DOCKETED	
Docket Number:	18-IRP-01
Project Title:	Integrated Resource Plan
TN #:	256803
Document Title:	City of Burbank, Water and Power IRP Report Part 5
Description:	2024 IRP Submittal
Filer:	Mandip K Samra
Organization:	City of Burbank
Submitter Role:	Applicant
Submission Date:	6/11/2024 11:08:09 AM
Docketed Date:	6/11/2024

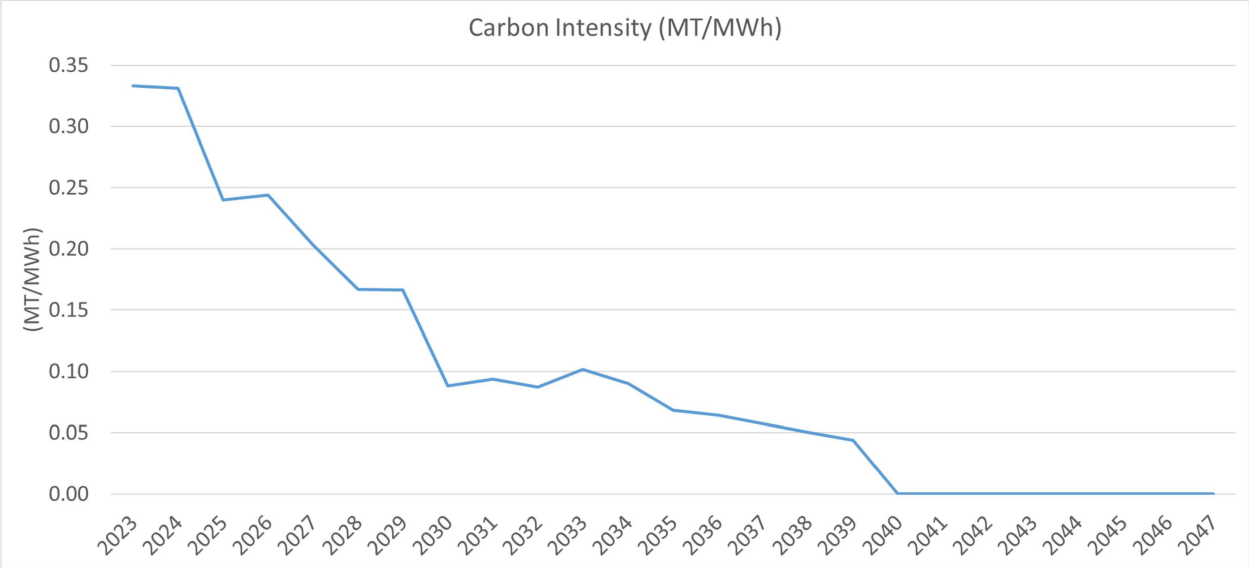


Figure 2-23 "SB1020+SMR w/ 50% DEV & EV Demand" Planning Scenario - Carbon Intensity

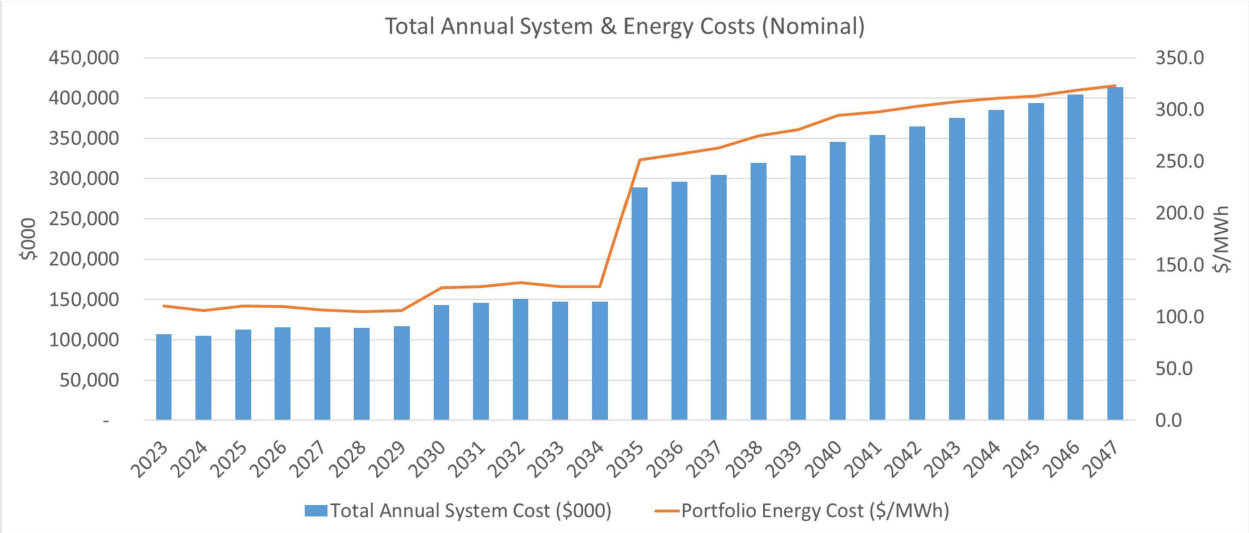


Figure 2-24 "SB1020+SMR w/ 50% DEV & EV Demand" Planning Scenario - Total System and Energy Costs

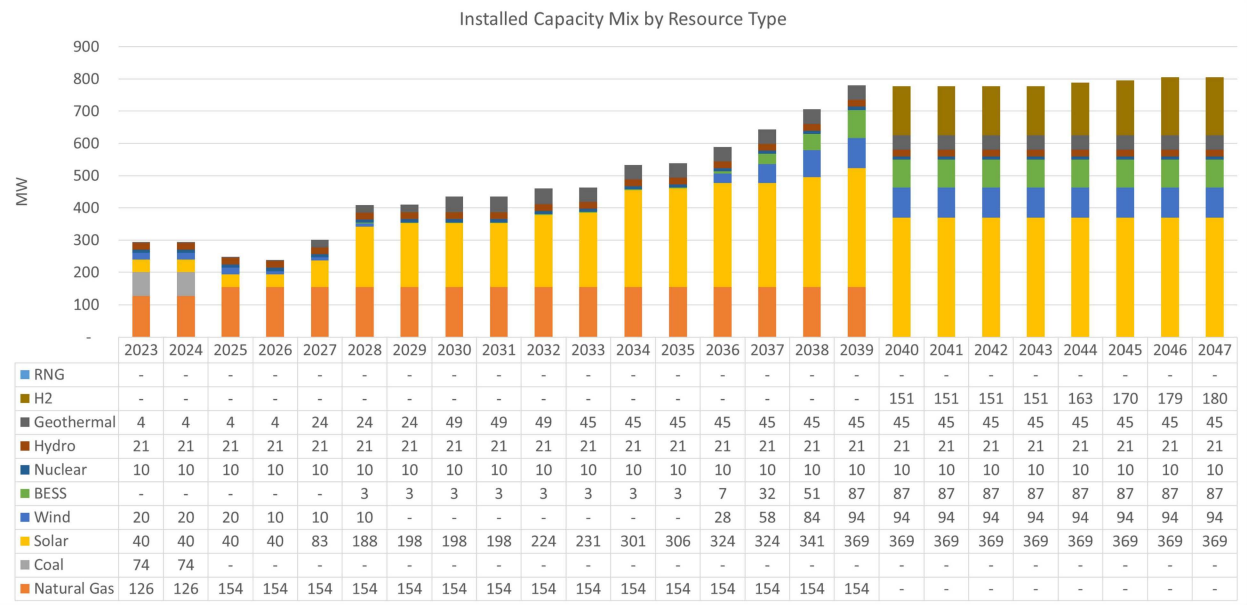
2.6.5 "10% Higher EV & DEV Demand" Planning Scenario

The uncertainties inherent in the forecast of long-term trends in the demand for electricity made it prudent to include sensitivity cases focused on the effects of Burbank's demand that might be higher or lower than what was assumed in the Base Case. Of particular interest are the contributions to future demand from planned development projects within Burbank and the demand associated with the increased adoption and charging of electric vehicles because they are the key drivers in Burbank's demand growth. Within this sensitivity scenario, the assumed demand

from those two categories was increased by 10%. All other assumptions and inputs from the Base Case remained unchanged.

