BONNEVILLE POWER ADMINISTRATION

# 35+ GRID Modernization

## PROJECT SUMMARIES

MAY 2020

Grid modernization projects support the implementation of BPA's strategic goals to modernize federal power and transmission system operations and supporting technology, and to provide competitive power and transmission products and services.

# 35+ GRID Modernization

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*For more information, visit www.bpa.gov/goto/gridmodernization.*
*Questions? Email gridmod@bpa.gov.*

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# Agency Enterprise Portal

The project modernizes BPA's online public and customer experience on the agency's website, delivering a supportable, flexible digital platform to meet customers' and visitors' needs. The website will host BPA-produced content, provide secure access to customer-specific information, and allow information exchange between customers and BPA necessary for managing Power, Transmission, Energy Efficiency and Environment, Fish & Wildlife products and services.

**WHY?**

**Improve BPA's online presence by delivering** a modern, seamless and consistent portal interface to improve customer service and satisfaction, improve information availability, information exchange and ease the process of doing business with BPA.

**Align with the expectations and needs of BPA's customer and the general public** while also meeting the requirements of the 21st Century Integrated Digital Experience Act.

**Align external website with BPA's internal IT strategy** of reducing maintenance costs and technical complexities by replacing highly customized applications with off-the-shelf solutions designed to meet the needs of customers, the public and the agency.

**WHAT ARE THE BENEFITS?**

- Improve public and customer experience when visiting BPA's external website through a modernized and efficient website.
- Facilitate two-way communication between BPA and website visitors with improved access to business information allowing for more efficient use of internal resources and a better experience for website users and customers.
- Improve website reliability from new technology and ongoing vendor support resulting in reduced IT costs.
- Enhance system capabilities to allow for industry changes, including Western Energy Imbalance Market participation.

**WHAT IS CHANGING FOR CUSTOMERS?**

A new modern digital customer experience when accessing customer-specific data and public information on BPA's Power, Transmission, Energy Efficiency and Environment, Fish & Wildlife products and services through the website.

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# Agency Metering System Replacement

The project implements a new agency metering system that will meet requirements for current and future business needs. The system will meet BPA's Metering Services requirements for short- and long-term meter data retrieval, meter data management, event tracking and reporting.

**WHY?**

**Maximize efficiencies regarding data retrieval and validation** by increasing revenue quality meter data transparency, enhancing automation and improving accuracy of RQMD processes for downstream users.

**Replace highly customized code with commercial off-the-shelf functionality** by assessing vendor options along with business and integration requirements for future metering work and in line with the Mission Critical IT Architecture project and its team recommendations.

**Allow BPA to effectively enter the Western Energy Imbalance Market** by supporting customer billing, settlements, RQMD verification and data availability for downstream users.

**WHAT ARE THE BENEFITS?**

- Expand Metering Services' capabilities to meet both current and future demands.
- Support BPA's participation in the EIM and other grid modernization efforts.
- Increase system reliability and customer service from enhanced vendor support.
- Improve business efficiency with specific training designed for all metering services staff led by the selected vendor.
- Reduce revised billing statements and unmetered events due to improved automated validation protocols.
- Reduce IT costs by reducing amount of custom code in AMS.

**WHAT IS CHANGING FOR CUSTOMERS?**

This system exemplifies the agency goal of buying off-the-shelf products with little to no customization outside the core system to simplify information technology infrastructure and meet evolving customer needs related to metering data, which will both meet customer needs and provide cost savings.

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# Automatic Generation Control Modernization

Automatic generation control regulates the power output of electric generators within a balancing authority area in response to changes in load, system frequency and other factors to maintain the scheduled system frequency and interchanges with other control areas. The project modernizes BPA's automatic generation control system to improve reliability, enable Power Services to market new products and services, and improve communication within BPA as well as between BPA, neighboring balancing authorities and Federal Columbia River Power System plant operators.

