

CUSTOMER

WINTER 2018

Circuit

WESTERN AREA POWER ADMINISTRATION

2018 State of WAPA's Assets

inside

2 Administrator's letter

4 State of Operations

11 Water and Power

13 2018: In the Works
Resilience through security
Balances in asset investments, risks
Financial planning answers



A LETTER FROM THE ADMINISTRATOR AND CEO

March 2018

Approaching my fifth anniversary as administrator and CEO, I am so proud of what WAPA has done to continue our 40-year history of bringing low-cost, clean, renewable hydropower to more than 40 million Americans across our 15-state region. The hydropower and transmission resources continue to offer great value, grid security and reliability to customers and the nation.

The electric utility industry is changing rapidly, and while our critical and noble mission remains the same, our role continues to evolve. As envisioned by our Strategic Roadmap, we have seen dramatic changes in how power is being generated and delivered throughout the utility industry. For example, the Southwest Power Pool market saw three wind- and renewable-generation-related records, Dec. 4, 2017:

- Wind generation hit 13,271 megawatts, serving 56.25 percent of SPP's load.
- Total renewable penetration hit 58.23 percent.
- Peak wind generation hit 13,588 megawatts.

These SPP records are examples of the dynamics that are changing the way utilities think about operating and running their businesses. We must not only keep pace with the changes, but anticipate them and plan accordingly. We must be laser focused on both delivering our mission today and preparing for the future.

We must evolve.

Making the difference in 2018

Valuable service, partnership, inclusion and innovation will be the hallmarks of the future. This year's State of the Assets illustrates how we are helping ourselves and customers in 2018 continue to strike the balance between the needs of today and the goals of tomorrow by:

- **Continuing our powerful partnerships:** Working with our customers who provide more than 90 percent of our funding, we have focused 10-year plans for capital programs allowing us to build and maintain a reliable, affordable system.
- **Developing public-private partnerships:** Also known as "P3 projects," these mutually beneficial partnerships leverage the strengths and benefits of bringing public and private organizations together in developing and modernizing infrastructure. In 2018, WAPA has a few P3 projects it is working on at a regional level, such as the San Luis Transmission Project in northern California.

**MY STAFF AND I ARE
COMMITTED TO BUSINESS
EXCELLENCE
AND EVOLVING OUR
SERVICES TO...
SERVE LIKE OUR LIGHTS
DEPEND ON IT.**

- **Inspiring innovation:** In July, WAPA will hold its third Inclusion, Innovation and Technology Summit. Focused on the theme “Creating a Culture of Innovation.” The event will celebrate our employee accomplishments in devising new technology and tools, fostering an inclusive and diverse environment and other achievements that propel us forward.
- **Strengthening budget insights:** Building upon years of executed budgets and work plans, we will leverage this financial information and couple it with cost-side planning to maximize the funds we have available for critical projects that serve our customers. This also supports WAPA’s ongoing transparency efforts.
- **Furthering the conversation:** Partnership with customers is at the center of everything we do. In 2018, we will continue our discussions with customers about what’s happening within the electric utility industry and other global changes that impact the utility space, such as Artificial Intelligence.

My staff and I are committed to business excellence and evolving our services to meet your needs. We are here for you, our customers.

Together, we help provide power to communities that would not otherwise have affordable access to electricity. We help generate economic growth in communities that do not have other competitive advantages. We help businesses afford to stay afloat, which keeps people employed and families thriving.

This is who we are and it is reflected in our core value to serve like our lights depend on it.



Mark A. Gabriel
Administrator and CEO

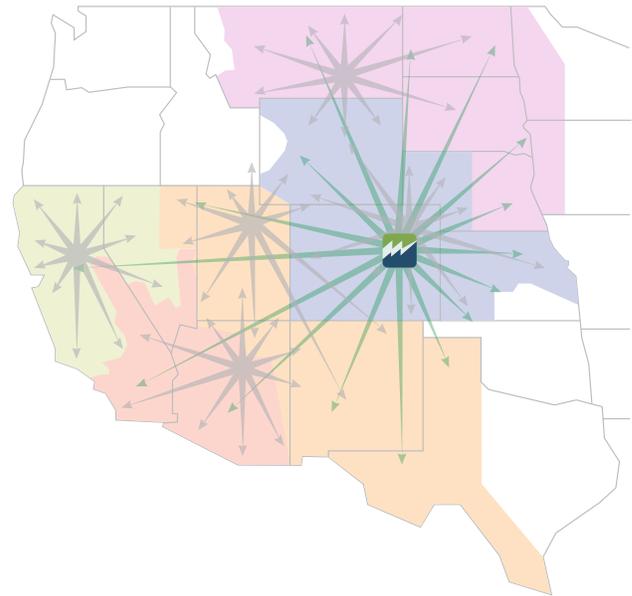


WAPA's Headquarters office (Photo by Travis Weger)

WAPA operates a distributed business model with the organization's various functions spread throughout a 15-state, 1.4-million-square-mile territory. Located in Lakewood, Colorado, WAPA's Headquarters serves many diverse customers, ranging from Congress to Native American power customers, special interest groups and WAPA's regional offices. HQ is home base for WAPA's administrator and CEO, as well as the organization's legal, public affairs, administrative, operating, engineering, finance, information technology and economic impact and diversity functions.

Within these functions, the organization accomplishes the "behind-the-scenes," WAPA-wide work to ensure it fulfills the needs of more than 700 firm electric service utility customers, who then provide electricity to more than 40 million people in the West. This work includes representing WAPA in Washington, D.C., conducting public meetings, managing finances, focusing on employee safety, system security and reliability, designing and maintaining facilities for the power systems and supporting renewable resources and environmental protection.

WAPA is continuing to assess its performance to make improvements that match the commitment to being a more efficient and effective organization. In 2018, the Internal Audit and Compliance Office is conducting audits of WAPA's inventory of operating materials and supplies,



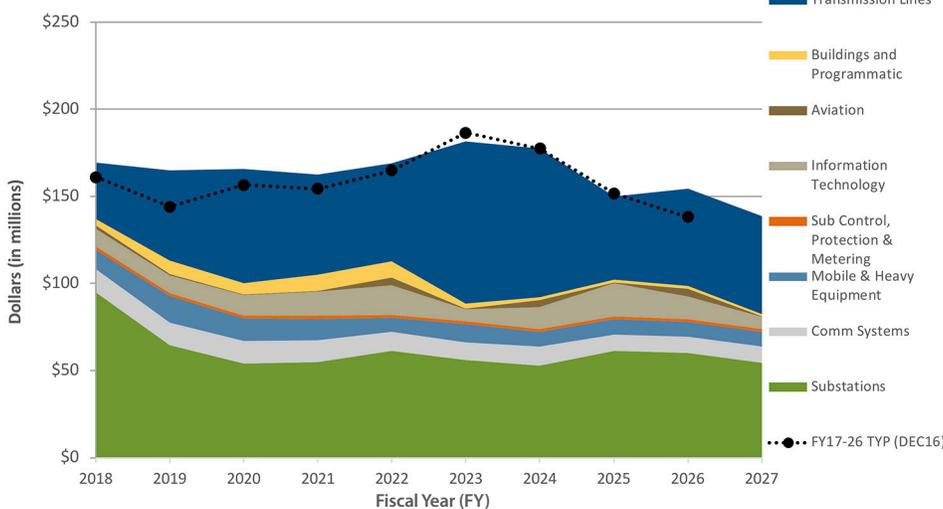
charge card transactions and the costs of relocating employees from one official duty station to another. Staff also anticipates initiating an audit of WAPA's project management program and processes.

