COMMONWEALTH EDISON COMPANY

# Load Forecast for Five-Year Planning Period
# June 2014 – May 2019

July 15, 2013

Revised August 9, 2013

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## I. INTRODUCTION AND SUMMARY

The Public Utilities Act ("PUA") provides that beginning in 2008 electric utilities in Illinois shall provide a range of load forecasts to the Illinois Power Agency ("IPA") by July 15th of each year. The PUA further provides that these load forecasts shall cover the 5-year planning period for the next procurement plan and shall include hourly data representing high-load, low-load and expected-load scenarios for the load of eligible retail customers ("Eligible Retail Customers"). The electric utility is also to provide supporting data and assumptions (220 ILCS 5/16-111.5(d)(2)). This document presents Commonwealth Edison Company's ("ComEd") load forecast for the planning period of June 2014 through May 2019. ComEd will provide the supporting data and assumptions in a separate package of materials.

ComEd's 5-year hourly load forecast ("Forecast") is based on the PUA's definition of Eligible Retail Customers. Eligible Retail Customers include residential and non-residential customers who purchase power and energy from ComEd under fixed-price bundled service ("Blended Service") tariffs, other than those customers whose service has been declared competitive. Because service to certain classes of customers has been declared competitive either by statute or by the Illinois Commerce Commission ("ICC"), only residential and non-residential customers below 100 kW in size are eligible for Blended Service.[1]

The Forecast includes the effects of energy efficiency, demand response and renewable energy resources programs. The Forecast anticipates that these programs will be observed in full compliance with the PUA's requirements, subject to the defined rate impact test.

## II. LOAD FORECAST

### A. Purpose and Summary

This section of the Forecast provides forecasted energy usage for the Eligible Retail Customers within ComEd's service territory for the 5-year procurement planning period beginning on June 1, 2014. In accordance with Section 16-111.5(b) of the PUA, the Forecast includes a multi-year historical analysis of hourly loads, a review of switching trends and competitive retail market development, a discussion of known and projected changes to future loads and growth forecasts by customer classes. The Forecast also addresses the impacts of demand response and energy efficiency programs on the forecast. Lastly, this Forecast discusses any supply side needs that are projected to be offset by the purchase of renewable energy resources.

[1] There is one exception to this statement. The common area accounts for the condominium associations are exempted from this competitive declaration (see Section 16-103.1 of the PUA).

## B. Development of the Five-Year Load Forecast (June 1, 2014 – May 31, 2019)

The hourly load analysis provides the means to determine the on-peak and off-peak quantities needed in the procurement process. In presenting the Forecast, this document focuses on average usage or load during the 12 monthly on-peak and off-peak periods during a year. For the purposes of this Forecast, the definitions of the on-peak and off-peak periods are consistent with those commonly used in the wholesale power markets, and on trading platforms such as the New York Mercantile Exchange ("NYMEX") and the Intercontinental Exchange, Inc. ("ICE"). The on-peak period consists of the week day period from 6 a.m. to 10 p.m. CPT excluding NERC holidays (this is referred to as the 5X16 peak period). The off-peak period consists of all other hours (this is referred to as the off-peak "wrap" period). The Forecast therefore has been summarized as load requirements using the 24 different time periods covered by these standard products. This is the same approach that was presented in past forecasts and approved by the ICC. The hourly load data is being supplied with the supporting data and assumptions materials.

### 1. Hourly Load Analysis

#### a. Multi-year historical analysis of hourly load

The 2013 multi-year historical analysis of hourly load is very similar to the approach used in past procurement filings. Essentially, the hourly models that were developed last year were updated with another year of customer data and reviewed for fit. The results this year are similar to the previous filing.

The 2013 multi-year historical analysis of load during the 24 monthly on-peak and off-peak periods is based on hourly profile data for the period from January 2005 to December 2012. The profiles are based on statistically significant samples from ComEd's residential customer population along with customers applicable to the non-residential watt-hour and 0 to 100 kW delivery classes. These samples provide the only basis for an analysis of actual historical hourly usage of Eligible Retail Customers because the standard meters currently used for these customers do not record usage on an hourly basis. As discussed in greater detail below, the profiles show clear and stable weather-related usage patterns that are indicative of how residential and the small non-residential customers use electricity. Thus, the customer load profiles provide reliable information on the historical hourly usage of customers.

Using the hourly load profiles and actual customer aggregate usage, Table II-1 depicts the historical on-peak and off-peak hourly usage of the major customer groups within the Eligible Retail Customers for the period from January 2010 to December 2012.

# Table II-1

# Load Forecast Table (Historical Detail 20010-2012)

**ComEd Historical Actual Usage**

**Historical Energy Usage in MWh for Eligible Retail Customers (Line Loss Adjusted)**

| | | Residential Load | | Watthour | | Small Load (0 to 100kW) | | Street Lighting Load | | Total Load (MWh) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Month | On-Peak | Off-Peak | On-Peak | Off-Peak | On-Peak | Off-Peak | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2010 | 1 | 1,404,757 | 1,717,737 | 31,413 | 29,865 | 394,710 | 379,688 | 1,788 | 3,991 | 1,832,667 | 2,131,281 |
| 2010 | 2 | 1,286,133 | 1,277,782 | 29,465 | 23,330 | 372,304 | 295,291 | 1,619 | 3,809 | 1,689,522 | 1,600,212 |
| 2010 | 3 | 963,208 | 913,012 | 25,448 | 18,550 | 373,592 | 269,198 | 1,490 | 4,225 | 1,363,739 | 1,204,986 |
| 2010 | 4 | 946,120 | 885,498 | 23,413 | 16,808 | 367,770 | 259,600 | 1,134 | 4,203 | 1,338,438 | 1,166,109 |
| 2010 | 5 | 1,031,288 | 1,213,285 | 23,074 | 20,893 | 369,598 | 334,528 | 868 | 5,285 | 1,424,828 | 1,573,992 |
| 2010 | 6 | 1,576,774 | 1,388,093 | 25,980 | 17,951 | 448,417 | 309,681 | 193 | 1,043 | 2,051,363 | 1,716,769 |
| 2010 | 7 | 2,129,095 | 2,108,142 | 30,188 | 22,581 | 472,460 | 380,518 | 456 | 2,342 | 2,632,199 | 2,513,583 |
| 2010 | 8 | 1,969,934 | 1,818,869 | 29,621 | 20,526 | 470,662 | 353,644 | 391 | 1,730 | 2,470,608 | 2,194,769 |
| 2010 | 9 | 1,114,031 | 1,041,725 | 22,093 | 16,078 | 374,281 | 273,692 | 550 | 1,792 | 1,510,955 | 1,333,287 |
| 2010 | 10 | 888,085 | 960,659 | 20,918 | 17,188 | 316,503 | 260,706 | 776 | 1,918 | 1,226,282 | 1,240,471 |
| 2010 | 11 | 1,049,053 | 1,098,253 | 26,069 | 20,560 | 359,348 | 285,012 | 900 | 1,965 | 1,435,369 | 1,405,790 |
| 2010 | 12 | 1,528,240 | 1,418,867 | 29,071 | 20,653 | 363,802 | 273,574 | 893 | 1,643 | 1,922,006 | 1,714,736 |
| **Totals** | | **15,886,718** | **15,841,923** | **316,753** | **244,983** | **4,683,448** | **3,675,132** | **11,057** | **33,947** | **20,897,976** | **19,795,985** |
| 2011 | 1 | 1,368,678 | 1,521,717 | 27,834 | 23,594 | 368,850 | 325,727 | 785 | 1,716 | 1,766,147 | 1,872,754 |
| 2011 | 2 | 1,206,062 | 1,186,929 | 25,623 | 20,068 | 347,348 | 280,764 | 774 | 1,749 | 1,579,807 | 1,489,511 |
| 2011 | 3 | 1,159,167 | 1,136,895 | 24,281 | 17,635 | 347,838 | 255,457 | 709 | 1,949 | 1,531,996 | 1,411,935 |
| 2011 | 4 | 969,437 | 983,804 | 21,379 | 16,775 | 308,747 | 248,293 | 556 | 1,937 | 1,300,120 | 1,250,809 |
| 2011 | 5 | 1,019,568 | 1,094,005 | 21,641 | 16,868 | 322,611 | 259,005 | 389 | 2,140 | 1,364,208 | 1,372,018 |
| 2011 | 6 | 1,470,860 | 1,238,235 | 22,653 | 14,935 | 372,637 | 254,261 | 324 | 1,938 | 1,866,474 | 1,509,369 |
| 2011 | 7 | 1,975,570 | 2,222,529 | 21,480 | 17,785 | 377,078 | 340,216 | 375 | 2,009 | 2,374,503 | 2,582,539 |
| 2011 | 8 | 1,735,218 | 1,390,515 | 25,114 | 15,491 | 409,079 | 276,763 | 368 | 1,810 | 2,169,779 | 1,684,580 |
| 2011 | 9 | 1,099,125 | 1,079,116 | 16,169 | 11,730 | 268,504 | 206,113 | 578 | 1,861 | 1,384,376 | 1,298,820 |
| 2011 | 10 | 889,369 | 960,021 | 18,227 | 14,295 | 270,184 | 219,439 | 751 | 1,867 | 1,178,532 | 1,195,622 |
| 2011 | 11 | 1,006,338 | 1,012,818 | 19,001 | 14,450 | 273,852 | 215,951 | 770 | 1,689 | 1,299,960 | 1,244,908 |
| 2011 | 12 | 1,124,395 | 1,250,986 | 21,493 | 17,811 | 290,015 | 251,954 | 947 | 1,744 | 1,436,850 | 1,522,495 |
| **Totals** | | **15,023,788** | **15,077,571** | **264,895** | **201,438** | **3,956,742** | **3,133,942** | **7,327** | **22,410** | **19,252,752** | **18,435,361** |
| 2012 | 1 | 1,113,049 | 1,268,557 | 19,952 | 17,352 | 286,014 | 251,024 | 719 | 1,546 | 1,419,733 | 1,538,479 |
| 2012 | 2 | 1,002,918 | 1,003,895 | 19,713 | 15,157 | 268,264 | 207,063 | 695 | 1,563 | 1,291,591 | 1,227,679 |
| 2012 | 3 | 889,193 | 908,161 | 16,770 | 12,791 | 266,940 | 205,048 | 587 | 1,568 | 1,173,491 | 1,127,569 |
| 2012 | 4 | 749,478 | 794,980 | 15,897 | 12,059 | 236,245 | 185,297 | 506 | 1,733 | 1,002,126 | 994,068 |
| 2012 | 5 | 892,511 | 1,014,805 | 18,038 | 13,007 | 260,396 | 197,408 | 345 | 1,720 | 1,171,289 | 1,226,939 |
| 2012 | 6 | 1,395,995 | 1,383,541 | 17,240 | 12,161 | 285,354 | 214,818 | 341 | 1,764 | 1,698,930 | 1,612,284 |
| 2012 | 7 | 1,881,588 | 1,841,516 | 15,450 | 11,351 | 336,523 | 271,884 | 332 | 1,664 | 2,233,893 | 2,126,415 |
| 2012 | 8 | 1,253,985 | 1,004,126 | 13,383 | 8,312 | 296,859 | 197,258 | 379 | 1,736 | 1,564,607 | 1,211,433 |
| 2012 | 9 | 620,240 | 758,566 | 8,980 | 7,952 | 207,444 | 188,892 | 463 | 1,464 | 837,127 | 956,875 |
| 2012 | 10 | 556,985 | 514,144 | 10,551 | 7,219 | 239,305 | 164,207 | 668 | 1,634 | 807,509 | 687,204 |
| 2012 | 11 | 631,591 | 636,484 | 9,523 | 7,299 | 201,907 | 161,673 | 681 | 1,500 | 843,702 | 806,956 |
| 2012 | 12 | 596,983 | 713,900 | 9,752 | 9,114 | 206,257 | 198,004 | 772 | 1,432 | 813,765 | 922,451 |
| **Totals** | | **11,584,517** | **11,842,675** | **175,250** | **133,776** | **3,091,507** | **2,442,577** | **6,488** | **19,324** | **14,857,762** | **14,438,351** |

Table II-2 carries forward the total load in MWh from Table II-1 and then provides the average load for each period in MW, which is useful in determining the required volume of standard wholesale energy products.

**Table II-2**

**Load Forecast Table (Historical Summary 2010-2012)**

**ComEd Historical Actual Usage**
**Historical Energy Usage for Eligible Retail Customers**
**(Line Loss Adjusted)**

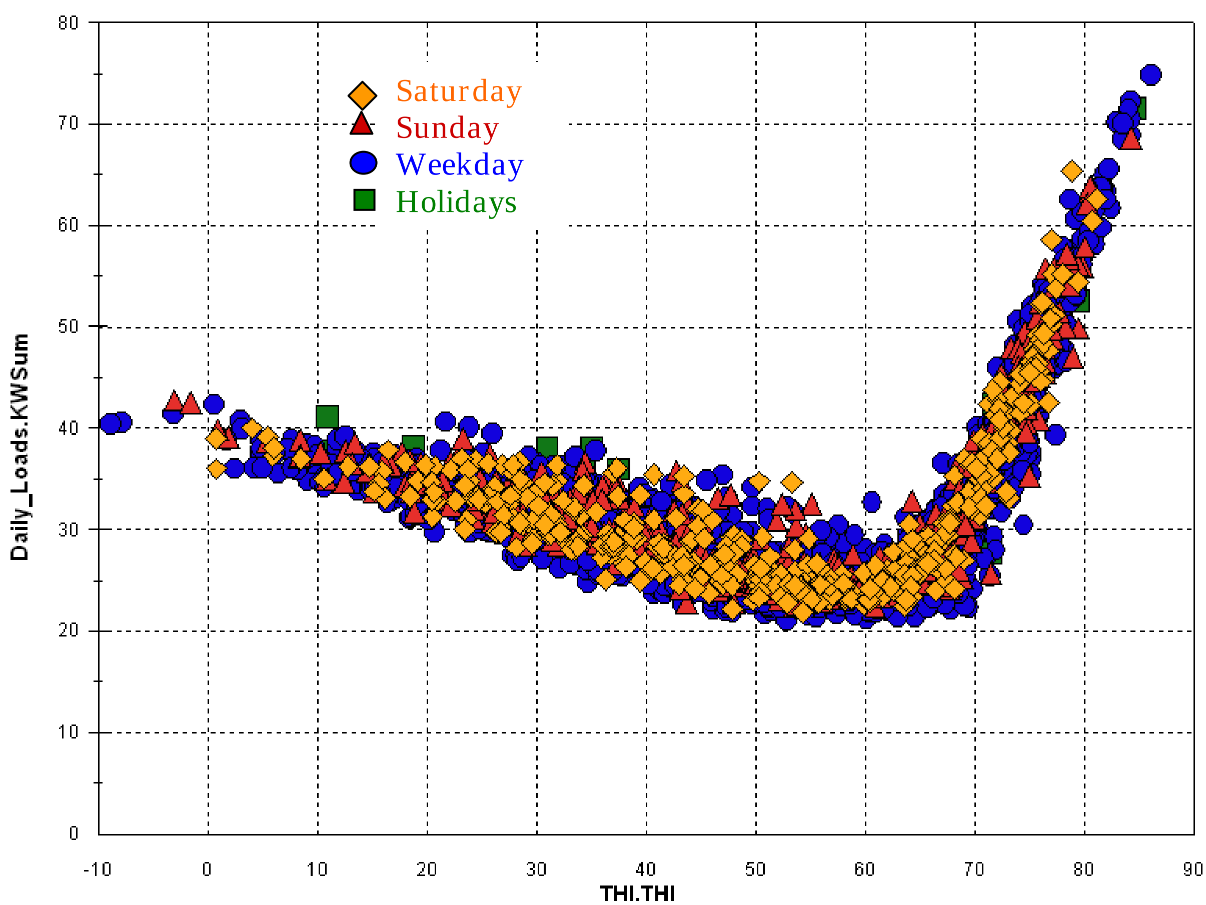
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
|---|---|---|---|---|---|
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2010 | 1 | 1,832,667 | 2,131,281 | 5,727 | 5,027 |
| 2010 | 2 | 1,689,522 | 1,600,212 | 5,280 | 4,546 |
| 2010 | 3 | 1,363,739 | 1,204,986 | 3,706 | 3,205 |
| 2010 | 4 | 1,338,438 | 1,166,109 | 3,802 | 3,169 |
| 2010 | 5 | 1,424,828 | 1,573,992 | 4,453 | 3,712 |
| 2010 | 6 | 2,051,363 | 1,716,769 | 5,828 | 4,665 |
| 2010 | 7 | 2,632,199 | 2,513,583 | 7,834 | 6,161 |
| 2010 | 8 | 2,470,608 | 2,194,769 | 7,019 | 5,599 |
| 2010 | 9 | 1,510,955 | 1,333,287 | 4,497 | 3,472 |
| 2010 | 10 | 1,226,282 | 1,240,471 | 3,650 | 3,040 |
| 2010 | 11 | 1,435,369 | 1,405,790 | 4,272 | 3,661 |
| 2010 | 12 | 1,922,006 | 1,714,736 | 5,223 | 4,560 |
| **Totals** | | **20,897,976** | **19,795,985** | | |
| 2011 | 1 | 1,766,147 | 1,872,754 | 5,256 | 4,590 |
| 2011 | 2 | 1,579,807 | 1,489,511 | 4,937 | 4,232 |
| 2011 | 3 | 1,531,996 | 1,411,935 | 4,163 | 3,755 |
| 2011 | 4 | 1,300,120 | 1,250,809 | 3,869 | 3,257 |
| 2011 | 5 | 1,364,208 | 1,372,018 | 4,060 | 3,363 |
| 2011 | 6 | 1,866,474 | 1,509,369 | 5,302 | 4,102 |
| 2011 | 7 | 2,374,503 | 2,582,539 | 7,420 | 6,091 |
| 2011 | 8 | 2,169,779 | 1,684,580 | 5,896 | 4,480 |
| 2011 | 9 | 1,384,376 | 1,298,820 | 4,120 | 3,382 |
| 2011 | 10 | 1,178,532 | 1,195,622 | 3,508 | 2,930 |
| 2011 | 11 | 1,299,960 | 1,244,908 | 3,869 | 3,242 |
| 2011 | 12 | 1,436,850 | 1,522,495 | 4,276 | 3,732 |
| **Totals** | | **19,252,752** | **18,435,361** | | |
| 2012 | 1 | 1,419,733 | 1,538,479 | 4,225 | 3,771 |
| 2012 | 2 | 1,291,591 | 1,227,679 | 3,844 | 3,410 |
| 2012 | 3 | 1,173,491 | 1,127,569 | 3,334 | 2,876 |
| 2012 | 4 | 1,002,126 | 994,068 | 2,983 | 2,589 |
| 2012 | 5 | 1,171,289 | 1,226,939 | 3,328 | 3,130 |
| 2012 | 6 | 1,698,930 | 1,612,284 | 5,056 | 4,199 |
| 2012 | 7 | 2,233,893 | 2,126,415 | 6,648 | 5,212 |
| 2012 | 8 | 1,564,607 | 1,211,433 | 4,252 | 3,222 |
| 2012 | 9 | 837,127 | 956,875 | 2,754 | 2,300 |
| 2012 | 10 | 807,509 | 687,204 | 2,194 | 1,828 |
| 2012 | 11 | 843,702 | 806,956 | 2,511 | 2,101 |
| 2012 | 12 | 813,765 | 922,451 | 2,543 | 2,176 |
| **Totals** | | **14,857,762** | **14,438,351** | | |

