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DIVISION OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION

Report on the Results of Operations for Southern California Edison Company General Rate Case Test Year 2012

Sales and Customers

San Francisco, California
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SALES and CUSTOMERS

I. INTRODUCTION

This exhibit presents the analyses and recommendations of the Division of Ratepayer Advocates (DRA) regarding Southern California Edison Company's (SCE or Edison) forecasts of electric sales and customers for 2010, 2011, and Test Year (TY) 2012. SCE and DRA rely upon econometric models to forecast electric sales and customers. The econometric models forecast electric sales and customers as a function of whether, electric rates faced by the various end-users, and economic/demographic conditions in SCE's service area. SCE and DRA present forecasts of sales and customers to the residential, commercial, industrial, and agricultural classes of service.[1]

Section II summarizes DRA's recommendations and conclusions. Section III discusses SCE's and DRA's forecasts for electric sales. Section IV discusses SCE's and DRA's customer forecasting methodologies and forecast results.

II. SUMMARY OF RECOMMENDATIONS

The following summarizes DRA's recommendations for sales:

- For the residential class of service SCE forecasts (GWH) electric sales of 28,870 in 2010, 28,608 in 2011, and 28.666 in test year 2012.[2] DRA's residential forecast is nearly identical to SCE's. DRA forecasts (GWH) electric sales of 28.800 in 2010, 28,600 in 2011, and 28,843 in test year 2012. Since DRA's electric sales forecasts are within one percent of SCE's, DRA concludes that SCE's residential forecast is reasonable.

[1] Public Authority includes Other Public Authority, Street Lighting, and the Interdepartmental classes of service.

[2] GWH is gigawatt hours.

- DRA's and SCE's commercial forecasts are virtually identical. For 2010, 2011, and test year 2012 SCE forecasts commercial GWH sales of 39,277, 40,787, and 41,934, respectively. DRA forecasts GWH commercial electric sales of 39,367 in 2010, 40,874 in 2011, and 42,224 in test year 2012. DRA concludes that SCE's commercial sector electric sales forecast is reasonable.

- DRA's forecasts of industrial sales are slightly below those recommended by SCE. For 2010, DRA forecasts industrial electric sales of 8,279 while SCE forecasts GWH electric sales of 8,170. In 2011 and test year 2012, SCE forecasts GWH electric sales of 8,223 and 8,224 while DRA forecasts industrial electric sales of 8,117 and 8,128, respectively.

- SCE's and DRA's forecasts of total public authority electric sales differ by less than one percent. For 2010, 2011, and test year 2012, DRA forecasts (GWH) public authority electric sales of 5,569, 5,741, and 5,718, respectively. SCE forecasts (GWH) electric sales 5,569 in 2010, 5,755 in 2011 and 5,729 in test year 2012. DRA concludes that SCE public authority sales forecasts are reasonable.

- For the agricultural class of service SCE forecasts (GWH) electric sales of 1,310 in 2010, 1,365 in 2011, and 1,368 in test year 2012. DRA's agricultural sales forecasts are virtually identical to SCE's. For the forecast period 2010, 2011, and test year 2012, DRA forecasts (GWH) agricultural sales of 1,325, 1,358 and 1,376, respectively.

DRA's and SCE's electric sales forecasts for 2010, 2011, and test year 2012 are summarized in Table 3-1.

Table 3-1
DRA and SCE Electric Sales
2010 – 2012
(GWH)

Year/Class	2010	2011	2012
Residential			
SCE	28,870	28,608	28,666
DRA	28,800	28,600	28,843
% Difference	-0.24 %	-0.03 %	0.62 %
Agricultural			
SCE	1,310	1,355	1,368
DRA	1,325	1,358	1,376
% Difference	1.16 %	0.22 %	0.60 %
Commercial			
SCE	39,277	40,787	41,934
DRA	39,367	40,874	42,224
% Difference	0.23 %	0.21 %	0.69 %
Industrial			
SCE	8,279	8,223	8,224
DRA	8,170	8,117	8,128
% Difference	-1.32 %	-1.28 %	-1.17 %
Total Public Authority			
SCE	5,599	5,755	5,729
DRA	5,569	5,741	5,718
% Difference	-0.54 %	-0.25 %	-0.19 %
Total Retail Sales			
SCE	**83,335**	**84,728**	**85,921**
DRA	**83,230**	**84,690**	**86,289**
% Difference	**-0.13 %**	**-0.04 %**	**0.43 %**

