Boulder City Electric Utility 2013-2017 Integrated Resource Plan

Revised 8/06/2013

Integrated resource planning (IRP) is a planning process for new energy resources that evaluates the full range of alternatives, including new generating capacity, power purchases, energy conservation and efficiency, and renewable energy resources, to provide reliable service to electric consumers.

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 five-year IRPs per the required standard format, public participation in the IRP process, and submittal of IRPs and annual updates to the Western Area Power Administration (WAPA).

The draft IRP was presented at the regular meeting of the Boulder City Council on July 9, 2013. Public comments and utility staff responses made at the July 9 presentation were added to the first revision of the draft IRP, which was posted on July 17, 2013 to the City's website at the following location:

`http://www.bcnv.org/?q=ElectricIntegratedResourcePlan`

This location may be accessed from the Boulder City home page (`bcnv.org`) by clicking Departments on the menu bar at the top of the page, then Conservation from the list of Departments. This opens the City's Conservation Page. The IRP may be downloaded by clicking Integrated Resource Plan from the menu on the left side of the page.

The public is invited to email questions and comments on the plan to the Electric Utility Administrator at `rdwyer@bcnv.org`.

The City Council will consider adoption of the final revision of the IRP at its regular meeting at 7:00 PM on Tuesday, August 13, 2013 at City Hall, 401 California Avenue, Boulder City, NV.

Background Information:

Utility / Customer Service Overview

The municipal electric utility of Boulder City (COBC) serves about 15,200 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.

Customer Mix

Customer Class	% meters	% sales
Residential	87.4%	63.9%
Commercial *	11.7%	33.1%
Municipal	1.0%	3.0%

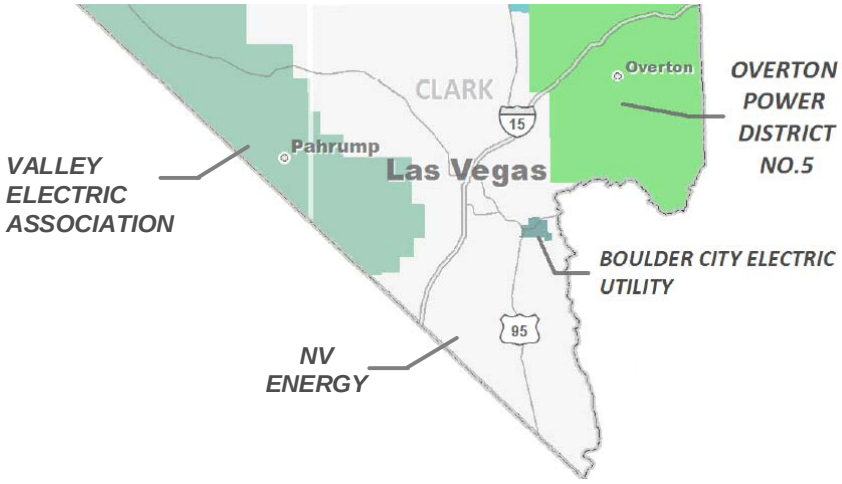
** including industrial, nonprofit, non-municipal government*

Commercial Customer Mix	% Com. Sales	Customer Type	% Com. Sales
Public Schools (4)	9.8%	Federal Facilities	4.3%
Restaurants and Bars (31)	8.7%	Airport	3.0%
Supermarkets (2)	7.6%	City Golf Courses (2)	2.8%
Private Golf Course (1)	5.9%	Regional Water Authority	2.5%
Hospital (1)	4.8%	Gas Station/Convenience Stores (5)	2.4%
Hotels and Motels (10)	4.5%	Industrial Customers (3)	2.4%
State Facilities	4.5%	Churches (17)	1.6%

Competitive Situation

There are four electric utilities located in southern Nevada:

- NV Energy
  Investor-Owned Utility
  840,000 customers
  (southern service territory)
- Valley Electric Association
  Rural Electric Cooperative,
  20,600 customers
- Overton Power District No. 5
  NV General Improvement District
  12,500 customers
- City of Boulder City (COBC)
  7,800 customers



Residential Rate Comparison

An analysis, summarized below, shows that an average Boulder City residential customer would pay about 30 – 56% more for electric service for an equivalent house located in a neighboring service area.

