or high-side metering to low-side metering based on the detailed field assessments and additional design work. Many of the planned dispatch sites no longer required PLC projects and most non-dispatch projects ultimately required new transformers. Contractors were hired to support project management, electrical design, and drafting services. All deviations from preliminary estimates have been governed by the Advisory Committee and the Director Steering Committee for approvals, and changes have been documented, approved and filed for record.

6.5.2.1 *High Side Meter Scope*

High-side meter (HSM) projects planned to install SEL-735 meters on the substation-side of the Generation Step-up Units (GSU) in accordance with Avista's most current *SEL-735 Combined (interchange and generation) Meter Setting Standard*. These meters validate market resource configurations, and related metering components in alignment with the physical characteristics and EIM participation level with all generation resources feeding the metered GSU (for example, multiple units and station service). When a HSM is installed at a participating resource, revenue class CTs/PTs are often installed as part of the project. HSM projects involve SCADA and network communication improvements, as well as MV-90 configuration.

6.5.2.2 *Low Side Meter Scope*

Low-side meter (LSM) projects planned to install SEL-735 meters at plant-side of the GSU in accordance with Avista's most current *SEL-735 Combined Meter Setting Standard*. One LSM meter validates market resource configurations and related metering components in alignment with the physical characteristics and the EIM participation level within one generating unit or station service. When a LSM is installed, revenue class CTs/PTs are added or existing non-revenue class CTs/PTs are utilized with an appropriate compensation factor applied. LSM projects involve SCADA and network communication improvements, as well as MV-90 configuration.

6.5.2.3 *Programmable Logic Control Scope*

EIM Programmable Logic Control projects (PLC) planned to install a PLC system to act as an interface point between Avista's Supervisory Control and Data Acquisition (SCADA) system, plant high-side meters, low-side meters and plant unit controllers. The PLC receives plant MW set points from SCADA, from Avista operators or the market, and delivers the unit MW set point to the unit PLC. It also receives HSM, unit, and station service metering MW signal inputs, as well as meter position switch inputs. It blocks unit rough zone and non-compliant emission operating set points and connects to the plant Human Machine Interface (HMI), which allows plant operations to start and stop units. Finally, the EIM PLC possess a switch input for EIM participation and non-EIM participation modes.

6.5.2.4 *Low Side Meter Reconfiguration Scope*

At some generation sites, the unit and/or station service meters were already upgraded to SEL-735 meters as part of a previous project. These meters required reconfiguration in accordance with Avista's most current *SEL-735 Combined Meter Setting Standard.* These new settings integrate with MV-90 billing recorders and contain EIM information in the SCADA and Generation Distributed Network Protocol (DNP) Maps. The transformer compensation is applied to meter settings so SCADA has a backup MV-90 signal to create redundancies with the new HSMs. No new assets are planned for installation; therefore this work is classified as expense.

6.5.2.5 *Metering & Transformer Research Scope*

The CAISO Metering Business Process Manual outlines acceptable equipment ratings such as transformer accuracy and burden ratings needed for EIM participation. This scope includes researching meter details, and conducting field tests where the accuracy of the equipment burden rating was unknown and correction factors would be applied. EIM entities can use equipment which does not meet the ratings requirements and apply a correction factor, which reduces the observed readings to ensure that the metered output is not overstated – it doesn't increase accuracy. With field test data, Avista can calculate the appropriate correction factor to adjust for deficiencies in CT and PT accuracy. No new assets are planned for installation; therefore this work is classified as expense.

6.5.3 GPSS Financial Estimate Summary

The Charter estimates were considered preliminary and assigned a plus or minus 50% accuracy, per AACE standards. In the Charter, they were represented as capital only items in the Solutions & Services column, but should have be represented in the Avista Labor column under the following:

- Charter Line Item 19 "Generation Metering from GPSS – Low Side" at $764k
- Charter Line Item 20 "Generation Metering from GPSS – High Side" at $2.3 million
- Charter Line Item 21 "Generation Metering from GPSS – EIM PLC" at $2.1 million

The estimates in the Charter did not include a potential 50% increase in costs and assumed internal engineering design for all aspects of the projects and internal field labor. The original estimates included labor, materials, and travel time, but failed to include drafting labor (internal or contracted), project management labor (contracted), labor for planning costs, professional services for engineering (Northwest Power Engineering), Utilicast, AFUDC and overheads. The updated estimates below include these additions. They also reflect:

- Elimination of EIM PLC projects at six generation locations
    - Rathdrum, Lancaster, Boulder Park, Kettle Falls, Long Lake and Little Falls
- Transfer of Lancaster efforts to Substation for management and execution for the installation of Automated Generation Control (AGC) at the plant and HSM configuration at the BPA-owned Lancaster interchange.
- Transfer of Coyote Springs HSM efforts to ET Network, as there is a BPA-owned interchange and revenue quality meter that can be leveraged
- Transfer of costs at two locations to Substation based on project accounting rules, while the management and execution of the work stayed with GPSS.
    - Noxon 230 kV, Northeast CT
- Scope change as strategies changed from high-side to low-side metering, dispatch to non-dispatch, and the use of correction factors to control costs. This was the case at Boulder Park, which switched from a HSM to a LSM project. The decision to make Long Lake a non-dispatchable resource resulted in a scope from a HSM to a LSM project.
- Change of scope and/or accounting clarification of scope resulted in a transfer of capital to expense costs
    - Monroe, Kettle Falls and Little Falls
- Discovery of open-delta transformer complications at two locations
    - Post Falls (LMS to HSM) and Long Lake
- Non-Participating Resource (NPR) metering research conducted by Northwest Power Engineering to support meter settings and configuration
- Utilicast metering and controls support labor estimated for GPSS projects open as of August 2020.
- The O&M expense estimates represent a single time charge.

Table 14 – GPSS Financial Estimate Updates

Track 5 - GPSS	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
Project Type	*Capital*	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
HSM (Line 20)	$ 2,336,696	$ -	$ -	$ 2,137,536	$ -	$ -
PLC (Line 21)	$ 2,131,353	$ -	$ -	$ 1,594,331	$ -	$ -
LSM (Line 19)	$ 607,615	$ -	$ -	$ 663,490	$ -	$ -
LSM Reconfiguration	$ -	$ -	$ -	$ -	$ 222,326	$ -
Metering Research	$ -	$ -	$ -	$ -	$ 62,250	$ -
Totals	**$ 5,075,664**	**$ -**	**$ -**	**$ 4,395,356**	**$ 284,576**	**$ -**
Utilicast	$ -	$ -	$ -	$ 67,060	$ -	$ -
Grand Totals	**$ 5,075,664**	**$ -**	**$ -**	**$ 4,462,416**	**$ 284,576**	**$ -**

6.5.4 Substation Interconnection & Third-Party Generation – Scope Summary

As outlined in the 2018 Utilicast metering assessment, Avista and Utilicast provided an initial assessment of what substation interconnection and third-party generation locations would need metering upgrades, which led to the initial cost estimate in the Charter. Since that time, the forecasted scope of work for substation interchange and third party generation metering is nearly equivalent to what was originally estimated, with some differences:

- The original scope of work assumed meter replacement at all sites, but further research determined that three sites required meter reconfiguration because a SEL-735 meter had been installed under a previous substation project.
  - Substation Interchange Locations: Deer Park, Orofino and Colbert
  - Third-Party Generation Locations: Lind Solar
- Six sites were removed from this body of work because planned substation projects already addressed EIM needs, were scheduled to complete prior to the EIM deadline and funded through other business cases.
  - Substation Interchange Locations: Spirit, North Lewiston, Westside, Dry Gulch, Opportunity
  - Third-Party Generation Locations: Clearwater Paper Company
- The metering and controls work at the Lancaster generation site was originally included in the GPSS upgrade work and has been transferred to third-party generation work because Avista does not own the plant. The controls work to install Automated Generation Control (AGC) at Lancaster, and the associated communication upgrades, are planned to be funded by Avista but installed by Tyr, the plan owner. The substation interconnection meter reconfiguration, which will serve as a high-side meter for Lancaster generation, will be funded by Bonneville Power Administration (BPA).

The original substation estimates did not include project costs for meter upgrades at Saddle Mountain interchange or the Rattlesnake Flats third-party wind generation site and are not reflected in the updated estimates. Those locations will accommodate EIM metering standards and MV90 configuration under existing substation projects and are funded through other business cases.

- Pend Oreille Public Utility District: At the time of the Charter estimates, Avista assumed metering upgrades for Pend Oreille Public Utility District (POPUD), would not be funded by Avista. Although Avista owns these interchange and generation meters, the upgrade costs would be funded by POPUD and updated prior to EIM entry per the existing Metering Agreement between the entities.
  - POPUD Substation Interchange Locations: Newport, Diamond Lake, Metaline Falls, Pine Street, Box Canyon.
  - POPUD Generation: Box Canyon

  Based on current discussions with POPUD leadership and Avista, Avista may need to fund the upgrades as POPUD does not have the resources to complete the work within the timeframe required to meet CAISO milestones. The upgrades are estimated at $200k for design and installation.

6.5.4.1 *Meter Replacement Scope*

At some interconnection locations, a meter replacement project was planned to install one or more SEL-735 meters in accordance with Avista's most current *SEL-735 Combined Meter Setting Standard*. These new settings integrate with MV-90 billing recorders and contain EIM information in the SCADA and Generation Distributed Network Protocol (DNP) Maps. In some cases, accompanying integration equipment was also planned for installation, such as a Remote Terminal Unit (RTU), GPS clock, SEL-3620 or SEL-3622 security appliance, and/or RuggedCom Ethernet switch.

