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Exhibit Number	:	ORA-03
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ALJ	:	Darling/Dudney
Witness	:	Kanter

OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION

Report on the Results of Operations for Southern California Edison Company General Rate Case Test Year 2015

Sales, Customers, and Other Operating Revenues

San Francisco, California
August 4, 2014

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SALES, CUSTOMERS, and OTHER OPERATING REVENUES

I. INTRODUCTION

This exhibit presents the analyses and recommendations of the Office of Ratepayer Advocates (ORA) regarding Southern California Edison Company's (SCE) forecasts of sales, customers, and Other Operating Revenues (OOR) for Test Year (TY) 2015.

Section II summarizes ORA's recommendations and conclusions. Section III discusses SCE's and ORA's customer forecasting methodologies and forecast results for new meters, customers and sales. Section IV discusses SCE's and ORA's forecasts for other operating revenues. Section V discusses ORA's recommendations for information SCE should be required to provide in its next General Rate Case (GRC).

II. SUMMARY OF RECOMMENDATIONS

The following summarizes ORA's recommendations for New Meters:

- For the residential class of service SCE forecasts 27,758 new meters in 2013, 38,463 new meters in 2014 and 51,238 new meters in TY 2015. ORA's residential new meter forecasts are 21,840 new meters in 2013, 26,465 new meters in 2014 and 29,560 new meters in TY 2015.
- For the non-residential class of service SCE forecasts 5,114 new meters in 2013, 6,542 new meters in 2014 and 8,607 new meters in TY 2015. ORA's non-residential new meter forecasts are 5,252 new meters in 2013, 5,947 new meters in 2014 and 6,943 new meters in TY 2015.

For Sales and Customers, due to problems with SCE's documentation, ORA neither accepts nor rejects SCE's estimates.

The following summarizes ORA's recommendations for Other Operating Revenues:

- ORA recommends increasing SCE's OOR forecast for TY 2015 by the amount of $0.83 million.

ORA also has two recommendations regarding information SCE should be required to provide in its next GRC

Table 3-1 compares ORA's and SCE's TY 2015 forecasts of new meters:

Table 3-1
ORA and SCE New Meter Forecasts

Description (a)	ORA Recommended (b)	SCE Proposed[1] (c)	Amount SCE>ORA (d=c-b)	Percentage SCE>ORA (e=d/b)
New Meters	36,838	60,180	23,342	63%

Table 3-2 compares ORA's and SCE's TY 2015 forecasts of Other Operating Revenues:

Table 3-2
Other Operating Revenues for TY 2015

Description (a)	ORA Recommended (b)	SCE Proposed[2] (c)	Amount SCE>ORA (d=c-b)	Percentage SCE>ORA (e=d/b)
OOR	$199.03 million	$198.20 million	($.83)	-.42%

III. DISCUSSION / ANALYSIS OF ELECTRIC BILLINGS, NEW METERS, AND SALES

For forecasts of SCE's electric sales and customers for 2013, 2014 and TY 2015, SCE and ORA both rely upon econometric models. The econometric models forecast electric sales and customers as a function of electric rates faced by the various end-users, and economic/demographic conditions in SCE's service area. SCE's and ORA's recommendations for forecast sales and customers are presented below.

[1] Ex. SCE-10, Vol. 1, p. 63.

[2] Ex. SCE-10, Vol. 1, p. 85.

A. New Meter Connections

1. Residential New Meter Connections

SCE forecasts residential meter connections as a function of housing starts (SCESTART) and a series of monthly variables.[3] In the last rate case, SCE used new building permits instead of housing starts. SCE does not explain in its testimony or workpapers why it changed its methodology from the last rate case to this rate case.

For the residential class of service SCE forecasts 27,758 new meters in 2013, 38,463 new meters in 2014 and 51,238 new meters in TY 2015. ORA's residential new meter forecasts are 21,840 new meters in 2013, 26,465 new meters in 2014 and 29,560 new meters in TY 2015. ORA's forecasts are based on a better statistical model than SCE's, as indicated by the random character of its residuals.

In this GRC, SCE used a regression model primarily based on a second degree 12 month lagged Polynomial Distributed Lag (PDL) model [4] of housing starts to forecast new residential meter connections.[5] The regression model also included monthly variables such as an indicator whose value was 1 for certain months and other dummy variables.[6] SCE's model's estimates were based on monthly housing start data over the period January 1997 through February 2013, as was revealed through a data request. [7] This clarification of the historical basis for SCE's residential new meter model is necessary, since SCE's workpapers indicate that the sample has a beginning date of January 1998.[8]

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[3] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 55.

[4] For more information regarding PDL regression models see Appendix C of this exhibit.

[5] Ex. SCE-10, Vol. 1, Chapter 5, Pt. 1, Workpapers, p. 54.

[6] Dummy variables are variable whose values are either 0 or 1.

[7] SCE's response to ORA data request DRA-228-MRK, Q.1.a and 1.b. This data request was concerned with SCE's PDL residential new customer model, but SCE treats all its PDL models in the same way. Thus the workpapers present the sample period for all of SCE's PDL models in a way that indicates a shorter historical basis for SCE's analysis than what SCE actually used.

[8] Ex. SCE-10, Vol. 1, Chapter 5, Pt. 1, Workpapers, p. 54.

SCE's residential meter model parameters and statistics[9] include the PDL(SCESTART) coefficient of .0218 and its standard error, which SCE regards as indicative that its PDL specification is adequate. SCE explains its position as follows:

"The coefficient of .0218 with standard error of .0005 simply indicates that SCE's PDL specification is significant and therefore meaningful."[10]

In this response, SCE did not address ORA's question, which asked that SCE provide some insight as to how the numbers .0218 with standard deviation .0005 were derived or computed. In response to another ORA data request, SCE also writes:

"SCE does not have deep knowledge of the computation algorithms EViews employs to derive PDL(SCESTART). It is well possible that EViews utilizes both SCESTART and other variables in the model to derive the PDL(SCESTART) variable."[11]

Despite four separate data requests,[12] SCE could not provide any indication of how EViews computed the PDL statistics on which SCE bases its assessment that its residential new meter PDL model, and all its other PDL models, are "significant and therefore meaningful." In its response to the last data request, DRA-328-MRK, Q1a, SCE agreed that the PDL variable(SCESTART) is one of the functions "that is consistent with common practice among forecasters and the resulting estimation can be replicated with other economic software packages such as SAS." However, in response to ORA data request 328-MRK, Q.1b, SCE stated that "The EViews PDL variable (SCESTART) will not be reproduced identically in SAS," in seeming contradiction to its answer to Q.1a, thus leaving unresolved how ORA can confirm the calculations by which SCE determined the adequacy of its residential new meter model.