	COBC	Utility #1	Utility #2	Utility #3
Monthly Charge	$5.00	$10.00	$25.00	$15.00
Minimum Charge	---	---	---	$20.00
Franchise Fee	---	5.0%	5.0%	5.0%
Energy Charge	**cents per kWh**			
0 - 500 kWh	7.43¢	11.21¢	7.47¢	10.99¢
501 - 2000 kWh	7.43¢	11.21¢	8.52¢	10.99¢
2001 - 4000 kWh	9.79¢	11.21¢	10.00¢	10.99¢
Over 4000 kWh	10.80¢	11.21¢	10.00¢	10.99¢
Annual total cost - 1,500 sf detached house, 19,710 kWh used				
Cost	$1,582	$2,446	$2,050	$2,463
% of COBC cost	100.0%	154.6%	129.6%	155.7%

Commercial Rate Comparison

Comparing the cost of commercial service is complicated the fact that the four southern Nevada utilities each have multi-tiered rates for energy, demand, and monthly service, with each utility having unique criteria for each tier. For example, most COBC commercial customers fall into the following four rate classes:

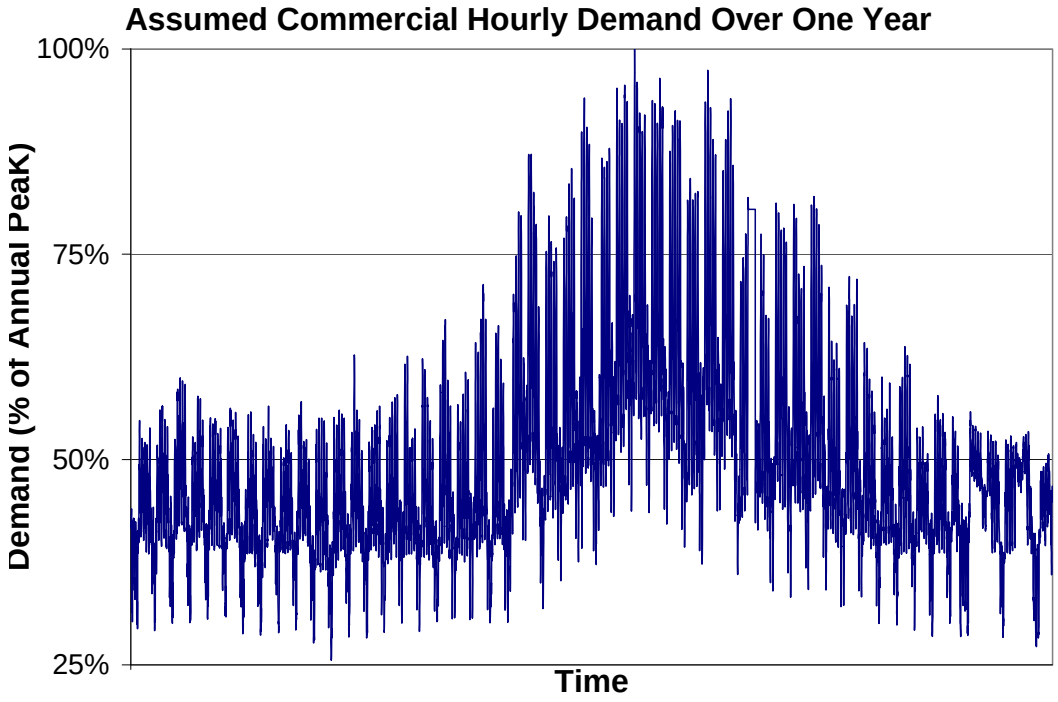
COBC Commercial Electric Rates

Peak Demand highest 3 months out of 12	Service Voltage	Service Charge per Month	Energy Charge per kWh	Demand Charge per kW
< 300 kW	Secondary	$10.00	8.78¢ (0-3000 kWh) 9.92¢ (> 3000 kWh)	$0.00 (0-10 kW) $2.50 (> 10 kW)
300 - 499 kW		$50.00	11.14¢	$2.50
≥ 500 kW		$200.00	13.97¢ (SON) 9.92¢ (SOFF) 11.14¢ (OTH)	$12.00 (SON) $4.00 (SOFF) $2.50 (OTH)
	Primary	$200.00	13.72¢ (SON) 9.75¢ (SOFF) 11.02¢ (OTH)	$11.76 (SON) $3.92 (SOFF) $2.50 (OTH)

A Universal Energy Chare of 0.039¢/kWh is added to all energy charges except exempt customers, such as government agencies

Time-of-Use Periods
SON (Summer On-Peak): Noon - 10 PM, May - September
SOFF(Summer Off-Peak): 10 PM - Noon, May - September
OTH (All other periods): October - April

