



SRP's Integrated System Plan: Scenario Narratives

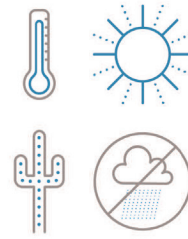
Revised February 2023

This document accompanies the summary study plan for SRP's Integrated System Plan and provides narrative descriptions for each of the four future scenarios used in the planning exercise. Each scenario defines a plausible future state of the world around us, reflecting societal, technological, economic, environmental and political trends & conditions. These factors are outside of SRP's control and reflect the unpredictable nature of the future that needs to be accounted for in SRP's planning activities. These Scenario Narratives were updated in February 2023 to incorporate various components of the Inflation Reduction Act passed in 2022.

SCENARIO: DESERT CONTRACTION

Arizona becomes a less desirable place for people and businesses due to a slowing economy and worsening climate conditions, which negatively impacts residential and commercial growth. Declining rainfall leads to significant drought events that impact watersheds throughout the region, particularly on the Colorado River. Loss of power capacity from hydrogeneration significantly stresses power markets, especially during peak demand periods. Additionally, global competition and consolidation initiates an exodus of large industry from the Valley, creating a cascading effect for the state's population. As a result, electricity demand in SRP's service area falls well short of current projections.

DESERT CONTRACTION



Key Drivers	Descriptions
Load	Higher summer temperatures and water supply issues stifle growth in the Southwest, limiting new migration and reversing expected growth trends. Large commercial and industrial customers emigrate out of Arizona and population growth levels off over time.
Climate Change	The Southwest experiences accelerated temperature rise consistent with the Intergovernmental Panel on Climate Change's (IPCC) pessimistic Representative Concentration Pathway (RCP) 8.5 as the impacts of climate change manifest in the region. Moreover, the regional drought significantly worsens, resulting in Lake Powell dropping below minimum power production levels for hydrogeneration from Glen Canyon Dam starting in 2025.
Policy	Worsening climate and intense global competition increase economic pressure on governments, resulting in a failure around the globe to adopt more consistent and aggressive carbon emission reduction regulations. SRP is committed to its 2035 Sustainability Goals, and no federal or state sustainability policies are passed that supersede these goals.
Customer Participation	Spurred by the worsening impacts of climate change and the lack of cohesive federal climate action, more and more Arizonans prioritize sustainability. Therefore, adoption rates for electric vehicles (EV), heat pumps, and distributed solar and batteries increase. Growing adoption rates for these customer-sided technologies mixed with lower overall population growth results in absolute levels of electric technology and distributed energy adoption in SRP's service area.
Technology	Increased global market competition, prolonged supply chain issues and stagnant economic growth in the Southwest raise material and labor costs, slowing the decline of renewable and storage costs. Tax credits provided through the Inflation Reduction Act help to reduce costs, although a stretched labor market makes qualifying for such credits expensive.
Market Dynamics	Extreme heat waves, wildfires and the loss of power capacity at Glen Canyon Dam as well as other hydrogeneration in the West lead to constrained regional markets that cannot be relied upon during peak periods.

SCENARIO: CURRENT TRENDS

Large-scale changes currently underway in society, the region and the utility sector continue on their current trends and result in substantial changes for SRP and Arizonans by 2035. Population in the Valley grows at a steady pace as the affordable cost of living and pleasant weather most of the year in the Phoenix area drive continued migration from California and surrounding states. With land availability, a competitive workforce, a geographical location in the middle of large markets (including California, Texas and Mexico), and with local and federal support of industries such as domestic semiconductor manufacturing, Phoenix becomes increasingly attractive to large commercial and industrial loads. Data centers and manufacturing companies continue to move into the Valley, creating more jobs and attracting even more growth. Some of these companies have significant load requirements measured in the hundreds of megawatts, much larger than those seen in the past. EVs gain popularity due to the broadening availability of models and improving charging infrastructure across the nation.

CURRENT TRENDS



Key Drivers	Descriptions
Load	Load growth is sustained in the greater Phoenix area, driven by continued migration and expansion in commercial and industrial business activities.
Climate Change	Climate change remains consistent with the projected RCP 4.5 scenario modeled by the IPCC, which envisions global emissions dropping below 2005 levels by 2100. Temperature increases moderately while current drought conditions in the West continue throughout the study period.
Policy	While the federal government continues to make slow progress towards incentivizing clean energy technologies (including the Inflation Reduction Act), partisan politics makes it challenging to adopt comprehensive carbon reduction policies. The resulting policy environment is one of piecemeal policies enacted on both the state and local levels in the U.S. without strong sustainability policies that supersede SRP’s 2035 Sustainability Goals.
Customer Participation	SRP continues to be a regional leader in offering energy efficiency and demand response programs to customers. The number of light-duty EVs increases significantly by 2035, benefiting from strong federal policy support provided in both the Infrastructure Investment and Jobs Act and the Inflation Reduction Act, and is consistent with SRP’s current 2035 Sustainability Goals. Cost declines of distributed solar and batteries drive increased adoption by residential and commercial customers.
Technology	Renewable and storage technologies continue to advance over time, leading to sustained cost declines. Tax credits provided through the Inflation Reduction Act make carbon-free resources even more competitive, but the cost reductions are partially offset by continued supply chain constraints driven by a large spike in demand. Emerging technologies such as small modular reactors, natural gas power plants equipped with carbon capture and green hydrogen production become commercially available in the 2030s.
Market Dynamics	Diversity in load and generation resources across different Balancing Authority Areas in the Southwest allow SRP to rely on market purchases to meet part of its electricity demand when necessary and economical. Natural gas prices increase moderately over time, reflecting increased demand.

