BONNEVILLE POWER ADMINISTRATION

GRID Modernization

CLOSEOUT REPORT

July 2025

Department of Energy

Bonneville Power Administration
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In reply refer to: MTM-3

July 16, 2025

To Customers and Interested Parties:

The Bonneville Power Administration is proud to share the results of our Grid Modernization initiative after successfully completing dozens of projects designed to position the agency for success in an ever-changing landscape. BPA developed Grid Modernization in connection with the agency's 2018-2023 Strategic Plan, which balanced the need to modernize system operations and assets with the need to control costs and provide competitive rates.

Through a carefully sequenced body of work carried out over six years, the agency transformed BPA's commercial operations to enhance reliability and optimize performance across power and transmission functions. The result is a more reliable, flexible and efficient system operation.

Importantly, BPA completed this work under budget. With a total program budget from 2019-2023 of $62.5 million, BPA spent approximately $49.5 million on the execution of over 30 projects.

The benefits of Grid Modernization

Many of the projects in the Grid Modernization portfolio enabled BPA's participation in the Western Energy Imbalance Market and will allow the agency to leverage future market opportunities that could lower power costs for retail consumers.

Other projects improved the reliability of the electrical grid, reducing outages and enhancing overall service continuity.

Additionally, the portfolio provided greater real-time grid visibility. Through the use of cutting-edge technologies, such as smart meters and automated systems, this work enabled more efficient monitoring and management of electricity distribution.

Projects also enhanced data-driven decision-making by leveraging data analytics to inform grid operations, improving response times and operational efficiency. And lastly, by focusing on the importance of adaptable infrastructure, our Grid Modernization investments will support BPA's ability to meet changing needs in the future.

A new approach to program management

From the beginning of our Grid Modernization initiative, BPA recognized that such a large-scale undertaking with numerous project interdependencies would require an unprecedented level of cross-agency support and coordination. BPA created the Business Transformation Office in 2016 for this very purpose.

In addition to providing a central point of oversight, the BTO adopted a structured approach to program management, starting with thorough scoping and prioritization. The BTO also developed enterprise architecture practices that link business operations and processes with information technology, all while establishing a disciplined approach to change management.

Stakeholder engagement was also important to the successful execution of our Grid Modernization portfolio. Strong engagement from both the Power and Transmission business lines were key to execution success. In addition, through collaboration with various stakeholders, including utility customers and regulatory bodies, the agency aimed to ensure these modernization efforts met the needs of the communities BPA serves.

Looking ahead

Of the original 35 planned projects, three are still in the final stages of execution (expected to conclude by the end of 2028), two have been transferred to the business lines and the rest have been completed. BPA transferred the management of three longer-term projects and their associated costs to Power Services and Transmission Services, freeing up the BTO to take on the next portfolio of work, which includes day-ahead market implementation and Corporate Modernization. Additionally, BPA chose to transfer two projects from the Grid Modernization portfolio to Transmission Services: Real Time Operations Modernization, which aims to enhance visualization and situational awareness in control center locations and Wildfire Risk Modeling Tools, which will implement a real-time wildfire modeling tool once completed.

In alignment with its 2024-2028 Strategic Plan, BPA launched Corporate Modernization – a set of projects aimed to improve the efficiency, accuracy and flexibility of foundational internal business systems and processes. These enhancements will support our ability to deliver reliable, resilient and competitive power and transmission services as the electricity industry landscape continues to change.

Based on our experience managing the Grid Modernization portfolio, BPA is fine-tuning and standardizing our program management approach.

I'd like to thank the many members of BPA's workforce who worked tirelessly to achieve our Grid Modernization objectives. I also appreciate the engagement of stakeholders and partners who contributed to our success along the way.

On behalf of all of us at BPA, we look forward to working with you as we continue advancing market participation and take on other initiatives associated with our 2024-2028 Strategic Plan to preserve reliability, respond to changing customer needs, and strengthen grid resilience.

This closeout report provides a recap of the projects in the Grid Modernization Portfolio and shares the benefits gained and the lessons learned.

Sincerely,

Nita Zimmerman
Chief Business Transformation Officer

GRID Modernization

AUTOMATION IMPROVED ACCURACY ENHANCED VISIBILITY

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Acronyms

AEP – Agency Enterprise Portal

AGC – Automatic Generation Control

AMS – Agency Metering System

AOP – Automated Operations Planning

ATC – Available Transfer Capability

BAA – Balancing Authority Area

BTO – Business Transformation Office

CAISO – California Independent System Operator

CBC – Customer Billing Center

ETRM – Energy Trading and Risk Management

FCRPS – Federal Columbia River Power System

FCRTS – Federal Columbia River Transmission System

FGDM – Federal Data and Generation Dispatch Modernization

GM – Grid Modernization

IDID – Identify, Define, Integrate and Deliver

LRF – Load and Resource Forecasting

MCIT – Mission Critical Information Technology

MDC – Meter Data Collection

MDM – Meter Data Management

OMS – Outage Management System

PDCI – Pacific Direct Current Intertie

PRADA – Price and Dispatch Analysis

RAS – Remedial Action Scheme

RC – Reliability Coordinator

RQMD – Revenue quality meter data

WEIM – Western Energy Imbalance Market

Grid Modernization/Western Energy Imbalance Market Lessons Learned

In addition to the successes that came from the Grid Modernization and Western Energy Imbalance Market projects, there were several areas that could be improved. Through the analysis of hundreds of survey questions, meeting comments and general feedback, three key themes and major areas were identified that require attention before BPA begins new projects: processes, people and training. Within each area, BPA identified key feedback and actions, which the Business Transformation Office has implemented.