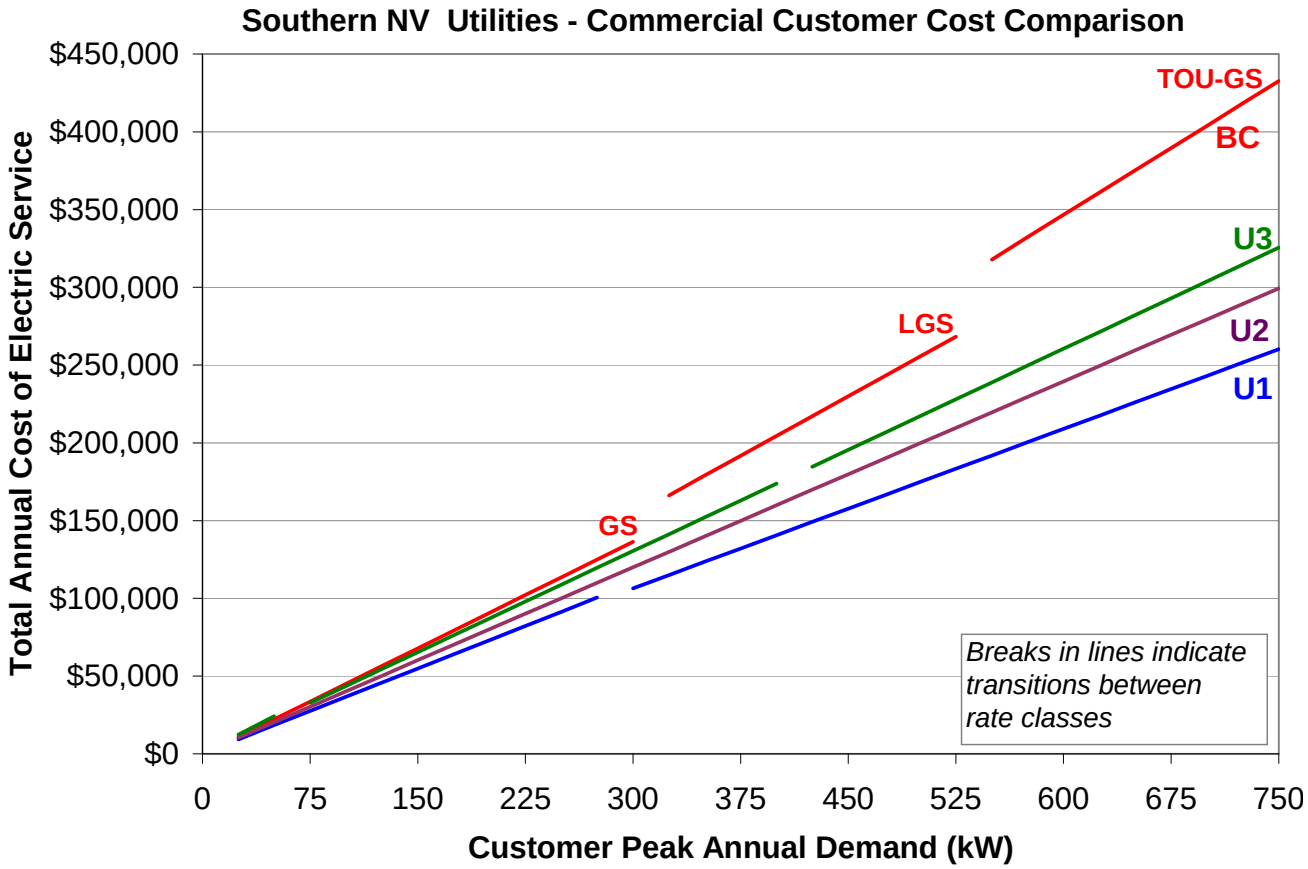
Another complicating factor is that two commercial customers using identical amounts of energy in a month will have different electric costs because their monthly peak usages (i.e., their demands) are different. If they are large customers with a time-of-use rate, then when they use energy affects their billing. For the sake of simple comparison, this analysis assumes that all commercial customers, regardless of size, have an identical use pattern, shown below:



With this assumed load profile, the total annual cost verses commercial customer peak annual demand (kW), is estimated as shown in the table to the right. The colored blocks indicate the differing rate classes for each utility. For example, a commercial customer in Boulder City with the assumed load profile will fall into the GS class (yellow) if the annual peak load is 300 kW or below, the LGS class (blue) if the load is between 300 and 500 kW, or the TOU-GS class (green) if the annual peak load is 550 kW or above.