The following summarizes DRA's recommendations for customers:

- For 2010 SCE forecasts year end residential customers of 4,282,484 with increases into 2011 and test year 2012. In 2011 and test year 2012 SCE forecasts residential customers of 4,284,484 and 4,398,993, respectively. DRA residential customer forecast differs from SCE's by less than one percent. For 2010 DRA forecasts residential customers of 4,285,420. For 2011 and test year 2012, DRA forecasts year end residential customers of 4,314,663 and 4,356,096, respectively. DRA concludes that SCE's residential customer forecasts are reasonable.
- For the agricultural class of service DRA has adopted SCE's customer forecasts. SCE is projecting very little, if any, growth in the number of agricultural customers. For 2010, 2011, and test year 2012 SCE forecasts year end agricultural customers of 22,306, 22,298 and 22,295, respectively.
- DRA and SCE arrive at virtually identical forecasts of commercial customers for 2010, 2011 and test year 2012. For 2010 SCE forecasts commercial customers of 543,304 while DRA forecasts commercial customers of 544,351. In 2011 and 2012 SCE forecasts commercial customers of 548,079 and 554,556. For these years DRA forecasts commercial customers of 549,425 and 555,956.
- For the industrial class of service SCE forecasts year end customers of 11,810, 11,512 and 11,400, respectively, for 2010, 2011, and test year 2012. DRA's industrial customer forecast for these years is virtually identical with DRA forecasting industrial customers of 11,823 in 2010, 11,506 in 2011, and 11,379 in test year 2012.
- As in the residential, commercial, and industrial classes of service DRA's public authority customer forecast is indistinguishable from SCE's. In 2010 DRA forecasts public authority customers of 46,626 while SCE forecasts customers of 46,737. In 2011 and 2012, SCE forecasts public authority customers of 46,525 and 46,265, respectively. DRA forecasts public authority customers of 46,478 in 2011 and 46,220 in test year 2012.

DRA's and SCE forecasts of customers by customer class are summarized in Table 3-2.

Table 3-2
DRA and SCE Electric Customers
2010 – 2012

Year/Class	2010	2011	2012
Residential			
SCE	4,284,484	4,308,993	4,338.669
DRA	4,285,420	4,314,663	4,356,096
% Difference	0.02 %	0.15 %	0.40 %
Agriculture			
SCE	22,306	22,298	22,295
DRA	22,306	22,298	22,295
% Difference	--	--	--
Commercial			
SCE	543,304	548,079	554,556
DRA	544,351	549,425	555,956
% Difference	0.23 %	0.25 %	0.25 %
Industrial			
SCE	11,810	11,512	11,400
DRA	11,823	11,506	11,379
% Difference	0.11 %	-0.06 %	-0.19 %
Public Authority			
SCE	46,788	46,525	46,265
DRA	46,737	46,478	46,220
% Difference	-0.11 %	-0.10 %	-0.08 %
Total Retail Customers			
SCE	**4,908,692**	**4,937,407**	**4,973,206**
DRA	**4,910,816**	**4,944,371**	**4,991,946**
% Difference	**0.04 %**	**0.15 %**	**0.38 %**

III. DISCUSSION / ANALYSIS OF ELECTRIC SALES

A. Overview of Sales

SCE and DRA relied upon econometric models to forecast electric sales to the residential, commercial, industrial, other public authority, agricultural and street lighting classes of service. The econometric models rely upon historical monthly data to establish a statistical relationship between electric energy consumption and weather, average constant dollar electric rates, and economic conditions in SCE's service area.[3] Under SCE's approach, historic electric consumption is defined to include electric sales plus electric conservation and economic bypass. To arrive at forecasted sales, forecasts of electric conservation and economic bypass are subtracted from forecasted electric consumption.

B. Economic/Demographic Conditions

An important factor explaining forecasted electric consumption is the growth in economic activity in SCE's service area. Therefore before turning to the specific econometric forecast results obtained by SCE and DRA it will be useful to review SCE's and DRA's forecast of economic activity in SCE's service area.

