BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET NO. UE-22_____

EXH. SJK-2

SCOTT J. KINNEY

REPRESENTING AVISTA CORPORATION

Capital Additions for 2021-2024 by Plant Group
Kinney

WA GRC Plant Group	Business Case	2021 TTP (System)	2022 TTP (System)	2023 TTP (System)	2024 TTP (System)	Exh. SJK-2 Page #
EIM	Energy Imbalance Market	$ 10,554,903	12,016,376	-	-	2
	Energy Imbalance Market Modernization & Operational Efficien	-	-	499,974	585,791	14
Total Energy Imbalance Market (EIM)		**$ 10,554,903**	**$ 12,016,376**	**$ 499,974**	**$ 585,791**	
Exh. SJK-1T Total 2021-2024 Capital Additions		**$ 10,554,903**	**$ 12,016,376**	**$ 499,974**	**$ 585,791**	

Energy Imbalance Market

EXECUTIVE SUMMARY

In an effort to continue as a low cost, customer-focused energy service provider, Avista signed an Implementation Agreement on April 25, 2019 with the California Independent System Operator (CAISO) to join the Western Energy Imbalance Market (EIM) by April 2022. The Western EIM is a real-time, intra-hour energy market operated by CAISO that facilitates regional resource dispatch on a five minute basis to dispatch the lowest cost resources across the entire market footprint, while balancing in-hour load and resource obligations. This market allows participants to lower energy costs by either dispatching less expensive resources to meet load obligations, or by increasing revenue through the bidding of excess energy into the market. By the time Avista joins, more than 82% of the Western Interconnection load will be transacting in the EIM. As such, the liquidity of the hourly bi-lateral market Avista has traditionally transacted in will be significantly impacted because market rules require EIM participants to determine their resource schedules well in advance of the upcoming hour. As such, non-EIM participants will have less counterparties to transact with close to the operating hour. In addition, as renewable portfolios are increasingly mandated, Avista will need the market to ease the financial pressure of integrating renewable resources, while maintaining reliability.

In July 2020, in partnership with CAISO and the Bonneville Power Administration (BPA), Avista changed their entry date to March 2022, to align with BPA and Tacoma Power. This decision was made in an effort to coordinate the testing phases and go-live operations amongst northwest entities for a smoother market entry transition.

Avista will need to implement a variety of EIM software solutions, perform metering upgrades at a majority of its generation and substation interconnection sites, and install generation control systems. The original estimates described in the EIM Program Charter reflected $18.1M, with $4.5M planned in contingency, for a total estimated capital spend of $22.6M. The Charter also outlined $2.9M in implementation expense for a total Program implementation cost estimate of $26.6M and $3.5-$4M in on-going annual expense. In October 2020, cost estimates were updated in the Program Scope document, reflecting $24.1M with $2.6M planned in contingency, for a total estimated capital spend of $26.7M. The Charter also outlined implementation expense estimates at $5.4M for a total Program implementation cost estimate of $32.1M and an on-going annual expense estimate of $3.9M.

The Program implementation effort began in 2019 and will continue through March 2022, with warranty and closing activities through summer 2022. The CAISO allows Entities to join the market annually in April, with a fixed CAISO-set schedule for testing phases and market go-live. If Avista does not meet the planned go-live date, Avista will need to wait until April 2023 to join the market. Missing the go-live date will put Avista at risk for maintaining reliable service to our customers, providing energy services at the lowest costs, integrating renewable energy at the lowest costs and hindering de-carbonization efforts.

Energy Imbalance Market

The work in the EIM Business Case (BC) will benefit electric customers in Washington and Idaho while the network improvements will benefit gas and electric customers in Washington, Idaho and Oregon.

VERSION HISTORY

Version	Author	Description	Date	Notes
1.0	*Kelly Dengel*	*Original Business Case Template*	*4/29/2019*	
2.0	*Kelly Dengel*	*Updated Business Case Template*	*7/31/2020*	*Based on Charter Document*
3.0	*Kelly Dengel*	*Updated Business Case Template*	*12/17/2020*	*Based on Scope Document*

GENERAL INFORMATION

Requested Spend Amount	$26.7M
Requested Spend Time Period	3 Years – 2019 through 2022
Requesting Organization/Department	Power Supply
Business Case Owner | Sponsor	Kelly Dengel | Scott Kinney & Mike Magruder
Sponsor Organization/Department	Power Supply | System Operations
Phase	Execution
Category	Program
Driver	Performance & Capacity

1. BUSINESS PROBLEM

1.1 What is the current or potential problem that is being addressed?

Avista, and other utilities across the northwest, have traditionally operated in a bilateral market. As more utilities join an organized market, market liquidity will be impacted by reducing the number of available bi-lateral trading partners to conduct near term daily energy transactions. This puts Avista at risk for higher market prices and reliability issues if energy can't be procured from the bi-lateral market during stressed conditions, such as the loss of an Avista generating facility. Avista's resource mix continues to change with the inclusion of additional renewable resources to meet both internal clean energy goals and state policy requirements. As additional renewable energy integrates into the Avista portfolio, it becomes more expensive to manage and follow the variable nature of these resources. The EIM provides a more economic means to manage renewable resource variability.