The information in the table is shown graphically on the following page. The graph illustrates that the cost of power for commercial customers in Boulder City is the highest of the four southern Nevada utilities, and that the margin between COBC and the other utilities widens with increasing customer size.

Pk kW	COBC	Utility #1	Utility #2	Utility #3
25	$10,822	$9,376	$10,402	$12,301
50	$22,235	$18,485	$20,364	$24,225
75	$33,647	$27,595	$30,325	$32,892
100	$45,060	$36,705	$40,287	$43,730
125	$56,472	$45,815	$50,248	$54,568
150	$67,884	$54,925	$60,210	$65,406
175	$79,297	$64,034	$70,171	$76,244
200	$90,709	$73,144	$80,132	$87,082
225	$102,122	$82,254	$90,094	$97,920
250	$113,534	$91,364	$100,055	$108,758
275	$124,947	$100,474	$110,017	$119,596
300	$136,359	$106,435	$119,978	$130,434
325	$166,263	$114,980	$129,940	$141,273
350	$179,006	$123,525	$139,901	$152,111
375	$191,750	$132,070	$149,863	$162,949
400	$204,493	$140,614	$159,824	$173,787
425	$217,236	$149,159	$169,785	$184,625
450	$229,980	$157,704	$179,747	$195,463
475	$242,723	$166,249	$189,708	$206,301
500	$255,466	$174,794	$199,670	$217,139
525	$268,210	$183,338	$209,631	$227,977
550	$317,899	$191,883	$219,593	$238,815
575	$332,239	$200,428	$229,554	$249,653
600	$346,580	$208,973	$239,515	$260,491
625	$360,921	$217,518	$249,477	$271,329
650	$375,262	$226,063	$259,438	$282,167
675	$389,603	$234,607	$269,400	$293,005
700	$403,944	$243,152	$279,361	$303,843
725	$418,284	$251,697	$289,323	$314,681
750	$432,625	$260,242	$299,284	$325,519



Key Trends Affecting Resource Needs

Due to a growth control ordinance, Boulder City did not experience a significant inflow of residents during the post-1997 period of economic expansion. Nor, due to a high percentage of residents that are either retired or employed in recession-resistant jobs, did it experience a significant outflow of residents during the post-2007 recession. Over the five-year period 2008-2012, the growth in the number of residential electric accounts has been essentially flat (0.2% average increase per year). However, the total energy sold decreased by an average of 1.6% per year. (The year-by-year decline is shown in the following chart.) This decrease is attributed to the following combination of factors:

- COBC's DSM (demand side management) programs
- increased attention to conservation by both residents and businesses due to a less favorable economic climate over the five-year period
- milder weather over the five-year period, as indicated by an average decrease in "modified" total degree days of 1.0% per year from 2008 through 2012*

* "Degree day" reflects demand for energy to heat or cool houses and businesses. A mean daily temperature (average of the daily maximum and minimum temperatures) of 65°F is the base for both heating degree day (HDD) and cooling degree day (CDD) calculations. HDDs are summations of negative differences between the mean daily temperature and the 65°F base; CDDs are summations of positive differences from the same base. The sum of HDDs and CDDs

- a 35% increase in energy rates for all COBC rate classes, which occurred in January 2010 in response to an increase in COBC's wholesale power costs

Electric Utility Staff and Resources

As shown below, COBC's number of full time equivalent (FTE) employees is about 56% of the national average for non-IOU utilities of similar size. However, the low staffing does not impact resource planning due to the low and predictable load growth previously described, and the role of the Silver State Energy Association in identifying and procuring market energy resources on behalf of the City.

Function	FTEs	Function	FTEs
Power Production	0	Meter Readers	1.3
Engineering and Management	1.9	Billing	1.7
Distribution	6.6	Finance and Administration	0.5
Substations	1.8	**Total Equivalent FTEs**	**13.6**

Retail Customers per FTE Employee

COBC	Utilities with 5,000 to 10,000 Customers	Utilities in Southwest US (All Sizes)
574	319	322