**WHY?**

**Ensure AGC is compatible** with California Independent System Operator processes and systems and enable AGC to receive and respond to signals from the market operator on a 5-minute basis.
**Implement AGC dispatch improvements** to enable high-side control and high-side dispatch aggregation to optimize the hydro system for our customer's benefit.
**Implement reserves enhancements** to optimize location, amount, type and priority of reserves while fulfilling operations for fish, including spill, and increasing market opportunities.

**WHAT ARE THE BENEFITS?**

- Improve efficiency of how resources are operated.
- Improve system flexibility for how BPA holds and deploys energy reserves.
- Enable marketing of new products and services.
- Support BPA's ability to participate in the Western Energy Imbalance Market, other energy markets and overall grid modernization efforts.
- Improve communication and transparency within BPA and between BPA, neighboring balancing authorities and FCRPS plant operators.

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# Automated Operations Planning and Reliability Assessment

The project enables the automation of case development in order to enhance and optimize the operation of BPA's transmission system. It incorporates real-time tools and develops efficiencies within existing tools which will improve visibility, situational awareness and reliability of the grid.

**WHY?**

**Improve situational awareness** to optimize short-term operations.
**Make data-informed decisions** using real-time and forecasted information to analyze total transmission capabilities and system operating limits.
**Increase visibility** into real-time conditions for assessing system operating limits.
**Increase staff efficiency** by improving real-time tools.

**WHAT ARE THE BENEFITS?**

- Automation allows study engineers to perform more studies with existing staffing.
- Optimize operations by reducing margin in system operating limits and total transfer capabilities.
- Reduce study case set-up time resulting in the ability to perform the required analysis closer to real-time.
- Review the potential to reduce system operating limits exceedances to allow more flexibility and more efficient use of the grid.
- Allow for more sophisticated analysis of system stability.

**WHAT IS CHANGING FOR CUSTOMERS?**

Improved reliability by identifying and mitigating issues more quickly and effectively. Total transmission capabilities and system operating limits should have less margin due to the ability to reassess closer to real-time.

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# BPA Network Model

The project improves the efficiency and accuracy of transmission modeling capabilities. It will enable BPA to consistently and reliably produce power flow, dynamic and real-time models in order to enable better planning, operational and commercial decisions.

**WHY?**

**Produce 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.

**WHAT ARE THE BENEFITS?**

- Increase visibility of transmission capacity.
- Enhance transmission system reliability.
- Improve accuracy of available surplus capacity to market.
- Decrease time required to update model when system changes occur.
- Reduce staff time spent on aligning models.

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# Customer Billing Center Replacement

The project replaces the existing billing system that will no longer be supported in March 2022 and ensures BPA's ability to bill customers to enable participation in the Western Energy Imbalance Market.

**WHY?**

**Improve agency operational efficiency** by streamlining internal business processes to better serve our customers.

**Align with IT strategy** to reduce cost and IT complexities by moving away from a highly customized software platform.

**Ensure seamless customer billing experience** by upgrading or replacing CBC ahead of March 2022.

**WHAT ARE THE BENEFITS?**

- Reduce the risk of system downtime which can result in delayed responses to customers and impacts cash flow.
- Enables consolidating systems and optimizing business processes as well as keeping up with evolving customer billing needs and industry changes.
- Support BPA's participation in the Western EIM and grid modernization efforts by looking for opportunities to improve efficiency of business practices.
- Reduce IT costs associated with software customizations.

**WHAT IS CHANGING FOR CUSTOMERS?**

Customers may see a change in the look of their bills but the new system should provide a seamless transition and experience for customers reviewing and paying their bills.

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# Data Analytics

The project creates the environment and capabilities, including architecture, toolsets, platforms, integrations, data models and datasets that are flexible and extensible enterprise-wide, using modern technology to meet evolving business information and customer needs.

**WHY?**

**Enable subject matter experts** to more efficiently and effectively access, correlate, integrate and analyze increasing amounts of data.

**Foster data-driven insight and innovation to inform strategic decision making** in a rapidly evolving energy industry through improved visibility.