In monitoring this risk and bilateral market shift, Avista has progressively monitored organized energy market activity within the west including the CAISO EIM and the possible formation of the

Energy Imbalance Market

Mountain West Transmission Group (MWTG). In April 2018, the MWTG initiative was deferred, and in December 2018 Avista decided to pursue entry to the Western EIM. Avista signed an EIM Implementation Agreement with the CAISO on April 25, 2019 to join the market in April 2022. In July 2020, in partnership with CAISO and the Bonneville Power Administration (BPA), Avista changed their entry date to March 2022, to align with BPA and Tacoma Power. This decision was made in an effort to coordinate the testing phases and go-live operations amongst northwest entities for a smoother market entry transition.

1.2 Discuss the major drivers of the business case *(Customer Requested, Customer Service Quality & Reliability, Mandatory & Compliance, Performance & Capacity, Asset Condition, or Failed Plant & Operations)* and the benefits to the customer

The major drivers influencing Avista's decision to join the market centered on reliability, the integration of renewable resources and a desire to adhere to clean energy goals.

The CAISO EIM is an in-hour economic based regional resource dispatch program that allows participants to maintain system reliability and lower energy costs by either dispatching less expensive resources to meet load obligations, or increase revenue through the bidding of excess energy into the market. The EIM dispatches the most economic resource across the entire market footprint based on bid prices to balance in-hour load and generation, resulting in lower overall dispatch cost for each individual participant. The EIM also lowers the amount of on-line regulation that each utility holds in excess every hour to make up the error between the forecasted load and resource plans, and what actually occurs during the operating hour. The reduced regulation can then be monetized creating additional revenue.

Another driver for joining the EIM is the integration of additional renewable resources in the Avista Balancing Authority Area (BAA). Renewable generation requires additional regulation and load following to back up the intermittency of the resource. There is a tipping point where Avista's existing hydro flexibility can't sufficiently or economically supply the required load following for the amount of renewable resources integrated into the Avista BAA. The EIM allows for the expanded integration of renewable resources by providing a cost effective, reliable market backstop to balance intermittent resources. Currently Avista has only a single 100 MW wind facility and a 20 MW solar facility within its BAA, so there is adequate hydro flexibility to follow these plants. Recently Avista signed a new 20 year Power Purchase Agreement with Clearway Energy for 145 MW of wind starting in the fall of 2020. In addition there are multiple third-party independent power producers in the Avista transmission interconnection queue that are exploring integration into the Avista BAA, including projects that meet the Public Utility Regulatory Policies Act requirements to be considered as a qualifying resource.

In April of 2019, Washington State passed clean energy legislation that will drive additional renewable resources to be built in Avista's BAA. Finally, Avista recently announced its own clean energy goals that will transition our resource mix to 100 percent clean by 2045. Any additional renewable resource integrated in Avista's service territory results in a reduction of hydro flexibility to follow these variable resources, and the EIM is the most efficient and cost effective way to provide the required flexible ramping capability.

1.3 Identify why this work is needed now and what risks there are if not approved or is deferred

Entities typically announce their intent to join the market at least two years prior to go-live, while the CAISO-driven implementation schedule is 18 months for market integration. Avista has given itself a little over 2.5 years to prepare for market entry, as there is a substantial body of technical work, physical construction work and business process design Avista must complete. This extended timeline allows Avista to implement five new software applications, conduct upgrades to existing software, and perform generation metering and control upgrades, interconnection metering upgrades at substations and associated network infrastructure upgrades. Throughout the implementation, Avista will rely on Utilicast, their consultant system integrator, to provide market education and expertise in preparing the company for successful market participation.

Several northwest utilities, (PacifiCorp, Portland General Electric (PGE), Puget Sound Energy, Idaho Power Company (IPC), Northwestern, Seattle City Light and BPA) along with other western utilities, have either already joined the CAISO EIM or announced they will join in the near future. When BPA joins the Western EIM in March 2022, more than 80 percent of the load in the Western Interconnection will be participating in the market. This shift in market participation will impact daily market liquidity by reducing the number of available bi-lateral trading partners to conduct near term daily energy transactions. The risk of limited trading partners could drive daily market prices higher and/or cause reliability issues for Avista if energy can't be procured from the bi-lateral market during stressed conditions, such as the loss of an Avista generating facility.

1.4 Identify any measures that can be used to determine whether the investment would successfully deliver on the objectives and address the need listed above.

CAISO publishes a quarterly benefit report, which represents a calculation of each Entities' market benefits. This report will be used in part to reflect Avista's EIM benefits, and determine the EIM Business Case investment payback period. Avista will also develop an internal benefit report, which will include considerations for hydro bidding and Avista specific operational factors that may not be adequately represented in CAISO's benefit calculation. These two items combined will help Avista determine the financial investment return.

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 has 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 are four main study assumptions that result in 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. 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 IPC and PGE achieved EIM benefits in 2018 that were over five times their anticipated benefits calculated by E3 studies. 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.

1.5 Supplemental Information

1.5.1 Please reference and summarize any studies that support the problem

Additional Program detail is provided in the EIM Program Initiation Charter dated May 17, 2019 and the EIM Program Scope Document dated October, 29, 2020. Both are posted to the EIM SharePoint site.

1.5.2 For asset replacement, include graphical or narrative representation of metrics associated with the current condition of the asset that is proposed for replacement.

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. 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 communication 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. The generation meters will be replaced with a SEL-735 meter, or a locations where the SEL-735 already exists, the meter will be reprogrammed to collect 5-minute reads.

Throughout 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 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 focus and evolution for Avista. 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.