Benchmark data provided by the American Public Power Association

Historical Demand and Energy Use

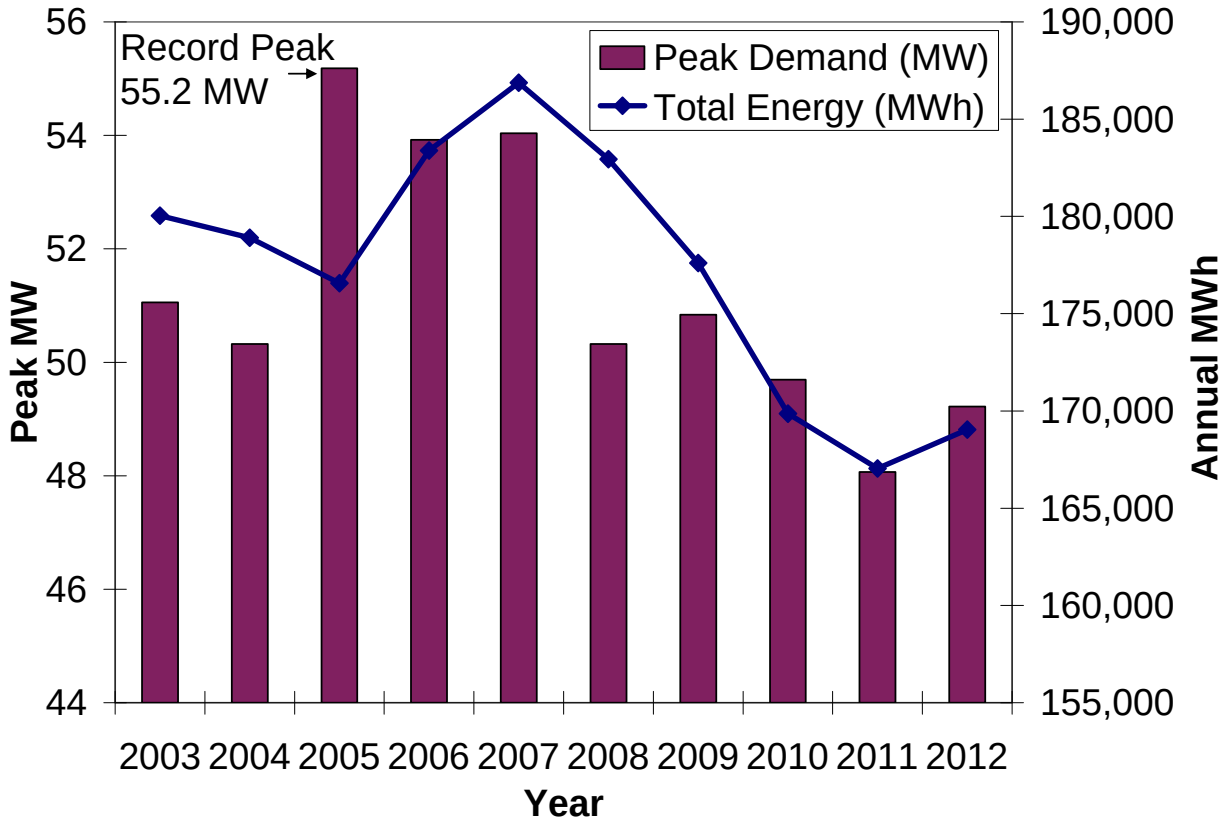
As noted previously, total energy used has declined an average of 1.6% per year for the last five years, despite the fact that the residential meter count has increased by an average of 0.2% per year over the same period.

Total energy used, in MWh, and annual peak MW for the years 2003 – 2012 are listed in the following table, and illustrated in the following chart.

over one year equals the Total Degree Days (TDD). Since most residents in Boulder City do not use electric heating, the weight given to HDD is decreased by using a "modified" TDD calculation: TDD' = CDD + 0.2*HDD.