SCE relies upon ISI Global Insight (Global Insight) for its projections of economic conditions in its service area. SCE explains that: "Global Insight is forecasting a very slow recovery…The recession is projected to officially end in 2010, but economic activity is expected to be very modest in the next few years."[4] The UCLA Anderson Forecast for the Nation and California (UCLA)is similarly pessimistic. UCLA's December 2010 forecast concludes that: "In the last California Report we characterized the recovery in the near term as…indicating a period of almost imperceptible growth. The current forecast is for similar slow growth until the end of next year. With only the first indication of changes in consumer and business

[3] Constant dollar electric rates are defined as average nominal electric rates deflated by a price deflator.

[4] Southern California Edison, 2012 General Rate Case, SCE-10,Volume I, November 2010, p. 47.

expectations revealing themselves in the contemporaneous data, and in the absence of an external driver to induce growth, this is the most likely scenario for this phase of the recovery."[5]

The key macroeconomic drivers of SCE's residential, commercial, industrial, other public authority, and agricultural econometric models are real per capital personal income and employment.

Table 3-3 compares SCE's forecasts of real per capita personal income growth in SCE's service area to UCLA's December 2010 forecast of real per capita personal income growth for California. While SCE's personal income growth forecasts are slightly below UCLA's forecasts for the state, they are generally consistent with UCLA's projections. Since SCE's forecasts are generally consistent with UCLA's projections, DRA has adopted SCE's real per capita income forecasts.

Table 3 – 3
SCE and UCLA Forecasts of Real Per Capita Personal Income Growth

Area/Year	2010	2011	2012
Los Angeles County	0.05 %	0.47 %	1.44 %
Orange County	-0.25 %	0.27 %	1.44 %
Riverside County	-0.96 %	-0.12 %	1.17 %
San Bernadino County	-0.96 %	-0.12 %	1.17 %
Ventura / Santa Barbara Counties	-1.52 %	0.49 %	1.92 %
Rural Counties	-1.63 %	-0.41 %	1.21 %
California – UCLA	0.42 %	0.62 %	2.52 %

Table 3-4 reports a comparison SCE's commercial, industrial, and agricultural employment forecasts to several employment forecasts taken from the December 2010 UCLA forecast. For the commercial sector, SCE's employment forecast is slightly more optimistic than UCLA's. In 2011 and 201, for example, SCE forecasts that commercial employment will rise by 3.79 and 3.14 percent, respectively. For the

[5] The UCLA Anderson Forecast For The Nation and California, December 2010, p. 79.

trade sector, UCLA forecasts statewide employment growth of 2.26 percent in 2011 and 3.96 percent in 2012. SCE's industrial employment forecast is also slightly more optimistic than UCLA's statewide manufacturing employment forecast. UCLA projects that between 2010 and 2011 manufacturing employment will increase by less than one percent. Between 2011 and 2012 UCLA forecasts manufacturing employment growth of about two percent. In contrast, SCE forecasts industrial employment growth of 1.36 percent between 2010 and 2011 with a further increase of 2.57 percent between 2011 and 2012. The December UCLA is for slow employment growth through 2012. UCLA concludes that: "Our expectation for 2011 is a growth in employment of 1.6 %...Employment growth is expected to speed up in 2012..[With] …the unemployment rate…stuck between 12 % and 13 %...Employment growth will only push unemployment down marginally and we do not expect it to reach 9.9 % until the 4th quarter of 2012."[6]

Table 3–4
SCE and UCLA Employment Forecasts
2010 – 2012

Sector	2010	2011	2012	Average
Commercial	0.33 %	3.79 %	3.14 %	2.42 %
Industrial	-2.88 %	1.36 %	2.57 %	0.35 %
Agricultural	-2.52 %	1.78 %	2.91 %	0.73 %
UCLA				
Trade	-1.85 %	2.26 %	3.96 %	1.46 %
Non-Durable Manufacturing	-3.73 %	0.22 %	1.72 %	-0.60 %
Durable Manufacturing	-3.13 %	0.65 %	2.19 %	-0.10 %
Manufacturing	-3.28 %	0.40 %	2.01 %	-0.29 %
Total Non-Farm Employment	-1.48 %	1.32 %	3.11 %	-0.42 %

[6] The UCLA Anderson Forecast For The Nation and California, December 2010, p. 79.

