

Boulder City Electric Utility

2023 - 2027

Integrated Resource Plan

Adopted

xxxx xx, 20xx

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1. Background Information and Public Process

Integrated resource planning is a planning process for new energy resources that evaluates the full range of alternatives, including:

- supply-side resources - such as generation facilities or purchased power contracts
- demand-side resources that reduce the need to acquire supply-side resources - such as energy efficiency improvements to the utility distribution system, customer incentive programs for purchase of energy efficient appliances, and net metering programs

As a recipient of federal hydro-power, the City of Boulder City must comply with the requirements of the Energy Planning and Management Program (10 CFR Part 905), including:

- preparation of an IRP document conforming to the requirements of the Western Area Power Administration (WAPA) every five years
- public participation in the IRP process
- submittal of annual IRP updates to WAPA

The draft CY 2023 – 2027 IRP was presented at the Utility Advisory Committee Meeting on December 7, 2022 and at the Boulder City Council Meeting on January 10, 2023. Public and Council comments and City Staff responses were included in this document, which was posted on xxxxx,xx 20xx to the City's website at the following location:

The City Council adopted this revised 2023 – 2027 IRP at its Public Meeting on Tuesday, xxxx,xx, 20xx

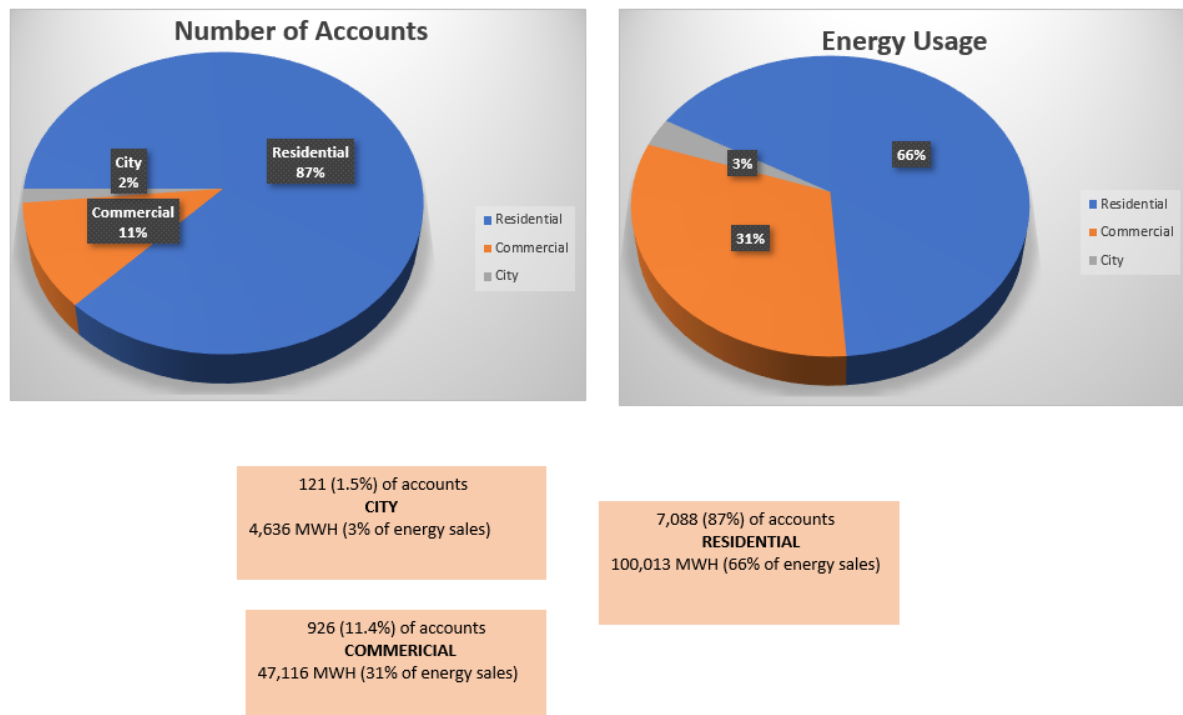
2. Utility/Customer Overview

The Municipal Electric Utility of the City of Boulder City (COBC) serves about 16,200 residents in the populated area of the City, about 35 of the 207 square miles of incorporated area. The unpopulated area southwest of the town site is served by NV Energy.

In accordance with Section 704.340 of the Nevada Revised Statutes, the Municipal Electric Utility is subject to the jurisdiction and approval of the Boulder City Council.

The Boulder City Electric Utility is a full-service provider (energy and delivery service) to ultimate customers. The Utility does not own or operate generation facilities.

Key Customers and Significant Loads



Notes

1. Fiscal Year (FY) 2021 data.
2. The *Commercial* Service Class includes industrial, non-profit, and non-municipal government customers.

