



Appendix A: February 2019 Update



Current Business Environment

The utility industry as a whole is experiencing a significant resource portfolio transformation, as coal-fired generation continues to be displaced, natural gas utilization is increasing, wind and solar generation continue to experience rapid growth, and more companies are implementing energy storage projects. These trends are driven by a combination of economics, customer preferences, technological advancements, and momentum for carbon reduction.

As these external forces evolve, it is important for SRP to assess these changes and test them against the 2017-2018 Integrated Resource Plan (IRP) key driver assumptions. Testing those assumptions ensures that SRP's strategic directions are still sufficiently comprehensive and appropriate in today's business environment.

With this in mind, SRP regularly reviews and updates its resource plan to identify how best to secure the power necessary to meet the growing electricity needs of its customers at the best value. This planning process examines market conditions, including projected customer demand for electricity along with forecasted fuel supply and technology costs. These metrics are the key drivers that affect SRP's business environment and influence the resource decisions that SRP makes.

During SRP's most recent resource planning process, conducted in 2018-2019, SRP produced new retail peak demand, natural gas and technology cost forecasts. All of these forecasts are consistent with the assumption ranges used during the 2017-2018 IRP process. SRP believes the IRP strategic directions are still sufficiently comprehensive and appropriate in today's business environment. As such, SRP continues to implement an IRP action plan based on these strategic directions. More details on this action plan are shared on the following pages.

Implementation of 2017-2018 IRP Conclusions

During the 2017-2018 IRP process, stakeholders provided input and guidance on elements that have formed SRP's strategic directions for resource decisions. These strategic directions, summarized below, have guided SRP's resource decisions since completion of the 2017-2018 IRP process.

Element	Strategic Resource Directions
Coal Generation	Further reduction in coal generation; address implications for employees and communities.
Natural Gas Generation	Develop flexible natural-gas generation options to meet peak demand and integrate renewables.
Renewable Energy and Energy Storage	Grow renewables portfolio to reduce CO ₂ intensity and manage costs; expand opportunities for customer-dedicated projects. Seek cost-effective battery alternatives before making major commitments to new gas generation.
Nuclear Generation	Preserve option for new nuclear generation in mid-to-late 2030s with focus on small modular technology.
Customer Programs	Develop and promote a variety of energy efficiency programs focusing on those with peak demand reduction benefits. Develop and promote new customer-side demand management programs and technologies.
Market Resources	Expand participation in regional transmission markets.
New Technologies	Pursue pilot projects and research and development efforts for innovative applications of new power generation, load management, energy storage and electrification.

The following are major resource initiatives completed or underway as part of SRP's IRP action plan, which is based on the strategic resource directions described above:

Coal Generation

In February 2017, the participant owners of the Navajo Generating Station voted to cease plant operations by the end of 2019, in lockstep with the end of the original lease with the Navajo Nation¹. Operation of the coal plant is expected to stop in December 2019. Additionally, SRP plans to exit Unit 1 of the Craig Generating Station, located in Northeast Colorado, by 2025.

SRP recently completed an assessment of SRP's remaining coal fleet, including analysis of risks associated with joint ownership, fuel supply, regulatory and legislative action, environmental policies, transmission systems, and impacts to the communities in which these plants operate. Based on this assessment, SRP will perform more detailed analysis on specific resources.

¹ In July 2017, the owners and the Navajo Nation signed a replacement lease, which allows sufficient time for decommissioning and monitoring after cessation of plant operations.