Forecasted electric sales are also impacted by electric rate assumptions. SCE forecasts of electric rates for the residential, commercial, industrial, and agricultural classes of service are reported in Table 3-5. SCE notes that: "The average electric price in 2010 is expected to remain approximately equal to the 2009 level, but increase in 2011 due to higher fuel prices and expenditures associated with the 2012 GRC application…All other things equal, the impact of higher electric rates is a reduction in average electricity use per customer."[7] In developing its forecasted electric sales, DRA has relied upon SCE forecasted electric rate assumptions.

Table 3 – 5
SCE Forecasted Electric Rates
2010 – 2012
(Cents/Kwh)

Year/Sector	2010	2011	2012
Residential			
Los Angeles County	12.26	13.24	13.51
Orange County	12.64	13.64	13.92
Riverside County	12.28	13.26	13.53
San Bernadnio County	11.78	12.72	12.98
Santa Barbara/Ventura Counties	12.55	13.56	13..83
Rural Counties	12.24	13.22	13.49
Residential Average			
Commercial	14.74	16.18	16.78
Industrial	9.60	10.37	10.59
OPA	9.92	9.91	9.89
Agriculture	10.57	10.55	10.54

[7] Southern California Edison, 2012 General Rate Case, SCE-10, Volume 1, November 2010, p. 47.

C. Sales

1. Residential Sales

SCE estimates residential econometric models for Los Angeles County, Orange County, Riverside County, San Bernadino County, Ventura/Santa Barbara Counties and Rural Counties. For each county area model, electric consumption per customer (electric sales plus conservation plus economic bypass) is modeled as a function of heating and cooling degree days, billing days, a linear time trend, constant dollar per capita personal income, constant dollar average electric rates, along with various monthly dummy variables. Heating and cooling degree days are multiplied by winter and summer season dummy variables and scaled by heating and cooling efficiency indexes.[8] The linear time trend captures "the systematic long term trend growth that is not explained by other explicit variables in the econometric models."[9] The real average price terms in the models are adjusted to reflect the impact of electric restructuring on residential electric consumption. This is accomplished by multiplying the average real residential price terms by dummy variables reflecting the historic periods when the Commission was restructuring the California electric energy industry.[10] An average use functional form is used

[8] SCE defines the summer season to include the months of April through October. For these months the summer season dummy takes on the value one and zero in the remaining months. The winter season includes the months of November through March. For these months the winter dummy variable takes on the value one and zero in the remaining months.

[9] SCE response to DRA data request DRA_006_TMR, response to Question 01, August 30, 2010.

[10] As a result, there are two price terms in the residential models. The two price terms are derived by multiplying the real average electric rates by dummy variables representing the restructuring and non-restructuring periods. The electric restructuring period includes the months of February 2001 through January 2002 and the non-restructuring period includes the remaining months.

(electric consumption divided by electric customers) and the models are estimated with monthly observations over the period January 2001 through February 2002.[11]

DRA evaluated SCE's residential econometric models by first replicating their results.[12] This is standard practice in empirical economics. DRA then estimated alternative versions of SCE's residential models. Specifically, DRA regressed the log of residential energy consumption (electric sales plus conservation and economic bypass) on cooling and heating degree days, the log of billing days, the log of real personal per capita income, the log of real average electric rates, a linear time trend, along with a set of monthly binary variables. Following SCE DRA adjusted the real average price terms in its alternative models to capture the impact of electric restructuring on residential electric consumption.

Table 3-6 reports a detailed comparison of SCE's and DRA's county level forecasts for 2010, 2011, and test year 2012. The results reported in Table 3-6 show that for each county, DRA's residential forecasts are within one percent of SCE's forecasts.

[11] Specifically, the models for Los Angeles County, Orange County, and Riverside County were estimated from January 2001 through February 2002. The remaining models were estimated over the period from June 2001 through February 2002.

[12] DRA relied upon the Time Series Processor (TSP) econometric software package while SCE relied upon the E-Views econometric software package.

Table 3-6
DRA and SCE Residential County Forecast Comparison
2010-2014

Year/County	2010	2011	2012
Los Angeles			
SCE	10,658	10,518	10,489
DRA	10,645	10,546	10,553
Orange			
SCE	5,283	5,262	5,256
DRA	5,286	5,242	5,237
Riverside			
SCE	4,263	4,287	4,320
DRA	4,611	4,589	4,720
San Bernadino			
SCE	4,315	4,287	4,320
DRA	4,286	4,243	4,310
Ventura/ Santa Barbara			
SCE	2,214	2,206	2,202
DRA	2,206	2,204	2,206
Rural			
SCE	1,784	1,777	1,799
DRA	1,785	1,777	1,817

DRA and SCE are forecasting declines in residential sales over the 2010-2012 forecast period. SCE projects that total residential sales will decline from 30,063 GWH in 2009 to 28,666 GWH in 2012. This is an annual average decline of 1.35 percent per year from 2009 recorded levels. DRA's forecasted decline in residential sales is similar, with DRA forecasting that residential sales will decline to 28,843 GWH in 2012. DRA's and SCE's residential demand forecast is consistent with the recent decline in residential sales.