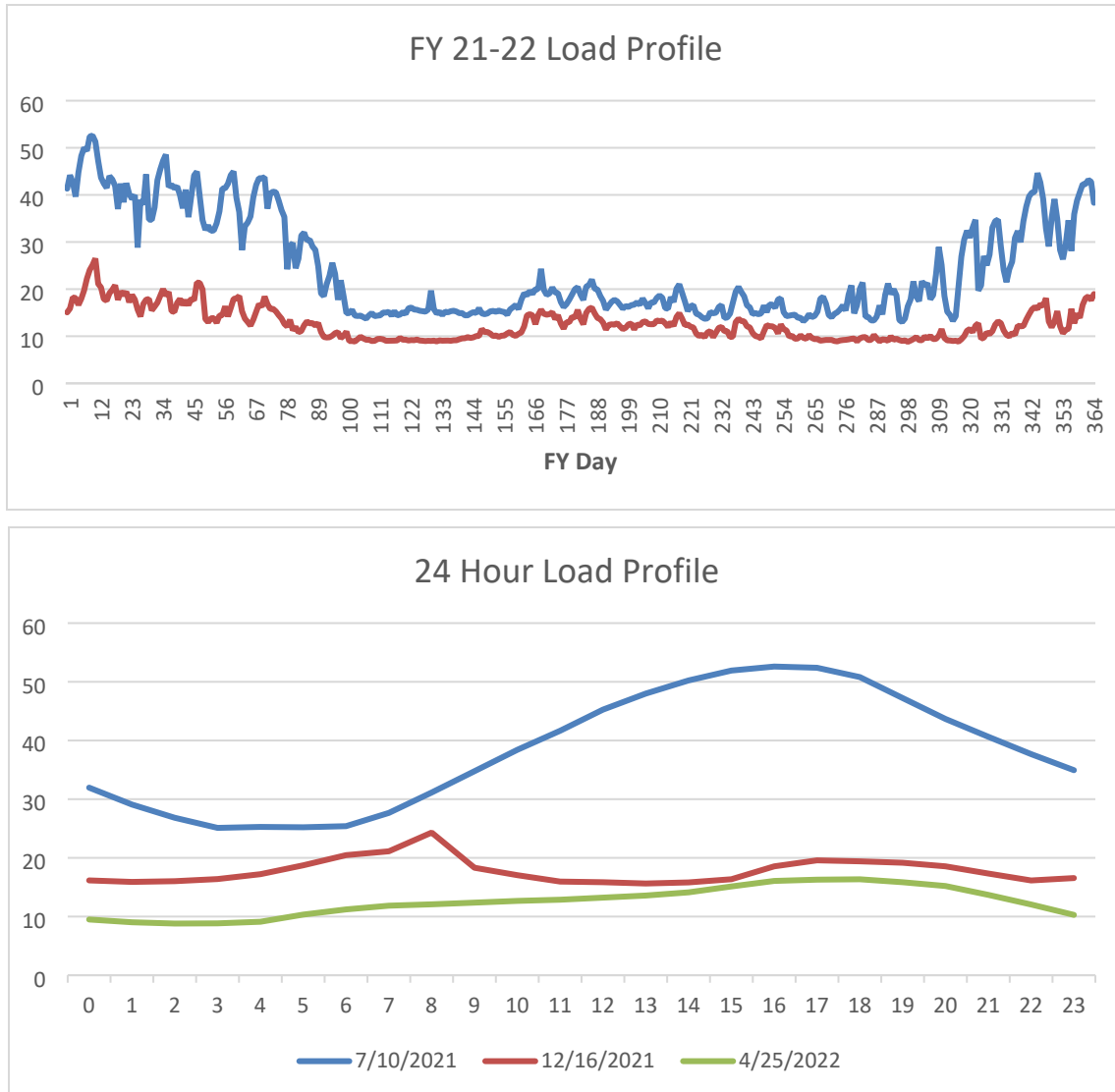
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Customer Mix

% CY 2021 Energy Sold	Load Type
65%	Residential
47%	Detached homes
3%	Apartments
5%	Condominiums
1%	Duplex homes
3%	Mobile homes
6%	Manufactured homes
31%	Commercial
2.1%	Automotive sales, service, fuel
2.1%	General commercial
0.32%	Construction
3.11%	Food (retail and wholesale)
4.1%	Lodging
1.47%	Manufacturing
6.06%	Healthcare and assisted living
1.14%	Financial, real estate and other professional services
4.1%	General retail sales and services
6.5%	Eating and drinking establishments
1%	Government
0.3%	City (excluding airport, golf courses, utilities)
0.7 %	County, State, Federal (excluding schools & research)
.5%	Utility
0.25%	Municipal
0.25%	Non-municipal (including wireless)
1%	Golf courses
0.30%	City
0.70%	Private
1%	Schools and other mixed Government/Commercial
0.21%	Aviation
0.44%	Schools and daycare
0.35%	Research
.5%	Non-profit
0.2%	Churches
0.3%	Charitable and social organizations
100.0%	Total Energy

Peak Drivers

Summer air conditioning load, especially residential, is the dominant driver of peak demand. The ratio of summer peak demand to yearly average demand is about 2.9 to 1 for feeders dominated by residential loads, and about 2.0 to 1 for feeders dominated by commercial loads.



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Rates

Class	Description	Applies to	# Accts	Service Charge
RS	residential	single-family units	7097	\$10.00
RM	residential master-metered	five or more units	2	\$50.00
GS	general service	service where no other schedule applies	906	\$15.00
LGS	large general service	over 300 kW demand in 3 of last 12 months	6	\$50.00
TOU	time-of-use	over 500 kW demand in 3 of last 12 months	2	\$200.00
BCH	Boulder City Hospital	Boulder City Hospital	1	\$25.00
MUN	municipal	City of Boulder City	107	\$10.00
SL	sports field lighting	pole-mounted HID fixtures, minimum 10 kW	1	\$50.00
AL	area lighting	all customers	223	\$8.77-\$17.55
LL	landscape lighting irrigation control	HOAs and PUDs	7	\$8.77-\$17.55

Class	Applies to	Energy Rate ¢ per kWh	% of kWh sales in class	Demand \$ per kW
RS	1st 2000 kWh	8.78	90.7%	n/a
	2001 - 4000 kWh	11.56	7.20%	
	kWh > 4000	12.76	2.10%	
RM	All kWh	10.77	100%	
GS	1st 3000 kWh	10.38	83.3%	3.05
	kWh > 3000	11.73	16.7%	
LGS	All kWh	13.17	100%	3.05
TOU (4)	Summer On-Peak	16.52	34.6%	14.33
	Summer Off-Peak	11.73	35.2%	4.78
	Non-Summer	13.17	30.2%	3.05
BCH	All kWh	8.86	100%	n/a
MUN	All kWh	Avg wholesale rate	100%	Varies
SL	All kWh	11.14	100%	n/a

Notes

1. Rates are effective for Fiscal Years 2022 and 2023 (July 1, 2022 – June 30, 2023).
2. Residential customers without AMR (radio-read) meters will be charged \$25.00 per month after June 2018. Less than 0.2% of residential customers have selected this option.
3. A demand meter will be installed when billed energy exceeds 4,000 kWh in three months of previous 12 months. The demand charge applies to each kW above 10 kW.