6.5.4.2 *Meter Reconfiguration Scope*

At some interconnection locations, one or more SEL-735 meters had been installed as part of a previous project. These meters required reconfiguration in accordance with Avista's most current *SEL-735 Combined Meter Setting Standard.* These new settings integrate with MV-90 billing recorders and contain EIM information in the SCADA and Generation Distributed Network Protocol (DNP) Maps. No new assets are planned for installation, therefore this work is classified as expense.

6.5.5 Substation & Third-Party Financial Estimate Summary

The Charter estimates for substation and third-party generator work assumed internal engineering design for all aspects of the projects and field labor. This work was represented under Charter Line Item 15 "Transmission Meters & Data Collection – SS & 3rd Party" at $852k for capital, without any expense estimates. They were represented as capital only items in the Solutions & Services column, but should have been represented in the Avista Labor column. The original estimates included some internal labor, materials, and travel time, but failed to include drafting labor (internal and external), project management labor, labor for planning costs, AFUDC, overheads, professional services for engineering design (POWER Engineers) and Utilicast. The updated estimates below include these additions. They also reflect:

- Change in the scope at three locations from meter replacement to meter reconfiguration.
- The removal of costs associated with six locations where other substation projects will address EIM needs.
- Inclusion of Lancaster efforts for the installation of Automated Generation Control (AGC) and HSM configuration at the BPA-owned Lancaster interchange.
- Inclusion of two generation projects that were managed by the GPSS business unit, but the project accounting details were recorded under the substation business unit based on FERC accounting rules.
    - Noxon 230 kV, Northeast CT
- Inclusion of POPUD meter replacements
- Utilicast metering support labor estimated for all substation and third-party generation meter projects open as of July 2020.
- The O&M expense estimates represent a single one-time charge.

Table 15 – Substation & Third-Party Generation Financial Estimate Updates

Track 5 - Substation	Charter Estimates (as of 2019)			Scope Estimates (as of 08/2020)		
Project Type	*Capital*	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Substation Interchange						
Meter Replace (Line 15)	$ 610,200	$ -	$ -	$ 1,312,291	$ -	$ -
Meter Reconfiguration	$ -	$ -	$ -	$ -	$ 18,720	$ -
Third-Party Gen						
Meter Replace (Line 15)	$ 242,000	$ -	$ -	$ 315,515	$ -	$ -
Meter Reconfiguration	$ -	$ -	$ -	$ -	$ 36,100	$ -
AGC	$ -	$ -	$ -	$ 157,724	$ -	$ -
Totals	**$ 852,200**	**$ -**	**$ -**	**$ 1,785,530**	**$ 54,820**	**$ -**
Utilicast	**$ -**	**$ -**	**$ -**	$ 67,060	$ -	$ -
Grand Totals	**$ 852,200**	**$ -**	**$ -**	**$ 1,852,590**	**$ 54,820**	**$ -**

6.5.6 Network Infrastructure Support – Scope Summary

At the time of Program Charter estimates, every controls and meter upgrade project assumed a parallel network communications capital project to support asset implementation. The network scope was divided into "packages" as detailed below and each site was assigned a package. With the exception of Package 6, each package assumed on-going expense estimates for maintenance and support. The Charter financial estimates assumed Avista would remove existing dial-up communications and install secure third-party Internet Provider (IP) communications via a reliable wired circuit at many, if not all, locations. Internet Protocol communications can either be physical wires, such as Ethernet or a T1 line that provides high-speed data transport services, or wireless options such as private microwave or commercial cellular. Avista has a mixture of communication options in production, including a mixture of contracted carrier services and Avista-owned private services.

As the metering or controls projects began, network site surveys were conducted to evaluate communication options with the goal of implementing an economic, reliable and secure network path. Sometimes, this meant retaining existing dial-up communications at a location or changing the body of work from capital to expense. Throughout the middle of 2019 and into 2020, these site surveys led to an updated scope of work for network infrastructure as reflected in the following changes:

- At eight substation interconnection locations, the original scope assumed delivery of wired T1 communications with High Voltage Protection outlined in Package 2, but upon conducting site surveys that scope has been reduced to one location – Burke.
    - Three sites were removed because planned network projects already addressed IP communication needs, were scheduled to complete prior to the EIM deadline and funded through other business cases: Orofino, Sagle & Colbert
    - Three sites originally planned for wired IP communications will now deliver a wireless option:
        - Cellular Wireless: Milan & Priest River under Package 5
        - Microwave: Kettle Falls under a modified Package 2
    - One site planned for wired IP communications will retain dial-up communications: Spirit
- Two substation interconnection locations identified to receive IP communications under Package 1 were already delivered under a previous project: Lolo & Dry Creek
- Four substation interconnection locations were planned for IP communications under Package 3, but will deliver a wireless cellular option under Package 5: Noxon 13kV, Deer Park, Wilbur & Loon Lake
- At the Northeast CT generation site, it was determined that no network hardware was needed based on the GPSS design.
- At two generation sites, it was determined that network hardware would be delivered and funded through other business cases:
    - Boulder Park & Rathdrum
- At three generation sites, the meters had already been upgraded and only needed network reconfiguration. These sites have been transferred to Package 6 scope as expense:

- Monroe Street, Little Falls & Kettle Falls

6.5.6.1 *Package 1 – Standard Substation Communication Package Scope*

Some locations do not have IP communications delivered to the site. Those locations were planned to receive IP communication services from a Network Service Provider. The Standard Substation Communication Package includes contracting IP services from a third-party Local Exchange Carrier (LEC) and the installation of communication hardware: Cisco Connected Grid Router 2010 (CGR2010), a Cisco Industrial Ethernet 4010 Switch (IE4010), and a NetGuardian Remote Terminal Unit (RTU) for monitoring the communications system and physical elements of the substation. Fiber-optic transceivers, fiber jumpers and other cabling equipment were also included.

6.5.6.2 *Package 2 – Standard Substation Communication Package + High Voltage Protection Scope*

This scope assumed the base installation of Package 1 and equipment to protect against Ground Potential Rise. At some locations, a LEC wired communication service was required to protect from Ground Potential Rise – a phenomenon that occurs when large amounts of electricity enter the ground and have a high potential to harm people or equipment. To provide this High Voltage Protection (HVP), fiber-optic cabling is used between the substation panel house and the Copper-Fiber Junction box (CFJ) where services from the provider are transferred to Avista. The distance between these two points is determined by the LEC and provides protection for the LEC if an electrical disturbance were to happen in the substation.

6.5.6.3 *Package 3 – Standard Substation Communication Package + Modified High Voltage Protection Scope*

This scope assumed the installation of Packages 1 & 2, with a modification for the CFJ. At some locations, a power over fiber (PoF) solution was installed, which provides electrical isolation between the device and the power supply. This eliminates the need to supply power to the CFJ outside of the substation, however that PoF solution will not support T1/Ethernet services required for IP communications. Therefore, a power source and enclosure were required at the CFJ.

6.5.6.4 *Package 4 – Network Capacity Increase and Extension Package Scope*

At some locations, IP communications were already available, but required an extension of the Local Area Network (LAN) to provide connectivity to new meters. This package was identified for the generation facilities due to the location of the meters and distance from the existing network cabinet. It also included additional metering connectivity that could be required to support low and high side metering, along with small industrial Ethernet switches currently, fiber-optic transceivers, and cabling.

6.5.6.5 *Package 5 – Commercial Cellular Communications Scope*

At some locations, IP communications could be attained via a wireless cellular option leveraging the standard IP package of a Cisco Connected Grid Router 2010 (CGR2010), a Cisco Industrial Ethernet 4010 Switch (IE4010), and a NetGuardian RTU for monitoring the communications system and physical elements of the substation plus an LTE interface module in the Connected Grid Router.

6.5.6.6 *Package 6 – Network Communications Expense Scope*

At some generation or substation sites, IP communications already existed, but network configurations were required to support metering work. This configuration could include opening a network port or updating an existing drawing. No new assets were planned for installation; therefore this work is classified as a one-time expense.

6.5.7 Network Infrastructure Financial Estimate Summary

The Charter estimates for network infrastructure assumed internal engineering design and field labor for all aspects of the metering and control projects. They were represented under Charter Line Item 16 “Network Improvements for Metering (1)” at $1.719 million in capital, $15k in re-occurring annual expense. Charter Line Item 26 “Network Maintenance” at $256k represented a summary of on-going network expense, with the components of $215k for the network packages and $39k for the dedicated network connections.

Charter Line Item 24 “Network PM” reflected estimates for project management of the network projects, as the package estimates did not include project management labor. The project management costs have been incorporated in the Scope capital estimates for the projects. The original estimates failed to include labor for planning costs, AFUDC, overheads and professional services (Utilicast). The updated estimates below include these additions. New estimates also include scope changes for 13 substation locations and the elimination of six generation projects as listed in Section 5.5.6. With the exception of Package 6, all other expense estimates in the Scope column represent on-going O&M costs.