Additionally, WAPA is exploring a structural change for the myriad programs reporting to the Chief Operating Officer. This realignment will move administrative functions under an Office of the Chief Administrative Officer. The effort will best

leverage the current staffing levels to more effectively focus on the specific priorities for both operating and administrative functions.

In 2018, WAPA will also implement a single, secure software solution for the Power Repayment Study. The software replaces outdated work processes with a reliable, transparent means to calculate rates and track repayment for the rate-setting systems that support WAPA's power and transmission projects. By consolidating and automating this necessary tool that still

WAPA-wide 10-year Capital Investment Plan
FY 2018-2027 estimates as of October 2017



respects project differences, WAPA will be able to save time and money determining the rates for customers to pay off investments in the projects, with interest.

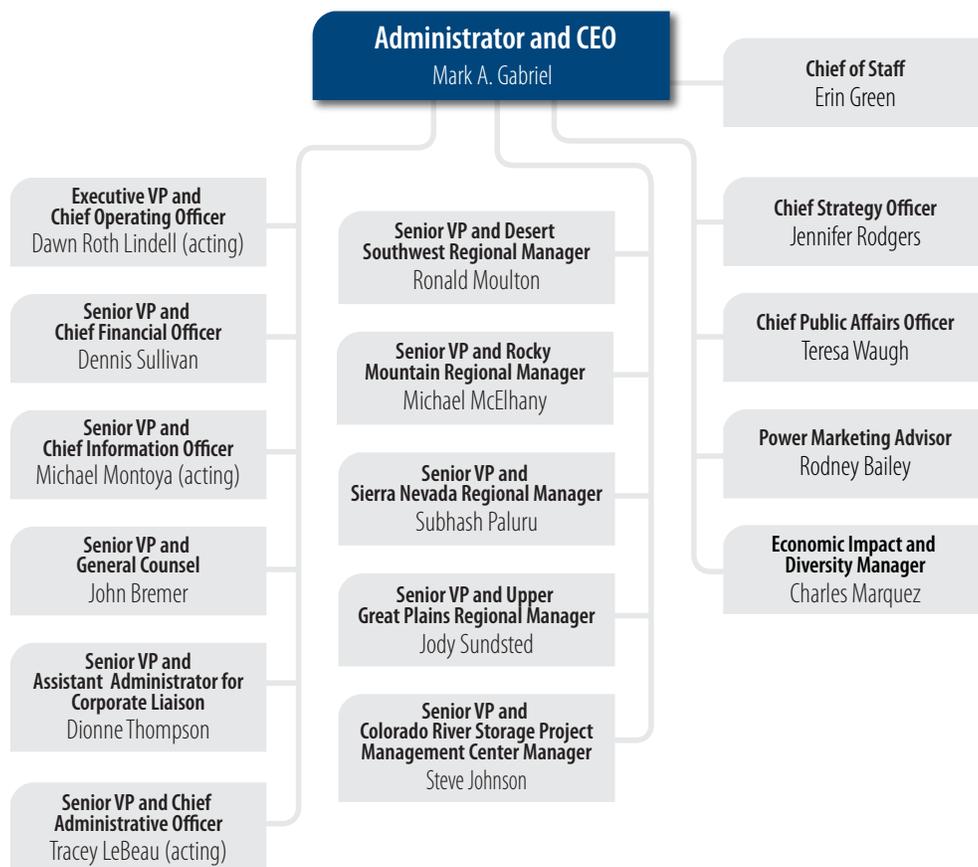
This year the budget will continue to provide WAPA-wide benefits to customers through a more transparent process. Staff will continue to mature WAPA's capital investment plan by focusing on capital investment drivers, such as life-cycle replacements and cybersecurity, to ensure programs and projects remain dependable. Some upcoming projects include:

- **Software replacements and upgrades:** WAPA is upgrading several of its enterprise applications and business tools to maintain a proactive cybersecurity stance, eliminate vulnerabilities and ensure employees have cost-effective tools for carrying out WAPA's mission. Specifically, WAPA is:
 - Moving to digital records management.
 - Developing market tools for power marketing and settlements.
 - Upgrading the transmission maintenance and asset management system.

- **Helicopter replacements:** HQ's Aviation Program manages aviation staff and equipment, including helicopters that have become an integral part of WAPA's maintenance. The plan to do lifecycle replacement of helicopters in each of WAPA's regions is underway.
- **Invoice automation:** Finance will implement an automated, electronic self-service invoice processing platform for about 500 vendors that have contracts with WAPA. This commercial tool, called Invoice Processing Platform, will save processing time and reduce costs for managing the invoices and payments for awarded contracts.

WAPA is committed to being prepared to make funding allocation decisions that support the current system reliability as a top priority, while working within a flat budget.

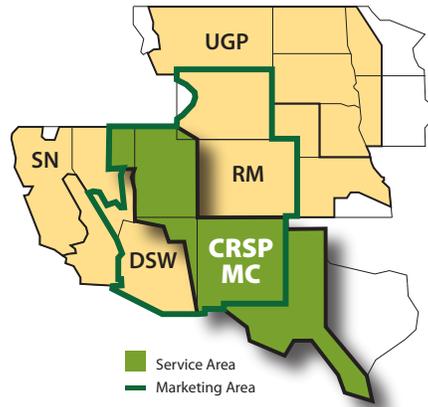
WAPA's 2018 Leadership Team



State of the Regions

COLORADO RIVER STORAGE PROJECT MANAGEMENT CENTER

The generating resources of the Colorado River Storage Project Management Center are the 11 powerplants consolidated into a single power rate known as the Salt Lake City Area/Integrated Projects. The SLCA/IP has produced an average of 3,967 GWh of energy over the past 10 years. The largest powerplant is located at Glen Canyon Dam near Page, Arizona. That single powerplant provides 76 percent of the generated energy provided to the CRSP MC's 136 preference and project-use customers, more than one-third of which are Native American tribes. Wholesale preference customers distribute clean, reliable hydropower to about 5 million retail consumers across Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. The CRSP MC owns 2,325 miles of transmission lines, 36 substations and 38 transformers.



