

GEOFF BROWN & ASSOCIATES LTD

**PERFORMANCE BASED RATE SETTING
REVIEW OF FORECAST CAPITAL EXPENDITURE FOR THE SECOND
REGULATORY PERIOD**

**LA UNION ELECTRIC COMPANY, INC.
(LUECO)**

Prepared for
ENERGY REGULATORY COMMISSION

FINAL
November 26, 2009

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EXECUTIVE SUMMARY

TOTAL CAPEX

A comparison of our recommended total CAPEX with LUECO's forecasts for the period January 2009 to June 2014 is shown in the table below.

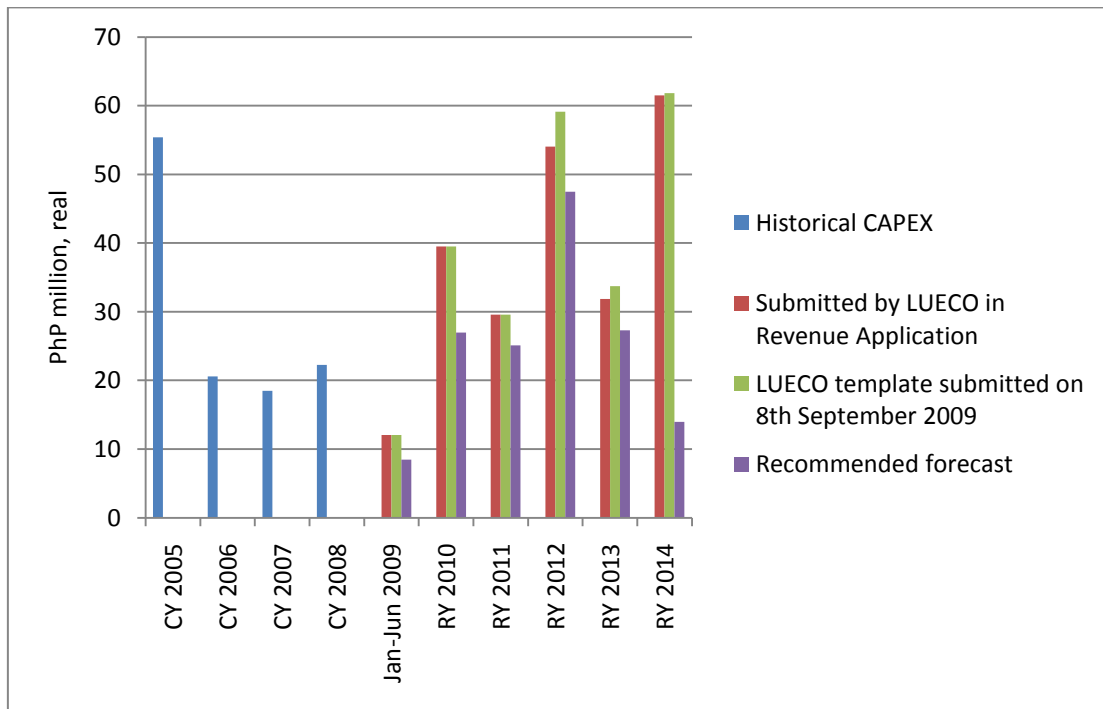
Comparison of Recommended Total CAPEX with LUECO's Forecasts (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014	Total (RY 2011-14)
Submitted by LUECO in revenue application	12.05	39.5	29.58	54.05	31.86	61.48	176.97
LUECO template submitted on 8 th September 2009	12.05	39.5	29.58	59.12	33.73	61.83	184.26
Recommended forecast	8.46	26.97	25.11	47.48	27.28	13.96	113.83
Adjustment ¹	(3.59)	(12.53)	(4.47)	(6.57)	(4.58)	(47.52)	(63.14)
Impact of adjustment compared to revenue application	(30%)	(32%)	(15%)	(12%)	(14%)	(77%)	(36%)

Note 1: Adjustment shown is to revenue application forecast

A comparison of our recommended and LUECO's forecast CAPEX with LUECO's actual CAPEX over the historical period CY 2005-08 is shown in the figure below.

Comparison of Recommended and Historical Total CAPEX with LUECO's Forecasts



MAJOR PROJECTS

A comparison of our recommended total major project CAPEX with LUECO's template and major project information summary forecasts for the period January 2009 to June 2014 is shown in the table below.

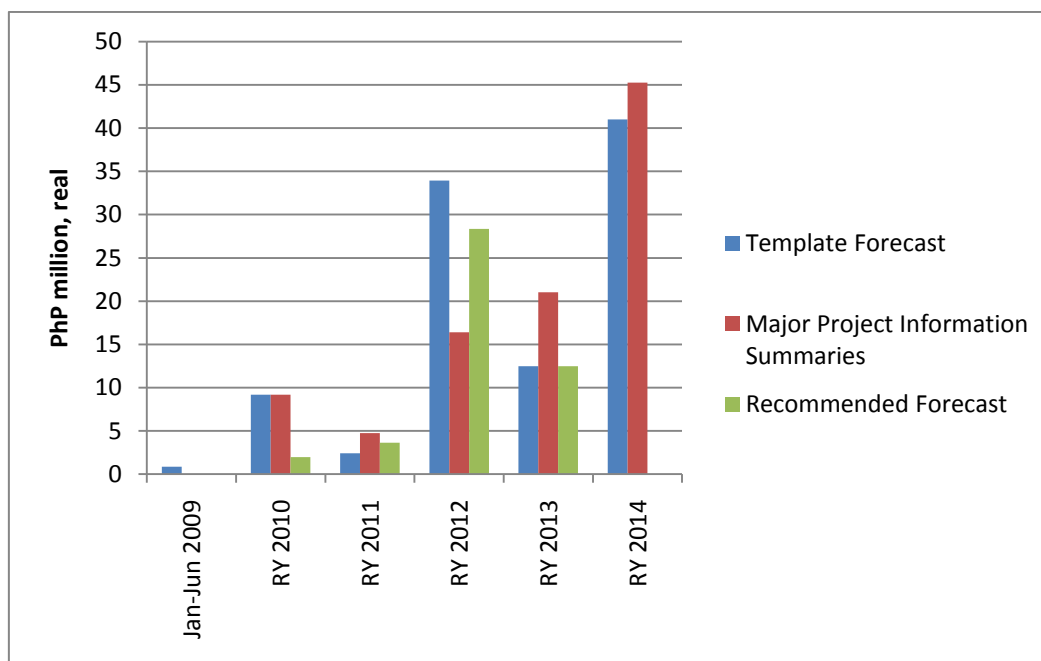
Comparison of our Recommended Major Project CAPEX with LUECO's Forecast (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014	Total (RY 2011-14)
Template Forecast	0.86	9.18	2.43	33.93	12.48	40.98	89.82
Project Information Summaries		9.18	4.75	16.4	21.03	45.26	87.44
Recommended Forecast		1.98	3.65	28.34	12.48		44.47
Adjustment ¹	(0.86)	(7.20)	1.22	(5.59)		(40.98)	(45.35)
Impact of Adjustment	(100%)	(78%)	(50%)	(16%)		(100%)	(50%)

Note 1: Adjustment is to template forecast

A comparison of our recommended major project CAPEX with LUECO's forecasts is shown in the figure below.

Comparison of Recommended Major Project CAPEX with LUECO's Forecast



We made an initial reconciliation adjustment to LUECO's forecast major project CAPEX in its CAPEX template since the forecast expenditure in the template did not reconcile with the costs in the major project justifications provided. We then recommended additional adjustments to the costs in the major project sheets submitted.

The adjustments to the individual projects are itemized below.

- We recommend that the CAPEX for the upgrade of Bauang substation be reduced by PhP7.00 Million and that the timing of all expenditure be adjusted to RY 2012. The reduction in CAPEX reflects advice we received from Asian Appraisal that the forecast cost was high for the proposed project scope and the change in timing is consistent with ERC policy that CAPEX be recognized only when assets are commissioned. We appreciate that upgrade projects such as this are difficult to properly scope in advance and that there is consequently some uncertainty surrounding cost estimates. However the CAPEX provided should be sufficient to replace the existing transformer, which we consider the most urgent requirement. If necessary, some of the other proposed upgrade work could be deferred to the third regulatory period.
- We recommend that some (but not all) of the distribution line conductor upgrades not proceed as our analysis indicated that the existing conductors have sufficient capacity to carry the expected peak loads under contingency operating conditions. We have left sufficient funding

in our recommended CAPEX for the replacement of structures on all lines LUECO proposed for upgrade.

These reductions do not impact LUECO's proposal to upgrade its 4.16 kV network to 13.2 kV or the upgrade of the Central Bank line, which will increase the load transfer capacity between the Bauang and Poro substations.

- We recommend that the proposed new 20 MVA substation be deleted from the forecast. LUECO has not finalized the site for this substation, although a site along the Diversion Rd close to the new mall is proposed. While this site is away from the existing 69 kV line route, no provision was made in the CAPEX forecast for a line extension to provide supply. Further, our analysis indicates that, with an increased capacity to transfer load between Bauang and Poro substations and the increase in transformer capacity at Bauang, there will be sufficient power transformer capacity to provide 'n-1' security through to the end of the second regulatory period. We also consider that, when additional transformer capacity is required, increasing the transformer capacity at Poro could be more cost effective than establishing a new substation on a green field site.

RESIDUAL RENEWAL CAPEX

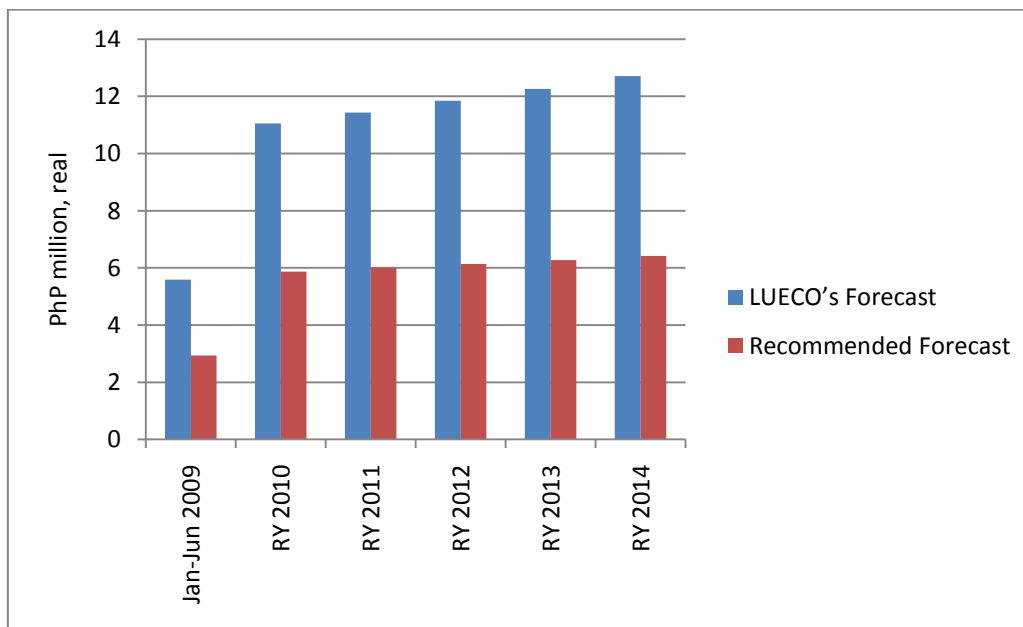
A comparison of our recommended residual renewal CAPEX with LUECO's forecast for the period January 2009 to June 2014 is shown in the table below.