Option	Capital Cost	Start	Complete
CAISO Western Energy Imbalance Market	*$26.7M*	*05/2019*	*06/2022*
Do Nothing	*$0*	*N/A*	*N/A*

2.1 Describe what metrics, data, analysis or information was considered when preparing this capital request.

Reference key points from external documentation, list any addendums, attachments etc.

Avista developed its initial EIM implementation estimate with help from Utilicast who has aided several other Utilities prepare for market operations. Avista hired Utilicast to perform a technology assessment, a meter and controls assessment, and develop an overall cost assessment in 2018. Avista recognizes that the EIM project implementation cost estimate is a working estimate and will evolve as the Company learns more about the specific CAISO EIM requirements, determines the capability of its existing equipment, completes the preliminary design of required upgrades and selects its market application vendors.

After the Utilicast assessments were complete, Avista used the information to reexamine the work load and design requirements for facility upgrades including meters, generation controls, and communication networks. Avista also develop a project schedule, project structure and preliminary resource plan. This updated information was used to develop the EIM Program Initiation Charter in May of 2019 and inform the EIM Business Case narrative. The Program Scope document approved in October 2020 provided further cost estimate updates base on completing initial project designs and installations and reevaluating employee resource needs. Avista recognizes the cost and preparation for EIM entry is significant so it has been diligent in its structured approach to estimate project costs and keep actual costs under control. The Company reached out to multiple existing EIM participating entities to acquire best practices based on their approach and experience. Avista chose to hire Utilicast to leverage its EIM operational and integration expertise in lieu of attempting an Avista-guided implementation.

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2.2 Discuss how the requested capital cost amount will be spent in the current year (or future years if a multi-year or ongoing initiative). (i.e. what are the expected functions, processes or deliverables that will result from the capital spend?)**. Include any known or estimated reductions to O&M as a result of this investment.**

[Offsets to projects will be more strongly scrutinized in general rate cases going forward *(ref. WUTC Docket No. U-190531 Policy Statement)*, therefore it is critical that these impacts are thought through in order to support rate recovery.]

The EIM Program is a multi-year program affecting Generation Production & Substation Support, Power Supply, Transmission System Operations, Substation, Enterprise Technology, Accounting and SCADA. The below tables represents the anticipated capital allocation request per year based on the Program Scope estimates and a summary of what projects or deliverables will be addressed.

BC Year	Capital Request	Projects/Deliverables
2019	$1,510,000	Controls/meter upgrades, EIM MV90 project
2020	$9,860,000	Controls/meter upgrades, EIM software projects
2021	$10,500,000	Controls/meter upgrades, EIM software projects
2022	$4,830,000	EIM software projects
Total	**$26,700,000**	

In preparation for Avista to enter the Western EIM, the discussion of the roles and teams required for a successful market entry and on-going operations was imperative. As described in the executive-approved EIM Human Resource Plan of May 2020, 17 incremental full-time employees were identified for the program implementation and the post-implementation phases. This document includes justification for each position, an explanation of job functions as they relate to EIM and associated risks if the position isn't approved for hire. After reviewing the program implementation schedule, and accommodating a timeline for resources to participate in the software implementation phases, a preferred hire date was developed. This preferred hire date, along with an estimation of time allocated to EIM capital activities and expense activities, provided input for a 2020-2023 annual financial estimate, with 2023 representing a full-year of operations and maintenance (O&M) expense activities.

In 2018, Avista originally estimated annual O&M expense at $3.5 - $4.0 million, with $2.5 million attributed to the original labor estimate of 11-13 incremental EIM FTEs. The revised estimate of 17 EIM FTEs, as described in the EIM Human Resource Plan, increases the annual labor estimate to $3.2 million (system loaded) and the total estimated annual expense to $3.9M. The need for the additional 4 FTEs (17 vs. 13), 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. Any additional EIM roles Avista may need will be assessed after Avista has gained experience operating in the market.

In August 2020, prior to incorporating the updated EIM Human Resource Plan cost estimates in the Scope Document estimates, the FTE cost estimates were reviewed in light of the EIM Charter estimates and reductions were made. Reductions were also made to reflect 2020 hiring delays and the postponement of two positions – the Training Admin and one of the Settlement Analysts. These positions are anticipated to be hired approximately six months after market go-live.

2.3 Outline any business functions and processes that may be impacted (and how) by the business case for it to be successfully implemented.

By joining the Western EIM, many existing business processes will be impacted and Avista will adopt an entirely new set of market processes to incorporate in daily operations. The primary business groups impacted by operating in the market include Power Supply, Transmission System Operations and Accounting/Finance. The Power Supply group will be responsible for generating hourly market bids for generation resources, while System Operations will implement a new 24-hour desk with EIM operators representing Avista's Balancing Authority Area (BAA) in the market and the Accounting/Finance group will analyze data and CAISO settlement information. These three groups will need to communicate closely with each other and the plant operators through phone calls and the aid of the EIM software applications. The Accounting/Finance business unit will acquire a new Settlements team to perform market settlements and analysis of Avista's financial position in the market. Throughout substation and generation projects, a planning and timing shift will need to occur to align Avista's delivery schedules with CAISO's scheduled updates. If Avista does not align with CAISO's update schedules for physical changes in the BAA, such as new substations or transmission lines, Avista's physical system will not be represented in CAISO's market design, which could result in negative financial impacts for Avista.

