

Chapter 1 – Energy Requirements & Reliability

This chapter discusses City Light's load forecast through 2027.

About 380,000 customers rely on City Light to provide reliable, low-cost and environmentally sound electricity to their homes and businesses. Power generated by City Light's hydroelectric facilities, purchased under contract and purchased on the wholesale power market are sufficient to meet power needs for the utility's service area under most circumstances. However, in order to ensure power delivery under adverse conditions, for example a winter cold spell during drought conditions, the utility must acquire additional resources. Growing demand and policy changes are two drivers in why and how the utility must obtain new resources over the long term.

Forecasting long-term load growth in City Light's service area was the first step in developing this Integrated Resource Plan (IRP). The IRP team also evaluated the ability of the utility's existing resources to serve future load at a predetermined level of reliability, described in Chapter 2. This level of reliability is called the resource adequacy standard. Because the purchase of resources to guarantee 100% reliability cannot be justified, the utility chose a 95% level of reliability that load will be served, implying a 5% risk that load will not be served.

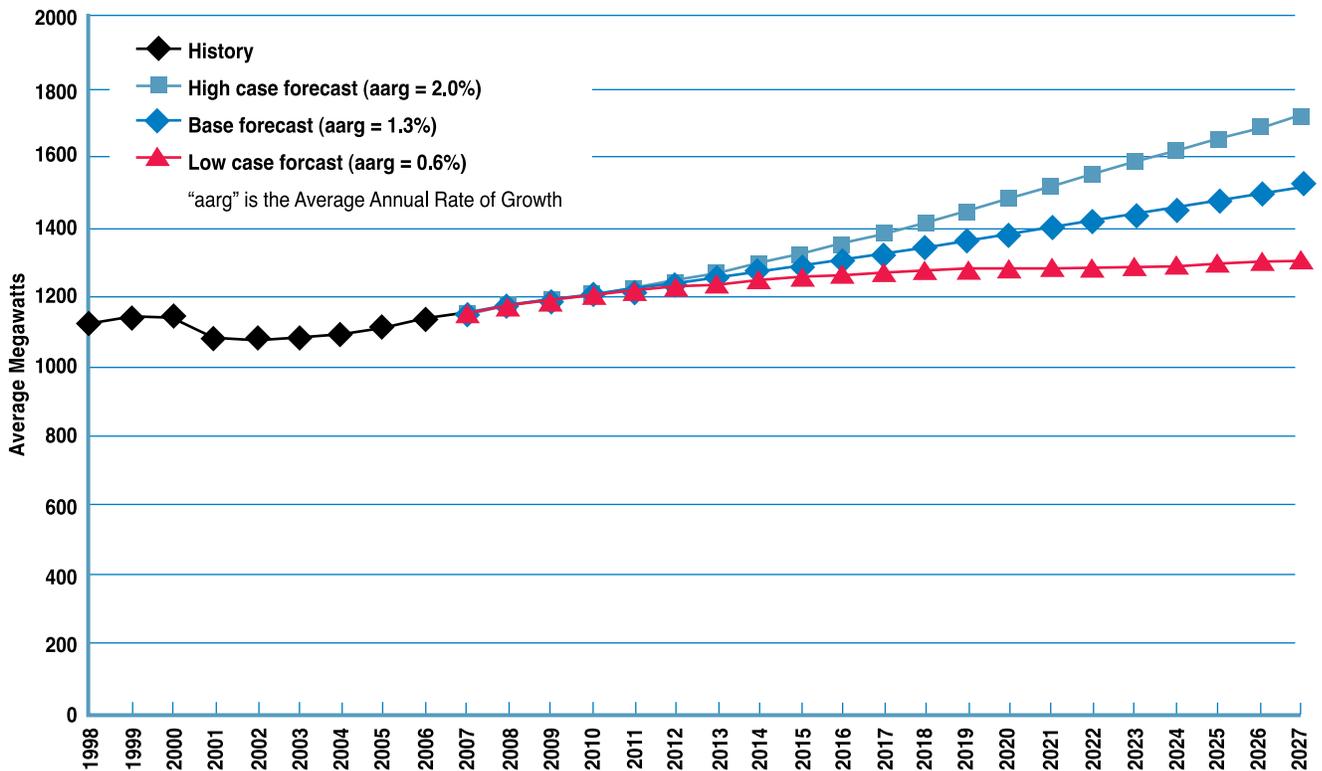
Load Forecast

Since the 2006 IRP was issued, City Light has produced a new long-range load forecast. Compared to the earlier forecast used for the 2006 IRP, the 2007 long-range forecast predicts slower load growth in the near-term and slightly higher growth farther out. The near-term load was reduced because the growth of the regional economy is expected to slow over the next two years, but not fall into recession. The building boom fueled by high levels of economic activity in the service area during 2005-07 has started to slow in response to the economic downturn. A severe recession is one of the scenarios used for testing candidate portfolios in the 2008 IRP.