Comparison of Recommended Residual Renewal CAPEX with LUECO's Forecast (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014	Total (RY 2011-14)
LUECO's Forecast	5.59	11.05	11.43	11.84	12.26	12.71	48.24
Recommended Forecast	2.93	5.87	6.00	6.14	6.27	6.42	24.83
Adjustment	(2.66)	(5.18)	(5.43)	(5.70)	(5.99)	(6.29)	(23.41)
Impact of Adjustment	(48%)	(47%)	(48%)	(48%)	(49%)	(49%)	(49%)

A comparison of our recommended residual renewal CAPEX with LUECO's forecast is shown in the figure below.

Comparison of Recommended Residual Renewal CAPEX with LUECO's Forecast



LUECO's residual renewal CAPEX forecast includes PhP32.79 Million for expenditure on the line item *materials and supplies including spares*. As recognized by LUECO at the clarificatory meeting, there

was a mistake in the template in that the forecast CAPEX for this line item reflected the total value of the inventory. Given that equipment and materials in store would be charged to CAPEX and OPEX accounts as materials are taken out of store, the forecast expenditure for this line item should only reflect the expected change in inventory between the beginning and end of each regulatory year.

At the clarificatory meeting LUECO indicated that it assumed a 5% increase yearly on the inventory level. Hence we reduced this line item to a level that reflects this change rather than the total inventory level.

RESIDUAL GROWTH CAPEX

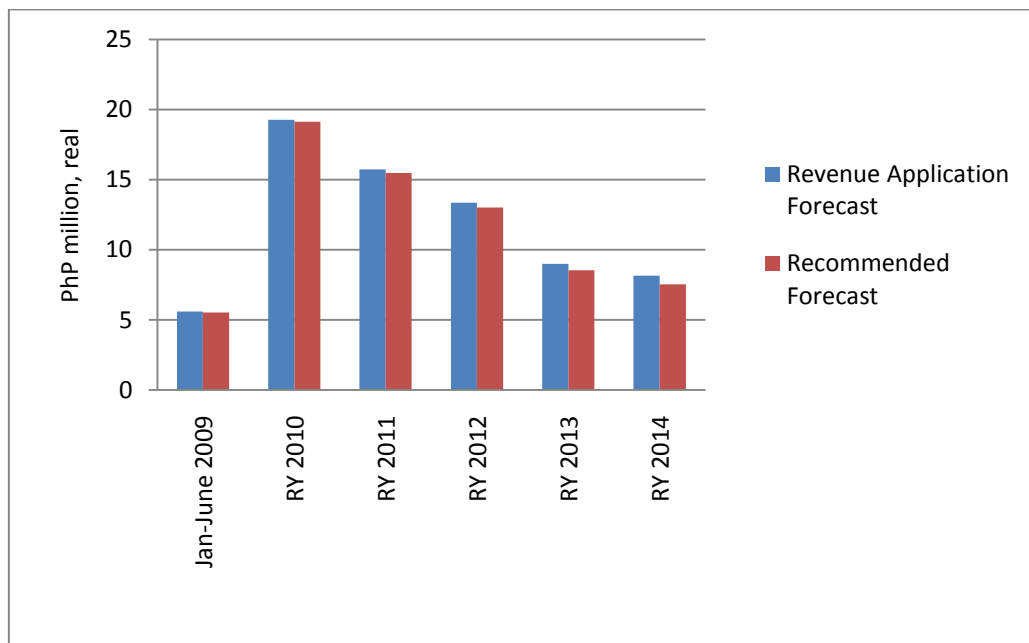
A comparison of our recommended residual growth CAPEX with LUECO's forecast for the period January 2009 to June 2014 is shown in the table below.

Comparison of Recommended Residual Growth CAPEX with LUECO's Forecast (PhP Million, real)

	Jan-June 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014	Total (RY 2011-14)
LUECO's Forecast	5.60	19.27	15.72	13.35	8.99	8.14	46.20
Recommended	5.53	19.12	15.46	13.00	8.54	7.54	44.54
Adjustment	(0.07)	(0.15)	(0.26)	(0.35)	(0.45)	(0.60)	(1.66)
Impact of Adjustment	(1%)	(1%)	(2%)	(3%)	(5%)	(7%)	(4%)

A comparison of our recommended residual renewal CAPEX with LUECO's forecast is shown in the figure below.

Comparison of Recommended and Residual Growth CAPEX with LUECO's Forecast



LUECO's revised forecast includes PhP18.15 Million for growth and renewal related expenditure on distribution transformers. We recommend this growth related expenditure component be reduced by 25%, consistent with our view that LEUCO's forecast demand at the end of the second regulatory period is high.

LUECO's forecast CAPEX on the line item *meters, instruments and metering transformers* was over 30% higher in RY 2014 than in RY 2010, expressed in real peso. As we could not see a reason for this, we recommend the forecast be reduced to reflect the level of expenditure in RY 2010 over the remainder of the forecast period.

RESIDUAL REFURBISHMENT CAPEX

LUECO's CAPEX forecast did not include any residual refurbishment expenditure.

OTHER ISSUES

LUECO owns a 4.3 km length of 115 kV line between a point adjacent to Poro substation and the customer owned Voice of America substation. While we believe that LUECO is the energy supplier, the substation is treated as directly connected to the NGCP network for transmission charging purposes. As we understand it, the effect of this arrangement is that LUECO receives no transmission revenue from the ownership of this line, although it must maintain the asset.

We further note that the NGCP-owned section of this line runs between the NGCP Bauang grid connection point and LUECO's Poro substation. If this line were operated at 69 kV, it could be diverted into the Poro substation for a relatively small cost. This would reduce LUECO's technical sub-transmission losses by 50% and provide 'n-1' security on the sub-transmission network. We understand that contractual arrangements between VoA and NGCP are preventing this.

1. INTRODUCTION

The Energy Regulatory Commission (ERC) is currently implementing a performance-based form of regulation (PBR) for investor owned electricity distribution utilities in the Philippines. Under the PBR framework a distribution utility will be subject to a cap on the average price that it may charge for the delivery of distribution wheeling services. This price cap is reset in advance of each four year regulatory period using the building block approach described in the Rules for Setting the Distribution Wheeling Rate (RDWR), which was released by the ERC on December 8 2008¹. It takes the form of a price path that specifies the maximum average price (MAP) that a regulated utility may charge in each year of the regulatory period.

The entry of distribution utilities into the PBR process has been staggered into four (4) entry points and the reset process for the setting of the price cap for the six (6) utilities entering the PBR at the third entry point is currently underway. This process will result in the setting of the price path for each utility for a regulatory period that commences on July 1 2010 and terminates on June 30 2014. This regulatory period is specified in the RDWR as the second regulatory period².

The ERC has published a Position Paper, also dated December 8 2008, which sets out in detail how the price reset process for the six third entry point utilities will be undertaken³.

An important requirement of this reset process is the review of the capital expenditure (CAPEX) forecasts submitted by the IOUs in the revenue applications that have been submitted in accordance with the requirements of the RDWR and the Position Paper. CAPEX over the second regulatory period will impact the size of the regulatory asset base (RAB), which will in turn impact both the return on capital (profit) and return of capital (depreciation). Profit and depreciation form two of the building blocks in the price setting process specified in the RDWR.

Geoff Brown & Associates Ltd (GBA) has been engaged by the ERC to review the capital expenditure forecasts of the utilities that will enter PBR at the third entry point. These are:

- Cabanatuan Electric Corporation (CELCOR);
- Davao Light and Power Company, Inc. (DLPC);
- Ibaan Electric and Engineering Corporation (IEEC);
- La Union Electric Company, Inc. (LUECO);
- Tarlac Electric Incorporated (TEI); and
- Visayan Electric Company (VECO).

In accordance with clause 4.12.4 of the RDWR the objective of the review is to determine whether each CAPEX forecast is:

- based upon the best available prices obtainable from international markets;
- reasonably efficient from a design and implementation point of view;

¹ Rules for Setting Distribution Wheeling Rates for Privately Owned Distribution Utilities Entering Performance Based Regulation (Third Entry Point), Energy Regulatory Commission, December 8 2008.

² No first regulatory period applied to the six utilities entering PBR at the third entry point.

³ Regulatory Reset for the July 2010 to June 2014 Regulatory Period for Privately Owned Distribution Utilities subject to Performance Based Regulation, Position Paper, Energy Regulatory Commission, 8 December 2008.

- likely to support the forecast growth in connections, co-incident peak demand and energy delivered; and
- is sufficient to allow the relevant utility to achieve or exceed the applicable target levels of performance.

This report presents GBA's review of the CAPEX forecast of LUECO. The forecast was submitted to the ERC as part of LUECO's revenue and performance incentive scheme application (revenue application), on June 19, 2009.

In undertaking this review we have relied on the accuracy of the information provided to the ERC by LUECO. During the clarificatory meeting process, we queried information that appeared to be incomplete, inconsistent or inaccurate. However, we did not undertake an audit or attempt to verify the information on which we relied. We therefore cannot be held responsible for any conclusions or recommendations based on misleading or inaccurate information provided to us.

2. NETWORK OVERVIEW

2.1 NETWORK DESCRIPTION

LUECO takes its supply at 69 kV from the National Grid Corporation of the Philippines (NGCP) substation at Bauang, located south of San Fernando city. This substation supplies two lines, one rated at 69 kV and another at 115 kV from a single 50 MVA 230/115/69/13.2 kV transformer. The 69 kV line supplies two LUECO-owned zone substations with a total available power transformer capacity of 41.5 MVA. The 115 kV line supplies a Voice of America (VoA)-owned 115/4.16 kV substation with a power transformer capacity of 5 MVA.

One of LUECO's zone substations is located at Bauang and has a 7.5 MVA transformer, which is currently derated to 4 MVA because of the condition of the unit. The other substation, which has 37.5 MVA transformer capacity, is located at Poro. In addition, the Poro substation has a spare 5 MVA transformer which can be used in emergency. These power transformers convert electricity from 69 kV to 13.2 kV or 4.16 kV and supply a distribution network that is used to distribute electricity to approximately 1,550 distribution transformers located throughout its 118.45 km² franchise area. The distribution transformers are used to convert the electricity to a low voltage that is used to supply the majority of LUECO's 35,300 customers.