2.4 Discuss the alternatives that were considered and any tangible risks and mitigation strategies for each alternative.

As stated in Section 1.1, Avista monitored EIM expansion and development activity in the West and as more northwest utilities joined the CAISO EIM, it was inevitable that Avista would also need to join an in-hour market to reduce market liquidity risk and costs to integrate renewable resources. Avista delayed a market entry decision until the financial and operational risks were present. Once the MWTG initiative was deferred in April 2018, Avista decided to pursue entry to the Western EIM in December 2018 since it was the only market option available.

2.5 Include a timeline of when this work will be started and completed. Describe when the investments become used and useful to the customer, spend, and transfers to plant by year.

The EIM Program began in April 2019, and capital project progressively began in May 2019. The bulk of the capital investments centered on the implementation of the EIM software, the upgrade of Avista's metering infrastructure across generation and substation to install revenue quality meters capable of secure 5-minute reads, and the upgrade of some plant control systems in generation. While the completion of the generation and substation projects will be progressive

throughout late 2020 and into early 2021, the EIM software applications will not be complete until market entry in March 2022.

2.6 Discuss how the proposed investment aligns with strategic vision, goals, objectives and mission statement of the organization.

In April of 2019, Avista announced its own clean energy goals that will transition our resource mix to 100 percent clean by 2045. Also in 2019, Washington State passed clean energy legislation that will drive additional renewable resources to be built in Avista's BAA to meet specific emission reduction requirements between 2030 and 2045. Any additional renewable resource integrated in Avista's service territory results in a reduction of hydro flexibility to follow these variable resources, and the EIM is the most efficient and cost effective way to provide the required flexible ramping capability.

2.7 Include why the requested amount above is considered a prudent investment, providing or attaching any supporting documentation. In addition, please explain how the investment prudency will be reviewed and re-evaluated throughout the project

Avista conducted a cost to benefit analysis based on the information developed from the E3 benefit study and the EIM Program Initiation Charter. Based on the estimated benefits and costs from these assessments, Avista anticipates breaking even with its EIM investments in 7-8 years assuming an annual revenue of $6M from market participation.

Avista performed an additional economic analysis based on the updated costs estimates provided in the EIM Scope Document. 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.

2.8 Supplemental Information

2.8.1 Identify customers and stakeholders that interface with the business case

Avista internal stakeholders include: Power Supply, Transmission System Operations, SCADA, Generation Production & Substation Support, Substation Engineering, Finance & Accounting, Distribution System Operations, Risk, Network and Technology. Avista's primary external stakeholder is CAISO, however the EIM software vendors – Power Costs, Inc., and Power Settlements – are also key stakeholders. The below table represents business units that will perform capital projects under the EIM BC and the associated rate jurisdiction:

Business Unit	Service Code	Rate Jurisdiction	Location
Generation	ED-Electric Direct	AN-Allocated North	098-Common-WA/ID
Substation	ED-Electric Direct	AN-Allocated North	098-Common-WA/ID
ET Applications	ED-Electric Direct	AN-Allocated North	098-Common-WA/ID
ET Network	CD-Common Direct	AA-Allocated All	099-Common-WA/ID/OR
SCADA	ED-Electric Direct	AN-Allocated North	098-Common-WA/ID
Facilities	ED-Electric Direct	AN-Allocated North	098-Common-WA/ID

2.8.2 Identify any related Business Cases

The Energy Imbalance Market Business Case and the Resource Metering, Telemetry and Controls Upgrade Business Case were initiated in 2017 to prepare Avista to join an organized energy market. In 2019, the Resource Metering, Telemetry and Controls Upgrade Business case scope, and the then allocated $2.21M (2019 and 2020 funds), were consolidated under the Energy Imbalance Market Business Case, which at that time, and had a placeholder estimate of $9.4M. With the help of Utilicast, Avista continues to gain a better understand of the current status and capability of existing equipment and full pre-market integration requirements. This information has been used to create the current Program estimate.

Market entrance is also dependent on the creation and integration of the Full Network Model delivered under the SCADA/SOO/BuCC BC (System Operations Office and Backup Control Center).

3.1 Steering Committee or Advisory Group Information

The EIM Business Case has the following levels of program governance; the business unit Advisory Committees, the Director Steering Committee and Executive Steering Committee.

- **Advisory Committees** – varies by business unit for technical subject matter expertise

- **EIM Director Steering Committee** – Scott Kinney, Andy Vickers, Mike Magruder, Jim Corder, Hossein Nikdel, Pat Ehrbar, Todd Colton, Adam Munson and Clay Storey

- **EIM Executive Steering Committee** – Jason Thackston, Heather Rosentrater, Jim Kensok, Ryan Krasselt and Kevin Christie

3.2 Provide and discuss the governance processes and people that will provide oversight

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 Committees and, where appropriate, reported to the EIM Director or Executive Steering Committee. The Advisory Committee does not have the authority to approve change requests, but must seek approval from the EIM Director Steering Committee.

Program level authority sits with the EIM Director Steering Committee, and the Executive Steering Committee. Ultimate approval authority sits 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 be responsible for this re-negotiation of the EIM Implementation Agreement with the CAISO.

3.3 How will decision-making, prioritization, and change requests be documented and monitored

The EIM Program has implemented procedures and documentation to provide effective mechanisms to control the scope of the program, manage issues and risks and monitor progress. Project level change requests will be discussed at the Advisory Committees, and approvals will be granted at the EIM Director Steering Committee. 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.

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The undersigned acknowledge they have reviewed the *Energy Imbalance Market* Business Case and agree with the approach it presents. Significant changes to this will be coordinated with and approved by the undersigned or their designated representatives.