4. Summer rates apply May through September. On-peak rates apply noon through 10 PM. After almost seven years of no adjustments, electric rates were increased by 15% (effective October 2016), then by 6% (effective July 2017), to account for increased operating costs, fund approximately \$45,000,000 of capital improvements over a ten-year period and maintain adequate reserves. The city contracted Raftelis to do a rate study. The results of the study suggested that a rate reduction was possible, and the city reduced the electric rate by 3%.

The city provided four programs to reduce economic impact of electric increases on the City's utility customers: tiered rates, low income energy assistance, energy efficient appliance rebates, and 12-month averaged billing.

Tiered rates – the impact of tiered rates on customer costs is described in Section 4.

Low income energy assistance (LIEA) – most electric sales in Nevada are subject to Universal Energy Charge (UEC) of 0.0039%, which helps to fund the state's LIEA program. Over the last fiscal year, the State provided an average of \$533 per eligible household.

However, Boulder City has funded its own separate energy assistance program for 40 years. Providing a 35% discount on residential energy and monthly service charges, the BCEAP is the most generous utility-funded energy assistance program in Nevada.

The following table lists LIEA metrics for Nevada's non-profit (NP) electric utilities in State Fiscal Year 2021. It shows that, although the City accounted for only 5% of NP energy sold, it provided 65% of the total NP LIEA assistance.

LIEA (Low Income Energy Assistance) Metrics – SFY21	Boulder City	Other NV non-profit utilities	Total	BC % Total
Total energy sales (Million \$)	\$16,284	\$276,000	\$292,284	5.6%
LIEA total provided (\$)	\$96,370	\$26,956	\$123,326	78.1%
LIEA customers assisted	207	10	217	95.4%

Energy Efficient Appliance Rebates are described in Section 4.

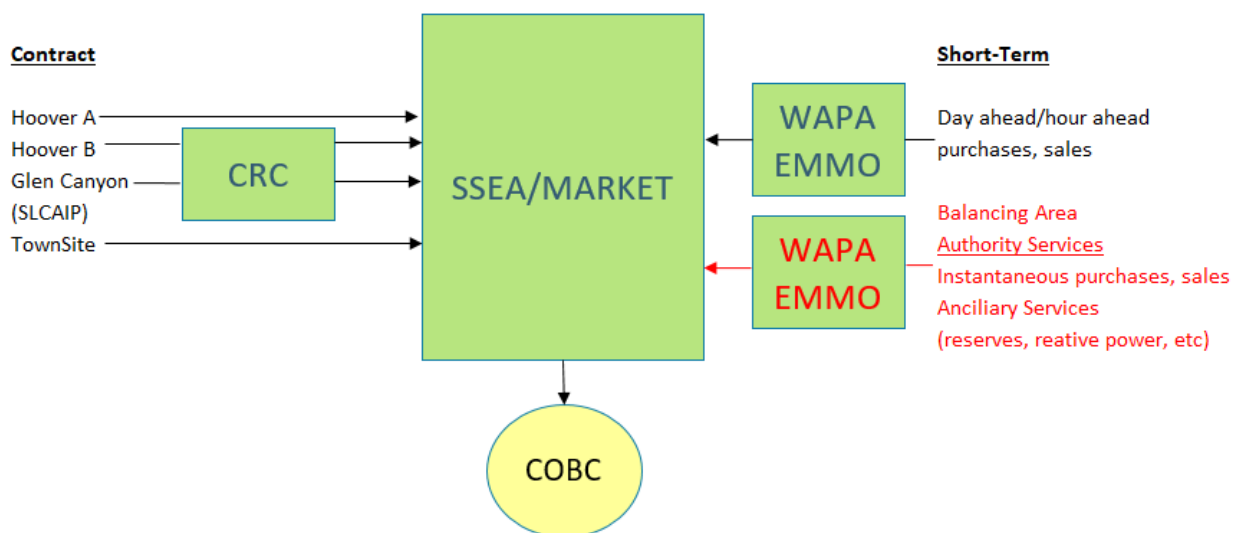
3. Existing Supply-Side Resources

Refer to Section 9 for descriptions of terms used in this section.

Purchased Power Contracts

Description	Capacity	Expiration
Hoover Schedule A	20.0 MW	2067
Hoover Schedule B	8.5 MW	2067
SLCAIP	5.5 MW (S) 7.3 MW (W)	2057
Townsite Solar	5 MW	2052
Market Energy (SSEA)	Varies	Varies