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[9] Ex. SCE-10, Vol. 1, Chapter 5, Pt. 1, Workpapers, p. 54.

[10] SCE's response to ORA data request DRA-83-MRK Follow-up, Q.3.

[11] SCE's response to ORA data request DRA-286-MRK, Q.2b.

[12] ORA data requests DRA-83-MRK, DRA-286-MRK, DRA-317-MRK, Q.3a, 3.b, and 5.b, and DRA-328-MRK, Q.1b.

Another shortcoming in SCE's documentation of its PDL models is illustrated in Table 12, titled "Residential Meter Connection Model Variable Description."[13] According to its title, the table is supposed to list the variables that SCE used to estimate its residential meter connection model. SCE lists the variable PDL(SCESTART) in this table, rather than the variable SCESTART supplied by Global Insight and Moody's. The variable PDL(SCESTART) was accompanied by the description: "Polynomial distributed lag of housing starts. Source Global Insight & Moody's".[14] This attribution for the source of the PDL(SCESTART) variable is somewhat confusing in view of SCE's previously cited response: " It is well possible that EViews utilizes both SCESTART and other variables in the model to derive the PDL(SCESTART) variable."[15]

If SCE were correct in listing the variable PDL(SCESTART) in Table 12, then PDL(SCESTART) would also appear in the table titled "Residential Meter Connection Model Data"[16] which lists the monthly values of the "Residential Meter Connection Model Variables" that actually were input into SCE's residential new meter model. However, PDL(SCESTART) does not appear in the latter table. Instead, SCESTART appears, as it should. ORA asked SCE to explain why SCE listed PDL(SCESTART) instead of the variable SCESTART in Table 12. SCE's response was "SCE considers PDL(SCESTART) as an independent variable."[17]

Based on the responses supplied by SCE regarding the PDL(SCESTART) variable and their coefficient, ORA has come to the conclusion that:

(1) SCE listed the source of the PDL(SCESTART) variable as Global Insight and Moody's, whereas Eviews actually computed the monthly variable identified as

[13] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, Workpapers, p. 55.

[14] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 55.

[15] SCE's response to ORA data request DRA-286-MRK, Q. 2b.

[16] Ex. SCE-10, Vol. 1, Chapter V, Pt. 2, Workpapers, p. 161.

[17] SCE's response to ORA data request DRA-286-MRK, Q. 1.d.

the PDL(SCESTART) variable and used it as an independent variable in a regression equation to derive the PDL(SCESTART) coefficient .0218;

(2) Regarding the PDL(SCESTART) variable and its associated coefficient which supposedly indicates the validity of SCE's residential meter model, SCE does not display any precise understanding of how EViews computes either the PDL(SCESTART) variable or the PDL(SCESTART) coefficient. Neither can SCE point to any specific documentation of how EViews computes the PDL(SCESTART) variable or coefficient;

(3) SCE listed the PDL(SCESTART) variable in Table 12 "Residential Meter Connection Variable Description" without clarifying that PDL(SCESTART) was not computed by Global Insight or Moody's and that it does not appear as a monthly variable in any of the printouts in its workpapers or spreadsheets supplied to ORA in accordance with the MDR;

(4) SCE declares the PDL(SCESTART) coefficient "has no direct impact on the model forecast",[18] even though it puts the associated PDL(SCESTART) variable into a table that is supposed to list the variables that SCE used to estimate its residential meter connection model.

SCE's statistical PDL model for new residential meters did not fulfill a necessary statistical criterion relating to residual errors. When SCE fitted its model to the actual data, the residual errors were not consistent with White Noise[19] statistics as would be the case in a successful model. This is evident in the White Noise Probability graph output that ORA produced in checking SCE's results and which is included as Appendix A to this exhibit.

SCE's PDL model used near and far point restrictions. This resulted in twelve coefficients, corresponding to the twelve lags.[20] These twelve coefficients are

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[18] SCE's response to ORA data request DRA-83-MRK, Q. 3. (Note that the coefficient PDL(SCESTART) corresponds to the temporary regressor variable also named PDL(SCESTART).

[19] A White Noise time series is defined on page 357 of "Econometrics" by Baldi H. Baltagi, Springer-Verlag, Berlin, 2008, in the following manner: "White Noise, i.e. , purely random with constant mean and variance and zero autocorrelation."

[20] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 54.

computed in terms of three statistically estimated parameters corresponding to the three coefficients of the second degree polynomial used in the PDL. The twelve coefficients are symmetric around the six month lag (the midway point), on account of the near end and far end restrictions, and the six month lag coefficient is maximal.[21]

In order to achieve a model consistent with SCE's for comparison purposes as well as having residual errors with acceptable White Noise statistics,[22] ORA replaced SCE's twelve month PDL model with a six month lagged SCESTART independent variable. Using a simple time series model, ORA's model residual errors have a satisfactory White Noise Probability graph.[23]

2. Commercial New Meter Connections

SCE forecasts non-residential (commercial) meter connections as a function of residential new meters (RESMETER) and a series of monthly variables.[24] Non-residential new meters are modeled as a second degree 28 month lagged PDL model of new residential meters.[25] It follows that, in the forecast period from March 2013 to December 2017, SCE's commercial new meter estimates reflect SCE's forecast for new residential meters rather than forecasts supplied by an outside source such as Moody's. Thus, if the Commission finds that SCE's residential meter estimates are inflated in this forecast period, then SCE's commercial meter estimates are even more inflated.

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[21] See Appendix C of this exhibit.

[22] Page 357 of "Econometrics" by Baldi H. Baltagi, Springer-Verlag, Berlin, 2008, describes how statistical time series models are subjected to diagnostic checks. "One commonly used check is to see whether the residuals are White noise. If they fail this test, these models are dropped from the list of viable candidates."