**WHAT ARE THE BENEFITS?**

- Provide efficient access to a broad array of data through a robust suite of tools.
- Enable innovation within business lines through ownership of data management and the enhanced ability to leverage staff's technical skills.
- Provide new flexible and scalable environment, data structure and integration components across the agency using best-in-class technology.
- Increase revenue and reduce costs from improved data analytics used to inform strategic decisions.

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# EIM Bid and Base Scheduling

This project delivers the organizational and system capabilities required to allow BPA to bid participating resources into the Western Energy Imbalance Market and maintain base schedules for resources (both participating and non-participating), interchange and EIM transfers. This effort will require synchronization with other grid modernization projects including Price and Dispatch Analysis, Load and Renewable Forecasting, Federal Data and Generation Dispatch Modernization and EIM Real-Time Operations.

**WHY?**

**Submit balancing authority area schedules** to the EIM for all generation, interchange and EIM transfers hourly in 5-minute granularity.
**Submit bids to the EIM** to enable participating Federal Columbia River Power System resources to be awarded for dispatches to meet EIM area imbalances, ultimately enhancing revenue.
**Meet power balance constraints** by ensuring the BAA has sufficient generation to fully cover its load and obligations.

**WHAT ARE THE BENEFITS?**

- Maximize the value of BPA's resources by participating in the EIM.
- Meet new market requirements for scheduling practices and ensure market runs effectively.
- Ensure efficiency in the EIM.
- Leverage automation to improve internal process efficiency.

**WHAT IS CHANGING FOR CUSTOMERS**

Customers within BPA's balancing authority area may see new data requirements based on decisions made in the BP/EIM/TC stakeholder process regarding topics such as resource sufficiency and transmission network usage.

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# Energy Imbalance Market Real-Time Operations

This project enables BPA's power and transmission operations to dispatch participating resources every five minutes, inform the Western Energy Imbalance market of real-time events and dynamically integrate market dispatches and interchange (e.g., EIM transfer system resources) while continuing to ensure reliable operations of the grid.

**WHY?**

**Enable EIM participation and maintain transmission system reliability** by ensuring BPA tools and processes effectively support market participation.
**Optimize use of imbalance energy** by ensuring that the market appropriately accommodates reliability constraints while dispatching economically-optimized imbalanced energy.
**Improve congestion relief efficiency** by leveraging market resources to avoid running into constraints.

**WHAT ARE THE BENEFITS?**

- Leverage reliability benefits of security-constrained market dispatches.
- Provide improved operational visibility for the balancing authority area.
- Leverage automation to drive process efficiency.
- Maximize the value of BPA's resources by participating in the EIM.

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# Energy Imbalance Market Settlements Implementation

The project develops a centralized settlement function through a phased approach with the capability to support successful processing of California Independent System Operator market settlements. In the Western Energy Imbalance Market, BPA will be charged or credited by the California ISO depending on the results of market bids and awards and how it responds to signals sent by the market operator. BPA must validate the meter data being used to determine these settlement charges and have a function that can dispute market settlements if it determines there is an error or discrepancy.

**WHY?**

**Allow BPA's cost-effective participation in the EIM** by automatically finding low-cost energy to serve real-time consumer demand across a wide geographic area. Joining the EIM could potentially result in increased value for the flexibility obtained from the federal hydropower system and other Northwest generators as well as improve congestion management.

**Create quality reporting of EIM settlements** and allocation capabilities that conform to California ISO requirements.

**Improve capturing EIM participation results** to serve as an input to optimize BPA's EIM marketing and operations.

**WHAT ARE THE BENEFITS?**

- Improve and automate, where possible, settlements processes through a centralized settlements system and function.
- Enable holistic EIM analytics and settlement validations to make better informed market participation decisions, resulting from increased visibility of EIM marketing and operations.
- Enhance system capabilities to increase flexibility to meet future needs of customers and industry changes.
- Maximize the value of BPA's resources by supporting participation in the EIM.

**WHAT IS CHANGING FOR CUSTOMERS**

The EIM settlements software will provide visibility to any backup documentation for EIM charges and credits. Through the BP/EIM/TC stakeholder process, the EIM charge code allocation policy team is evaluating sub-allocation of charge codes to customers and the potential impacts to customers. Depending on the outcome of the process, customers could see changes like new line items on customer bills.