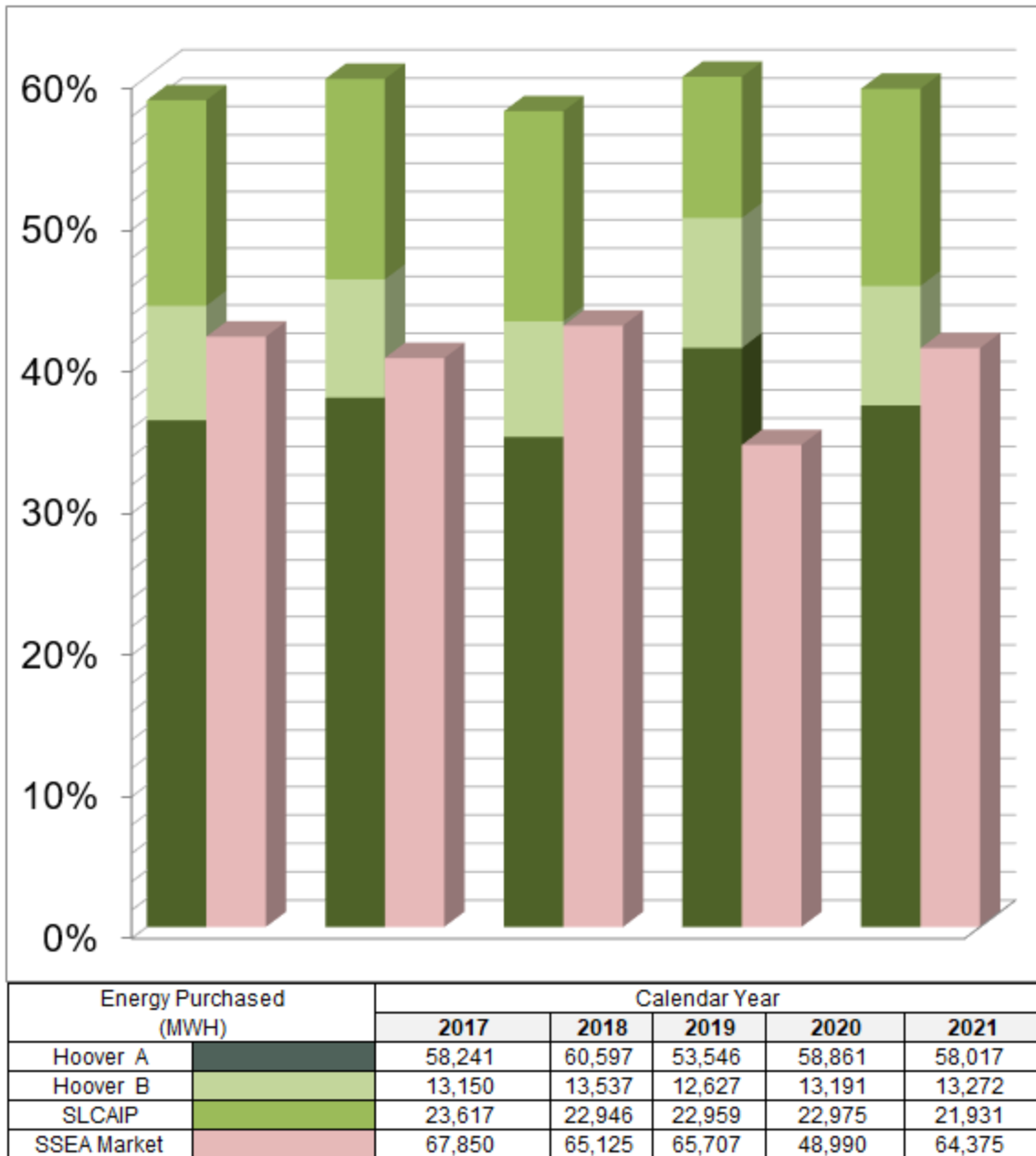
Business Relationships Related to Wholesale Power Services