Processes

- The BTO's internal program management Identify, Define, Integrate, Deliver (IDID) process is overtasking and created duplicative work, presentations and reports.
- The process lacked policies and guidance on interaction with other work groups.
- The process lacked holistic identification of all project activities and requirements.
- There were expectations to incorporate constant changes without assistance.

BTO actions

- Moving forward, our goal is to minimize duplicative or non-value-added work as much where possible. New templates, job aids, and improved process clarity should address each element.
- ABTO Roles and Responsibilities document has been updated to clarify role assignments versus position descriptions and includes their interaction with others project members.
- Consistent alignment with the executive sponsor and committee members from impacted organizations, along with improved communications.
- The BTO has engaged a new, more holistic approach to the project intake process working with enterprise architecture to provide better project context for decision making, and transparency of all connected systems and stakeholders. This supports a more standardized approach to requirements and our process will ensure all project-related business processes will be mapped in the current state
- Integration of a standard change request process to document needs, facilitate collaborative feedback on impacts, and direct requests to decisions as quickly as possible.

People

- Not enough staff to manage workload and employee turnover.

- Staffing needs were not well assessed to manage real-time and operational issues.
- BPA staff were not involved in configuration development, which led to lack of service desk support post deployment.

BTO actions

- With any personnel issues, the BTO will work with appropriate managers to ensure transparency of risks and impacts by planning for turnover, accelerating integration of new project team members via standard onboarding process, and working with managers to ensure performance plans are reviewed in collaboration with employees for any large workload assignments.
- Continuous and crucial conversations between sponsors and managers around capacity management and schedule impacts are essential to project success.
- The BTO shall ensure stakeholders are verified and included where necessary. We're also standardizing BTO requirements, gathering and documenting all related business processes to the project which is intended to facilitate comprehensive identification and translation of pain points, risks and clear needs.

Training

- Poor training and inadequate knowledge transfer was present prior to going live.

BTO actions

- The BTO has incorporated and expanded a consistent change management approach with activities and resources into our project framework to reduce the risk of this happening.
- Consistent change management throughout the course of the project will also be the norm moving forward so that communications and training plans are created, validated and adhered to.

Agency Enterprise Portal (AEP 1A)

Completed 2022

The project modernizes BPA's online public and customer experience, delivering a supportable, flexible digital platform. It hosts BPA-produced content, provides secure access to customer-specific information and allows the exchange of customer-BPA information for the administering of BPA products and services for Power Services, Transmission Services, Energy Efficiency and Environment, Fish & Wildlife.

Why?

- This project leveraged BPA's online presence to deliver a modern, seamless and consistent portal interface improving customer service and satisfaction, improving information availability, information exchange and the reduction of transactional friction in doing business with BPA.
- The Enterprise Public Portal and Customer Portal were deemed inefficient and no longer met the expectations of our customers and BPA's business, nor did they have the ability to meet the requirements of the 21st Century Integrated Digital Experience Act.
- It aligns with BPA's information technology strategy of reducing maintenance costs and IT complexities by replacing customized end-of-life applications with a commercial solution designed to meet both the agency's and customers' needs.

Benefits

- Improves public and customer experience through a modernized and efficient website with one consistent experience.
- Provides workflows that facilitate two-way communication and access to business information, allowing for more efficient deployment of BPA resources.
- Improves reliability with new technology and vendor support and reduces the risk of system loss.
- Enhances system capabilities to meet future business and operational demands, including BPA's participation in the Western Energy Imbalance Market (WEIM) participation.

What Changed?

- Arigid taxonomy and search was replaced with dynamically focused content to specific audiences.
- Automated workflows allow customers to become self-managed users with faster response times.

- An integrated BPA approach provides greater system reliability.

Agency Enterprise Portal – Stabilization and Resiliency (AEP 1B)

Scheduled for completion in 2025

This project built on the foundation from Phase 1 to further improve the user experience with the Enterprise Public Portal and Customer Portal. While Phase 1 was limited to "like for like," this phase enhanced BPA's platform with additional resiliency and stabilization.

Why?

- The previous Agency Enterprise Portal solution was unstable and unreliable. BPA found a vendor for an architecture and design review of the current solution.
- Enhanced resiliency of the platform base was made to implement the recommended corrective actions from the site assessment.
- Improved system availability and recoverability were made because the previous deployed solution was unstable and recoverability was at risk due to single point of failure.

Benefits

- Increased BPA's ability to deliver value through a stable and efficient website.
- Improved reliability with technology and vendor support.
- Increased BPA staff efficiency for content delivery.

What Changed?

- A new content hub was created for a separated test environment to ensure better site availability.
- Improved error handling for better user experience.
- The system is more resilient and scalable due to system design improvements.

Agency Metering Replacement

Completed 2025

This project implemented a new Agency Metering System (AMS) that meets requirements for current and future business needs. AMS meets both BPA's Metering Services group and the agency's short-term and long-term meter data retrieval, meter data management, event tracking and reporting platform requirements.

Why?