ComEd analyzed the hourly load profiles for all the major customer groups within the Eligible Retail Customers. As a result of that analysis, ComEd developed hourly load models for those major customer groups that determined the average percentage of monthly usage that each customer group used in each hour of that month. Those hourly models were then used to develop the monthly on-peak and off-peak usage percentages for the planning periods. These percentages were applied to ComEd's forecasted monthly usage to obtain the forecasted procurement quantities. In the following section, the hourly analysis of the residential single-family non-space heating customer segment is described. This class represents approximately half of the annual usage of the Eligible Retail Customer segment and provides a good example of how the hourly load profile data were analyzed and modeled.

**(i) Residential Single-Family Hourly Load Profile Analysis**

One of the most significant, and easily understood, determinants of residential energy usage is weather. The "scatter plot" shown below (Chart II-1) demonstrates the significant relationship that exists between weather and usage for the single-family non-space heating residential customer segment.

Chart II-1
Single Family Non-Space Heating Daily Usage vs. Temperature/Humidity



A scatter plot shows the relationship between two variables. Each point represents a single observation (a day in this case). In this chart, the values shown on the vertical or Y-axis are daily usage per customer ("UPC"). The values shown on the horizontal or X-axis are the daily average temperature-humidity index ("THI"). The graph shows daily UPC based on observations from January 2005 to December 2012 and the average THI on those days. THI, rather than temperature alone, is used because residential usage is sensitive to humidity. Different geometric shapes are used to distinguish points representing weekdays from those depicting Saturday, Sunday or holiday usage.

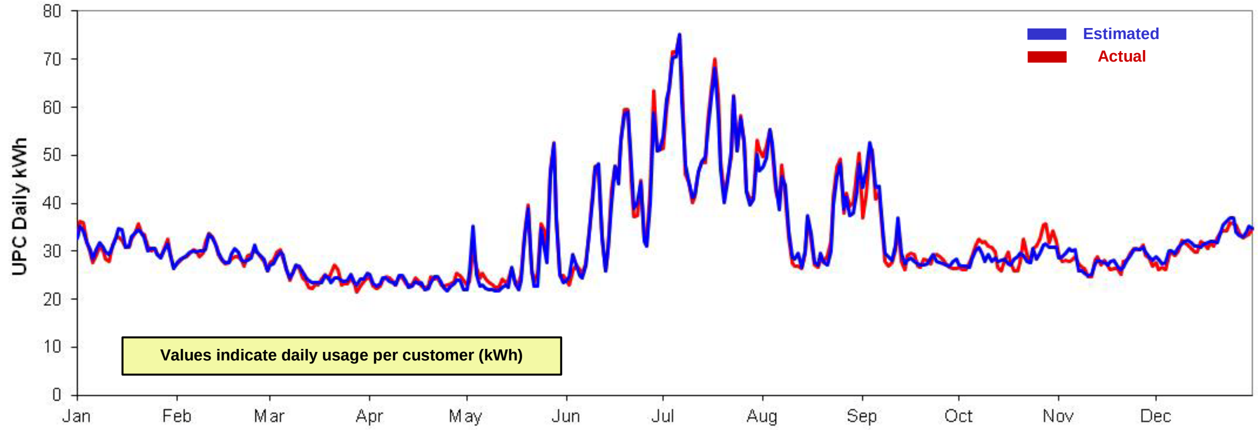
The scatter plot is very useful in understanding the relationship between customer usage and weather. If there were no relationship between usage and weather, then the graph would not display a clear pattern. However, it is apparent that there is a clear pattern. The right side of the graph at the high end of the horizontal axis shows the days on which THI was the highest. The points at that end of graph indicate that the highest UPC occurred when THI levels were at their peak -- 80 plus degrees. Moving to the left, the points show UPC declining rapidly as the THI decreases until the 60 degree level is reached at which a base usage appears. From that base level, UPC gradually increases as colder temperatures are experienced.

Hourly models were developed to account for the strong weather relationship shown in the graph and to account for numerous other factors that influence residential usage. The models explicitly account for the differing effects of energy use at various temperatures. Variables are included to allow for seasonal usage patterns in water heating, refrigeration and other seasonal uses. Weekend and holiday variables are included to allow for behavioral differences on those days relative to weekdays. The amount of daylight on each day is included to account for seasonal differences in lighting loads. Weather variables for prior days are included in the model to account for the dynamic effects of temperature buildup. The full list of variables included in the residential single-family model is shown in Appendix A-1.

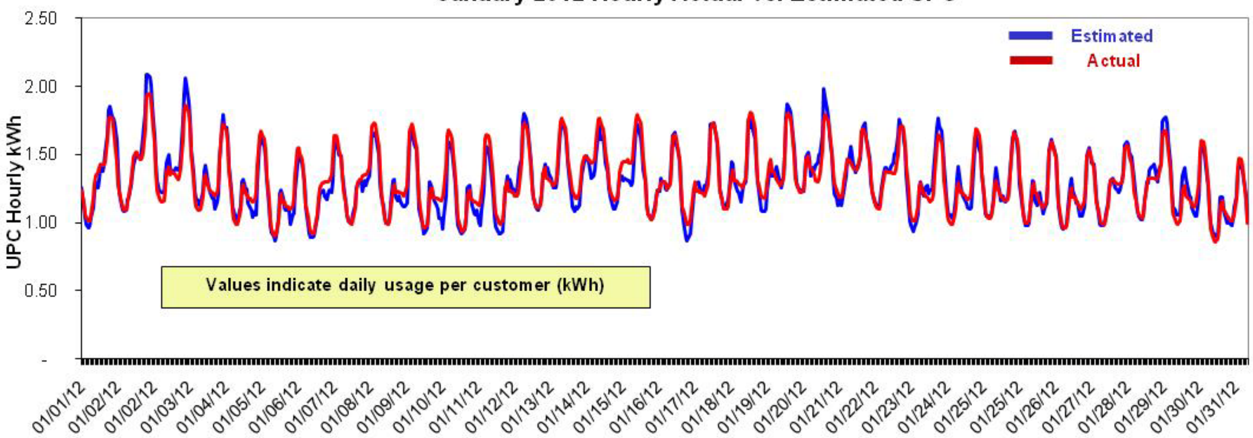
One way to visualize the model's performance is to look at plots of actual and estimated[2] values for the historical estimation period. The following chart demonstrates the performance of the model over the one-year period from January 2012 through December 2012 at the daily level and zooms in to show the hourly performance in January and July of 2012.

[2] The estimated data in Chart II-2 is based on the actual weather experienced over the relevant period.

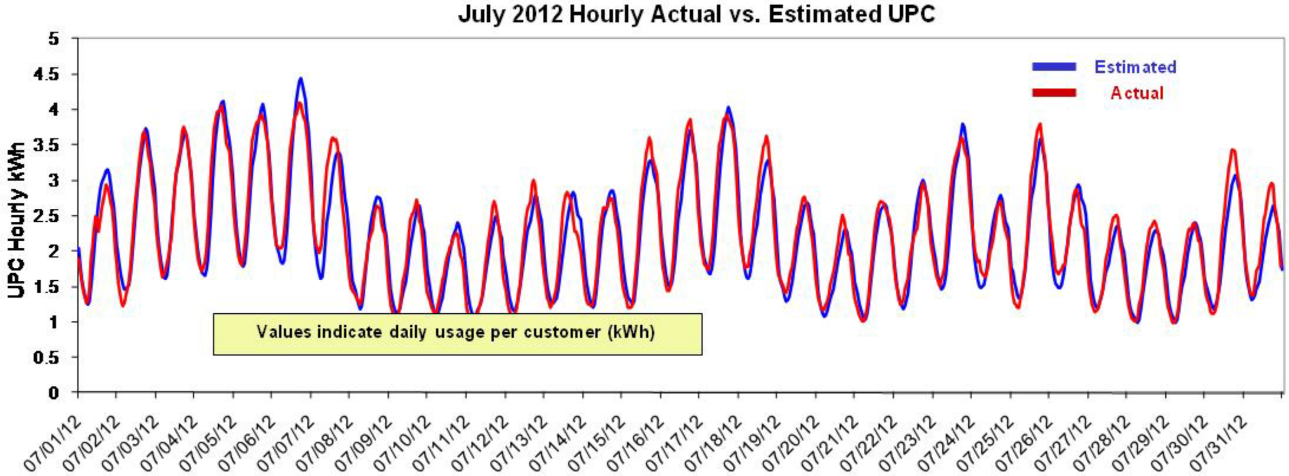
**Chart II-2**
**ComEd Single Family Profile: Estimated vs. Actual**
**2012 Daily Actual vs. Estimated UPC**




**January 2012 Hourly Actual vs. Estimated UPC**




**July 2012 Hourly Actual vs. Estimated UPC**



In all of the graphs above in Chart II-2, the red line indicates the "actual" load data and the blue line indicates the model's estimated values, adjusted for actual weather. It is important to understand that the actual load data itself is an estimate based on a statistical sample of single family residential customers, and minor variations do occur in the sample. Despite these variations, the charts demonstrate that the model's estimated usage is extremely close to the actual usage. The close alignment of the estimated and actual lines on the charts demonstrates that the model is very effective in estimating variations in electrical usage patterns that are significantly influenced by weather conditions.

#### b. Switching Trends and Competitive Retail Market Analysis

In determining the expected load requirements for which standard wholesale products will be procured, it is important to provide the best possible estimate of the number of Eligible Retail Customers that are likely to be served by Retail Electric Suppliers ("RES"). That issue is considered in the following discussion, which reviews retail development in ComEd's service territory, the entry of RES, the rate of customer switching in the past, future trends affecting customer choice and ComEd's 5-year forecast of the percentage of load from various customer segments that will continue to be served with supply procured by ComEd.

##### (i) Introduction and Brief Overview of Retail Development

Retail choice is very active within ComEd's service territory as demonstrated in several ways:

1. Residential RES service is approximately two-thirds of ComEd's total residential usage as of May 2013. In comparison, 14% of ComEd's residential usage was supplied by RES service in May 2012. It was only 1% as of May 2011. Without a doubt, residential RES service has been growing dramatically in the past year.

2. Municipal Aggregation ("Muni Agg") coupled with significant savings opportunity through May 2013 is the major driver of the rapid expansion of residential RES service in the past year. According to information contained on the ICC website (as of May 8, 2013), there are approximately 330 governmental entities (i.e., municipalities, townships or counties) within the ComEd service territory that are either participating in Muni Agg or have passed a referendum related to Muni Agg. ComEd estimates that over 80% of the increase in residential RES usage in the past year is related to Muni Agg. Clearly, Muni Agg is the driver of the increase in residential RES service in the past year; however, the non-Muni Agg activity should not be ignored as it did contribute to a meaningful increase in RES usage. Additional information related to Muni Agg can be found at (www.icc.illinois.gov/ORMD/Municipalaggregation.aspx).

3. Not only has the number of active RES continued to grow within ComEd's service territory, as noted below, but Illinois received high marks in a 2012 national assessment of customer choice. The Annual

Baseline Assessment of Choice in Canada and the United States ("ABACCUS") was conducted by Distributed Energy Financial Group LLC in December 2012. The report was sponsored mostly by a group of retail energy providers. The ABACCUS report ranked Illinois second highest in the commercial and industrial segment among the restructured states and seventh in the residential sector.

4. Approximately 92% of ComEd's entire non-residential usage is either supplied through either RES or Hourly service as of May 2013. An even more impressive fact is that almost three-quarters of the usage for the smallest sized non-residential customers (i.e., the watt-hour only delivery class) comes from RES service. Whether big or small, non-residential customers are actively participating in customer choice in the ComEd service territory.

In summary, customers are very engaged in retail choice within the ComEd service territory. A healthy retail market is anticipated for the forecast period.

### (ii) RES Development

There continues to be growth in the number of RESs within the ComEd service territory. This growth is shown in the table below:

**Table II-3**
**RES Development in the ComEd Service Territory**

| RES Category | Jan 2009 | May 2010 | May 2011 | May 2012 | May 2013 |
|---|---|---|---|---|---|
| Number of Active RESs[3] | 22 | 26 | 31 | 48 | 66 |
| Number of RESs approved to serve Residential customers | 6 | 9 | 16 | 32 | 49 |
| Number of entities in the RES certification process as of May 2013 | N.A. | N.A. | N.A. | N.A. | 1 |

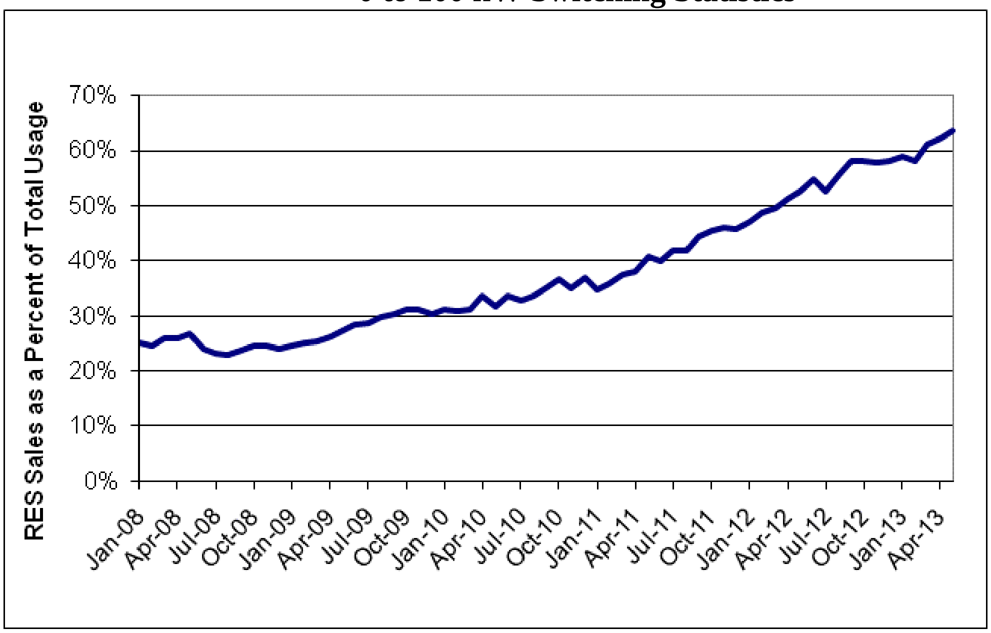
From January 2009 to May 2013 there has been a 200% increase in the number of active RES in the ComEd service territory. The increase in RES approved to serve residential customers is even more remarkable. The number of RES approved to serve residential customers has increased by more than 700% since 2009. This growth in the number of RES further highlights the growing retail market in ComEd's service territory.

[3] An "Active RES" is defined as an ICC-approved RES that has passed ComEd's certification process.