Table 16 – Network Financial Estimates Updates

Track 5 - Network	Charter Estimates (as of 2019)			Scope Estimates (as of 08/2020)		
Project Type	*Capital*	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Package 1 (Line 16)	$ 270,000	$ -	$ 91,000	$ -	$ -	$ 1,000
Package 2 (Line 16)	$ 1,016,000	$ -	$ 72,800	$ 457,200	$ -	$ 18,200
Package 3 (Line 16)	$ 208,000	$ -	$ 36,400	$ -	$ -	$ -
Package 4 (Line 16)	$ 225,000	$ -	$ 15,000	$ 323,255	$ -	$ 15,100
Package 5	$ -	$ -	$ -	$ 751,796	$ -	$ 35,200
Package 6	$ -	$ -	$ -	$ -	$ 10,000	$ -
Network PM (Line 24)	$ 416,000	$ -	$ -	$ -	$ -	$ -
Totals	**$ 2,135,000**	**$ -**	**$ 215,200**	**$ 1,532,251**	**$ 10,000**	**$ 69,500**
Utilicast	$ -	$ -	$ -	$ 67,060	$ -	$ -
Grand Totals	**$ 2,135,000**	**$ -**	**$ 215,200**	**$ 1,599,311**	**$ 10,000**	**$ 69,500**

6.5.8 Network – Miscellaneous Improvements

Beyond the network upgrades identified for the various generation and substation integration sites, Avista also identified the potential need for network upgrades associated with EIM software, connection to CAISO’s Automated Dispatch System (ADS) and meter access for BPA. These two items were represented under Charter Line Item 8 “Network for Vendor & CAISO” at $60k in capital, while the on-going expense was represented under Charter Line Item 26 “Network Maintenance” at $39k as a component of the total $256k.

- **Dedicated CAISO Connection:** At the time of Program Charter estimates, Avista assumed a dedicated communications network between CAISO and Avista would be needed to support dispatch operational targets (DOTs) from CAISO’s ADS system. It was Avista’s preference to integrate with CAISO via a private leased solution instead of a VPN connection over the Internet. Since that time, Avista has determined that a private leased connection to CAISO is not required and this scope has been removed. This was represented under Charter Line Item 8 “Network for Vendor & CAISO” with capital estimate was $35k, while on-going operations and maintenance support expense was not included.

- **Dedicated SaaS Connection:** At the time of Program Charter estimates, Avista assumed approximately seven software solutions would be purchased with a SaaS deployment. It was unknown what Cloud Service Provider (CSP) network would be used, but one of the three major CSP networks was assumed: Amazon AWS, Microsoft Azure or Google Cloud. Avista’s preference was to utilize a leased private connection between Avista premises and the CSP, with AT&T MPLS serving as the preferred conduit. Since that time, Avista has determined a leased private connection to the CSP is not required and this scope has been removed. This was represented under Charter Line Item 8 “Network for Vendor & CAISO” with capital estimate was $14k, while on-going operations and maintenance support expense was not included.

6.5.9 Network Miscellaneous Financial Estimate Summary

The planned dedicated network connections have been removed from the Program scope and reflected below.

Table 17 – Miscellaneous Network Financial Estimate Updates

Track 5 - Miscellaneous Network	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Dedicated CAISO Connection (Line 8)	$ 35,000	$ -	$ 25,000	$ -	$ -	$ -
Dedicated SAS Connection (Line 8)	$ 25,000	$ -	$ 14,000	$ -	$ -	$ -
Totals	**$ 60,000**	**$ -**	**$ 39,000**	**$ -**	**$ -**	**$ -**
Utilicast	$ -	$ -		$ -	$ -	$ -
Grand Totals	**$ 60,000**	**$ -**	**$ 39,000**	**$ -**	**$ -**	**$ -**

6.6 Track 6 – Operations Readiness & Training

In order to prepare Avista for the EIM, there is a significant body of work for market training and understanding, adopting software and navigating organizational change management. Joining the EIM has far-reaching effects across System Operations, Power Supply, Generation, Substation, SCADA, and Technology, with each business unit gaining understanding of how the market changes their day-to-day operations. This track accommodates training, items Avista needs to prepare to accommodate new personnel and or compliance with joining the market, and the hiring of new FTEs to support EIM market operations.

6.6.1 Operations Readiness & Training Scope Summary

6.6.1.1 *Training*

The CASIO provides computer-based training, in-person training, EIM workshops, train-the-trainer workshops and training support for phased testing: Day in the Life, Market Simulation, Parallel Operations and Go-Live initiation. In addition, Avista will need to develop their training plan, with specific emphasis given to developing the internal operations readiness criteria for those operating in the market and training new FTEs hired to support market settlements and analysis. This effort was represented under Charter Line Item 14 "Training & OCM" at $480k in Avista labor expense. This estimate provided for hiring a temporary Organizational Change Management Specialist for the EIM Program and labor associated with training.

6.6.1.2 *EIM Human Resource Plan*

At the time of the Charter, Avista assumed additional temporary resources would be needed for the Program implementation and incremental resources would be needed to support on-going EIM operations. Avista planned for two additional resources to support the Program implementation – the EIM Program Manager and the Organization Change Management Specialist. Costs associated with the EIM Program Manager were primarily captured in Charter Line Item 9 "Program Leadership, Management & SMEs" at $700k.

Avista assumed 11-13 incremental FTEs would be needed to support EIM post go-live, with the positions hired 9-18 months prior to market entry and approximately one third of their time would be allocated to the EIM project for market education and software training. Throughout Q1/Q2 2020, in partnership with Utilicast and input from other EIM Entities, Avista conducted further analysis of what resources would be needed to prepare for market entry during the implementation phase, and those that would be needed for effective and efficient market operations. In June 2020, the EIM Human Resource Plan was signed by the Executive Steering Committee members, approving 17 incremental EIM FTE hires throughout 2020-2021 in preparation for market operations, however each individual position would be further evaluated prior to hiring to ensure need and timing. In August 2020, hiring date revisions were made and are reflected in Table 18.

The need for the additional 5 FTEs (17 vs. 12), was determined through staffing conversations with other EIM Entities, who indicated lean staffing levels at the time of market entry have hindered operational performance. Avista believes the 17 FTEs represents a mature workforce needed to fully support EIM operations at market entry. There were two primary areas that drove the FTE increase and associated costs – System Operations and Settlements. Although System Operations planned for a team of five EIM Operators, they identified an

additional relief operator and adjusted the timing of each hire to allow for NERC certification. It was originally assumed the existing accounting team could accommodate EIM settlements, with the addition of a Settlement Analyst and Data Management Operator for meter data submission to the CAISO. After discussions with Utilicast and other EIM entities, the need for a separate Settlements team was identified with a staff of up to five.

- **EIM Operators:** Within System Operations, a common approach to EIM operations includes adjusting existing desk processes/responsibilities and adding an EIM Operator desk to focus solely on pre-operating hour EIM operations. Through discussions with Utilicast, Avista identified which tasks would reside with the Merchant and which tasks would reside with the Entity (Balancing Authority). The results included shared generation management tasks between the Merchant and Reliability Operators, new EIM tasks for the Reliability & Transmission Operators, and a full set of EIM tasks for the new EIM Operator role.

  In order to provide continuity amongst all the operators and an environment for cross-functional desk/role qualifications, the EIM Operator role will need to be NERC certified. This assumption requires all System Operators to obtain NERC certification and qualify on their respective desks, with the Reliability Operators and EIM Operators qualified for both desks. This would allow greater flexibility for covering shifts during emergency conditions, training, vacations and unexpected absences. The NERC certification process will require the EIM Operators to be hired at least 12-16 months in advance to allow for NERC certification and learning the EIM job functions.

- **Settlements Team:** When the original EIM FTE estimates were identified, Avista assumed the existing MRTU settlements process would be similar to EIM settlements and assumed two additional FTEs would cover Avista's needs. In MRTU settlements, a member of Power Supply reconciles the charges for accuracy and a member of the Resource Accounting team ensures CAISO payment and financial recording to the financial system. As conversations with Utilicast and other EIM Entities, occurred, the complexity of the EIM settlements and the need for dedicated team became clear. At the time of market entry, some Entities underestimated settlement complexity and staff needed to perform the daily settlements processes and have added staff to ensure adequate support. Avista plans to avoid this risk by proposing a settlement team of up to five at the time of market entry, with imbedded analysts in the Merchant and Entity to coordinate with the Settlements team and conduct deeper market analysis. While the Merchant Analyst was included in the original FTE proposal, the Entity Analyst is an addition. The Entity Analyst role is vital to understanding what impact the EIM BA Operator's actions have on Avista's overall performance and financial position in the market.

  The centralized Settlements team will support Merchant and Entity settlements, promotes expansion of settlement specific skill sets and ensures the timely analysis and appropriate priority is given to settlements. The team will have visibility to the financial results for both the Merchant and Entity, so cost benefit studies and overall market performance will be more easily evaluated and assembled.