- The project maximizes efficiencies regarding data retrieval and validation by increasing Revenue Quality Meter Data (RQMD) transparency, enhancing automation and improving accuracy of RQMD processes for downstream users.
- The project allowed BPA to confidently enter the WEIM by supporting customer billing, settlements and providing proof of physical meter accuracy, RQMD verification and data display for downstream customer use.
- Extensive custom code needed to be replaced with commercial off-the-shelf functionality. This was performed by assessing vendor options and business and integration requirements for future Metering Services work, Mission Critical Architecture and Architecture Team recommendations.

Benefits

- Expansion of metering services and capabilities allow BPA to meet current and future demand.
- The project supports BPA's participation in the WEIM and other grid modernization efforts.
- Increased reliability and customer service from the vendor.
- Improved business efficiency with detailed training for the Metering Services group by selected vendor.
- Reduction in revised bills and unmetered events using new automated validation routines.
- Reduced IT costs by reducing the amount of custom code in AMS.

What Changed?

- Metering Services' business processes are aligned with commercial off-the-shelf software.
- The new vendor meets current and future requirements of Metering Services.

Automatic Generation Control Modernization

Completed 2023

This project modernized the Automatic Generation Control (AGC) system to enable Power Services to market new products and services and improve communication and supportability within BPA, as well as between BPA, neighboring Balancing Authorities and Federal Columbia River Power System (FCRPS) generators.

Why?

- The project facilitates the capability to ensure AGC is compatible with California Independent System Operator (CAISO) processes and systems and enables AGC to receive and respond to signals from the Market Operator on a five-minute basis.
- Implements AGC dispatch improvements to enable high side control, high side dispatch aggregation and optimization of unit/plant control strategies for the benefit of BPA's customer.
- Implements Reserves Enhancements to enable BPA to optimize location, amount, type and priority of reserves while avoiding fish spill violations and increasing market opportunities.

Benefits

- Supports marketing of new products and services.
- Support BPA's ability to participate in the WEIM, other energy markets and overall grid modernization efforts.
- Improves communication within BPA and between BPA, neighboring Balancing Authorities and FCRPS generators.
- Improves how resources are operated.
- Increases system flexibility for how BPA holds and deploys reserves.

What Changed?

- Updated AGC system software.
- AGC is compatible with CAISO on a five-minute basis.
- Enhanced flexibility with reserve management.
- AGC dispatch disaggregates CAISO signals.
- Updated AGC visualizations for dispatchers, schedulers and generators allow for faster decision making.
- Optimized AGC processes and intra-business line operations.

Automated Operations Planning and Reliability Assessment

Scheduled for completion in 2028

This project enables the automation of case development to enhance and optimize the operation of BPA's transmission system. Incorporating real-time tools along with developing efficiencies within existing tools will improve visibility and situational awareness.

Why?

- Improves situational awareness in the operations horizon.
- Makes data-informed decisions using current and forecasted information to set total transmission capabilities and system operating limits.
- More accurately assess the stability of the transmission system to appropriately offer capacity to the market and prevent wide area instability.
- Increase efficiency in staff time and real-time tools.
- Enhances ability to compete in the WEIM using new tools and efficiencies to enhance BPA's competitiveness.

Benefits

- Automations allow study engineers to perform more studies with current staffing.
- Reduced margin in system operating limits and total transfer capability.
- Reduced study case set-up results in cases being done closer to real-time.
- Potential reduction of system operating limits exceedances.

What Changed?

- Curtailments are reduced with greater situational awareness.
- Reduced time to perform studies allows engineers to perform other tasks.
- Potential reliability issues are identified sooner and mitigated.

BPA Network Model

Completed 2023

This project improved the efficiency and accuracy of transmission modeling capabilities to enhance the production of consistent and reliable power flow, dynamic and real-time models to enable better planning, operational and commercial decisions.

Why?

- Produce consistent and reliable power flow, dynamic and real-time models to make more informed planning and operations decisions for the benefit of customers.
- Improve the efficiency and accuracy of BPA's modeling capabilities.

Benefits

- Increased visibility of transmission capacity.
- Enhanced transmission system reliability.

- Provides accurate understanding of the available capacity to sell to the market.
- Decreased time required to update the model when system changes occur.
- Decreased staff time spent on aligning models.

What Changed?

- Data alignment and consistent data management.
- Consistent and accurate way of modeling the power system for all users.

Concurrent Losses

Completed 2023

This project implemented systems and processes that allow BPA to recover, concurrent with customer's use of the transmission system, the losses of the power load that occurs on the Federal Columbia River Transmission System during the transmission of power from the point of generation to load.

Why?

- Addresses customers' requests to allow them to return concurrent losses without incurring capacity charges.
- Ensures BPA fully recovers costs and does not shift costs to other customers that do not benefit from a concurrent loss return service.
- Retires 168-hour loss return by moving most customers to another option (with the exception of legacy contracts).

Benefits

- Gives BPA access to energy and capacity used for delayed loss returns.
- Avoids BPA shifting costs to customers not using the concurrent service.
- Reduces administrative and software complexity by eliminating 168-hour loss return (with exception of legacy contracts).
- Customers can avoid incurring capacity costs.

What Changed?

- BPA offers only in-kind concurrent loss returns and financial loss returns (with exception of legacy contracts).
- New method/rate design encourages delivery of loss returns.

Customer Billing Center Replacement

Scheduled for completion in 2026

This project replaces the existing billing system that lost support in March 2022 and ensures BPA's ability to bill customers in support of BPA's participation in the WEIM.