SCENARIO: STRONG CLIMATE POLICY

Political consensus is reached on the need to act decisively to combat climate change resulting in several new policies and measures at the U.S. federal level. These policies are guided by an economy-wide net-zero emissions target by the year 2050 and provide power companies access to clean and renewable energy technologies faster and at lower cost. The pace of electrification in the building and transportation sectors accelerates, causing demand for electricity to increase. On the other hand, energy efficiency measures improve in efficacy and decrease in cost due to government support, which mitigates the increase in electricity demand. Extensive research and development support of clean energy resources advances power companies' operational learning curves and accelerates cost declines. Such cost declines also impact distributed generation on the customer side and create favorable conditions for the adoption of solar and storage systems. A Regional Transmission Organization (RTO) or a regional resource adequacy program is established in the Southwest, allowing power companies to better take advantage of load and resource diversity in the region.

STRONG CLIMATE POLICY



Key Drivers	Descriptions
Load	Load growth is sustained as large commercial and industrial customers continue to migrate into the Valley. Furthermore, the load growth is accelerated by rapid electrification of the building and transportation sectors.
Climate Change	Through 2035 temperatures in the Southwest remain consistent with the IPCC's RCP 4.5 scenario. Temperature increases moderately while current drought conditions in the West continue throughout the study period.
Policy	The U.S. federal government implements a suite of comprehensive policies to address climate change. These policies are designed around an economy-wide net-zero emissions requirement by 2050.
Customer Participation	Stronger federal codes, standards and incentives lead to high energy efficiency growth. Technology improvements and rapid cost declines drive accelerated distributed solar and battery adoption among SRP's residential and commercial customers. The number of light-duty, medium-duty and heavy-duty EVs as well as heat pumps increases significantly with federal support for these technologies.
Technology	Additional federal tax incentives, research and development investments and increased deployment of clean energy resources advance learning curves, driving significant cost declines for renewables and storage and accelerating the commercialization of emerging technologies. Domestic manufacturing is able to keep up with demand, and no price increases from supply chain constraints are included.
Market Dynamics	Federal policy support, incentives and subsidies drive increased transmission buildout across the nation. An RTO or a regional resource adequacy program is established in the Southwest region and system planning is conducted at a regional level. The regional planning paradigm and operational coordination allow the Balancing Authority Areas in the region to better take advantage of regional load and resource diversity, lowering the planning reserve margin SRP requires. More aggressive policies related to the natural gas supply chain increase natural gas prices.

SCENARIO: DESERT BOOM

Arizona grows to be a regional energy, technology and manufacturing hub, creating a second “Silicon Valley” in the Valley of the Sun. Economic growth in the Valley accelerates far beyond current projections and is led by a strong global technology industry and a supportive environment in Arizona. Electricity demand increases significantly with accelerated economic activity, growth in energy-intensive businesses and increased energy exports. Arizona’s central location, affordable cost of living and skilled workforce drive an influx of people and businesses to the area. Strong economic growth supports accelerated EV and heat pump adoption, adding more electrification loads to the grid. Increased availability of distributed solar and battery technology helps mitigate system demand but not at the scale needed to provide full grid backup.

DESERT BOOM



Key Drivers	Descriptions
Load	Load growth accelerates significantly as Arizona grows to be a regional energy, technology and manufacturing hub.
Climate Change	Climate change accelerates around the globe due to both climate policy inaction and strong global economic activity. Greater temperature rise occurs consistent with the IPCC’s pessimistic RCP 8.5 scenario while current drought conditions in the West continue throughout the study period.
Policy	Governments around the globe prioritize economic agendas over carbon emission reductions in the midst of an economic boom. SRP is committed to its 2035 Sustainability Goals, and no federal or state sustainability policies are passed that supersede these goals.
Customer Participation	Population growth and higher incomes accelerate adoption of light-duty EVs, heat pumps and distributed solar and batteries.
Technology	Renewable and storage technologies continue to advance over time, leading to sustained cost declines. Tax credits through the Inflation Reduction Act make carbon-free resources even more competitive, but the cost reductions are partially offset by continued supply chain constraints driven by a large spike in demand. Emerging technologies such as small modular reactors, natural gas power plants equipped with carbon capture, and green hydrogen production become commercially available in the 2030s.
Market Dynamics	Diversity in load and generation resources across different Balancing Authority Areas in the Southwest allows SRP to rely on market purchases to meet part of its electricity demand when necessary and economical. Natural gas prices increase moderately over time, reflecting continued demand growth and declining supply.