### (iii) Future Trends

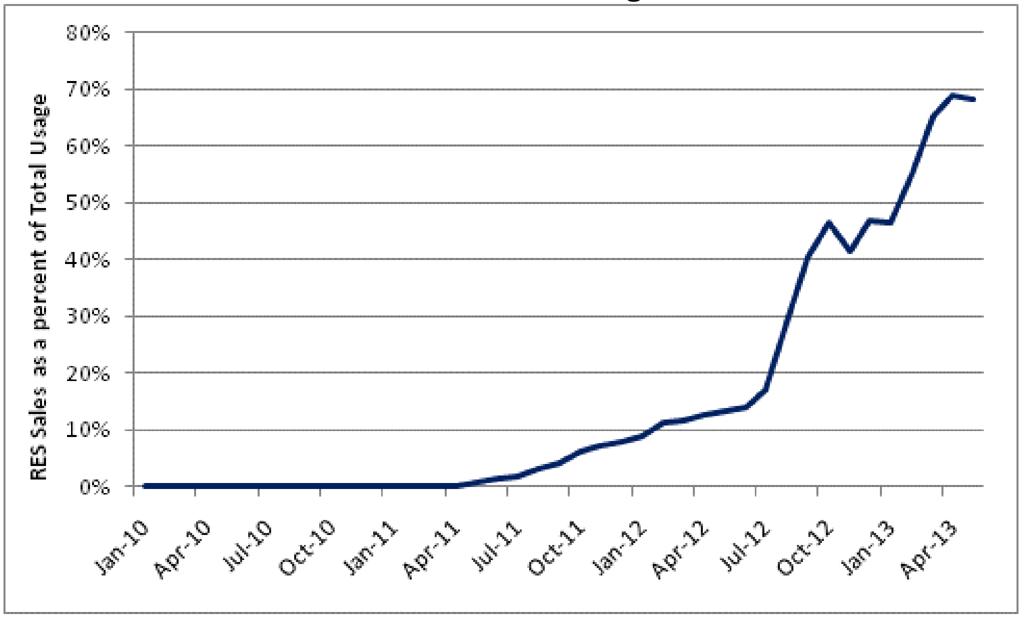
The future trends reflect an active retail market for several reasons. First, usage by RES customers in the 0 to 100 kW class continues to grow. Chart II-3 contains the monthly percentage of usage by RES customers from January 2007 through April 2013. Growth in RES usage has not only been rather steady over the past three years, but has essentially doubled during that time period. RES usage was approximately 30% in May 2010 and grew to over 60% by May 2013. Clearly, a large portion of small businesses are engaged in retail choice.

**Chart II-3**
**0 to 100 kW Switching Statistics**




Second, the retail market for residential customers has undergone a major transformation in the past two years with a significant increase in RES usage. Chart II-4 contains the monthly percentage of usage by RES customers from January 2010 to May 2013. In just two years residential RES usage has gone from essentially zero usage (1% in May 2011) to approximately two-thirds of total residential usage (May 2013). Just as in the case of small businesses, a large portion of residential customers are engaged in retail choice.

**Chart II-4**
**Residential Switching Statistics**




Third, Muni Agg is very active within the ComEd service territory. Approximately 330 governmental entities are involved in Muni Agg within the service territory. Muni Agg by its very nature requires engagement not only by public officials within each community, but also by the citizens of the community that approve the Muni Agg referendums. This large number of governmental entities is another indicator of an engaged customer base that is active in retail choice.

For these reasons, we expect retail markets to continue to reflect a significant level of engagement and to be active during the Forecast period.

### (iv) Forecasted Retail Usage

The forecast percentages of Blended Service usage are shown below, along with some historical perspective.

**Table II-4**
**Percentage of Blended Service Usage**

| Month | Residential | Watthour | 0-100 kW |
|---|---|---|---|
| Jun-04 | 100.0% | 99.4% | 87.8% |
| Jul-05 | 100.0% | 99.4% | 87.3% |
| Jul-06 | 100.0% | 99.6% | 90.7% |
| Jul-07 | 100.0% | 97.4% | 76.5% |
| Jun-08 | 99.9% | 98.0% | 75.2% |
| May-09 | 99.8% | 98.0% | 72.1% |
| Jun-10 | 99.9% | 95.0% | 65.8% |
| Jun-11 | 98.3% | 92.3% | 57.3% |
| Jun-12 | 85.6% | 76.3% | 43.8% |
| Jun-13 | 31.0% | 25.2% | 34.4% |
| Jun-14 | 24.8% | 20.9% | 28.1% |
| Jun-15 | 23.9% | 18.7% | 25.1% |
| Jun-16 | 23.5% | 17.7% | 23.9% |
| Jun-17 | 23.5% | 17.7% | 23.9% |
| Jun-18 | 23.5% | 17.7% | 23.9% |
| Jun-19 | 23.5% | 17.7% | 23.9% |

The main drivers of this forecast are:

1. Residential RES service is expected to increase from current levels for a couple of reasons. First, the approximately 63 Muni Agg communities that passed an April 2013 referendum are expected to opt for RES service by the end of 2013. Second, non-Muni Agg switching has continued to occur and has been averaging 0.5% to 1.0% per month for the residential customers in non-Muni Agg communities in the past year. That activity is expected to continue into the future, but at lower switching rates because of lower headroom and fewer numbers of Eligible Retail Customers over time (i.e., customers are more difficult to reach or they have already decided not to opt for RES service).

   An increase in the number of Muni Agg communities, beyond the existing approximately 330 governmental entities, is not expected in the forecast. The next possible referendum date would be in the spring of 2014. At that point, the potential savings are expected to be marginal and likely not to induce many new Muni Agg communities. In addition, a few communities may decide the relatively low savings levels do not justify continuing their Muni Agg program. It is important to note that this does not portend an end to Muni Agg activity. The existing Muni Agg communities have become very knowledgeable and proficient with the Muni Agg process. Thus, they are far along on the learning curve and can continue their Muni Agg programs. In addition, there are other attributes that Muni Agg communities find useful besides savings (e.g., 100% green products). Thus, the forecast anticipates an essentially stable number of Muni Agg communities. However, as discussed in more detail below, we are monitoring the situation and will update this Muni Agg issue in both the November 2013 and March 2014 updated forecasts.

2. The Blended Service supply cost is expected to be marginally higher than RES prices beginning in June 2013 and even closer to RES pricing beginning June 2014. This reflects a combination of existing contracts within the portfolio which are above market prices (principally the long-term renewable energy contracts) and a meaningful portion that is at market prices. This combination is anticipated to provide a relatively small amount of "headroom" between Blended Service and RES prices going forward.

3. The 0 to 100 kW customer class is expected to continue to migrate to RES service, but at a slower pace than in the past. The Muni Agg movement of the past year and the available savings opportunity has resulted in a considerable portion of these customers taking RES service. The reduced savings opportunity lessens the pace at which these remaining smaller-sized customers opt for RES service.

The effects of those drivers by customer group are as follows:

1. The Blended Service portion of the 0 to 100 kW customer class is expected to decline from 34.0% (May 2013) to approximately 28% by June 2014. This reflects a combination of Muni Agg developments and RES continuing to acquire the smaller customers within this customer class.

2. The Blended Service portion of the Watthour customer class is expected to decline from 26.8% (May 2013) to approximately 21% by June 2014. This is mostly the result of the Muni Agg assumptions in the Forecast.

3. The Blended Service portion of the Residential customer class is expected to decline from 31.4% (May 2013) to approximately 25% by June 2014. This decline results from a combination of Muni Agg and non-Muni Agg activities noted above.

By June 2014, Blended Service is expected to be less than one-third of the usage by customers in the Eligible Retail Customer classes; specifically 25.9%.

### c. Known or Projected Changes to Future Load

Typically, when ComEd forecasts future loads, it considers whether there are any known major customer decisions, such as the relocation of part or all of a business, that would impact load. For the Eligible Retail Customers, other than the factors we have discussed elsewhere, e.g. switching, energy efficiency measures, growth, etc., there is only one known or projected change that ComEd is aware of that is different from past conditions and could affect future loads for this group of customers. This is the residential real-time pricing program ("RRTP").

In compliance with Section 16-107(b-5) of the PUA, ComEd received ICC approval to implement an RRTP program for a four-year period,[4] and, more recently, to continue the program post-2012.[5] ComEd has changed its RRTP program administrator and plans to expand marketing for RRTP. As a result, approximately 7,500 additional residential customers per year are expected to migrate to RRTP service over the next five years. This forecasted increase is reasonable given the new program administrator's marketing plan and because ComEd has worked to reduce the marketing and acquisition costs for RRTP customers. The expected target of 50,000 RRTP customers by the end of 2017 is a small percent of the existing 3.4 million residential customers.

### d. Growth Forecast by Customer Class

#### (i) Introduction

This section describes ComEd's growth forecast by customer class for the 5-year procurement planning period beginning on June 1, 2014. Section II(B)(1) discussed the hourly customer load profiles used by ComEd to develop models to present the historical load analysis required by the PUA and to predict UPC, or usage per customer. As indicated in this section, in arriving at a growth forecast by customer class, there are additional models beyond those customer-level hourly models that are used to forecast future customer class usage. These other models play an important role in determining expected load during the 5-year planning period among the Eligible Retail Customer groups.

The following chart illustrates the steps in the ComEd load forecasting process.

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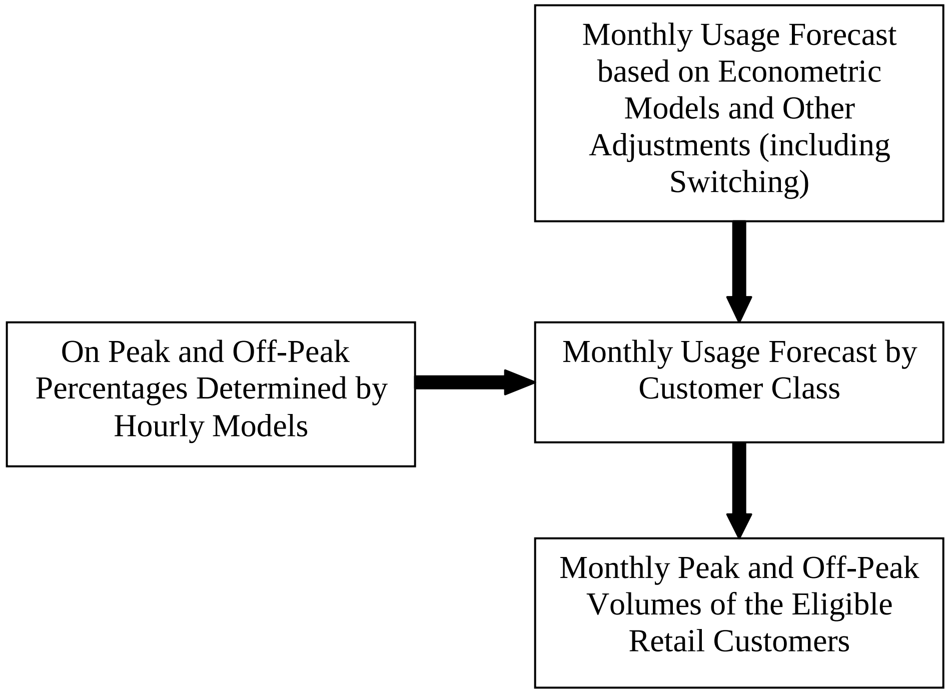
[4] See ICC Order of December 20, 2006, in Docket No. 06-0617.

[5] See ICC Order of May 29, 2012 in Docket No. 11-0546.

**Chart II-5**

**ComEd Energy Usage Forecast Process**

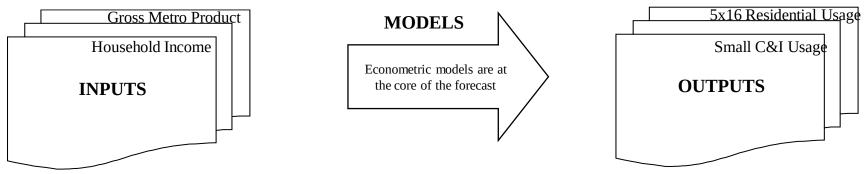



The forecasting process is model based subject to adjustments and judgment. A suite of econometric models is used to produce monthly usage forecasts for ComEd's revenue customer classes. The two major customer classes applicable to this Forecast are Residential and Small C&I. That monthly forecast is adjusted for other considerations (e.g., switching activity) and allocated to more granular delivery service classes (e.g., the residential customer class is composed of four delivery services classes). The forecast usage is combined with the input from the hourly models to obtain on-peak and off-peak quantities for each month and delivery service class.

The econometric modeling portion of the process is described in the following chart:

**Chart**
**II-6**

**Econometric Modeling Process**




**Economic Forecasts**
- Chicago Gross Metro Product
- Real Income per Household
- Household Growth

**Switching Forecast**
- RES Activity
- Market Developments

**Top Down Approach**
- Zone output modeled using historical weather and economic variables
- Customer class usage modeled using historic weather data and economic variables for each class
- Customer class forecast calibrated to equal zone output forecast (less line loss)
- Other research and judgment used to determine final energy forecast (e.g., effects from new energy efficiency programs)
- Usage forecast adjusted for projected switching activity
- Hourly customer class models used to determine on-peak and off-peak usage

**Sales and Load Forecasts**
- ComEd Zone Output
- Customer Class Usage
- Procurement Eligible Usage by On-Peak and Off-Peak Usage

As the chart indicates, ComEd's forecasts of usage for its service territory are based on a "top-down" approach. The top-down approach provides a forecast of total usage for the entire service territory and allocates the usage to various customer classes using the models specific to each class. The "zone" forecast model takes into account a number of economic variables that affect electric energy use. For example, the gross metropolitan product ("GMP") for the Chicago and other metropolitan areas within ComEd's service territory is a good measure of economic activity of the service territory. As GMP (which is expressed in billions of dollars) increases, use of electric energy rises as well. Section II (B)(1) describes the significant relationship between weather and energy usage, and the zone model contains sophisticated variables to reflect the effects of temperature and humidity, as well as seasonal usage patterns and other factors. The economic assumptions are contained in Table II-6.

**Table II-6**

| Chicago Area Economic Forecasts - Global Insight (May13) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Economic Variables** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| Gross Metro Product (Billions) | $ 443 | $ 457 | $ 463 | $ 471 | $ 479 | $ 491 | $ 506 | $ 518 | $ 531 | $ 542 |
| Real Disposable Income (Millions) | $324,131 | $328,170 | $328,050 | $329,408 | $330,472 | $339,506 | $348,784 | $357,553 | $366,675 | $373,854 |
| # of Households (Thousands) | 3,320 | 3,320 | 3,317 | 3,324 | 3,337 | 3,360 | 3,386 | 3,413 | 3,441 | 3,468 |
| Real Income/HH | $ 97,633 | $ 98,859 | $ 98,894 | $ 99,085 | $ 99,033 | $101,039 | $102,996 | $104,759 | $106,567 | $107,798 |
| Total Employment (Thousands) | 4,161 | 4,117 | 4,170 | 4,235 | 4,288 | 4,350 | 4,427 | 4,494 | 4,541 | 4,575 |
| Non-Manufacturing | 3,754 | 3,722 | 3,768 | 3,828 | 3,875 | 3,928 | 3,995 | 4,055 | 4,100 | 4,135 |
| Manufacturing | 407 | 395 | 402 | 407 | 413 | 422 | 433 | 439 | 440 | 440 |
| Housing Starts | 5,488 | 5,438 | 6,117 | 8,462 | 11,687 | 16,699 | 22,372 | 23,776 | 24,135 | 25,592 |
| U.S. GDP | 12,758 | 13,063 | 13,299 | 13,593 | 13,843 | 14,231 | 14,688 | 15,118 | 15,555 | 15,967 |
| ***Growth Rate*** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| Gross Metro Product | (4.8%) | 3.1% | 1.3% | 1.6% | 1.7% | 2.5% | 3.2% | 2.4% | 2.4% | 2.2% |
| Real Disposable Income | (4.5%) | 1.2% | (0.0%) | 0.4% | 0.3% | 2.7% | 2.7% | 2.5% | 2.6% | 2.0% |
| # of Households | (0.1%) | (0.0%) | (0.1%) | 0.2% | 0.4% | 0.7% | 0.8% | 0.8% | 0.8% | 0.8% |
| Real Income/HH | (4.4%) | 1.3% | 0.0% | 0.2% | (0.1%) | 2.0% | 1.9% | 1.7% | 1.7% | 1.2% |
| Total Employment | (5.3%) | (1.1%) | 1.3% | 1.6% | 1.3% | 1.4% | 1.8% | 1.5% | 1.0% | 0.8% |
| Non-Manufacturing | (4.5%) | (0.9%) | 1.2% | 1.6% | 1.2% | 1.4% | 1.7% | 1.5% | 1.1% | 0.9% |
| Manufacturing | (11.8%) | (2.9%) | 1.9% | 1.2% | 1.4% | 2.1% | 2.5% | 1.5% | 0.3% | (0.1%) |
| Housing Starts | (61.9%) | (0.9%) | 12.5% | 38.3% | 38.1% | 42.9% | 34.0% | 6.3% | 1.5% | 6.0% |
| U.S. GDP | (3.1%) | 2.4% | 1.8% | 2.2% | 1.8% | 2.8% | 3.2% | 2.9% | 2.9% | 2.6% |

Source: Global Insight

All of the variables used in each of the models in the forecasting process are identified in Appendix A-4.[6]

The remainder of this section will provide a brief description of the models, starting with the ComEd's Monthly Zone energy usage model ("Monthly Zone Model") and proceeding to the three customer-level models for Monthly Residential bill-cycle energy usage ("Monthly Residential Model"), Monthly Small C&I bill-cycle energy usage ("Monthly Small C&I Model") and Monthly Street Lighting bill-cycle energy usage (Monthly Street Lighting Model").