[23] See Appendix A to this exhibit.

[24] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 59.

[25] For more information regarding PDL regression models see Appendix C of this exhibit.

For the non-residential class of service SCE forecasts 5,114 new meters in 2013, 6,542 new meters in 2014 and 8,607 new meters in TY 2015. ORA's non-residential new meter forecasts are 5,252 new meters in 2013, 5,947 new meters in 2014, and 6,943 new meters in TY 2015. ORA's forecasts are based on a better statistical model than SCE's, as indicated by the random character of its residuals.

SCE's non-residential new meter model is estimated using monthly data over the period January 1998 through February 2013, but SCE's documentation states that the sample of historical data used started on May 2000, twenty eight months past January 1998.[26] An unsuspecting outside party trying to verify SCE's results might easily be working with a historical period that is two and a third years too short.

SCE's statistical PDL model for new commercial meters did not fulfill a necessary statistical criterion relating to residual errors. When SCE fitted its model to the actual data, the residual errors were not consistent with White Noise statistics as would be the case in a successful model. This was evident in the White Noise Probability graph output that ORA produced in checking SCE's results, included in this exhibit as Appendix B.

SCE's PDL model used near and far point restrictions. This resulted in twenty eight coefficients, corresponding to the twenty eight lags. These twenty eight coefficients are computed in terms of three statistically estimated parameters corresponding to the three coefficients of the second degree polynomial used in the PDL model. The twenty eight coefficients are symmetric around the fourteen month lag (the midway point) on account of the near end and far end restrictions, and the fourteen month lag coefficient is maximal.[27]

In order to achieve a better model consistent with SCE's for comparison purposes as well as having residual errors with acceptable White Noise statistics, [28]

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[26] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 56.

[27] See Appendix C of this exhibit.

[28] Page 357 of "Econometrics" by Baldi H. Baltagi, Springer-Verlag, Berlin, 2008, describes how statistical time series models are subjected to diagnostic checks. "One commonly used check is to

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ORA replaced SCE's twenty eight month PDL model with a fourteen month lagged RESMETER independent variable. Using a simple time series model, ORA's model achieves a satisfactory White Noise Probability graph.[29]

ORA used SCE's estimated residential new meter estimates to populate the fourteen month lagged RESMETER independent variable in the period from March 2013 to December 2017. Thus, if SCE's residential new meter estimates are too high, then that is reflected in ORA's commercial new meter estimates.

Table 3-3 compares ORA's and SCE's forecasts of new meters for the years 2013-2017.

Table 3-3
ORA and SCE New Meter Forecasts

	ORA RESMETER	ORA COMMETER	SCE RESMETER	SCE COMMETER
2013	21840	5252	21840	5252
2014	26466	5947	38643	6542
2015	29561	6943	51238	8607
2016	31206	7929	56320	10698
2017	31859	8570	55939	11897

ORA's commercial new meter estimates are conservative inasmuch as ORA used SCE's estimated residential new meter estimates to populate the fourteen month lagged RESMETER independent variable in the period from March 2013 to December 2017. When ORA reran its estimate using the SCESTART variable instead of the RESMETER variable, its forecasts for commercial new meters were significantly lower.

Table 3-4 compares ORA's forecasts of Commercial new meters for the years 2013-2017, using the RESNEWMETER variable as an independent regressor versus using the SCESTART variable as an independent regressor. This table

(continued from previous page)
see whether the residuals are White noise. If they fail this test, these models are dropped from the list of viable candidates."

[29] See Appendix B of this exhibit.

demonstrates the inflating impact of using RESMETER as an independent regressor.

Table 3-4
ORA New COMMETER Forecasts

	USING RESMETER	USING SCESTART
2013	5252	5252
2014	5947	5186
2015	6943	5608
2016	7929	5982
2017	8570	6294

B. Customers

1. Residential Customers

SCE forecasts residential customers as a PDL function of lagged residential housing starts and a series of monthly variables.[30] In the last rate case, SCE used new building permits and vacancy rates. SCE does not explain in its testimony or workpapers why it changed its methodology from rate case to rate case.

SCE presents forecasts of residential customers for Los Angeles County, Orange County, Riverside, San Bernardino County, Ventura/Santa Barbara Counties and the rural counties (Inyo, Kern, Kings, and Mono Counties.) [31] Total residential customers are the sum of the county level forecasts.

Taking the forecast of Los Angeles County as an example, SCE modeled housing starts as a second degree 7 month lagged Polynomial Distributed Lag model PDL model for Los Angeles County housing starts (LASTART) and monthly variables. SCE's model's estimates were based on monthly housing start data over the period June 2000 to through December 2000, as was revealed through a data

[30] See Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 51.

[31] Ex. SCE-10, Vol. 1, Pt. 2, Chapter V, Workpapers, pp. 1-74

request.[32] SCE's workpapers state that the sample of historical data used started on January 2001.[33] SCE explained its documentation as follows:

"The heading information is part of EViews' output. To the extent that any party wants to gain a better understanding of the modeling results, SCE is willing to provide additional information upon request."[34]

Both in its last GRC and in this one, SCE documented its historical sample in this way, giving the impression that the historical sample period is shorter than it really is by the amount of lagged periods in the PDL model. This practice led to substantial confusion both in this rate case and the previous one.[35] Numerous data requests [36] were required to clarify the situation, and ORA's analysis was impeded. SCE's stated willingness "to provide additional information upon request" did not mitigate this problem, since interested parties who accept at face value SCE's documentation as to the historical basis for its analysis are unlikely to pursue what should be a simple matter. In fact, the historical basis of SCE's PDL analysis was not a simple matter on account of the undocumented situation that it depended on the maximal lag of the PDL model.[37]

ORA did not prepare separate residential customer estimates. However, this does not mean that ORA supports SCE's residential customer estimates. On the contrary, ORA encourages other parties who developed their own residential customer estimates to submit them. ORA does this on account of the problems with

[32] SCE's response to ORA data request DRA-228-MRK, Q.1.a and 1.b. SCE treats all its PDL models in the same way. Thus the workpapers present the sample period for all of SCE's PDL models in a way that indicates a shorter historical basis for their analysis than what SCE actually used.

[33] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 34.

[34] SCE's response to ORA data request DRA-286-MRK, Q.6.c.

