

DOCKETED	
Docket Number:	18-IRP-01
Project Title:	Integrated Resource Plan
TN #:	253560
Document Title:	City of Burbank, Water and Power IRP Report Part 1 Page 1-1 to Page 2-9
Description:	The Burbank IRP file was too large, so it had to be separated into multiple parts. This is "Part 1."
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Organization:	City of Burbank
Submitter Role:	Applicant
Submission Date:	12/7/2023 8:24:00 PM
Docketed Date:	12/8/2023



**WATER AND
POWER**

2024 INTEGRATED RESOURCE PLAN REPORT



2024 BWP IRP

Acknowledgements

BWP would like to thank the following entities:

- **Stakeholder Technical Advisory Group (STAG) for their input and thoughtful analysis on the development of the IRP**
- **The community members for attending the community meetings, as well as responding to the survey to provide input on the IRP**
- **City leadership (including the BWP General Manager) for their support throughout the IRP process**
- **The Black and Veatch Management Consultant, LLC team, who developed the report and analysis**
- **The power supply management team for their efforts on the analysis, quality assurance checks, development of the presentations and leading the stakeholder engagement efforts**
- **The power supply admin team for organizing the stakeholder meetings**
- **The sustainability, marketing and strategy team for their work on the IRP cover art, IRP survey, stakeholder meetings and event planning**

Thank you all for your efforts on developing the 2024 BWP IRP

2024 INTEGRATED RESOURCE PLAN

BURBANK, CA

B&V PROJECT NO. 415039

PREPARED FOR

Burbank Water and Power

13 NOVEMBER 2023



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1 Executive Summary

The development of Burbank’s Integrated Resource Plan (IRP) is mandated by the “Clean Energy and Pollution Reduction Act,” also known as Senate Bill 350 (SB 350). After it was passed in 2015, SB 350 required that, every five years, publicly-owned utilities with an annual electricity demand greater than 700 gigawatt-hours develop an IRP and file it with the California Energy Commission (CEC). As one of the publicly-owned utilities affected by SB 350, Burbank Water and Power (BWP) completed its previous IRP in December 2018. BWP uses its IRPs as tools to help make plans for Burbank’s energy future. As such, the IRP is a living document that will be routinely reviewed and updated as conditions in Burbank and the larger energy marketplace continue to change.

The 2024 IRP documented in this report was developed with input taken from a robust public stakeholder process. In November 2022, the Stakeholder Technical Advisory Group (STAG) was formed and included representatives from large corporations, non-profit entities, small commercial customers, civic leaders, environmental groups, and residential ratepayer advocates. In addition, BWP developed an IRP website to give the public an additional opportunity to follow along with the information shared at four community meetings that were hosted throughout 2023. At those meetings BWP provided IRP status updates and time was given for the public to ask questions about the IRP process in general and the 2024 IRP specifically. BWP’s website also contained a short, 12-question IRP survey. Between December 2022 and November 2023, the survey garnered a total of 952 responses from members of the public.

To assist in the creation of the detailed technical analysis that would be necessary for its 2024 IRP, BWP partnered with Black & Veatch Management Consulting, LLC, a wholly-owned subsidiary of Black & Veatch Holding Company. Black & Veatch Holding Company is a global engineering, construction, and consulting company. Since its founding in 1915, Black & Veatch has expanded to include over 10,000 professionals working out of more than 120 offices worldwide. Black & Veatch Management Consulting, LLC is made up of more than 170 experts from the electric, water, oil, natural gas, and technology industries. Prior to its work with BWP, Black & Veatch Management Consulting, LLC had recently engaged with clients, both in California and throughout the rest of the United States, on projects including IRPs, decarbonization strategies, market price forecasts, and long-term strategic plans for generation and transmission resources. For this project, Black & Veatch created a production cost model representing the City of Burbank that included its existing transmission and generation resources, purchased power contracts, and forecasts for energy demand, market energy prices, and fuel costs. Once the Burbank model had been completed by Black & Veatch, BWP was able to define multiple planning scenarios representing possible future conditions for the 25-year period from 2023 through 2047. A total of seven different planning scenarios were evaluated. They are listed below in Table 1-1.