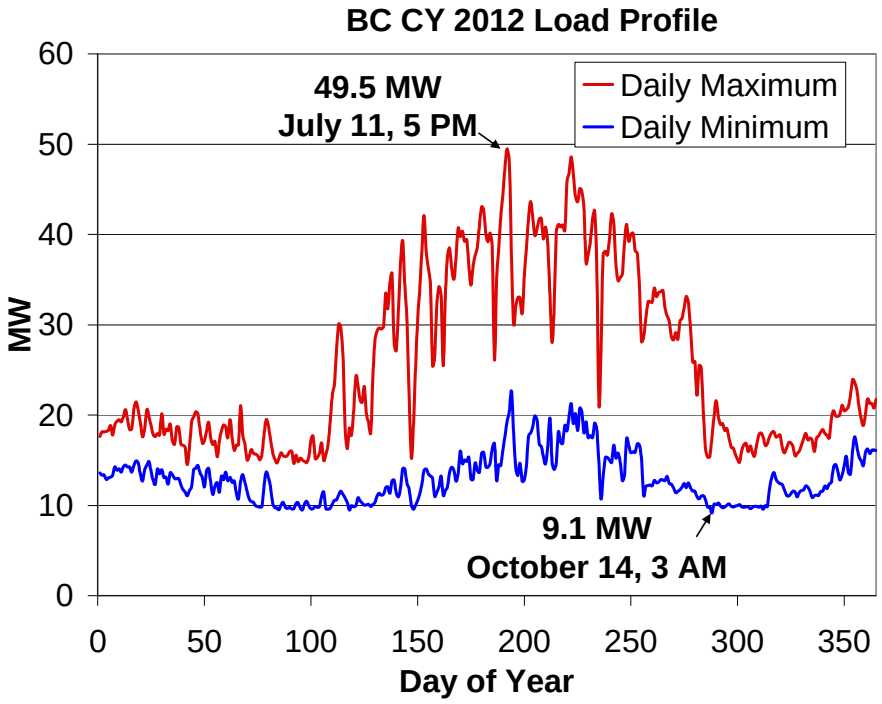
Historical Demand and Energy Use

Year	Peak Demand (MW)	Total Energy (MWh)
2003	51.1	180,034
2004	50.3	178,905
2005	55.2	176,571
2006	53.9	183,387
2007	54.0	186,867
2008	50.3	182,940
2009	50.8	177,602
2010	49.7	169,855
2011	48.1	167,038
2012	49.2	169,043



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 2.9:1 for feeders dominated by residential loads, and about 2.0:1 for feeders dominated by commercial loads.



Existing Supply Side Resources

The following acronyms and terms are used in this section:

- CRC – Colorado River Commission of Nevada
- 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). SSEA provides complete load requirements service for COBC and SNWA.
- NVE – Nevada Power Co., doing business as NV Energy
- WAPA DSW – Western Area Power Administration, Desert Southwest Region
- WAPA EMMO - Western Area Power Administration, Energy Management and Marketing Office.
- Hoover Schedule A – Power from Hoover Dam as originally configured. COBC receives Hoover A power as a direct contractor of the United States, through WAPA.

- Hoover Schedule B – Additional power from Hoover Dam 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. Power generated from several hydro projects, but principally Glen Canyon Dam. COBC receives SLCAIP power through a contract with CRC.
- WRP– Western Replacement Power (market power procured by WAPA to replace shortfalls in SLCAIP hydro power).
- Balancing Energy – Energy for the next hour, or next day, bought or sold by SSEA's round-the-clock, 365-day-a-year scheduling entity, WAPA EMMO, in order to match SSEA power purchases made for COBC and SNWA to the expected combined COBC / SNWA load. Mismatches occur because:
  - long-term market power can only be purchased in large blocks (25 MW minimum)
  - curtailments in purchased power (particularly hydro)
  - due to weather and other factors, the load expected in the next hour(s) is usually different than originally forecast
- Balancing Area Authority (BAA) – The entity responsible for maintaining an instant-by-instant balance between power resources and power demand. COBC's BAA changed on 4/1/2013 from NVE to WAPA EMMO (via a contract with SSEA).
- Imbalance Energy – Instant-by-instant energy supplied or taken by the BAA in order to match SSEA (COBC + SNWA) purchases to SSEA actual instantaneous load.
- Ancillary Services – Reserves, regulation, reactive power and other overhead charges required by the BAA.