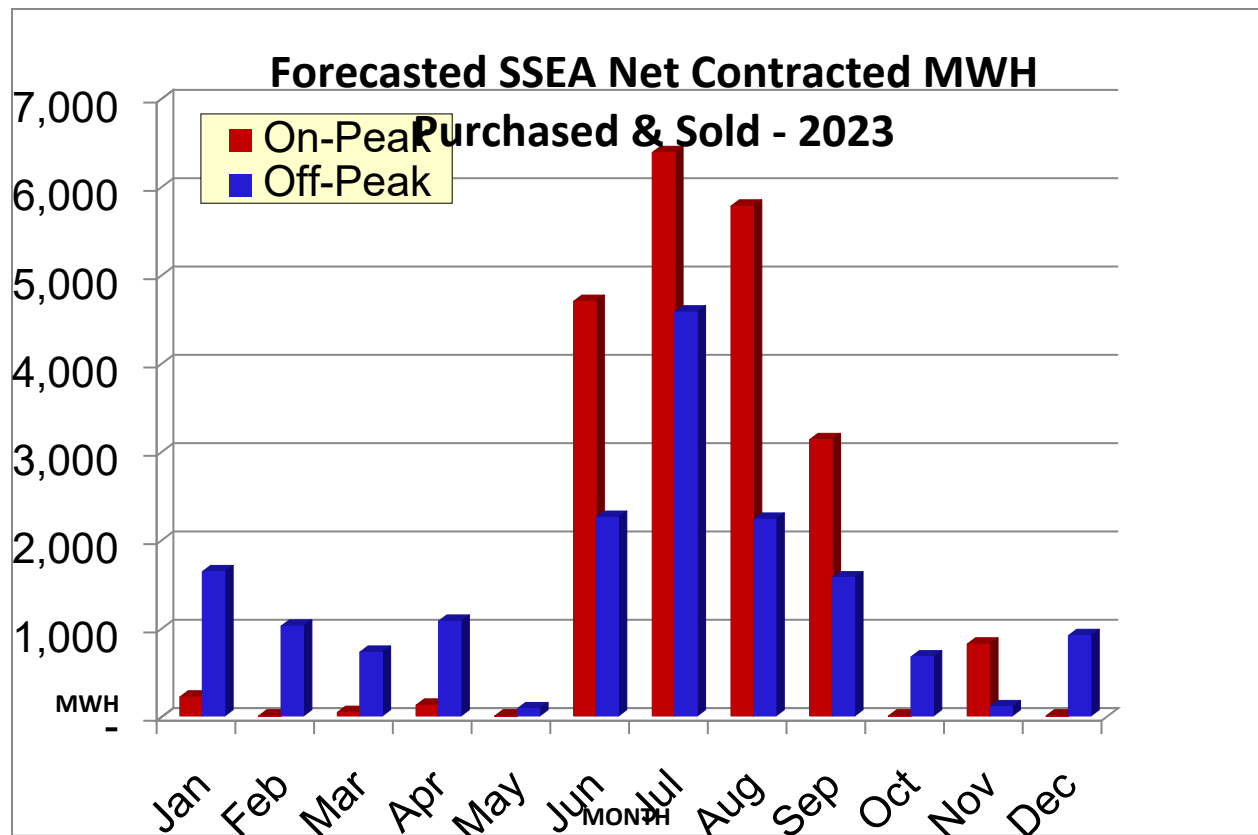


Energy Delivered by Resource

The charts on the following page illustrate the benefits of COBC's hydro resources:

- Hydro provided over half (53% - 56%) of the City's energy requirement in each year of the preceding five years.
- Hydro deliveries are sufficient to supply the City's entire energy requirement during the spring months.
- Hydro deliveries can be scheduled such that most market purchases are made during off-peak periods. Zero net on-peak energy was purchased during five of 12 months in 2017.





4. Existing Demand-Side Resources

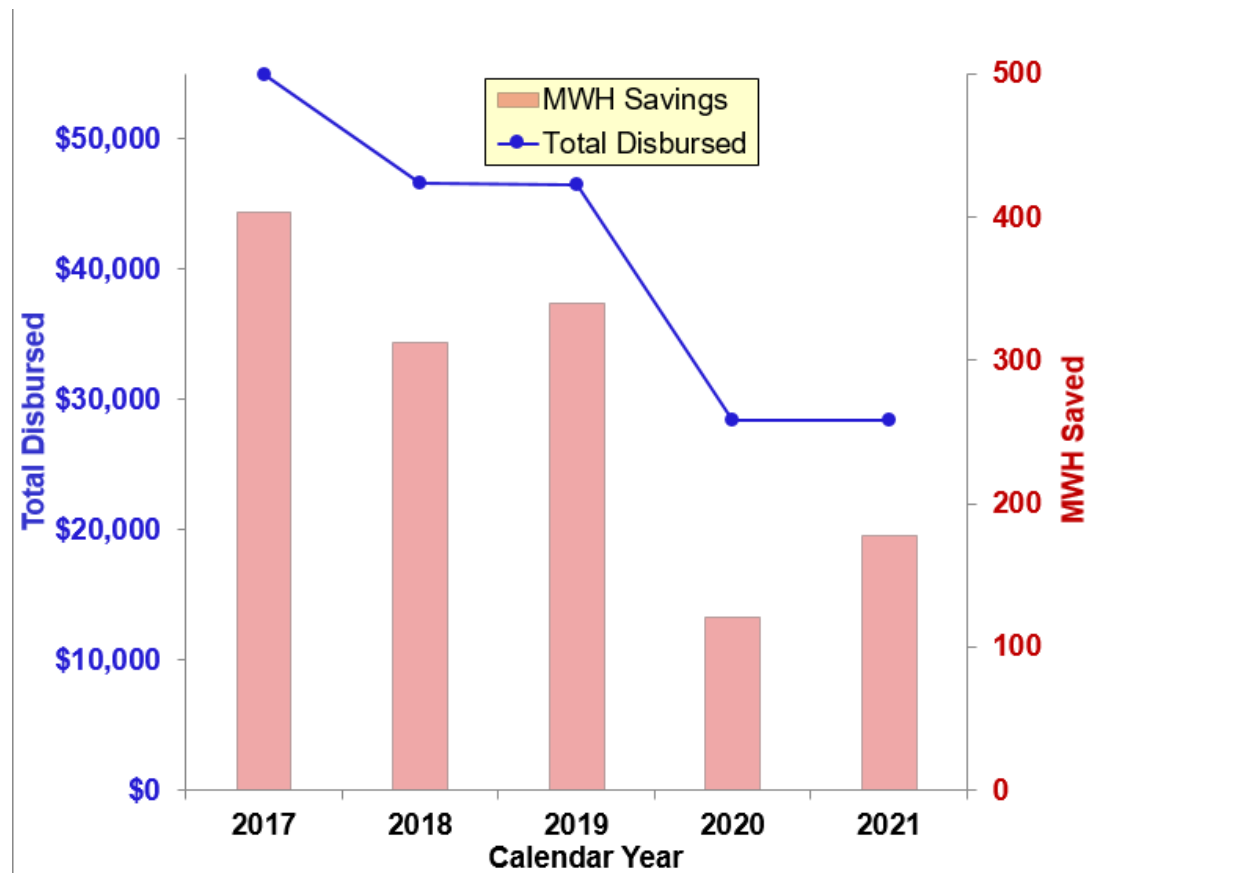
Energy Efficiency Rebate Program

Boulder City has been providing energy efficiency rebates to residents for 27 years. All residents, regardless of income, qualify for rebates for installation of certain appliances, subject to the restrictions described below:

- Air Conditioners: \$70 per ton for installation of units with a S.E.E.R. rating between 14.0 and 14.9; \$125 per ton for units with a S.E.E.R. rating of 15.0 or higher.
- Window Treatments: \$0.50 per square foot for the installation on west-facing windows of solar screens, or window film (reflectivity not greater than 40%). The shading coefficient must not be greater than 0.4 for screens, or 0.45 for film.
- Water Heater: \$200 for the installation of a solar or natural gas domestic water heating system with a minimum storage of 40 gallons, to supplement an electric domestic water heating system.
- Evaporative Coolers: \$50 per 1,000 CFM for installation of units to supplement air conditioned living or serving spaces.
- Pool Pumps: \$100 for the installation of a two-speed pump; \$200 for the installation of a variable speed pump.