Table 18 – EIM Human Resource FTE Comparison

EIM FTE Estimates	Charter Estimates (as of 05/2019)		Scope Estimates (as of 08/2020)		
	Quantity	*Hire Date*	*Quantity*	*Org. Hire Date (as of 06/2020)*	*Rev. Hire Date (as of 08/2020)*
Implementation Resources					
EIM Program Manager	1	Jan-19	1	Jan-19	
Org. Change Management Specialist	1		1	Sep-20	
Substation Engineer			1	Jan-20	
Total	**2**		**3**		
Incremental EIM FTEs					
Power Supply Analyst	1	Oct-20	1	Jul-21	Sep-21
Network Model Tech	1	Oct-20	1	Jun-20	
SCADA Tech	1	Oct-20	0		
EIM BA Desk	1	Jul-21	1	Feb-20	
EIM BA Desk	1	Jul-21	1	Sep-20	Oct-20
EIM BA Desk	1	Jul-21	1	Sep-20	Oct-20
EIM BA Desk	1	Jul-21	1	Jan-21	
EIM BA Desk	1	Jul-21	1	Jan-21	
EIM BA Desk	0		1	Mar-21	Mar-22
Training Admin	0		1	Mar-22	
EIM BA Analyst	0		1	Jul-21	Sep-21
Settlements Manager	0		1	Sep-20	Oct-20
Data Management Operator	1	Oct-20	1	Apr-21	
Settlement Analyst	1	Apr-21	1	Apr-21	
Settlement Analyst	0		1	Jul-21	Jun-21
Settlement Analyst	0		1	Jul-21	Aug-22
Compliance	0 or 1	Apr-21	0		
IT Analyst	1 or 2	Oct-20	1	Jun-20	Oct-20
IT Analyst	0		1	Jun-20	Jan-21
Total	**11 to 13**		**17**		

In the EIM HR Plan document, a financial estimate during the implementation and post-implementation phases was established. Each FTE was assigned an estimated hire date, an annual salary (assumed 78.05% loaded rate) and a breakout of efforts between capital and O&M. These resources were further assigned an estimated annual 3% annual merit increase, and where applicable, incremental step increases based on achieving certain experience levels. This framework provided an estimate of annual capital and O&M FTE costs across 2020-2023, with 2022 representing a shift to primarily O&M expenses based on a market go-live date of March 2022 and 2023 representing a fully burdened O&M year. With the increased incremental FTE count needed to support market operations, a better understanding of when the new FTE needs to be hired and a robust financial estimating framework, the Program saw an increase of capital, implementation expense and on-going O&M costs. Of the Charter's $3.5-$4 million annual estimated on-going expense impact, $2.5 million was estimated for labor (assumed 60% loading rate). The revised estimate of 17 EIM FTEs increased the annual labor estimate to $3.2 million (system loaded).

As shown in Table 19, an estimate for the EIM incremental FTEs was accommodated under Charter Line 17 and 17a "Incremental Permanent Avista FTEs": $550k in capital, $185k in implementation expense and $2.5 million in on-going annual expense. The original new employee estimate included only four months of labor costs to support parallel testing and employee training. The Charter estimate significantly underestimated the

incremental integration labor. In addition to the specific incremental labor in Charter Line Item 17, other incremental labor estimates included in the Charter. In order to provide a net incremental estimate based on the EIM HR Plan, Table 19 identifies other Charter incremental labor estimates and removes them from the EIM HR Plan estimates. In August 2020, prior to incorporating the updated EIM FTE incremental costs in the Scope forecast, the EIM FTE cost estimates were reviewed and further reductions were made to reflect 2020 hiring delays and the postponement of two positions – the Training Admin and one of the Settlement Analysts. These positions will be hired approximately six months after market go-live. Those August reductions are presented in the August 2020 HR Plan Reductions line in Table. 19.

Table 19 – EIM Human Resource FTE Estimates

Track 6 - EIM HR FTEs	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Incremental Avista FTEs (Line 17, 17a)	$ 550,000	$ 185,000	$ 2,500,000	$ -	$ -	$ -
EIM Human Resource Plan	$ -	$ -	$ -	$ 2,878,954	$ 2,285,070	$ 3,227,467
Program Leadership & SMEs (Line 9)	$ -	$ -	$ -	$ (350,000)	$ -	$ -
Full Network Model (Line 11)	$ -	$ -	$ -	$ (80,000)	$ -	$ (50,000)
Training & OCM (Line 14)	$ -	$ -	$ -	$ -	$ (480,000)	$ -
System Selection (Line 10) @ 25%	$ -	$ -	$ -	$ -	$ (170,000)	$ -
August 2020 HR Plan Reductions	$ -	$ -	$ -	$ (193,735)	$ (601,500)	$ -
Totals	**$ 550,000**	**$ 185,000**	**$ 2,500,000**	**$ 2,255,219**	**$ 1,033,570**	**$ 3,177,467**
Utilicast	$ -	$ -	$ -	$ -	$ -	$ -
Grand Totals	**$ 550,000**	**$ 185,000**	**$ 2,500,000**	**$ 2,255,219**	**$ 1,033,570**	**$ 3,177,467**

6.6.1.3 *Go-live Procedures and Support Model*

In partnership with the CAISO, Avista will determine the planned go-live procedures that must be followed across all business units to ensure a smooth transition into the market. In order to support market operations post go-live, Avista has been discussing options for a 24-hour technology support model with a combination of vendor and internal labor support. This level of technology support is not present in current operations, and the limited availability of support is not scalable. Avista will continue discussions to ensure the appropriate support model is in place at the time of market entry. Avista has planned for two technology resources dedicated to EIM software operations. Details and cost estimates can be found in the EIM Human Resource Plan.

6.6.1.4 *Transmission System Operations EIM Desk Scope – Mission*

To prepare for EIM entry, Transmission System Operations needs to hire additional personnel to staff a 24x7 EIM Operator desk/workstation. The existing System Operations area has the Reliability System Operator desk, the Training/Storm Recovery desk and the Transmission System Operator desk. The original scope planned to modify the System Operations area to accommodate an additional workstation to perform the necessary EIM activities, while maintaining sight lines to necessary displays/monitors and not hindering the necessary activities and functions performed by the existing desks. This scope planned to deliver two new computers, a phone console, new monitors, ergonomic chairs and a projector and screen for the Mission Campus. This was represented under Charter Line Item 22 “Transmission Desk” at $233k in capital, while no expense was estimated.

6.6.1.5 *Transmission System Operations EIM Desk Scope – BuCC*

The establishment of an EIM BA desk/workstation at the Backup Control Center (BuCC) was not planned under the EIM Program Charter. The establishment of a secondary control center is mandated by NERC and the EIM BA workstation needs to be operational by market entry. After reviewing the available space at the BuCC, the Program will deliver a modified workstation with two new computers, new monitors and a new phone console. This project was not planned in the Program Charter and must be complete prior to market go-live in accordance with FERC standards that require a functional back up control center where all functions of the BA

and Transmission Operators can be performed and meet all compliance standards. The capital estimate for this project is $86k.

6.6.1.6 *Noxon 230kV Switchyard CIP PSP Project*

As part of the metering and network upgrade projects at the Noxon Hydro Eclectic Dam (HED) and the Noxon 230kV Switchyard, external routable communications have been introduced, thus classifying the Noxon 230kV Switchyard as a Medium Impact BES Cyber System. Due to this new classification, additional requirements must be met to remain compliant with all relevant Critical Infrastructure Protection (CIP) requirements. This project will implement new processes, cyber security and physical security infrastructure at the Noxon 230kV Switchyard. The CIP standards that will be addressed in this project include:

- CIP-004-6 Cyber Security – Personnel & Training
- CIP-005-5 Cyber Security – Electronic Security Perimeters
- CIP-006-6 Cyber Security – Physical Security of BES Cyber Systems w/ (ERC)
- CIP-007-6 Cyber Security – System Security Management
- CIP-008-5 Cyber Security – Incident Reporting and Response Planning
- CIP-009-6 Cyber Security – Recovery Plans for BES Systems
- CIP-010-2 Cyber Security – Configuration Change Management & Vulnerability
- CIP-011-2 Cyber Security – Information Protection

This project was not planned in the Program Charter and must be complete in order to implement the metering and control projects at Noxon HED. The capital estimate for this project is $95k and $25k for implementation expense.

6.6.2 Track 6 Financial Summary

The primary cost driver in Track 6 is the EIM HR Resource Plan, documenting the incremental FTEs needed for market operations. The Charter estimates did not sufficiently account for the capital and expense costs associated with the EIM FTEs during project implementation. Updates have been made to remove duplicate incremental labor costs represented in other areas of the Charter (Table 19) and represent the net additional costs to the Program. The estimates also include the following:

- An updated FTE capital allocation across 2019-2022 and an updated annual O&M expense estimate (including the August 2020 revisions).
- A capital estimate for the additional EIM desk at the BuCC
- A capital and expense estimate for the Noxon 230kV Switchyard CIP compliance project.

Table 20 – Operations Readiness & Training Financial Updates

Track 6 - Operation Readiness & Training	Charter Estimates (as of 05/2019)			Scope Estimates (as of 08/2020)		
	Capital	*Implementation Expense*	*Ongoing Expense*	*Capital*	*Implementation Expense*	*Ongoing Expense*
Training & OCM (Line 14)	$ -	$ 480,000	$ -	$ -	$ 480,000	$ -
EIM Human Resource Plan (Line 17, 17a)	$ 550,000	$ 185,000	$ 2,500,000	$ 2,255,219	$ 1,033,570	$ 3,177,467
EIM System Ops Desk - Mission (Line 22)	$ 233,000	$ -		$ 225,071	$ -	$ 4,000
EIM System Ops Desk - BuCC	$ -	$ -		$ 86,000	$ -	$ 4,000
Noxon 230kV CIP PSP	$ -	$ -		$ 110,624	$ 10,000	$ -
Totals	**$ 783,000**	**$ 665,000**	**$ 2,500,000**	**$ 2,676,914**	**$ 1,523,570**	**$ 3,185,467**
Utilicast	$ -	$ -	$ -	$ -	$ -	$ -
Grand Totals	**$ 783,000**	**$ 665,000**	**$ 2,500,000**	**$ 2,676,914**	**$ 1,523,570**	**$ 3,185,467**

6.7 Where will assets or technology be deployed?

The EIM Program has a range of physical assets that will be installed and a variety of technology applications that will be deployed. Physical assets such as meters and control systems and network and communications equipment, will be deployed at generation plants, third-party generation locations and substation interconnection facilities. EIM technology application assets for Power Costs, Inc. will be deployed in the Amazon Web Services (AWS) cloud environment, while the Power Settlements EIM application will be deployed at Mission Campus and Avista's disaster recovery center in San Jose, CA.