Table 1-1 Summary of Planning Scenarios

Scenario #	Scenario Name	Details
1	Base Case	Meets SB 100 requirements of 60% renewables by 2030 and the BWP requirement of 100% zero carbon by 2040.
2	Net Zero by 2030	Meets the Base Case requirements and 100% zero carbon by 2030 (Accomplished by assuming renewable natural gas could be secured for Magnolia and Lake One in addition to assuming a full conversion of Intermountain Power Plant (IPP) to hydrogen by 2030).
3	SB1020+SMR	Meets the Base Case requirements, contracts for 25 megawatts (MW) of small modular reactor capacity by 2030 from outside CA, meets the SB 1020 goal of 90% carbon free resources by 2035 and 100% carbon free resources by 2040.
4	SB1020+SMR w/ 50% DEV & EV Demand	Meets the Base Case requirements, contracts for 25 MW of small modular reactor capacity by 2030 from outside CA, meets the SB 1020 goal of 90% carbon free resources by 2035 and 100% carbon free resources by 2040 and includes a 50% reduction of electrification (EV) and development (DEV) demand as compared to the Base Case.
5	10% Higher EV & DEV Demand	Meets the Base Case requirements and includes 10% higher electrification (EV) and development (DEV) demand as compared to the Base Case.
6	10% Lower EV & DEV Demand	Meets the Base Case requirements and includes 10% lower electrification (EV) and development (DEV) demand as compared to the Base Case.
7	New Transmission & PPAs	Meets the Base Case requirements and assumes working with LADWP to secure additional transmission services contracts to bring in renewables from outside CA, through power purchase agreements (PPAs)

Simulations corresponding to each of the seven planning scenarios were run using the production cost model. The output for each planning scenario included the unique portfolio of generating assets and purchased power contracts that would provide the lowest cost, reliable energy needed to serve the people of Burbank. Greenhouse gas emissions and total system and energy costs were also calculated.

Following the completion of the modeling for each of the planning scenarios, the results were reviewed by the BWP Rate Manager who completed a rate impact analysis. Within that analysis there were two key factors that differentiated the different scenarios and drove rate impacts: annual power supply costs and annual electric sales. Other utility costs were assumed to be the same for each of the seven planning scenarios. Two different measures of rate impact were calculated. The first was the average annual rate increase from current levels associated with achieving a target of 200 days cash on hand (DCOH) in the final analysis year of 2047. The second measure was the total bill increase projected to occur by 2047 for each of the scenarios using the previously calculated average annual rate increase and taking into account the rate increases approved for 2025 and rate increases projected for the future. The rate increases associated with

the IRP are above and beyond the already approved and forecasted rate increases for BWP. This increase should be interpreted as being in addition to the current bill. That is, if the calculated bill increase is 158%, a \$100 electric bill today would increase to \$258 in 2047 (in nominal terms). As a point of reference, if rates were increased by 2% per year to keep pace with a general inflation rate, customer bills in 2047 would be 67% higher than they are today.

Table 1-2 Rate Impacts from Planning Scenarios

Scenario #	Scenario Name	Annual Rate Increase (if contracts are signed and are available)	Bill Increase 2047 vs. Current
1	Base Case	4.03%	158%
2	Net Zero by 2030	9.49%	694%
3	SB1020+SMR	4.96%	213%
4	SB1020+SMR w/ 50% DEV & EV Demand	5.57%	256%
5	10% Higher EV & DEV Demand	3.94%	153%
6	10% Lower EV & DEV Demand	4.12%	163%
7	New Transmission & PPAs	4.03%	158%

Once all of the results for the seven planning scenarios were available, the scenarios were ranked using a scorecard that was based on feedback from the IRP survey, the members of the STAG, and other community stakeholders.