[35] E-mail sent April 10, 2014, by Tom Renaghan who was ORA's Sales and Customer witness for SCE's 2012 GRC re SCE's 2012 workpapers, Ex. SCE-10, Vol. 1, Chapter 5, pp. 31-42.

[36] SCE responses to ORA data requests DRA-83-MRK, DRA-155-MRK, DRA-195-MRK, DRA-228-MRK, and DRA-286-MRK.

[37]SCE's response to ORA data request DRA-228-MRK, Q.2.

SCE's documentation and because SCE has not demonstrated how EViews computed the statistics on which SCE bases its assessment that its PDL models are "significant and therefore meaningful."

2. Commercial Customers

SCE models small commercial customers as a function of nine month lagged values of residential customers, a first difference of one month lagged values of commercial customers, and a series of monthly variables.[38] Specifically, the first difference of small commercial customers is regressed on one month lagged values of the first difference of small commercial customers and a nine month lag second order PDL of the first difference of residential customers and monthly dummy variables.

SCE models large commercial customers as a function of a twenty four month lag second order PDL of commercial building square footage and a series of monthly dummy variables.[39]

ORA has not prepared separate non-residential customer estimates. However, this does not mean that ORA supports SCE's non-residential customer estimates.

3. Industrial Customers

SCE models the first difference of industrial customers as a function of lagged values of the first difference of industrial customers, a nine month lag PDL of manufacturing employment data and a series of monthly binary variables.[40]

ORA has not prepared separate industrial customer estimates. However, this does not mean that ORA supports SCE's residential customer estimates.

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[38] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 42.

[39] Ex. SCE-10, Vol. 1, Chapter V, Pt. 1, p. 43**.**

[40] The manufacturing employment data is modeled as a nine month PDL of degree one.

C. Sales

SCE relied upon econometric models to forecast electric sales to the residential, commercial, industrial, other public authority, agricultural, and street lighting classes of service. SCE uses employment per customer or per square foot to explain how electricity consumption varies in response to varying economic conditions. 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.

An important factor explaining forecast electric consumption is the growth in economic activity in SCE's service area. SCE states that "The modest but steady growth in non-farm employment and housing starts between 2010 and 2012 appears to indicate that Southern California's economy has entered a post-recession recovery, albeit a modest one. Consistent with the recent modest economic gains in the Southern California economy, SCE is forecasting a modest growth in sales of approximately 0.5% per year for 2013-2017."[41]

ORA is not making a separate recommendation regarding SCE's TY 2015 sales.

IV. DISCUSSION / ANALYSIS OF OTHER OPERATING REVENUES

SCE forecasts $198.2 million of OOR for TY 2015. SCE derived its forecast on an account-by-account basis.[42] ORA recommends an adjustment to SCE's total OOR forecast based on extra revenues SCE received for labor expenses that SCE ratepayers had already paid.

ORA recommends the amount $199.03 million as its forecast of OOR for TY 2015. ORA bases its forecast of OOR on SCE's forecast increased by $0.830 million. This amount is an estimate of the amount of reimbursements SCE can reasonably be expected to receive on average for its labor costs in helping other

[41] Ex. SCE-10, Vol. 1, p. 57.

[42] Ex. SCE-10, Vol. 1, pp. 84-85.

utilities in the wake of natural disasters such as Hurricane Sandy. It does not include material costs, depreciation costs, or equipment-related costs. This estimate was derived as an average of the amount of such labor related reimbursements received over the seven year period from 2006 to 2012.[43]

In its forecasts for O&M and A&G expenses elsewhere in the GRC, SCE apparently did not make provisions for mutual aid to another utility as in the situation of Hurricane Sandy:

"SCE made no adjustments to its proposed test year revenue requirement request or its proposed 2010-2012 capital expenditures to reflect a potential, forecast adjustment for workers working outside of its service territories, such as Mutual assistance."[44]

In situations like Hurricane Sandy, SCE used equipment and labor paid for by SCE's ratepayers.[45] This equipment and labor was diverted from its original purpose on behalf of SCE's ratepayers; instead, it was used to provide mutual assistance to other utilities. The costs for this mutual assistance were placed in a service order account[46] and recorded as a debit and credit in FERC account 143.[47] According to SCE:

> "There is no difference between the costs received incurred by SCE for mutual assistance for Hurricane Sandy and the amount billed and received from Consolidated Edison Company of New York."[48]

This statement does not explain or justify SCE's diversion of labor and equipment from its original purpose. However this statement provides the rationale for scrutinizing SCE's Mutual Assistance reimbursements in OOR, since the matching expenses are not scrutinized elsewhere. This statement also justifies ORA's estimate $0.830 million as the amount that SCE ratepayers are likely to pay

[43] SCE's response to ORA data requests DRA -07-MRK, Q.7 and DRA-028-MRK, Q.2.

[44] SCE's response to ORA data request DRA-48-MRK, Q.1.

[45] SCE's responses to ORA data requests DRA-007-MRK, Q.3, Q.4, Q.5, and Q.6.

[46] SCE's response to ORA data request DRA-03-MRK, Q.1.

[47] SCE's response to ORA data request DRA-254-MRK, Q.6.

[48] SCE's response to ORA data request DRA-03-MRK, Q.1.

SCE on an annual basis in the future for services they will not get due to SCE mutual assistance to other utilities, assuming that the future reflects the past. SCE's ratepayers funded SCE, based on the premise that SCE workers would be on the job throughout the year. No reduction in SCE's funding was made for 241 workers to be elsewhere for two weeks.[49] SCE ratepayers who funded SCE for the labor and associated payroll expenses for those two weeks did not get the services they paid for during those two weeks, including overtime.[50] According to its response to ORA data request DRA-48-MRK, Q.1, quoted above, that "SCE made no adjustments to its proposed test year revenue request", it is appropriate to include an adjustment to OOR for an amount of revenues that SCE obtains in situations when it assist other utilities.

For the above reasons, ORA recommends that SCE's OOR forecast for TY 2015 be increased by the amount of $0.83 million. This amount is a conservative estimate of the amount of reimbursements SCE can reasonably be expected to receive for its labor costs in helping other utilities in the wake of natural disasters such as Hurricane Sandy. (ORA's estimate is restricted to labor costs and contains no estimate of equipment and equipment-related costs.)