7 EIM Program Milestones

Avista originally signed the EIM Implementation Agreement with an April 1, 2022 entry date. Since that time, other entities have announced entry for the 2022 class: BPA, Tacoma Power, Tucson Electric and Xcel Energy (parent company of Public Service Company of Colorado). Due to BPA operational and environmental requirements, they were able to negotiate a March entry date. In early 2020, BPA leadership approached Tacoma and Avista EIM leadership about changing their entry date to March 2, 2022. This request was driven by a desire to align testing cycles and operational data, as there are numerous transmission interconnection points BPA shares with Tacoma and Avista. Discussions with BPA, Tacoma and CAISO leadership, and internal review amongst the Avista EIM Program team and Steering Committees, occurred in Q1/Q2 2020. After seeking approval from the Director and Executive EIM Steering Committees in July 2020, Avista formally changed their market entry date to March 2, 2022.

In order the meet the March entry date, the internal Avista schedule needed to align with the adjusted March-driven CAISO milestones. In addition, Avista set an internal deadline date of June 2021 for the completion of all metering, controls and software projects for a successful entry into the testing phases. The below table reflects the adjusted milestone schedule.

Major Milestone Descriptions	Target Completion Dates (MM/YY)	
	Planned Date	Revised Date
Program Initiation		
• CAISO implementation agreement signed	04/2019	04/2019
• System Integrator selected	05/2019	12/2019
Program Planning		
• Vendor agreements & SOWs signed	02/2020	05/2019
• EIM software requirements gathered	12/2019	12/2019
• EIM software vendor RFPs & selections	09/2019	10/2019
Program Execution		
• SCADA EMS Upgrades	NA	03/2021
• CAISO EIM Agreements Executed	NA	03/2021
• Network Model Integrated with CAISO	NA	06/2021
• ADSS & Nucleus Enhancements Complete	06/2021	06/2021
• GPSS Meter/Control Installations Complete	09/2021	06/2021
• Substation Meter Installations Complete	09/2021	06/2021
• Network Comm Installations Complete	09/2021	06/2021
• Internal Avista Readiness Deadline	NA	06/2021
• EIM Software Ready for Testing with CAISO	09/2021	06/2021
• SQMD Portfolio Approved	NA	09/2021
• MBR Authorization Granted	NA	10/2021
• EIM Software Integrations Verified	09/2021	11/2021
• OATT Revisions Approved	NA	12/2021
System Integration & Testing with CAISO	09/2021 to 03/2022	

• Connectivity & Integration	NA	08/2021
• Day-in-the-Life	NA	09/2021
• Market Simulation	NA	11/2021
• Parallel Operations	NA	02/2022
All EIM Systems Go-Live with CAISO	03/2022	03/2022
All EIM Technology Systems Warranty	07/2022	06/2022
Program Closing		
• Program Level Approval to Close	12/2022	12/2022

7.1.1 CAISO Project Milestones

The below schedule represents the CAISO driven project schedule for EIM entry on March 2, 2022. The milestones listed reflect payment to the CAISO of $50k per milestone, for a total, implementation fee of $300k to join the EIM market. Unless otherwise stated, the milestone dates below represent a month-end deadline.

Activity	Project Delivery Dates supporting March 2, 2022 Go-Live
Detailed Project Management Plan The Parties will develop and initiate a final project management plan that describes specific project tasks each Party must perform, including delivery dates, project team members, meeting requirements, and a process for approving changes to support completion of the Project. This phase will include a detailed IT system review to assist Avista in development of a detailed metering plan, bid-to-bill system and coordination with Avista EMS. Work will be initiated on the Avista staff training program using the foundational and detailed system computer-based training module, as well as on the resource data templates needed during Milestone 2.	March 2019-December 2019
• **Milestone 1** – This milestone is completed when the Agreement has been made effective in accordance with Section 1 of the Agreement.	April 2020
Full Network Model Expansion Full Network Model expansion for Avista and EMS/SCADA including: proof of concept of export/import of EMS data, complete model into the CAISO test environment, complete validation for all SCADA points from Avista, testing of the new market model and validation of the Outage and State Estimator applications.	November 2020
• **Milestone 2** – This milestone is completed upon modeling Avista into the CAISO Full Network Model through the EMS which will be deployed into a non-production test environment using the CAISO's network and resource modeling process.	June 30, 2021

System Implementation and Connectivity Testing System requirements and software design, the execution of necessary software vendor contracts, development of Market network model including Avista, allow Avista to connect to a non-production test system.	August 2021
• **Milestone 3** CAISO to promote market network model including Avista area to non-production system, and allow Avista to connect and exchange data in advance of Market Simulation.	July 15, 2021
Construction, Testing and Training in Preparation for Market Simulation - This task includes IT infrastructure upgrades, security testing, training, Day-in-life simulation and functional testing.	July 15, 2021
• **Milestone 4a** Start of Joint Integration Testing with CAISO, Interface testing with minimum data requirements and functional integration testing. CAISO will make the test environment available for Avista connectivity testing prior to the delivery date assuming Avista has provided all prerequisite data and non-production system availability does not conflict with CAISO production system Spring Release schedule.	Mid-July 2021
• **Milestone 4b –** Begin 'Day in the Life' scenario testing	September 2021
• **Milestone 4c –** Begin Structured Market simulation (Milestone 4 payment due at this point)	October 1, 2021
Activate Parallel Operations During December 2021**,** the CAISO will activate a parallel operation environment to practice production grade systems integration as well as market processes and operating procedures in anticipation of the impending Avista activation as an EIM Entity and to confirm compliance with the EIM readiness criteria set forth in the CAISO tariff.	December 2021
• **Milestone 5** – Start of parallel operations	December 2021
System Deployment and Go Live Implementing the Project and going live will include resource registration, operating procedures and updates, execution of service agreements, completion of the Avista tariff process, applicable board approvals, the filing and acceptance of service agreements and tariff changes with FERC, and	March 2, 2022

completion and filing of a readiness criteria certification in accordance with the CAISO tariff.	
• **Milestone 6** – This milestone is complete upon the first production Avista EIM trade date.	March 2, 2022

8 Program Assumptions, Risks, Constraints & Dependencies

This section has been updated to reflect changes at the Program level since the time of the Charter. Items resolved or no longer applicable have been removed, while open items or new additions have been listed below.

8.1 Assumptions

The following assumptions have been made:

a) All Avista required program/project resources will be available for the duration of the program.
b) All the necessary funding to complete the program will be available.
c) All Avista business users will be available for all application and system testing phases within the independent projects and the program as a whole.
d) The in-house Avista Decision Support System (ADSS) application will be enhanced for EIM functions.
e) The in-house Nucleus application will have minor modifications for EIM functions.
f) Avista will receive the needed permissions from various third-party generation and metering entities to perform EIM-related upgrades. Avista will fund EIM-related upgrades at various third-party sites.
g) Avista will procure an Energy Management System (EMS) plug-in for EIM market dispatch integration.
h) Avista plans to conduct an EMS upgrade prior to market entry funded by the SCADA BC. Although the upgrade is planned to be complete in March of 2021, prior to the internal Avista deadline of June 2021, any delays for this project would significantly impact Avista's ability to conduct the CAISO testing phases and market go-live as planned.
i) Avista has plans to fund a 24-hour operations center within the next three-five years, to house various operational business units, including Transmission System Operations. As such, the construction effort and costs for the EIM transmission operations desk at Mission campus and the Backup Control Center (BuCC) should be kept minimal.
j) The in-flight GPSS funded Human Machine Interface (HMI) project and the EIM-related PLC projects, have independent scope. The HMI project's goal is to standardize plant control screen display for plant operators, and the EIM PLC projects will capitalize on that standardization to display EIM data. If the HMI project is complete at the site where an EIM PLC project is needed, the new HMI screens will be updated to incorporate EIM data. If the HMI project has not begun at a site where an EIM PLC project is needed, the existing HMI screens will be updated with EIM data until the HMI project is available to update that site.
k) The Long Lake EIM LSM project will be completed independent of a future-planned Long Lake Overhaul project.
l) Although an integration with the settlement software to Avista's Oracle E-Business Suite (EBS) financial system is desirable, it is not necessary for market entry. The project team will consider integration options, but be prepared to create a manual process for recording EIM financial data in the financial system. Costs associated with full integration between the settlement software and EBS are not included in the Scope program estimates.
m) As part of the PCI Asset Operations software suite, Avista purchased licenses for the PCI Journal module – a feature that supports operator logging. The Program costs include the purchase of the licenses and initial scoping with PCI for transmission and generation use, but the implementation of the module will be funded outside the EIM Program.
n) Joining the Western EIM presents a large amount of organizational business change that will require an Organizational Change Management (OCM) plan. An OCM specialist will start in September 2020 and

will be a dedicated advocate for the Program's success and employee adoption of the EIM practices through go-live.

o) The installation of revenue quality meters in substation will not preclude existing third-party meter data access. The new meters will continue to collect hourly data, and supplement with the collection of five-minute internal data for EIM.

p) If Avista fails to meet the March 2, 2022 market entry date with BPA and Tacoma, the CAISO will allow us to join April 1 with the rest of the 2022 class. This will present additional testing and operational challenges.