Why?

- Optimizes organizational effectiveness by streamlining business processes between organizations to create operational efficiencies internally and better serve our customers.
- Aligns with the IT strategy to reduce costs and IT complexities moving away from our current highly customized platform.
- Prepares for ending system support in 2022 by upgrading or replacing the Customer Billing Center.

Benefits

- Reduces the risk of system downtime which can result in delayed response to customers and cash flow.
- Enables opportunities to consolidate systems and optimize business processes, as well as keep up with evolving customer billing needs.
- Supports BPA's participation in the WEIM and grid modernization efforts by looking for opportunities to consolidate business practices.
- Reduces the IT costs associated with maintaining customizations.

What's Changing?

- Automated processes increase productivity and position BPA for WEIM participation.
- Improved rate, contract and billing determinant inputs improve billing accuracy.
- Enhancements to user configurability increases efficiencies.

Data Analytics

Completed 2023

This project created the environment and capabilities, including architecture, toolsets, platforms, integrations, data models, and datasets that are flexible and extensible, to full enterprise level, using modern technology to meet evolving business information and customer needs.

Why?

- Enables subject matter experts to more efficiently and effectively access, correlate, integrate and analyze increasing amounts of data.
- Fosters data-driven insight, innovation and informed strategic decision making in a rapidly evolving energy industry.

Benefits

- Provides efficient access to a broad array of data through a robust suite of common tools.
- Fosters ground-level innovation with business line ownership of data management and the ability to leverage technical skills.
- Provides environment, data structure and integration components that are flexible and extensible to full enterprise level, using best-in-class technology.
- Increases revenue and reduces costs as data analytics are used to drive strategic decisions.

What Changed?

- Provides new flexible and scalable enterprise-level data analytics capabilities.
- A single source of truth for data users reduces the need for manual workarounds.
- Provides a consistent and accurate way of modeling the power system for all users.

Energy Trading and Risk Management

Completed 2020

This project created systems that capture and report surplus power sales transactions in energy markets to make system balancing purchases and market reserve services. It consolidated systems, reducing integration points and allowing enterprise level software to participate in the WEIM.

Why?

- The Enterprise Trading and Risk Management system supports BPA's Bulk Marketing, Transacting, Credit Risk, Contract Administration, Settlements and Technical Accounting.
- The previous trade management system was twelve years old and was no longer supported by the vendor.

Benefits

- Automated trade management includes efficient deal capture, trade validation, settlement, options implementation and timely and accurate reports.
- Enhances users' ability to conduct real-time monitoring of credit risk exposures.
- Improves integration with BPA upstream and downstream systems.

What Changed?

- Systems were consolidated and integration points reduced, moving BPA a step closer to enterprise level software for WEIM participation.
- Enhances the ability to conduct real-time monitoring of credit risk exposures including A/R, market to market against counter party position and credit limits.

Federal Data and Generation Dispatch Modernization

Completed 2023

This project optimized hydro system coordination decisions made based on data from federal projects through improving the timeliness, accuracy and dependability of project data shared between BPA, the Bureau of Reclamation and the U.S. Army Corps of Engineers.

Why?

- Data streams that arrive at BPA from multiple paths often don't match each other, leading to inefficient decision tools creating more conservative operations.
- Human error and intervention cause slowdowns. The goal is to remove duplicative work and streamline systems among FCRPS partners.
- Visibility into current and future hour operational limits is inadequate causing limited visibility into project-level parameters that impedes reliable operation of the FCRPS and creates uncertainty. This results in difficult reserve management, conservative operations, less than optimal system flexibility and less marketing capability.

Benefits

- Reduces station control error to improve grid reliability and system flexibility.
- Improves accuracy and timeliness of data shared between federal projects and BPA.
- Supports BPA's ability to participate in the WEIM and other energy markets.
- Improves communications by standardizing scheduling processes with federal partners.

What Changed?

- Efficient and timely processes exist for creating and updating schedules and project ramping.
- Standardized schedule formats and units across projects.
- Automated data transfers produce accurate data.

Load and Renewable Forecasting

Completed 2023

This project identifies and maps load forecast business processes and data transfers across BPA, identifies missing data that can be collected to reduce load uncertainty, answers load and renewable forecast questions needed for WEIM implementation and delivers an improved forecast of Power Service's load obligations.

Why?

- Uncertain water management caused by multiple, inconsistent forecasts was used across operations.
- Load uncertainty decreased BPA's ability to offer flexibility for marketing.
- An ineffective feedback loop for load forecasting improvements existed due to a lack of standardized use of load forecasts across BPA.
- BPA needed to decide which load and renewables forecasts to use to participate in the WEIM.

Benefits

- Additional marketing opportunities are created because of more precise water management.
- Reduced load uncertainty improves BPA's ability to operate efficiently.
- Improved forecasting facilitates WEIM participation by reducing settlement charges.

What Changed?

- BPA has a comprehensive understanding of needed forecast improvements.
- Forecasts are based entirely on quality hourly metered data updated within-day.
- Demand forecasts are aligned with CAISO's needs.
- The project created a comprehensive identification and mapping of business processes and data transfers.

Metering Review and Update

Transferred to Transmission Services and scheduled for completion in 2027

This project develops and implements an agency strategy to define metering requirements, improvements for generation, interchange and load sites. Additionally, it provides MDM meter reconfigurations and upgrades support participation in the WEIM.

Why?