The SLCA/IP rate is set through 2020. In 2018 it will remain unchanged. Additionally, the Power Marketing staff will continue marketing efforts for customers including:

- Marketing Olmsted hydropower:** This hydroelectric power resource is anticipated to be commercially operational in summer 2018. The marketing plan and customer allocations for this small facility of the Central Utah Project are complete, and the formula rate for power sales is expected to take effect April 1. The historic Olmsted Powerplant will be preserved as a museum, while the replacement hydropower generator will deliver about 27 million kilowatt-hours of electricity per year.
- Signing 2025 SLCA/IP power contracts:** WAPA staff sent executable SLCA/IP contracts to provide long-term assurance and stability for customers. The contracts extended customers' services under the current marketing plan through 2057 with no significant changes.

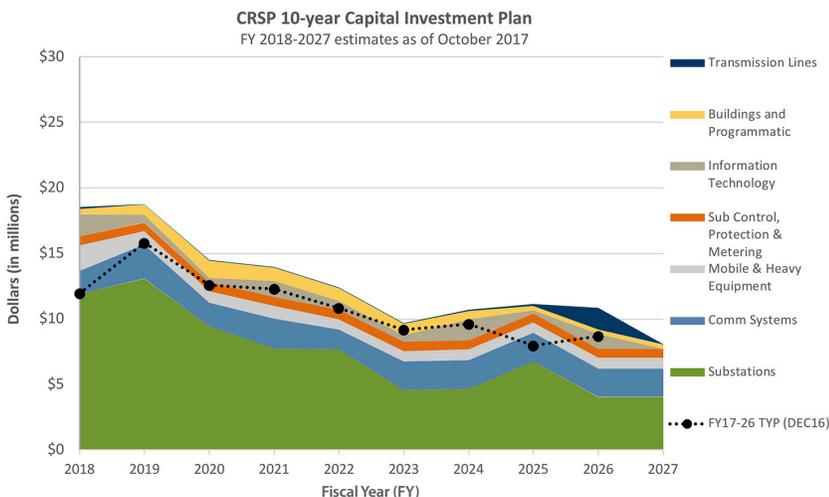
Focused on partnerships, CRSP MC personnel continue to work with six other entities as part of the Mountain West Transmission Group, WAPA is determining potential benefits of regional transmission organization membership. Also the CRSP MC is partnering with Sandia Labs and the University of Oklahoma, which worked together to produce significant scientific research on how much the American public values hydropower.

In 2018, CRSP MC will continue to work with the Department of Interior to minimize impacts to hydropower from experiments and management actions in Grand Canyon below Glen Canyon Dam.

CRSP MC environmental staff also continues to work on supporting recovery of four endangered fish in the Upper Colorado River Basin. This is critical work, as many of the facilities within the CRSP MC are restricted in operations by requirements to protect and recover these endangered species. Staff participate in the Upper Basin Recovery Implementation Program, as well as the Glen Canyon Dam Adaptive Management Program. The CRSP MC also provides substantial funds to these and other recovery

programs from the Basin Fund, totaling about \$20 million per year. CRSP MC staff members participate as experts on the recovery planning teams, and look for ways to recover these species with the least impact to hydropower.

Ever focused on cost-effective solutions to meet long-term goals, the CRSP MC plans to standardize its energy scheduling software under an existing WAPA contract. This replaces obsolete software that was developed in-house. The upgrade will save money by leveraging the same commercial software tools as other WAPA offices.



DESERT SOUTHWEST

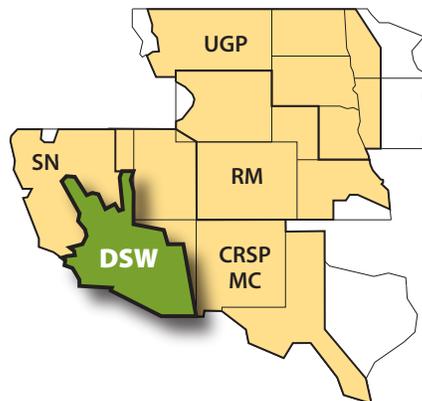
The Desert Southwest region markets hydroelectric power to about 100 municipalities, cooperatives, federal and state agencies and irrigation districts in California, Arizona and Nevada from powerplants operated at Hoover, Parker and Davis dams. Power is also marketed from hydroelectric projects in the Bureau of Reclamation's Upper Colorado region and the federal portion of power generated at Navajo Generating Station near Page, Arizona. DSW maintains more than 75 substations, 2,616 miles of transmission lines ranging from 34.5-kilovolt to 500-kV and 86 communication sites to provide safe, secure, reliable and affordable energy and transmission services to its customers.

In 2017, WAPA successfully brought 31 new electric service customers onboard through its Boulder Canyon Project. This year, DSW will continue to improve its customer service through an online portal that allows customers the flexibility to schedule their own capacity and energy needs. Called the Hoover Energy Application, it is likely the way of the future when it comes to engaging with customers across WAPA.

DSW is also establishing the WAPA model for supporting America's military installations in the West. Since 2007, WAPA has provided power marketing support to Navy installations in Southern California. In 2014, WAPA and the Navy collaborated on a long-term renewable energy purchase, which came to fruition in 2016. These services are fully paid for by the Navy, and support national defense by supplying the Navy with valuable, reliable and affordable power. This partnership is inspiring similar arrangements around WAPA's territory.

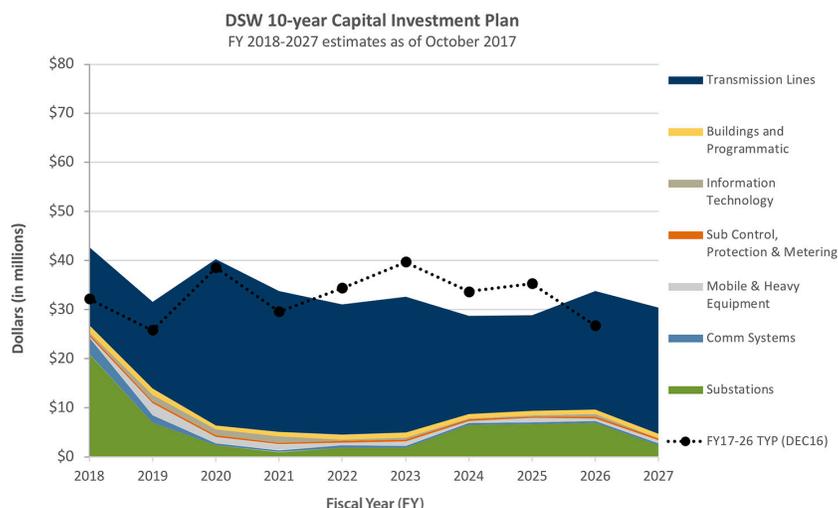
Rates for the Pacific Northwest-Pacific Southwest Intertie expire in April this year. WAPA continues to work with customers to extend the existing formula rates through Fiscal Year 2020. At the same time, WAPA is working with customers to evaluate combining the southern portion of the Pacific Northwest-Southwest Intertie and Parker-Davis Project transmission rates, which will provide rate stability across a broader range of customers.