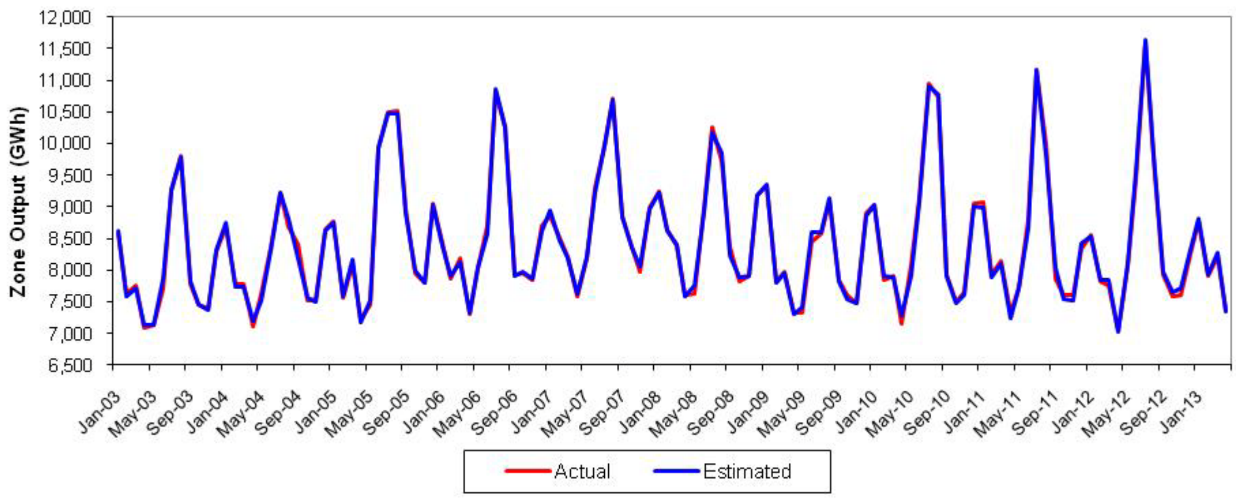
### (ii) ComEd Monthly Zone Model

The Monthly Zone Model forecasts energy usage in gigawatt hours (GWh) for the entire ComEd service territory. The following chart shows the performance of the ComEd Monthly Zone Model by comparing actual zone output to the estimates[7] from that model for each calendar month from January 2002 through April 2013.

[6] Technical information about the model coefficients and regression statistics are included in Appendix A-2 and A-3.

[7] Once again, for purposes of this Forecast, the estimates used in Charts II-7, II-8 and II-9 are based on actual weather.

**Chart II-7**
**ComEd Monthly Zone Model: Estimated vs. Actual**

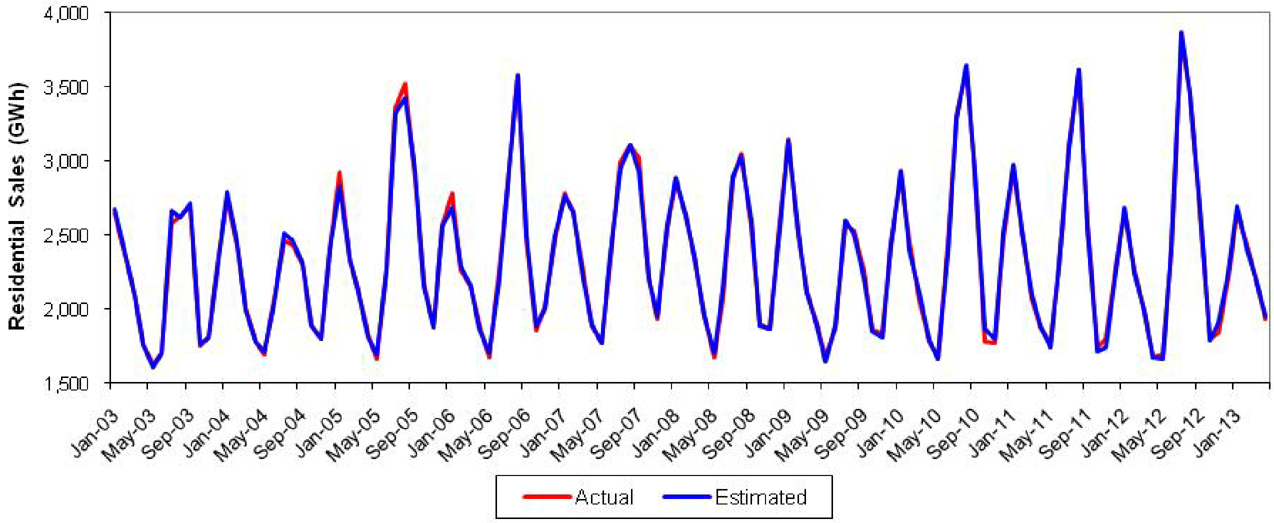



As with customer-level models discussed in Section II(B)(i)(a), the Monthly Zone Model is highly useful in understanding energy usage. The graph line depicting the model's estimated usage (based on actual weather) and the line showing actual usage for the period are nearly identical.

### (iii) ComEd Monthly Residential Model

The Monthly Residential Model forecasts monthly residential bill-cycle usage expressed in kWh per customer per day. The Monthly Residential Model is also very useful in understanding energy usage for this customer segment. The following chart compares the monthly energy usage for residential customers estimated by the Monthly Residential Model to the actual residential usage for the time period of January 2002 to April 2013. The graph line depicting the model's estimated usage and the line with actual usage for the period are highly correlated.

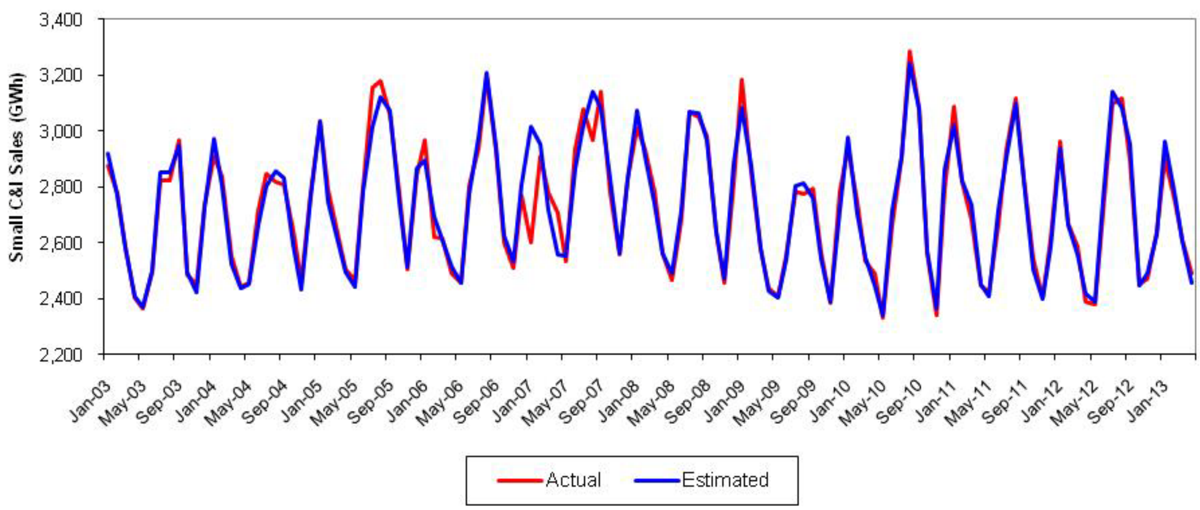
**Chart II-8**
**ComEd Monthly Residential Model: Estimated vs. Actual**




### (iv) ComEd Monthly Small C&I Model

The Monthly Small C&I Model forecasts monthly Small C&I bill-cycle usage. Chart II-9 shows an estimated versus actual comparison demonstrating the model's effectiveness.

**Chart II-9**
**ComEd Monthly Small C&I Model: Estimated vs. Actual**



### (v) ComEd Monthly Street Light Model

The Monthly Street Lighting Model forecasts monthly bill-cycle usage related to street lighting. This final model estimates use per day in GWh.

### (vi) Growth Forecast

ComEd's historical and forecasted weather-adjusted energy usage for the Residential and Small C&I customer classes are shown in Table II-7.

**Table II-7**

| ComEd Weather Adjusted Annual Energy Usage | | | | |
|---|---|---|---|---|
| | Residential | | Small C&I | |
| Year | Usage (GWh) | Percent Growth | Usage (GWh) | Percent Growth |
| 2005 | 28,290 | | 33,057 | |
| 2006 | 28,516 | 0.8% | 32,958 | (0.3%) |
| 2007 | 28,459 | (0.2%) | 33,508 | 1.7% |
| 2008 | 28,599 | 0.5% | 33,391 | (0.3%) |
| 2009 | 28,202 | (1.4%) | 32,644 | (2.2%) |
| 2010 | 27,865 | (1.2%) | 32,445 | (0.6%) |
| 2011 | 27,514 | (1.3%) | 32,182 | (0.8%) |
| 2012 | 27,360 | (0.6%) | 32,264 | 0.3% |
| 2013 | 27,569 | 0.8% | 32,096 | (0.5%) |
| 2014 | 27,732 | 0.6% | 32,016 | (0.2%) |
| 2015 | 27,678 | (0.2%) | 32,463 | 1.4% |
| 2016 | 27,727 | 0.2% | 32,923 | 1.4% |
| 2017 | 27,753 | 0.1% | 33,063 | 0.4% |
| 2018 | 27,886 | 0.5% | 33,246 | 0.6% |
| 2019 | 28,218 | 1.2% | 33,430 | 0.6% |

Residential customer class usage declined by an average of 0.7% per year from 2006 to 2012. This decline is attributed to a combination of the 2009 recession and the growing energy efficiency programs. The year 2009 was the first time since 1954 (which is the extent of our records) that ComEd experienced a decline in the average number of residential customers from the prior year. In addition, the implementation of energy efficiency programs has worked to reduce residential usage. Looking forward, the growth is forecasted to be slightly positive at 0.3% per year from 2012 to 2018 as the economy improves. However, residential usage does not exceed the usage levels of 2008 in the Forecast period. Small C&I usage declined 0.4% per year from 2006 to 2012. Small C&I is ComEd's revenue class related to commercial and industrial customers below 1,000 kW in size. A significant decline in Small C&I usage was experienced in 2009 because of the recession. The forecasted growth rate from 2012 to 2018 is also a small 0.5% per year. Small C&I usage does not exceed 2007 levels during the Forecast period.

### 2. Impact of Demand Side and Energy Efficiency Initiatives

The PUA sets out annual targets for the implementation of cost-effective demand side and energy efficiency measures. The most recent, ICC-approved energy efficiency and demand response plan covered the planning years ("Planning Year")[8] 2011-2013 ("2011-2013 EE/DR Plan").[9]

The demand-side and energy efficiency plans for subsequent years have not yet been developed by ComEd or approved by the ICC. While Planning Year targets have not been established for Planning Years 2014-2017, it is expected that spending screen limits will affect the total amounts of energy efficiency that can be achieved in a manner similar to how the screens limited the amount for Planning Year 2013.[10]

#### a. Impact of demand response programs, current and projected

##### (i) Background

ComEd is a strong supporter of the use of demand response to actively manage peak demands. Use of demand response resources grew in the mid to late 1990s, and ComEd has maintained a large portfolio of demand response resources, with participation from residential, commercial, and industrial customers. ComEd is a leader in the development and management of demand response resources, and will increase participation in appropriate programs to meet the requirements of the PUA.

The 2012 portfolio of ComEd programs includes the following:

- **Direct Load Control ("DLC"):** ComEd's residential central air conditioning cycling program is a DLC program with 71,900 customers with a load reduction potential of 87 MW (ComEd Rider AC).

- **Voluntary Load Reduction ("VLR") Program:** VLR is an energy-based demand response program, providing compensation based on the value of energy as determined by the real-time hourly market run by PJM. This program also provides for transmission and distribution ("T&D") compensation based on the local conditions of the T&D network. This portion of the portfolio has roughly 1,010 MW of potential load reduction (ComEd Rider VLR).

- **Residential Real-Time Pricing (RRTP) Program:** All of ComEd's residential customers have an option to elect an hourly, wholesale market-based rate. The program uses ComEd's Rate BESH to determine the monthly electricity bills for each RRTP participant. This program has roughly 5 MW of price response potential.

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[8] A Planning Year runs from June 1 of one year through May 31 of the next year.

[9] See Order of December 21, 2010 in Docket No. 10-0570.

[10] Order, p. 18

- **Peak Time Savings (PTS) Program:** This program is required by Section 16-108.6(g) of the PUA and was recently approved by the ICC in Docket No. 12-0484. The PTS program is an opt-in, market-based demand response program for customers with smart meters. Under the program, customers receive bill credits for kWh usage reduction during curtailment periods. The program commences with the 2015 Planning Year. ComEd recently sold 35 MW of capacity from the program into the PJM capacity auction for the 2016 Planning Year.

#### (ii) Legislative Requirement

Section 8-103(c) of the PUA establishes a goal to implement demand response measures, providing that:

> (c) Electric utilities shall implement cost-effective demand response measures to reduce peak demand by 0.1% over the prior year for eligible retail customers, as defined in Section 16-111.5 of this Act, and for customers that elect hourly service from the utility pursuant to Section 16-107 of this Act, provided those customers have not been declared competitive. This requirement commences June 1, 2008 and continues for 10 years.

Section 1-10 of the Illinois Power Agency Act defines demand response as "measures that decrease peak demand or shifts demand from peak to off-peak periods."

Table II-8 shows the estimated annual MWs of demand response measures that will need to be implemented over the Five-year Forecast period to meet the goals set forth in the PUA:

**Table II-8**
**Estimated Annual Level of Demand Response Measures**[11]

| Planning Year | Peak Load at Meter (Prior Year) (MW) | Annual Goal (0.1%) (MW) | Cumulative Goal (MW) |
|---|---|---|---|
| 2014 | 2,778 | 2.8 | 67.6 |
| 2015 | 2,652 | 2.7 | 70.2 |
| 2016 | 2,628 | 2.6 | 72.9 |
| 2017 | 2,655 | 2.7 | 75.5 |

As noted above, ComEd's 2014 – 2016 EE/DR Plan has not yet been developed or approved by the ICC. It is assumed ComEd will meet the statutory goals.

[11] Per Section 8-103(c) the demand response goal expires at the end of the 2017 Planning Year (10 year requirement).

#### (iii) Implementation of Demand Response Measures

In the 2011-2013 EE/DR Plan, ComEd demonstrated that the demand response targets mandated by the PUA are satisfied by the demand reductions achieved from the implementation of energy efficiency measures. As such, it is not anticipated that any additional demand response acquisition will be provided for in the 2014-2016 EE/DR Plan.

#### (iv) Impact of Demand Response Programs

Demand response programs do not impact ComEd's load forecasts. Load forecasts are made on a weather normalized, unrestricted basis. Since demand response measures are called on days when the temperature is hotter than "normal", the avoided capacity and energy associated with these resources is incremental to the weather normal forecast, and thus is not factored into the load forecasts. In fact, when developing forecasts, any impact on energy usage from actually implementing a demand response measure in a prior year is added back into that prior year's usage data and then weather normalized before being used to assist in the forecasting process. This assures that the forecast represents a complete picture of the unrestricted demands on the system.

### b. Impact of Energy Efficiency Programs

The PUA has a number of provisions regarding various types of energy efficiency programs. This section discusses the impact of each on these programs on the Forecast.

#### (i) Section 8-103 Energy Efficiency Measures

Section 8-103 of the PUA requires ComEd to implement cost-effective energy efficiency measures beginning June 1, 2008. This provision provides annual kWh targets based on a projection of the upcoming years' energy usage for all delivery service customers. Additionally, there is a spending cap that limits the amount of expenditures on energy efficiency measures in any year.

#### (A) kWh Targets

The kWh target for energy efficiency is based on a projection of the amount of energy to be delivered by ComEd to all of its delivery service customers in the upcoming Planning Year. This percentage increases annually through the year 2015, subject to specified rate impact criteria. The table below shows the target percentages.

**Table II-9**
**Target Incremental Percentages to Meet Energy Efficiency Goals**

| Year | Annual Percent Reduction in Energy Delivered |
|---|---|
| 2008 | 0.2% |
| 2009 | 0.4% |
| 2010 | 0.6% |
| 2011 | 0.8% |
| 2012 | 1.0% |
| 2013 | 1.4% |
| 2014 | 1.8% |
| 2015 and each year thereafter | 2.0% |

### (B) Projected Overall Goals

The annual energy efficiency goals were determined based on the kWh targets and the rate impact criteria. As noted above, ComEd's 2011-2013 EE/DR Plan was approved in late 2010. For 2013, the ICC approved an agreed upon 1% reduction instead of the statutory target of 1.4% due to the impacts of the spending screen limitations in the PUA.[12] There is as of yet no ICC-approved plan for Planning Years 2014 – 2016. However, for the purposes of this Forecast ComEd assumes that the spending screen will similarly limit the annual percent reduction to approximately 1%. Also, for purposes of this Forecast only,[13] the allocation of the energy (kWh) targets to the various customer classes (as shown in Table II-7) was based on several years of historical data and judgment.

The above percentages represent the incremental goal to be achieved by the end of each Planning Year for all delivery services customers. Since the various energy efficiency measures will be implemented and phased in over the course of each Planning Year and since Eligible Retail Customers are only a subset of delivery services customers, the actual amount of GWh for Eligible Retail Customers that is impacted in each Planning Year will be somewhat less (as shown in Table II-10, below).

[12] See Order of December 21, 2010 in Docket No. 10-0570, p. 18.

[13] The PUA does not prescribe how the kWh targets are to be apportioned among the customer classes, and the energy efficiency plan did not set goals on a customer class basis.

