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Background

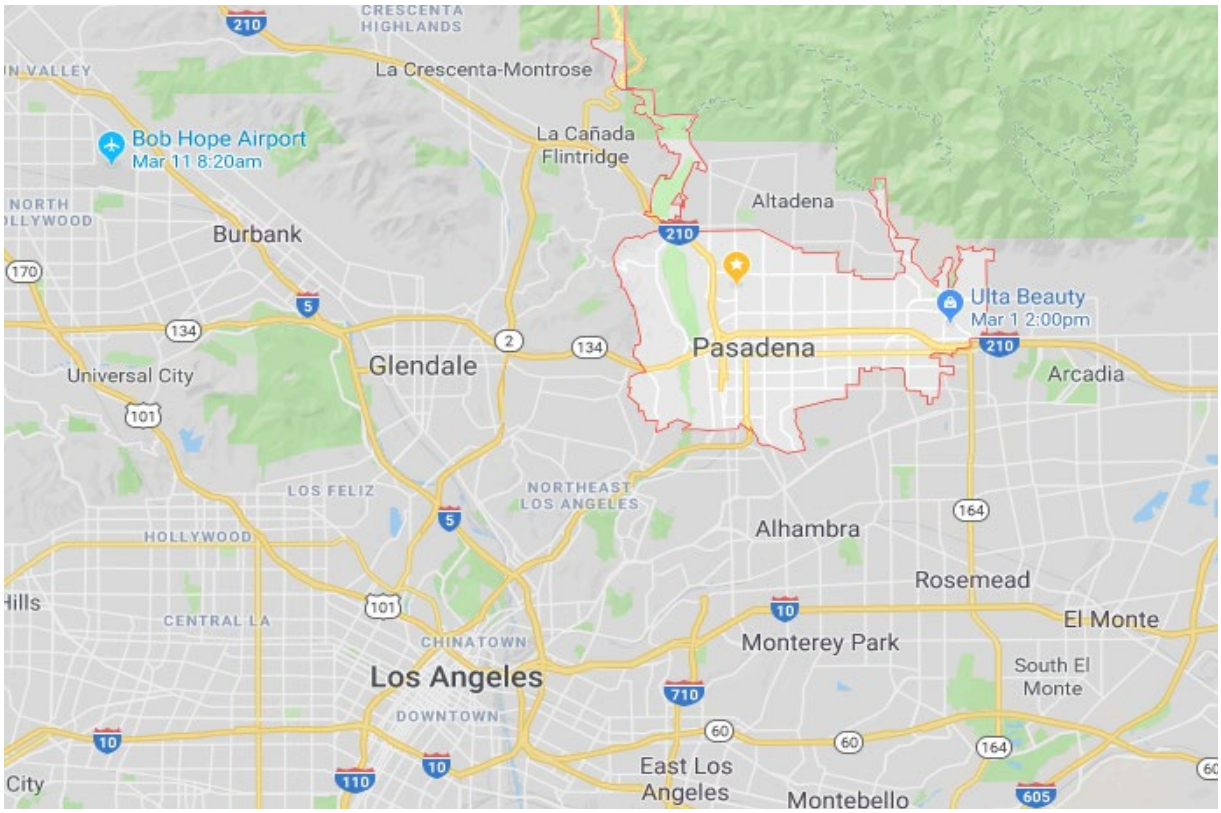
The City of Pasadena, Water and Power Department (also referred to as Pasadena Water and Power ("PWP") is pleased to provide a description of the demand forecast methodology for its peak demand, total system load and retail sales forecast.

Area for the demand forecast methods and models

Map of Pasadena

The demand forecast was developed for the City of Pasadena, California city limits. The City of Pasadena is located in Los Angeles County, California. Below is a map of the City of Pasadena:

Figure 1: Pasadena Map



Customer Class Definitions For Demand Forecast

The demand forecast references four customer class types- residential, commercial/industrial, city accounts and other. The customer classes are segmented into the categories listed on Table 1: PWP Customer Type and Rate Classifications, below. The City of Pasadena, Municipal Code defines the rate classifications, per Chapter 13.04- Power Rates and Regulations.