Peak Capacity Needs

SRP has identified the need for new incremental peaking power generation beginning in the mid-2020s, given the current demand and resource outlook. This new generation will need to quickly increase or reduce output (ramp), be flexible to support additional variable energy resources such as wind and solar generation, and provide reliable reserve capacity. Prior to making any financial commitments to major equipment or construction contracts for this new-build generation, SRP pledged in the 2017-18 IRP to issue an all-source request for proposals (RFP) to evaluate alternatives for the planned capacity. SRP recently issued the RFP for 650 megawatts (MW) of capacity, 550 MW of new supply-side generation and 100 MW of demand response. Proposals received in response to the RFP included battery/energy storage charged by a renewable resource or the grid, natural gas resources, and demand management options. This all-source RFP is consistent with IRP strategic directions to develop and promote customer programs focusing on peak demand reduction benefits; to seek flexible natural-gas generation options to meet peak demand and to integrate renewables; to seek opportunities to further develop SRP's renewables portfolio to reduce CO₂ intensity and manage costs; and to seek cost-effective battery alternatives before making major commitments to new gas generation.

Natural Gas Generation

SRP is currently pursuing the purchase of all of the ownership interest in Coolidge Power, LLC ("Coolidge Power"), and the owner of the 575 MW Coolidge natural gas peaking-plant, located in Pinal County. Commercial since 2011, SRP currently receives the full output from the plant under a 20-year power purchase agreement, with an option to extend the term for an additional 10 years. Under the agreement, SRP pays for all fuel and ongoing operating expenses at the plant. The 12 simple-cycle combustion turbines which comprise the Coolidge facility offer a reliable and flexible platform to enable SRP to further integrate renewables to the system. Different from other SRP resources, these units are designed for quick starting and fast ramping.

After conducting a thorough review of the current power purchase agreement with Coolidge Power, plus future resource requirements, SRP has determined that acquiring Coolidge Power is in the best interest of its customers. Further integrating the plant can provide long-run cost savings and flexibility for SRP's customers. SRP and the owner of Coolidge Power are currently negotiating the terms and conditions for the transaction.

Renewable Energy and Energy Storage

Currently, SRP has approximately 200 MW of existing utility scale solar resources. A cross-departmental study revealed that the SRP system can support an additional 1,000 MW of utility-scale solar generation by the end of fiscal year 2025. Thus, SRP plans to accelerate both the pace and total capacity of solar generation by adding this level of solar into its plans. The addition of 1,000 MW of solar energy is expected to reduce carbon dioxide emissions by about 5.2 million tons — equivalent to what is produced by more than 1 million passenger cars driven in a year.

As part of the commitment to add 1,000 MW of utility-scale solar by 2025, SRP has signed power purchase agreements for two new large-scale 100 MW solar projects, expected to be online in 2020. The output and renewable attributes of these projects will be dedicated to subscribing large customers to help them meet their individual renewable objectives, while also reducing SRP's overall carbon emissions.

Two utility-scale battery storage projects for which SRP entered into power purchase agreements have achieved commercial operation since completion of the 2017-2018 IRP. In April 2018, the Pinal Central



Solar Energy Center came online with a 20 MW solar plus 10 MW/40 MWh battery installation. It is designed to produce solar energy and charge the battery during daylight hours, and then discharge the battery in the late afternoon and evening when customer electricity demand is at its peak. Thus far, the Pinal Central Solar Energy Center project has met expectations. The second battery storage project, a 10 MW/40 MWh stand-alone, grid-charged battery, came online at the Dorman Substation in January 2019.

SRP also agreed to purchase a 25 MW/100 MWh stand-alone battery, which will be installed at the Agua Fria Generating Station in Glendale, and is expected to begin commercial operation in the first quarter of 2021.

In conjunction with these battery projects, SRP has initiated a battery learning plan to monitor industry and technology developments and gain the necessary operational, procurement and design knowledge to integrate additional batteries in the future.

Nuclear Generation

SRP has continued to take the measured steps necessary to develop and preserve the option for new nuclear generation in the mid-to-late 2030s. The major tasks associated with that effort include selection of a proposed site and alternative sites for an Early Site Permit (ESP) application preparation process, the development of a Nuclear Quality Assurance Program, and creation of an ESP Project Planning Framework Document. Due to recent developments in the U.S. nuclear industry, SRP has decided not to proceed with an ESP application at this time. However, SRP will remain engaged in nuclear industry activities, focusing on monitoring the advancements in small modular technology.