With the assumption that total demand will be higher in this scenario, more total energy was needed to be generated to meet Burbank's energy needs. Consequently, moderate increases in the total build-out of generating facilities were calculated within the model. Compared with the Base Case, more hydrogen-fueled combustion turbine capacity was built along with higher wind and solar capacity. Market purchase of energy were also found to be somewhat greater. All of those results were in line with expectations due to the assumptions made for this scenario.

Since electric vehicle and new development demand are only a portion of total demand, this scenario resulted in a total demand increase relative to the Base Case of 2.6% with an increase in total system cost. Likewise, a small increase of about 1% in total carbon emissions was calculated. This was expected due to the need to generate slightly more electricity from fossil-fueled resources prior to their phase out in 2040.



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RNG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151	151	151	151	163	170	179	180
Geothermal	4	4	4	4	24	24	24	49	49	49	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Hydro	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Nuclear	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
BESS	-	-	-	-	-	3	3	3	3	3	3	3	3	7	32	51	87	87	87	87	87	87	87	87	87
Wind	20	20	20	10	10	10	-	-	-	-	-	-	-	28	58	84	94	94	94	94	94	94	94	94	94
Solar	40	40	40	40	83	188	198	198	198	224	231	301	306	324	324	341	369	369	369	369	369	369	369	369	369
Coal	74	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Gas	126	126	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	-	-	-	-	-	-	-	-

Figure 2-25 "10% Higher EV & DEV Demand" Planning Scenario – Installed Capacity Mix