- Builds certainty for Power Services and Transmission Services to maximize system benefits for the region by minimizing reservation of generation capacity for operational uncertainty.
- Builds certainty for BPA's metering asset management capabilities by validating and updating our inventory, assessing current and future needs based on business requirements and operational standards.
- Supports BPA's ability to participate in the WEIM or other markets with revenue quality metering to support billing, settlements and market operations.

Benefits

- Increases certainty of power to the transmission grid through energized high-side metering.
- Supports BPA's ability to participate in the WEIM, other energy market opportunities and overall grid modernization efforts.
- Supplies revenue quality meter data for billing and settlements to support our customers.
- Delivers agency-level communication, coordination and collaboration to enhance metering practices, procedures, policies and guidelines.

What Changed?

- Energizing high-side metering on the FCRPS (Grand Coulee, Chief Joseph, John Day, The Dalles, McNary, Lower Monumental, Lower Granite and Little Goose, Ice Harbor and Bonneville).
- Brings a focus on data governance and asset management across BPA in support of the agency metering strategy and WEIM or other market participation.

Mission Critical Information Technology Architecture

Completed 2020

This project established a capability to apply foundational principles and design patterns driven by business needs to IT processes, systems and people.

Why?

- Leverage industry best practices for people, processes and technology to operate more efficiently and effectively, scale as customer demands increase and better adapt as agency priorities change.
- Drive efficiency and reduce total cost of ownership by reducing system and support complexity, optimizing infrastructure and avoiding disparate technology patterns.

Benefits

- MCIT Architecture puts in place the right model for people, processes and technology to be able to scale as customer demands increase and adapt as agency priorities change.
- MCIT reduces architecture complexity, redundant infrastructure and disparate processes to drive efficiency and reduce total cost of ownership.

What Changed?

- Industry-specific technology architecture and practices guide MCIT modernization and served as a foundation for grid modernization projects.

Mission Critical Information Technology Infrastructure

Completed 2023

This project unifies the hardware, virtualization software and infrastructure services across data centers through a replacement of end-of-life, out-of-support infrastructure with Infrastructure as a Service services. This new MCIT infrastructure supports all mission critical applications and supports systems using best practices aligned with critical business systems services.

Why?

- Reduces capital costs through virtualization and a hyper-converged infrastructure to meet the business agility needs of the WEIM.
- Provides vision architecture capability by developing common, transferrable skill sets across IT organizations.
- Supports grid modernization operations and business agility through scalability of computing and storage.

- Provides greater flexibility through the standardization of services.
- Reduces complexity through adoption of MCIT Architecture.

Benefits

- Reduction of the overall footprint of BPA's Transmission Technology Services (TT) data centers.
- Virtualization of tools to save time when deploying new virtual servers.
- Standardization of processes and services.
- Reduction of operational overhead once systems migrate from legacy environment.

What Changed?

- New virtual data centers (private-like-public cloud) are in the Dittmer and Munro data centers.
- The new high-performing virtual infrastructure supports the application, integration, and process work required to achieve the benefits of the grid modernization portfolio.

Mission Critical Information Technology Integration

Completed 2020

This project implements an application integration capability, a platform and on-going service for MCIT system-to-system integrations to support the grid modernization program at BPA.

Why?

- Reduces complexities and inefficiencies in the management and support of the technology environment by minimizing the number of integration patterns and providing centralized visibility into data flow.
- Develops a managed approach to application integration by leveraging technology to simplify, standardize and improve the provisioning and support of application integrations.
- Develops the capability to provide integration as a service for consumption by the application service providers.

Benefits

- Enables reliable, secure and cost-effective integrations.

- Reduces manual, duplicative systems leading to cost and time savings.

What Changed?

- Cross-agency organizational team support.
- Simplified MCIT owned system to system integrations.

Mission Critical Information Technology Re-Platforming

Transferred to Transmission Services and scheduled for completion in 2027

This project aims to establish eligible Transmission Technology Services (TT) applications in the new virtual TT infrastructure consistent with the MCIT Technology architecture and informed by a Tenant model for TT applications by re-platforming them from their legacy computing environments.

Why?

- Modernizes TT applications by moving to the new virtual TT infrastructure consistent with the MCIT Technology architecture, specifically, "… establishing a modern, consistent and structured architecture with robust operational reliability."
- Better meets customer needs in a timely manner at lower costs and reduces the chance for compliance and security errors.
- Further BPA's IT strategy to lower operational and maintenance costs and complexity of systems to meet fast paced changes and new market opportunities.
- Increases sustainability of mission critical systems via removal of 'hardware obsolescence," in that hardware can be updated and maintained independent of changes to software and applications in the virtual computing environment.

Benefits

- Creates savings from operational efficiencies and modernization.
- Better meets customer needs.
- Optimizes performance, operation, reliability and support.

What Changed?

- Moving control centers into the virtual data center minimizes the need to support multiple environments.
- Moving to the MCIT virtual data center environment improves the ability to respond to fast-paced business changes and new market opportunities.

Mission Critical Information Technology Service Management

Completed 2020

This project defined and implemented a model for service management and matured services unified across BPA's Information Technology group and Transmission Technology Services group.

Why?

- Better accommodate customers, providers and leaders through a standardized framework in support of TT's goal of becoming more customer centric.
- Creates a foundational capability to enable delivery of the grid modernization portfolio as well as other TT and telecom projects.