8.2 Risks

Program level risks will be managed through a spreadsheet and posted to a common work-space accessible by EIM project team members. Program risk will be discussed at steering committee meetings for mitigation recommendations and decisions, and decisions will be documented. The following are potential risks for the Program:

a) Interdependencies and integrations between EIM software projects will add complexity and may delay project completion.

b) Interdependencies among the control/meter upgrade projects and the network projects may delay project completion.

c) Competing priorities amongst other Avista programs/projects may constrain funds and resource availability. Resource areas that are likely to be constrained include network engineers, substation engineering and design, protection engineers and generation engineers.

d) This program requires multiple, concurrent projects to be in flight at the same time, while competing for the same business, engineering and technology resources.

e) Although an integration with the Settlement software to Avista's Oracle E-Business Suite financial system is desirable, the financial application upgrade timeline may not align with the EIM implementation timeline. If an integration were to be pursued on an unsupported platform, it could cause technical complications or require rework after the application is upgraded. The project team will pursue integration efforts, but will also create a manual process for recording EIM financial data in the financial system.

f) Delays in business processes re-engineering based on EIM requirements and complexities will impact the program/project schedule.

g) The in-flight HMI project utilizes the same ET resources needed for EIM-related projects that could cause delays in completing work.

h) Delays in the POPUD interconnection and generation meter upgrades will hinder Avista's ability to submit five-minute meter data granularity.

i) Market entry requires Avista to follow CAISO's time for FNM updates, including updates independent of Avista and those related to market entities interconnected with Avista. This timeline will impact field construction schedules and data submission deadlines. Although failure to meet these deadlines doesn't limit Avista's ability participate in the market, it does negatively impact neighboring interconnected entities and Avista's EIM settlements.

j) Avista plans to conduct an EMS upgrade prior to market entry funded by the SCADA BC. Although the upgrade is planned to be complete in March of 2021, prior to the internal Avista deadline of June 2021, any delays for this project would significantly impact Avista's ability to conduct the CAISO testing phases and market go-live as planned.

k) The completion of the Burke substation network upgrades may be at risk due to potential environmental compliance. The Burke substation is located on a Superfund site, which requires a long-term response to clean up hazardous material contaminations. Additionally, the site's climate incurs inclement weather regularly which could impact construction at the site, both for third party and Avista construction.

l) The COVID-19 pandemic has forced a majority of the Avista workforce to work remotely for an extended period of time. At the time of this writing, the overall Program schedule hasn't been impacted by this shift, though individual projects have been delayed due to crew's ability to work on site or the

constraints of conducting application design sessions remotely. It is unknown how long this pandemic may impact Avista's work plans, which may likely be a significant risk to meeting the Program schedule for market go-live.

8.3 Constraints

The program schedule is the hard constraint. Although Avista originally signed the CAISO implementation agreement with an EIM entry date of April 1, 2022, Avista plans to formally change their entry date to March 2, 2022 to align with BPA and Tacoma Power. In order to meet that date, Avista will chose to adjust scope and budget as necessary.

- Given a fixed schedule, we will choose a scope and adjust resources as necessary.

Place one "X" in each column (one per row) to provide a visual queue as to this project's Flexibility Matrix.

Flexibility Matrix	Low Flexibility	Medium Flexibility	High Flexibility
Scope		X	
Schedule	X		
Budget			X

- *Note: Quality is always expected to be high*

8.4 Dependencies

Given the vast business impact of the EIM program, there are multiple projects that rely on other portions of a project being complete – both inside the EIM BC and in other business cases – for EIM work to be completed.

8.4.1 GPSS Dependencies

a) The introduction of external routable communications at the Noxon 230kV interconnection substation due to EIM metering upgrades, has required the location to be classified as a Medium Impact Bulk Electric System (BES) Cyber System location. Medium Impact BES locations must comply with various Critical Infrastructure Protection (CIP) standards regulated by NERC. The Noxon 230kV CIP project must be complete prior to the Noxon 230kV metering upgrade project and the Noxon HSM, LSM and PLC projects conducting their integrated configurations and testing for production use.
b) The Cabinet Gorge HSM, PLC and LSM (not funded by EIM Program BC) projects all depend on the Cabinet Gorge Automation Project for Unit 2, 3 and 4 (not funded by EIM BC).
c) All LSM, HSM and PLC projects have some level of dependency on each other at the plants
d) Coyote Springs 2 and Lancaster both rely on PTs and high side meters at BPA substation interconnection sites. Avista will partner with BPA to perform the EIM-related work at those locations.
e) The completion of HSM projects will require completion of the PLC and network projects.

8.4.2 Network Dependencies

a) Conducting EIM operations from the Backup Control Center (BuCC) will be required. The EIM Program has planned to install an EIM BA workstation at the BuCC. The ability for EIM work to be quickly executed will be aided by the Session Initiation Protocol (SIP) project. This project will increase network bandwidth to Backup Control Center (BuCC) and is not funded by the EIM Program BC. The completion of the EIM BA workstation at the BuCC is not dependent on completion of the SIP project at the BuCC, but conducting work from the BuCC would be improved.

8.4.3 Transmission System Operations/SCADA Dependencies

a) None known at the time of the document submission.

8.4.4 Substation Dependencies

a) The EIM meter replacement at the Westside interconnection substation is not part of the EIM Program BC. The meter replacement scope will be funded under a multi-phase substation rebuild at Westside. The completion of the rebuild is dependent on the timing of another project – the Downtown Transmission Cable Replacement project. These dependencies impact the timeline of when the EIM work can be completed at Westside. The current schedule calls for the Westside rebuild to be completed by the end of

May 2021, which is close to the June 2021 EIM internal deadline for project completion. If the work cannot be completed within the EIM timeline, Avista may seek a metering exception for Westside with CAISO.

9 Program Costs

9.1 Actual Costs as of August 2020

The EIM Program formally began in March 2019 and the tracking of EIM project costs began in June 2019. The EIM software RFP process (expense) was conducted in 2019, and Avista began capital projects focusing on network, metering and control upgrades. As of August 2020, Avista has formally transferred to plant or put into production, seven projects:

- ET Applications: EIM MV90 head-end meter system, the CT Analyzer for transformer testing.
- ET Network: Nine Mile LSM Network, Post Falls LSM Network, the Noxon PLC Network
- Generation: Noxon HSM
- Substation: Noxon HSM Substation 230kV

The following details are reflected in the actual Program charges between June 2019 and August 2020:

- Avista began recording EIM expense labor as of June 1, 2019 with project accounts in the given business areas.
- The expense charges in Table 21 reflect totals and do not include a reduction associated with the Idaho Commission's deferral order.
- As described in the EIM Human Resource Plan, Avista planned to hire three temporary FTEs to support the Program implementation and 17 incremental FTEs to support on-going EIM operations. As of August 2020, Avista has hired two of the Program implementation FTEs (Program Manager and Substation Engineer) and two incremental FTEs for on-going support (EIM BA Operator and EMS Modeling Engineer).
- The Utilicast capital costs reflect charges under the 2020-2022 Implementation Agreement for support of metering, controls and network upgrades, and software application projects.
- The Utilicast expense costs are associated with the 2019 Utilicast Technology RFP and the 2020-2022 Implementation Agreement. The 2018 Utilicast Assessments expense costs were are not included. Although the Utilicast expense items may align with support of a specific business unit, the costs have been centralized under the EIM Program line and charged to the Power Supply business unit.
- The Substation business unit is inclusive of capital costs for the Transmission FNM support, the EIM Dispatch Module, the Noxon 230kV CIP project, the Noxon 230 kV project and the Northeast CT project.
- In terms of Implementation Expense, the EIM Program line represents the business units that charge labor expense to the Program, including Power Supply, Supply Chain, Legal, Rates and Technology Applications.

Table 21 – EIM Program Implementation Costs as of August 2020

Actual Program Costs by Business Unit (as of 08/2020)	Actual Program Costs (as of 08/2020)			
	Capital		Implementation Expense	
	Avista	Utilicast	*Avista*	Utilicast
ET Applications	$ 855,024	$ 477,231	$ -	
ET Network	$ 636,214	$ 46,399	$ 8,593	
GPSS	$ 1,946,138	$ 43,309	$ 206,822	
Substation	$ 624,687	$ 20,256	$ 54,374	
Transmission	$ -	$ -	$ 314,002	
Facilities	$ 34,072	$ -	$ -	
ADSS	$ 603,126	$ 70,281	$ -	
EIM Program	$ -	$ -	$ 569,983	$ 684,795
Totals	**$ 4,699,261**	**$ 657,476**	**$ 1,153,774**	**$ 684,795**
Grand Totals	**$ 5,356,737**		**$ 1,838,569**	

9.2 Forecasted Program Cost Estimates as of August 2020

The Charter estimates from May 2019 outlined the total integration costs for joining the EIM (Table 22). After a year into the EIM integration effort and acquiring a better understanding of the market operation support needs, the Program Scope Document reflects the updated estimated costs for market integration. The total project estimates from the original Charter to the Scope Document are provided in Table 22 (Charter) and Table 23 (Scope) for comparison.