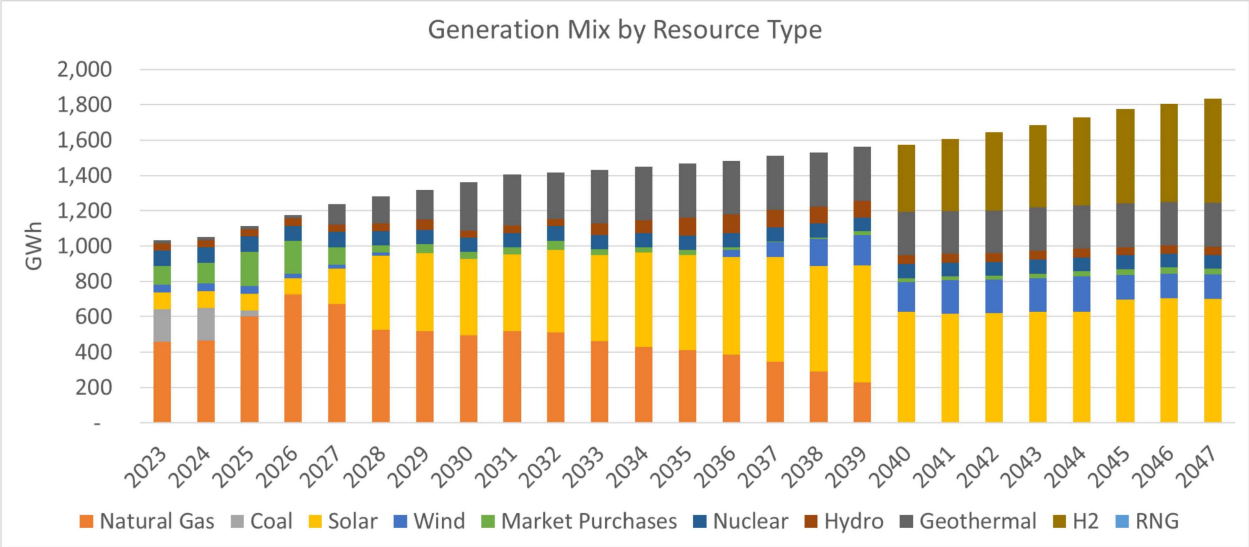


Figure 2-26 "10% Higher EV & DEV Demand" Planning Scenario – Generation Mix

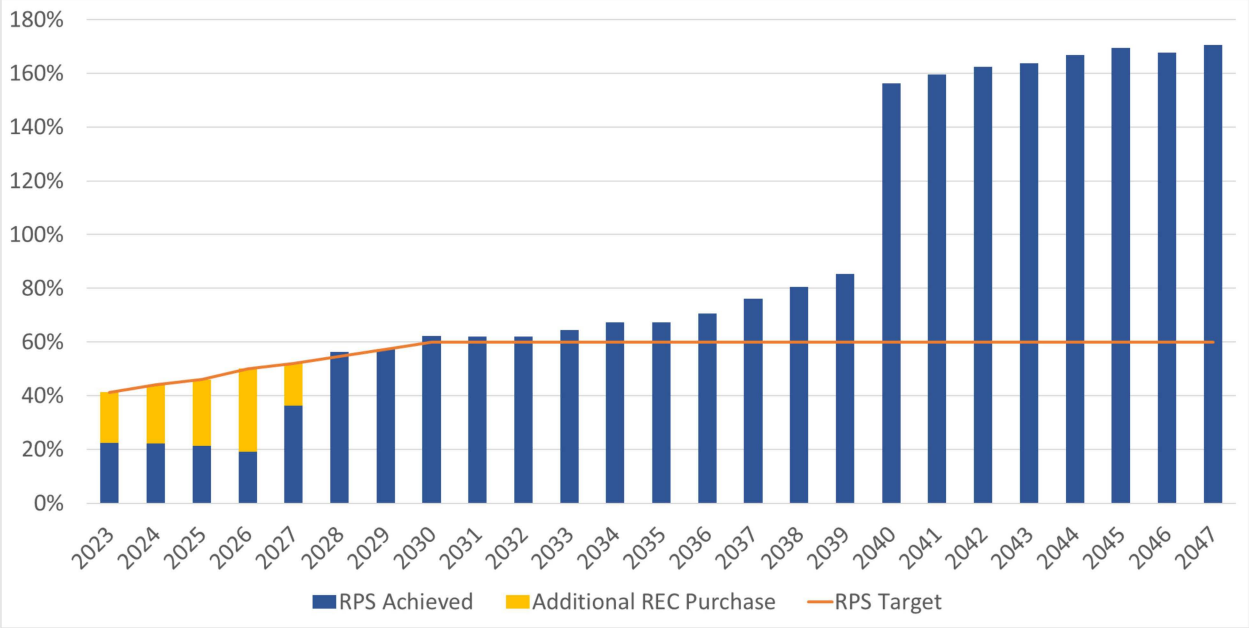


Figure 2-27 "10% Higher EV & DEV Demand" Planning Scenario – RPS Percentage

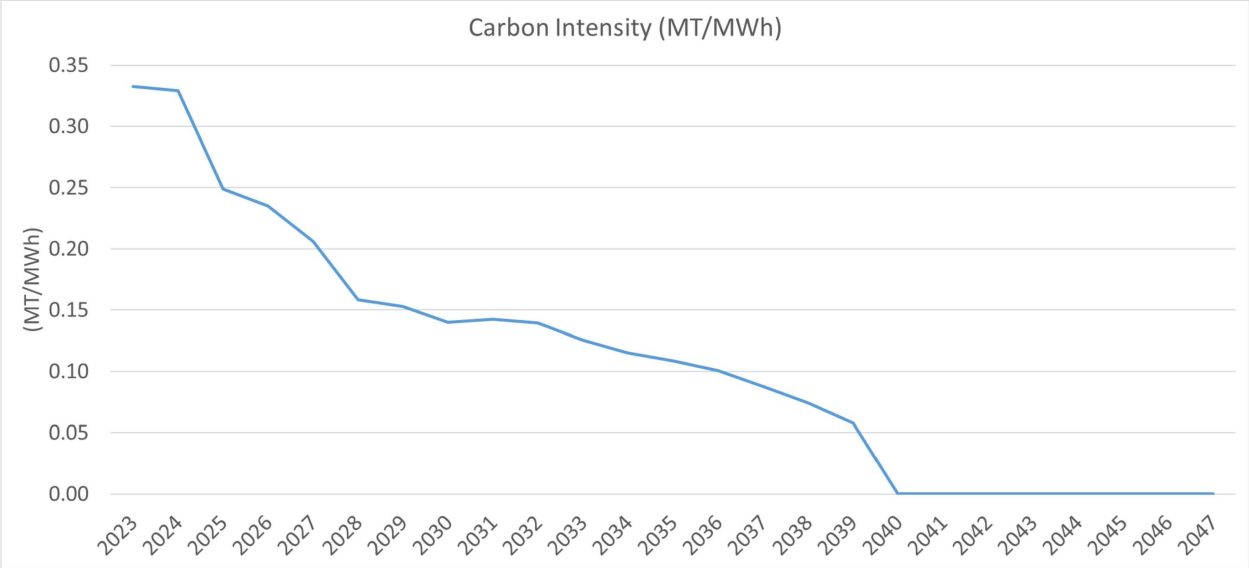


Figure 2-28 "10% Higher EV & DEV Demand" Planning Scenario – Carbon Intensity

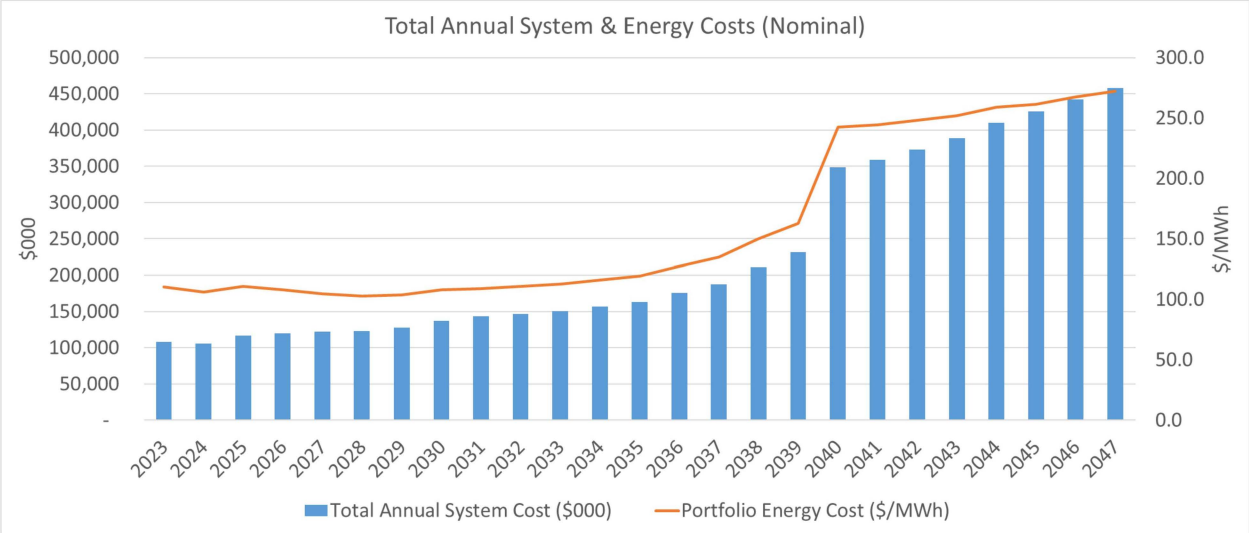


Figure 2-29 "10% Higher EV & DEV Demand" Planning Scenario – Total System and Energy Costs

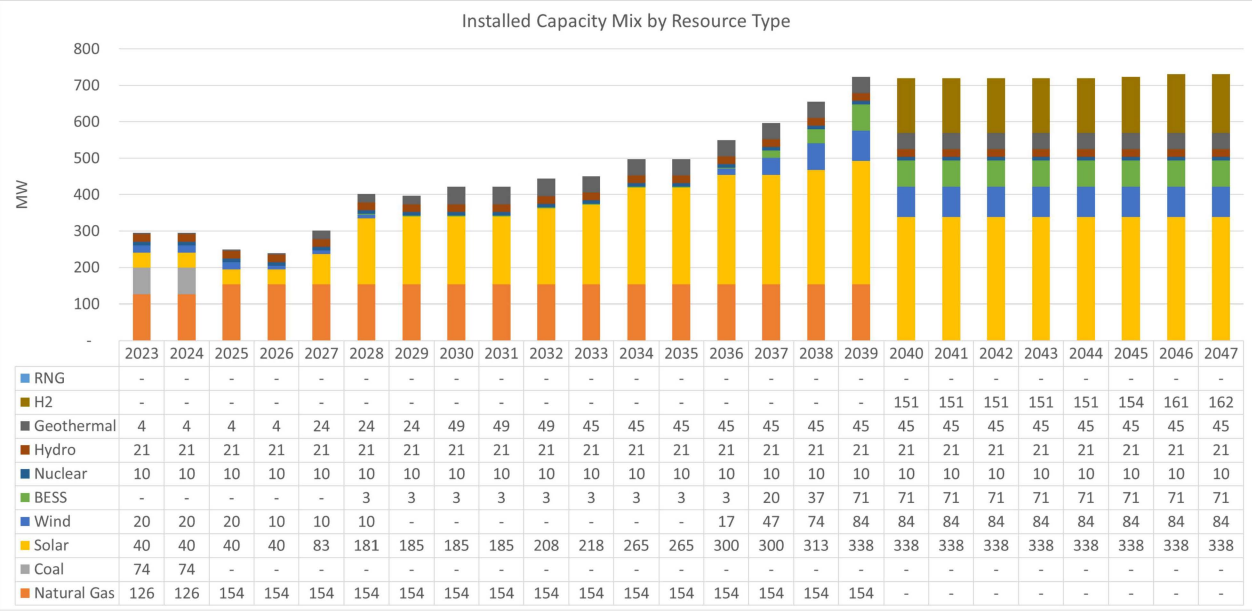
2.6.6 "10% Lower EV & DEV Demand" Planning Scenario

The uncertainties inherent in the forecast of long-term trends in the demand for electricity made it prudent to include sensitivity cases focused on the effects of Burbank's demand that might be higher or lower than what was assumed in the Base Case. Of particular interest are the contributions to future demand from planned development projects within Burbank and the demand associated with the increased adoption and charging of electric vehicles because they are the key drivers in Burbank's demand growth. Within this sensitivity scenario, the assumed demand

from those two categories was decreased by 10%. All other assumptions and inputs from the Base Case remained unchanged.

With the assumption that total demand will be lower in this scenario, less total energy was needed to be generated to meet Burbank's energy needs. Consequently, moderate decreases in the total build-out of generating facilities were calculated within the model. Compared with the Base Case, less hydrogen-fueled combustion turbine capacity was built along with lower wind and solar capacity. Market purchase of energy were also found to be somewhat lower. All of those results were in line with expectations due to the assumptions made for this scenario.

Since electric vehicle and new development demand are only a portion of total demand, this scenario resulted in a total demand decrease relative to the Base Case of 2.6% with a decrease in total system cost. Likewise, a small decrease of about 1% in total carbon emissions was calculated. This was expected due to the need to generate slightly less electricity from fossil-fueled resources prior to their phase out in 2040.