While the above accurately describes the essence of the LUECO's network the following features are of note.

- The 69 kV sub-transmission line is currently owned by NGCP. LUECO signed a contract in October 2008⁴ to purchase the line from NGCP⁵ and this transaction is currently awaiting ERC approval.
- The section of the radial 115 kV sub-transmission line between Bauang and a point close to the Poro substation is owned by NGCP. The remainder of the line is owned by LUECO. The feeder runs along the same route as the 69 kV line between the NGCP grid connection and the Poro substation.
- The sub-transmission network does not have any 'n-1' capability. In the event of loss of either of the 69 kV or 115 kV lines, the connected customers will lose supply. There is no alternative means of providing supply to the disconnected customers.
- There is a revenue meter located at NGCP's Bauang substation to meter the energy delivered through the 69 kV line. Energy delivered through the 115 kV line is metered at the remote end of the line.
- The 115 kV line was originally constructed to provide enhanced security of supply to the VoA and the US Defense Force⁶. The line still supplies the VoA and the defense base, which is now owned by the Philippines Air Force. We understand that the line now also supplies the Thunderbird Casino. The maximum demand on this line in 2008 was 1.95 MW. Since the VoA owns the 115/4.16 kV substation and its associated 4.16 kV distribution network, LUECO's only interest in this feeder (insofar as it relates to the provision of electricity distribution services) is as the owner of a portion of the 115 kV line.
- LUECO's Bauang substation is located close to the NGCP substation in a semi-rural area to the south of the city, whereas the Poro substation is located within

⁴ Contract To Sell between TRANSCO and LUECO, 27th October 2008

⁵ NGCP is the National Transmission Corporation (TRANSCO)

⁶ SKM's Asset Valuation Report for LUECO, 24 April 2009

the San Fernando urban area. The length of the 69 kV line supplying Poro is 6 km.

- LUECO has 16 customers connected at 13.2 kV and four of them own their own supply transformer.
- LUECO's maximum demand in 2008 on the 69 kV feeder was 22.3 MW.

2.2 CURRENT AND FORECAST ENERGY SALES AND DEMAND

Growth in peak demand is a key driver of capital expenditure and the forecast growth in demand therefore underpins this review. If, for example, the ERC considers that the peak demand forecast in the revenue application is high, then some of the projects forecast for commissioning towards the end of the second regulatory period will not be required until after the start of the third regulatory period. LUECO's revenue application forecast the network after diversity peak demand to grow from a peak demand of 24.3 MW in CY 2008 to 29.0 MW in CY 2014, as shown in Table 2.2. However this includes the load on both the 69 kV and 115 kV lines.

As LUECO does not own the substation and 4.16 kV distribution network supplied from the 115 kV line, the load on this line is not directly relevant to this review. For the purposes of this review we have therefore considered only the demand on the 69 kV line. We requested LUECO to disaggregate its forecast into 115 kV and 69 kV loads and the historical and forecast growth in energy and demand on the 69 kV line is shown in Table 2.1. It can be seen that the peak 69 kV demand is forecast to grow from 22.3 MW in 2008 to 26.0 MW in 2014, an annual growth rate of 2.6%.

Table 2.1: Historical and Forecast 69 kV Energy and Demand

	Actual				Forecast					
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Energy (GWh)	117.4	116.5	119.1	121.2	122.5	123.8	125.2	126.5	127.9	129.3
Demand (MW)	22.7	21.4	23.0	22.3	22.9	23.5	24.1	24.7	25.3	26.0

An analysis of Table 2.1 indicates that while energy consumption declined between 2005 and 2007, it rebounded strongly in 2007 and 2008 to the extent that the overall growth in energy input between 2005 and 2008 was 1.1%. LUECO appears to have extrapolated this growth rate through to the end of the regulatory period, since the energy input in 2014 is consistent with a growth rate of 1.1% over the period 2005-14.

In contrast to energy, LUECO's 69 kV feeder demand reduced marginally from 22.7 MW in 2005 to 22.3 MW in 2008. LUECO is forecasting this demand to increase to 26.0 MW by 2014, an annual growth rate of 2.6% over the period 2008-14. If measured over the period 2005-2014, this growth rate reduces to 1.6%.

Measured over a long period, we would not expect any difference in the growth rates between energy and demand. Any difference in long term growth rates would imply a changing load factor, which would in turn indicate a fundamental change in either the nature of the electricity load or in electricity use patterns. No evidence has been provided of any such fundamental change. It is therefore reasonable to assume that the decline in electricity demand over the period 2005-08 is a short term phenomenon that will correct itself over time. LUECO appears to have made this assumption in forecasting its 69 kV electricity demand to grow at an annual rate of 2.6% over the period 2008-14.

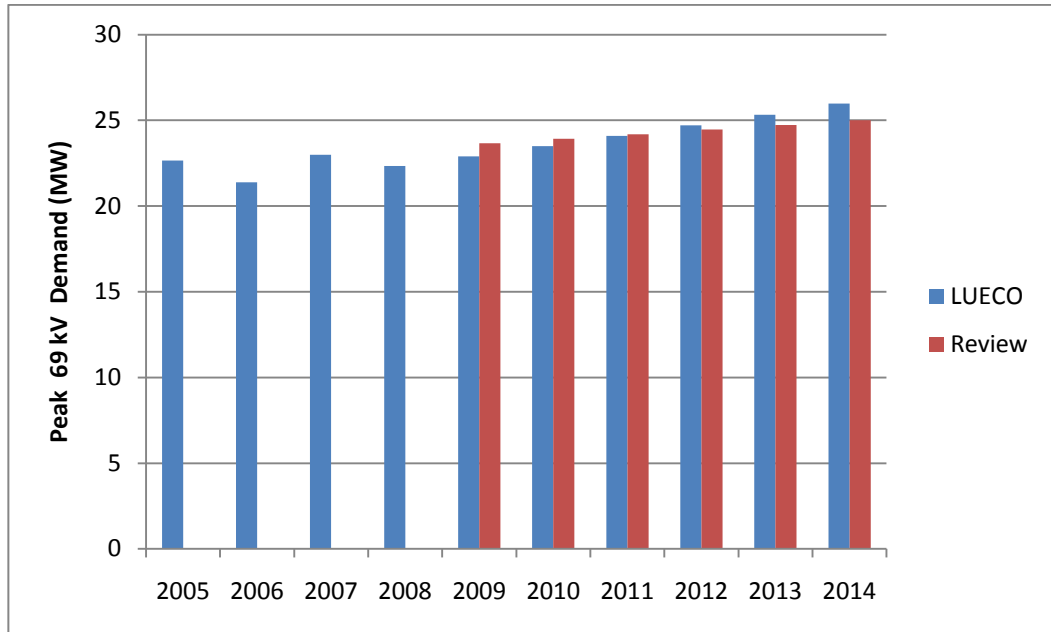
We believe this is an overcorrection. A more realistic forecasting scenario would be for the growth in electricity demand to mirror the forecast growth in energy input over the period 2005-14. Therefore, for the purposes of this review, we have reduced LUECO's forecast demand growth to a level that reflects an annual growth rate of 1.1% over the period 2005-14. This is shown in Table 2.2 and Figure 2.1.

It can be seen that the overall impact of this adjustment is to reduce the increase in demand on the 69 kV network over the six year period 2008-14 from the 3.7 MW forecast by LUECO to 2.7MW. This is an overall reduction of slightly over 25%.

Table 2.2: Comparison of LUECO and Review Forecast 69 kV Demand (MW)

	Actual				Forecast					
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
LUECO	22.7	21.4	23.0	22.3	22.9	23.5	24.1	24.7	25.3	26.0
Review					23.7	23.9	24.2	24.5	24.7	25.0

Figure 2.1: Comparison of LUECO and Review Forecast 69 kV Demand



2.3 NETWORK UTILIZATION

The extent to which the existing network is utilized is also relevant to the required capital expenditure since if the network is lightly utilized then proposed capital expenditure can be deferred until demand growth has used up existing spare capacity.

A network that is over-utilized is normally unable to provide reasonable reliability of supply. On the other hand networks that are under-utilized are economically inefficient because they include excess assets that must be paid for by customers. Hence determining the appropriate level of network utilization requires reliability to be balanced against economic efficiency. Table 5.1 of the Position Paper specifies the level of security that may be allowed for in network design and permits the 69 kV sub-transmission network and the zone substations to have a level of security of 'n-1'. We interpret this to mean that, following the loss of any one sub-transmission line or zone substation transformer at peak load, sufficient redundant capacity may be built into the network to allow supply to be restored following network reconfiguration and utilizing any embedded generation that may reasonably be expected to be available.

2.3.1 Utilization of Transformers

The 69/13.2 kV and 69/4.16 kV power transformers currently available to supply LUECO's distribution network are shown in Table 2.3.

Table 2.3: Existing Transformer Capacity

Substation	Transformers	Total Capacity (MVA)
Buang (69/13.2 kV)	1 x 7.5 MVA	4 ⁷
Poro (69/13.2 kV)	1 x 10/12.5 MVA	12.5
Poro (69/13.2 kV)	1 x 15/20 MVA	20
Poro (Spare, 69/13.2 kV)	1 x 5 MVA	-
Poro (69/4.16 kV)	1 x 5 MVA	5
Total		41.5

Source: SKM's Regulatory Asset Valuation Report for LUECO, Dated 24 April 2009.

There are no loads directly connected at 69 kV. Based on our analysis of Section 2.2, the maximum 69 kV load in RY 2014 will be 25 MW (or 26.3 MVA assuming a power factor of 0.95). We also understand that by 2014 LUECO proposes to upgrade its 4.16 kV network to 13.2 kV. Assuming that the existing spare 69/13.2 kV transformer at Poro is utilized in place of the 69/4.16 kV transformer and no additional transformer capacity was added, in the event of a failure of the largest 20 MVA transformer, there would only be 21.5 MVA of 69/13.2 kV transformer capacity available to carry the forecast 26.3 MVA of peak demand. Hence additional power transformer capacity is necessary if 'n-1' redundancy was to be achieved.

2.3.2 Utilization of the Distribution Network

The analysis of transformer utilization in Section 2.3.1 presupposes that there is some capacity in the distribution network to allow the network to be reconfigured and load to be transferred from one power transformer to another. To confirm this, we have measured the total capacity of the distribution network (at the connection point of each feeder) and compared this with the required level of load transfer.