Table 1-3 Initial Scorecard Results

Metric	Weight	Base case	Net Zero by 2030	SB1020+SMR	SB1020+SMR w/ 50% DEV & EV Demand	10% Higher EV & DEV Demand	10% Lower EV&DEV Demand	New Transmission & PPAs
MODEL FOR EACH SCENARIO		PLEXOS	PLEXOS	PLEXOS	PLEXOS	PLEXOS	PLEXOS	PLEXOS
Cost/Ratepayer Impacts	40%	39%	0%	35%	37%	39%	40%	39%
Reliability	40%	24%	8%	27%	40%	21%	25%	24%
Environmental Stewardship	10%	0%	10%	3%	4%	0%	0%	1%
Diversity	10%	0%	5%	8%	8%	0%	0%	10%
Total	100%	63%	23%	72%	89%	60%	66%	75%
Rank		5	7	3	1	6	4	2

After the planning scenarios were ranked using the scorecard analysis, BWP removed three of the potential scenarios from consideration. This action was taken due to recent developments affecting the underlying assumptions for those scenarios. Specifically, the lack of availability for adequate sources of renewable natural gas (RNG) made the “Net Zero by 2030” scenario significantly more challenging to achieve. Additionally, in the summer of 2023, BWP entered into negotiations with several large commercial customers that could materially add to Burbank’s annual energy demand. As a result, the two planning scenarios that considered slower energy demand growth (“SB1020+SMR w/ 50% DEV & EV Demand” and “10% Lower EV & DEV Demand”) were also

eliminated. In the end, two preferred scenarios were chosen by BWP. These were the scenarios named “SB1020+SMR” and “New Transmission & PPAs.”

Table 1-4 Final Scorecard Results

Metric	Weight	Base case	SB1020+SMR	10% Higher EC & DEV Demand	New Transmission & PPAs
MODEL FOR EACH SCENARIO		PLEXOS	PLEXOS	PLEXOS	PLEXOS
Cost/Ratepayer Impacts	40%	39%	35%	39%	39%
Reliability	40%	24%	27%	21%	24%
Environmental Stewardship	10%	0%	3%	0%	1%
Diversity	10%	0%	8%	0%	10%
Total	100%	63%	72%	60%	75%
Rank		5	3	6	2

The “SB1020+SMR” planning scenario includes the updated zero-carbon energy requirements that are a part of the “Clean Energy, Jobs, and Affordability Act of 2022,” also known as Senate Bill 1020 (SB 1020), and the assumption that BWP will be able to procure a purchased power contract for 25 MW of capacity from a small modular reactor (SMR) starting in 2030. In addition to the new SMR contract, this portfolio also included new geothermal, solar, hydrogen, and battery storage assets.

The “New Transmission & PPAs” planning scenario assumes that new transmission lines would be in-service by 2035. Those new transmission resources would allow BWP to acquire power from generating resources outside Burbank that it would otherwise not be able to benefit from. New geothermal, solar, hydrogen, wind, and battery storage resources would add diversity to Burbank’s energy portfolio and align with its emission reductions goals. The results for this scenario include the costs associated with the Transmission Service Agreements (TSAs) that would be necessary for Burbank to take advantage of new transmission capacity.

Both of the preferred scenarios chosen by BWP provide a path forward for compliance with California’s renewable energy portfolio (RPS) and clean energy mandates as well as meeting the BWP goal of achieving 100% zero-carbon resources by 2040. The choice of preferred scenarios also aligns with BWP’s continuing commitment to provide reliable, affordable, and sustainable power for the residents and businesses of Burbank.

2 Introduction and Background

2.1 INTRODUCTION

The following report documents the 2024 IRP for BWP. The IRP is a long-term plan that is intended to provide guidance for BWP’s electric supply from 2023 to 2047. This IRP, like all long-term planning documents, is directional rather than determinative. In other words, the IRP helps Burbank see the broad contours of its energy future and the general direction that Burbank should head toward to reach that future.

The utility industry continues to undergo dramatic changes and this IRP reflects them. Concerns for climate change, the growth of renewable energy and energy storage, and the pending retirement of legacy fossil fuel-fired resources are all elements that have been considered.

The IRP is also informed by public input and the perspectives of Burbank residents, businesses, and other stakeholders. BWP had engagement with the public throughout its IRP process.

As a long-term planning document, this IRP is based on assumptions about what will happen in the future. These assumptions are based on the best available information and the judgement of experts at the time they were developed. However, the utility industry is continuing to experience a period of significant changes and so the assumptions that have been made carry inherent uncertainties. Future changes to the energy markets and to federal and state policies affecting the generation and transmission of electricity will influence the choices that BWP will make in the years to come. To account for this, this IRP is a living document that will be regularly revisited and improved to incorporate new or updated assumptions and to adopt practices that further BWP's mission to provide its customers with reliable, affordable, and sustainable electric service.