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RNG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151	151	151	151	151	154	161	162
Geothermal	4	4	4	4	24	24	24	49	49	49	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Hydro	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Nuclear	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
BESS	-	-	-	-	-	3	3	3	3	3	3	3	3	3	20	37	71	71	71	71	71	71	71	71	71
Wind	20	20	20	10	10	10	-	-	-	-	-	-	-	17	47	74	84	84	84	84	84	84	84	84	84
Solar	40	40	40	40	83	181	185	185	185	208	218	265	265	300	300	313	338	338	338	338	338	338	338	338	338
Coal	74	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Gas	126	126	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	-	-	-	-	-	-	-	-

Figure 2-30 "10% Lower EV & DEV Demand" Planning Scenario – Installed Capacity Mix

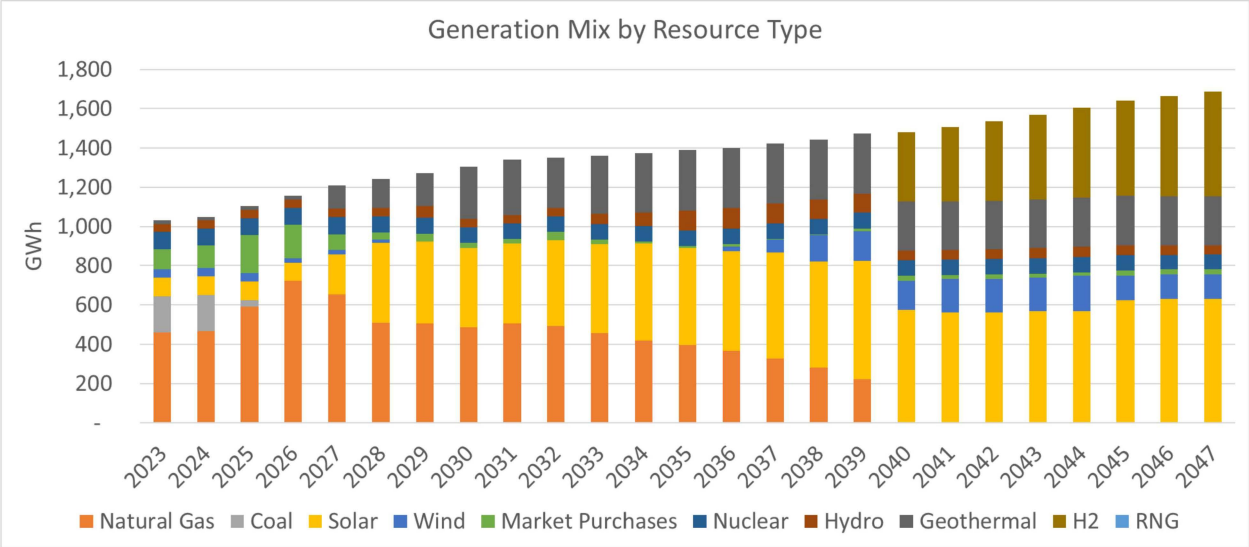


Figure 2-31 "10% Higher EV & DEV Demand" Planning Scenario – Generation Mix

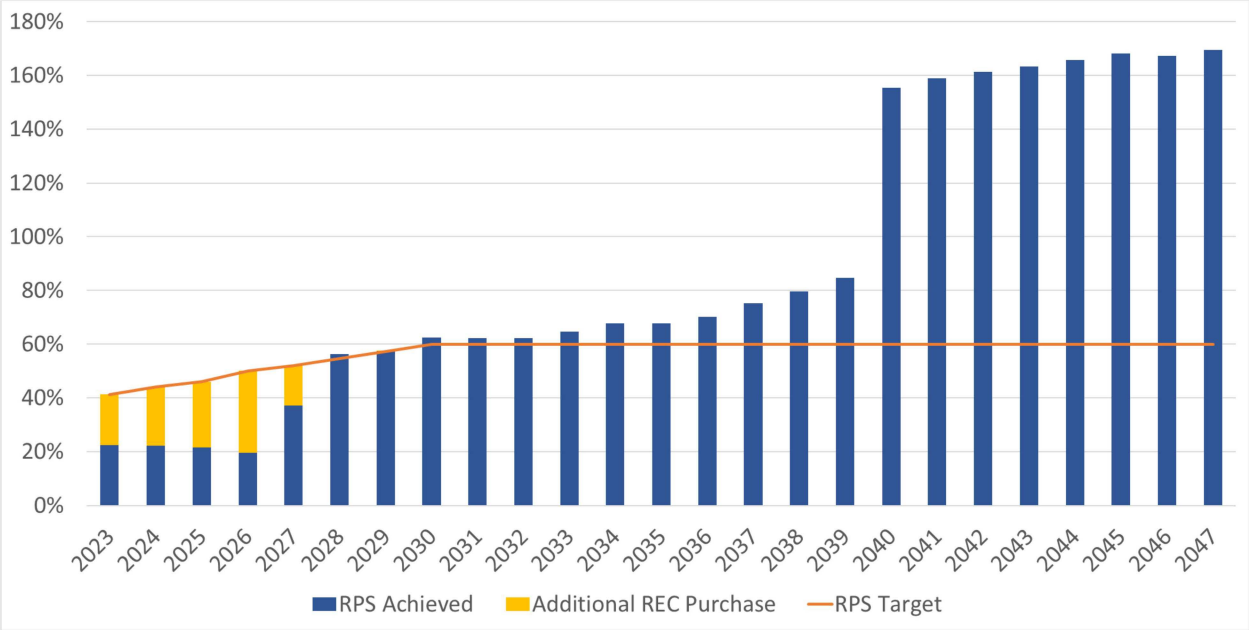


Figure 2-32 "10% Higher EV & DEV Demand" Planning Scenario – RPS Percentage

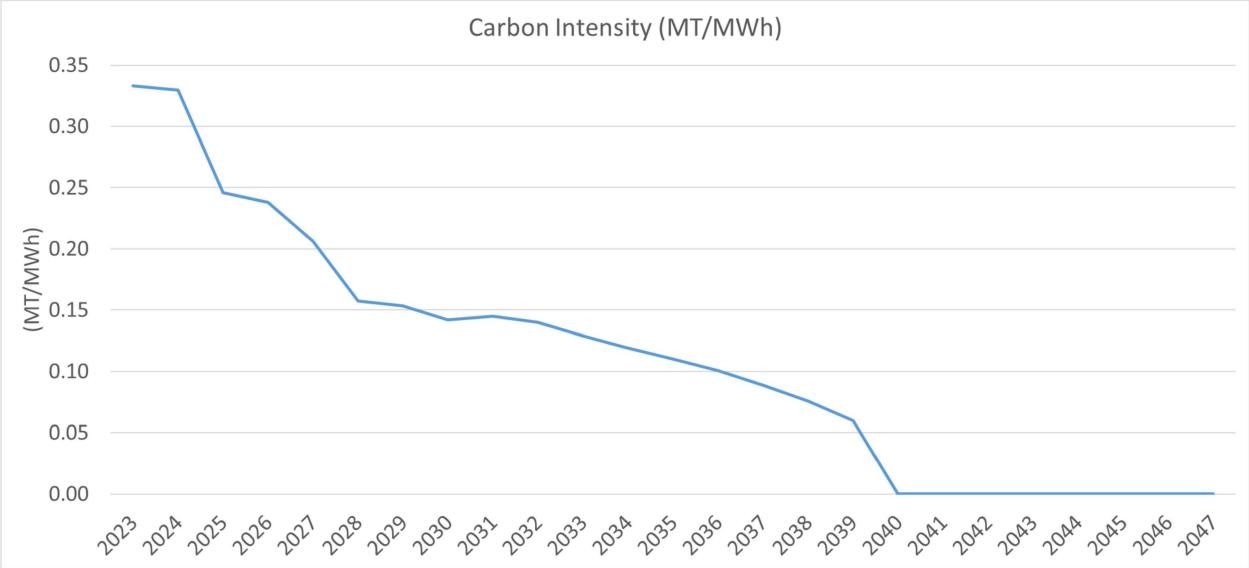


Figure 2-33 "10% Lower EV & DEV Demand" Planning Scenario – Carbon Intensity

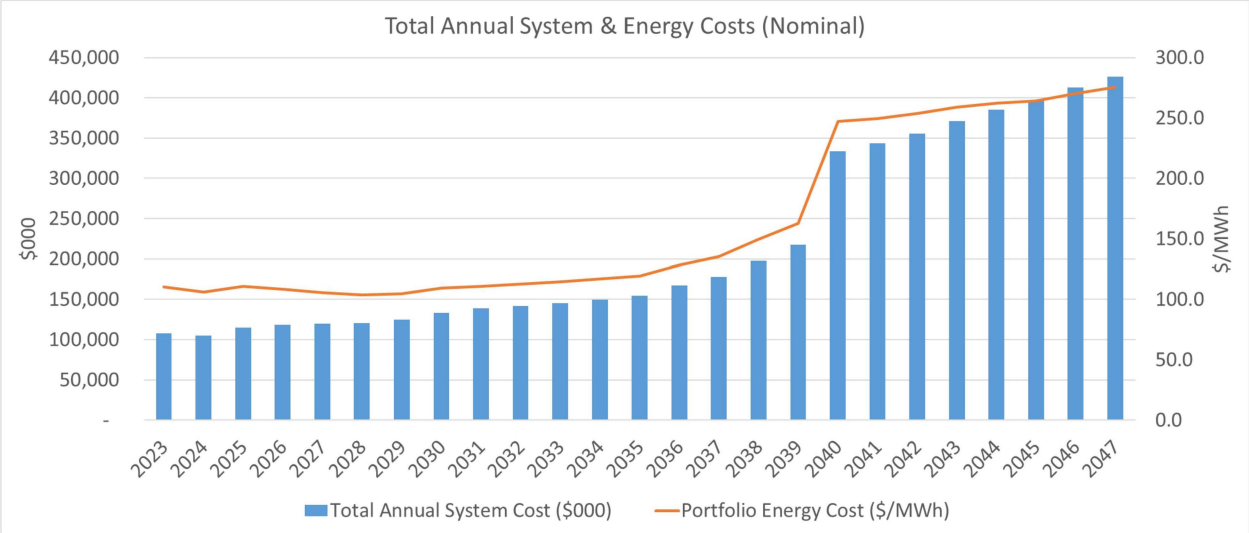


Figure 2-34 "10% Lower EV & DEV Demand" Planning Scenario – Total System and Energy Costs

2.6.7 "New Transmission & PPAs" Planning Scenario

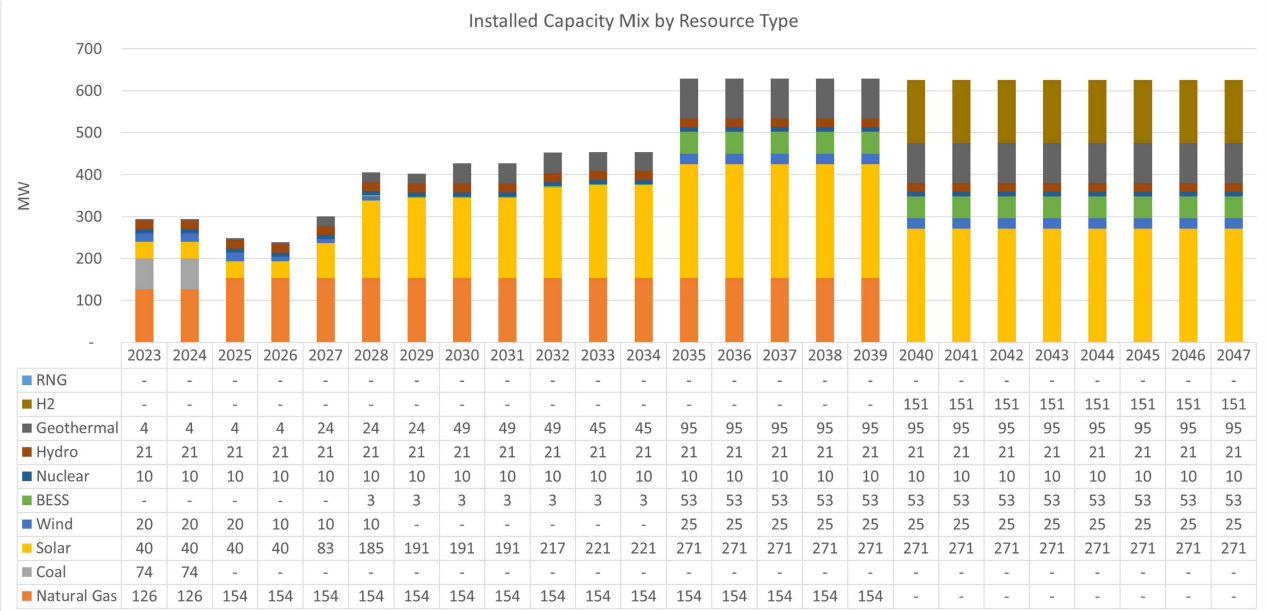
To achieve a carbon free future for Burbank, the obstacle of transmission investments, upgrades, and advancements will need to be addressed. Transmission upgrades can dictate where future generating resources can be located, and it is important for BWP to keep a close eye on how the transmission system advances in the case that certain upgrades could lead to beneficial resource procurement opportunities. The New Transmission & PPAs planning scenario is predicated on the addition of new transmission lines that would potentially be in-service by 2035. These new transmission lines would allow BWP to acquire power from resources it otherwise would not be

able to due to transmission constraints. It is important to note that if these transmission upgrades do not materialize that this portfolio would no longer be a viable option.

The major changes from the Base Case made to create this scenario are the transmission upgrades and the new generating resources that they facilitate. The new generating resources are 50MW of solar within California, 50MW of geothermal power (also from within California), and 25MW of wind from New Mexico & Arizona. These potential resource additions are diverse and align with BWP's RPS and CES goals. Although BWP does not have to provide the new transmission capital, BWP will have to enter into Transmission Service Agreements (TSAs) for these resources. The cost associated with the TSAs have been incorporated into this analysis.

As compared to the Base Case, the major portfolio change in this planning scenario is the addition of an additional 50MW of geothermal power starting in 2035. Geothermal power plants have a higher capacity factor than intermittent solar or wind facilities. This higher capacity factor resulted in a reduced buildout of other resources such as solar, BESS, and wind.

Compared to the Base Case, the system cost is relatively equivalent until the mid-2030s when the new transmission projects are assumed to go in-service and new PPAs can be executed. The system cost is higher in the mid to late 2030s for this portfolio compared to the Base Case; however, it is better positioned for Burbank's 2040 net-zero carbon goal and system cost is lower post 2039.