Signature:	Kelly Dengel	Date:	12-17-2020
Print Name:	Kelly Dengel		
Title:	EIM Program Manager		
Role:	Business Case Owner		

Signature:	Scott Kinney	Date:	12-17-20
Print Name:	Scott Kinney		
Title:	Director of Power Supply		
Role:	Business Case Sponsor		

Signature:	Michael A Magruder	Date:	12-17-2020
Print Name:	Mike Magruder		
Title:	Director System Ops & Planning		
Role:	Business Case Sponsor		

Signature:		Date:	
Print Name:			
Title:			
Role:	Steering/Advisory Committee Review		

Template Version: 05/28/2020

Energy Imbalance Market Modernization & Operational Efficiency

EXECUTIVE SUMMARY

Avista will join the Western Energy Imbalance Market (EIM), operated by the California Independent System Operator (CAISO), in March 2022. The Western EIM is a real-time, intra-hour energy market operated that facilitates regional resource dispatch on a five-minute basis to dispatch the lowest cost resources across the entire market footprint, while balancing in-hour load and resource obligations. This market allows participants to lower energy costs by either dispatching less expensive resources to meet load obligations, or by increasing revenue through the bidding of excess energy into the market. By the time Avista joins, more than 82% of the Western Interconnection load will be transacting in the EIM. As such, the liquidity of the hourly bi-lateral market Avista has traditionally transacted in will be significantly impacted because market rules require EIM participants to determine their resource schedules well in advance of the upcoming hour. Therefore, non-EIM participants will have less counterparties to transact with close to the operating hour. In addition, as renewable portfolios are increasingly mandated, Avista will need the market to ease the financial pressure of integrating renewable resources, while maintaining reliability.

Under the EIM Program Business Case (2019-2022), a variety of EIM software solutions were implemented to conduct market operations. Each year, based on operational improvements and market design changes, the CAISO releases market technology updates. These updates are coordinated with EIM software vendors to ensure efficient market operations and avoid disruption to entity participation. Avista's on-going participation in the market is dependent on ensuring the EIM software suite, associated internal integrations and updates to associated EIM software, are in compliance with software vendor and CAISO market releases. In addition, the updates must be applied simultaneously across the entire EIM suite, impacting Power Supply, Transmission System Operations, Supervisory Control & Data Acquisition (SCADA), Generation Production & Substation Support (GPSS) and EIM Settlements business groups. Failure to comply with the given upgrades, will likely disrupt Avista's participation in the market and hinder operational efficiency.

The work in the EIM Business Case (BC) will benefit electric customers in Washington and Idaho.

VERSION HISTORY

Version	Author	Description	Date	Notes
1.0	*Kelly Dengel*	*Business Case Template*	*06/25/2021*	

Energy Imbalance Market Modernization & Operational Efficiency

GENERAL INFORMATION

Requested Spend Amount	$2,730,000
Requested Spend Time Period	5 years
Requesting Organization/Department	Energy Delivery
Business Case Owner | Sponsor	Kelly Dengel | Mike Magruder
Sponsor Organization/Department	Transmission System Operations
Phase	Execution
Category	Program
Driver	Performance & Capacity

1. BUSINESS PROBLEM

1.1 What is the current or potential problem that is being addressed?

This program is required to support the EIM application-related software platforms and integrations implemented under the EIM Program BC (2019-2022).

Application upgrade projects are necessary due to the continuous requirement to provide updates, upgrades and/or replacements on existing EIM applications, as they are required to respond to changing business needs and/or technical obsolescence. These refreshes/upgrades are essential in order to remain reliable, current, compatible with CAISO market software releases, and address security vulnerabilities to ensure ongoing value is achieved by joining the EIM.

1.2 Discuss the major drivers of the business case *(Customer Requested, Customer Service Quality & Reliability, Mandatory & Compliance, Performance & Capacity, Asset Condition, or Failed Plant & Operations)* and the benefits to the customer

The primary investment driver for the EIM Modernization & Operational Efficiency BC is Performance and Capacity. A secondary investment driver is Asset Condition.

Many of the applications and respective projects in this BC directly impact Avista's ability to optimize generation resources, operate in the market, continue as a low-cost energy provider, and reliably operate the electric grid. They enable Avista's people to effectively perform their job functions and thereby help control Avista's power costs by gaining access to cost-efficient power in the market.

Some benefits to upgrades and enhancements to these systems include:

- Utilizing technology to make more informed decisions
- Providing data to optimize Avista's generation resource performance
- Continuing as a low-cost energy provider though market participation
- Increasing grid reliability through market participation
- Managing renewable resource variability more economically
- Advancing the 'Innovation and Performance' focus

- Increasing productivity and efficiency
- Maintaining compliance with all FERC, NERC, and CAISO rules

1.3 Identify why this work is needed now and what risks there are if not approved or is deferred

The applications below in Section 2 are essential to efficient market operations and grid reliability. Updates and upgrades to these applications, and associated integrations, address operational changes within Avista, EIM software vendors and the CAISO market, and allow Avista to effectively participate in the market.

The primary alternative to keeping these systems in compliance with EIM software vendors and the market is to maintain the software as-is and not pursue ongoing updates. This puts Avista at risk for maintaining operational efficiency, market compliance and could ultimately keep Avista from operating in the market for a period of time. For each market release, the CAISO provides backward compatibility for two previous market release versions, thus giving Avista some flexibility in determining when an update is applied. In addition, the EIM software vendors also release upgrades independent of CAISO market releases that Avista will need to incorporate into the delivery cycle.