Customer Programs

SRP is committed to further developing and promoting a portfolio of energy efficiency (EE) programs focusing on those with peak demand reduction benefits. SRP has met or exceeded its annual savings target in each of the past seven years – savings goals grew from 1.50% to 2.00% over that time. In FY18, SRP again exceeded its 2.00% annual saving target as the EE programs delivered savings equal to 2.14% of SRP's retail requirements – representing over 628,000 MWh of incremental savings. The program budget was increased in FY18 to \$44.9 million, and again in FY19 to \$46.6 million, to fully fund the EE program offerings. SRP has developed various residential demand response programs to help manage system peak and grow into this future area.

As part of the development and promotion of new customer-side demand technologies, SRP has initiated a residential Battery Storage Incentive Program, which provides an incentive of up to \$1,800 toward a customer's purchase and installation of a qualifying home energy storage system. The incentive is available to up to 4,500 SRP residential electric customers on a first-come, first-served basis during a 36-month period, which began May 1, 2018.

Beyond customer-side demand management and storage programs, the 2017-2018 IRP concluded that other cost-effective options, such as the electrification of transportation and other technologies, would also be considered and implemented as a means of meeting SRP's strategic objectives and reducing carbon emissions. SRP provides a Workplace EV Charging Program for its business customers, which offers a \$500 rebate per charging port toward the installation of new EV chargers. Additionally, SRP is continuing to expand its plug-in electric vehicle (EV) fleet, with a goal of 100% of sedans being electric by 2021. SRP supports employees by providing access to EV workplace charging stations at 18 SRP facility locations. SRP has also implemented an Electric Vehicle Price Plan, similar to the Time-of-Use Price Plan, under which customers can save by charging vehicles during lower-priced super off-peak hours. SRP's



Electric Technologies (E-Tech) program continues to grow as SRP is offering rebates toward the purchase of electric forklifts, electric infrastructure for truck refrigeration units, and other custom electrification projects. These programs further reduce site emissions and contribute to our customers' and SRP's decarbonization efforts.

Market Resources

SRP signed an agreement with the California Independent System Operator (CAISO) to participate in the western Energy Imbalance Market (EIM), beginning in April 2020. The EIM is a real-time, five-minute energy market available to non-CAISO members. Advanced market systems automatically find the lowest-cost energy to serve real-time consumer demands of participating utilities. SRP expects to benefit from the EIM by having more efficient access to low-cost resources across a significant portion of the western region.

New Technologies

SRP has historically been deeply involved in ongoing research and development (R&D) programs within the industry. Since the 2017-2018 IRP, SRP implemented a new Innovation Pipeline process to strengthen the organization's current and planned innovation and technology efforts. As part of this effort, eight Innovation and Technology Priorities were developed. These priorities include Customer-Sided Technologies, Utility-Scale Storage, Integration of Utility-Scale Renewables, Electrification, Water Resources and Conservation, Asset Optimization, and Emerging Technologies Information Technology/Operational Technology (IT/OT) & Telecommunication. Additionally, SRP developed an enterprise-wide Innovation and Technology Plan that documents existing and planned research activities that address the Innovation and Technology Priorities. Further, SRP identified the Top 20 Innovation and Technology high-impact projects, which will receive elevated focus and collaboration to ensure their success and maximize the value to SRP. This Innovation Pipeline process provides the foundation to evaluate technologies and to proceed with R&D projects that provide the most value to SRP and its customers.

In November 2018, SRP held its first annual Electric Power Research Institute (EPRI) Day. The event brought together over 200 SRP subject matter experts and EPRI research managers to discuss challenges facing the industry and to review results from some of the cutting-edge research EPRI is conducting to address those challenges.

SRP has a longstanding research partnership with Arizona State University that dates back to 1982. Since the 2017-2018 IRP, SRP expanded its university research program to also include both the University of Arizona and Northern Arizona University. For the 2018-2019 school year, between the three state universities, SRP supported a combined 47 research projects on a wide variety of energy, transmission, water-resource and forest health topics.