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RNG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151	151	151	151	151	151	151	151
Geothermal	4	4	4	4	24	24	24	49	49	49	45	45	95	95	95	95	95	95	95	95	95	95	95	95	95
Hydro	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Nuclear	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
BESS	-	-	-	-	-	3	3	3	3	3	3	3	53	53	53	53	53	53	53	53	53	53	53	53	53
Wind	20	20	20	10	10	10	-	-	-	-	-	-	25	25	25	25	25	25	25	25	25	25	25	25	25
Solar	40	40	40	40	83	185	191	191	191	217	221	221	271	271	271	271	271	271	271	271	271	271	271	271	271
Coal	74	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Gas	126	126	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	-	-	-	-	-	-	-	-

Figure 2-35 "New Transmission & PPAs" Planning Scenario – Installed Capacity Mix

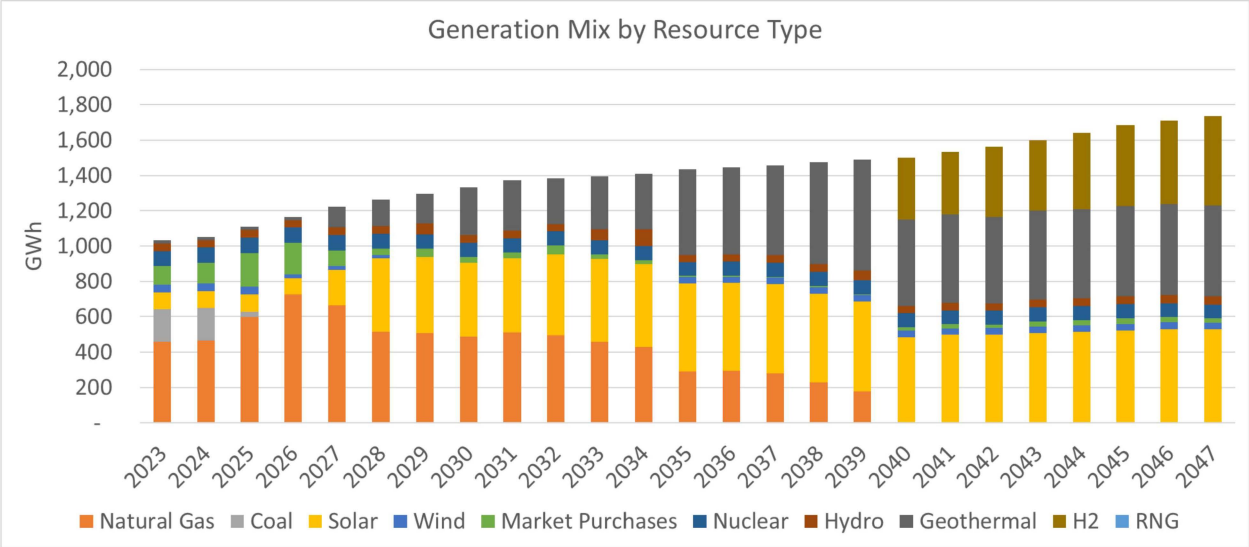

Figure 2-36 "New Transmission & PPAs" Planning Scenario – Generation Mix

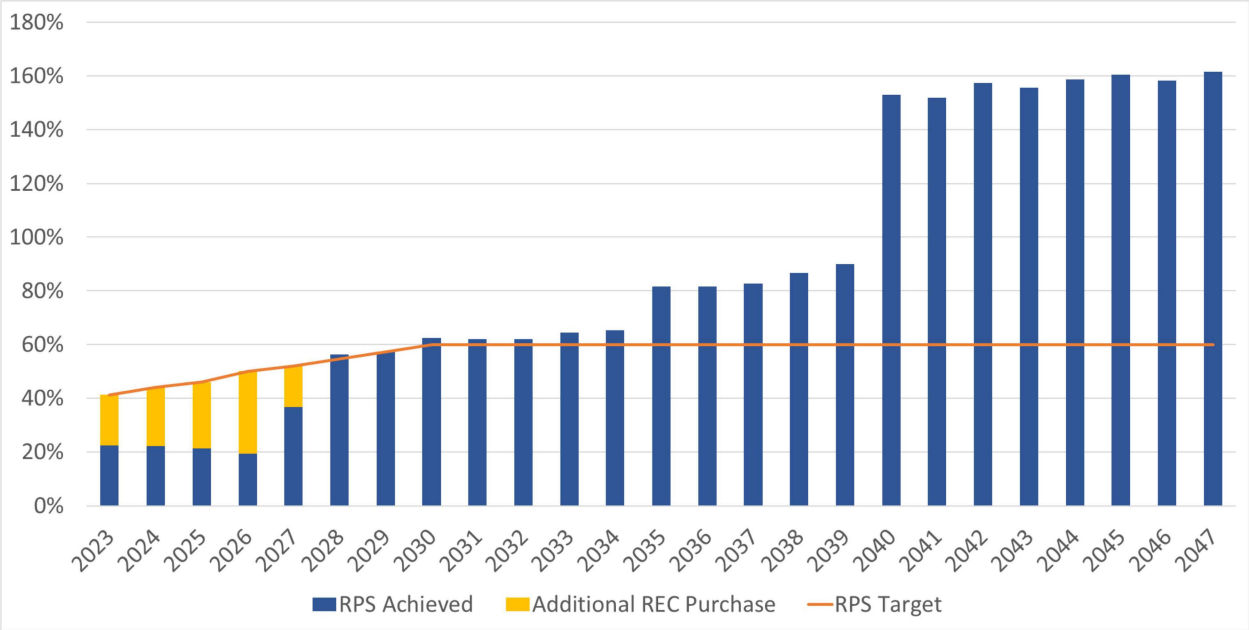

Figure 2-37 "New Transmission & PPAs" Planning Scenario – RPS Percentage

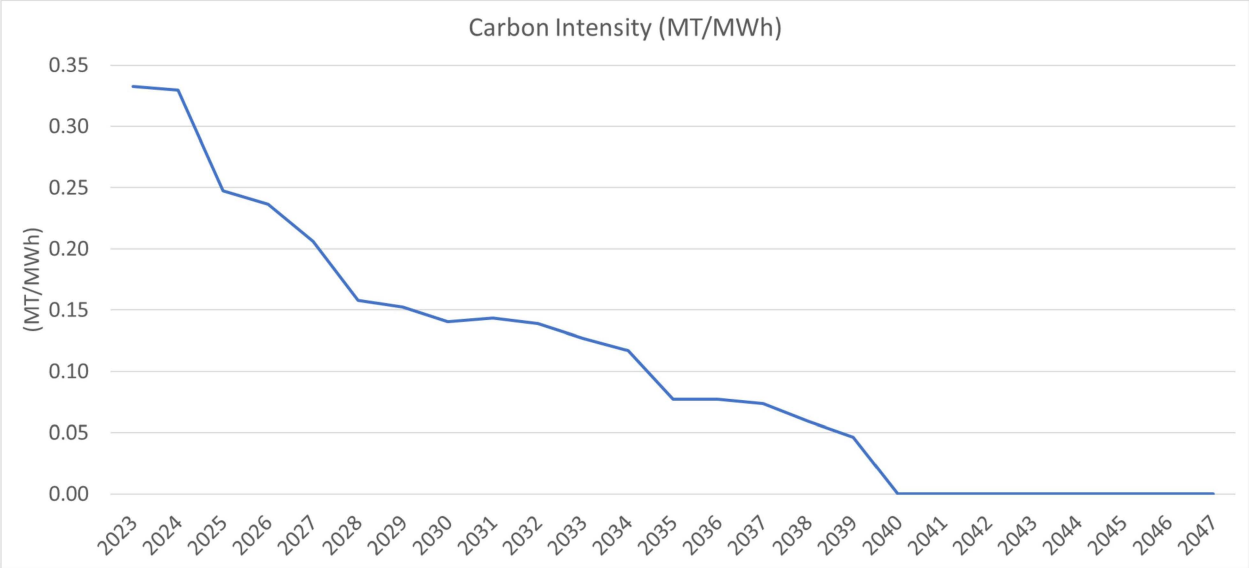

Figure 2-38 "New Transmission & PPAs" Planning Scenario – Carbon Intensity

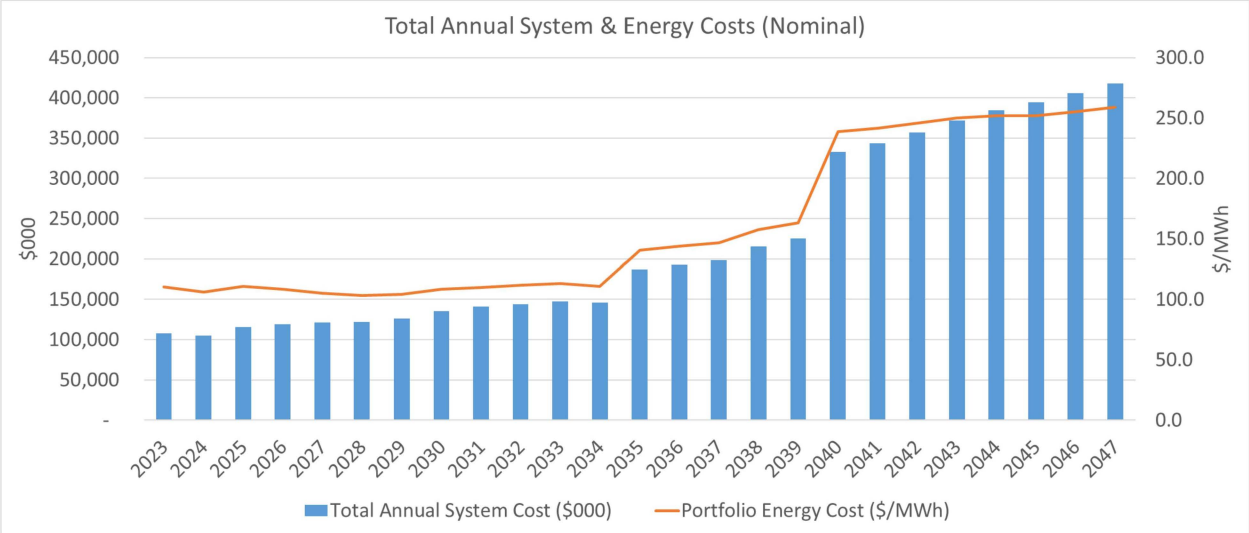

Figure 2-39 "New Transmission & PPAs" Planning Scenario – Total System and Energy Costs

2.6.8 Scorecard and Recommended Strategy

Based on the feedback from the IRP survey, the STAG and the community stakeholders, a scorecard was developed to rank each scenario. The IRP survey (provided as Attachment 2 to this report), indicated a preference for reliability first, followed closely by affordability and then minimizing environmental impacts. Reliability means ensuring that the lights turn on when you flip the switch and that outages are minimized. Affordability is the rate impact to BWP's customers. BWP has one of the lowest electric rates in the state. Minimizing environmental impacts means to procure

renewable energy above and beyond what is required and to significantly reduce GHG emissions. The weights assigned to these characteristics along with additional details of the scorecard are listed below:

Table 2-9 Scorecard Details and Weighting

Item	Details	Weight
Cost/Ratepayer Impacts	The total overall cost of the portfolio (the lower the cost, the higher the weight or score)	40%
Reliability	Lower transmission losses and lower market purchases (the lower the losses and purchases, the higher the weight or the score)	40%
Environmental Stewardship	Total greenhouse gas emissions (the lower the emissions, the higher the weight or the score)	10%
Diversity	Type of resource, length or term of the contract, type of resource technology (like wind, solar, geothermal, etc.), location of resource, a mix of baseload and variable resources, etc. Diversification of resources is required under SB 350	10%
Total		100%

Table 2-10 Initial Scorecard Results

Metric	Weight	Base case	Net Zero by 2030	SB1020+SMR	SB1020+SMR w/ 50% DEV &EV Demand	10% Higher EC & 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

2.6.8.1 Recommended Scenario(s)

Given that the market conditions on which the model assumptions were based have continued to change since the initial development of the IRP, BWP removed three scenarios from consideration. Scenarios "Net Zero by 2030," "SB1020+SMR w/50% DEV & EV Demand," and "10% Lower EV &

DEV," were all removed. Through continuous monitoring of the relevant market factors, BWP determined that those three scenarios were the least likely to match Burbank's energy future.

The "Net Zero by 2030" scenario was removed because it relied solely on RNG to achieve zero carbon emissions at Magnolia and Lake One Unit. Unfortunately, as of October 2023, there are not enough RNG contracts available on the market to reach that goal. In order to plan for this scenario, BWP would need to find RNG contracts and start to negotiate for these contracts immediately.