Tables 4.16–4.18 of the SKM Asset Valuation Report indicate that there are a total of seven distribution feeders. However two of these feeders operate at 4.16 kV. The Pennsylvania line has a 336.4 MCM aluminum core steel reinforced (ACSR) backbone conductor with a power transfer capacity of 11.77 MVA. The remaining feeders use AWG #4/0 conductor with a power transfer capacity of 7.77 MVA. Hence the existing five 13.2 kV distribution feeders have an overall capacity of 42.9 MVA

Assuming that the 4.16 kV load was transferred to the existing five 13.2 kV distribution feeders, the distribution network utilization in 2014 (assuming a peak demand of 25 MVA) would be 58%. This is consistent with distribution network loadings often found internationally.

⁷ Due to past failures the maximum permissible transformer loading is 4 MVA.

3. OVERVIEW OF HISTORICAL AND FORECAST EXPENDITURE

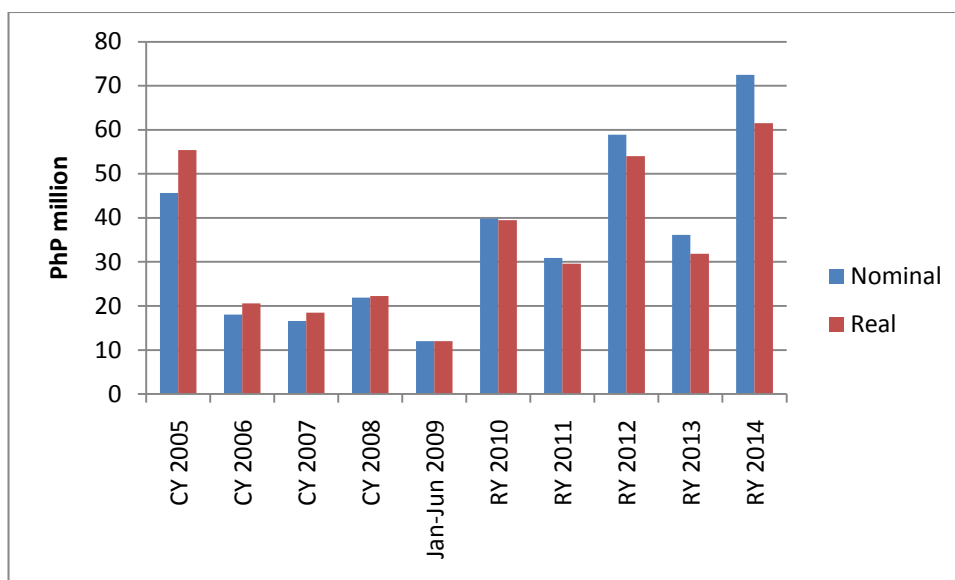
LUECO's historical and forecast total capital expenditure (CAPEX), as presented in its revenue application, is shown in Table 3.1 below.

Table 3.1: Total Historical and Forecast CAPEX (PhP Million)

	Historical (Calendar Year)					Forecast (Regulatory Year)				
	2005	2006	2007	2008	Jan-Jun 2009	2010	2011	2012	2013	2014
PhP nominal	45.69	18.03	16.62	21.93	12.05	39.87	30.93	58.90	36.11	72.46
PhP real	55.38	20.60	18.48	22.28	12.05	39.50	29.58	54.05	31.86	61.48

This historical and forecast CAPEX is also shown graphically in Figure 3.1 below.

Figure 3.1: Total Historical and Forecast CAPEX



An examination of the information above indicates that the base year for conversion from real to nominal is CY 2009. In this year real and nominal CAPEX are identical. For prior years nominal CAPEX is less than the same expenditure expressed in real terms while in subsequent years it is vice versa. This is to be expected in situations where the real value of the PhP depreciates over time. In this report all expenditures are expressed as PhP real, unless otherwise stated in order to remove the impact of this depreciation on our analysis.

For LUECO and all third entry point utilities the regulatory year starts on 1 July and finishes on 30 June. RY 2010 denotes the regulatory year ending 30 June 2010. Hence there is a six (6) month overlap between CY 2009 and RY 2010 and expenditure budgeted to occur during this overlap period (1 July 2009 – 31 December 2009) is shown twice in the revenue application. This is a consequence of the ERC's transition from calendar years to regulatory years for forecasting and rate setting purposes. However in Table 3.1 and Figure 3.1 we have not shown the expenditure in the revenue application for the full year CY 2009 and so this duplication has been removed.

It can also be seen that, in real terms, budgeted and forecast CAPEX is highest in CY 2005, RY 2010, RY 2012 and RY 2014. This high capital expenditure is due to the number of projects either commissioned or being proposed for commissioning in these years. In RY 2010 LUECO is proposing to replace the 7.5 MVA 69/13.2 kV transformer at the Bauang substation. In RY 2012 it is proposing to do improvements to the Bauang

substation and replace poles and upgrade conductor for the Pennsylvania line. In RY 2014 LUECO is proposing to install a new 20 MVA 69/13.2 kV transformer within the San Fernando City area.

While LUECO included CAPEX schedules in its revenue application, it did not provide a template that disaggregated this expenditure into the ERC's standard expenditure categories. We therefore asked LUECO to provide this template but noted discrepancies between the total forecast CAPEX in the template supplied and the forecast in the revenue application. These differences are shown in Table 3.2. The template forecast is PhP7.29 Million higher than the revenue application forecast over the forecast period.

Table 3.2: Comparison of Revenue Application and Template Forecasts (PhP Million, real)

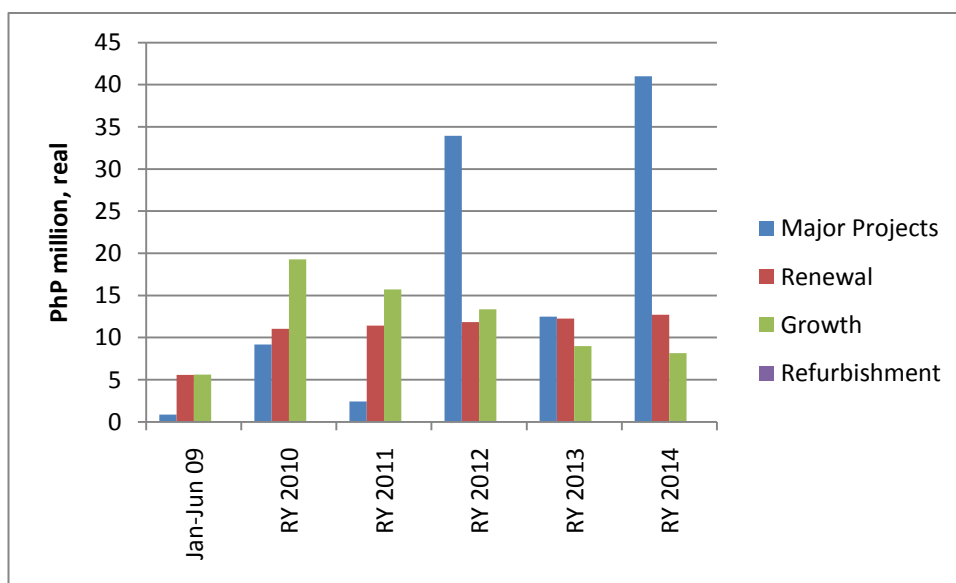
	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application	12.05	39.50	29.58	54.05	31.86	61.48
Template	12.05	39.50	29.58	59.12	33.73	61.83
Difference	-	-	-	5.07	1.87	0.35

The breakdown of the template historical and forecast expenditure into ERC's standard expenditure categories is shown below in Table 3.3 and Figure 3.2.

Table 3.3: Breakdown of Forecast Expenditure (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Major Projects	0.86	9.18	2.43	33.93	12.48	40.99
Renewal	5.59	11.05	11.43	11.84	12.26	12.71
Growth	5.60	19.27	15.72	13.35	8.99	8.14
Refurbishment	-	-	-	-	-	-

Figure 3.2: Breakdown of Forecast Expenditure



In the template forecast, major projects form a high proportion of the total CAPEX, but the residual growth expenditure is still very significant. LUECO was unable to provide a breakdown of historical CAPEX and therefore a direct comparison between historical residual expenditure and forecast expenditure is not possible.

4. MAJOR PROJECT EXPENDITURE

4.1 INTRODUCTION

We were unable to fully reconcile the major CAPEX template with the costs in the individual project sheets provided to support this expenditure. In order to reconcile the template with our review we have made an initial reconciliation adjustment as shown in Table 4.1.

Table 4.1: Reconciliation Adjustment (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Major Project Template	0.86	9.18	2.43	33.93	12.48	40.98
Project Sheets						
Buang Substation Upgrade		7.20		8.56	8.56	4.28
Pennsylvania Line Upgrade					3.66	
Upgrade to 13.8 kV		1.12	1.54	2.12	8.06	
CBL Line Upgrade				2.40		
Monumento - Pagdalagan Bridge			2.51			
SJL Main Backbone		0.86	0.70	0.92	0.75	
New 20 MVA substation						40.98
Pagdalagan - Lussoc Bridge				2.40		
Total		9.18	4.75	16.40	21.03	45.26
Reconciliation adjustment	(0.86)	-	2.32	(17.53)	8.55	4.28

It can be seen from Table 4.1 that LUECO's total forecast major project expenditure, as presented in the project sheets, over the period RY 2010-14 is PhP96.62 Million. Of this, PhP40.98 Million (42%) is for the new 20 MVA substation. A further PhP28.60 Million is for the refurbishment of Bauang substation while the balance is for upgrading the distribution network, including the upgrade of the legacy 4.16 kV distribution network to 13.2 kV and increasing the conductor size of much of the backbone network to 336.4 MCM ACSR.

The load on LUECO's network is concentrated in San Fernando city, which is served from the Poro substation. The Bauang substation is located close to the NGCP supply point, which is situated in a relatively lightly loaded rural location about 6 km south of the city. However, the transformer at Bauang is derated because of its poor condition and this transformer needs to be replaced to reduce the risk of a complete failure.

A problem for LUECO is that there is currently insufficient transformer capacity to cover for the loss of the largest 20 MVA transformer at Poro. As shown in Table 2.3 above, in the event of a loss of the 20 MVA transformer, there would be no more than 21.5 MVA of power transformer capacity to serve a potential load of 26.3 MVA. LUECO proposes to address this deficiency by constructing a new 20 MVA substation. However, it advised at the clarificatory meeting that it had still to identify a suitable site and, in fact, was still discussing the appropriate location. A location adjacent to the recently opened new mall was one possibility and Schedule C1.4 of the revenue application indicated that the new substation would be built on the Diversion Road. However we understand that this potential site is away from the existing 66 kV line route and no provision has been made in the CAPEX forecast for a 66 kV line extension. This means that, if a new substation is to be built before the end of the second regulatory period it would need to be built along the route of the existing 66 kV line. LUECO has provided no evidence that a suitable site is available along the route of the line nor has it provided substantive evidence that this would be the most appropriate location for a new substation in the longer term. Because of the concentrated load, any new substation along this route would need to be located

very close to Poro substation, raising the question of whether a new substation on a new site is actually required.