As indicated in the table below, the number of customer rebates and total rebate disbursements have increased significantly over the preceding five years.

Do we want to mention our proposed changes to the rebates here or not?



Calendar Year	2017	2018	2019	2020	2021	Average
Number of Rebates	139	132	129	77	81	112
Total Disbursements	\$54,951	\$46,621	\$46,433	\$28,403	\$28,408	\$40,963
MWH Saved	403.5	312.5	339.4	120.6	177.7	270.7
MW Saved	1.28	0.16	0.17	0.06	0.09	0.35
\$/MWH	136.2	149.2	136.8	235.5	159.9	163.5

Net Metering

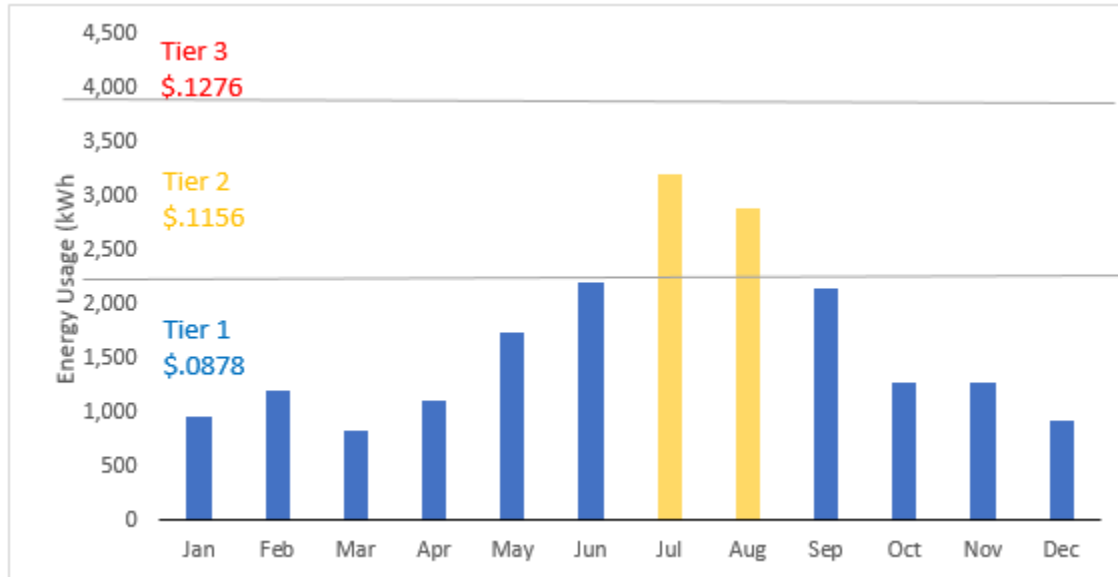
In 2010, COBC instituted a net metering program for residential and commercial solar and wind generators. At the end of CY 2017, a total of 394 kW (DC) of net metered generation was installed in the City, providing an estimated energy savings of 682 MWH in that year.

Net Meters	2017	2018	2019	2020	2021
Residential Meters	13	11	27	32	39
Commercial Meters	4	2	2	1	2
MWH Saved	682	808	1182	1089	1047

Two of the four commercial net meter systems, totaling 13 kW (DC), are installed in COBC facilities.

Tiered Rates

Tiered rates provide a conservation incentive as shown below.



Typical consumption for 1,500 SF residence (average boulder City size) 19,710 kWh/Yr with an average cost of 09.83¢/kWh including \$10 monthly service charge.

Time-of-Use (TOU) Metering

TOU metering in Boulder City is required for commercial customers having a monthly demand exceeding 500 kW. Only two commercial customers in the City qualify for TOU metering.

5. Load and Price Forecast

Key Trends Affecting Resource Needs

Boulder City's population trend-line indicates recovery from the 2008 recession by 2013; population growth in the preceding five years has been 0.61% average per year. System summer peak demand has increased by an average of 0.8% per year while total energy consumption has decreased an average of 1.2% per year over the preceding five years.

Calendar	Population	Peak Demand	Energy Consumed
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Year	Est. (1)	Change	MW	Change	MWH	Change
2013	15,850		50.3		165,374.3	
2014	15,852	+0.0%	50.8	+1.0%	161,970.2	-2.1%
2015	16,011	+1.0%	49.7	-2.2%	166,220.0	+2.6%
2016	16,570	+3.5%	48.1	-3.3%	162,798.3	-2.1%
2017	16,508	-0.4%	49.2	+2.4%	159,389.2	-2.1%
2018	16,104	-2.4%	49.9	+1.3%	162,206.0	+1.8%
2019	16,398	+1.8%	47.4	-5.0%	154,841.0	-4.5%
2020	16,505	+0.7%	46.3	-2.3%	144,017.0	-7.0%
2021	16,410	-0.6%	50.8	+9.7%	157,596.0	+9.4%
2022	16,500	+0.5%	50.9	+0.4%	164,426.0	+4.3%
5-yr avg. annual change		+0.0%		+0.8%		+0.8%

(1) Governor Certified Population Estimates of Nevada's Counties, Cities and Towns 2000-2017

Forecast Basis

The estimated change in the City's energy requirement of the five year period 2018 - 2022 is based on three scenarios for residential unit additions:

- Low growth: 192 homes in currently approved subdivisions, three homes per year built on privately-owned, pre-existing building lots
- Midrange growth: 192 homes in currently approved subdivisions, 50 homes in subdivisions not currently approved, five homes per year built on privately-owned, pre-existing building lots
- High growth: 192 homes in currently approved subdivisions, 100 homes in subdivisions not currently approved, seven homes per year built on privately-owned, pre-existing building lots

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Assumptions:

- The average residential unit in currently approved subdivisions will be 2,064 SF (28.5 MWH annual energy consumption).
- The average residential unit for all other additions will be 3,000 SF (41.4 MWH annual energy consumption).
- Commercial load growth (load addition in per cent of existing load) matches residential load growth.
- The existing trend of conservation and efficiency improvements (1.2% per year) will continue over the forecast period.