The "SB1020+SMR w/50% DEV & EV" and "10% Lower EV & DEV" scenarios are no longer considered to be the best planning options since additional planned development projects were added to BWP's mix after the IRP assumptions were developed. As of late summer 2023, BWP has entered into negotiations with several large commercial customers which will add 30-35 MW of demand around the clock. This would add approximately 275,000 MWh of demand annually, which is a 25% increase relative to BWP's current annual energy demand. These new commercial projects were not known about at the time the assumptions and scenarios for this IRP were developed. As a result of this added demand, any scenario that projects slower energy demand growth may no longer be an optimal choice for planning future decisions.

Below in Table 2-11 are all the scenarios that were identified by BWP as being practical. Based on the results of the scorecard, the "New Transmission & PPAs" and "SB1020+SMR" options were selected as the preferred scenarios. Both scenarios were selected, as the plan for the long-term future is based on the availability of technology and ability to secure additional transmission service agreements with the Los Angeles Department of Water and Power. Both scenarios provide a path forward to SB 100 and SB 1020 compliance as well as meeting the BWP 2040 goal of 100% zero-carbon resources.

Table 2-11 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

2.7 OTHER PLANNING CONSIDERATIONS

2.7.1 Resources

2.7.1.1 Renewable and Storage Options

The PLEXOS model used for the planning scenarios included several types of new renewable generation resources as possible future expansion options for BWP. These were wind turbines,

stand-alone solar, and hybrid solar plus energy storage. Stand-alone storage was also included as an option as well.

The contributions from customer-owned distributed generation and energy efficiency were included as a part of the demand forecast and not as separately modeled generation resources.

2.7.1.2 Non-Fossil Fuel Dispatchable Technologies

Modeling provisions were also made for the construction of new hydrogen-fueled combined cycle and combustion turbines along with the conversion of existing natural gas-fired power plants to use hydrogen or RNG.

2.7.1.3 Fossil Fuel Technologies

Burbank does not plan for any new fossil fuel power generation to be added to its portfolio in the future and the construction of new natural gas- or coal-fired resources were not a part of any of the scenarios that were studied. Existing fossil-fuel power plants were assumed to continue to be used in the near-term until they are retired either due to reaching their natural end-of-life or due to the requirements to meet RPS or clean energy targets. Within the model, fossil fuel generators were also converted to use other less carbon-intensive fuels such as renewable natural gas or hydrogen.

2.7.1.4 Energy Purchases

The PLEXOS model included the ability for the BWP system to make purchases in the energy market for times when it would be the least cost option for meeting BWP's demand needs. These purchases from the spot energy market are not tied to any generating resource owned by BWP or to any long-term purchased power contract that it has entered into. Spot energy market prices are not fixed and are largely outside of the control of BWP and can therefore represent a potential risk if spot market purchases form too large of a portion of BWP's energy supply.

2.7.1.5 Reserve Obligations

In 2015, following negotiations involving technical, operational, commercial, legal, and regulatory issues, LADWP, BWP, and Glendale Water and Power (GWP) were successful in negotiating a Balancing Authority Area Services Agreement (BAASA) that is cost-based and founded on modern industry policy and practice. It is comprehensive, flexible, fair, and provides a durable basis for BWP's operations and planning.

As a part of the BAASA, BWP also negotiated the opportunity to purchase all of its reserve obligations from LADWP instead of using BWP's own assets and limited market access to provide for the reserves. BWP reserve obligations were determined during and through negotiation of the BAASA as 40 MW of spinning capacity and 40 MW of supplemental capacity for a total of 80 MW of reserve capacity. LADWP does not guarantee that the full 80 MW of these reserves will be available for purchase every year, subject to LADWP's load growth and resource planning. BWP staff works closely with LADWP staff to manage this risk.