V. DISCUSSION OF ADDITIONAL INFORMATION SCE SHOULD BE REQUIRED TO PROVIDE IN ITS NEXT GRC

The following summarizes ORA's recommendations regarding information SCE should provide in future rate cases. ORA makes these recommendations based on responses ORA received to its Master Data Requests in this and previous rate cases. In this and previous rate cases, SCE has presented the historical basis of its models (such as its PDL models) in a way that is not clear unless knowledge of the statistical model is brought to bear. SCE has referred to model variables (such as PDL(SCESTART)) without clarifying who created them, how they were created, and without making available their monthly values.

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[49] SCE's responses to ORA data request DRA-007-MRK, Q.1 and Q.2.

[50] SCE's response to ORA data request DRA-007-MRK, Q.4.

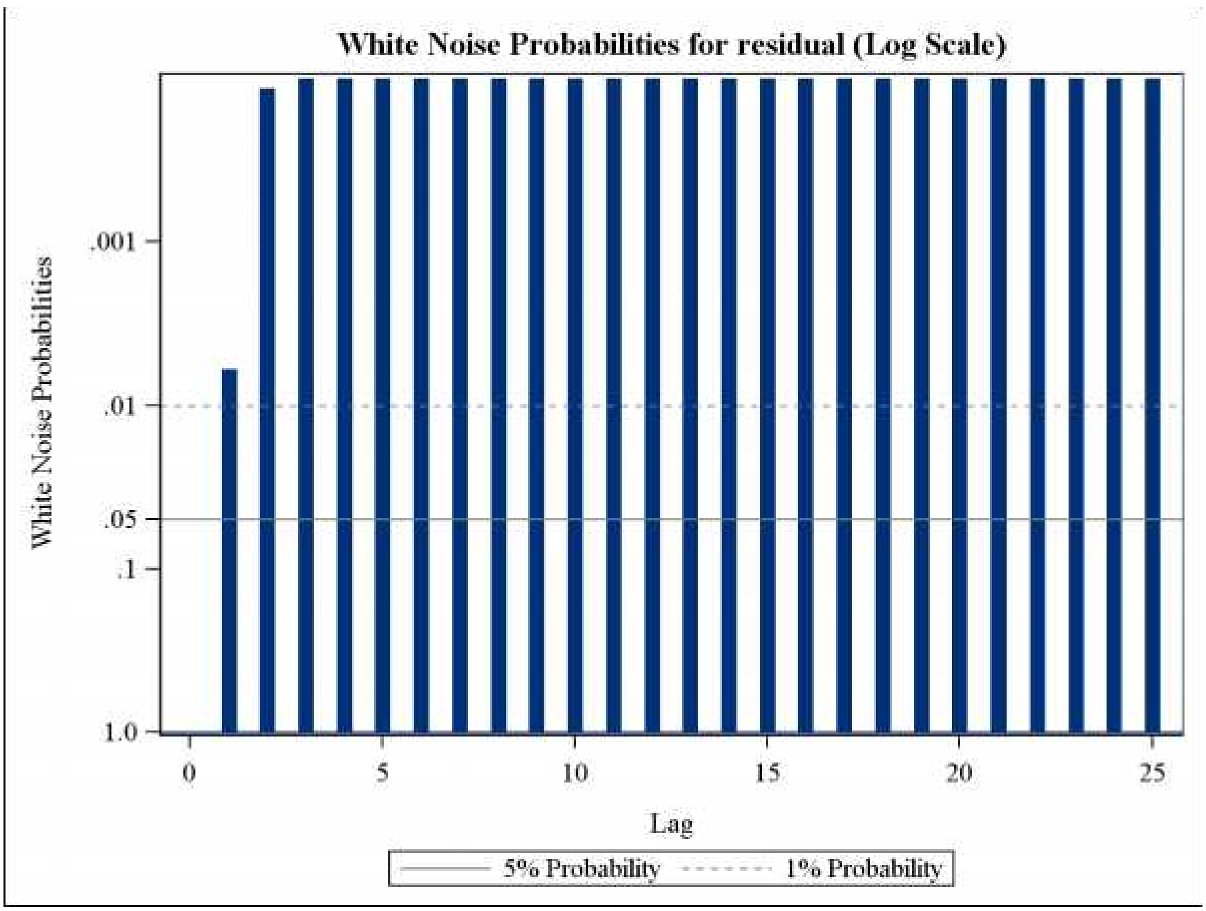
ORA, therefore, recommends that SCE should be required, in its next GRC, to provide:

- The historical basis for the company’s model clearly stated in a way that does not depend on familiarity of the particular statistical analysis the company has performed to get its forecasts.
- The variables used in the analysis in the work papers and on spreadsheets. Their definition should not depend on the particular statistical analysis the company has performed to get its forecasts.

APPENDIX A
COMPARISON OF SCE'S RESIDENTIAL METER MODEL RESULTS WITH ORA'S RESULTS

This appendix compares SCE's Residential New Meter model residual white noise probabilities with ORA's. It is customary to test a statistical model by checking whether the residuals (the differences of model estimates and historical values for the forecast dependent variable) are consistent with a white noise pattern. SCE's and ORA's residuals were analyzed in a consistent manner using PROC TIMESERIES in SAS. Graph A-1 displays SCE's residential new meter model white noise probabilities in a logarithmic scale.