2.1.1 Burbank Water and Power

The City of Burbank is known as the “Media Capital of the World” and is home to many film and animation studios including Disney, Warner Bros., and Netflix. There are many smaller businesses in Burbank who also depend on reliable and cost-competitive electric service. About 105,000 people in a vibrant residential community call Burbank home. In total, BWP serves approximately 46,290 residential, 6,880 commercial, and 82 large commercial accounts.¹

BWP is a vertically integrated municipal utility owned and operated by the City of Burbank as a not-for-profit that generates, transmits, and distributes power to its customers at cost. During calendar year 2022, BWP maintained an availability rate of 99.999% with a system average interruption of less than 5 minutes per customer.² BWP's continuing excellence in system performance was recognized in 2021 when it was presented with a Reliable Public Power Provider (RP3) award by the American Public Power Association and earned its highest possible score.³ This level of performance was achieved while maintaining customer rates at levels lower than the average California customer. For fiscal year 2022, the system weighted average electric rate for the City of

¹ “City of Burbank Water and Power Annual Report, Fiscal Year 2021-2022,” page 59, https://www.burbankwaterandpower.com/images/administrative/downloads/BWP_FY2021-22_AnnualReport_Audited.pdf

² “City of Burbank, Burbank Water and Power, Staff Report,” dated February 2, 2023, page 19, https://www.burbankwaterandpower.com/images/administrative/downloads/BWP_MonthlyOpsReport_February2023.pdf

³ “Burbank Water and Power (BWP) Wins Prestigious National Award for Electric Reliability,” April 16, 2021, <https://www.burbankca.gov/newsroom/-/newsdetail/20124/burbank-water-and-power-bwp-wins-prestigious-national-award-for-electric-reliability>

Burbank was 15.66 Cents/kWh⁴ while the June 2022 system average for all of California was 23.83 cents/kWh.⁵

2.1.2 Mandate for Integrated Resource Plan

In accordance with the requirements of “The Clean Energy and Pollution Reduction Act” (SB 350) that was passed in 2015, publicly-owned utilities in California with an annual electricity demand greater than 700 gigawatt-hours were required to develop an IRP and submit it to the CEC.⁶ That IRP is required to be updated at least once every five years. As one of sixteen publicly-owned utilities affected by that IRP requirement, Burbank last completed an IRP in December 2018.

2.1.3 Objectives of the Integrated Resource Plan

Burbank’s IRP is a tool to assist the City as it makes plans for its energy future. It must serve to help guide the City in its long-term power supply planning for generation resources, transmission resources, renewable energy procurement, and greenhouse gas (GHG) emissions reductions. These long-term plans must also serve the mission of providing Burbank with reliable electrical service while minimizing the impact on ratepayer bills.

2.1.4 Policy Guidelines, Major Implications, and Action Items

Through the IRP process, BWP found that, while the business of providing Burbank with reliable, affordable, and sustainable electric service continues to experience rapid change, the overarching principles that guide its business are captured in the following policy guidelines:

BWP should continue to ***meet electricity demand growth*** by first encouraging energy efficiency and conservation. Future generation resources or long-duration energy storage capabilities necessary to satisfy additional demand growth will be researched and considered on a case-by-case basis.

- BWP should ***optimize cost-effective energy efficiency and conservation programs***.
- BWP will ***add renewable energy*** to meet state mandates.
- BWP should ***plan to achieve GHG emissions reductions*** in line with state and city goals.
- BWP aims to ***maintain low cost of service*** for its electric customers.