Benefits

- Improves the predictability in the service fulfillment process.
- Creates an understanding of the costs of services to help prioritize, assess resource needs and create service level agreements.
- Increases TT customer satisfaction.

What Changed?

- Delivery of services across the grid modernization portfolio is based on an industry standard.
- A service catalog exists to request services.
- Compliance work is incorporated as a key part of service delivery.

One BPA Outage

Completed 2020

This project established an ongoing, cohesive, collaborative and transparent means for BPA to plan, evaluate and coordinate outages from the identification of a confirmed outage need through the outage completion. It developed improvements in outage prioritization; clarified and analyzed decision criteria and impact; synchronized timing and schedule; and increased outage visibility. It also established an Outage Governance process that facilitates ongoing, transparent, synchronized, cross agency outage analysis and assessment, and ensured decisions can be made when issues cannot be resolved by normal organizational level processes.

Why?

- Continually identifies the optimal timing for an outage need early and communicates outage probability to affected stakeholders.
- Resolves outage conflicts and assist in the identification of risk to outages.
- Develops a holistic and logically sequenced plan of upcoming work in a geographic location or location connection.
- Effectively plans, coordinates and executes work safely with minimum impact on the transmission system and customers during each proposed outage.

Benefits

- Creates more schedule certainty with fewer outage moves.
- Increases visibility of outages for early impact analysis and risk management.
- Improves collaboration (business-line integration) including feedback for continuous improvement.
- Increases lead time to manage risks and issues.
- Increases efficiency in use of resources (e.g. staff, budgets and equipment).
- Reduces risk of non-compliance.

What Changed?

- Shared outage operating agreements across agencies.
- Automated outage workflows and scheduling and streamlined data entry.
- Shared views and reporting of real-time outage data across agencies.

Outage Management System

Completed 2024

This project implements Sun-Net's iTOA software, an industry leader in OMS. BPA sought to improve process standardization and increase automation in outage submission, scheduling, coordination and reporting.

Additionally, it positioned BPA to effectively transition to the WEIM outage management coordination requirements.

Why?

- Increases efficiency through automation of manual processes and early outage request conflict resolution.

- Embraces industry standard tools that are able to keep pace with market changes and updated compliance requirements.
- Improves functional capability developed with industry experts coming together to share experience and challenges.
- Improves data accuracy and speed to enhance BPA's real-time situational analysis as well as compliance reporting.
- Establishes internal and external interfaces that allow BPA to confidently enter the WEIM if desired as well as potentially simplify the BPA architecture through elimination of redundant systems.

Benefits

- Operational efficiency
  - Process automation reduces redundant data entry and the potential of human error.
  - CIP moderate designation reduces operational expenses associated with maintaining technical compliance standards.
- Business decisions
  - Additional outage management analysis and reporting capabilities. Common views by user role enhance internal controls.
- Market responsiveness
  - Partnership with the vendor that can respond to market, reliability and safety changes to support over 60 utilities.

What Changed?

- Partnership with the vendor to determine an effective approach to satisfy reliability standard changes.
- Embracing out-of-box solutions reduced operations and maintenance costs long-term.
- Potential to simplify the system architecture.

Power Services Training Program

Completed 2020

This project developed and delivered a formal structured training curriculum using modern technology for Power Services generation scheduling and trading functions.

Why?

- Optimizes river management and financial decision capability for managing fuel supply to meet power/non-power constraints and ensure reliable power delivery to our customers.
- Meets regional, national and environmental regulatory requirements to ensure electrical reliability now and in the future.
- Improves accountability and align training for potential future training and job requirements.

Benefits

- Provides faster time to proficiency for new hires.
- Reduces training costs.
- Delivers consistent quality content and delivery.
- Aligns training with Department of Energy standards.
- Increased efficiency in training delivery.
- Increased staff retention and promotion.

What Changed?

- Training is standardized and effective.
- A dedicated training coordinator runs the program across Power Services.
- Forward looking training program includes industry changes and prepares staff.

Price and Dispatch Analysis

Completed 2023

This project creates a systematic analytical process for quantifying opportunity costs that reflects appropriate economic signals in all power planning and marketing decisions, resulting in optimal dispatch and marketing strategy, and limited unrecorded decision making.

Why?

- Creates a systematic, data-driven, and consistent application of economic signals for commercial and operational decisions to promote objectivity, consistency and transparency around valuing hydro resources.
- Improves baseline planned operations by removing default or legacy assumptions to improve marketing for net secondary revenue.

- Optimizes modeling by updating historical assumptions since economic patterns diverge from historical patterns and modeling based on historical assumptions will likely diverge from the optimum.

Benefits

- Improves the quality of BPA's planning models.
- Creates faster, more informed and consistent decision-making.
- Improves optimization of net secondary revenue consistent with agency risk tolerances.
- Allows for greater participation in emerging energy markets.

What Changed?

- Better models lead to fewer overrides.
- Automated processes allow for faster and more precise decision making.

Reliability Coordinator Decision, Planning and Execution

Completed 2021

This project orchestrated a seamless transition of reliability coordination service providers.

Why?

- CAISO announced that it would no longer take Reliability Coordinator services from Peak RC effective July 2019 and would become the RC for its balancing authority area. It also offered RC services to other Balancing Authorities and Transmission Operators in the Western Interconnection.
- BPA re-evaluated its choice of RCs based on reliability, governance and cost.
- Peak RC announced its intention to wind down operations in 2019. BPA announced the selection of CAISO for RC services.