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# Federal Data and Generation Dispatch Modernization

The project improves BPA's ability to optimize hydro system operations by 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?**

**Enable BPA's federal partners to provide more consistent and accurate data streams** to support improved hydropower operations decision making.
**Streamline systems and remove duplicative processes** to reduce human error and time-intensity.
**Enhance visibility into project-specific operating parameters and current and future hour operational limits** to create more certainty around reserves management and optimize operations, system flexibility and marketing capability.

**WHAT ARE THE BENEFITS?**

- Reduce station control error to improve grid reliability and system flexibility.
- Improve accuracy and timeliness of data shared between federal projects and BPA.
- Support BPA's ability to participate in the Western Energy Imbalance Market and other energy markets.
- Improve communications, transparency and visibility by standardizing scheduling processes with federal partners.

**WHAT IS CHANGING FOR CUSTOMERS?**

Slice customers will see more accurate data in the Slice computer application.

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# Load and Renewable Forecasting

The project identifies and maps load forecast processes and data transfers across BPA, identifies missing data that can be collected to reduce load uncertainty, answers load and renewable forecast questions necessary for Western Energy Imbalance Market implementation, and identifies forecast improvements.

**WHY?**

**Reduce uncertainties in water management** by creating more accurate, consistent forecasts used across power and transmission operations.
**Reduce load uncertainty** to increase BPA's ability to offer flexibility for new marketing opportunities.
**Create a more effective feedback loop for load forecasting improvements** by standardizing uses of load forecasts across BPA.
**Support strategic decision-making on load and renewables forecasts to use** to participate in the EIM.

**WHAT ARE THE BENEFITS?**

- Increase marketing opportunities through more precise water management.
- Reduce load uncertainty and increase visibility to improve efficiency of operations in the short-term and real-time horizons.
- Improve forecasting accuracy to reduce EIM settlement charges that could occur due to inaccurate forecasts.

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# Metering Review and Update

The project develops and implements an agency strategy to update current metering requirements and improvements for generation, interchange and load sites. These requirements and recommended upgrades also support participation in the Western Energy Imbalance Market.

**WHY?**

**Build certainty for Power Services and Transmission Services** to maximize system benefits for the region by minimizing generation capacity held for operational uncertainty through enhanced visibility and accuracy.

**Improve BPA's metering asset management capabilities** by validating and updating the meter inventory as well as assessing current and future needs based on business requirements, industry changes and operational standards.

**Support BPA's ability to participate in the EIM** or other markets with revenue quality metering that supports effective billing, settlements and market operations.

**WHAT ARE THE BENEFITS?**

- Increase certainty of power operations and transmission grid capabilities through improved metering visibility and accuracy.
- Supply revenue quality meter data for billing and settlements to provide a consistent customer experience.
- Support BPA's overall grid modernization efforts and the ability to participate in the EIM and other energy market opportunities.
- Enhance metering practices, procedures, policies and guidelines through cross-agency communication, coordination and collaboration.

**WHAT IS CHANGING FOR CUSTOMERS?**

Customers will not see a change in their load "revenue-only" meters or the technical requirements for load metering. However, the inventory will validate existing metering information for more robust asset management.

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# Mission Critical Information Technology Architecture

The project uses business drivers to inform the structure of IT services and systems. It establishes a capability to apply foundational principles and design patterns driven by business needs to IT processes, systems and people across the agency.

**WHY?**

**Implement industry best practices for people, processes and technology** to operate more efficiently and effectively, adapt to industry changes, scale up to meet customer needs, and quickly adopt changes to agency priorities.

**Drive efficiency and reduce total cost of ownership** by reducing system and support complexity, optimizing infrastructure and avoiding disparate technology patterns

**WHAT ARE THE BENEFITS?**

- Implement the right model for people, processes and technology that is able to scale as customer needs change and adapt as agency priorities change.
- Reduce software architecture complexity, redundant infrastructure and disparate processes to drive efficiency and reduce total costs.
- Guides MCIT modernization and serves as a foundation for grid modernization projects that are critical business systems.