During the preparation of this 2024 IRP, BWP identified a number of major implications to consider. These implications are as follows:

⁴ “City of Burbank Water and Power Annual Report, Fiscal Year 2021-2022,” page 60, https://www.burbankwaterandpower.com/images/administrative/downloads/BWP_FY2021-22_AnnualReport_Audited.pdf

⁵ U.S. Energy Information Administration, Electric Power Monthly, Table 5.6.A., released August 2023, <https://www.eia.gov/electricity/monthly/archive/august2022.pdf>

⁶ Public Utility Code Section 9621(a)

- BWP should pursue cost-effective energy efficiency and demand response programs to fulfill California energy efficiency requirements and place additional emphasis on peak demand reduction.
- BWP's share of the Intermountain Power Project (IPP) coal-fired generating plant in Utah will be retired in June 2025. After that, BWP will continue to purchase energy from the new natural gas-fired facility at IPP that will be coming online at the same time. As a result of the conversion of IPP from coal to natural gas, the total capacity of IPP is decreasing from 1,800 MW to 840 MW. Due to that change in total site capacity, BWP's share of that capacity will decrease from 89.28 MW to 35 MW for the period from 2025 through 2027. Then, starting in 2027, a new 50-year contract with IPP will begin and BWP's capacity share will be further reduced to 28 MW. IPP will be 30% hydrogen capable in 2025, with an aim of 100% hydrogen by 2045.
- In accordance with SB100, BWP will need to procure additional renewable energy resources to increase their projected 41.25% share of BWP's retail sales in 2023 to at least 60% by 2030. All of the planning scenarios documented in Section 2.6 of this report included this SB100 renewable energy requirement.
- Additional quantities of fast-ramping energy storage and dispatchable generation will be needed to address the intermittency of renewable resources. Mitigating the effects of the "Duck Curve" will necessitate expanding the capacity of energy storage resources. During the daytime, conventional and renewable energy generation is able to meet the real time needs of customers in the energy market. However, during the evening hours, as the sun sets and solar generation rapidly decrease to zero, large amounts of energy from conventional generation or energy storage needs to be available to fill that gap. Energy storage will allow renewable energy to be storage during time of excess generation and then released back into the system when it is needed.
- BWP's greenhouse gas emissions should be dramatically reduced during the planning period, consistent with California Air Resources Board (CARB) targets set forth in the 2017 Scoping Plan. Those targets represent proportional shares of the overall California emissions reductions goals for publicly owned utilities including BWP. The CARB Scoping Plan was updated in 2022, with the dataset for greenhouse gas emissions reductions updated in September 2023.⁷ The dataset for greenhouse gas emissions reductions used for this IRP is based on the 2017 Scoping Plan, since that was the only dataset that was available during the development of the IRP. Additional information about the changes to the CARB emissions targets are provided in Section 3.1.3 below. In each planning scenario within this 2024 IRP, BWP achieves its aspirational goal of 100% zero carbon resources no later than 2040.
- Similar to the 2022 CARB Scoping Plan, this IRP assumes that technologies like carbon capture and sequestration and hydrogen will be commercially available in the amount

⁷ California Air Resources Board, "Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2023 Update," September 2023, <https://ww2.arb.ca.gov/resources/documents/irp-ghg-targets-2023-update>

necessary to achieve the greenhouse gas reductions necessary to get BWP to its 2040 zero-carbon resources goal.

- Alternative fuel technologies such as hydrogen or RNG and other dispatchable clean energy resources such as geothermal power and SMRs will need to be considered as the BWP system transitions from a 60% RPS requirement in 2030 to 100% zero-carbon resources by 2040 (though SB 100 requires 100% of resources come from zero-carbon resources by 2045, BWP has a more aggressive goal of meeting 100% of its resources from zero-carbon resources, starting in 2040). Some of these energy technologies have not reached high levels of developmental maturity or have not yet seen widespread adoption. Risks associated with the delayed deployment of these necessary technologies could impact the planning forecasts in this IRP and the ability of BWP to achieve its stated emissions reduction goals in a timely and cost-effective way.
- Electrification could have a significant impact on BWP's energy procurement and system cost. Materially higher levels of electrification over time could result in significantly higher electricity demand and could subsequently make the transition to renewable and clean energy goals more challenging and costly. Electrification results in greater utilization of assets and can eventually drive down total costs in the future. Uncertainty about long-term trends in electrification has been addressed within the planning scenarios in this 2024 IRP Report. Sensitivity cases that include higher or lower demand from the electrification of the transportation sector are described more fully in Section 2.6. It is important to note, that state mandates for electrification; specifically, the requirement that all new passenger cars and trucks be zero-emission post-2035 and the elimination of natural gas appliances, will lead to overall savings for customers. The electric costs will go up; however, natural gas and gasoline bills should dramatically decrease.