In 2019, Navajo Generating Station in Arizona is set to close, which will directly affect the Navajo Nation, a WAPA customer. WAPA has worked extensively over the past several months with the owners and the Navajo Nation to develop a transmission service agreement that provides the tribe with 500 megawatts of transmission capacity on WAPA lines. This transmission capacity could assist the development of alternative generat-



ing resources by the tribe and help them get that generation to market. Additionally, in 2018 the Navajo Nation is doubling its Kayenta solar farm, which is brought to market by a WAPA interconnection established when the first stage of the project came online.

Finally, DSW continues to work diligently to maintain its extensive electric system, using a combination of fiscal responsibility, asset management and innovative partnerships to create the most valuable investments for customers. A public-private partnership combines upgrades to existing Parker-Davis lines in need of replacement with new construction that will continue to provide reliable and affordable electricity to customers and consumers across the Southwest. The Southline Transmission Project, paid for by the private partner, would remove about \$120 million in costs from DSW's 10-year Capital Plan and, by extension, its customers' rates. In 2018, WAPA signed a participation agreement with Southline Transmission LLC that contains the parties' intent to construct the project. Later in 2018, associated key agreements will be negotiated, including construction, operations and maintenance, ownership and lease agreements.



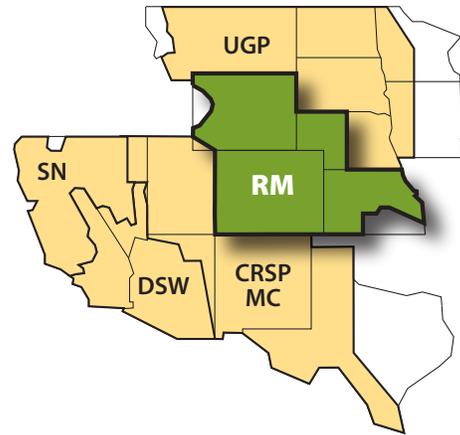
ROCKY MOUNTAIN

The Rocky Mountain region serves about 120 preference customers with Loveland Area Project allocations in Colorado, Wyoming, Nebraska and Kansas. It sells more than 2.8 million megawatt-hours of power generated at 20 hydroelectric plants in the Loveland Area Projects, through both the Fryingpan-Arkansas Project and the Pick-Sloan Missouri Basin Program—Western Division. RM reliably delivers federal and non-federal power through 3,422 miles of transmission lines and 80 substations.

The hydrology of the river systems fluctuates, yet RM Power Marketing staff provides stability in navigating the ebb and flow of hydropower while keeping costs low. In fact, this year LAP customers' rates are lower than last year because small increases in the base rate were offset by zeroing out the drought-adder rate component, made possible by repaying historic drought costs ahead of schedule. The change represents a 14-percent reduction to the prior composite rate, resulting in roughly \$40 million saved annually in power costs for customers across Colorado, the Dakotas, Kansas, Montana, Nebraska, Wyoming and the western sections of Minnesota and Iowa.

RM's Operations staff is also focused on efficiency that translates to every dollar delivering quality service and maintaining grid reliability. Beginning in FY 2018, RM Operations implemented new working tools and increased coordination with other operations staff, the reliability coordinator and customers, to reduce overtime costs and be better prepared to operate in an organized market. This will save \$1.4 million per year by modifying how it staffs the transmission scheduling and security desk.

Additionally, in FY 2018, real-time engineers began monitoring power system operating limits in both the RM system and Desert Southwest system 24 hours a day, seven



days a week. The real-time assessments allow dispatchers to predict and prepare for a spectrum of contingencies in the bulk electric system every half hour and ensures WAPA is prepared to meet the anticipated North American Electric Reliability Corporation reliability standards for monitoring and analyzing real-time contingencies.

The evolution of RM operations, products and services will continue in 2018. WAPA, through participation in the Mountain West Transmission Group, is considering membership in a regional transmission organization for itself and its customers. The decision is expected in 2018, with the goal of implementing any changes in early 2020.

Additionally, RM is working with the Bureau of Reclamation to review and upgrade hydropower generator meters as needed. The updates to meter accuracy and data transfer improve how hydropower generation is tracked and marketed. This will properly capture the economic value of generated hydropower in an organized market.

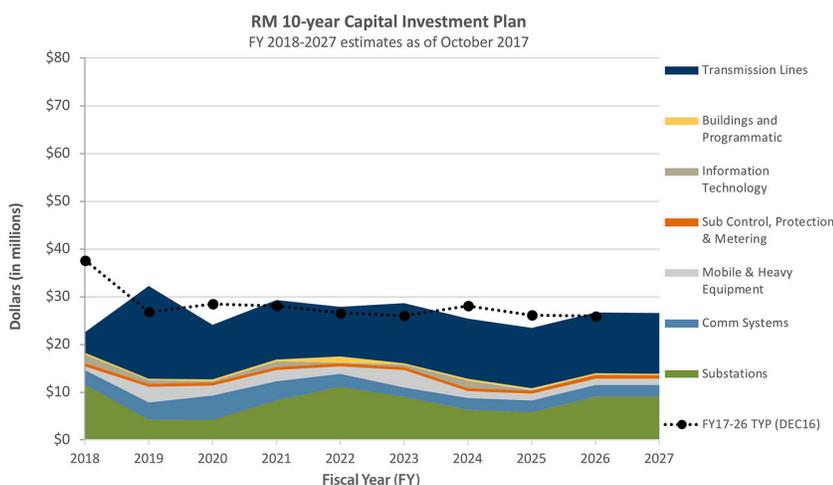
Maintaining a reliable, resilient transmission system also requires attention to capital, maintenance and operational projects. RM plans to address the following major projects within the next year:

■ Big George-to-North Cody

Transmission project: RM will begin installing a new 115-kV line on existing poles between Big George and Cody in northwestern Wyoming. The project includes construction of a new 115-kV yard at the North Cody Substation. These additions will provide additional reliability and much-needed voltage support in the Cody area.

■ Substation access control improvement:

To increase physical security, WAPA is installing equipment to standardize access control and additional cameras at substations in Colorado and Wyoming.



SIERRA NEVADA

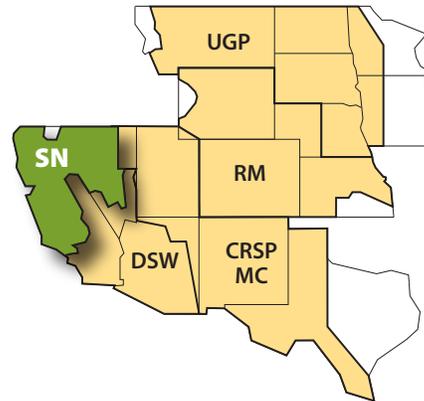
Sierra Nevada markets hydroelectric power generated from the Bureau of Reclamation's Central Valley Project to 93 preference power customers in California including municipal public power utilities, irrigation districts, federal and state entities, Native American tribes and rural electric cooperatives.