Forecast Result

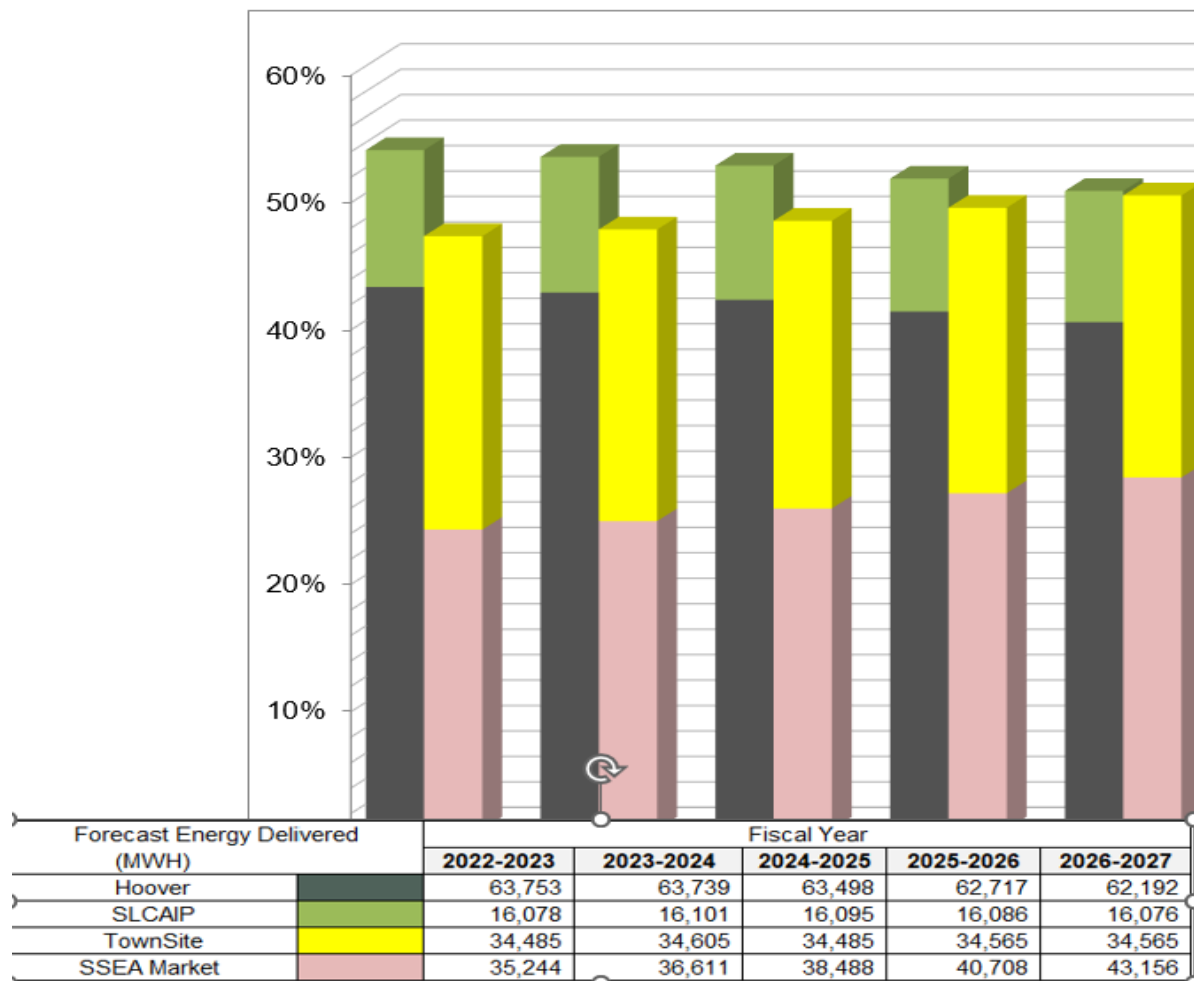
As shown in the following table, the City's energy consumption is expected to grow between 0.0% and +1.0% per year over the next five years. Barring an unforeseen large load addition, energy consumption in the City will be less in CY 2023 than it was in CY 2021.

Five Year Forecast Energy Requirement (MWH)			
Growth assumption	Low	→	High
Base year (2021) energy	157,596	157,596	157,596
Load addition	9,173	12,912	17,524
Conservation/efficiency (1.2%/yr.)	-9,456	-9,456	-9,456
Net load growth 2018-2022	-283	3,457	8,069
2023 Forecast	157,313	161,053	165,665
Annual growth rate % base year MWH	0.0%	0.4%	1.0%

6. Future Supply-Side and Demand-Side Resources

Supply-Side Resources

COBC has firm resource commitments throughout the 2023-2027 five-year planning period. All hydro-power contracts and market contracts that secure power for COBC extend through 2026. Hydro-power capacity continues to be reduced by the ongoing drought. TownSite has supplemented the future reductions in



The forecasted price for each resource and the total energy budget for the planning period is shown in the following table.