GRAPH A-1
SCE Residential New Meter Model White Noise Probabilities



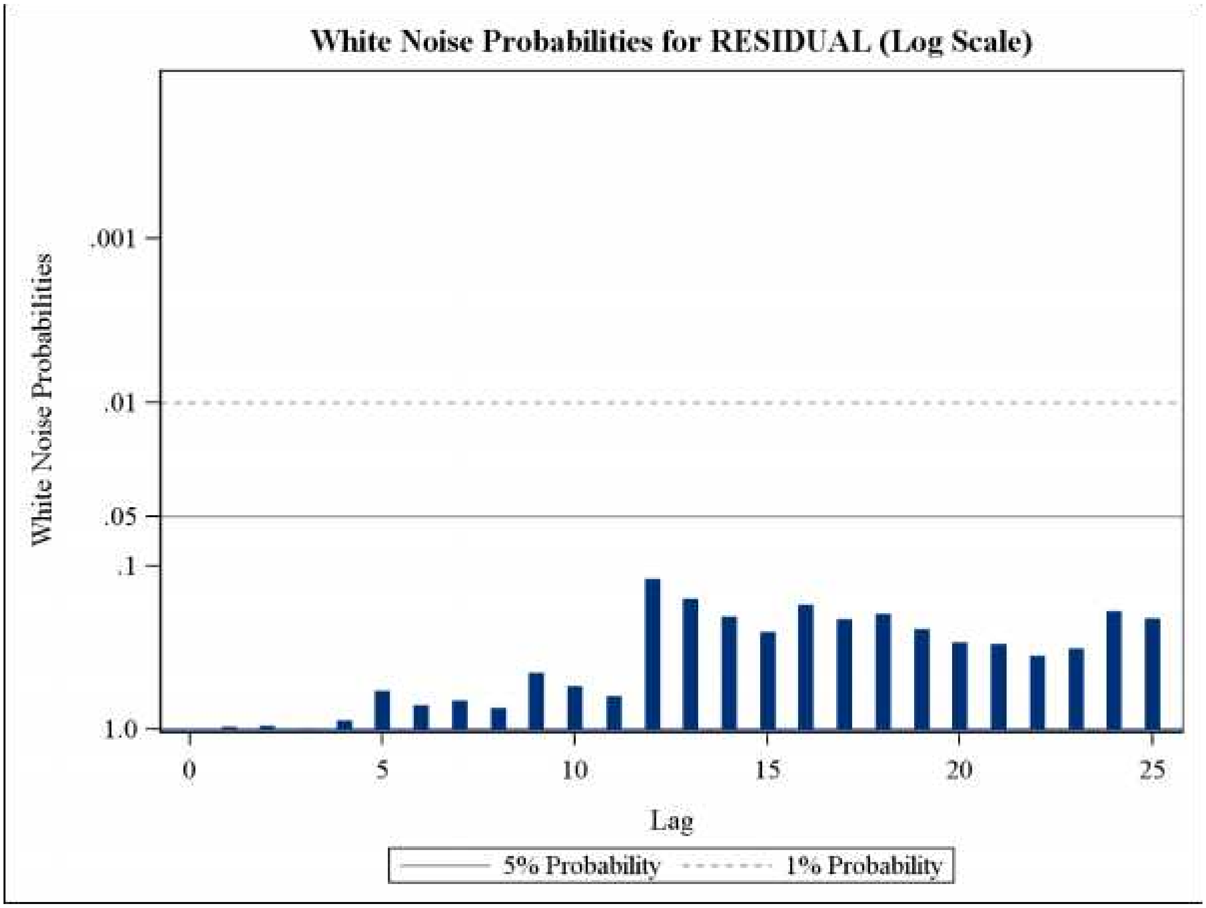
The graph puts the smallest probabilities higher, with .001 near the top. The probabilities are decreasing exponentially as they approach the top (because of the logarithmic scaling.) The .05 line indicates the level at which the probabilities are so small (less than .05) that it is unlikely the corresponding residuals are representing white noise, as is desirable in the residuals of a properly fitted model. As is evident from the graph, all of the white noise probabilities associated with SCE's model are in the danger zone, indicating a problem with the model. The actual white noise probability values, printed in Table A-1 below, are all extremely small.

TABLE A-1
SCE White Noise Probabilities

Obs	_NAME_	LAG	WNPROB
1	residual	0	.
2	residual	1	.006003650
3	residual	2	.000115439
4	residual	3	.000000627
5	residual	4	.000000819
6	residual	5	.000000423
7	residual	6	.000001054
8	residual	7	.000002751
9	residual	8	.000006849
10	residual	9	.000014918
11	residual	10	.000017348
12	residual	11	.000025051
13	residual	12	.000046298
14	residual	13	.000031195
15	residual	14	.000031549
16	residual	15	.000008310
17	residual	16	.000001293
18	residual	17	.000001107
19	residual	18	.000000165
20	residual	19	.000000142
21	residual	20	.000000209
22	residual	21	.000000400
23	residual	22	.000000720
24	residual	23	.000000350
25	residual	24	.000000195
26	residual	25	.000000345

Graph A-2 presents ORA's residential new meter model white noise probabilities in a logarithmic scale.

GRAPH A-2
ORA Residential New Meter Model White Noise Probabilities



The graph puts the smallest probabilities higher, with .001 near the top. (because of the logarithmic scaling.) The .05 line indicates the level at which the probabilities are so small (less than .05) that it is unlikely they are representing white noise, as is desirable in the residuals of a properly fitted model. ORA's white noise probabilities consistently vary between .2 and .9, indicating that ORA's Residential new meter model residuals consistently represent white noise. The actual white noise probability values are printed in the Table A-2 below.