***WHAT IS MISSION CRITICAL INFORMATION TECHNOLOGY?***

*The MCIT program includes a collection of five projects that seek to modernize control center systems in order to improve effectiveness and efficiencies and better position BPA to participate in existing and emerging markets. The MCIT projects include: Architecture, Infrastructure, Integration, Re-Platforming and Service Management.*

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# Mission Critical Information Technology Infrastructure

The project builds a new, modern high-performing computing environment that is more efficient to operate, provides more processing power and simplifies the environment for software. It unifies the hardware, virtualization software and infrastructure services across data centers through replacing end-of-life, no-longer-supported infrastructure with updated technology and systems. This new infrastructure will support all mission critical applications and supporting processes using industry best practices and state-of-the-art technology.

**WHY?**

**Reduce capital costs through creation of new virtual datacenters** to meet the business needs of participating in the Western Energy Imbalance Market.
**Provide vision architecture capability** by developing universal, transferrable skill sets across IT organizations.
**Support grid modernization operations and business agility** through scalability of computing and digital storage.
**Provide greater flexibility** through the standardization of services.
**Reduce complexity through** adoption of MCIT Architecture.

**WHAT ARE THE BENEFITS?**

- Reduce the overall footprint of Transmission Technology data centers.
- Automate deployment of virtual servers and associated tools across BPA's mission-critical private cloud.
- Standardize processes and services across mission critical systems.
- Reduce operational overhead costs as systems migrate from legacy environment to the new MCIT environment.

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# Mission Critical Information Technology Integration

The project implements an application integration capability, a platform and ongoing service for Mission Critical Information Technology system-to-system integrations to support the grid modernization program at BPA.

**WHY?**

**Reduce IT integration complexities and inefficiencies** by minimizing the number of integration patterns and providing centralized visibility into data flow.
**Develop a managed, strategic approach to application integration** by leveraging technology to simplify, standardize and improve the provisioning and support of application integrations.
**Mature capability to provide integration as a service** for application service providers.

**WHAT ARE THE BENEFITS?**

- Enable reliable, secure and cost-effective integration of IT applications.
- Save on IT costs and staff time by reducing manual, duplicative systems.

***WHAT IS MISSION CRITICAL INFORMATION TECHNOLOGY?***

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# Mission Critical Information Technology Re-Platforming

The project moves eligible transmission technology applications from legacy computing environments to a new virtual data center enviornment in alignment with MCIT Architecture.

**WHY?**

**Modernize transmission technology applications** by updating to a new virtual infrastructure consistent with MCIT Architecture to establish a modern and structured architecture with robust operational reliability.

**Better meet customers' changing needs** in a timely manner at lower costs while improving compliance and security.

**Reduce operational and maintenance costs** by minimizing complexity of systems and enabling responsive changes for realizing new market opportunities.

**Increase reliability and sustainability of MCIT systems** by enhancing hardware to enable updates and maintenance independent of changes to software and applications in the virtual computing environment.

**WHAT ARE THE BENEFITS?**

- Cost savings from improved operational efficiencies and modernization of IT systems.
- Optimize performance, operation, reliability and support of IT applications and services.
- Improve the ability to respond to business changes and new market opportunities to better meet customer needs.

***WHAT IS MISSION CRITICAL INFORMATION TECHNOLOGY?***

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# Mission Critical Information Technology Service Management

The project implements and defines a model for service management that will provide strategy, framework and governance for service delivery across IT and Transmission Technology.

**WHY?**

**Better accommodate internal customers and service providers through a standardized framework** becoming more customer-centric while meeting industry and compliance standards.
**Create a foundational capability to enable delivery of the grid modernization portfolio** as well as other critical projects.

**WHAT ARE THE BENEFITS?**

- Improve predictability in the service fulfillment process.
- Prioritize, assess resource needs and create service-level agreements through a better understanding of service costs.