Benefits

- Continued reliability by ensuring RC seams are managed and practices and policies meet or exceed required standards.
- Reduced ongoing costs.
- Continued compliance with North American Electric Reliability Corporation standards requiring each balancing authority/transmission operator to have a RC with a wide area view of the Bulk Electric System.

- Additional services, including forward system view (day-ahead and intra-day), 24-hour system analysis (vs peak hour) and look-ahead Real-time Contingency Analysis.
- Comprehensive outage coordination in all time horizons, a benefit BPA didn't get from Peak RC.

What Changed?

- Transition from Peak RC to RC West.
- Change from two reliability coordinators in Western Interconnection to four.
- System Operating Limit methodology was simplified to remove Max Total Transfer Capability.
- The RC now reviews outages in short, mid and long-range.
- The 45-day mid-range outage coordination deadline has been updated to a two-month mid-range outage coordination deadline to allow for the BPA outage study.
- Previously, there was no defined timeline to provide a viable post-contingency operating plan. There are now 30 minutes to provide viable post-contingency operating plan.

Remedial Action Scheme Automatic Arming

Completed 2021

This project automates the process of arming the most effective generation required to support the transmission capacity needed.

Why?

- Increases reliability by reducing arming errors, Remedial Action Scheme arming dead-bands, and arming requirements in real time.
- Delivers value by reducing or eliminating costs incurred from end customer outages, gen drop, mis-operations and cost of energy delivered.
- Maximizes benefits across flowgates and allows for more efficient and cost effective transmission dispatch.
- Enables modernization for a rapidly changing western grid including sub-hourly scheduling on the Pacific Direct Current Intertie and WEIM participation.

Benefits

- Optimizes power system capability while maintaining or improving reliability.

- Increases precision in arming for optimal generator tripping effectiveness.
- Reduces frequency and duration of generation arming and drop.

What Changed?

- RAS Arming is automated for normal operations reducing the dependency of manual arming.
- Arming is more precise.
- Arming automatically on real-time conditions allows for dynamic transfers and sub-hourly scheduling.

Short-Term Available Transfer Capability

Completed 2022

The project improves processes, provides transparency to customers and developed metrics related to Short-Term Available Transfer Capability. This includes creating clear accountability for inventory management, generating and using business metrics, automating data inputs and outputs and using better commercial modeling assumptions informed by risk tolerance.

Why?

- BPA committed to transparency and to communicate project scope and status with customers per the TC-20 Settlement Agreement.
- Improves Short-Term ATC accuracy and forecasting via process and system updates.

Benefits

- Fulfills TC-20 Settlement commitments.
- Establishes business metrics for Short-Term ATC.
- Provides clear ownership, responsibility and accountability for inventory management.
- Calibrated model assumptions are based on metrics and chosen risk tolerance.
- Potential increase in revenue from increased Short-Term ATC sales.
- Improved customer satisfaction with BPA's Short-Term ATC methodology.

What Changed?

- Created Short-Term ATC role clarity and accountability in Transmission Operations.

- Customers received updates on Short-Term ATC improvements.
- Automates data inputs and integrated powerflow outputs. Developed business metrics. Improved Short-Term ATC calculations.

Sub-Hourly Scheduling on the Pacific Direct Current Intertie

Transferred to Transmission Services

This project satisfies customer requests and potentially increases Transmission Services revenue by better responding to emerging energy markets through implementation of sub-hourly scheduling on the Pacific Direct Current Intertie.

Why?

- Satisfies customer transmission service requests for 15-minute scheduling on the PDCI and increases BPA revenue.
- Reduces risk of non-compliance with Federal Energy Regulatory Committee Order 764 which specifically calls out 15-minute scheduling on the PDCI. It also brings PDCI scheduling in-line with alternating current scheduling.
- Allows BPA to participate in the expected CAISO 15-minute and five-minute market enhancements.

Benefits

- Gains maximum flexibility regarding AC/DC transfers when AC and DC are both sub-hourly.
- Frees up Celilo operator time to focus on value added tasks.
- Increases Transmission Services sales revenue.
- Reduces curtailments.
- Eliminates manual processes to reduce the possibility of errors when scheduling frequency goes sub-hourly.
- Increases customer satisfaction as BPA is more responsive to customer requests for sub-hourly scheduling on the PDCI.
- Allows Transmission Services to capitalize on changes taking place in the WEIM.

What Changed?

- Power orders are electronically sent from Dispatch to Celilo.
- Scheduling on the PDCI occurs in 15-minute increments or less.
- Replica allows full testing off-line before production release to minimize risks to the PDCI.

Western Energy Imbalance Market Bid and Base Scheduling

Completed 2023

This project delivered the organizational and system capabilities required to allow BPA to bid participating resources and maintain base schedules for resources (participating and non-participating), interchange and WEIM transfers. This effort also synced with other grid modernization projects including Price and Dispatch Analysis, Load and Renewable Forecasting, Federal Data and Generation Dispatch Modernization and WEIM Real-Time Operations.

Why?

- Allows submittal of balancing authority area schedules to the WEIM for all generation, interchange and WEIM transfers in five-minute granularity.
- Allows submittal of bids to the WEIM to enable participating FCRPS resources to be awarded for dispatch to meet WEIM area imbalances, ultimately enhancing revenue.
- Meets power balance constraints by ensuring the balancing authority area has sufficient generation to fully cover its load and obligations.
- Ensures adequate capacity and flexibility is available for BPA to meet its operational obligations while participating in the WEIM.