DRA's and SCE's residential forecast is slightly below the long term trend growth in residential sales. Over the period 2000 through 2009 residential sales

grew, on average, by 1.51 percent. It should be noted, however, that historic residential sales is characterized by large year to year fluctuations. Between 2000 and 2001, for example, residential sales decline by 6.74 percent. Between 2005 and 2006, residential sales rose by 4.52 percent. More recently, residential sales declined sharply. Between 2008 and 2009 residential sales declined by 2.22 percent. The DRA and SCE residential forecasts are consistent with the recent decline in residential sales.

2. Commercial Sales

SCE models commercial electric consumption as a function of efficiency adjusted cooling degree days, commercial employment, real average commercial gas rates, billing days, a linear time trend along with a series of monthly dummy variables. Similar to the residential models the real average price terms in the model are adjusted to reflect the impact of electric restructuring on commercial employment construction. An average use functional form is used and the model is estimated with monthly observations over the period March 2003 through February 2010.

DRA's commercial model is similar to SCE's. In contrast to SCE, however, DRA regressed the log of commercial consumption on efficiency adjusted cooling degree days, the log of commercial employment, the log of real average electric rates, a linear time trend and a series of monthly binary variables. As did SCE, DRA adjusted the real average price terms in its model to reflect the impact of electric restructuring on historic commercial electric consumption. DRA estimated its model with monthly observations over the period March 1993 through February 2010.

DRA and SCE arrive at very similar forecast results. For 2010, 2011, and test year 2012, DRA's commercial forecast differs from SCE's by less than one percent. DRA and SCE are projecting increases in commercial sales over the 2010-2012 forecast horizon. SCE forecasts commercial sales to rise from its 2009 recorded level of 41,819 GWH to 41,819 GWH in 2012. This is an annual average increase of 2.70 percent. DRA forecasts that commercial sales will increase to 42,224 GWH. This is a slightly higher annual average growth rate of 3.30 percent.

The DRA and SCE commercial forecasts are consistent with the long-run growth in commercial sales. Over the period 1993 through 2008, commercial sales

grew, on average, by 2.59 percent per year.[13] Over the period 2000 – 2009 commercial sales grew, on average, by two percent per year. As a result of the recent recession, commercial sales declined by 4.53 percent between 2008 and 2009.

3. Industrial Sales

SCE models industrial sales as a function of efficiency adjusted cooling degree days, real average electric rates, manufacturing employment, billing days, a linear time trend, and a series of monthly dummy variables. Following the approach used in the residential, and commercial models, the price terms in the model are adjusted to reflect the impact of electric restructuring on historic industrial electric consumption. SCE relies upon an average use functional form and the model is estimated with monthly observations over the period January 1995 through February 2010.

DRA's industrial econometric model is similar to SCE's. DRA regressed the log of industrial electric consumption on efficiency adjusted cooling degree days, the log of billing days, the log of manufacturing employment, the log of real average industrial electric rates, a linear time trend, and a series of monthly dummy variables. Following SCE, DRA adjusted the real average electric rates to capture the impact of electric restructuring on historic electric industrial consumption. DRA estimated its industrial econometric model with monthly observations over the period January 1995 through February 2010.

DRA forecasts slightly lower industrial sales than does SCE. For the 2010 – 2012 forecast period DRA's industrial forecasts are approximately between one and two percent below SCE's forecast. DRA and SCE are projecting declines in industrial sales into the forecast period. SCE projects that industrial sales will decline, on average, by 1.18 percent. DRA's forecasted decline is similar, projecting that industrial sales will decline, on average, by 1.56 percent over the forecast period. Both the DRA and SCE forecasts are consistent with the historic decline in

[13] Recall that the SCE and DRA commercial econometric models were estimated over this time period.

industrial sales. For example, over the period 1995 through 2009 industrial sales declined, on average, by 3 percent per year. Over the more recent period, the decline was even sharper. Between 2007 and 2008 industrial sales declined by 4.84 percent. This was followed by a 2.73 percent decline between 2008 and 2007. The largest historic decline in industrial sales occurred between 2008 and 2009 when industrial sales declined by nearly 12 percent.