TABLE A-2

ORA White Noise Probabilities

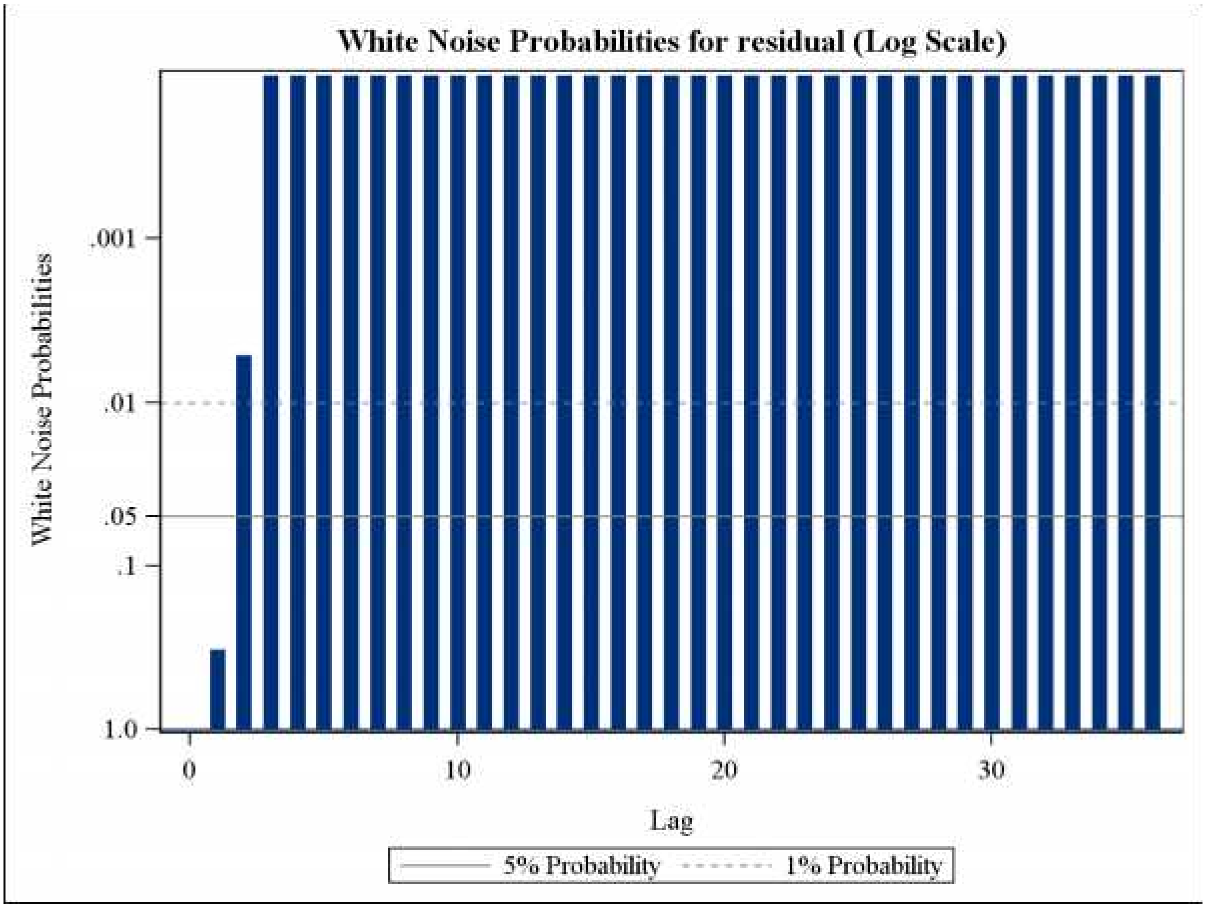
Obs	_NAME_	LAG	WNPROB
1	RESIDUAL	0	.
2	RESIDUAL	1	0.96146
3	RESIDUAL	2	0.94882
4	RESIDUAL	3	0.99077
5	RESIDUAL	4	0.87812
6	RESIDUAL	5	0.58083
7	RESIDUAL	6	0.70521
8	RESIDUAL	7	0.66186
9	RESIDUAL	8	0.73801
10	RESIDUAL	9	0.45012
11	RESIDUAL	10	0.54517
12	RESIDUAL	11	0.62222
13	RESIDUAL	12	0.11978
14	RESIDUAL	13	0.15858
15	RESIDUAL	14	0.20302
16	RESIDUAL	15	0.25249
17	RESIDUAL	16	0.17370
18	RESIDUAL	17	0.21096
19	RESIDUAL	18	0.19729
20	RESIDUAL	19	0.24429
21	RESIDUAL	20	0.29175
22	RESIDUAL	21	0.29698
23	RESIDUAL	22	0.35061
24	RESIDUAL	23	0.31793
25	RESIDUAL	24	0.18808
26	RESIDUAL	25	0.21046

APPENDIX B

COMPARISON OF SCE'S NON-RESIDENTIAL METER MODEL RESULTS WITH ORA'S RESULTS

This appendix compares SCE's Non-Residential meter model white noise probabilities with ORA's. The white noise probabilities were computed in a consistent manner for SCE and ORA using PROC TIMESERIES in SAS. Graph B-1 displays SCE's Non-Residential new meter model white noise probabilities in a logarithmic scale.

GRAPH B-1
SCE Non-Residential Meter Model White Noise Probabilities



The .05 line indicates the level at which the probabilities are so small (less than .05) that it is unlikely the corresponding residuals are representing white noise, as is desirable in the residuals of a properly fitted model. As is evident from the graph, all of the white noise probabilities associated with SCE's model are in the danger zone, indicating a problem with the model. The actual white noise probability values, printed in Table B-1 below, are all extremely small.