We are also concerned about the proposed size of the new substation – an additional 20 MVA transformer would provide a total of over 60 MVA of transformer capacity to supply only 26.3 MVA of load, without allowing for any increase in the transformer capacity currently available at Bauang. We are therefore reluctant to recommend funding be provided for the new substation given that, on the information available to us, not only is the size of the substation excessive, but also LUECO may not be in a position to commission it by the end of the second regulatory period.

An alternative approach would be for LUECO to relocate the 12.5 MVA transformer currently at Poro to Bauang and to install a second 20 MVA transformer at Poro. In the longer term it could seek to purchase the VoA substation, upgrade it to 13.2 kV and use it as the third point of injection into the distribution network. Under this scenario, Poro would remain the main injection point but the San Fernando city load would be supported by the Bauang and VoA substations located at either end of a relatively strong 13.2 kV distribution network.

We also note that LUECO's line losses are almost 10.5%, which is high for an investor owned utility and approximately 2% above the current loss cap. LUECO's program of upgrading the distribution network, and in particular the legacy 4.16 kV system, should assist reducing these losses and should also improve the overall reliability of the network. We therefore think this program should take priority over the construction of a new substation. While our analysis indicates that some of the conductor upgrades proposed are necessary even to cater for 'n-1' contingencies, our recommended CAPEX provides for a stronger 13.2 kV interconnection between Poro and Bauang substations to allow these substations to support one another to a greater degree than at present. We note that the cost of conductor upgrades is small when compared to the forecast cost of a new green field substation.

For the purposes of this review we have therefore allowed most of the requested CAPEX, although we have recommended the proposed new 20 MVA substation not proceed before the end of the second regulatory period. We do suggest, however, that LUECO treat the recommended expenditure as a budget level, and review its development program to ensure that the expenditure is utilized in a manner consistent with a least cost long term network development strategy.

4.2 IMPROVEMENT OF BAUANG SUBSTATION (2010, 2014)

This project involves the replacement of wooden pole structures, upgrading of Bauang substation protection equipment and replacement of the transformer rated at 7.5 MVA 69/13.2 kV with a new 10 MVA 69/13.2 kV unit. In its major project information summary, LUECO estimated a cost of PhP28.60 Million and with commissioning occurring progressively between RY 2010 and RY 2014.

Bauang substation was loaded to 4.5 MVA at 0.95 power factor in CY 2008 and based on our demand forecast the load will reach about 5 MVA at the end of second regulatory period. Unfortunately, the existing 7.5 MVA transformer cannot now be loaded to more than 4 MVA⁸ because it has failed the dissolved gas analysis test. Based on the insulation oil test records for the transformer, we agree that the 7.5 MVA transformer has a high risk of failure, even at its derated capacity, and should therefore be repaired or replaced. LUECO is proposing to replace this transformer with a 10 MVA transformer.

LUECO also proposes to replace wooden structures and upgrade the protection for better reliability and safety since the substation was commissioned in 1988. However, Asian Appraisals has reviewed the estimated project cost and advised that it is approximately PhP7.00 Million higher than it would expect for the work proposed.

⁸ SKM's Asset Valuation Report for LUECO, April 2009

We note that a 10 MVA transformer is larger than necessary to supply the potential load in the area supplied by Bauang. However we have not recommended reducing the transformer size as, with a strong distribution network, the larger transformer could, if necessary, be used to supply some of the load currently supplied by Poro. If a 10 MVA transformer is installed the total usable power transformer capacity on the network would increase from 41.5 MVA to 47.5 MVA. This would give sufficient transformer capacity to provide n-1 redundancy for the expected load in 2014, provided the full capacity of the new transformer could be utilized, and could therefore defer the need for the new 20 MVA substation or additional transformer capacity at Poro.

We recommend the CAPEX provision for the Bauang substation upgrade be reduced by PhP7.00 Million to P21.60 Million to reflect the cost that Asian Appraisal considered reasonable for the work proposed. We appreciate that upgrade projects such as this are difficult to properly scope in advance and that there is consequently some uncertainty surrounding cost estimates. However our recommended CAPEX should provide sufficient funding to replace the transformer and undertake essential upgrading work. Should LUECO find the amount provided insufficient, then some planned work may need to be deferred until the after start of the third regulatory period. We have also readjusted the timing of the project to RY 2012. This adjustment gives the project some urgency and is consistent with the ERC requirement that CAPEX is included in the regulatory asset base after assets are placed in service rather than when the expenditure is incurred.

Table 4.2: Adjustments to Cost of Improvements to Bauang Substation (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast		7.20		8.56	8.56	4.28
Resubmitted CAPEX Forecast		7.20		8.56	8.56	4.28
Recommended adjustment for Improvements to Bauang Substation		(7.20)		13.04	(8.56)	(4.28)
Recommended Project CAPEX				21.60		

4.3 CONVERSION OF DISTRIBUTION NETWORK FROM 4.16 KV TO 13.2 KV

The purpose of this project is to convert the existing 4.16 kV primary lines at Poro substation and associated distribution transformers to 13.2 kV. The Poro substation 4.16 kV feeder demand is 1.74 MVA in CY 2008 and could reach 1.95 MVA in CY 2014. With this project the system losses on this part of the network will be reduced by 89%. Further, LUECO finds it difficult to maintain two voltage systems in the centre of the commercial district and Poro industrial zone of San Fernando City. With 13.2 kV feeders, the system will have higher flexibility in transferring load from other feeders.

The total estimated cost for this project is PhP12.85 Million. When this project is fully completed, the existing 5 MVA, 69/4.16 kV transformer will become redundant. However, at Poro substation there is a spare 5 MVA, 69/13.2 kV transformer available and this can be used to replace 69/4.16 kV transformer capacity. The upgraded 13.2 kV feeders will be connected to the existing 69/13.2 kV transformers at the Poro substation. The project will be commissioned in four phases RY 2010, RY 011, RY 2012 and RY 2013.

Our view is that LUECO should go ahead with this project and we recommend the full expenditure as shown in Table 4.3 be approved.

Table 4.3: Cost of Conversion of 4.16 kV to 13.2 kV (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast	-	1.12	1.54	2.12	8.06	-

4.4 CENTRAL BANK LINE UPGRADING (RY 2012)

LUECO proposes to replace old and rotten wood poles with concrete poles and reconductor the old 13.2 kV Central Bank Line (CBL) feeder from Bauang substation. The CBL has an AWG #4/0 all aluminum conductor (AAC)⁹ with a capacity of 7.8 MVA and will be upgraded to 336.4 MCM AAC conductor with a capacity of 11.8 MVA. LUECO has estimated a project cost of PhP2.40 Million in the revenue application as well as in the resubmission. The project is scheduled to be commissioned in RY 2012.

The existing CBL feeder is loaded to 0.44 MVA at 0.885 power factor in CY 2008. The loading on the CBL in RY 2014 will be 0.49 MVA and is very low. LUECO proposes that upgrading of CBL will improve looping capability of the distribution network.

Table 4.4: Adjustments to Cost of Central Bank Line Upgrading (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast				2.40		

The Central Bank line is almost 4 km in length and connects the Bauang Substation with the Diversion Rd. While the load on this line is low, the upgrade will provide a strong 13.2 kV interconnection between the Poro and Bauang substations, which will improve the ability to transfer load between the two substations should there be a power transformer failure.

We therefore recommend the forecast CAPEX be allowed in full.

4.5 UPGRADE OF MONUMENTO TO PAGDALAGAN BRIDGE 13.2 KV LINE (RY 2011)

LUECO proposes to replace wooden poles with concrete poles on the 13.2 kV line from Pagdalagan Bridge to Monumento and LUECO proposes to upgrade this line from AWG #4/0 AAC conductor with a capacity of 7.77 MVA to 336.4 MCM aluminum conductor steel reinforced (ACSR) conductor with a capacity of 11.8 MVA. As per LUECO's drawing, this line segment has a maximum loading of 1.76 MVA in CY 2008 and as per our forecast will reach 1.97 MVA in RY 2014. The estimated expenditure for this project as per the revenue application is PhP2.58 Million and LUECO plans to commission the project in RY 2011.

Our view is that the existing conductor size of AWG # 4/0 AAC is sufficient to meet the forecasted demand of RY 2014 on this particular section of the network. The existing 7.7 MVA capacity of the line segment is also sufficient for some load transfer, which will support the additional transfer capacity made available by the Central Bank line upgrade. We therefore do not consider the line conductor upgrade proposed by LUECO is necessary. However in the expenditure forecast we have allowed for cost for replacement of unsound wooden poles as this will improve reliability. This adjustment is shown below in Table 4.5.

Table 4.5: Adjustments to Revamp of Monumento to Pagdalagan Bridge (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast			2.51			
Resubmitted Application CAPEX Forecast			2.51			
Recommended adjustment			(1.10)			

⁹ SKM's Asset Valuation Report and LUECO's Main Backbone SLD-13.2 kV drawing

4.6 PENNSYLVANIA LINE MONUMENTO TO CNR QUEZON AVE & ORTEGA ST, SFC (RY 2013)

This project involves the pole replacement (wooden to concrete) and conductor upgrading (AWG #4/0 AAC to 336.4 MCM ACSR) of the 13.2 kV Pennsylvania Line from Monumento to corner Quezon Avenue and Ortega St, San Francisco City. The existing line uses AWG #4/0 AAC conductor rated for 7.77 MVA. The estimated expenditure for this project as per the revenue application is PhP3.66 Million and LUECO plans to commission the project in RY 2013. Under the worst case contingency, i.e. failure of Pennsylvania line (336.4 MCM ACSR with 5.56 MVA loading in RY 2014), the entire load of 11.35 MVA will be on the existing line from Monumento to corner Quezon Avenue.

Our view is that LUECO should be allowed to upgrade the 13.2 kV line from Monumento to corner Quezon Avenue to 336.4 MCM ACSR conductor rated for 11.7 MVA. This will prevent the overloading of the line under the worst case contingency. We recommend the full expenditure for the project be allowed and the details are shown in Table 4.6.

Table 4.6: Adjustments to CAPEX for Pennsylvania Line from Monumento to cnr Quezon Avenue (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast					3.66	

4.7 UPGRADE OF SAN JUAN LINE MAIN BACKBONE (RY 2010, RY 2011, RY 2012 & RY 2013)

This project involves pole replacement (wooden to concrete) and conductor upgrading (AWG #4/0 AAC to 336.4 MCM ACSR) of the 13.2 kV San Juan Line main backbone. The existing line is an AWG #4/0 AAC conductor rated for 7.77 MVA. The estimated expenditure for this project as per the revenue application is PhP3.23 Million and LUECO plans to commission the project in four phases over RY 2010 to RY 2014. The SJL line is the outgoing feeder of the 10 MVA, 69/13.2 kV transformer. As per SKM's Asset Valuation Report, the loading on the line for CY 2008 is 8.4 MVA and is higher than the 7.77 MVA capacity of the line. As per our analysis, the loading is forecast to increase to 9.4 MVA in RY 2014.