Load Forecast Range

Figure 1-1 shows the utility's 20-year base forecast of annual average load, with high and low forecasts that reflect uncertainty about the future. These forecasts define the range in which actual load will most likely fall for each year into the future. None of these forecasts reflect the effect of any future programmatic conservation. The exclusion of future utility-sponsored conservation from these forecasts allows conservation to be treated the same as a generating resource in our modeling. The high forecast is one of the scenarios that will be used to test the candidate portfolios.

Figure 1-1. Base, High and Low Forecast (no new programmatic conservation)

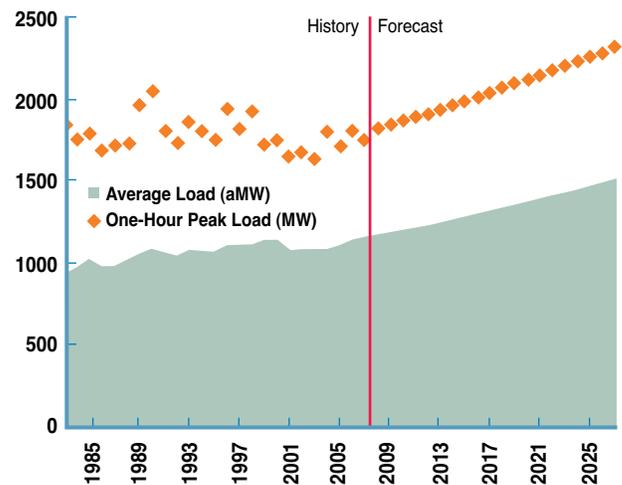


Peak Load Forecast

Figure 1-2 shows the average load history from 1983 through 2007 and the forecast through 2027, as well as the one-hour peak load (average load over a one-hour period). The historical data is actual consumption and reflects the impact of conservation programs in the past. As in Figure 1-1, the forecast does not reflect the effect of any future programmatic conservation. Programmatic conservation is evaluated along with other types of resources included in City Light’s portfolio, described in Chapter 4.

Because of the prohibitive cost of acquiring enough resources to serve one-hour peaks of infrequent occurrence, the measure of resource adequacy was devised. This measure is described more fully in Chapter 2.

Figure 1-2. System Annual Load History and Forecast (no new programmatic conservation)



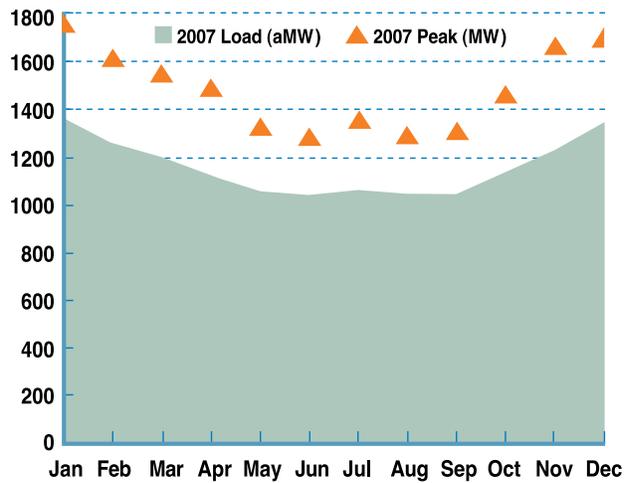
Load Shape

In planning for resource acquisition, City Light requires more information about future load than just average annual consumption provided by the long-range load forecast. The utility must also consider load shape throughout the year. Consumption in the winter is greater than in the summer because of greater customer need for winter heating and lighting. Average monthly variability in load is fairly predictable; usually about 20% higher in December and January than in July and August.

The utility needs sufficient resources to serve its customers during times of peak consumption. The one-hour peak load in any month can be many megawatts greater than the average load. Figure 1-3 shows the monthly load shape and monthly one-hour peaks for 2007. In January, the one-hour peak was nearly 400 megawatts higher than the January average; in August the one-hour peak was nearly 250 megawatts higher than the August average. The range of variability in peak loads

for November through February is much greater than in other months. The highest historical peak of 2,055 MW occurred on December 21, 1990, when the temperature dropped to 12 degrees Fahrenheit.

Figure 1-3. 2007 Monthly Average Load and Monthly Peaks



Extreme Weather

In order to assure resource reliability, City Light must be able to serve peak loads under extreme conditions, such as severely cold weather that usually occurs every few years with little warning. Very cold weather can push the one-hour peak load nearly 50% higher than the average load for the month. Such peaks are short-lived, and cold snaps rarely last much longer than three days. Figure 1-4 shows the hourly load shape for December 19-21, 1990, when peak load exceeded 2,000 megawatts for three consecutive weekdays.

Future peak load is only part of the equation to assess the need for additional resources necessary for a high level of reliability. In addition to understanding how much power might be needed under the stress of very cold weather, City Light needs to understand how existing resources operate under stress. The system is most stressed during periods of drought because almost all of the utility's resources are hydroelectric. Existing resources combined with very low hydro (1 in 20 years) were modeled against forecasted electricity demand.

Figure 1-4. Peak Hourly Load – Cold Snap December 19-21, 1990