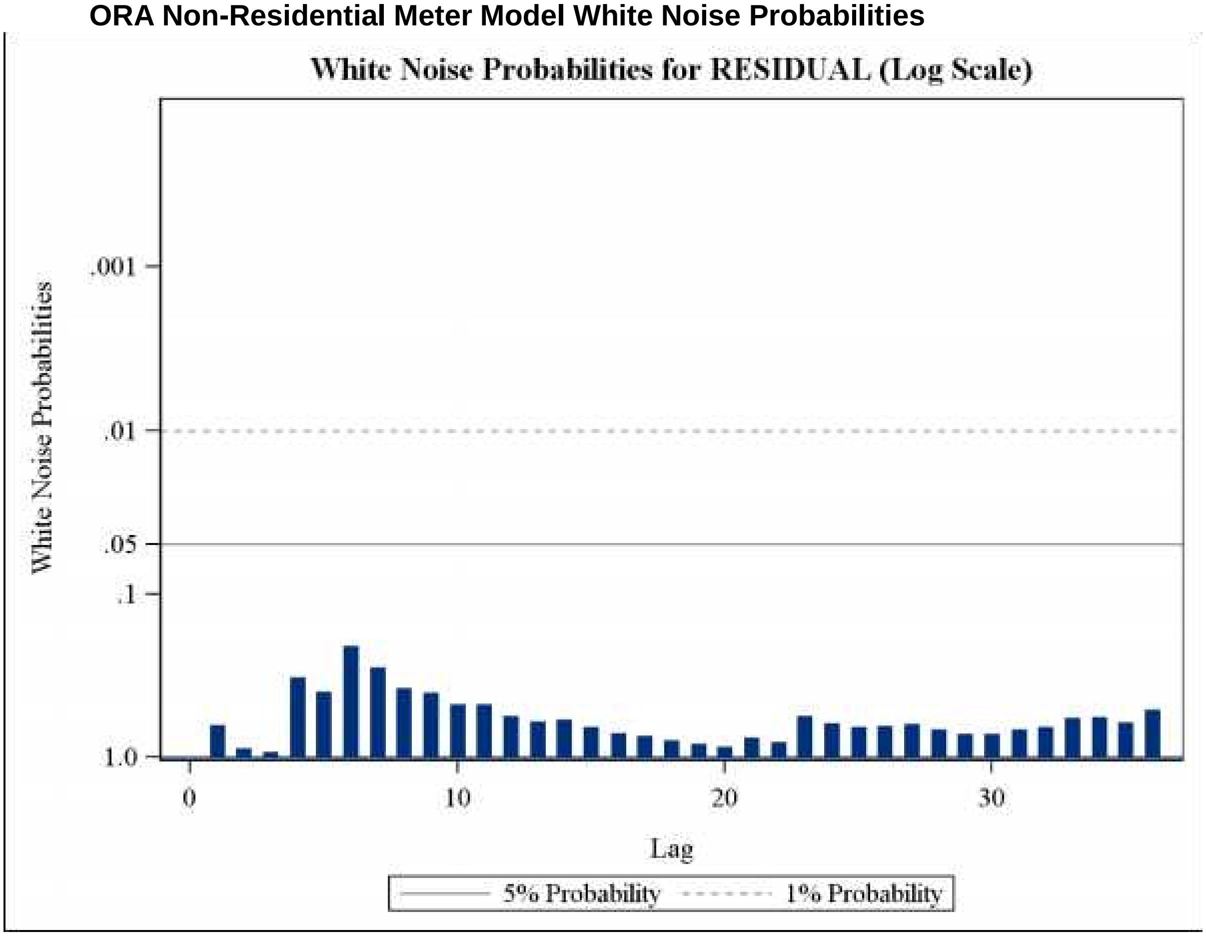
TABLE B-1
SCE White Noise Probabilities

Obs	_NAME_	LAG	WNPROB
1	Residual	0	.
2	Residual	1	0.32196
3	Residual	2	0.00515
4	Residual	3	0.00000
5	Residual	4	0.00001
6	Residual	5	0.00000
7	Residual	6	0.00000
8	Residual	7	0.00000
9	Residual	8	0.00000
10	Residual	9	0.00000
11	Residual	10	0.00000
12	Residual	11	0.00000
13	Residual	12	0.00000
14	Residual	13	0.00000
15	Residual	14	0.00000
16	Residual	15	0.00000
17	Residual	16	0.00000
18	Residual	17	0.00000
19	Residual	18	0.00001
20	Residual	19	0.00001
21	Residual	20	0.00001
22	Residual	21	0.00002
23	Residual	22	0.00002
24	Residual	23	0.00002
25	Residual	24	0.00000
26	Residual	25	0.00000
27	Residual	26	0.00000
28	Residual	27	0.00000

Obs	_NAME_	LAG	WNPROB
29	Residual	28	0.00000
30	Residual	29	0.00000
31	Residual	30	0.00000
32	Residual	31	0.00000
33	Residual	32	0.00000
34	Residual	33	0.00000
35	Residual	34	0.00000
36	Residual	35	0.00001
37	Residual	36	0.00001

Graph B-2 presents ORA's Non-Residential model white noise probabilities in a logarithmic scale.

GRAPH B-2
ORA Non-Residential Meter Model White Noise Probabilities



ORA's Non-Residential new meter model white noise probabilities consistently vary between .2 and .8, indicating that ORA's Non-Residential new meter model residuals consistently represent white noise. The actual white noise probability values are printed in the Table B-2 below.

TABLE B-2
ORA White Noise Probabilities

Obs	_NAME_	LAG	WNPROB
1	RESIDUAL	0	.
2	RESIDUAL	1	0.63327
3	RESIDUAL	2	0.88135
4	RESIDUAL	3	0.92408
5	RESIDUAL	4	0.32031
6	RESIDUAL	5	0.39468
7	RESIDUAL	6	0.20656
8	RESIDUAL	7	0.28174
9	RESIDUAL	8	0.37462
10	RESIDUAL	9	0.39821
11	RESIDUAL	10	0.47299
12	RESIDUAL	11	0.47119
13	RESIDUAL	12	0.55727
14	RESIDUAL	13	0.60164
15	RESIDUAL	14	0.58841
16	RESIDUAL	15	0.64981
17	RESIDUAL	16	0.70842
18	RESIDUAL	17	0.73747
19	RESIDUAL	18	0.78320
20	RESIDUAL	19	0.82535
21	RESIDUAL	20	0.85806
22	RESIDUAL	21	0.75514
23	RESIDUAL	22	0.80213
24	RESIDUAL	23	0.55642
25	RESIDUAL	24	0.61477
26	RESIDUAL	25	0.64438
27	RESIDUAL	26	0.63800

Obs	_NAME_	LAG	WNPROB
28	RESIDUAL	27	0.62175
29	RESIDUAL	28	0.66979
30	RESIDUAL	29	0.71793
31	RESIDUAL	30	0.71802
32	RESIDUAL	31	0.67018
33	RESIDUAL	32	0.64902
34	RESIDUAL	33	0.56981
35	RESIDUAL	34	0.56265
36	RESIDUAL	35	0.61035
37	RESIDUAL	36	0.50771

APPENDIX C

POLYNOMIAL DISTRIBUTED LAG ESTIMATION

The simple finite distributed lag model is expressed in the form

$$y_t = \alpha + \sum_{i=0}^{p} \beta_i x_{t-i} + \varepsilon_t$$

The Almon polynomial distributed lag model writes the beta lag coefficients as

$$\beta_i = \alpha_0^* + \sum_{j=1}^{d} \alpha_j^* i^j$$

The Polynomial Distributed Model (PDL model) is said to be of second order (or quadratic) if d=2. It is said to be of first order if d=1. The alphas in the last equations are the only parameters that need to be estimated. (This is evident because the beta parameters are computed from the alpha parameters, using the second equation.) This alleviates the necessity of estimating many beta parameters in the first equation when the lag p in the first equation is large.

End point constraints are often applied to the beta lag coefficients. In a second order PDL model, sometimes beta is set equal to zero at -1 and at p+1. In that case the PDL model is said to use both near and far point restrictions. It is easy to deduce that the beta parameters are then symmetric around p/2 and maximal there.