The CVP federal transmission system is owned, operated and maintained safely and reliably by WAPA's SN region and consists of 22 substations, 21 transformers and 957 miles of transmission line. SN is also the operating agent for the 350-mile California-Oregon Transmission Project, one of the three lines forming the California-Oregon Intertie.

In 2018, Sierra Nevada staff will continue to work with customers and state and federal partners to protect the value of the hydropower product. In particular, SN is working in tandem with the newly formed Hydropower Operations Committee to represent the interests of CVP preference power customers in public forums. Those interests include the Restoration Fund offsets and credit, the proposed Twin Tunnels WaterFix Project and evaluating the impacts proposed for CVP water and hydropower operations in response to changing environmental regulatory constraints. Specifically, the Bureau of Reclamation is working with the federal fish and wildlife management agencies to create a long-term no-jeopardy biological opinion that could potentially negatively affect hydropower production and increase costs to customers by changing the timing and quantity of hydropower releases.

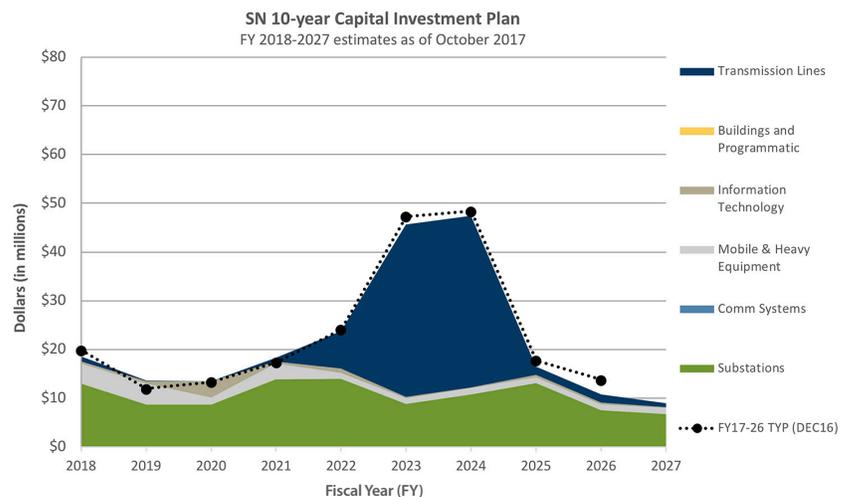
WAPA continues to explore new ways to reduce costs while meeting its mission. For example, in 2017, WAPA proactively funded U.S. Fish and Wildlife Service-approved programs to protect endangered species in northern California, where it plans to build new energy infrastructure. The approach avoids more than \$21.5 million in mitigation costs and better aids the recovery of both federal- and state-protected species.

SN staff continues to work closely with customers addressing today's issues, as well as preparing for tomorrow's power-related services and system needs. In collaboration with its customers, SN has established a 10-year capital investment program to



ensure the grid continues safe, reliable operation. The proposed plan also supports new initiatives through public-private partnerships. These partnerships will generate benefits to the preference power and transmission customers by containing costs. In mid-2018, SN expects to execute a project development agreement with Duke American Transmission Company to construct the San Luis Transmission Project. SLTP is a 230-kilovolt line that will deliver Reclamation-generated hydropower to move water deliveries to agricultural and water users.

Precursor project development activities, particularly under the National Environment Policy Act, will continue for the proposed Colusa-Sutter Transmission Project and proposed Beale Air Force Base Interconnection Project. SMUD is funding the CoSu line project; if constructed, this project will support local energy reliability and increase SMUD's ability to import renewable power supplies from the Pacific Northwest. The Beale Air Force Base interconnection will provide the base access to reliable energy sources that will help bolster security and resilience of this military installation in northern California.



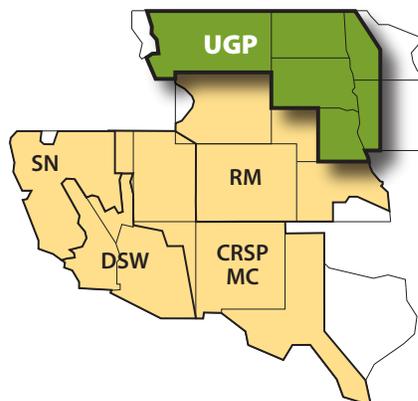
UPPER GREAT PLAINS

The Upper Great Plains region markets more than 9 million megawatt-hours generated at eight dams and powerplants in the Pick-Sloan Missouri Basin Program—Eastern Division to more than 339 preference customers in Montana, North Dakota, South Dakota, Nebraska, Iowa and Minnesota. UGP delivers enough hydropower to serve more than 3 million households, through more than 123 substations with 121 transformers and across 7,923 miles of federal power lines in its 378,000 square-mile service territory.

UGP's preference customers include rural electric cooperatives, cities, towns, public utility districts, irrigation districts, state and federal agencies and Native American tribes.

For the second year in a row, Pick-Sloan Missouri River Program customers saw a rate decrease. On Jan. 1, the Pick-Sloan composite rate was 24.29 mills/kWh. The 14-percent reduction in 2018 is a result of historic drought-related debt being repaid a year ahead of schedule. Bringing the drought-adder rate component to zero results in more than \$40 million saved annually in power costs for customers. The drought component is still a part of the rate design and can be used in the future to react to changing hydrological conditions.

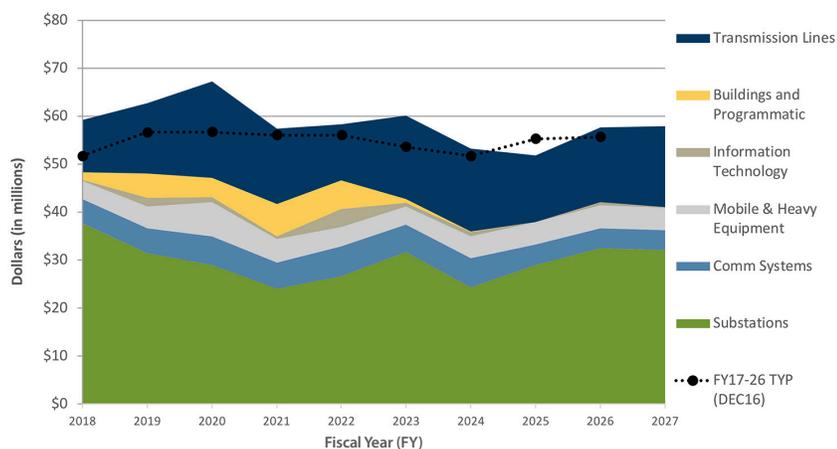
In 2018, UGP is prepared to support the interconnection requests and the prioritized capital projects that support the transmission system's long-term health and reliability, as well as address the growing demands for energy throughout the region. In FY 2017, 11 construction transmission projects were completed, 54 projects were in progress and