Performing at least one annual CAISO-initiated software updates as planned supports Avista's ability to continue to operate as a low-cost energy provider and have access to cost-efficient energy within the market. While there is flexibility in determining when an upgrade can be applied, additional functionality and efficiencies may be lost by omitting recommended/required upgrades.

1.4 Identify any measures that can be used to determine whether the investment would successfully deliver on the objectives and address the need listed above.

The CAISO publishes a quarterly benefit report, which represents a calculation of each Entities' market benefits. This report will be used in part to reflect Avista's EIM benefits and determine the EIM BC investment payback period. Avista will also develop an internal benefit report, which will include considerations for hydro bidding and Avista specific operational factors that may not be adequately represented in CAISO's benefit calculation. These two items combined will help Avista determine the financial return on the implementation and on-going costs. Ensuring all EIM-related software is updated in accordance with vendor and market timelines enables Avista to operate efficiently and realize market benefits.

Based on EIM integration costs of $32.1 million and on-going costs of $3.9 million, an annual system benefit of $7.8 million is needed to break even after 10 years of market operations. This $7.8 million in estimated benefits is within the range of Avista's estimated benefits determined by an Energy and Environmental Economics (E3) market study. 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. Ensuring the EIM software suite, and associated integrations, are updated as directed by the software vendors and CAISO will help enable Avista to achieve these benefits.

1.5 Supplemental Information

1.5.1 Please reference and summarize any studies that support the problem

Prior to signing the CAISO EIM Implementation agreement in April 2019, Avista hired 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. 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. The E3 EIM is posted here on the EIM SharePoint site.

1.5.2 For asset replacement, include graphical or narrative representation of metrics associated with the current condition of the asset that is proposed for replacement.

N/A

Option	Capital Cost	Start	Complete
Support EIM vendor and market enhancements	*$2.5M*	*07/2022*	*07/2027*

2.1 Describe what metrics, data, analysis or information was considered when preparing this capital request.

Avista intends to follow the recommended application refresh and expansion requirements for EIM applications as outlined by the EIM software vendors and CAISO. The requested allocation is based primarily on maintaining compatibility, reliability, addressing security vulnerabilities and ensuring ongoing value is achieved from participation in the EIM. Additional criteria include maintaining operational efficiencies and aligning with Avista's strategic objectives.

This BC supports upgrades to the core EIM software suite, including Power Costs, Inc. (PCI), SettleCore and Itron, and associated changes to the integration software, including, MuleSoft and Globalscape. In addition, updates to secondary support applications such as Plant Information (PI) and/or integrations with third-party providers for weather forecasts that support EIM operations are also included. Although the Avista Decision Support System (ADSS) supports EIM operations, funding for on-going improvements to that application are under the Energy Resources Modernization and Operational Efficiency (ERMOE) BC.

The PCI software is a cloud-based Software as a Service (SaaS) solution, while the SettleCore and Itron applications are on premise. The capital request under this BC includes funds for professional services, internal labor, and internal non-labor associated with application upgrades. As the SettleCore and Itron applications are on premise, it also includes upgrades to server and database hardware. The EIM MV90 installation is planned for a hardware refresh in 2024, with costs estimated at $100k, while the SettleCore installation is planned for a hardware refresh in 2026, with costs estimated at $130k. The capital allocation request in 2024 and 2026 reflects funding these activities.

MV90 - 2024				SettleCore - 2026		
Item	**Labor**	**Hardware**		**Item**	**Labor**	**Hardware**
Comm Server	$ 30,000	$ 30,000		Comm Server	$ 30,000	$ 22,000
App Server	$ 20,000			App / OS work	$ 32,000	
Database	$ 19,200			Database	$ 25,600	
Total	$ 69,200	$ 30,000		RabbitMQ	$ 20,000	
				Total	$ 107,600	$ 22,000
Grand Total:	**$ 99,200**			**Grand Total:**	**$129,600**	

With the exception of Itron's EIM MV90 agreement, professional services to support these upgrades are included in the maintenance agreements. In addition, upgrades to the SettleCore software will be performed by the vendor.

The roadmap for the next five years includes refreshing and/or expansion initiatives to these core systems:

- **PCI 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.
- **PCI GenManager Front Office**
  - **Participating Resource Scheduling Coordinator (PRSC) Bidding & Scheduling System** – Performs Merchant functions to submit bids and base schedules to CAISO for participating resources.
  - **EIM Entity Scheduling Coordinator (EESC) Scheduling System** – Performs Entity (Balancing Authority) functions to submit base schedules for both participating resources and non-participating resources.
- **PCI 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.
- **SettleCore Power Settlements**
  - **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.

- **SettleCore Visual Analytics**
    - **Performance & Analytics System** – Performs a near real-time market analytic functions in a visual display.
- **Itron EIM MV90**
    - **Head-End Meter System** – Collects 5-minute interval generation and interchange meter data

2.2 Discuss how the requested capital cost amount will be spent in the current year (or future years if a multi-year or ongoing initiative). (i.e. what are the expected functions, processes or deliverables that will result from the capital spend?). Include any known or estimated reductions to O&M as a result of this investment.

[Offsets to projects will be more strongly scrutinized in general rate cases going forward *(ref. WUTC Docket No. U-190531 Policy Statement)*, therefore it is critical that these impacts are thought through in order to support rate recovery.]