Benefits

- BPA can meet market requirements for scheduling practices and ensure the market runs effectively.
- Enables efficiency in the WEIM.
- Leverages automation to drive process efficiency.
- Maximizes the value of BPA's resources by participating in the WEIM.

What Changed?

- The balancing authority assures balanced generation, load and interchange utilizing WEIM, Automatic Generation Control and Outage Management System.
- Real time hydraulic decisions are made in a timeframe that complies with WEIM data submission timeline.
- Base schedules are produced at the aggregate level and base points computed using distribution factors set by hydro duty schedulers.

Western Energy Imbalance Market-Real-Time Operations

Completed 2022

This project enabled Power Services and Transmission Services to dispatch participating resources every five minutes, inform the WEIM of real-time events and dynamically integrate market dispatches and interchange (e.g., WEIM transfer system resources) while continuing to ensure reliable operations of the grid.

Why?

- Enables WEIM participation and maintenance of transmission system reliability by ensuring BPA tools and processes effectively support market participation.
- Optimizes use of imbalance energy by ensuring that the market appropriately accommodates reliability constraints while dispatching economically-optimized imbalanced energy.
- Improves congestion relief efficiency by leveraging market resources to avoid running into constraints.

Benefits

- Leverages reliability benefits of security constrained market dispatches.
- Provides improved operational visibility for the BAA.
- Leverages automation to drive process efficiency.
- Maximizes the value of BPA's resources by participating in the WEIM.

What Changed?

- The market balances the BAA every five minutes through economic dispatch of offered resources. The BAA provides regulation between the five-minute dispatches.
- The WEIM proactively manages congestion on a five-minute basis. BPA maintains the ability to further manage real-time congestion through existing mechanisms.

Western Energy Imbalance Market Settlements Implementation

Completed 2024

This project developed a centralized settlement function through a phased approach with the capability to support successful processing of CAISO market settlements.

Why?

- Allows cost effective participation in the WEIM to contribute to BPA's successful participation in the WEIM.
- Establishes quality reporting of settlements for efficient and effective WEIM settlements and allocation capabilities.
- Continued improvements provide WEIM participation results as an input to WEIM marketing and operation optimization.

Benefits

- Maximizes the value of BPA's resources by participating in the WEIM.
- Improves the settlements process efficiencies through a centralized settlements capability and system.
- Enables holistic WEIM analytics and settlement validations based on the full understanding of data from WEIM marketing and operations.
- More accurate accounting of WEIM charges and credits delivered to customers.
- Enhances system capabilities to enable flexibility to meet future business demands, including WEIM participation.

What Changed?

- Adds WEIM Settlements to existing CAISO settlements.
- WEIM costs are allocated to BPA BAA customers.
- CAISO market settlements are phased into a centralized organization.

Western Energy Imbalance Market Testing Program

Completed 2024

This project implemented the structured and focused formal testing program required for BPA's WEIM participation. This included connectivity testing, integration testing, day-in-the-life testing, market simulation testing and parallel operations testing. The project created repeatable testing capability for long-term support of BPA's participation in WEIM.

Why?

- Provides operational assurance that all the base configuration data properly enables the market to run and that the interconnected systems, processes and actions effectively work together.

- Instills confidence that BPA has the ability to transact and operate in the market, while still carrying out BPA's obligations to customers and the region.
- Meets WEIM testing requirements demonstrating that BPA's implementation of WEIM systems and processes are operational and consistent with the CAISO's requirements.

Benefits

- Ensures systems and processes supporting BPA's participation in the WEIM function accurately, timely and consistently.
- Provide testing capability that meets CAISO's requirements, which were a prerequisite to join the WEIM.
- Provides permanent, repeatable end-to-end and regression testing capabilities.

What Changed?

- A project team was created to establish capabilities and to carry out the structured testing functions of the integrated WEIM data, systems and processes.
- Established the capability to conduct full-function WEIM integrated system and process testing capability that not only serves the immediate needs and requirements, but can also be used to support future WEIM system, data or process changes.

Western Energy Imbalance Market Training Program

Completed 2022

This project created a structured and coordinated approach to training BPA managers and staff involved in WEIM activities. The training included internal staff in Power Services and Transmission Services, staff from BPA's federal partners and BPA customers. It focused on providing the right amount of WEIM knowledge and skill for various roles and responsibilities in the market operation and engagement. The training also included mechanisms to retain and grow capabilities over time.

Why?

- Increases the likelihood of successful operation in the WEIM due to building the necessary skills and knowledge among staff executing impacted roles.
- Builds assurance with BPA managers, executives and customers that staff have the necessary knowledge and skill to perform their WEIM roles.

- Ensures a sufficient, coordinated delivery of training such that trainees will gain the necessary knowledge at the optimal time during the phased WEIM implementation.

Benefits

- Gives staff involved in WEIM more targeted, technical training to maximize market benefits.
- Prepares the workforce to achieve anticipated reliability and financial benefits.
- Improves decision making, communications and accountability across BPA through training and proficiency.

What Changed?

- Staff and leaders have deep knowledge in critical roles.
- Role specific training was documented for performing WEIM business functions, including on-boarding for new staff.
- Trainees and managers have a resource to understand the training they need to complete.