***WHAT IS MISSION CRITICAL INFORMATION TECHNOLOGY?***

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# Outage Management System

The project implements an industry leader's software designed for outage management systems. The system will standardize processes and increase automation of outage submissions, scheduling, coordination and reporting. OMS will also position BPA to effectively transition to the Western Energy Imbalance Market outage management coordination requirements.

**WHY?**

**Increase efficiency** through automation of manual processes and proactive outage request conflict resolution.
**Implement industry standard tools** that are able to keep pace with market changes and compliance requirements.
**Improve functional capability** by collaborating with industry experts to share experience on both opportunities and challenges.
**Improve data accuracy and speed** to enhance BPA's real-time situational analysis for strategic decision-making and to ensure appropriate compliance reporting.
**Establish internal and external interfaces** that allow BPA to effectively enter the EIM while simplifying the agency's IT architecture by consolidating systems.

**WHAT ARE THE BENEFITS?**

- Improve operational efficiency and accuracy by automating business processes, which will eliminate redundant data entry and the potential of human error.
- Provide additional outage management analysis and reporting capability to better inform business decisions.
- Enhance common views by user role which will also support internal controls.
- Increase market responsiveness through a vendor partnership allowing continual adjustments to incorporate market, reliability and safety changes.

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# Power Services Training Program

The project develops and delivers a formal, standardized training curriculum for Power Services' day-ahead and hourly generation scheduling, planning, trading and transmisison scheduling functions. This provides an effective, repeatable and efficient approach to training.

**WHY?**

**Optimize river management and financial decision-making capabilities** for managing fuel supply to meet power and non-power constraints and ensure reliable power delivery to customers.
**Ensure electrical reliability now and in the future** by meeting changing regional, national and environmental regulatory requirements.
**Improve the quality and the speed of training required** to meet existing and future training and job requirements due to market or industry changes.

**WHAT ARE THE BENEFITS?**

- Reduce training costs and time.
- Improve quality of training provided to existing and new staff to retain or become proficient in their jobs.
- Provide consistent, high-quality content and delivery while aligning with Department of Energy standards.

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# Price and Dispatch Analysis

The project creates a systematic analytical process for quantifying opportunity costs that reflect appropriate economic signals in all power planning and marketing decisions, resulting in optimal dispatch and marketing strategy, and improved documentation of decision-making.

**WHY?**

**Create a systematic, data-driven and consistent application of economic signals for commercial and operational decisions** to promote objectivity, consistency and transparency in valuing hydro resources.

**Improve baseline planned operations by removing default or legacy assumptions** to improve marketing for net secondary revenue.

**Optimize modeling by updating historical assumptions** to capture divergence in economic patterns and improve accuracy of modeling results.

**WHAT ARE THE BENEFITS?**

- Improve quality of BPA's planning models.
- Enable faster, more informed and consistent decision-making.
- Increase net secondary revenue consistent with agency risk tolerances.
- Provide greater opportunity to participate in emerging energy markets.

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# Real-Time Operations Modernization

The project modernizes BPA's power and transmission operations by increasing visibility and situational awareness.

**WHY?**

**Increased visibility allows for more proactive decisions at control centers** by leveraging BPA's vast amount of data.
**Decrease the amount of time to mine data to make operational decisions** in order to operate the federal power and transmission system closer to its limits while maintaining reliability for customers.
**Create a common platform for BPA real-time operations** to enable more efficient discussions of operational issues across multiple locations, organizations and business lines.

**WHAT ARE THE BENEFITS?**

- Communicate more easily and reliably amongst control centers in real-time, resulting in more efficient and informed decisions.
- Improve staff efficiency and accuracy when conducting real-time operations.
- Provide clearer visualizations which will allow for more simplified and strategic decision making.

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# Reliability Coordinator Decision, Planning and Execution

The project provides a seamless transition of reliability coordination service providers to ensure stability of the grid and reduce the risk of outages.

**WHY?**

**California Independent System Operator announced that it would no longer take RC 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 evaluated its choice of RCs** on three criteria; reliability, governance and cost.