4. Other Public Authority Sales

SCE models OPA electric consumption as a function of energy efficiency adjusted cooling degree days, real average electric rates lagged one month, government employment, billing days, a dummy variable capturing military base closings, a linear time trend along with a series of monthly binary variables. An average use functional form is used and the model is estimated with monthly observations over the period January 1993 through February 2010.

DRA's model is similar. DRA regressed the log of OPA electric consumption on efficiency adjusted cooling degree days, the log of real average electric rate lagged one month, the log of government employment, the log of billing days, a linear time trend, a dummy variable representing military base closings, along with additional monthly binary variables.

As in the case of the other classes of service, DRA and SCE arrive at virtually identical OPA forecasts. For the entire 2010 – 2012 forecast period the DRA and SCE OPA sales forecasts differ by less than one percent.

Both DRA and SCE are projecting declines in OPA sales. SCE forecasts that OPA sales will decline from 5,209 MWH in 2009 to 5,180 GWH in test year 2012. This is an annual average decline of 0.15 percent over the forecast period. DRA forecasts an annual average percent decline in OPA sales of a similar magnitude, 0.21 percent. The DRA and OPA forecasts are consistent with long-run decline in OPA sales. Over the period 1993 through 2009, OPA sales declined, on average, by 0.45 percent per year. Over the more recent 2000-2009 period, OPA sales declined on average by 1.41 percent per year.

5. Agricultural Sales

For the agricultural sector, SCE models agricultural consumption per customer as a function of real average agricultural electric rates, agricultural employment per capita, a variable capturing water runoff from the San Joaquin River, billing days, a linear time trend, along with several monthly binary variables. The model is estimated with monthly observations over the period January 1995 through February 2010.

Similar to its other econometric forecasting models, DRA's agricultural model is based on a log-log functional form. DRA regressed the log of agricultural electric consumption on the log of billing days, the log of agricultural employment, the log of real average electric rates, logged values of the San Joaquin river runoff, a linear time trend, along with a series of monthly dummy variables. DRA estimated its model over the period February 1995 through February 2010.

For the forecast period the DRA and SCE agricultural sales forecasts are virtually identical. For 2011 and 2012, the DRA and SCE forecasts differ by less than one percent. SCE and DRA are both forecasting declines in agricultural sales. SCE forecasts that agricultural sales will decline from 1,432 GWH in 2009 to 1,368 GWH in 2012. This is an annual average decline of 1.39 percent. DRA's test year forecast of 1,376 GWH is an annual average decline of 1.21 percent from 2009 recorded levels. The DRA and SCE forecasts are consistent with the recent trend in agricultural sales growth. Over the period 2007 through 2009, agricultural sales grew, on average, by less than one percent per year.

6. Sales Conclusion

DRA evaluated SCE's electric sales forecasts for the residential, commercial, industrial, other public authority, and agricultural sectors by first replicating their econometric model results. DRA then developed alternative econometric models based on log-log functional forms for each sector. DRA's alternative models produced forecasts which do not materially differ from SCE's. Based on DRA's replication of SCE results and the forecasts produced by its alternative models, DRA concludes that SCE test year sales forecasts are reasonable.

IV. DISCUSSION / ANALYSIS OF CUSTOMERS

A. Overview of Customers

This section presents DRA's analysis of SCE's forecasting methodology and customer forecast results for 2010, 2011, and test year 2012. SCE forecasts customers to the residential, commercial, industrial, agricultural, and public authority classes of service. A non-econometric methodology is used to forecast residential customers. Econometric models are developed to forecast commercial, industrial, agricultural, other public authority customers.

1. Residential Customers

SCE forecasts residential customers as a function of new building permits and vacancy rates. As SCE explains: "The forecast of residential customer additions in multiple steps for each county within the SCE service area. The primary steps are: 1) forecasting residential building permits, 2) lagging the building permits for construction time to calculate new residential units, 3) converting residential units to active residential customers based on assumptions about future residential vacancy rates."[14] Following the approach used to forecast residential sales, SCE presents forecasts of residential customers for Los Angeles county, Orange county, San Bernadino county, Ventura/Santa Barbara counties, and the rural counties, (Inyo, Kern, Kings, and Mono counties.) Total residential customers are the sum of the county level forecasts. Over the 2010 – 2012 forecast period SCE is projecting that total residential customers will grow by less than one percent per year.