Purchased Power Contracts

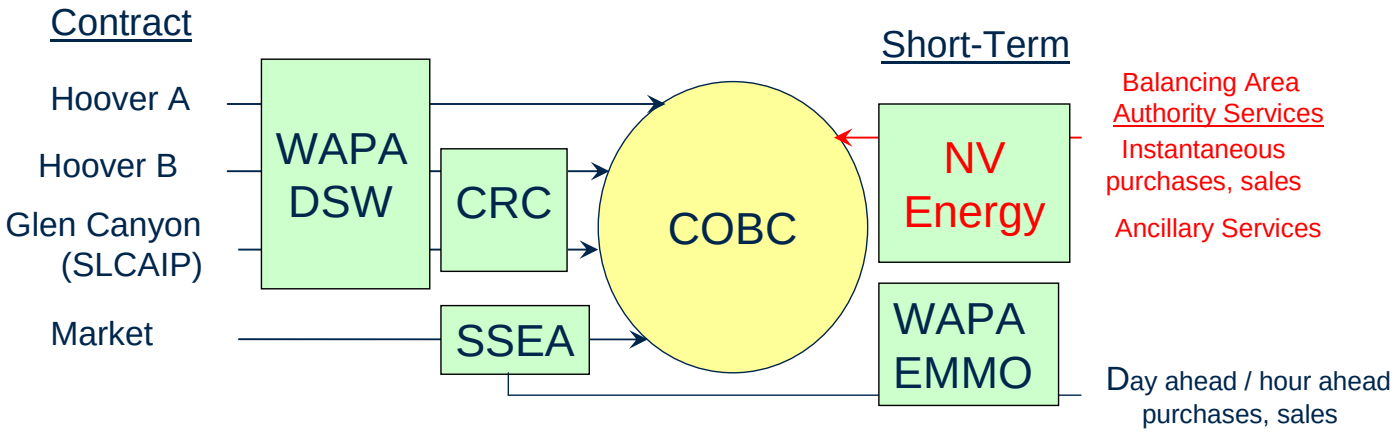
Resource Description	Contract Demand	Type of Service	Contract Expires
Hoover Schedule A	20.0 MW	Firm	2017
Hoover Schedule B	8.5 MW	Firm	2017
SLCAIP	5.5 MW (S) 7.3 MW (W)	Firm	2024
Market Energy (SSEA)	Varies	Requirements	Varies

Resource Summary

Billing and contract relationships, except where noted, are illustrated below. Refer to the tables on the following page for actual delivered energy and total cost of each resource.