Our view is that LUECO should be allowed to proceed with this project, because the upgraded line with 336.4 MCM conductor will have a capacity of 11.77 MVA and the pole replacement will improve the reliability. This upgraded capacity will prevent the line from getting overloaded. The project cost and timeline is shown in Table 4.7.

Table 4.7: CAPEX for SJL Main Backbone Line (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast		0.86	0.70	0.92	0.75	

4.8 NEW 20 MVA SUBSTATION (RY 2014)

LUECO proposes to install this new substation with a 20/25 MVA, 69/13.2 kV transformer within the San Fernando City to San Juan area. The project would be commissioned in RY 2013 at a forecast cost of PhP40.98 Million. LUECO proposes this substation because it would reduce the load on both Poro substation and Bauang substations.

As discussed in Section 4.1 we agree that additional power transformer capacity can be justified but note that sufficient additional capacity to meet the immediate requirement will become available with the Bauang substation upgrade. Hence we do not consider an additional 20 MVA capacity to be required at this point. We are also unconvinced that construction of a new green field substation is consistent with a least cost long term

development strategy for the LUECO network. Finally, given that LUECO has to finalize the preferred location for the substation and then identify and purchase a specific site, it is not clear to us that it will be possible for LUECO to complete this project by RY 2014.

Notwithstanding the above, in Schedule C1.4 of the revenue application, LUECO has indicated that the substation will be located along the Diversion Rd. This will require an extension to the 69 kV network, which has not been allowed for in the forecast.

We therefore recommend that funding for this project not be included in the CAPEX forecast for the second regulatory period. Should additional planning work establish that a new green field substation is indeed required it should be programmed for the third regulatory period.

The adjustment to the CAPEX forecast to reflect this recommendation is shown in Table 4.8.

Table 4.8: Adjustments to CAPEX for New 20 MVA Substation (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast						40.98
Recommended Adjustment						(40.98)

4.9 REVAMP OF PAGDALAGAN BRIDGE TO LUSSOC BRIDGE 13.2 KV LINE (RY 2012)

LUECO's proposes to replace wooden poles with concrete poles on the 13.2 kV line from Pagdalagan Bridge to Lussoc Bridge. The existing 13.2 kV line uses AWG # 4/0 AAC conductor with a capacity of 7.77 MVA and LUECO proposes to upgrade this line to 336.4 MCM ACSR conductor with a capacity of 11.77 MVA. As per LUECO's drawing, this line segment has a maximum loading of 0.82 MVA in CY 2008 and as per our forecast the loading will reach 0.92 MVA in RY 2014. The estimated expenditure for this project as per the revenue application is PhP2.4 Million and LUECO plans to commission the project in RY 2012.

Our view is that the existing conductor size of AWG # 4/0 AAC is sufficient to meet the forecasted demand of RY 2014 on this particular section of the network. The Central Bank Line which is running parallel to the Pagdalagan Bridge to Lussoc Bridge line has a relatively low loading and we have recommended that this line is upgraded to strengthen the 13.2 kV interconnection between the Bauang and Poro substations.

We therefore recommend that the line conductor upgrade proposed by LUECO should not be allowed. However in the expenditure forecast we have allowed for cost of replacement of unsound wooden poles as this will improve reliability. This adjustment is shown below in Table 4.9.

Table 4.9: Cost to Revamp of Pagdalagan Bridge to Lussoc Bridge (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Revenue Application CAPEX Forecast				2.40		
Resubmitted CAPEX Forecast				2.40		
Recommended adjustment				(1.10)		

4.10 SUMMARY OF MAJOR PROJECT CAPEX

A breakdown of LUECO's revised forecast major project expenditure into individual projects is shown in Table 4.1. It can be seen from that table that the total expenditure in the individual project sheets was different from the forecast expenditure in the major project template and a reconciliation adjustment was therefore necessary.

Our recommended individual project adjustments are summarized in Table 4.10.

Table 4.10: Summary of Individual Adjustments (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Adjustment for improvements to Bauang substation		(7.20)		13.04	(8.56)	(4.28)
Adjustment to upgrade of 13.2 kV line from Monumento to Pagdalagan bridge			(1.10)			
Deletion of new 20 MVA substation						(40.98)
Adjustment to upgrade of 13.2 kV line from Pagdalagan bridge to Lussoc bridge				(1.10)		
Recommended adjustments		(7.20)	(1.10)	11.94	(8.56)	(45.26)

Our recommended major project CAPEX for the second regulatory period is shown in Table 4.11 and a comparison between the LUECO forecast and our recommendation is shown in Figure 4.1.

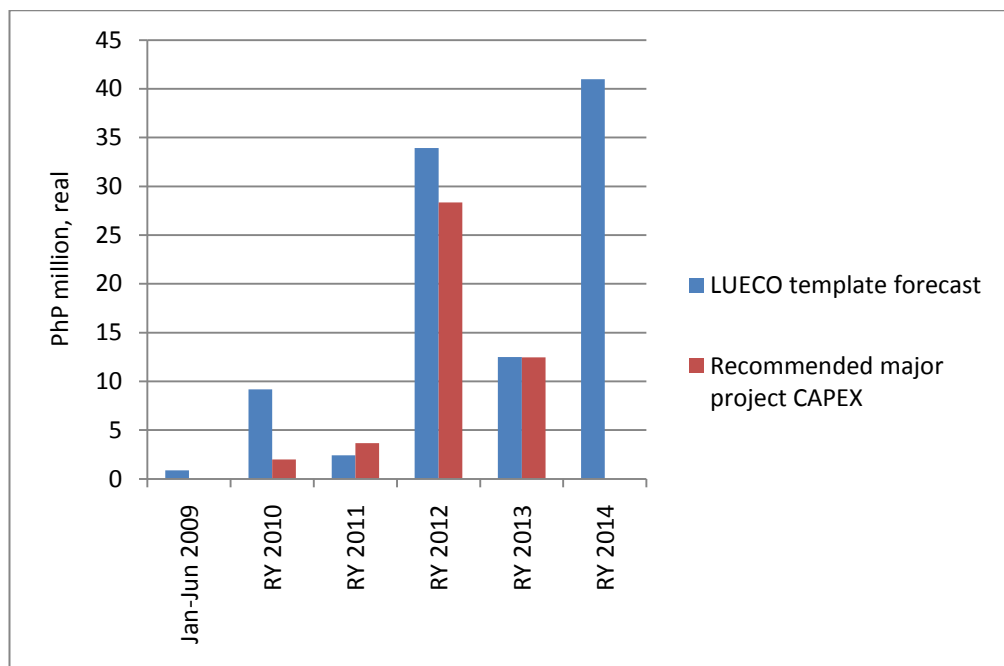
Table 4.11: Summary of Recommended Major CAPEX Expenditure (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
LUECO template forecast	0.86	9.18	2.43	33.93	12.48	40.98
Reconciliation adjustment ¹	(0.86)		2.32	(17.53)	8.55	4.28
Recommended project adjustments ²		(7.20)	(1.10)	11.94	(8.55)	(45.26)
Recommended major project CAPEX		1.98	3.65	28.34	12.48	

Note 1: See Table 4.1

Note 2: See Table 4.9

Figure 4.1: Comparison of LUECO Forecast and Recommended Major Project CAPEX



All LUECO's major project CAPEX should be categorized as growth for operating and maintenance expenditure (OPEX) forecasting purposes.

5. REVIEW OF RESIDUAL CAPITAL EXPENDITURE

An analysis of LUECO's residual capital expenditure as submitted in its revenue application showed an average annual decrease of 9% for the second regulatory period with RY 2010 as the base. LUECO was unable to provide any information on residual capital expenditure for the historical years CY 2005 to CY 2008. We have therefore focused this review on those line items in the CAPEX template where the residual forecast expenditure is substantially higher than that in other years. We think that this approach is reasonable and also fair to LUECO.

5.1 POLES, TOWERS AND FIXTURES

LUECO's CAPEX forecast includes PhP5.52 Million for growth related residual CAPEX on poles, towers and fixtures for the period RY 2010-14. This expenditure is primarily for the ad hoc replacement of rotten wooden poles for both the 69 kV and 13.8 kV lines. The forecast shown in Table 5.1 indicates that the growth related expenditure forecast is consistent throughout the second regulatory period. LUECO was unable to provide a breakdown of historical expenditure for poles, towers and fixtures and therefore historical values were not used for comparison.

Table 5.1: Residual CAPEX for Poles, Towers and Fixtures (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application	0.55	1.10	1.10	1.10	1.10	1.10
Refurbishment forecast as per revenue application						

Our view is that LUECO should be allowed the requested expenditure in full.

5.2 OVERHEAD CONDUCTORS AND DEVICES

LUECO's CAPEX forecast includes PhP12.34 Million for residual growth related CAPEX on overhead conductors and devices over the period RY 2010-14. The forecast shown in Table 5.2 indicates that the growth related expenditure forecast is higher in RY 2010, RY 2011 and RY 2012.

Table 5.2: Residual CAPEX for Overhead Conductors and Devices (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application	1.39	2.79	2.79	2.79	1.79	0.79
Refurbishment forecast as per revenue application						

LUECO was unable to provide a breakdown of historical expenditure for overhead conductors and devices. In Schedule C1.4 of the revenue application, LUECO indicated that funding of PhP2.00 Million per year (presumably over the period CY2009-RY 2012) was intended to install reclosers and sectionalizers in order to contain the effects of temporary faults to limited areas like lateral lines. This should improve the overall reliability of the network.

We recommend that LUECO be allowed full its full forecast growth related residual CAPEX for overhead conductors and devices in the forecast period.

5.3 DISTRIBUTION LINE TRANSFORMERS

LUECO's revised forecast includes PhP18.15 Million for growth and renewal related expenditure on distribution transformers. LUECO was unable to provide a breakdown of historical expenditure for distribution line transformers and therefore we have based our analysis for the expenditure shown for the period of January-June 2009. The forecast shown in Table 5.3 indicates that the renewal related expenditure forecast is consistent throughout the second regulatory period. However we have reduced the growth related expenditure component by 25%, consistent with the reduction in the demand forecast discussed in Section 2.2.

Table 5.3: Adjustments to Residual CAPEX for Distribution Line Transformers (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application	1.35	2.70	2.70	2.70	2.70	2.70
Growth forecast as per revenue application	0.30	0.60	0.60	0.60	0.60	0.60
Refurbishment forecast as per revenue application						
Recommended adjustments to growth forecast	(0.07)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)

Our view is that LUECO should be allowed the full renewal related residual expenditure for distribution line transformers.