With BWP's reserve obligations being met through LADWP, no additional reserve margin was accounted for in the modeled planning scenarios within this IRP.

2.7.2 Environmental Costs

As a city, Burbank is pursuing an aspiration goal of becoming 100% zero-carbon by 2040. That goal exceeds the California state target for 100% clean energy by 2045. Meeting mandated GHG and RPS targets unavoidably incurs costs. The costs of new energy contracts and resources that are

compliant with those targets are built into all of the scenarios that were modeled for this IRP. BWP is committed to meeting its environmental mandates and goals while maintaining system reliability and affordable rates for its customers.

3 IRP Filing Contents Per CEC

3.1 PLANNING PERIOD (HORIZON)

3.1.1 Study Period

The Burbank 2024 IRP evaluates the period from 2023-2047. This study period exceeds the minimum requirements of PUC Section 9621 and allows for additional insights to be gathered as they relate to long-term planning and decision making that could impact BWP and its customers.

3.1.2 RPS Obligations

All the planning scenarios considered in this IRP include the RPS mandates from SB100 requiring an RPS of 60% by 2030. Table 3-1 details the Annual RPS Targets BWP plans to meet using a mixture of existing resources/contracts, additional procurement of renewable assets, and REC purchases. These annual RPS targets were used as a constraint in the PLEXOS model.

Table 3-1 Annual RPS Targets

Target Quantities of Renewable Energy Resources (%)									
Compliance Period 4				Compliance Period 5			Compliance Period 6		
2021	2022	2023	2024	2025	2026	2027	2028	2029	2030+
36%	39%	41%	44%	46%	50%	52%	55%	57%	60%

Consistent with regulations, BWP is not required to demonstrate a specific quantity of procurement in any of the intervening years between 2021 up to and including 2030, however, BWP must demonstrate procurement equal to the compliance period target. BWP will submit its annual and compliance period compliance reports, as required under the California Energy Commission (CEC). Compliance periods beyond compliance period 6 will consist of three years. Each compliance period beyond compliance period 6 will need to meet an average of 60% RPS or greater of its retail sales as required by law.

3.1.3 GHG Targets

In addition to the 100% carbon free energy by 2045 target from SB100, the planning scenarios also consider Burbank's own goal of 100% carbon free energy in 2040. This is accomplished through the assumption that existing natural gas-fired generating units will be converted to run on either renewable natural gas or hydrogen fuel no later than 2040.

In the fall of 2023, the California Air Resources Board (CARB) updated its greenhouse gas planning targets for 2030. In that update, the target planning range for Burbank changed from 129,000 – 228,000 metric tonnes of carbon dioxide equivalent ($MTCO_2e$) to 129,000 – 163,000 $MTCO_2e$. This change in CARB planning targets was finalized after the modeling for this IRP was completed. All planning scenarios in this IRP result in large reductions of carbon emissions, and all achieve a net zero carbon result by 2040. However, while all the planning scenarios satisfy the previous CARB

targets by 2030, only three of the planning scenarios (Net Zero by 2030, SB1020+SMR, and SB1020+SMR w/ 50% EV & DEV) achieve greenhouse gas emission reductions in line with the new CARB planning targets.

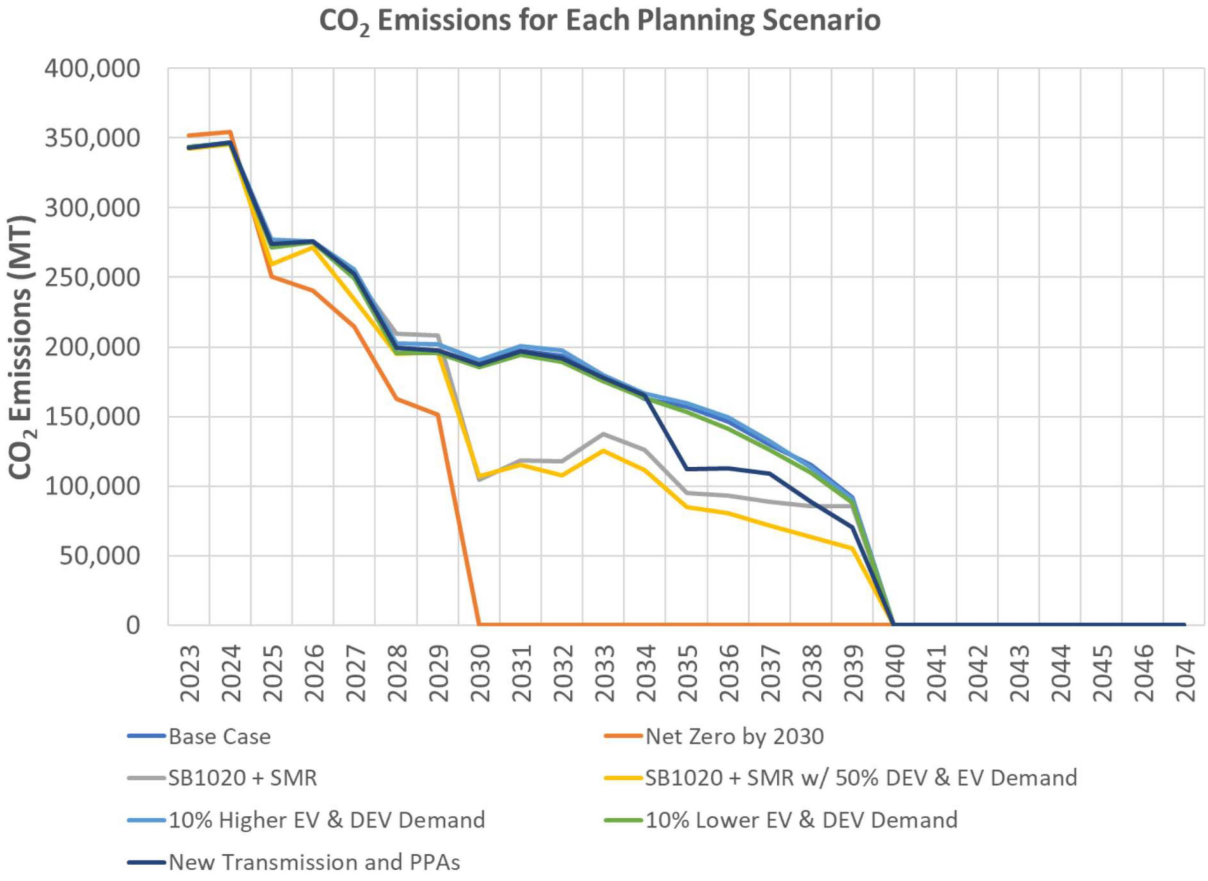

Figure 3-1 Planning Scenario Carbon Emissions

3.2 SCENARIOS AND SENSITIVITY ANALYSIS

3.2.1 Production Cost Modeling Software

The PLEXOS models evaluated resource combinations that Burbank could use to meet future requirements in the 2023-2047 planning period. PLEXOS is an industry standard capacity expansion and production cost model that is used all around the world by many different utilities and energy sector professionals. PLEXOS was used to create least cost portfolios for each of the seven planning scenarios discussed in Section 2.6. Results were calculated while obeying the operational constraints defined for the power plants and transmission components, maintaining system reliability, and serving the forecasted demand.

3.2.2 Key Inputs and Assumptions

As a long-term planning, document, the IRP is based on significant assumptions about the future. This carries inherent uncertainty, especially with the utility industry undergoing dramatic change. This IRP must make assumptions about a variety of key aspects of BWP's business during the planning period, from federal and state policy direction to the availability of cost-effective