Table 22 – Charter Program Estimates as of May 2019

EIM Program Charter Estimates (as of 05/2019)	Implementation	Contingency	Totals	Annual O&M Expenses	Annual Capital
Capital	$ 18,129,000	$ 4,532,250	$ 22,661,250	$ -	$ -
Expense	$ 2,380,000	$ 595,000	$ 2,975,000	$ 3,534,000	$ -
Pre-Paid Expense	$ 840,000	$ 210,000	$ 1,050,000	$ -	$ -
Total Costs	**$ 21,349,000**	**$ 5,337,250**	**$ 26,686,250**	**$ 3,534,000**	**$ -**

Table 23 – Scope Program Estimate as of August 2020*

EIM Program Scope Estimates (as of 08/2020)	Implementation	Contingency	Totals	Annual O&M Expenses	Annual Capital
Capital	$ 24,091,964	$ 2,600,000	$ 26,691,964	$ -	$ 500,000
Expense	$ 5,011,026	$ 400,000	$ 5,411,026	$ 3,907,100	$ -
Total Costs	**$ 29,102,990**	**$ 3,000,000**	**$ 32,102,990**	**$ 3,907,100**	**$ 500,000**

*Pre-paid expense estimates reclassified to capital

- **Implementation Capital** – this estimate includes all known updated project costs for EIM software integration, EIM resource plan, and metering and controls upgrades.
- **Implementation Expense** – this estimate includes all known expense costs associated with market integration prior to market entry, including existing Avista labor, new Avista labor (incremental) associated with the EIM HR Plan for market operations, and non-labor expense items such as the CAISO milestone payments and Utilicast.
- **Contignecy** – this estimate for capital and expense represents funds to cover unknown costs or increased costs above expected spend. This is consisent with Avista project estimating practices. Considering most phyiscal infrastructure projects have completed the 60% design phase and the hiring of new employees is set based on the EIM Human Resource plan, the contignecy estimate is lower than the Charter estimate.
- **Annual O&M Expenses** – this estimate includes all known updated costs associated market operations post go-live, including the incremental Avista labor to support EIM operations (EIM HR Plan), CAISO grid management fees, software maintenance and liscencing fees, and network maintenance.
- **Annual Capital Estimate** – this prelimary estimate represents anticipated capital costs for software enhancements and upgrades. Avista will have a better estimate after gaining operational experience and understanding the impact CASIO annual updates have on system integration. These estimates were not included in the cost benefit anaylsis.

9.3 Forecasted Program Cost Estimates by Business Area

The estimates in Table 24 (Charter) represent the Charter costs by business area, excluding the contingency. For comparison, Table 25 (Scope), excluding contingency, has been provided.

Table 24 – Charter Program Costs by Business Unit as of May 2019

Business Area (as of 05/2019)	Implementation Capital	Pre-Paid Expense	Implemention Expense	Annual O&M Expense
ET Applications	$ 4,640,000	$ 840,000	$ -	$ 593,000
Application Procurement	$ -	$ -	$ 1,180,000	$ -
ET Network	$ 2,465,000	$ -	$ -	$ 271,000
GPSS	$ 5,164,000	$ -	$ -	$ -
Transmission & Substation	$ 1,760,000	$ -	$ 420,000	$ -
EIM Program	$ 4,100,000	$ -	$ 780,000	$ 120,000
New Avista FTEs	$ -	$ -	$ -	$ 2,550,000
Grand Totals	**$ 18,129,000**	**$ 840,000**	**$ 2,380,000**	**$ 3,534,000**

**Capital labor associated with the New Avista FTEs was included in the Transmission & Substation estimate*

Table 25 – Scope Program Costs by Business Unit as of August 2020

Business Area (as of 08/2020)	Implementation Capital	Pre-Paid Expense	Implemention Expense	Annual O&M Expense
ET Applications	$ 9,760,600	$ -	$ -	$ 532,133
ADSS	$ 3,460,133	$ -	$ -	$ -
Application Procurement	$ -	$ -	$ 1,251,671	$ -
ET Network	$ 1,599,311	$ -	$ 10,000	$ 77,500
GPSS	$ 4,462,416	$ -	$ 284,576	$ -
Substation	$ 1,963,214	$ -	$ 264,820	$ -
Transmission	$ 280,000	$ -	$ -	$ -
Facilities	$ 311,071	$ -	$ -	$ -
EIM Program	$ -	$ -	$ 1,685,000	$ 120,000
New Avista FTEs	$ 2,255,219	$ -	$ 1,513,570	$ 3,177,467
Grand Totals	**$ 24,091,964**	**$ -**	**$ 5,009,637**	**$ 3,907,100**

9.4 Incremental Cost Guidance & Estimates

9.4.1 IPUC EIM Expense Deferral & Approval

On March 23, 2020, the Idaho Public Utilities Commission (IPUC) issued Order No. 34606 approving Avista's application to defer incremental O&M costs (without a carrying charge), associated with joining the EIM operated by the CAISO. Commission Staff comments, filed on March 4, 2020 expressed support of Avista's request to defer its EIM incremental expenses, noting they believe the Company demonstrated it is reasonable for it to join the EIM. Per Order No. 34606, the Company is to cease deferring the incremental implementation costs at the go-live date, and is to file a report after one year of participation, describing the costs and benefits of participation, any other relevant information,

including but not limited to the CAISO's quarterly Western EIM Benefits Report. Recovery of any operational cost associated with membership in the EIM after the Company's go-live date would be determined in a future proceeding. At that time, a prudency review would be conducted to determine the reasonableness of recovering the deferrals from Idaho customers.[1]

At the time of the filing, the Company expected the annual O&M expense after joining the market to be approximately $3.5 - $4.0 million per year on a system basis, mostly associated with adding 11-13 new employees to facilitate market operations and settlements, including a five-person 24x7 hour EIM operating desk. Idaho's share of these costs is approximately 35% or $1.2 - $1.4 million annually. Staff noted the Company's estimated costs appear reasonable and that it is Avista's responsibility to demonstrate these costs are prudent prior to recovery. Staff noted some concern over expected labor costs, when comparing Avista's estimated costs to that of similar utilities, but recognize current cost estimates may change and will be reviewed in detail in future general rate cases.

9.4.2 Avista's Incremental EIM FTE Guidance

After the approval by IPUC of the Company's accounting petition to defer incremental operating expenses associated with the implementation of EIM, the following guidance will be used to determine what expenditures are incremental. EIM incremental guidance determination:

- New positions* which are added specifically for EIM will be considered incremental if they meet one of the following criteria:
    - A new employee is hired into an EIM position.
    - An existing employee is hired into an EIM position and their previous position is backfilled.

  ** Avista will not account for partial positions (i.e. an employee is working on EIM and non-EIM work) as incremental unless there is a significant impact to the business and there is a determinable way to recognize and document the specific incremental portion of actual work.*

- Labor Loadings (primarily medical and retirement benefits) for incremental employees are tracked as "non-labor" within the Company's financial system. Loadings are determined monthly by the Company's internal Corporate Accounting team and represented as a percent which is applied to the account where the direct labor is charged. In order to appropriately represent the net cost of these incremental employees, the company will apply the loading rate to the incremental labor cost for each new employee.

Based on Avista's incremental guidance, the Table 26 represents incremental expense during implementation and the anticipated on-going expense.

Table 26 – Scope Incremental Cost Estimates

EIM Program Scope Estimates (as of 08/2019)	Implementation	Contingency	Totals	Annual O&M Expenses
Capital	$ 24,091,964	$ 2,600,000	$ 26,691,964	$ -
Incremental Expense	$ 3,608,880	$ 400,000	$ 4,008,880	$ 3,907,100
Total Costs	**$ 27,700,844**	**$ 3,000,000**	**$ 30,700,844**	**$ 3,907,100**

[1] Avista intends to include Washington's share of all incremental EIM capital expenses in future Washington General Rate Cases.

10 Cost Benefit Analysis

Prior to signing the CAISO EIM Implementation agreement in April 2019, Avista hired Energy and Environmental Economics (E3) to conduct an EIM benefit assessment in the fall of 2017. E3 conducted similar benefit assessments for several other utilities to help understand the potential value of EIM participation. The E3 assessment estimated that Avista could see a range of annual benefits from $2 to $12 million from EIM participation. There were four main study assumptions that drove the wide range of potential EIM benefits: the amount of flexible hydro Avista bids into the market, the amount of transmission made available for market transactions, the amount of renewable generation that is integrated into the Avista BAA, and the assumed EIM price volatility. E3 stated in the Avista's Benefit Analysis report in the Overview section on page 3, "actual benefits to Avista will depend primarily on the availability of its hydropower resources to participate in the EIM, the transmission capacity that is available for use by the EIM, expansion of wind and solar resources within the Avista balancing area, and EIM market conditions." These are the primary drivers for EIM benefits and will be different for each EIM participating utility.

Using Avista's best estimates for these critical study assumptions, Avista anticipates EIM annual benefits to be close to $6 million, with potential for benefits to move closer to the upper end of the study range depending upon observed market price volatility. Recent market price volatility experienced in 2018 significantly increased the benefits of current market participants. Both the Idaho Power Company (IPC) and Portland General Electric (PGE) achieved EIM benefits in 2018 that were over five times their anticipated benefits calculated by E3. Avista's resource mix and transmission connection to other EIM participants most closely matches IPC and PGE. Therefore Avista may achieve similar elevated EIM benefits during times of high market price volatility.