5.4 POWER CONDITIONING EQUIPMENT

LUECO has forecast PhP6.02 Million for growth related expenditure on power conditioning equipment over the forecast period. This refers to equipment such as capacitor banks for power factor correction, and other equipment for improving power quality. LUECO was unable to provide a breakdown of historical CAPEX for this line item. The forecast shown in Table 5.4 indicates that the growth related expenditure forecast is required in RY 2011 and RY 2012.

Table 5.4: Residual CAPEX for Power Conditioning Equipments (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application			3.01	3.01		
Refurbishment forecast as per revenue application						

LUECO proposes to install capacitor banks in places where there is low voltage. We recommend that LUECO be allowed the full growth related expenditure for power conditioning equipments.

5.5 METERS, INSTRUMENTS AND METERING TRANSFORMERS (REGULATED RETAIL SERVICE ASSET)

LUECO has forecast PhP25.84 Million for growth and renewal related CAPEX on meters, instruments and metering transformers over the forecast period. It was unable to provide a breakdown of historical expenditure for this line item. However the average annual historical expenditure for this line over all ERC expenditure categories was

PhP4.82 Million compared to a forecast annual expenditure of PhP4.85 Million over the period RY 2010-14. This expenditure is towards meters, instruments and transformers required to serve new and existing customers both residential and commercial.

Given that forecast expenditure is broadly consistent with historical levels, we recommend no change be made to the renewal component of the forecast. However we cannot see any reason for annual growth related expenditure being over 30% higher in RY 2014 than in RY 2010, given that expenditure is expressed in real peso. We therefore recommend that the growth related forecast be reduced to reflect the level of expenditure in RY 2010 over the remainder of the forecast period. This adjustment is shown in Table 5.5.

Table 5.5: Adjustments to Residual CAPEX for Meters, Instruments and Metering Transformers (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application	1.46	2.92	3.03	3.15	3.27	3.40
Growth forecast as per revenue application	0.69	1.38	1.47	1.58	1.68	1.81
Refurbishment forecast as per revenue application						
Recommended adjustments to growth forecast			(0.09)	(0.20)	(0.30)	(0.45)

5.6 INFORMATION SYSTEMS EQUIPMENT (NON-NETWORK)

LUECO's revised CAPEX forecast includes PhP0.81 Million for growth related residual expenditure on non-network related information system equipment. As per the CAPEX template, LUECO's expenditure for this line item was PhP0.07 Million in January-June 2009 period and is similar for the second regulatory period. The expenditure is towards updates and annual subscription fees for engineering analysis software and billing system software.

Table 5.6: Residual CAPEX for Information System Equipment (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application	0.07	0.14	0.15	0.15	0.15	0.15
Refurbishment forecast as per revenue application						

We recommend that LUECO be allowed the full residual expenditure on non-network related information system equipment.

5.7 OFFICE FURNITURE AND EQUIPMENT (NON-NETWORK)

LUECO's CAPEX template forecasts a total of PhP1.55 Million for residual expenditure on non-network related office furniture and equipments. Our view is that the expenditure is reasonable and is consistent with the expenditure shown by LUECO in CY 2009. LUECO's growth related expenditure forecast shown in Table 5.7 indicates that the forecast values will remain constant through the second regulatory period.

Table 5.7: Residual CAPEX for Office Furniture and Equipment (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application	0.13	0.26	0.27	0.28	0.30	0.31
Refurbishment forecast as per revenue application						

We recommend that LUECO be allowed the full residual expenditure on non-network related office furniture and equipment.

5.8 TRANSPORTATION EQUIPMENT (NON-NETWORK)

LUECO's CAPEX forecast includes PhP7.00 Million for residual expenditure on non-network related transportation equipment and all this expenditure is for growth. As per the revised CAPEX template, LUECO's average historical CAPEX for this line item was PhP7.00 Million and is similar to the average forecast expenditure of PhP7.00 Million for second regulatory period. As per information provided by LUECO additional transport equipment is needed for the maintenance and repair of the 69 kV sub-transmission line to be purchased from NGCP. We recommend that LUECO be allowed to its forecast expenditure in full and details are shown in Table 5.8.

Table 5.8: Residual CAPEX for Transportation Equipment (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application	0.75	1.50	1.50	1.25	1.00	1.00
Refurbishment forecast as per revenue application						

5.9 MATERIALS AND SUPPLIES INCLUDING SPARES

LUECO's residual CAPEX forecast includes PhP32.79 Million for residual expenditure on renewal related materials and supplies including spares. The figures reflected in the templates are total inventory levels and so most of the forecast expenditure would be on-charged to other work as inventory was taken out of stores.

At the clarificatory meeting LUECO indicated that it assumed a 5% increase yearly on the inventory level. Hence we recommend that this line item be reduced to reflect the change in inventory from year to year rather than the total inventory level.

Table 5.9: Adjustments to Cost of Materials and Supplies including spares (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application	2.78	5.43	5.70	5.99	6.29	6.60
Growth forecast as per revenue application						
Refurbishment forecast as per revenue application						
Recommended expenditure	0.12	0.25	0.27	0.29	0.30	0.31
Recommended adjustment to renewal forecast	(2.66)	(5.18)	(5.43)	(5.70)	(5.99)	(6.29)

5.10 TRANSFERRED SUB-TRANSMISSION ASSETS

LUECO is proposing to purchase the 69 kV line with a length of 6.03 km from NGCP. As per the CAPEX template, LUECO's CAPEX forecast included PhP7.40 Million in RY 2010 for the transfer of this asset in RY 2010. During the clarificatory meeting LUECO provided a copy of its sale and purchase contract with NGCP which was signed on 27th October 2008. Our view is that the provisions of the Electric Power Industry Reform Act 2001 (EPIRA) entitle LUECO to purchase this line and we see no impediment to the sale. We therefore recommend that this provision be included in the forecast.

Table 5.10: CAPEX for Transferred Sub-transmission Asset (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Renewal forecast as per revenue application						
Growth forecast as per revenue application		7.40				
Refurbishment forecast as per revenue application						

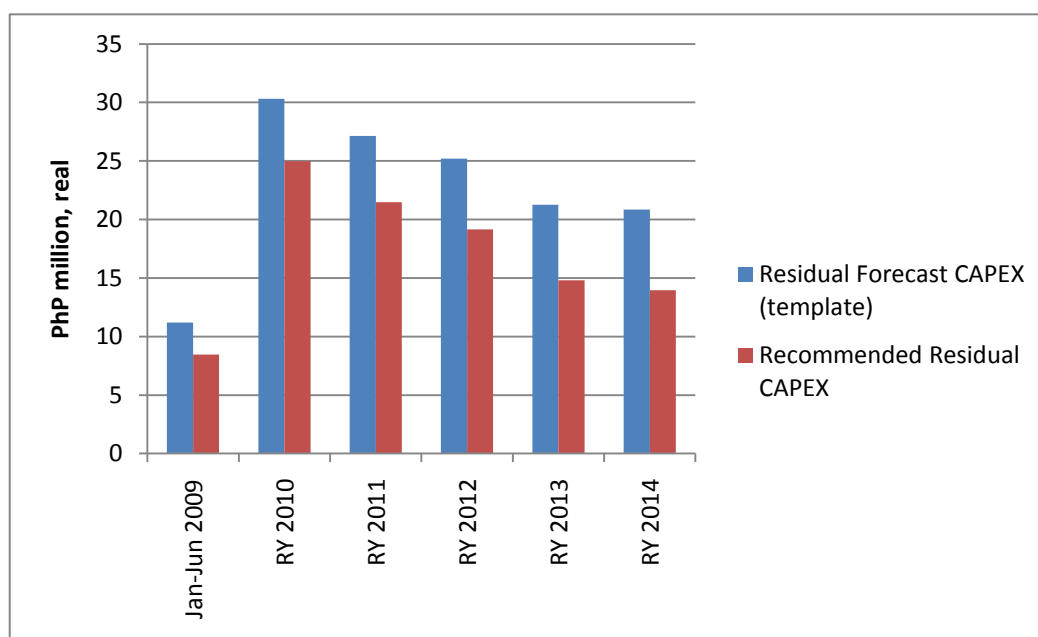
5.11 SUMMARY OF RECOMMENDED ADJUSTMENTS TO RESIDUAL FORECAST CAPEX

On the basis of the analysis above, we recommend the residual expenditure shown in Figure 5.1 and Table 5.11 be allowed for the forecast period RY 2010-14. The recommended residual CAPEX over the total forecast period Jan 2009-Jun 2014 is PhP102.85 Million, a decrease of 24% on LUECO's template value of PhP135.95 Million for total residual CAPEX over the same period.

Table 5.11: Recommended Residual CAPEX (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Residual Forecast CAPEX (template)	11.19	30.32	27.15	25.19	21.25	20.85
Total Recommended Adjustments	(2.73)	(5.33)	(5.67)	(6.05)	(6.44)	(6.88)
Recommended Residual Forecast CAPEX	8.46	24.99	21.48	19.14	14.81	13.97

Figure 5.1: Recommended Residual CAPEX



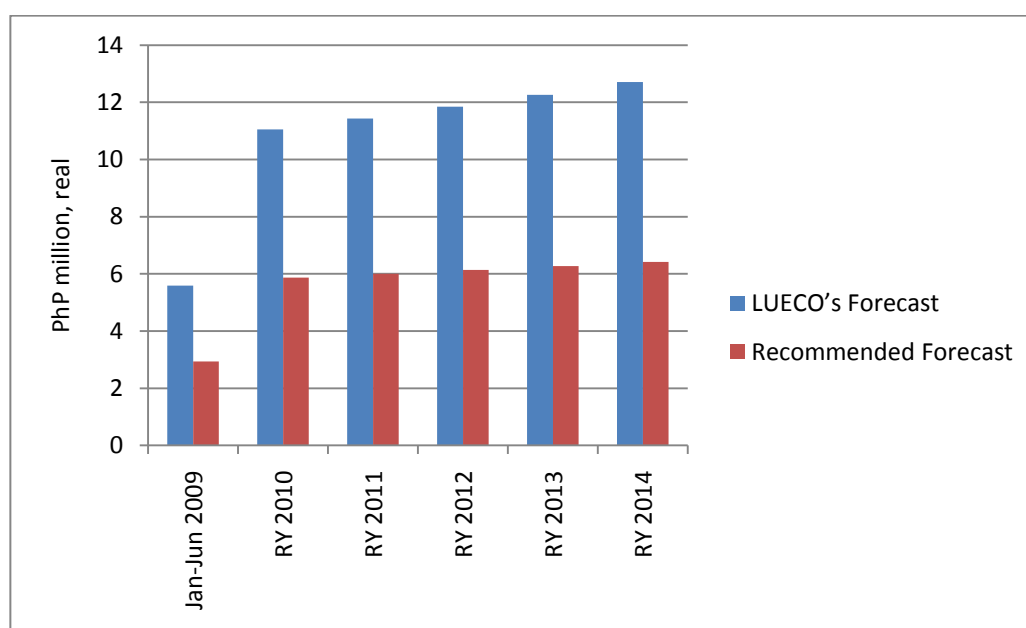
5.11.1 Residual Renewal CAPEX

LUECO's forecast residual renewal CAPEX and our recommended adjustments are summarized in Table 5.12 and Figure 5.2