Fiscal Year	Price per MWH				Energy Budget
	Hoover	SLCAIP	Townsite	Market Contract	
2021-2022	\$25.29	\$51.06	\$39.95	\$63.06	\$6,129,685
2022-2023	\$25.22	\$49.65	\$39.81	\$83.76	\$6,920,203
2023-2024	\$27.07	\$52.35	\$39.95	\$69.18	\$6,703,467

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2024-2025	\$28.42	\$53.85	\$39.86	\$65.55	\$6,799,392
2025-2026	\$29.88	\$55.03	\$39.86	\$88.85	\$8,062,798

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There are currently no state or federal regulations that will impact COBC's resource requirements during the 2023-2027 planning period.

Based on the forecast described in the previous section, COBC is not anticipating that load growth will require the electric utility to obtain additional purchased power resources during the 2023-2027 planning period.

It is COBC policy that resource adequacy be evaluated if a commercial or residential load addition requires construction of a new distribution feeder.

Demand-Side Resources

The City plans to convert thirteen 4.16 kV feeders to 12.47 kV by 2026 in order to allow the retirement of two aged 4.16 kV substations.

This project requires the preliminary step of replacing all 4.16 kV distribution transformers with dual-voltage 4.16 kV/12.47 kV units. Approximately 330 4.16 kV transformers are pole-mounted units and have been replaced during CY 2018 – CY 2021.

Almost all transformers replaced were manufactured in between 1930 and 1970, are significantly less efficient than the replacement transformers. The City estimates that system losses will be reduced 1,116 MWH per year after the pole-mount transformer replacement program is completed.

95% of all transformers and insulators on the 4,160kV system have been upgraded and/or replaced to accommodate the 12.47 kV voltage.

Demand for net-metering and roof-top solar continues to increase, tripling the amount of annual customers from 2017 to 2022.

7. Environmental Considerations

Environmental evaluation is not required for supply-side resources, as none are planned to be acquired during the five-year planning period.

Environmental protection will be enhanced by COBC's:

- Existing and planned demand-side resources.
- Electric vehicles. Fifteen vehicles in the City fleet are electric. In 2023, it is estimated these vehicles will provide 9,185 gallons of fuel savings to the City.

8. Action Plan

- COBC's five-year goal is to maintain competitive rates, while providing reliable power to customers.
- Energy Efficient Appliance Program: the Boulder City Council has approved a rebate budget of \$25,000 FY 2022-2023. COBC's goal is to continue to make customer's aware of the rebate program through the City's web site and utility bill mail inserts.
- COBC will continue to measure the effectiveness of its demand-side programs by reporting expenditures and estimated peak demand and energy savings on an annual basis.
- COBC's goal for the overhead transformer replacement program is 100 replacements per year, with all transformers replaced by July, 2023.
- Per public comments subsequent to presentation of the draft IRP on June 26, 2018, COBC Staff will evaluate the feasibility of the following proposals, and make recommendations to Council:
 - Install solar PV panels on future parking shade structures, and adjust proposed project budgets accordingly.
 - LED-for-incandescent bulb exchange program:
 - COBC purchases LED bulbs in bulk quantities, in order to significantly reduce the cost per bulb.
 - Local retailers exchange LED bulbs with customer incandescent bulbs on a one-for-one basis.

9. Glossary of Terms

- CRC – Colorado River Commission of Nevada, a political subdivision of the State.
- SSEA – Silver State Energy Association (a joint action agency with members including COBC, Southern Nevada Water Authority (SNWA), Overton Power District, and Lincoln County Power District; also a political subdivision of the State.) SSEA provides complete load requirements service for COBC and SNWA.
- WAPA DSW – Western Area Power Administration, Desert Southwest Region. DSW is responsible for the marketing and transmission of hydro-power generated at US Bureau of Reclamation Colorado River dams.
- WAPA EMMO - Western Area Power Administration, Energy Management and Marketing Office. EMMO's functions as COBC's Balancing Area Authority (BAA) and Scheduling Entity (SE), as described below.
- Hoover – "Schedule A" is hydro-power from Hoover Dam as originally configured, and received by COBC through a direct contract with the United States (WAPA). "Schedule B" is additional power from Hoover Dam available after generator upgrades and scheduling entity improvements were made in the 1980s. COBC receives Hoover B power through a contract with CRC.
- SLCAIP – (Salt Lake City Area Integrated Projects) is power generated from several hydro projects, principally Glen Canyon Dam. COBC receives SLCAIP power through a contract with CRC.

- Market energy – energy purchased or sold through bilateral contracts between SSEA and any of several power trading entities. Contracts are for whole-month trades of On-Peak or Off-Peak energy. Peak hours are 7:00 AM to 11:00 PM Monday through Saturday, excluding holidays.

SSEA executes purchases up to five years in advance of delivery in order to enhance price stability. SSEA may execute additional purchases or sales prior to delivery due to revised weather or hydro delivery forecasts.

- Balancing Energy – Energy for the next hour or next day, bought or sold by the SE in order to match and market resources to the expected load. Balancing energy is required because hydro and market contract energy is scheduled to be delivered to the City at a constant rate, but the energy consumed by the City varies throughout the day.
- Balancing Area Authority (BAA) – The entity responsible for maintaining an instant-by-instant balance between power resources and power demand. WAPA EMMO (via a contract with SSEA) has been the City's BAA since 2013.
- Imbalance Energy – Instant-by-instant energy supplied or taken by the BAA in order to match delivered energy to the City's continuously varying load.
- Ancillary Services – Reserves, regulation, reactive power and other overhead charges required by the BAA.