### (C) Impact on Forecasts

Energy efficiency measures directly impact the amount of energy used by customers throughout the year. As such, they will directly impact the forecasts of future load. The following chart depicts the cumulative impacts of these measures on the Forecast:

**Table II-10**
**Cumulative Impacts of EE on Load Forecast by Customer Type[14]**

| Planning Year | Residential Allocation (GWh) | Watt-Hour Allocation (GWh) | 0-100 kW Allocation (GWh) |
|---|---|---|---|
| **2014** | 539 | 5 | 148 |
| **2015** | 587 | 5 | 157 |
| **2016** | 642 | 6 | 176 |
| **2017** | 687 | 7 | 196 |
| **2018** | 704 | 7 | 215 |

#### (ii) Energy Efficiency Building Codes and Appliance Standards

Section 16-111.5B(a)(1) of the PUA requires procurement plans to include a discussion of the impact of energy efficiency building codes and appliance standards on the Forecast.[15] This section describes generally how building codes and appliance standards are considered in and impact the Forecast.

The load forecasting models and process described herein takes into account all current and projected building codes and appliance standards. This is accomplished by making energy efficiency adjustments to the forecast beyond what is entailed in the mandated energy efficiency adjustments described herein. Also, the econometric models use actual historical usage data and that data, in turn, reflects the changes to these standards over time.

#### (iii) Section 16-111.5B Energy Efficiency Procurement

Section 16-111.5B of the PUA requires procurement plans to include an assessment of opportunities to expand the section 8-103 energy efficiency measures or to implement additional cost-effective energy efficiency measures. This assessment is to include a wide range of information for consideration by the IPA and the ICC. This section provides that information. A short summary of the selection process follows.

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[14] These amounts are cumulative from 2008, when the statutory program began.

[15] For a discussion of this impact in the most recent procurement plan, see 2013 Electricity Procurement Plan, pp. 22-23, filed on April 5, 2013 in docket No. 12-0544.

As an initial step, ComEd reviewed all of its programs under consideration for this year's Section 8-103 EE/DR plan filing, and determined that two of those programs are more appropriately suited for submission to the IPA under section 16-111.5B:

- Home Energy Reports
- Small Business Energy Services

In addition, ComEd solicited proposals from third party vendors to provide additional energy efficiency programs. Seventeen proposals were received and reviewed by ComEd and stakeholders. One proposal was subsequently withdrawn by the vendor, three proposals were determined to be unresponsive to the RFP, and six proposals were determined to compete against, rather than be incremental to, existing and continuing programs already offered. After this threshold screening, the remaining seven proposals were analyzed in accordance with the requirements of Section 16-111.5B(a)(3)(C, D), which require ComEd to:

- Identify new or expanded cost-effective measures or programs
- Show that the new or expanded measures or programs would lead to a reduction in the overall cost of electric service.

The first criteria is evaluated by performing a Total Resource Cost (TRC) test on each program. Five of the remaining proposals met this criteria with a TRC greater than 1.0. The second criteria is evaluated by conducting a Utility Cost Test (which compares the total avoided costs of electric service to the program administrator's total cost to deliver the program). Four of the proposals met this criteria with a Utility Cost Test result greater than 1.0.

Program-level details for each program that ComEd is submitting to the IPA in compliance with Section 16-111.5B of the PUA is provided in Appendix C-4.

The total program-level budget estimate for the two ComEd programs and the four third-party program proposals is $166,151,444. This estimate does not include certain overarching costs related to vendor administration, evaluation, reporting and tracking. All of these costs will be flowed through to customers pursuant to ComEd's Rider EDA.

Five of the programs identified by ComEd are three-year programs while two are one-year programs. The budget for each year for each program is provided in Appendix C-4, and the anticipated annual kWh savings for each year for each program is provided in Appendix C-3 and C-4. To the extent that the IPA and the ICC approve procurement of the programs ComEd requests that that approval be for all three years.

### (A) Energy Efficiency Potential Study

Section 16-111.5B(a)(3)(A) requires the inclusion of a comprehensive energy efficiency potential study for the utility's service territory that was completed within the past 3 years. Such a study is attached to this Forecast as Appendix C-1[16]. The study identifies technical, economic and achievable energy efficiency potential. Technical potential assumes that all energy efficiency measures are implemented by all of ComEd's customers, irrespective of cost or other barriers. Economic potential screens the technical potential to include only those measures that pass the statutory Total Resource Cost ("TRC") test. Achievable potential further filters these measures to reflect a variety of non-cost, or market barriers, that cause customers to not implement energy-saving measures.

### (B) Identification of New or Expanded Measures

Section 16-111.5B(a)(3)(C)[17] requires the listing of new or expanded cost-effective energy efficiency programs or measures that could be offered to eligible retail customers. Such a listing is provided in Appendix C-2 - Energy Efficiency Analysis Summary. The programs or vendor names are listed in column A of Appendix C-2. Greater detail regarding each program is provided in Appendix C-4.

### (C) Cost Analysis

Section 16-111.5B(a)(3)(D) requires an analysis showing that the new or expanded cost-effective energy efficiency programs or measures would lead to a reduction in the overall cost of electric service. Such an analysis is included in Appendix C-2. "Cost-effective", as used in Section 16-111.5B, has the same meaning as set forth in Section 8-103(a) of the PUA.[18] As defined in that section, "cost-effective" is determined using the Total Resource Cost ("TRC") test, with a TRC result greater than 1.0 being considered cost-effective. In addition, ComEd conducted an analysis of each program to show that the programs would each lead to a reduction in the overall cost of electric service. ComEd used the Utility Cost Test ("UCT"), as defined by the California Standard Practice Manual[19]. The UCT compares the avoided costs realized by implementing energy efficient measures to the utility's costs to acquire those measures. Since the language in 16-111.5B(a)(3)(D) does not address the time value of money, ComEd has adopted a position preferred by the Stakeholder Advisory Group which adopts a discount rate of zero for this test only. The TRC and UCT results are listed in columns G and H of Appendix C-2.

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[16] Pursuant to Section 8-103A ComEd is currently developing an updated potential study for inclusion with its 2014-2016 energy efficiency and demand response plan, which will be filed with the Commission by September 1, 2013. Once that new potential study is available, ComEd will supplement this Forecast with that new study. In the meantime, ComEd has attached its most recent potential study from 2009.

[17] Section 16-111.5B(a)(3)(B) does not require the inclusion of any additional information until 2014.

[18] See section 16-111.5B(b)

[19] http://www.calmac.org/events/SPM_9_20_02.pdf; Referred to as the Program Administrator Cost ("PAC") test in California

### (D) Comparison to Cost of Comparable Supply

Section 16-111.5B(a)(3)(E) requires an analysis of how the cost of procuring additional energy efficiency measures compares over the life of the measures to the cost of comparable supply. This analysis is provided in Appendix C-2. Column I in that appendix shows the Cost to Conserve Energy ("CCE"), which is expressed in dollars per lifetime kWh saved. The CCE is determined by dividing the total cost of each program by the lifetime energy savings associated with that program. It provides a useful comparison between the cost of saving a kWh of energy to supply alternatives.

### (E) Energy Savings Goal

Section 16-111.5B(a)(3)(F) requires the determination of an energy savings goal for each of the measures or programs to be implemented. In an effort to synchronize these programs with ComEd's upcoming 8-103 EEDR Plan filing, these programs will be implemented over three years, except where vendors have chosen not to pursue a multiple-year approach. Appendix C-3 shows the amount of energy that each of the new or expanded cost-effective energy efficiency programs or measures is expected to save each month over the five-year Forecast period. Appendix C-2, Columns D(1), D(2), D(3), E(1), E(2) and E(3) show the annualized MWh savings at the busbar and the meter, respectively, for each of the measures for each of the three years..

### (F) Reduction in Supply

Section 16-111.5 (G) requires an estimation of the amount that the program may reduce the IPA's need to procure supply. That information is also provided in Appendix C-3.

## C. Impact of Renewable Energy Resources

Section 1-75(c) of the IPA Act (20 ILCS 3855/1-75(c)) establishes the following goals and cost thresholds for cost effective renewable energy resources:

**Table II-11**
**Renewable Energy Resource Requirements**

| Delivery Period | Minimum Percentage | Maximum Cost |
|---|---|---|
| 2014-2015 | 9% of June 1, 2012 through May 31, 2013 Eligible Retail Customer load | No more than the greater of 2.015% of the amount paid per kilowatt hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt hour paid for these resources in 2011. |
| 2015-2016 | 10% of June 1, 2013 through May 31, 2014 Eligible Retail Customer load | No more than the greater of 2.015% of the amount paid per kilowatt hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt hour paid for these resources in 2011. |
| 2016-2017 | 11.5% of June 1, 2014 through May 31, 2015 Eligible Retail Customer Load | No more than the greater of 2.015% of the amount paid per kilowatt hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt hour paid for these resources in 2011. |
| 2017-2018 | 13% of June 1, 2015 through May 31, 2016 Eligible Retail Customer Load | No more than the greater of 2.015% of the amount paid per kilowatt hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt hour paid for these resources in 2011. |
| 2018-2019 | 14.5% of June 1, 2016 through May 31, 2017 Eligible Retail Customer Load | No more than the greater of 2.015% of the amount paid per kilowatt hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt hour paid for these resources in 2011. |

Based on the above, Table II-12 shows the amount of renewable energy resources that need to be procured for Planning Years 2014-2018, while Table II-13 shows the maximum amount, i.e., the budget amount, that may be spent acquiring such resources:

**Table II-12**

**Targeted Renewable Energy Resources**

| Planning Year | Reference Year | Reference Year Delivered Volume (MWH) | Planning Year RPS Target (%) | Planning Year RPS Target (RECs) |
|---|---|---|---|---|
| 2014-15 | 2012-13 | 22,241,598 | 9.0% | 2,001,744 |
| 2015-16 | 2013-14 | 11,710,856 | 10.0% | 1,171,086 |
| 2016-17 | 2014-15 | 10,422,670 | 11.5% | 1,198,607 |
| 2017-18 | 2015-16 | 10,002,399 | 13.0% | 1,300,312 |
| 2018-19 | 2016-17 | 9,928,411 | 14.5% | 1,439,620 |

**Table II-13**

**Renewable Energy Resources Budgets**

| Planning Year | Planning Year Delivered Volume (MWH) | RPS 2.015% Cost Cap ($/MWH) | Planning Year RPS Budget ($) |
|---|---|---|---|
| 2014-15 | 10,422,670 | 1.8917 | 19,716,565 |
| 2015-16 | 10,002,399 | 1.8917 | 18,921,538 |
| 2016-17 | 9,928,411 | 1.8917 | 18,781,575 |
| 2017-18 | 9,978,196 | 1.8917 | 18,875,753 |
| 2018-19 | 10,033,762 | 1.8917 | 18,980,868 |

Pursuant to previous Commission orders, ComEd currently has existing contracts to procure renewable energy resources that will be in effect over the period covered by the Forecast. In Docket No. 09-0373, the Commission directed ComEd to procure up to 1,400,000 MWh of renewable energy resources each year for twenty years pursuant to long-term contracts ("LT Renewables"). In Docket No. 11-0660, the Commission directed ComEd to procure the statutorily-prescribed amount[20] of RECs over the period June 1, 2013 through December 31, 2017 ("Rate Stability RECs").

Based upon the Expected Load Forecast, the cost for RECs under existing contracts will exceed the budget and result in rates for Eligible Retail Customers increasing by an amount greater than 2.015% in Planning Year 2014[21]. As a result, no additional RECs for Planning Year 2014 may be purchased[22]. In addition, purchases of RECs under existing contracts will need to be reduced. The LT Renewables contracts contain a provision that allow the quantities to be procured to be reduced in order to ensure that the statutory cost cap is not exceeded[23]. The LT Renewables contracts are the only contracts that permit such a reduction to occur.

As discussed above, the exodus of customers from ComEd Blended Service due to Muni Agg has matured and stabilized. The open issue for this Forecast is the extent to which customers who were a part of an original Muni Agg program might return to Blended Service. ComEd has been monitoring this situation. Appendix E depicts those communities whose

[20] See Section 16-111.5(k-5) of the PUA.

[21] See Appendix D.

[22] In fact, Appendix D shows that the purchases of renewables under the existing long-term contracts are forecasted to exceed the budget in each of the next five Planning Years, i.e. 2014-2018.

[23] See Par. D of the Confirmation, (http://www.comed-energyrfp.com/2010-RFP/docs/lt/8Sample_Confirmation_Final_11-08-2010.pdf).

original contracts with a RES expired in 2013 and whether those communities have renewed their program or have decided not to continue their Muni Agg program. There are 36 such communities with approximately 270,000 customers participating in their Muni Agg program. 27 of those communities, representing nearly 90% of the total customers, have decided (or are likely) to renew their Muni Agg program (based on data as of early July 2013). Most of the remaining communities still have time to make their decision. ComEd will continue to monitor the situation and present updated data when ComEd submits its updated forecasts in November. At that time, ComEd will also indicate how these Muni Agg programs will impact its Expected Load Forecast and the reduction in purchases under the existing LT Renewable contracts.

Similarly there are numerous communities that have contracts with RES that expire in 2014. ComEd will conduct a survey of the existing Muni Agg communities in January 2014 to obtain as much insight as possible regarding their future Muni Agg plans. We anticipate the communities will be in the process of making their evaluation in early 2014. ComEd will utilize its External Affairs Managers in conducting this survey. This will provide useful insight and this information will be utilized in preparing its March 2014 update.

In addition, the Expected Load Forecast does not include the impact on the load of the Eligible Retail Customers that would result from the procurement of the additional energy efficiency measures that are discussed in section II(B)(2)(b)(iii) of this Forecast. That impact can be provided with the updated Forecast in November after the IPA has indicated which, if any, of the additional measures it recommends be procured. This update will also impact the renewables budget and the amount of renewables that can be procured under the LT Renewables contracts. Therefore, the IPA's procurement plan should provide that the procurement of renewables under the LT Renewables contracts should be reduced by sufficient quantities so as not to exceed, on an actual basis, the 2.015% statutory cap.

In accordance with Section 1-75(c)(5) of the IPA Act, ComEd has been collecting Alternative Compliance Payments ("ACP") from its Hourly Service Customers. Beginning in 2011, ComEd began including in its Forecast the amount of ACP that is collected in the prior year ending May 31. For the period June, 1, 2010 through May 31, 2011 ComEd collected $1,499,113 in ACP. While ComEd reported this amount in its 2011 Forecast, it was not expended by the IPA in the regular REC 2012 procurement. For the period June 1, 2011 through May 31, 2012 ComEd collected $284,847 in ACP. In Docket No. 12-0544, the ICC ordered ComEd to use these funds to procure RECs that were curtailed under the LT Renewable contracts.[24] ComEd did so and $1,783,781 of the $1,783,960 is contracted to be expended over the 2013 Planning Year, leaving a remaining balance of $179. If, in addition to the expected balance, any of those contracted funds remain at the end of the 2013 Planning Year, ComEd will report on that in the forecast it submits in July 2014. For the period June 1, 2012 through May 31, 2013, ComEd collected $4,099,758 in ACP funds. ComEd proposes that funds be used once again to procure RECs curtailed under the LT Renewable contracts.

[24] See, Order, pp. 114-5

### 3. Five-Year Monthly Load Forecast

Based on all of the factors discussed in this section, ComEd has developed the following forecast of projected energy usage of Eligible Retail Customers for the period from June 1, 2014 through May 31, 2015:

**Table II-14**

**ComEd Procurement Period Load Forecast (Expected Load)**
**Projected Energy Usage and Average Demand For Eligible Retail Customers**
**(Weather Normal, Line Loss and DSM Adjusted)**

| Year | Month | Total Load (MWh) | | Average Load (MW) | |
|---|---|---|---|---|---|
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2014 | 6 | 528,657 | 476,372 | 1,573 | 1,241 |
| 2014 | 7 | 653,499 | 566,790 | 1,857 | 1,446 |
| 2014 | 8 | 583,989 | 557,371 | 1,738 | 1,366 |
| 2014 | 9 | 460,580 | 414,346 | 1,371 | 1,079 |
| 2014 | 10 | 439,660 | 358,647 | 1,195 | 954 |
| 2014 | 11 | 393,590 | 449,725 | 1,295 | 1,081 |
| 2014 | 12 | 524,506 | 494,330 | 1,490 | 1,261 |
| 2015 | 1 | 499,858 | 518,798 | 1,488 | 1,272 |
| 2015 | 2 | 444,960 | 416,853 | 1,391 | 1,184 |
| 2015 | 3 | 437,592 | 410,725 | 1,243 | 1,048 |
| 2015 | 4 | 393,810 | 339,309 | 1,119 | 922 |
| 2015 | 5 | 368,345 | 399,109 | 1,151 | 941 |
| **Totals** | | **5,729,046** | **5,402,375** | | |

The forecast set forth above shows ComEd's expected load for the 2014 Planning Year.[25] The PUA requires that the forecast cover a 5-year planning period. The forecast for ComEd's expected load for the 5-year planning period is set forth in Appendix B-1. The PUA also requires ComEd to provide low-load and high-load scenarios. That information for the 2014 Planning Year is set forth in Tables II-15 and II-16. The low-load and high-load scenarios for the 5-year planning period are set forth in Appendix B-2 and Appendix B-3, respectively. In all of the forecasted usage tables, "line loss" refers only to distribution losses.

[25] The forecasts in Tables II-13, 14 and 15 and in Appendices B-1, 2 and 3 do not include the impact of the new Section 16-111.5B energy efficiency procurement. The impact on the Forecast of those measures is depicted in Appendix C-3.