DRA relied upon SCE's residential customer forecasting methodology but updated SCE's building permit forecast with information taken from the December 2010 UCLA forecast. To arrive at an alternative building permit forecast based on the December UCLA report DRA applied SCE's county percent distribution of building permits to the UCLA forecast of total building permits for the state of California. For example, in 2010 SCE's percentage of building permits for Los

[14] Southern California Edison, 2012 General Rate Case, Workpapers, SCE-10, Volume 1, November 2010, p. 31.

Angeles County equaled 49 percent of their forecast of total building permits. To arrive at a forecast of building permits for Los Angeles County in 2010, DRA applied this percentage to the 2010 UCLA forecast of statewide building permits. A similar procedure was used to arrive at forecasted building permits for 2011 and 2012 for each of the counties in SCE's service area.

DRA's use of the December 2010 UCLA forecast results in slightly higher residential customer growth rates. For example, for 2011 and 2012 DRA forecasts total residential customer growth rates of 0.68 and 0.96 percent, respectively. SCE, on the other hand, forecasts total residential customer growth rates of 0.57 percent for 2011 and 0.69 percent for test year 2012. Both the DRA and SCE residential customer forecasts are slightly below the long run growth in residential customers. Over the period 1998 through 2009 total residential customers grew, on average, by one percent. However, since 1997 there has been a marked decline in residential customer growth. Between 2007 and 2009 total residential customers grew by less than one percent in each year.

2. Commercial Customers

SCE models commercial customers as a function of lagged values of commercial customers, lagged values of residential customers, a linear time trend and series of monthly dummy variables. Specifically, the first difference of commercial customers is regressed on lagged values of the first difference of commercial customers and lagged values of the first difference of residential customers.[15] The model is estimated over the period March 1991 through January 2010.[16]

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[15] The fist difference is defined as the difference between the current value of a series less the value of the series in the previous period. SCE also imposes a polynomial distributed lag (PDL) on past values of residential customers. A PDL is an econometric technique which forces the coefficients of the variable to lay along a polynomial of a certain degree and a pre-imposed lag structure. For the commercial customer model SCE uses a lag length of 10 months and a polynomial of degree one for the first difference of residential customers.

[16] The period January 1998 through December 2000 is excluded from the estimation period.

DRA's commercial customer model is also based on first differences. DRA regressed the first difference of commercial customers on the first difference of commercial employment, the first difference of residential customers, a linear time trend, and a series of monthly dummy variables. DRA's model is estimated over the period February 1993 through January 2010.[17]

The DRA and SCE commercial customer models yield virtually identical forecast results. Over the 2010 – 2012 forecast period the SCE and DRA commercial forecasts differ by less than one percent. Both the DRA and SCE forecasts are consistent with the recent growth in commercial customers. Over the forecast period SCE is projecting that commercial customers will grow, on average, by 0.94 percent per year. DRA forecasts that commercial customers will grow, on average, by one percent per year. While over the period 2000 – 2009 commercial customer growth has averaged 2.54 percent per year, recently the rate of growth of commercial customers has declined sharply. Between 2007 and 2009 commercial customers grew, on average, by less than one percent. The DRA and SCE forecasts represent a continuation of this recent slow growth in commercial customers.

3. Industrial Customers

SCE models the first difference of industrial customers as a function of lagged values of the first difference of industrial customers, lagged values of the first differences of manufacturing employment and a series of monthly binary variables.[18] The model is estimated with monthly observations over the period January 1994 through February 2010.

[17] Following SCE, DRA also excluded the period January 1998 through December 2000 from the estimation period.

[18] The first difference of manufacturing employment is modeled as a six month PDL of degree one.