At minimum, an annual CAISO-market update will be required for the EIM software suite. Based on the updates in the market release, additional updates to integration software and/or related software may be required. In addition, updates to third-party wind and solar forecast integration are also included. The below table represents the anticipated capital allocation request per year and a summary of what enhancement projects will be addressed.

BC Year	Capital Request	Projects/Deliverables Summary
2022	$500,000	EIM software and integrations upgrades
2023	$500,000	EIM software and integrations upgrades
2024	$600,000	EIM software, integrations, EIM MV90 hardware upgrades
2025	$500,000	EIM software and integrations upgrades
2026	$630,000	EIM software, integrations, SettleCore hardware upgrades
Total	**$2,730,000**	

2.3 Outline any business functions and processes that may be impacted (and how) by the business case for it to be successfully implemented.

By joining the Western EIM, many existing business processes were impacted and Avista adopted an entirely new set of market processes to incorporate in daily operations. The primary business groups impacted by operating in the market include Power Supply, Transmission System Operations, Thermal Operations, Hydro Operations and EIM Settlements. The Power Supply group is responsible for generating hourly base schedules and market bids for generation resources, while System Operations implemented a new 24-hour desk with EIM operators representing Avista's Balancing Authority Area (BAA) in the market. The Thermal Operations and Hydro Operations groups are responsible for submitting both planned and unplanned outage data associated with generation resources. The EIM Settlements group will

analyze data and CAISO settlement information. These groups need to communicate closely with each other and plant operators through phone calls and the aid of the EIM software applications. In addition, the Enterprise Technology operations team will need to support the EIM software suite 24x7 and the delivery teams will need to support on-going upgrades to the system. Failure to comply with the given upgrades within the specified time frame, will likely disrupt Avista's participation in the market and hinder operational efficiency.

2.4 Discuss the alternatives that were considered and any tangible risks and mitigation strategies for each alternative.

During the EIM Program implementation, Avista leadership discussed the merits of purchasing EIM software, purchasing software from a single EIM vendor, developing in-house EIM software, enhancing existing in-house software and how to integrate these systems with CAISO systems. Ultimately, Avista chose to purchase EIM software from two EIM vendors to leverage native integrations amongst the software suite and allow those systems to interface with CAISO applications directly. When necessary, Avista developed internal integrations with existing Avista software (ADSS, EIM MV90, PI, and Oracle Financials) and third-party variable energy resource forecast providers. Avista leadership determined this model was most ideal in limiting complexity and on-going maintenance costs. Therefore, use of the EIM software suite to maintain efficient market operations is most ideal. However, in the event that a portion of the EIM software suite were unavailable, and the degree to which it is unavailable, Avista personnel could manually submit some data through the CAISO web-based applications to continue market participation. This practice is not sustainable and doesn't allow for efficient operations or optimization. In addition, if the EIM software were completely unavailable, due to a software outage, network outage or non-compliant software, Avista would be unable to participate in the market for a period of time. In either event, hindering Avista's participation in the market will limit Avista's access to competitively-price power and limit Avista's ability to achieve the anticipated market benefits.

For each market release, the CAISO provides backward compatibility for two previous market release versions, thus giving Avista some flexibility in determining when an update is applied. In addition, the EIM software vendors also release upgrades independent of CAISO market releases that Avista will need to incorporate into the delivery cycle. The EIM software users will determine what updates are most critical and consider bundling updates in order to minimize the number of upgrades performed annually. While there is flexibility in determining when an upgrade can be applied, additional functionality and efficiencies may be lost by omitting recommended/required upgrades.

2.5 Include a timeline of when this work will be started and completed. Describe when the investments become used and useful to the customer, spend, and transfers to plant by year.

This is a program with discrete projects that will operate annually and Transfer to Plant (TTP) within that same year. There are times that a project may start in Q3/Q4 of one year and TTP the following year. Typically, application projects will TTP about 60 days prior to the project

completion date (based on the post implementation warranty period and the capture of trailing charges).

Ideally, large/complex projects will be segmented into smaller projects (phases) to avoid scope creep, budget overages, and ensure the work can be properly prioritized. The first phase of every project would be scoped at the Minimum Viable Product (MVP), and subsequent phases would be scoped accordingly, based on the next highest business priority after MVP. This also allows for more accurate Transfer to Plant forecasts.

2.6 Discuss how the proposed investment aligns with strategic vision, goals, objectives and mission statement of the organization.

In April of 2019, Avista announced its own clean energy goals that will transition the resource mix to 100 percent clean by 2045. Also in 2019, Washington State passed clean energy legislation that will drive additional renewable resources to be built in Avista's BAA to meet specific emission reduction requirements between 2030 and 2045. Any additional renewable resource integrated in Avista's service territory results in a reduction of hydro flexibility to follow these variable resources, and the EIM is the most efficient and cost effective way to provide the required flexible ramping capability.

2.7 Include why the requested amount above is considered a prudent investment, providing or attaching any supporting documentation. In addition, please explain how the investment prudency will be reviewed and re-evaluated throughout the project

Avista's EIM software systems are a necessity, as they provide essential functions to Avista. These vital systems require systematic upgrades and enhancements in order to maintain compatibility, reliability, address security vulnerabilities and ensure ongoing value is achieved from EIM participation. In addition, the updates must be applied and tested simultaneously across the platform and within the given upgrade timeframe to maintain market operations. This funding level will provide the appropriate technology and development to meet the periodic upgrades and enhancements, and is necessary to mitigate the risk of unsupported applications, security liability, and significantly higher costs as a result of the deferment of upgrades and enhancements.