**After Peak RC announced its intention to wind down operations in 2019,** BPA announced the selection of California ISO for RC services.

**WHAT ARE THE BENEFITS?**

- Continued reliability by ensuring RC seams are managed and practices and policies meet or exceed required standards.
- Continued compliance with North American Electricity Reliability Corporation standards which require each balancing authority/transmission operator to have a reliability coordinator with a wide area view of the bulk electric system.
- Additional services are provided by RC West including forward system (day-head and intra-day), 24-hour system analysis and look-ahead real-time contingency analysis.
- Comprehensive outage coordination in all time horizons.
- Reduce ongoing costs.

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# Remedial Action Scheme Automatic Arming

A remedial action scheme is a set of fast, automatic control actions used to ensure acceptable power system operation in protecting the system against cascading outages or other major system disturbances. The project automates the process of arming the most effective generation required to support the transmission capacity needed.

**WHY?**

**Increase reliability** by reducing arming errors, increase RAS arming precision and optimizing arming requirements in real-time.
**Reduce or eliminate costs** incurred from outages, generation drop or other service interruptions.
**Maximize benefits** across flow gates and allow for faster and more cost-effective transmission dispatches.
**Enable modernization** for a rapidly changing Western grid including sub-hourly scheduling on the Pacific Direct Current Intertie and Western Energy Imbalance Market.

**WHAT ARE THE BENEFITS?**

- Optimize power system capability while improving reliability.
- Increase precision in arming for optimal generator tripping effectiveness, reducing outage time.
- Reduce frequency and duration of generation arming and drop to minimize impacts to customers.

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# Short-Term Available Transfer Capability

The project improves processes, provides transparency to customers and develops metrics related to ST ATC. This includes automating data inputs and outputs, using better commercial modeling assumptions informed by risk tolerance, creating clear accountability for inventory management, and generating and using robust internal metrics.

**WHY?**

**Improve transparency on the ST ATC methodology** through ongoing communication with customers of the project scope and status per the TC-20 Settlement Agreement.

**Improve short-term available transfer capability accuracy and forecasting** via process and system updates.

**WHAT ARE THE BENEFITS?**

- Improve the accuracy, frequency and transparency of BPA's ATC calculation.
- Appropriately weigh system reliability with capacity offered to the market.
- Establish business metrics for ST ATC.
- Set clear ownership, responsibility and accountability for inventory management.
- Potential increase in revenue due to risk-informed ST ATC.
- Improve customer satisfaction with BPA's ST ATC methodology and meet TC-20 Settlement commitments.

**WHAT IS CHANGING FOR CUSTOMERS?**

BPA is holding a series of workshops to provide regular updates on the ST ATC project. More details are available at www.bpa.gov/transmission/CustomerInvolvement/TC20Implementation/Pages/Meetings.aspx.

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# Sub-Hourly Scheduling on the Pacific Direct Current Intertie

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

**WHY?**

**Satisfy customer transmission service requests** for 15-minute scheduling on the Pacific Direct Current Intertie which could increase revenue.
**Ensure compliance** with FERC Order 764 that requires 15-minute scheduling on the PDCI while aligning PDCI scheduling with alternating current scheduling.
**Enable BPA to more effectively participate** in the expected California Independent System Operator 15-minute and 5-minute energy markets.

**WHAT ARE THE BENEFITS?**

- Improve system flexibility for alternate current/direct current transfers under sub-hourly scheduling.
- Reduce time spent scheduling for Celilo operators, allowing more time to focus on other value-added tasks.
- Increase Transmission Services revenue.
- Minimize impacts to customers by reducing curtailments.
- Reduce scheduling errors by eliminating manual processes.
- Increase customer satisfaction through better responsiveness to customer requests for sub-hourly scheduling on the PDCI.
- Enable new transmission opportunities resulting from industry changes or markets, including the Western Energy Imbalance Market.

**WHAT IS CHANGING FOR CUSTOMERS?**

Customers will be able to take advantage of sub-hourly scheduling on the PDCI.