Finally, BWP also identified a number of action items that it plans to address.

- **Rate Design:** Design time-of-use (TOU) rates that encourage customers to shift their energy consumption away from higher cost periods to lower cost periods. BWP plans to develop a more robust TOU rate-making process in October 2024. See Sections 2.4.3 and 3.9.5.2 for more information on TOU rates.
- **Demand Response (DR):** Consider cost-effective BWP customer DR programs. See Section 2.1.5.3 for additional details on DR actions being pursued.
- **Beneficial Electrification:** BWP continues to manage a comprehensive portfolio of resource efficiency programs for residential and commercial customers focused on energy efficiency, peak load reduction, transportation electrification, and greenhouse gas savings. See Section 2.4 for more information on the programs that are already in place to encourage electrification.
- **Disadvantaged Communities:** Develop and implement a program to target disadvantaged communities with selected BWP energy efficiency, demand response, and beneficial electrification programs. See Section 2.4.5 for additional information about BWP programs available for customers in disadvantaged communities.
- **IPP Coal Replacement:** Accommodate the decrease in BWP's share of IPP's capacity and the change in fuel types planned for IPP starting in 2025. See Section 2.5.4 for additional details about the changes planned for IPP and how they will affect BWP.

- **Transmission Delivery for Renewables:** In collaboration with BWP’s Balancing Authority (the Los Angeles Balancing Authority), secure additional transmission services agreements. The availability of long-distance electrical transmission resources to bring energy to Burbank from more distant locations gives BWP additional opportunities to seek out and procure diverse energy resources.
- **Solar Over-Generation:** Work to mitigate the impact of solar generation (including morning and evening ramping, overgeneration, and instantaneous intermittency) such that reliability and affordability are maintained. To achieve the high levels of renewable energy use required by its RPS targets, BWP will have to procure renewable capacity that will exceed its annual peak demand. This means that it will have more renewable energy than it needs on many days of the year when peak demands are lower than the annual peak demand. On summer days, the mismatch between renewable supply and customer demand is manageable. However, during mild spring or fall days, the non-dispatchable renewable generation may exceed total customer demand. Solar over-generation can be mitigated through the curtailment of generation assets including the solar facilities themselves. This is not the ideal solution as it limits the benefits gained through the use of renewable energy. Another mitigation option is the use of energy storage or changes in demand (like demand response, etc.) to absorb the energy from over-generation during the day and then discharge that energy later in the day when it is needed. Section 3.6.3.3 contains additional information on how energy storage is used to increase the usefulness of intermittent renewable resources.
- **EIM Participation:** Evaluate possible participation in the California Independent System Operator’s (CAISO’s) Energy Imbalance Market (EIM). The EIM is an initiative by CAISO to create a larger daily wholesale electricity marketplace with more participants to ensure additional sharing of diverse energy resources. Participating is voluntary, although BWP cannot participate unless its balancing authority, the Los Angeles Department of Water and Power (LADWP), also joins. In April 2021, LADWP began its participation in CAISO’s EIM.⁸ BWP will also separately assess the possibility of joining the CAISO Extended Day-Ahead Market (EDAM). The EDAM seeks to improve efficiencies within the energy market by using day-ahead commitment and scheduling of generating resources across a large geographic area across multiple states. A regional day-ahead market such as the EDAM could also improve system reliability and help to more effectively schedule renewable resources and reduce the need for clean energy curtailment.
- **Resource Positioning:** Position BWP’s resources to work with the Duck Curve to the greatest extent possible to minimize costs and maximize reliability for Burbank. Evaluate further improvement in the operational flexibility of the Magnolia Power Project. In 2023, BWP was awarded the “Best Practices Award from the Combined Cycle Journal,” for the General Electric or GE enhancements that were implemented at Magnolia to allow for efficient turn down of the unit, as more variable resources, such as wind and solar come on to the grid. The GE enhancements reduced the minimum output of Magnolia from 165 MW,

⁸ Los Angeles Department of Water & Power, “LADWP Begins Participation in Western Energy Imbalance Market (EIM),” <https://www.ladwpnews.com/ladwp-begins-participation-in-western-energy-imbalance-market-eim/>