The CAISO publishes quarterly EIM benefit statements for each Entity. The EIM Settlements team will shadow the CAISO calculations and contribute to Avista's benefits methodology for determining a counter-factual benefit statement. Although Avista has an estimated annual system benefit of $7.8 million (Section 1.4), Avista will update their investment cost analysis based on quarterly and annual benefit results. On-going investment in the EIM software suite is prudent, as it allows Avista to efficiently operate in the market, thus enabling Avista to achieve optimal market benefits.

2.8 Supplemental Information

2.8.1 Identify customers and stakeholders that interface with the business case

Delivery within the EIM Modernization & Operational Efficiency BC requires a partnership between Enterprise Technology (ET) and various business unit teams, including Power Supply,

System Operations, SCADA, GPSS, and the EIM Settlements team under Finance & Accounting. The Steering Committee members include BC Sponsors and Directors within ET, Power Supply, System Operations, GPSS, and Finance & Accounting.

The BC Owner works in conjunction with the ET Delivery Manager, ET Project Management Office (PMO), the Program Manager and subsequent Project Managers. The BC Owner is accountable and responsible for all BC related activities and assignments, and consults members of ET and the business to ensure a strong partnership and navigate project, funding and priority intricacies throughout the course of the budget year.

Avista internal stakeholders include: Power Supply, Transmission System Operations, SCADA, GPSS, Finance & Accounting, Distribution System Operations (PI), Risk, Network and Technology. Avista's primary external stakeholder is CAISO, however the EIM software vendors – PCI, Power Settlements and Itron – are also stakeholders.

2.8.2 Identify any related Business Cases

The EIM Modernization & Operational Efficiency Business Case is related to the EIM Program Business Case (2019-2022) that implemented the needed EIM application-technologies.

3.1 Steering Committee or Advisory Group Information

The EIM Modernization & Operational Efficiency Steering Committee members include BC Sponsors and Owners, and directors within Power Supply, System Operations, GPSS, Finance & Accounting and Enterprise Technology.

3.2 Provide and discuss the governance processes and people that will provide oversight

Delivery within the EIM Modernization & Operational Efficiency BC requires a partnership between Enterprise Technology (ET) and various business unit teams. This BC will be governed by the Technology Planning Group (TPG), the Integrated Oversight Committee (IOC), and Program/Project Steering Committees.

The Capital Planning Group (CPG), an independent body, establishes funding allocations for each BC across the enterprise. The TPG sets priority across the technology investment portfolio, balancing: strategic alignment, business value, and customer benefits, as driven by the strategic initiatives established by Avista leadership. The IOC evaluates and compares all of the application portfolio project priorities on a weekly basis, utilizing risk, capacity, and other situational factors to ensure each planned project is meeting critical milestones.

The BC is largely limited by the funding allocation and resource capacity (staff) to meet its goals. The funding is approved at the BC level by the CPG. The resource capacity constraint is generally managed by the TPG and the BC owner. Once the two constrains are established, the BC owner works with steering committee(s) to set project priority and sequencing over a five-year planning period, and is subject to additional funding changes as directed by the CPG.

3.3 How will decision-making, prioritization, and change requests be documented and monitored

As a software application project, prioritization is evaluated by the ET management team on a weekly basis through the IOC. Each program and project steering committee meets regularly and oversees scope, schedule and budget within their respective programs and projects and inform the BC owner of any changes needing escalation to the TPG or CPG for decision-making around resource or funding constraints.

Any changes in funding or scope are documented at the BC level, via Change Request document that is presented to the CPG on a monthly basis and evaluated by the CPG for approval.

Changes in scope, schedule, or budget are also documented through a 'Change Request' at the project level and reviewed and approved through a formal workflow process. All ET projects in this BC are managed through the PMO, which follows the Project Management Institute (PMI) standards. Projects initiate with a 'Charter' to begin the planning process. When planning is complete, a 'Project Management Plan (PMP)' is created and approved as the projects baseline for scope, schedule and budget. At the end of execution, an 'Approval to Go Live' is submitted and approved prior to implementation (Transfer to Plant). After the technology is in service and out of the warranty period, the Project Manager will hold a Lessons Learned, and subsequently submit an 'Approval to Close' prior to finishing the project. All Monitor and Control documentation and Change Requests are documented and stored to ensure a comprehensive audit trail.The undersigned acknowledge they have reviewed the EIM Modernization & Operational Efficiency Business Case and agree with the approach it presents. Significant changes to this will be coordinated with and approved by the undersigned or their designated representatives.

Signature:	Kelly Dengel	Date:	07/08/2021
Print Name:	Kelly Dengel		
Title:	EIM Program Manager		
Role:	Business Case Owner		

Signature:	Michael A Magruder	Date:	07/08/2021
Print Name:	Mike Magruder		
Title:	Director of Trans System Ops & Planning		
Role:	Business Case Sponsor		

Signature:		Date:	

Energy Imbalance Market Modernization & Operational Efficiency

Print Name:	Scott Kinney, Mike Magruder, Andy Vickers, Adam Munson, Hossein Nikdel, Jim Corder, Clay Storey
Title:	Dir of Power Supply; Dir of System Operations; Dir of Gen Prod Sub Support; Dir of Accounting; Dir of App & Sys Planning; Dir of IT; Dir of Security
Role:	Steering/Advisory Committee Review

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