## Table II-15

| ComEd Procurement Period Load Forecast (Low Load)<br>Projected Energy Usage and Average Demand For Eligible Retail Customers<br>(Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2014 | 6 | 459,994 | 432,537 | 1,369 | 1,126 |
| 2014 | 7 | 534,054 | 483,531 | 1,517 | 1,233 |
| 2014 | 8 | 450,191 | 458,737 | 1,340 | 1,124 |
| 2014 | 9 | 427,313 | 382,451 | 1,272 | 996 |
| 2014 | 10 | 387,990 | 312,008 | 1,054 | 830 |
| 2014 | 11 | 340,099 | 382,964 | 1,119 | 921 |
| 2014 | 12 | 451,628 | 425,456 | 1,283 | 1,085 |
| 2015 | 1 | 444,802 | 449,872 | 1,324 | 1,103 |
| 2015 | 2 | 378,036 | 352,133 | 1,181 | 1,000 |
| 2015 | 3 | 358,486 | 330,154 | 1,018 | 842 |
| 2015 | 4 | 322,361 | 278,357 | 916 | 756 |
| 2015 | 5 | 303,316 | 319,060 | 948 | 753 |
| **Totals** | | **4,858,270** | **4,607,260** | | |

## Table II-16

| ComEd Procurement Period Load Forecast (High Load)<br>Projected Energy Usage and Average Demand For Eligible Retail Customers<br>(Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2014 | 6 | 672,100 | 611,686 | 2,000 | 1,593 |
| 2014 | 7 | 939,353 | 831,146 | 2,669 | 2,120 |
| 2014 | 8 | 1,048,272 | 968,866 | 3,120 | 2,375 |
| 2014 | 9 | 633,328 | 585,596 | 1,885 | 1,525 |
| 2014 | 10 | 628,287 | 510,790 | 1,707 | 1,358 |
| 2014 | 11 | 598,166 | 695,627 | 1,968 | 1,672 |
| 2014 | 12 | 769,372 | 733,090 | 2,186 | 1,870 |
| 2015 | 1 | 715,569 | 743,209 | 2,130 | 1,822 |
| 2015 | 2 | 656,771 | 623,258 | 2,052 | 1,771 |
| 2015 | 3 | 634,710 | 597,967 | 1,803 | 1,525 |
| 2015 | 4 | 584,042 | 511,867 | 1,659 | 1,391 |
| 2015 | 5 | 516,975 | 570,799 | 1,616 | 1,346 |
| **Totals** | | **8,396,945** | **7,983,901** | | |

The low-load and the high-load scenarios are based upon a change to three of the main variables impacting load: weather, switching and load growth.

The Low-Load Forecast assumes that the summer weather is cooler than normal, that load growth occurs at a rate 2% less than the Expected Load Forecast and that a greater number of customers opt for RES service relative to the Expected Load Forecast shown in Table II-14. In this scenario residential RES usage, which is approximately 75% of total residential usage as of May 2014, steadily increases over the next two years and reaches approximately 88% by June 2016. This increase reflects further movement to RES service because of greater than anticipated savings opportunity. A similar trend is anticipated for the non-residential customers. The percentage of Eligible Retail Customers taking Blended Service in this switching scenario is 14% (based on usage) as of June 2016 compared to 24% in the Expected Load Forecast.

The High-Load Forecast assumes that the summer weather is hotter than normal, that load growth occurs at a rate 2% more than is expected, and that fewer customers take RES service. This scenario assumes that there are fewer communities participating in Muni Agg and the number of customers taking Blended Service increases. In June 2014 residential RES usage, which again is 75% of total residential usage, is reduced by approximately 12 percentage points as fewer Muni Agg communities continue with their programs. Another group of communities also does not participate in Muni Agg in June of 2015. The net result is that residential RES usage declines from approximately 75% of total residential usage in May 2014 to 50% as of October 2015. There is no specific number of communities that no longer participate in Muni Agg in this scenario as the change in RES usage need not be an all or nothing situation for the community. For example, even if a community were to no longer participate in Muni Agg a large number of the existing RES customers within that community may renew with the existing RES. Likewise, the non-residential RES usage declines in this scenario because of the reduction in Muni Agg participation. The percentage of Eligible Retail Customers taking Blended Service in this switching scenario is 48% as of June 2016 compared to 24% in the Expected Load Forecast.

The +/- 2% load growth assumption in both scenarios reflects, in part, the current economic uncertainty. That uncertainty is described by IHS-Global Insight in its U.S. Executive Summary dated May 2013:

> "Recovery Stalls" Scenario: In the pessimistic scenario, it turns out that the economy has little momentum, so there is less of a cushion to absorb the drag from the sequester. Real GDP declines 0.4% in the second quarter of 2013 with the economy barely avoiding a recession. Just as housing appeared to be on the upswing, stagnating employment and weak wage gain produce a housing market relapse. The global outlook deteriorates rapidly in this scenario, which reduces the demand for U.S. exports. In this scenario, real GDP grows 1.1% in 2013 and 0.5% in 2014 (versus 1.8% and 2.8% in the baseline, respectively).
>
> "Recovery Reignites" Scenario: In the optimistic scenario, the private-sector recovery continues, while policymakers avoid imposing excessive fiscal restraint on the economy. This scenario is driven in part by a strong recovery in residential construction with

housing starts eclipsing 1.25 million units by the end of 2013, three quarters earlier than in the baseline. With a stronger outlook and less fiscal uncertainty, consumer and business confidence rises sharply. Accordingly, vehicle sales increase more than in the baseline. In this scenario, real GDP grows 2.5% in 2013 and 4.3% in 2014.

ComEd's intention is to keep the IPA informed of significant changes in its forecast during the procurement proceeding.

## III. CONCLUSION

For all of the reasons described here, ComEd believes that its Forecast for the period June 1, 2014 through May 31, 2019 is consistent with the requirements of the PUA and provides an appropriate approach to develop the procurement plan to acquire supply for the Eligible Retail Customers.

## Appendices

A. Load Forecast Models

1. Residential Single Family Model (Hour 16)
2. ComEd Model Coefficients
3. ComEd Model Regression Statistics
4. Detailed Description of Variables Used In Forecast Models

B. Five-Year Load Forecast

1. Expected load
2. Low Load
3. High Load

C. Energy Efficiency

1. Potential Study
2. Analysis Summary
3. Monthly Savings Curve
4. Program Details

D. Renewables

E. Municipal Aggregation

## Appendix A-1

| Residential Single Family Model (Hour 16) | | | |
|---|---|---|---|
| **Variable** | **Coefficient** | **T-Stat** | **Notes** |
| CONSTANT | 1.747 | 16.164 | Constant term |
| Monday Binary | -0.089 | -7.836 | |
| Tuesday Binary | -0.103 | -9.125 | |
| Wednesday Binary | -0.121 | -10.705 | |
| Thursday Binary | -0.136 | -11.983 | |
| Friday Binary | -0.116 | -10.180 | |
| Saturday Binary | -0.031 | -3.327 | |
| MLK Binary | 0.043 | 0.884 | Martin Luther King's Day |
| PresDay Binary | 0.066 | 1.357 | President's Day |
| GoodFri Binary | 0.036 | 0.732 | Good Friday |
| MemDay Binary | 0.093 | 1.795 | Memorial Day |
| July4th Binary | -0.061 | -1.171 | July 4th. |
| LaborDay Binary | 0.265 | 5.004 | Labor Day |
| Thanks Binary | 0.157 | 3.119 | Thanksgiving Day |
| FriAThanks Binary | 0.051 | 1.020 | Friday after Thanksgiving Day |
| XMasWkB4 Binary | 0.133 | 2.421 | Week before Christmas |
| XMasEve Binary | 0.362 | 5.196 | Christmas Eve |
| XMasDay Binary | 0.224 | 3.511 | Christmas Day |
| XMasWk Binary | 0.146 | 2.416 | Christmas Week |
| NYEve Binary | 0.206 | 2.697 | New Year's Eve Day |
| NYDay Binary | 0.170 | 2.608 | New Year's Day |
| XMasLights Binary | 0.0000 | -0.019 | Christmas Lights |
| DLSav Binary | -0.459 | -5.395 | Day-Light Sayings |
| Sun.FracDark6 | 0.341 | 4.656 | Fraction of hour 6 am that is dark |
| Sun.FracDark7 | 0.245 | 4.894 | Fraction of hour 7 am that is dark |
| Sun.FracDark8 | 0.320 | 4.566 | Fraction of hour ending 8 am that is dark |
| Sun.FracDark17 | 0.086 | 1.686 | Fraction of hour ending 5 pm that is dark |
| Sun.FracDark18 | -0.213 | -3.570 | Fraction of hour ending 6 pm that is dark |
| Sun.FracDark19 | -0.208 | -4.139 | Fraction of hour ending 7 pm that is dark |
| Sun.FracDark20 | -0.248 | -4.488 | Fraction of hour ending 8 pm that is dark |
| Sun.FracDark21 | -0.552 | -5.886 | Fraction of hour ending 9 pm that is dark |
| Binary Feb | -0.036 | -0.842 | |
| Binary Mar | 0.010 | 0.219 | |
| Binary Apr | 0.007 | 0.129 | Binary Apr |
| Binary May | 0.072 | 1.262 | Binary May |
| Binary Jun | 0.195 | 3.265 | Binary Jun |
| Binary Jul | 0.311 | 5.275 | Binary Jul |
| Binary Aug | 0.304 | 5.780 | Binary Aug |
| Binary Sep | 0.213 | 4.276 | Binary Sep |

| | | | |
|---|---|---|---|
| Binary Oct | 0.161 | 3.074 | |
| Binary Nov | 0.074 | 1.606 | |
| Binary Dec | 0.097 | 2.163 | |
| Usage Trend | -0.012 | -2.072 | |
| Fall HDD Spline | 0.008 | 4.345 | HDD Spline for September and October |
| November HDD Spline | 0.006 | 5.230 | HDD Spline for November |
| December HDD Spline | 0.006 | 5.630 | HDD Spline for December |
| January HDD Spline | 0.008 | 8.287 | HDD Spline for January |
| February HDD Spline | 0.009 | 8.609 | HDD Spline for February |
| March HDD Spline | 0.006 | 5.341 | HDD Spline for March |
| Spring HDD Spline | 0.009 | 6.259 | HDD Spline for April and May |
| Day lag of HDD Spline | -0.001 | -1.339 | |
| Two day lag of HDD Spline | 0.0010 | 0.987 | |
| Weekend HDD Spline | 0.000 | 0.912 | |
| Trend HDD Spline | 0.000 | -0.745 | |
| April THI Spline | 0.050 | 2.441 | THI (Temperature Humidity Index) Spline for April |
| May THI Spline | 0.163 | 32.156 | THI (Temperature Humidity Index) Spline for May |
| June THI Spline | 0.167 | 49.846 | THI (Temperature Humidity Index) Spline for June |
| July THI Spline | 0.156 | 44.710 | THI (Temperature Humidity Index) Spline for July |
| August THI Spline | 0.169 | 45.448 | THI (Temperature Humidity Index) Spline for August |
| September THI Spline | 0.183 | 40.469 | THI (Temperature Humidity Index) Spline for September |
| October THI Spline | 0.174 | 21.236 | THI (Temperature Humidity Index) Spline for October |
| Day lag of THI Spline | 0.010 | 4.463 | |
| Two day lag of THI Spline | 0.011 | 6.186 | |
| Weekend THI Spline | 0.007 | 3.216 | |
| THI Spline for Trend | 0 | 0.797 | |
| 2006 Plus THI Shift | -0.014 | -4.899 | |
| 2007 Plus Dummy | 0.068 | 5.271 | An End Shift to describe usage for 2007 and beyond |
| 2009 Plus Dummy | -0.028 | -2.18 | An End Shift to describe usage for 2007 and beyond |
| 2011 Plus Dummy | 0.016 | 1.191 | |
| September 6 2010 Dummy | -0.679 | -4.698 | |
| July 2011 Storm Dummy | -0.793 | -5.842 | |
| Sept-Nov 2010 Dummy | -0.076 | -4.448 | |

| | | | |
|---|---|---|---|
| Sept-Sep 2011 Dummy | -0.076 | -2.642 | |
| Oct-Oct 2011 Dummy | 0.242 | 8.83 | |
| Nov-Nov 2011 Dummy | 0.178 | 4.983 | |
| Sept-Nov 2012 Dummy | 0.166 | 8.339 | |

The coefficients provide the effect that each variable has on the hourly usage for a single hour (Hour 16 which includes the load from 3 p.m. to 4 p.m. in the afternoon). The "T-Stat" provides the statistical significance of the variable, with a value generally greater than +/- two (2) indicating that the coefficient is significantly different from zero. The hourly model for Hour 16 has an adjusted R-squared of 0.95, which means that 95% of the variance in the hourly data is being explained by the model.

At the daily level, the mean average percent error ("MAPE") for the summation of the hourly models is 3.3%. The 3.3% daily MAPE means that the average percentage difference on a daily basis between the usage predicted by the model and the actual usage for that period was very small. In other words, the model can explain usage with almost a 97% accuracy rate. Such a high accuracy rate is particularly noteworthy because the model is dealing with very short time frames in which many factors may come into play. The high accuracy rate, the low MAPE and the high R-squared indicate that the model captures the vast majority of factors that affect electrical usage.

## Appendix A-2

# ComEd Model Coefficients

**ComEd Zone Model**

| Variable | Coefficient | StdErr | T-Stat |
|---|---|---|---|
| CONST | -81.137 | 708.05 | -0.115 |
| CalVars.Jan | -122.611 | 30.261 | -4.052 |
| CalVars.Feb | -171.638 | 69.719 | -2.462 |
| CalVars.Mar | -344.199 | 39.813 | -8.645 |
| CalVars.Apr | -484.87 | 56.315 | -8.61 |
| CalVars.May | -420.817 | 64.932 | -6.481 |
| CalVars.Jun | -290.809 | 71.042 | -4.094 |
| CalVars.Jul | -239.748 | 83.252 | -2.88 |
| CalVars.Aug | -72.295 | 75.401 | -0.959 |
| CalVars.Sep | -163.877 | 64.991 | -2.522 |
| CalVars.Oct | -270.153 | 55.941 | -4.829 |
| CalVars.Nov | -153.384 | 46.87 | -3.273 |
| CalVars.Yr05Plus | 106.249 | 44.644 | 2.38 |
| CalVars.Jul10Plus | -219.453 | 35.089 | -6.254 |
| CalHDD.HDDSpline | 1.882 | 0.103 | 18.287 |
| CalHDD.HDDSplineTrend | 0.049 | 0.014 | 3.443 |
| CalCDD.SpringTDD | 11.499 | 0.811 | 14.173 |
| CalCDD.SummerTDD | 13.985 | 0.387 | 36.129 |
| CalCDD.FallTDD | 13.509 | 2.09 | 6.462 |
| CalCDD.TDDTrend | 0.295 | 0.093 | 3.177 |
| CalCDD.Yr06Plus_TDDShift | -1.562 | 0.555 | -2.814 |
| CalCDD.Yr11Plus_TDDShift | -1.284 | 0.376 | -3.415 |
| Monthly.EconIndex4 | 4.017 | 0.37 | 10.858 |
| AR(1) | 0.573 | 0.08 | 7.171 |

**Residential Customer Class Model**

| Variable | Coefficient | StdErr | T-Stat |
|---|---|---|---|
| Monthly.Jan | 11.668 | 2.817 | 4.142 |
| Monthly.Feb | 10.141 | 2.819 | 3.598 |
| Monthly.Mar | 9.322 | 2.811 | 3.317 |
| Monthly.Apr | 8.038 | 2.836 | 2.834 |
| Monthly.May | 7.8 | 2.808 | 2.778 |
| Monthly.Jun | 8.388 | 2.789 | 3.008 |
| Monthly.Jul | 10.501 | 2.805 | 3.744 |
| Monthly.Aug | 9.701 | 2.806 | 3.457 |
| Monthly.Sep | 9.57 | 2.804 | 3.413 |
| Monthly.Oct | 8.935 | 2.82 | 3.169 |
| Monthly.Nov | 8.869 | 2.865 | 3.095 |
| Monthly.Dec | 10.6 | 2.813 | 3.769 |
| Monthly.Yr09Plus | 0.436 | 0.202 | 2.158 |
| Monthly.July11Plus | -0.714 | 0.155 | -4.604 |
| CycVars.IncPerHH | 0.12 | 0.025 | 4.896 |
| CycWthrT.ResHDD_Spring | 0.236 | 0.034 | 6.89 |
| CycWthrT.ResHDD_Fall | 0.253 | 0.054 | 4.734 |
| CycWthrT.ResHDD_Winter | 0.204 | 0.015 | 13.71 |
| CycWthrT.ResCDD_Spring | 1.847 | 0.404 | 4.57 |
| CycWthrT.ResCDD_Jun | 2.233 | 0.116 | 19.24 |
| CycWthrT.ResCDD_Jul | 2.093 | 0.06 | 34.85 |
| CycWthrT.ResCDD_Aug | 2.345 | 0.063 | 37.33 |
| CycWthrT.ResCDD_Sep | 2.366 | 0.108 | 21.84 |
| CycWthrT.ResCDD_Fall | 2.431 | 0.17 | 14.3 |
| CycWthrT.ResCDDTrend | 0.023 | 0.008 | 2.943 |
| CycWthrT.Yr06Plus_ResCDDShift | -0.24 | 0.057 | -4.227 |
| CycVars.ResBill_MA | -0.121 | 0.033 | -3.682 |
| AR(1) | 0.395 | 0.093 | 4.263 |

