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Form 4: Demand Forecast Methods and Models
City of Santa Clara/Silicon Valley Power
Demand and Energy Forecast – 2015-2025
February 2015

1. Introduction

This forecast represents Silicon Valley Power's (SVP) assessment of future loads for the calendar years of 2015 to 2025. It is based on historical data and assessment of future system load growth potential. This forecast underlies SVP's 2015-16 budget and Five Year Revenue and Expenditure Projections for FY 2015-16 to FY 2020-21. Three energy forecast scenarios and three demand forecast scenarios were initially developed for management's consideration. The forecast selected reflects a somewhat above average growth in the near-term due to prospective customer load requests, and average growth thereafter consistent with historical trends.

2. Forecast Methodology and Scenario Selections

The basic approach to SVP's energy forecasts was to develop an expected case (Block Load), with optimistic and pessimistic (Low Case) variations from the expected case based on plausible alternate assumptions. Management decides on which forecast to adopt based on their assessment of the information available. This methodology has remained unchanged from previous submissions. The alternative forecasts developed are shown in Table 1, as well as the forecast adopted for the 2015-2016 budget.

2015 Energy Forecast (Gwh) Alternatives								
	Low Case		Block Load Case		Optimistic Case		2015-16 Adopted Case for Budget	
Calendar Year	Gwh	Yrly % Growth	Gwh	Yrly % Growth	Gwh	Yrly % Growth	Gwh	Yrly % Growth
2014	3,196.4	2.6%	3,196.4	2.6%	3,196.4	2.6%	3,196.4	2.6%
2015	3,228.4	1.0%	3,260.8	2.0%	3,303.4	3.3%	3,244.4	1.5%
2016	3,260.7	1.0%	3,332.0	2.2%	3,420.9	3.6%	3,293.0	1.5%
2017	3,293.3	1.0%	3,390.2	1.7%	3,496.6	2.2%	3,326.0	1.0%
2018	3,326.2	1.0%	3,432.0	1.2%	3,544.7	1.4%	3,359.2	1.0%
2019	3,359.5	1.0%	3,468.3	1.1%	3,583.4	1.1%	3,392.8	1.0%
2020	3,393.1	1.0%	3,502.9	1.0%	3,619.3	1.0%	3,426.7	1.0%
2021	3,427.0	1.0%	3,538.0	1.0%	3,655.4	1.0%	3,461.0	1.0%
2022	3,461.3	1.0%	3,573.3	1.0%	3,692.0	1.0%	3,495.6	1.0%
2023	3,495.9	1.0%	3,609.1	1.0%	3,728.9	1.0%	3,530.6	1.0%
2024	3,530.8	1.0%	3,645.2	1.0%	3,766.2	1.0%	3,565.9	1.0%
2025	3,566.1	1.0%	3,681.6	1.0%	3,803.9	1.0%	3,601.5	1.0%

Table 1

3. Block Load (Base) Case Energy Forecast

The Base Case Energy Forecast reflects SVP's historical trends, an assessment of area economic outlooks and information received from major customers. The Base Case Energy Forecast is our benchmark if no additional adjustments are made for aggressive customer expansion, or a sudden economic collapse. This case reflects the potential addition of 25.9 MW of new block loads over a 48 month period. This potential load growth is based on customer service inquiries, primarily the addition of new data center service customers. After this 48 month period, we applied a 1.0% annual load growth which is consistent with SVP's historical long-term trends. This growth can be observed in SVP's recorded energy consumption and the City of Santa Clara's annual population growth (See Attachment 1). Attachment 1 contains a table depicting the different trends and growth rates associated with SVP.

4. High Case Energy Forecast

The High Case forecast was developed with the same methodology as the Base Case, but reflects a more robust potential addition of 43 MW of Block Loads over this same 48 month period. As mentioned earlier, this potential load growth is based on customer service inquiries, and differs by applying a higher probability level of occurrence.

5. Low Case Energy Forecast

Because economic recovery in Silicon Valley had been relatively slow during the last few years, and if the current economic situation continues, then SVP sales may respond more slowly than portrayed in the Base Case and High Case energy forecast scenarios. We developed a Low Case scenario to quantify this view. Considering the substantial investment SVP has in energy efficiency, and the increased interest and availability of the installation of solar power systems in the business and home, it is plausible that low growth rates could result even with modest economic recovery. In all likelihood, the growth rate for the low case would reflect SVP's historical annual system load growth of 1.0%.