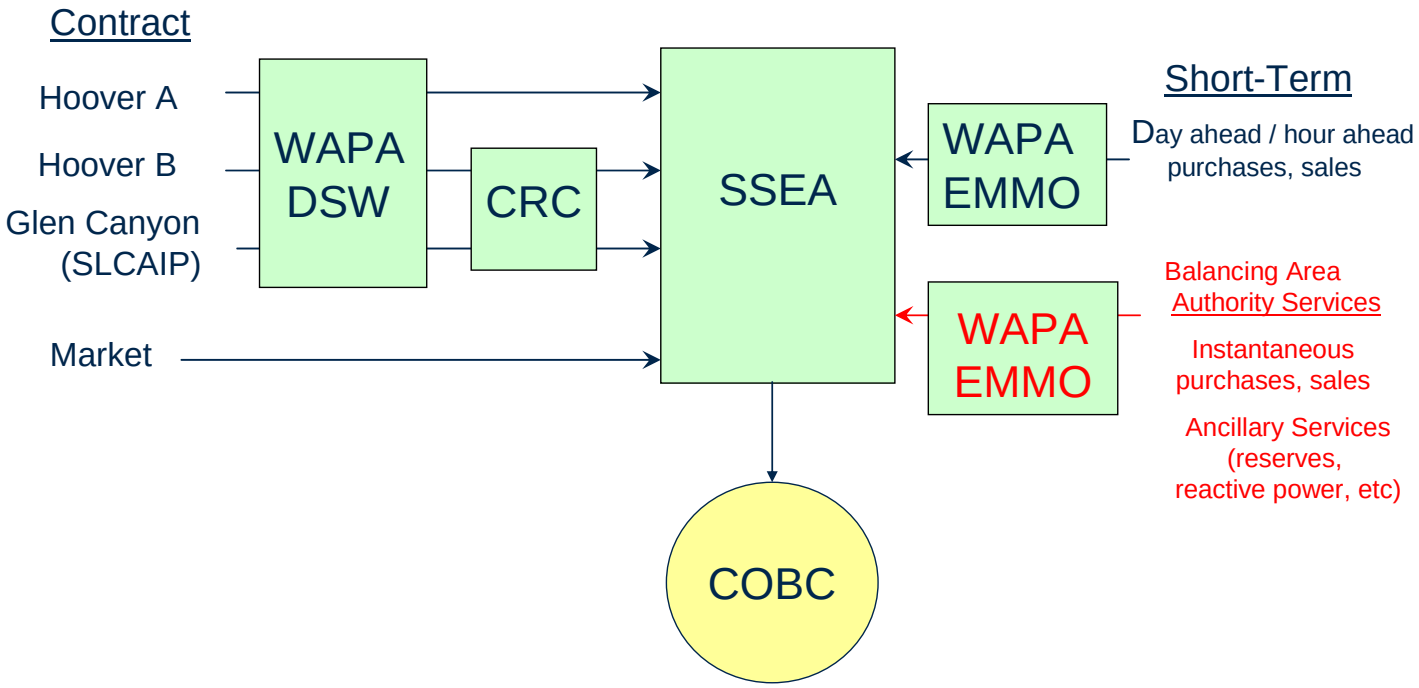
6/1/2011–3/31/2013

NVE is BAA, COBC is sole recipient of SSEA Load Requirements Service



Starting 4/1/2013

WAPA EMMO becomes BAA, SNWA joins SSEA Load Requirements Service



Note: COBC remains the direct contractor with WAPA for Hoover Schedule A, and with CRC for Hoover Schedule B and SLCAIP.

Existing Demand Side Programs

Efficient Appliance Rebate Program

- 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.

The rebates and requirements listed above are for residential customers. Rebates are also available for commercial customers; however rebate amounts and requirements are negotiated on a case-by-case basis.

In CY 2012, COBC rebated a total of $19,950 under the Efficient Appliance program. The energy and demand savings in 2012 due to this program was estimated to be 500 MWh and 0.5 MW.

Survey and Testing Services

- Residential Energy Surveys - estimated CY 2012 savings: 0.002 MW, 13 MWh
- Commercial Energy Surveys - estimated CY 2012 savings: 0.01 MW, 62 MWh
- Blower Door Testing - estimated CY 2012 savings: 0.001 MW, 6 MWh

Net Metering

In 2010, COBC instituted a net metering program for residential and commercial PV and wind generators. At the end of CY 2012, a total of 0.343 MW (DC) of net metered generation was installed in the City, with an estimated annual energy savings of 550 MWh.

Time-of-Use (TOU) Metering

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

Electric Service Installation and Connection Fee Discount for Energy-Star Certification

New residential installations receive discounts ranging from $4,000 (200 A service) to $14,000 (1200 A service).

Future Projections

Load Forecast

Based on the following assumptions:

1. Due to the growth control ordinance previously described, Boulder City's population growth will remain about 0.2% per year on average.

2. The recent trend toward milder weather will not continue.

3. Weather impacts will be offset by savings resulting from COBC's DSM program. In particular, it is expected that, due to the Energy Star discount, all new residences will be substantially more efficient than existing residences.

The forecast which results from these assumptions is for annual peak demand and total energy consumption to increase by 0.2% per year.

Resource Requirements

COBC has firm resource commitments throughout the 2013-2017 five-year planning period. All hydro contracts and market contracts that secure power for COBC extend through 2017.

There are no state or federal regulations that will impact COBC's resource requirements during the 2013-2017 planning period.

COBC is not anticipating that load growth will require the utility to obtain additional purchased power resources during the 2013-2017 planning period. COBC evaluates whether a commercial or residential load addition will trigger a need for new resources during the construction permitting process.

Action Plan

COBC's five-year goal is to maintain competitive rates, while providing reliable power to customers. By combining demand side management with hydro power to serve most COBC load, COBC will continue to help protect the environment.

COBC will continue all current demand side programs, and will continue to measure the effectiveness of its demand side programs by reviewing dollars spent, numbers of rebates and service calls provided, and estimation of peak demand reduction and annual energy savings.

Public Participation

The following questions and comments were raised during presentation of the draft 2013 – 2017 IRP at the July 9, 2013 regular meeting of the Boulder City Council:

1. Compare cost of service for commercial customers in Boulder City vs. neighboring utilities similar the residential comparison included in the draft IRP.

   Response
   A commercial customer cost of service comparison has been added on pages 3 – 5 of this document.

2. Include the electric rate increase of January, 2010 as a contributing factor to the decrease in total energy consumption in Boulder City in the years 2008 – 2012.

   Response
   The rate increase is noted on page 6 of this document.

3. Discuss the possibility that the ongoing drought in the Colorado River Basin may result in future reductions of hydro power to COBC, and modify the action plan as necessary.

   Response
   In December, 2012, the Bureau of Reclamation (USBR) completed a study that projects water supply and demand imbalances throughout the Colorado River Basin for the next 50 years. USBR and CRC have scheduled a presentation and meeting, scheduled for August 27, 2013, that will provide more information on the impacts on hydropower generation based on the data from the study.

   COBC will revise the 2013 – 2017 IRP before October 31, 2013 to incorporate USBR and CRC assessments of the risk of drought-related curtailments to future COBC hydro deliveries, and revise the action plan as necessary.