**Small C&I Customer Class Model**

| Variable | Coefficient | StdErr | T-Stat |
|---|---|---|---|
| Monthly.Jan | -5.313 | 9.868 | -0.538 |
| Monthly.Feb | -2.474 | 9.87 | -0.251 |
| Monthly.Mar | -3.598 | 9.835 | -0.366 |
| Monthly.Apr | -4.954 | 9.805 | -0.505 |
| Monthly.May | -6.018 | 9.8 | -0.614 |
| Monthly.Jun | -6.671 | 9.771 | -0.683 |
| Monthly.Jul | -6.641 | 9.763 | -0.68 |
| Monthly.Aug | -3.293 | 9.76 | -0.337 |
| Monthly.Sep | -3.312 | 9.773 | -0.339 |
| Monthly.Oct | -2.626 | 9.797 | -0.268 |
| Monthly.Nov | -4.746 | 9.826 | -0.483 |
| Monthly.Dec | -6.154 | 9.864 | -0.624 |
| Monthly.July07Plus | -0.938 | 0.436 | -2.152 |
| Monthly.July11Plus | -2.777 | 0.483 | -5.755 |
| CycWthrT.SCI_HDD | 0.401 | 0.052 | 7.753 |
| CycWthrT.SCI_HDDTrend | 0.011 | 0.005 | 2.306 |
| CycWthrT.SCI_CDD | 1.916 | 0.125 | 15.375 |
| CycWthrT.SCI_CDDTrend | 0.012 | 0.011 | 1.126 |
| CycVars.SCI_Econ_Index | 0.035 | 0.004 | 8.701 |
| SCI.DelayedBill2 | -0.024 | 0.003 | -8.093 |
| AR(1) | 0.325 | 0.091 | 3.591 |

**StreetLighting Class Model**

| Variable | Coefficient | StdErr | T-Stat |
|---|---|---|---|
| Monthly.Jan | -4.813 | 0.495 | -9.723 |
| Monthly.Feb | -4.811 | 0.494 | -9.73 |
| Monthly.Mar | -5.096 | 0.494 | -10.32 |
| Monthly.Apr | -5.173 | 0.495 | -10.45 |
| Monthly.May | -5.285 | 0.495 | -10.67 |
| Monthly.Jun | -5.3 | 0.494 | -10.73 |
| Monthly.Jul | -5.316 | 0.494 | -10.75 |
| Monthly.Aug | -5.242 | 0.494 | -10.62 |
| Monthly.Sep | -5.129 | 0.494 | -10.39 |
| Monthly.Oct | -5.054 | 0.493 | -10.25 |
| Monthly.Nov | -4.917 | 0.493 | -9.965 |
| Monthly.Dec | -4.835 | 0.494 | -9.779 |
| CycVars.ResCust | 0.002 | 0 | 13.92 |
| Monthly.Oct09Plus | 0.126 | 0.037 | 3.404 |
| Monthly.July10Plus | -0.066 | 0.038 | -1.736 |
| AR(1) | 0.284 | 0.085 | 3.337 |

**Appendix A-3**

# ComEd Model Regression Statistics

| Regression Statistics | ZONE | Residential | Small C&I | StreetLighting |
|---|---|---|---|---|
| Iterations | 15 | 14 | 13 | 10 |
| Adjusted Observations | 135 | 131 | 130 | 136 |
| Deg. of Freedom for Error | 111 | 103 | 109 | 120 |
| R-Squared | 0.995 | 0.996 | 0.974 | 0.934 |
| Adjusted R-Squared | 0.994 | 0.995 | 0.969 | 0.926 |
| AIC | 8.758 | -1.982 | 0.485 | -5.087 |
| BIC | 9.275 | -1.368 | 0.948 | -4.744 |
| Log-Likelihood | -758.74 | -28.04 | -194.99 | 168.95 |
| Model Sum of Squares | 130,780,305.52 | 2,855.40 | 5,703.27 | 9.38 |
| Sum of Squared Errors | 602,006.71 | 11.77 | 152.86 | 0.66 |
| Mean Squared Error | 5,423.48 | 0.11 | 1.4 | 0.01 |
| Std. Error of Regression | 73.64 | 0.34 | 1.18 | 0.07 |
| Mean Abs. Dev. (MAD) | 52 | 0.23 | 0.86 | 0.05 |
| Mean Abs. % Err. (MAPE) | 0.63% | 1.03% | 0.95% | 2.83% |
| Durbin-Watson Statistic | 2.486 | 2.077 | 2.069 | 1.867 |
| Ljung-Box Statistic | 38.17 | 22.69 | 25.03 | 19.42 |
| Prob (Ljung-Box) | 0.0333 | 0.5381 | 0.4042 | 0.7291 |
| Prob (Jarque-Bera) | 0.3699 | 0.0005 | 0.8173 | 0.0008 |

## Appendix A-4
## Detailed Description Of Variables
## Used In Forecast Models

The econometric models are statistical multi-variant regressions that determine the correlation between electrical usage (dependent variable) and weather, economic and monthly factors (independent variables). Consistent with its recent delivery services rate case filing, ComEd's weather normals are based on the 30-year time period of 1981 to 2010. The following models are used in producing the energy usage forecast (GWh) for the eligible customers:

Monthly Zone energy usage for the ComEd zone
Monthly Residential bill-cycle energy usage
Monthly Small C&I bill-cycle energy usage
Monthly Street Lighting bill-cycle energy usage

ComEd's Load Forecasting group with the input of industry experts developed the models. The following sections describe each model and its specifications. Appendices A-2 and A-3 contain the coefficients and other regression statistics for the models.

**ComEd's Monthly Zone Model**

The dependent variable in the Monthly Zone Model is monthly zone energy usage for the ComEd service territory. The monthly zone usage is in GWh units. The performance of the model is shown in the Chart II-7 in Section II B 1 d (ii) (estimated[26] vs. actual) for the January 2002 to April 2013 time period.

The independent variables within the model are:

- The monthly binary variables reflect monthly usage patterns. Customer electrical usage is a function of other items besides cooling and heating (e.g., lighting). This other usage is not constant per month and the monthly binary variables are used to account for this variability. December is excluded from the monthly binaries, as the constant term establishes December as the base from which the monthly binary variables are adjusted.

- The EconIndex4 variable is a composite economic variable that weights the contributions of GMP, total number of residential customers, and non-manufacturing employment in the ComEd service territory. GMP is the gross metropolitan product for the Chicago metropolitan area and also includes other metropolitan areas within ComEd's service territory. This variable measures economic activity for the ComEd service territory. The GMP is adjusted for

[26] As noted in the body of the Forecast, the estimated data used in Charts II-7, II-8 and II-9 is based on actual weather

inflation and is obtained from Global Insight. Further, the variable is adjusted for the number of weekends (and holidays) and weekdays within a calendar month because overall energy usage for a given month is a function of those daily influences. The variable's units are billions of dollars. The residential customer's component is the total number of residential customers within the ComEd service territory. This economic variable reflects the effect of a growing customer base on energy usage and is driven by household formations. This variable is also adjusted for the number of weekends, holidays and weekdays within a calendar month. The non-manufacturing employment is defined below in the Small C&I model. The three economic variables are weighted based on an exponential formula with each of the economic variable roughly receiving a one-third weighting.

- The temperature and humidity degree day ("TDD") variables are weather variables designed to capture the effect on usage from cooling equipment. The TDD variable is similar in design to a cooling degree day ("CDD") variable. A CDD weather variable is often used in energy models. The standard CDD measures the difference in the average daily temperature above a specific threshold (typically 65 degrees as that is a common point at which cooling activity begins). The TDD variable provides several enhancements to the typical CDD variable as delineated below:

  The average daily temperature is the 24-hour average instead of the average of the maximum and minimum temperatures for the day. This captures frontal movements within the day.

  Humidity is included in the TDD variable as humidity does influence electrical usage.

  The TDD variable uses multiple degree bases instead of just a 65 degree-base. This captures the change in the rate at which customers use electricity at different temperature levels.

  The TDD variable is interacted with seasonal binary variables (i.e., Spring, Summer and Fall) to reflect the seasonal usage pattern related to cooling equipment.

  The TDD variable is in degree-day units.

  The TDD trend variable is a weather variable that captures the changing relationship of cooling equipment over time. Simply put, the effect of a TDD changes over time as customers' usage patterns change over time. For example, as homes have become larger over time the amount of cooling load associated with a change in temperature will also change.

The TDD trend variable essentially captures the growing influence of cooling equipment over time within the service territory. The TDD trend variable is designed to capture this changing relationship by interacting the TDD variable with a linear time series variable. The TDD trend variable is in degree-day units.

The two TDD shift variables are weather variables akin to the TDD trend variable. For the first variable, the TDD variable is interacted with a binary variable for all years greater than or equal to 2006. The second variable is similar to the first except for all years greater than or equal to 2011. The negative sign in the first variable's coefficient acknowledges the reduction in cooling effect since 2006. The second variable's negative sign indicates an increase in the reduction in cooling effect beginning in 2011.

- The HDD Spline variable is a weather variable that measures the relationship on electrical usage from space heating equipment (e.g., natural gas furnace fans and electrical space-heating equipment). The HDD Spline variable is similar in concept to the industry-standard heating degree day ("HDD") weather variable. The HDD Spline provides a couple of enhancements to the HDD weather variable:

  The average daily temperature is the 24-hour average instead of the average of the maximum and minimum temperatures for the day. This captures frontal movements within the day.

  The HDD Spline uses multiple degree bases instead of just a 65 degree-base. This captures the change in the rate at which customers use electricity at different temperature levels.

  The HDD Spline variable is in degree-day units.

  The HDD Spline trend variable is a weather variable that reflects the changing relationship of heating equipment over time. This variable is conceptually similar to the TDD trend variable. The HDD spline trend variable is in degree-day units.

- The Year 2005 and July 2010 Shift Plus variables are binary variables designed to capture very recent usage activity within the model. For example, the 2005 Shift Plus variable is a binary variable with the unit one for all months beginning with January 2005 and thereafter. By forcing all of the residuals to sum to zero for the months January 2005 to present, the variable is causing the model to be closely aligned with recent usage activity. This variable is useful for forecasting purposes as it ensures that the forecasted usage is also closely aligned with the most recent pattern of electrical usage.

The coefficient values and the standard measurements of significance within the model (e.g., t-stats) and the overall model performance (e.g., R-squared and MAPE) are contained in Appendices A-2 and A-3. Chart II-7 contains a plot of the model's estimated monthly usage vs. actual monthly usage from January 2002 to April 2013. The two curves are tightly aligned, which speaks to the accuracy of the model.

**ComEd Residential Model**

The dependent variable in the Residential Model is residential use per customer per day and the units are kWh per customer per day. Chart II-8 shows the model's performance (estimated vs. actual monthly usage for the January 2002 to April 2013 time period), which reflects a close fit.

The independent variables are noted below. (Because many of the variables follow the same purpose and logic as in the Monthly Zone model, please see the Monthly Zone Model description for additional information.)

- The monthly binary variables reflect monthly usage patterns.
- The Real Income per Household variable is the disposable personal income for the Chicago metropolitan area and other metropolitan areas within the ComEd service territory (adjusted for inflation) divided by the number of households for the same area. The data is obtained from Global Insight. This variable captures the rising household incomes within ComEd's service territory and the correlation it has with consumer purchases of electronic equipment and housing stock. The variable is in dollars per household units.
- The Monthly Bill (Moving Average) variable is a typical monthly residential electricity bill assuming historical tariff charges and weather normal customer usage for the year 2002 (adjusted for inflation). Specifically, the historical tariff charges for a single-family and multi-family (both non-space heat) were multiplied by the weather adjusted billing units from the year 2002 for both residential groups. The monthly bills for both residential groups were weighted, based on energy usage, to form a single monthly bill. The monthly bill was also adjusted for the Chicago CPI-U. Lastly, a 12 month moving average is calculated for each month (average of the current month and the 11 preceding months). This variable reflects the influence of electricity charges/prices over time related to consumer behavior.
- Weather variables used in the residential model are similar in concept to the weather variables described in the Monthly Zone Model section and will not be repeated here.

- The Year 2009 Plus and July 2011 Plus binary variables are similar in concept to the same variables used in the Monthly Zone Model.

**ComEd Small C&I Model**

The dependent variable in the Small C&I Model is Small C&I use per day and the units are GWh per day. The independent variables within the model are:

- The monthly binary variables, weather variables and shift variables are similar in concept to the Monthly Zone Model and will not be repeated here.

- The Small C&I Economic Index variable is a composite economic variable that weights the contributions of GMP, total number of residential customers, and non-manufacturing employment in the ComEd service territory. The three economic variables are weighted based on an exponential formula with a weighting of employment (55%), residential customers (25%) and GMP (20%). The GMP and residential customer variables are defined in the Zone model description above and the employment variable is an economic variable that measures the total non-manufacturing employment in the Chicago area. Job growth is correlated to Small C&I development and growth

- The July 2007 and July 2011 Shift Plus binary variable is similar in concept to the Monthly Zone model.

- The Delayed Bill variable is the month over month (current vs. one month prior) variance in the Small C&I's estimated usage (GWh) of bills that are delayed beginning in October 2009. This variable is used to inform the model about an increase in delayed bill activity primarily in 2010.

**ComEd Street Light Model**

The dependent variable in the Street Lighting Model is Street Lighting use per day and the units are GWh per day. The independent variables are:

- Monthly binary variables and a shift variable are similar in concept to the Monthly Zone Model.

- The residential customer variable is the total number of residential customers within the ComEd service territory. This economic variable reflects the relationship of a growing service territory (measured by the number of residential customers) and street lighting usage.

- The October 2009 and July 2010 Shift Plus binary variable is similar in concept to the Monthly Zone model.

# Appendix B-1

| ComEd Procurement Period Load Forecast (Expected Load) Projected Energy Usage and Average Demand For Eligible Retail Customers (Weather Normal, Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2014 | 6 | 528,657 | 476,372 | 1,573 | 1,241 |
| 2014 | 7 | 653,499 | 566,790 | 1,857 | 1,446 |
| 2014 | 8 | 583,989 | 557,371 | 1,738 | 1,366 |
| 2014 | 9 | 460,580 | 414,346 | 1,371 | 1,079 |
| 2014 | 10 | 439,660 | 358,647 | 1,195 | 954 |
| 2014 | 11 | 393,590 | 449,725 | 1,295 | 1,081 |
| 2014 | 12 | 524,506 | 494,330 | 1,490 | 1,261 |
| 2015 | 1 | 499,858 | 518,798 | 1,488 | 1,272 |
| 2015 | 2 | 444,960 | 416,853 | 1,391 | 1,184 |
| 2015 | 3 | 437,592 | 410,725 | 1,243 | 1,048 |
| 2015 | 4 | 393,810 | 339,309 | 1,119 | 922 |
| 2015 | 5 | 368,345 | 399,109 | 1,151 | 941 |
| 2015 | 6 | 525,510 | 433,382 | 1,493 | 1,178 |
| 2015 | 7 | 649,668 | 516,752 | 1,765 | 1,374 |
| 2015 | 8 | 556,108 | 534,307 | 1,655 | 1,310 |
| 2015 | 9 | 437,690 | 394,075 | 1,303 | 1,026 |
| 2015 | 10 | 397,475 | 355,984 | 1,129 | 908 |
| 2015 | 11 | 395,134 | 411,620 | 1,235 | 1,029 |
| 2015 | 12 | 501,599 | 470,858 | 1,425 | 1,201 |
| 2016 | 1 | 455,446 | 515,085 | 1,423 | 1,215 |
| 2016 | 2 | 450,427 | 408,602 | 1,341 | 1,135 |
| 2016 | 3 | 441,340 | 379,362 | 1,199 | 1,009 |
| 2016 | 4 | 361,688 | 341,951 | 1,076 | 890 |
| 2016 | 5 | 377,637 | 370,950 | 1,124 | 909 |
| 2016 | 6 | 518,521 | 420,374 | 1,473 | 1,142 |
| 2016 | 7 | 558,663 | 582,720 | 1,746 | 1,374 |
| 2016 | 8 | 608,396 | 479,488 | 1,653 | 1,275 |
| 2016 | 9 | 430,568 | 392,860 | 1,281 | 1,023 |
| 2016 | 10 | 376,535 | 367,202 | 1,121 | 900 |
| 2016 | 11 | 415,303 | 393,509 | 1,236 | 1,025 |
| 2016 | 12 | 479,806 | 491,071 | 1,428 | 1,204 |
| 2017 | 1 | 480,578 | 497,463 | 1,430 | 1,219 |
| 2017 | 2 | 428,895 | 400,731 | 1,340 | 1,138 |
| 2017 | 3 | 442,473 | 380,816 | 1,202 | 1,013 |

| ComEd Procurement Period Load Forecast (Expected Load)<br>Projected Energy Usage and Average Demand For Eligible Retail Customers<br>(Weather Normal, Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| **Year** | **Month** | **Total Load (MWh)** | | **Average Load (MW)** | |
| | | **On-Peak** | **Off-Peak** | **On-Peak** | **Off-Peak** |
| 2017 | 4 | 345,585 | 356,262 | 1,080 | 891 |
| 2017 | 5 | 399,519 | 356,327 | 1,135 | 909 |
| 2017 | 6 | 524,756 | 420,672 | 1,491 | 1,143 |
| 2017 | 7 | 564,083 | 587,410 | 1,763 | 1,385 |
| 2017 | 8 | 612,927 | 483,736 | 1,666 | 1,287 |
| 2017 | 9 | 412,264 | 411,299 | 1,288 | 1,028 |
| 2017 | 10 | 397,841 | 352,555 | 1,130 | 899 |
| 2017 | 11 | 418,416 | 392,913 | 1,245 | 1,023 |
| 2017 | 12 | 457,738 | 511,880 | 1,430 | 1,207 |
| 2018 | 1 | 507,320 | 479,572 | 1,441 | 1,223 |
| 2018 | 2 | 430,369 | 402,416 | 1,345 | 1,143 |
| 2018 | 3 | 424,568 | 397,520 | 1,206 | 1,014 |
| 2018 | 4 | 366,270 | 341,756 | 1,090 | 890 |
| 2018 | 5 | 402,289 | 356,281 | 1,143 | 909 |
| 2018 | 6 | 502,307 | 444,449 | 1,495 | 1,157 |
| 2018 | 7 | 598,156 | 567,243 | 1,780 | 1,390 |
| 2018 | 8 | 616,628 | 487,662 | 1,676 | 1,297 |
| 2018 | 9 | 393,512 | 429,045 | 1,294 | 1,031 |
| 2018 | 10 | 418,610 | 337,302 | 1,138 | 897 |
| 2018 | 11 | 420,845 | 392,236 | 1,253 | 1,021 |
| 2018 | 12 | 459,544 | 512,879 | 1,436 | 1,210 |
| 2019 | 1 | 510,582 | 482,670 | 1,451 | 1,231 |
| 2019 | 2 | 432,885 | 405,153 | 1,353 | 1,151 |
| 2019 | 3 | 407,993 | 415,483 | 1,214 | 1,018 |
| 2019 | 4 | 388,464 | 328,621 | 1,104 | 893 |
| 2019 | 5 | 406,106 | 357,823 | 1,154 | 913 |
| **Totals** | | **27,838,083** | **25,952,702** | | |