As previously mentioned, SVP's recorded energy consumption and the City of Santa Clara's population from 1990 to 2014 grew slightly over 1.0% annually. This time period saw SVP experience an economic downturn from 2000 to 2003, and a slightly aggressive system recovery from 2003 to 2008. This time period takes into account the system's greatest gains, from 1995 to 2000, at almost 3.0% per year, and the slight recession that occurred from 1990 to 1995 at -1.0% per year.

6. Adopted Load Forecast

For its FY 2015-16 Operating Budget and Five Year Revenue and Expenditure Projection, SVP selected a forecast that lies between the Low and Block Load Cases. The adopted forecast reflects an above average growth in the near-term due to prospective customer load requests, and average growth thereafter. SVP is fairly conservative in projecting a 1.5% system growth load during the next two fiscal years, but is well within the range of growth that the utility and the City has experienced thus far.

7. Peak Demand Scenarios

For each energy forecast scenario, we developed the corresponding annual peak demand scenarios shown in Table 2. These annual peak demands were derived by applying the two year average monthly system load factors from 2013 to 2014, to the forecasted monthly energy values. This approach was taken to eliminate and to normalize any affects that weather or any other factors may have on the overall system activity.

As was stated in our prior reports, this approach has the effect of dampening weather impacts and may not accurately portray the load shape impact of economic recovery, which we expect to occur, or higher-than-normal temperatures, which we also expect to occur. Moreover, we believe that the economic downturn may reduce air conditioning and computer use, and cumulative energy efficiency improvements financed through SVP's Public Benefits Program are likely to have further reduced peak demands. Therefore, in an economic recovery, it is possible that prior peak usage patterns may re-emerge.

2015 Peak Forecast (MW) Alternatives								
	Low Case		Block Load Case		Optimistic Case		2015-16 Adopted Case for Budget	
Calendar Year	MW	Yrly % Growth	MW	Yrly % Growth	MW	Yrly % Growth	MW	Yrly % Growth
2014	482.4	0.7%	482.4	0.7%	482.4	0.7%	482.4	0.7%
2015	494.9	2.6%	501.6	4.0%	509.2	5.6%	497.4	3.1%
2016	499.9	1.0%	510.9	1.9%	524.6	3.0%	504.8	1.5%
2017	504.9	1.0%	518.9	1.6%	534.6	1.9%	509.9	1.0%
2018	509.9	1.0%	525.2	1.2%	541.9	1.4%	515.0	1.0%
2019	515.0	1.0%	530.5	1.0%	547.3	1.0%	520.1	1.0%
2020	520.2	1.0%	535.8	1.0%	552.8	1.0%	525.3	1.0%
2021	525.4	1.0%	541.1	1.0%	558.3	1.0%	530.6	1.0%
2022	530.6	1.0%	546.5	1.0%	563.9	1.0%	535.9	1.0%
2023	535.9	1.0%	552.0	1.0%	569.5	1.0%	541.3	1.0%
2024	541.3	1.0%	557.5	1.0%	575.2	1.0%	546.7	1.0%
2025	546.7	1.0%	563.1	1.0%	581.0	1.0%	552.1	1.0%

Table 2

Attachment 1

Calendar Year	Recorded Peak Demand	Historical Consumption	City of Santa Clara Population
1990	400.00	2,437.29	93,754
1991	384.90	2,363.73	94,925
1992	373.50	2,362.21	94,673
1993	393.40	2,351.80	96,125
1994	381.60	2,309.97	96,918
1995	396.70	2,332.78	97,964
1996	411.60	2,481.89	97,982
1997	427.00	2,574.70	100,030
1998	443.80	2,621.71	101,877
1999	426.20	2,567.25	102,682
2000	456.90	2,701.62	102,895
2001	437.80	2,615.99	104,616
2002	419.00	2,538.72	104,306
2003	407.20	2,498.33	105,831
2004	399.70	2,538.28	105,831
2005	415.40	2,645.16	107,200
2006	486.50	2,878.75	109,106
2007	452.00	2,953.84	110,771
2008	489.90	3,004.75	115,503
2009	459.80	2,933.37	117,242
2010	469.80	2,915.96	116,308
2011	471.40	2,997.16	118,169
2012	471.10	3,079.85	118,813
2013	478.90	3,116.92	120,284
2014	482.40	3,196.42	121,229
YRLY GRWTH Rate:1990-2000	1.34%	1.04%	0.93%
YRLY GRWTH Rate:1990-2012	0.75%	1.07%	1.08%
YRLY GRWTH Rate:1990-2014	0.78%	1.14%	1.08%
YRLY GRWTH Rate:1995-2000	2.87%	2.98%	0.99%
YRLY GRWTH Rate:2000-2014	0.39%	1.21%	1.14%
YRLY GRWTH Rate:2003-2014	1.55%	2.27%	1.24%