Table 1: PWP Customer Type and Rate Classification

Customer Type	Description	Per Municipal Code
Residential	Single family and multi-family residential dwellings	Applies to separately metered single-family dwellings and to individual family accommodations. Applies to separately metered multi-family dwellings and to individual family dwellings in multi-family dwellings. Multi-family dwellings are apartments, condominiums or town houses with at least four meters at the same physical location.
Industrial/ Commercial	Large and small businesses, non-profits, hospitals, institutions, etc.	Applies to single-phase and 3-phase general service, including lighting and incidental small power, through a single meter. Applies to service below 30 kW demand Applies to 3 phase general service, including power and lighting, measured with demand meter. Applies to service at 30 kW demand or greater, but less than 300 kW demand. Any customer served under this schedule whose monthly maximum demand has registered less than 30 kW or greater than 300 kW for twelve consecutive months is no longer eligible for service under this Schedule M-1 and must take service under another applicable rate schedule. This schedule is subject to meter availability. Applies to services metered and delivered at voltages less than 17 kV. Applies to 3 phase general service, including power and lighting, measured with demand meter. Applies to service at 30 kW demand or greater, but less than 300 kW demand. Any customer served under this schedule whose monthly maximum demand has registered less than 30 kW or greater than 300 kW for twelve consecutive months is no longer eligible for service under this Schedule M-2 and must take service under another applicable rate schedule. This schedule is subject to meter availability. Applies to services metered and delivered at voltages equal to or greater than 17 kV. Applies to 3 phase general service, including power and lighting, measured with demand meter. Applies to service at 300 kW demand or greater. Any customer served under this schedule whose monthly maximum demand has registered less than 300 kW for twelve consecutive months is no longer eligible for service under this Schedule L-1 and must take service under another applicable rate schedule. This schedule is subject to meter availability. Applies to services metered and delivered at voltages less than 17 kV Applies to 3 phase general service, including power and lighting, measured with demand meter. Applies to service at 300 kW demand or greater. Any customer served under this schedule whose monthly maximum demand has registered less than 300 kW for twelve consecutive months is no longer eligible for service under this Schedule L-1 and must take service under another applicable rate schedule. This schedule is subject to meter availability. Applies to services metered and delivered at voltages equal to or greater than 17 kV
City Accounts	All City accounts, including, but not limited to, parking garages (includes transportation electrification charging and garage lighting), street lights, department building energy usage, libraries, etc.	Applies to outdoor street, highway and area lights and traffic signals, whether publicly or privately owned, where the poles, electrifier standards and lighting equipment are owned by the customer. For such lights as are burned from 30 minutes after sunset to 30 minutes before sunrise, 4140 hours of service per year will be used for cost calculation purpose
Misc./Other	Adjustments made (overall) by PWP finance, to account for unbilled customers. The Other Customers take data from the customers classes, listed above. No data is available is available in the Municipal Code	

Method for Forecasting Electricity Demand Components

The load forecasting process takes into consideration the historical determinants of demand, such as weather and economic variables, as well as adjustments for customer additions, energy efficiency, Demand Side Management (DSM), and electric vehicle usage. The forecast followed a three-step process:

Step 1: Build an econometric model of the determinants of demand using historical weather, economic and seasonal dummy variables.

Step 2: Build forecasts of the independent (exogenous) variables:

Step 3: Incorporate adjustments including:

a. Expected increase in Plug-in Electric Vehicles (PEVs)
b. Energy Efficiency (EE) penetration levels and other DSM programs
c. Known Load Changes

Load Forecast Uncertainty

In California, policy is driving the state towards greater electrification and lower carbon emissions, but also toward greater energy efficiency. The balance of these forces is difficult to predict, especially because the policy climate is changing rapidly. Faster deployment of transportation and building electrification will contribute to larger load growth over time as well as a larger adoption of electric space cooling, which still has room for growth in California. On the other hand, growth of energy efficiency and demand response programs combined with stagnant economic growth could result in lower load growth over time.

Policies that hinder or enable gas-to-electric switching in space/water heating, specifically those involving customer rebate incentives, are major drivers that will determine the trajectory of load growth over time. Furthermore, market structures for energy storage, electric vehicle charging, and energy arbitrage (through load control of water heaters and air-conditioning) will result in different trajectories of load growth.