39 were in the planning stages. A few projects highlighted in the 10-Year Capital Planning effort that will be addressed this year include:

- Roberts County Substation:** A new 115/69-kV substation on the Summit-to-Forman 115-kV line to support East River Electric Cooperative in the northeast corner of South Dakota. The new interconnection will serve the growing load, provide additional voltage support and enhance system reliability in the event of the loss of the Summit Substation. The Southwest Power Pool has also identified the area to be in need of additional support in its 2017 Near Term Integrated Transmission Planning process.
- Martin Substation, Stage 07:** UGP is working with LaCreek Electric to take over ownership of the 115-kV yard. The majority of the existing equipment is original and has been in service since 1962. The oil breakers, disconnect switches, instrument transformers and electromechanical relays are being replaced to address reliability concerns. A dedicated transformer breaker will be added to simplify switching and increase reliability.
- Brookings Substation:** To increase reliability for local customers, WAPA will reconfigure the existing substation to a breaker-and-a-half configuration. This change will prevent a single event, such as a bus fault, from causing power outages for the city of Brookings, South Dakota, South Dakota State University and several manufacturing facilities in the area.

UGP 10-year Capital Investment Plan
FY 2018-2027 estimates as of October 2017





Does an average 2017 mean a good hydrology outlook for 2018?

Water converted to electricity is valuable to customers and the communities they serve. Hydropower courses through the transmission lines that serve WAPA customers much like the rivers that carry the source of this reliable generation. Without hydropower, WAPA must buy power on the open market from other sources to meet contractual obligations to its customers. This is referred to as purchase power.

In an ideal year, snowpack around the West is average or above average, yielding snowmelt runoff to recharge reservoirs behind the dams and powerplants that provide the energy WAPA markets. Federal dam owners and operators such as the Bureau of Reclamation, the Army Corps of Engineers and the International Boundary and Water Commission move water through federal hydroelectric powerplants.

Overall 2017 turns out average

Water Year 2017 turned out to be on par with WAPA's actual generation at 101 percent of average and a total generation of 26,148 gigawatt-hours. Across its entire service territory, WAPA purchased 2,638 GWh for \$64,687,868, which equates to \$24.51 per megawatt-hour.

Yet, the whole of WAPA's marketed hydropower is just the sum of its regional project-based production. The following

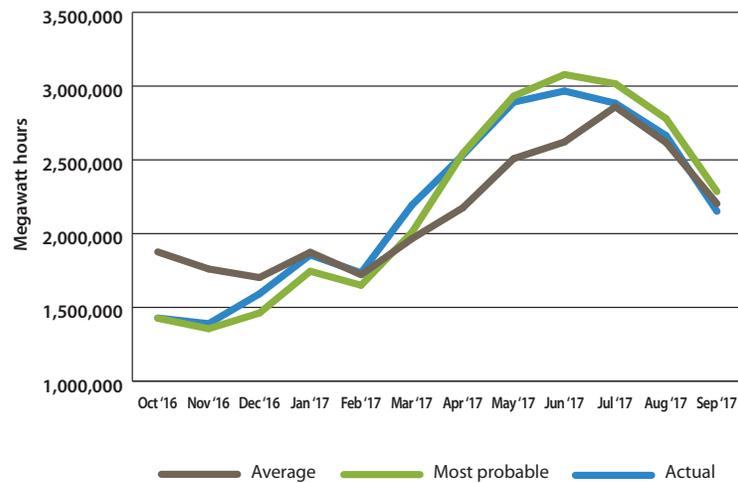
regional summaries of FY 2017 data reflect the straight power purchase costs, which are based solely upon hydrology, actual hydropower generation and related generation shortages.

The Colorado River Storage Project Management Center projected most probable purchase power expenses for FY 2017 to be \$11,688,670. Actual purchase power expenses were a little higher, at \$12,200,933. The cost per MWh was \$24.16. Lake Powell ended the water year at around 60 percent of capacity with an elevation of 3,628, which is about 138 feet above the minimum generation level. Throughout the year it held relatively steady between 46 and 63 percent of capacity.

Desert Southwest's hydrology is mostly dependent on the Colorado River Basin snowpack and precipitation above Lake Powell. The Water Year 2017 precipitation was 81 percent of average. The region's most probable projected purchase power expenses were \$8,527,308. Actual purchase power expenses were higher, at \$9,686,758, with a cost per MWh of \$44.29. Lake Mead ended the year with an elevation of 1,082 feet, about 132 feet above the minimum generation level. Throughout the year it fluctuated between 31 and 135 feet above the minimum generation level.

In Rocky Mountain, the overall reservoir content peaked in February at 126 percent of average. The Loveland Area Projects area remains mostly drought free, but the trend

Water Year 2017 Hydropower Generation



is for drier conditions in some areas. Water Year 2017 reservoir content ended at 83.5 percent of average. The most probable projected purchase power expenses were \$12,537,488, but actual purchase power expenses were significantly lower, at \$8,314,367. The cost per MWh was \$37.50.

In Sierra Nevada cumulative precipitation of the Northern Sierra Eight Station Index was at 186 percent of average in 2017. Based on a 15-year average, the northern California dams respectively saw hydropower production at a 171 percent of average for Trinity, a 181 percent for Shasta, 281 percent for Folsom, and 271 percent for New Melones. Unique from other power projects, WAPA offers a percentage of the output from the Central Valley Project system and customer-requested firming purchases. The most probable projection of 2017 purchase power was \$8,093,706. The actual purchase power costs were \$10,918,440 for 2017, breaking down to \$24.91 per MWh.

In Upper Great Plains, the Army Corps of Engineers reported its six main stem dams along the Missouri River ended the FY 2017 at 59,253 million acre-feet, as compared to the long term average of 55,776 MAF, or 106 percent of average. UGP's most probable projection for purchase power in FY 2017 was \$31,636,163. Actual purchase power expenses were lower at \$28,298,928. The cost per MWh was \$20.28. Generation was slightly less than projected but higher than average.

2018 drought conditions still look dry

The Seasonal Drought Outlook provided by the National Weather Service's Climate Prediction Center on Feb. 15, 2018, predicts that drought conditions will persist throughout much of the southwestern U.S. through May 2018. If the dry conditions continue, it could result in below-average hydropower production for CRSP MC and DSW power projects. Drought is also anticipated to develop in central and northern California, which would impact WAPA's Sierra Nevada hydrology.

Much of the upper Colorado River basin has seen improved hydrological conditions which could work out to another average hydropower year in 2018 for RM.

Looking north to UGP, the drought is expected to improve in eastern Montana and much of Wyoming. Drought conditions are anticipated to persist in the upper Missouri River Basin, specifically in northeastern Montana and western South Dakota. According to Army Corps of Engineers, the 2018 runoff forecast for the upper Missouri Basin is expected to be above-average mainly due to above-average mountain snowpack conditions.