Table 5.12: Comparison of Forecast and Recommended Residual Renewal CAPEX (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Template residual renewal forecast	5.59	11.05	11.43	11.84	12.26	12.71
Reduction in materials and supplies, including spares	(2.66)	(5.18)	(5.43)	(5.70)	(5.99)	(6.29)
Recommended residual renewal forecast	2.93	5.87	6.00	6.14	6.27	6.42

Figure 5.2: Comparison of Forecast and Recommended Residual Renewal CAPEX

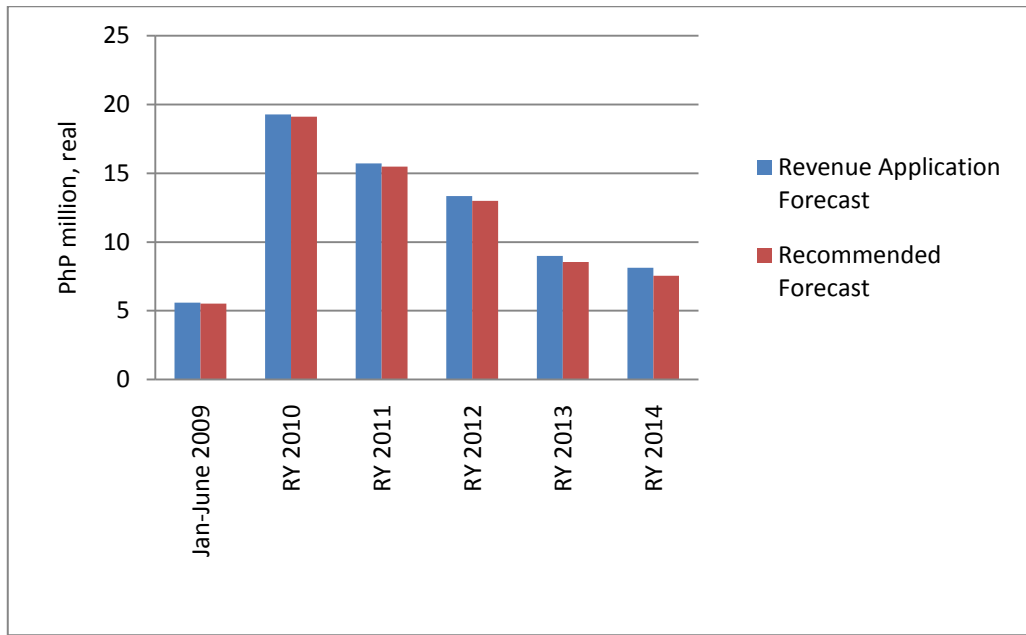
**5.11.1.1 Residual Growth CAPEX**

LUECO's forecast residual growth CAPEX and our recommended adjustments are summarized in Table 5.13 and Figure 5.13

Table 5.13: Comparison of Forecast and Recommended Residual Growth CAPEX (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Template residual growth forecast	5.60	19.27	15.72	13.35	8.99	8.14
Adjustments						
Adjustment to distribution line transformers	(0.07)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Adjustment to meters, instruments and metering transformers			(0.09)	(0.20)	(0.30)	(0.45)
Total recommended adjustments	(0.07)	(0.15)	(0.26)	(0.35)	(0.45)	(0.60)
Recommended forecast	5.53	19.12	15.46	13.00	8.54	7.54

Figure 5.2: Comparison of Forecast and Recommended Residual Renewal CAPEX



5.11.2 Residual Refurbishment CAPEX

LUECO's CAPEX forecast did not include any residual refurbishment expenditure.

6. SUMMARY OF RECOMMENDED TOTAL CAPITAL EXPENDITURE

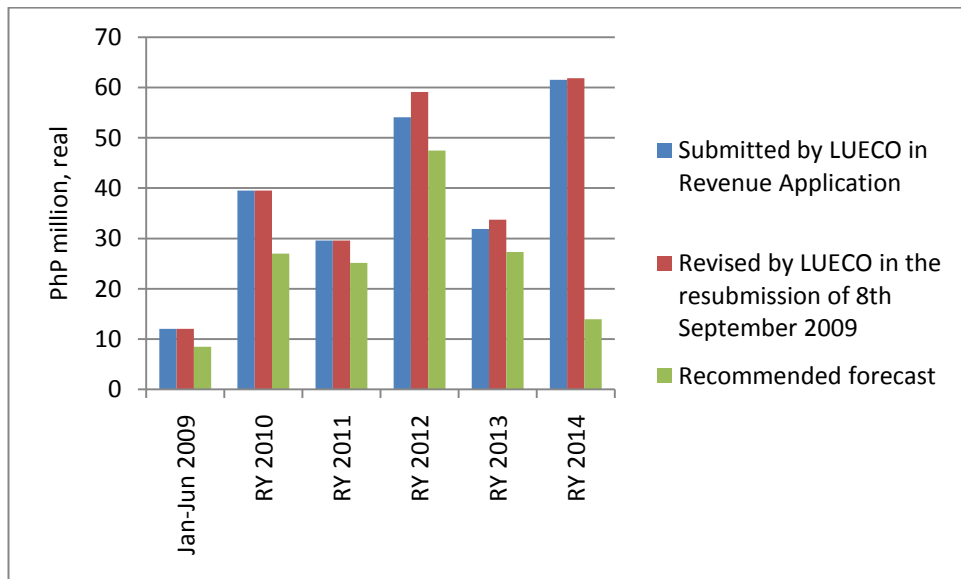
On the basis of the analysis for major projects and residual expenditure, we recommend the CAPEX shown in Table 6.1 be allowed for the forecast period January 2009 to June 2014. The total recommended CAPEX over the forecast period Jan 2009-Jun 2014 is PhP149.26 Million, a decrease of 35% on LUECO's revenue application value of PhP228.52 Million forecast for total CAPEX over the same period. When compared to the LUECO's revised total CAPEX of PhP235.81 Million for the forecast period the recommended CAPEX represents a reduction of 37%.

Table 6.1: Adjustments to Forecast Total CAPEX (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Submitted by LUECO in Revenue Application	12.05	39.50	29.58	54.05	31.86	61.48
Revised by LUECO in the resubmission of 8 th Sept. 2009	12.05	39.50	29.58	59.12	33.73	61.83
Recommended forecast	8.46	26.97	25.11	47.48	27.28	13.96

These recommended adjustments to forecast CAPEX is shown graphically in Figure 6.1 below.

Figure 6.1: Recommended Adjustments to Forecast Total CAPEX



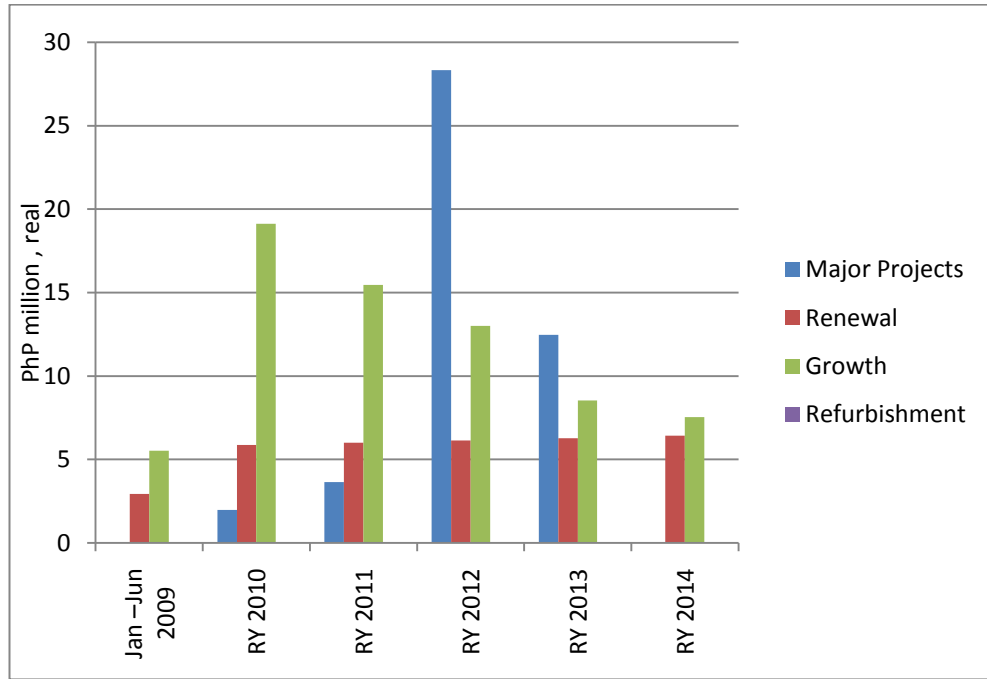
Our recommended forecast represents a reduction of PhP9.26 Million as against the forecast in the revenue application when measured over the period 1 Jan 2009 to 30 June 2014.

The breakdown of the recommended forecast expenditure consistent with the ERC's standard expenditure categories is shown in Table 6.2 and Figure 6.2.

Table 6.2: Breakdown of Recommended Forecast Expenditure (PhP Million, real)

	Jan-Jun 2009	RY 2010	RY 2011	RY 2012	RY 2013	RY 2014
Major Projects		1.98	3.65	28.34	12.47	0
Renewal	2.93	5.87	6.00	6.14	6.27	6.42
Growth	5.53	19.12	15.46	13.00	8.54	7.54
Refurbishment						

Figure 6.2: Breakdown of Recommended Forecast Expenditure



7. OTHER ISSUES

7.1 115 KV LINE

LUECO owns a 4.3 km length of 115 kV line between a point adjacent to Poro substation and the customer-owned VoA substation. While we believe that LUECO is the energy supplier, the substation is treated as directly connected to the NGCP network for transmission charging purposes. As we understand it, the effect of this arrangement is that LUECO receives no transmission revenue from the ownership of this line, although it is responsible for maintaining the asset. The line is currently included in the LUECO asset base and had an optimized depreciated replacement cost (ODRC) of PhP4.37 Million in the SKM valuation dated 31 December 2008¹⁰. This represented 1.15% of the ODRC of the asset base.

We further note that the NGCP owned section of this line runs between the NGCP Bauang substation and the LUECO Poro substation. If this line were operated at 69 kV it could be diverted into the Poro substation for a relatively small cost. This would reduce LUECO's technical sub-transmission losses by 50% and provide 'n-1' security on the sub-transmission network. We understand that contractual arrangements between VoA and NGCP are preventing this.

¹⁰ The line was optimized from 115 kV to 69 kV in the SKM asset valuation.