DRA's industrial customer model is very similar to SCE's. SCE regressed the first difference of industrial customers on lagged values of the first difference of manufacturing employment along with a series of monthly dummy variables.[19]

DRA and SCE arrive at virtually identical industrial customer forecasts. Over the forecast period DRA's and SCE's industrial customer forecasts differ by less than one percent. Both DRA and SCE project declines in industrial customer growth. Over the forecast period SCE forecasts that, on average, industrial customers will decline by 2.35 percent while DRA forecasts that industrial customers will decline by approximately the same amount. Over the period 1994 through 2009 SCE's industrial customers have declined, on average, by 5.63 percent per year. In fact in every year of the 2001 – 2009 period, industrial customers declined. This decline in industrial customer growth is consistent with the long run migration of industrial manufacturing away from California.

4. Other Public Authority Customers

SCE also relies on a first difference model to forecast OPA customers. Specifically, the first difference of OPA customers is regressed on lagged values of OPA customers, monthly dummy variables, and lagged values of the first difference of OPA floorspace.[20] The model is estimated over the period March of 2001 through February 2010.

DRA's model is similar. DRA regressed the first difference of OPA customers on lagged values of the first difference of OPA customers, lagged values of the first difference of OPA floorspace, and a series of monthly dummy variables.[21] DRA's model was also estimated over the period March 2001 through February 2010.

For the forecast period DRA's and SCE's forecasts are virtually identical. Both DRA and SCE are forecasting OPA customers to decline throughout the forecast

[19] While SCE used a six month PDL on the first difference of manufacturing employment, DRA's PDL on the first difference of manufacturing employment was only four quarters.

[20] A six month lag is imposed on the PDL for the first difference of OPA floorspace.

[21] DRA imposed a four month lag on the PDL for the first difference of OPA floorspace.

period. SCE projects that OPA customers will decline, on average, by 1.46 percent. This decline is consistent with the historic long run decline in OPA customers. Over the period 1993 through 2009 OPA customers declined, on average, by 1.31 percent per year. Similar, to the trend in industrial customers, OPA customers declined in every year of the historic period.

5. Agricultural Customers

A first difference model is also used to forecast agricultural customers. Specifically, SCE regresses the first difference of agricultural customers on the first difference of agricultural customers lagged one month, the first difference of agricultural employment, a linear time trend, along with a series of monthly dummy variables. The model is estimated from June 1993 through February 2010.

SCE forecasts virtually no growth in agricultural customers into the forecast period. This is consistent with the historic pattern of agricultural customer growth. Over the period 1993 through 2009 agricultural customers declined, on average, by .80 percent per year. Similarly, over the shorter 2000 – 2009 period, the pattern of growth was the same, with agricultural customers declining by less than one percent per year.

6. Customer Conclusion

SCE and DRA used econometric models to forecast customers for 2010, 2011, and test year 2012. The models are a primarily a function of employment, and past values of customers. As in the case of sales, DRA's customer forecasts do not differ materially from SCE's. As a result, DRA concludes that SCE's test year customer forecasts are reasonable.

B. New Meter Connections

1. Residential

SCE forecasts residential meter connections as a function of building permits and a series of monthly dummy variables. Building permits are modeled as a second degree 12 month PDL. The model is estimated with monthly observations over the period January 1998 through December 2009.

DRA's model is similar. DRA utilized a log-log model to forecast residential new meter connections. DRA regressed the log of new residential meters on the log of residential building permits along with a series of monthly dummy variables. DRA modeled building permits as a 16 month second degree polynomial. This model was estimated over the period February 1988 through December 2009.

DRA's model produces a forecast similar to SCE's. For example, in 2010, 2011, and test year 2012, SCE forecasts new gross residential meter connections of 22,324, 28,215, and 38,591, respectively. DRA forecasts gross new residential meter connections of 21,082 in 2010, 27,560 in 2011, and 38,757 in test year 2012. SCE and DRA are projecting sharp increases in new residential meter connections into the forecast period.

2. Non-Residential

SCE models non-residential customers as a function of residential meters lagged three months and commercial meters lagged one month. The model is estimated over the period from the first quarter of 1998 through the fourth quarter of 2009. DRA reviewed the model results and considers them reasonable.

SCE forecasts declines in non-residential meter connections in 2010 and 2011 and an increase in non-residential meters in test year 2012. Specifically, non-residential meter connections are forecast to decline from 8,078 in 2009 to 7,115 in 2010, with a further decline to 6,953 into 2011. In test year 2012 SCE is forecasting an increase in non-residential meter connections to 7,443. This is still below the level achieved in 2009. DRA considers SCE's non-residential meter forecast to be reasonable.