For more information...

WAPA provides monthly updates on the hydropower conditions monthly on its website at wapa.gov, **Power Marketing, Hydropower Conditions**.

To learn about the drought outlook for 2018, visit the National Weather Service's Climate Prediction Center at cpc.ncep.noaa.gov



2018: In the Works

Resilience built through security

There is a direct tie from WAPA's mission to the national essential function of providing for critical federal government services that address the national health, safety and welfare needs of the United States. Power is critical to continue daily operations in almost every aspect of our lives, and WAPA continues to look for ways to strengthen the bulk electric system to keep the power flowing.

Through cybersecurity and physical security, WAPA commits to blending security updates in facility design criteria, prioritizing how it invests in security assessments, strategically leveraging Department of Energy capabilities, and refining its threat-informed risk appetite. Cybersecurity and physical security teams collaborate and coordinate to improve the organization's focus and ability to respond.

WAPA took simple, yet effective, steps in 2017 to increase facility security by replacing signs, repairing locks and securing gates. WAPA also continued to improve its cyber

performance throughout the year. WAPA resolved 99.6 percent of cyber events within three days, and did not experience a single significant cyber incident.

In 2018, WAPA will continue to strengthen the resilience of its systems and its people by increasing training, testing and exercises designed to mature its cybersecurity and physical security capabilities. Teams are identifying real world impacts and critical interdependencies to secure assets and mitigate threats. Specifically, WAPA will maintain a status of proactive response by:

- Resolving 90 percent of its cybersecurity events within two days.
- Reducing its vulnerability to SpearPhishing through modern, interactive training and testing.
- Continuing to mature its insider threat programs.
- Participating in Electricity Information Sharing and Analysis Center and DOE platforms and events.
- Supporting DOE's Digital Transformation effort.



Completed 275+ risk assessments	FY 2014 - 67% resolved in 5 days
Fixed 1,300+ deficiencies (53%)	FY 2017 - 99.6% resolved in 3 days
Finalized 225+ remediation plans	FY 2018 goal = 90% resolved in 2 days

Asset Management balances investments, risks

Further leveraging information to make data-driven decisions and maximizing the value of its enterprise assets, WAPA's Asset Management program continues to deliver investment and planning insights. Asset Management's priorities are to assess risk to transmission facilities, identify areas where reliability is jeopardized and maximize the value of the assets.

The process of tracking asset performance and lifecycle is becoming increasingly important to WAPA's organizational strategy and planning. Program growth will take some new tools, some new processes and a shift in culture to push beyond looking at data on key elements to an integrated program, which covers all assets to understand necessary investments for just-in-time capital projects.

Data collection expands investment insights

In the coming year, Asset Management staff will build upon the foundational data it has collected for transmission lines, circuit breakers and transformers, and begin gathering data on other asset classes, such as batteries, battery chargers, buildings, building systems and instrument transformers.

Incorporating these assets will provide insights from significant and actionable data across WAPA's 15-state service territory. WAPA will use the analyses of all asset classes to further integrate sustainable funding and enterprise risk management across the organization.

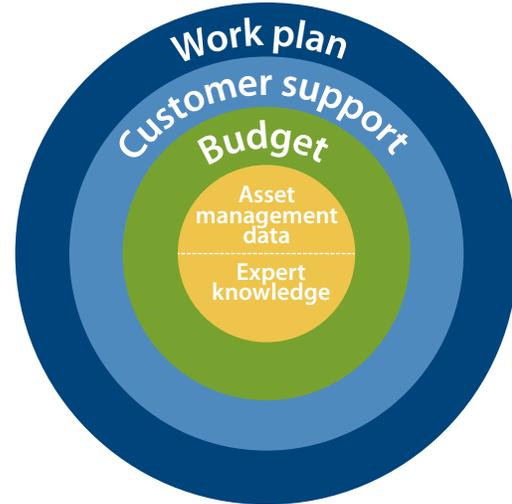
In 2018, WAPA will:

- Continue to improve condition assessment algorithms for currently tracked assets.
- Initiate a project to incorporate asset lifecycle management.
- Automate the process for collecting and reporting data.
- Populate engineering and inspection data supporting transmission line health index analysis.
- Reassess the health of WAPA transformers to optimize maintenance strategies.

Strategy addresses transformer risk

As concerns increase around physical attacks on infrastructure, WAPA is proactively developing a transformer risk strategy that supports system reliability and grid resilience. Although transformer-sharing efforts with other entities prepares us for typical operational failures, WAPA has been analyzing how to prepare for catastrophic events such as a large earthquake or a targeted attack on a major city or military base that could directly impact WAPA substations.

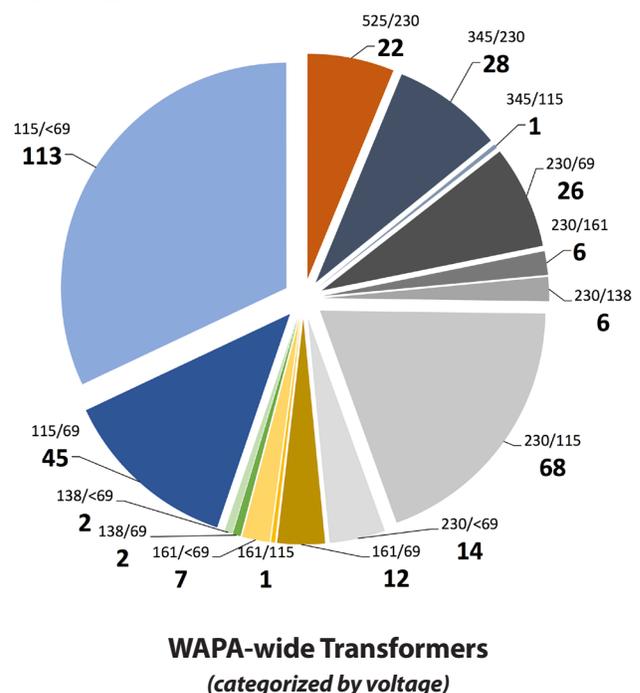
Asset management



As part of its commitment to customers to be prepared, WAPA is analyzing several alternatives for a spare-transformer strategy. Taking no action could leave WAPA and the rest of the bulk electric system vulnerable to a catastrophic event. The evaluation compares this current state with the costs and benefits of three alternatives:

- Store WAPA spare transformers as in-service units.
- Maintain WAPA in-service spare transformers.
- Participate in a subscription service with a third-party transformer provider.

In 2018, Asset Management anticipates finalizing and implementing one of the alternatives as a WAPA-wide strategy that makes the most efficient use of WAPA's entire fleet of transformers.



Industry changes driving power marketing tomorrow

The development of organized markets in the West has been a key topic the last several years, but in 2018, those discussions are shifting into high gear. This year, much of WAPA's focus around organized markets will be centered in the Rocky Mountain and Desert Southwest regions.