10.1 Analysis Based on the Charter Estimates

Avista performed an initial economic analysis to determine the system annual benefits required to breakeven over a ten-year operating period based on initial estimated EIM implementation and on-going costs based on two scenarios. The first scenario assumed integration costs of $21.4 million and on-going costs of $3.5 million (original expected system project costs) and the second scenario assumed integration costs of $26.7 million and on-going costs of $4.0 million (expected system with contingency).

In order to break even in 10 years, assuming integration costs of $21.4 million, Avista would need to achieve system annual benefits of approximately $5.0 million. Assuming integration costs of $26.7 million, Avista would need to achieve annual system benefits of approximately $6.0 million. As previously discussed, based on the E3 benefit analysis, Avista estimated conservative annual EIM benefits of $5.8 million (system). Therefore, Avista initially anticipated positive revenue from EIM participation in less than 10 years and could achieve breakeven much sooner if observed market benefits are closer to what IPC and PGE have experienced in 2018 and 2019.

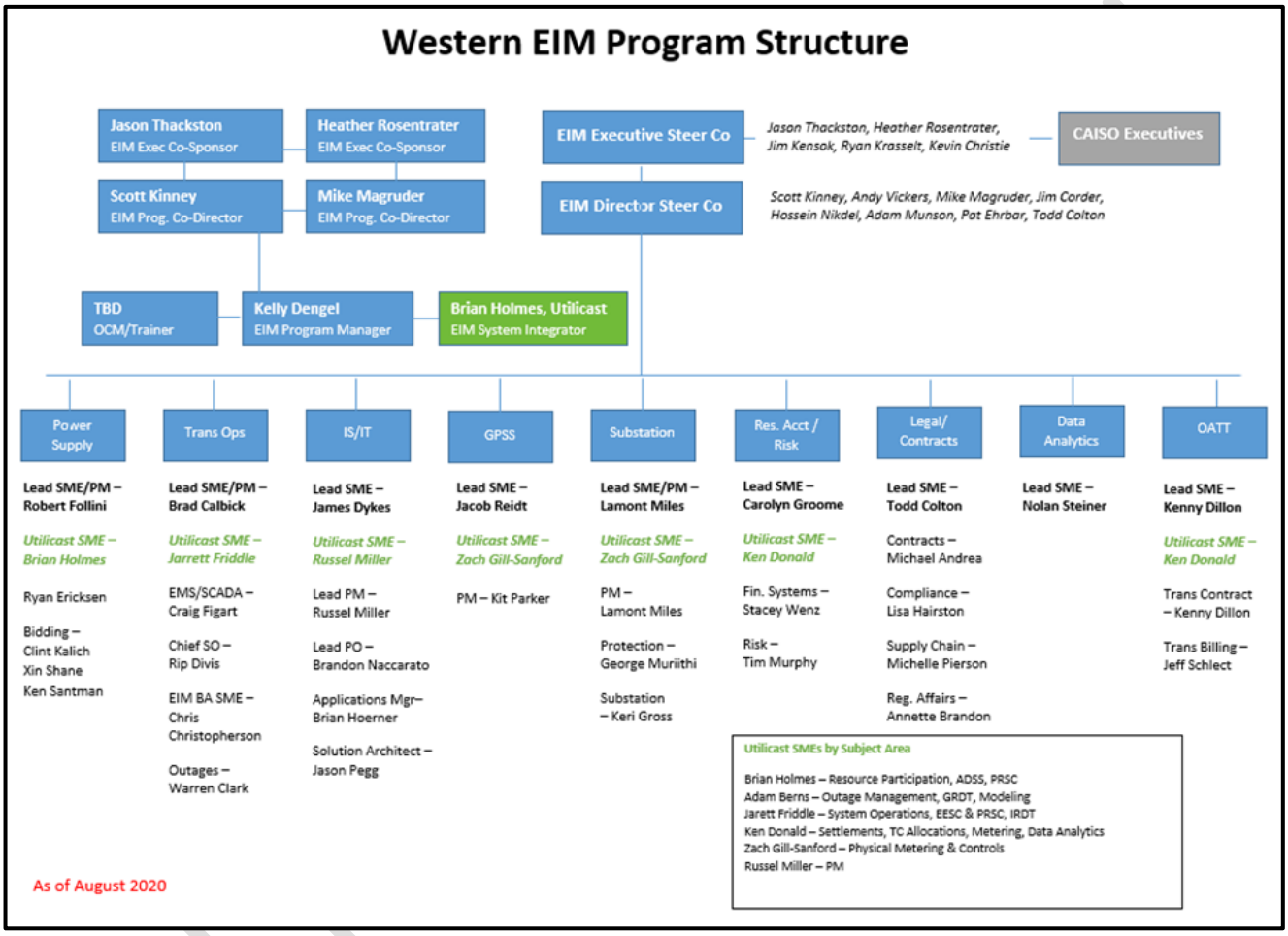
10.2 Analysis Based on Scope Estimates

Avista performed an additional economic analysis based on the updated costs estimates. Based on the new integration cost of $32.1 million and on-going costs of $3.9 million, an annual revenue of $7.8 million is needed to break even after 10 years of market operations. This is still well within the range of estimated benefits determined by E3 and quite a bit less than CAISO reported benefits for IPC and PGE in 2018 and 2019. If Avista's actual EIM system benefits are closer to or exceed the potential upper bound of $12 million, as determined by E3 and experienced by other similar situated EIM participating utilities, then Avista customers will see positive revenue in a much shorter time period. The economic analysis did not consider other EIM benefits such as reduced flexible ramping requirements, reliability and system visibility enhancements, and reductions in greenhouse gases.

11 Roles and Responsibilities

11.1 Program Organization Chart

The below program organization chart represents information known at the time of document submission. The organization chart will be a living document with updates and additions throughout the duration of the program. The organization chart(s) are posted on the EIM SharePoint site.



12 Program Governance and Reporting

12.1 Reporting

The purpose of these procedures and documents is to provide effective mechanisms to record and control the scope of the program, manage issues and risks and monitor progress. Program level management of decisions and documents will be discussed at the EIM Director and Executive Steering Committees and posted to the EIM SharePoint site. Enterprise Technology projects, and their associated processes, will be managed within Clarity. Generation, transmission operations and substation projects will be managed through their established project management processes and procedures, and final documentation posted to the EIM SharePoint site. Each project artifact will reference the EIM program with narrative related to EIM scope, CAISO track, requirements, and the financial structure with the EIM Parent Project ID of EIM422 and the associated Expenditure Request (ER) and Budget Item (BI). The request to open EIM projects will be reviewed by the EIM Program Manager and approved by the Business Case Sponsor.

12.2 Financial Control

Financial controls at the program level will managed with monthly financial reporting through Oracle reports, with assistance from the Financial Planning and Analysis team and project managers from the impacted business units. The Program finances and forecasted spend will be reviewed monthly with the Director and Executive Steering Committees. The Capital Planning Group (CPG) will also be kept informed of the Program Finances through existing CPG processes.

12.3 Change Control / Approval Authority

12.3.1.1 *Advisory Committee*

The Advisory Committees consist of the subject matter experts in the various business units who can direct the technical work, make engineering decisions and deliver the technical solution that meets the business need. The Advisory Committee is supplemented with input and knowledge from Stakeholders amongst neighboring business units. As needed, members of the Director Program Steering Committee will participate in the Advisory Committee meetings for input and decisions. The EIM Program manager will be invited to all Advisory Committee meetings and serve as a consistent conduit from the Advisory Committees to the EIM Program Steering Committee. Communication of project schedule risks, scope issues and financial impacts will be provided by the various project managers at the Advisory Committee and, where appropriate, reported to the EIM Director or Executive Steering Committee. The Advisory Committee does not have the authority to independently approve change requests, but must seek approval from the EIM Director Steering Committee.

12.3.1.2 *EIM Director and Executive Steering Committee*

Program level authority resides with the EIM Director and Executive Steering Committees. Ultimate approval authority resides with the Executive Steering Committee. The Executive Steering Committee is responsible for taking recommendations from the Director Steering Committee and ultimately making Program level decisions for use of contingency funding. In the unforeseen event that the EIM Program schedule is at risk, the Executive Steering Committee has the right to review and adjust the EIM go-live date. Members of the Executive Steering Committee and the Program Sponsors would then be responsible for re-negotiation of the EIM Implementation Agreement with the CAISO.

13 Director Approvals

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Scott Kinney, Director of Power Supply

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Andy Vickers, Director of Generation Production and Substation Support

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Mike Magruder, Director of System Operations and Planning

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Jim Corder, Director of Information Technology and Security

_____

Hossein Nikdel, Director of Applications and System Planning

_____

Adam Munson, Director of Accounting

_____

Pat Ehrbar, Director of Regulatory Affairs

_____

Todd Colton, Senior Legal Counsel

14 Executive Approvals

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Heather Rosentrater, Sr. VP of Energy Delivery

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Jason Thackston, Sr. VP of Energy Resources

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Kevin Christie, Sr. VP of External Affairs

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Jim Kensok, VP Chief Information & Security Officer

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Ryan Krasselt, VP and Controller