# Appendix B-2

| ComEd Procurement Period Load Forecast (Low Load) Projected Energy Usage and Average Demand For Eligible Retail Customers (Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2014 | 6 | 459,994 | 432,537 | 1,369 | 1,126 |
| 2014 | 7 | 534,054 | 483,531 | 1,517 | 1,233 |
| 2014 | 8 | 450,191 | 458,737 | 1,340 | 1,124 |
| 2014 | 9 | 427,313 | 382,451 | 1,272 | 996 |
| 2014 | 10 | 387,990 | 312,008 | 1,054 | 830 |
| 2014 | 11 | 340,099 | 382,964 | 1,119 | 921 |
| 2014 | 12 | 451,628 | 425,456 | 1,283 | 1,085 |
| 2015 | 1 | 444,802 | 449,872 | 1,324 | 1,103 |
| 2015 | 2 | 378,036 | 352,133 | 1,181 | 1,000 |
| 2015 | 3 | 358,486 | 330,154 | 1,018 | 842 |
| 2015 | 4 | 322,361 | 278,357 | 916 | 756 |
| 2015 | 5 | 303,316 | 319,060 | 948 | 753 |
| 2015 | 6 | 376,931 | 308,996 | 1,071 | 840 |
| 2015 | 7 | 431,722 | 336,099 | 1,173 | 894 |
| 2015 | 8 | 345,040 | 334,269 | 1,027 | 819 |
| 2015 | 9 | 318,504 | 282,576 | 948 | 736 |
| 2015 | 10 | 273,489 | 238,982 | 777 | 610 |
| 2015 | 11 | 259,487 | 266,138 | 811 | 665 |
| 2015 | 12 | 322,500 | 303,582 | 916 | 774 |
| 2016 | 1 | 300,842 | 330,174 | 940 | 779 |
| 2016 | 2 | 282,137 | 249,325 | 840 | 693 |
| 2016 | 3 | 263,213 | 218,438 | 715 | 581 |
| 2016 | 4 | 213,391 | 196,677 | 635 | 512 |
| 2016 | 5 | 221,104 | 202,998 | 658 | 498 |
| 2016 | 6 | 267,923 | 203,172 | 761 | 552 |
| 2016 | 7 | 268,390 | 263,529 | 839 | 622 |
| 2016 | 8 | 278,171 | 209,467 | 756 | 557 |
| 2016 | 9 | 229,930 | 207,912 | 684 | 541 |
| 2016 | 10 | 192,126 | 186,890 | 572 | 458 |
| 2016 | 11 | 208,645 | 194,716 | 621 | 507 |
| 2016 | 12 | 243,265 | 247,317 | 724 | 606 |
| 2017 | 1 | 253,805 | 261,090 | 755 | 640 |
| 2017 | 2 | 221,216 | 206,600 | 691 | 587 |
| 2017 | 3 | 222,811 | 189,012 | 605 | 503 |
| 2017 | 4 | 177,533 | 180,337 | 555 | 451 |
| 2017 | 5 | 203,393 | 183,639 | 578 | 468 |

| ComEd Procurement Period Load Forecast (Low Load)<br>Projected Energy Usage and Average Demand For Eligible Retail Customers<br>(Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| Year | Month | Total Load (MWh) | | Average Load (MW) | |
| | | On-Peak | Off-Peak | On-Peak | Off-Peak |
| 2017 | 6 | 246,582 | 189,782 | 701 | 516 |
| 2017 | 7 | 246,207 | 253,593 | 769 | 598 |
| 2017 | 8 | 259,361 | 201,765 | 705 | 537 |
| 2017 | 9 | 209,474 | 205,463 | 655 | 514 |
| 2017 | 10 | 194,417 | 171,447 | 552 | 437 |
| 2017 | 11 | 203,444 | 188,714 | 605 | 491 |
| 2017 | 12 | 228,533 | 251,659 | 714 | 594 |
| 2018 | 1 | 261,377 | 247,980 | 743 | 633 |
| 2018 | 2 | 216,825 | 204,076 | 678 | 580 |
| 2018 | 3 | 209,243 | 193,704 | 594 | 494 |
| 2018 | 4 | 185,385 | 168,512 | 552 | 439 |
| 2018 | 5 | 198,850 | 181,699 | 565 | 464 |
| 2018 | 6 | 225,097 | 202,595 | 670 | 528 |
| 2018 | 7 | 249,795 | 245,295 | 743 | 601 |
| 2018 | 8 | 255,132 | 199,175 | 693 | 530 |
| 2018 | 9 | 195,948 | 210,262 | 645 | 505 |
| 2018 | 10 | 202,139 | 159,178 | 549 | 423 |
| 2018 | 11 | 201,235 | 183,813 | 599 | 479 |
| 2018 | 12 | 223,557 | 248,365 | 699 | 586 |
| 2019 | 1 | 258,755 | 243,627 | 735 | 621 |
| 2019 | 2 | 214,573 | 200,412 | 671 | 569 |
| 2019 | 3 | 196,943 | 198,316 | 586 | 486 |
| 2019 | 4 | 192,025 | 159,186 | 546 | 433 |
| 2019 | 5 | 201,817 | 173,884 | 573 | 444 |
| **Totals** | | **16,510,552** | **15,291,697** | | |

# Appendix B-3

| ComEd Procurement Period Load Forecast (High Load) Projected Energy Usage and Average Demand For Eligible Retail Customers (Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| | | **Total Load (MWh)** | | **Load (MW)** | |
| **Year** | **Month** | **On-Peak** | **Off-Peak** | **On-Peak** | **Off-Peak** |
| 2014 | 6 | 672,100 | 611,686 | 2,000 | 1,593 |
| 2014 | 7 | 939,353 | 831,146 | 2,669 | 2,120 |
| 2014 | 8 | 1,048,272 | 968,866 | 3,120 | 2,375 |
| 2014 | 9 | 633,328 | 585,596 | 1,885 | 1,525 |
| 2014 | 10 | 628,287 | 510,790 | 1,707 | 1,358 |
| 2014 | 11 | 598,166 | 695,627 | 1,968 | 1,672 |
| 2014 | 12 | 769,372 | 733,090 | 2,186 | 1,870 |
| 2015 | 1 | 715,569 | 743,209 | 2,130 | 1,822 |
| 2015 | 2 | 656,771 | 623,258 | 2,052 | 1,771 |
| 2015 | 3 | 634,710 | 597,967 | 1,803 | 1,525 |
| 2015 | 4 | 584,042 | 511,867 | 1,659 | 1,391 |
| 2015 | 5 | 516,975 | 570,799 | 1,616 | 1,346 |
| 2015 | 6 | 941,034 | 788,979 | 2,673 | 2,144 |
| 2015 | 7 | 1,334,989 | 1,059,300 | 3,628 | 2,817 |
| 2015 | 8 | 1,422,077 | 1,308,215 | 4,232 | 3,206 |
| 2015 | 9 | 851,439 | 796,525 | 2,534 | 2,074 |
| 2015 | 10 | 795,766 | 708,175 | 2,261 | 1,807 |
| 2015 | 11 | 836,049 | 893,734 | 2,613 | 2,234 |
| 2015 | 12 | 1,025,958 | 974,428 | 2,915 | 2,486 |
| 2016 | 1 | 903,766 | 1,028,310 | 2,824 | 2,425 |
| 2016 | 2 | 917,430 | 855,207 | 2,730 | 2,376 |
| 2016 | 3 | 900,855 | 751,337 | 2,448 | 1,998 |
| 2016 | 4 | 746,755 | 709,438 | 2,222 | 1,847 |
| 2016 | 5 | 737,251 | 727,149 | 2,194 | 1,782 |
| 2016 | 6 | 1,202,922 | 974,827 | 3,417 | 2,649 |
| 2016 | 7 | 1,375,285 | 1,387,854 | 4,298 | 3,273 |
| 2016 | 8 | 1,636,816 | 1,326,333 | 4,448 | 3,527 |
| 2016 | 9 | 897,756 | 821,014 | 2,672 | 2,138 |
| 2016 | 10 | 785,902 | 771,673 | 2,339 | 1,891 |
| 2016 | 11 | 922,024 | 883,328 | 2,744 | 2,300 |
| 2016 | 12 | 1,018,219 | 1,048,231 | 3,030 | 2,569 |
| 2017 | 1 | 981,865 | 1,026,905 | 2,922 | 2,517 |
| 2017 | 2 | 901,738 | 857,948 | 2,818 | 2,437 |
| 2017 | 3 | 924,098 | 776,141 | 2,511 | 2,064 |
| 2017 | 4 | 728,763 | 757,353 | 2,277 | 1,893 |
| 2017 | 5 | 800,457 | 706,834 | 2,274 | 1,803 |

| ComEd Procurement Period Load Forecast (High Load) Projected Energy Usage and Average Demand For Eligible Retail Customers (Line Loss and DSM Adjusted) | | | | | |
|---|---|---|---|---|---|
| **Year** | **Month** | **Total Load (MWh)** | | **Load (MW)** | |
| | | **On-Peak** | **Off-Peak** | **On-Peak** | **Off-Peak** |
| 2017 | 6 | 1,243,758 | 994,165 | 3,533 | 2,702 |
| 2017 | 7 | 1,421,324 | 1,424,371 | 4,442 | 3,359 |
| 2017 | 8 | 1,678,257 | 1,372,759 | 4,560 | 3,651 |
| 2017 | 9 | 868,463 | 884,251 | 2,714 | 2,211 |
| 2017 | 10 | 843,877 | 758,855 | 2,397 | 1,936 |
| 2017 | 11 | 941,618 | 906,064 | 2,802 | 2,360 |
| 2017 | 12 | 991,696 | 1,113,365 | 3,099 | 2,626 |
| 2018 | 1 | 1,068,165 | 998,846 | 3,035 | 2,548 |
| 2018 | 2 | 936,660 | 865,198 | 2,927 | 2,458 |
| 2018 | 3 | 891,957 | 839,303 | 2,534 | 2,141 |
| 2018 | 4 | 788,696 | 740,170 | 2,347 | 1,928 |
| 2018 | 5 | 821,319 | 720,721 | 2,333 | 1,839 |
| 2018 | 6 | 1,225,749 | 1,061,995 | 3,648 | 2,766 |
| 2018 | 7 | 1,508,457 | 1,430,681 | 4,489 | 3,507 |
| 2018 | 8 | 1,728,476 | 1,409,857 | 4,697 | 3,750 |
| 2018 | 9 | 844,226 | 940,884 | 2,777 | 2,262 |
| 2018 | 10 | 906,691 | 739,554 | 2,464 | 1,967 |
| 2018 | 11 | 966,834 | 922,793 | 2,877 | 2,403 |
| 2018 | 12 | 1,015,237 | 1,138,218 | 3,173 | 2,684 |
| 2019 | 1 | 1,094,490 | 1,027,178 | 3,109 | 2,620 |
| 2019 | 2 | 967,184 | 882,779 | 3,022 | 2,508 |
| 2019 | 3 | 864,562 | 904,247 | 2,573 | 2,216 |
| 2019 | 4 | 855,984 | 723,679 | 2,432 | 1,967 |
| 2019 | 5 | 846,630 | 736,997 | 2,405 | 1,880 |
| **Totals** | | **57,306,469** | **53,460,069** | | |

## Appendix D

### ComEd RPS Contract Quantities

| Planning Year | LT Renewables (RECs) | Rate Stability (RECs) | Total (RECs) |
|---|---|---|---|
| 2014-15 | 1,261,725 | 623,577 | 1,885,302 |
| 2015-16 | 1,261,725 | 202,479 | 1,464,204 |
| 2016-17 | 1,261,725 | 299,672 | 1,561,397 |
| 2017-18 | 1,261,725 | 271,473 | 1,533,198 |
| 2018-19 | 1,261,725 | - | 1,261,725 |

### ComEd RPS Contract Quantity Costs

| Planning Year | LT Renewables ($) | Rate Stability ($) | Total* ($) |
|---|---|---|---|
| 2014-15 | 23,189,000 | 1,025,969 | 24,272,678 |
| 2015-16 | 22,613,000 | 490,678 | 23,159,931 |
| 2016-17 | 22,676,000 | 751,324 | 23,483,757 |
| 2017-18 | 23,139,000 | 581,034 | 23,776,890 |
| 2018-19 | 23,358,000 | - | 23,415,145 |

*Total Cost Includes REC retirement fees

### LT Renewables Contract Quantity Reductions

| Planning Year | Contract Quantity REC Cost* ($) | Planning Year RPS Budget ($) | LT Renewables Contract Quantity REC Cost Reduction ($) | LT Renewables Contract Quantity REC Cost ($) | LT Renewables Quantity Reduction (%) |
|---|---|---|---|---|---|
| 2014-15 | 24,272,678 | 19,716,565 | 4,556,113 | 23,189,000 | 19.6% |
| 2015-16 | 23,159,931 | 18,921,538 | 4,238,393 | 22,613,000 | 18.7% |
| 2016-17 | 23,483,757 | 18,781,575 | 4,702,182 | 22,676,000 | 20.7% |
| 2017-18 | 23,776,890 | 18,875,753 | 4,901,136 | 23,139,000 | 21.2% |
| 2018-19 | 23,415,145 | 18,980,868 | 4,434,278 | 23,358,000 | 19.0% |

*Total Cost Includes REC retirement fees

# Appendix E

| Community | Contract Expiration | Estimated RES Customers [1] | Continuing Muni Agg Program |
|---|---|---|---|
| Glenview | May-2013 | 14,342 | Yes |
| Addison | Jun-2013 | 10,286 | Yes |
| Franklin Park | Jun-2013 | 324 | Yes |
| River Forest | Jun-2013 | 3,667 | Yes |
| Seneca | Jun-2013 | 774 | Yes |
| Evanston | Jul-2013 | 24,768 | Yes |
| Gurnee | Jul-2013 | 10,568 | Yes |
| Morton Grove | Jul-2013 | 7,989 | Yes |
| North Barrington | Jul-2013 | 967 | Yes |
| Arlington Heights | Aug-2013 | 29,564 | Yes |
| Buffalo Grove | Aug-2013 | 14,221 | Yes |
| Hanover Park | Aug-2013 | 8,701 | Yes |
| Hickory Hills | Aug-2013 | 3,516 | Yes |
| Kankakee | Aug-2013 | 6,787 | Yes |
| Lincolnshire | Aug-2013 | 2,134 | Yes |
| Long Grove | Aug-2013 | 2,149 | Yes |
| Palatine | Aug-2013 | 26,648 | Yes |
| Palos Park | Aug-2013 | 1,662 | Yes |
| Round Lake Beach | Aug-2013 | 6,695 | Yes |
| Vernon Hills | Aug-2013 | 8,717 | Yes |
| Wheeling | Aug-2013 | 13,467 | Yes |
| Bannockburn | Sep-2013 | 306 | Yes |
| Crest Hill | Sep-2013 | 6,232 | Unlikely |
| Fox River Grove | Sep-2013 | 1,706 | No |
| Glenwood | Sep-2013 | 2,608 | |
| Harvard | Sep-2013 | 2,514 | Likely |
| Highwood | Sep-2013 | 1,668 | |
| Kildeer | Sep-2013 | 1,085 | Yes |
| Lake Villa | Sep-2013 | 2,656 | Yes |
| Lindenhurst | Sep-2013 | 4,125 | |
| Morris | Sep-2013 | 4,162 | |
| New Lenox | Sep-2013 | 7,919 | Unlikely |
| Sugar Grove | Sep-2013 | 2,970 | |
| North Aurora | Oct-2013 | 5,395 | Yes |
| Oak Brook | Dec-2013 | 3,340 | |
| Oak Park | Dec-2013 | 25,543 | Yes |
| **Total** | | **270,175** | |

| | |
|---|---|
| Customers in Communities Continuing Their Muni Agg Program in 2013: | 235,445 |
| Percent Continuing of Total | **87%** |

1. Number of accounts sent through Muni Agg Programs