The Mountain West Transmission Group continues to discuss regional transmission organization membership. The goal is to increase flexibility, remove rate pancaking and ensure WAPA can continue to deliver on its mission consistent with sound business principles. Eight entities, including WAPA's Loveland Area and Colorado River Storage projects, are anticipating wrapping up those discussions later this year. If the Mountain West participants decide to move forward, integration into Southwest Power Pool could potentially occur in early 2020.

In DSW, WAPA and six other local services providers are discussing market options. Known as the Southwest Market Alternatives Group, the footprint stretches across the western tip of Texas through New Mexico and Arizona before connecting to Southern California and Nevada. In 2018, the participants will continue preliminary discussions and evaluate the costs and benefits of joining an RTO. With the changing organized markets landscape around the group, more updates about their progress are expected within the year.

When looking at the energy landscape, WAPA's decisions are driven by careful analysis to calculate costs and benefits, conducted by both internal and independent sources. For WAPA, the cost equation is as critical as the savings. As a low-cost power provider in 15 states, WAPA guards against customer rates being negatively impacted.

Through its Organizational Approach to Markets effort, WAPA is implementing internal changes to ensure its staff and processes are ready for organized markets. After a yearlong introspective look, WAPA is implementing 14 OAM recommendations to best adapt its internal systems and functions and ensure WAPA continues fulfilling its mission. In the next 18 months, WAPA will:

- Realign some functions between regions to improve consistency in organizational structure.
- Improve monitoring of RTO and market activities.
- Move toward consistent information technology toolsets across WAPA.

Ultimately, what WAPA does with markets will shape the ways it does business and serves customers in the future. It also advances the widespread use of America's valuable hydropower resources. WAPA will continue to actively evaluate new market initiatives so it can best position itself to continue to deliver valuable services to its customers in this changing industry.

Reliability coordination in the West

WAPA is exploring multiple options for coordinating reliability after 2019. With several new developments springing up since November 2017, WAPA is evaluating reliability coordinator services for the future.

At the end of February, WAPA submitted notices of withdrawal for its four balancing authorities, or BAs, to depart Peak Reliability Coordinator, effective Sept. 2, 2019. WAPA's Upper Great Plains West and Western Area Colorado Missouri BAs submitted letters of intent to receive RC services from Southwest Power Pool beginning in fall 2019. WAPA's Western Area Lower Colorado BA is considering both SPP and the California Independent System Operator as potential providers for RC services. And in California, in coordination with the Balancing Authority of Northern California, WAPA's sub-balancing authority sent a letter of intent to CAISO for RC services.

"Our balancing authorities cover an expansive area in the West. Each has unique circumstances and requirements



that we will respect when seeking the best possible reliability coordinator for our operations and our customers," said Administrator and CEO Mark A. Gabriel.

The letters of intent enable WAPA's BAs to evaluate reliability coordinator services to determine the best path forward for ensuring reliability and delivering value to its customers.

Financial planning answers ‘why’ behind investments

Over the years, WAPA has strived to reduce costs to customers in practical and innovative ways. From consolidating information technology tools used across the enterprise to identifying cost-avoidance projects in the Continuous Improvement Program, WAPA remains disciplined and respectful of the funds provided by customers and Congress to support a more than \$4.3 billion organization.

In 2018, WAPA will continue this trend, leveraging advances in asset management, customer communications and new technologies to identify the most valuable investments that will support customers and the mission for decades to come. The top priorities of the Office of the Chief Financial Officer are to work closely with customers to learn from each other, further enhance WAPA’s transparency efforts and demonstrate the value of today’s investment choices.

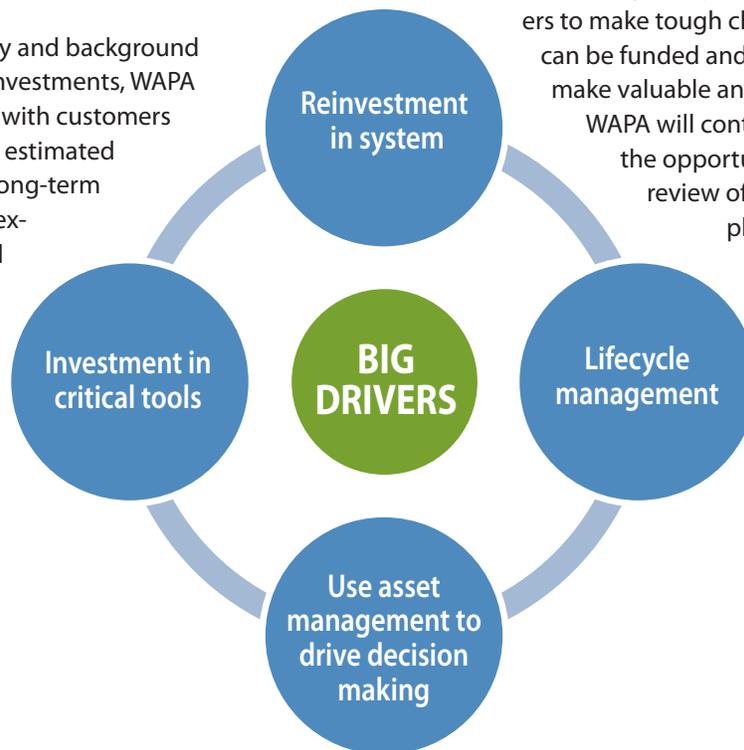
By increasing transparency and background knowledge of proposed investments, WAPA employees strive to share with customers the “why” behind projects estimated at more than \$1 million. Long-term benefits from short-term expenditures will be defined to ensure timely and

responsible investments are made into the system that delivers affordable hydropower across the West.

Expected 10-year investment parallels original construction costs

Over the next 10 years, WAPA anticipates investing \$1.6 billion in its assets, more than two-thirds of which will go toward transmission lines and substations. It is the largest investment since the infrastructure was originally built in the middle of the 20th century, and will require meaningful coordination with customers. WAPA continues to work with customers to flatten peaks in anticipated spending, as well as provide measured and attainable financial expectations.

Pressure on appropriations is anticipated to continue for the next few years, prompting WAPA and customers to make tough choices about which projects can be funded and when to fund them. To make valuable and informed decisions, WAPA will continue providing customers the opportunity to be involved in the review of the Fiscal Year 2020 work plans and updates to annual 10-year capital plans.



CUSTOMER **Circuit**

WINTER 2018

WESTERN AREA POWER ADMINISTRATION
 P.O. Box 281213
 Lakewood, CO 80228-8213
 720.962.7411
www.wapa.gov
 email: mediarelations@wapa.gov

Editor: JENNIFER NEVILLE
Graphic Designer: GRANT KUHN
Contributors:
 TIFFANI DeFORE
 LISA MEIMAN
 PHILIP REED
 TRAVIS WEGER

