

# **ELECTRICITY REGULATORY AUTHORITY**



## **ELECTRICITY SECTOR PERFORMANCE REPORT**

**(July 2008-June 2009)**

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## **EXECUTIVE SUMMARY**

The report analyses the performance of the Electricity Supply Industry for the period July 2008 to June 2009. The major performance driver during the review period was the procurement of the 50 MW Aggreko thermal-diesel plant in Mutundwe and the stability of the Lake Victoria water levels leading to steady hydro electricity dispatch. At the same time, end-user retail tariffs were left unchanged in line with Government policy.

Uganda's economy continued to grow despite the global financial crisis and recession, registering a growth rate of 7% in the period under review. Part of the reasons for the strong economic growth was the 20% growth in the service sector particularly transport and communication. Inflation moved to two digit figures recorded at 12.3% between June 2008 and June 2009 compared to 13.9% in the previous period. In the coming period, inflationary pressures are expected to ease, moving back to single digits due to a continuing drop in the world oil prices and the slow down in world growth and demand. The Uganda shilling depreciated by 26.45% from Ug Shs 1,640.64 per US dollar in June 2008 to Ug Shs 2,074 per US dollar at the end of June 2009. This was as a result of persistent demand for foreign currency from both corporate and off-shore investors in the face of the global economic crisis and the increasing demand for imports. The upward movement in crude oil prices continued in the review period reaching record high of US\$147 per barrel in July 2008. The high price being due to the increased demand from the emerging economies of China and India and constrained refinery capacity. The domestic fuel price was further affected by the implementation of the directive on restriction of fuel transporters to the use of 3-axle trucks. However, the oil prices took a dip to as low as US dollars 70 per barrel in October 2008 due to the drop in demand caused by the global financial crisis. World oil prices started to recover from February 2009 due to the response by OPEC countries to reduce quotas for the member countries and other measures to manage the global financial crisis. However the threat of Somali pirates and the problems with the Kenya pipeline delayed the effect of falling world prices to influence the domestic fuel pump prices in Uganda.

The largest source of electricity generation in Uganda remains hydro electricity. There was an increase in available capacity in the period under review due to restoration to full use of one of the turbines in the Nalubaale power station. Thermal generation capacity increased to

about 40% of the total generation capacity in Uganda due to the commissioning of two 50 MW thermal power plants at Mutundwe and Namanve operated by Aggreko and Jacobsen in August and September 2008 respectively. The average lake level for the period was 11.22m. The highest level recorded in the period was 11.36m during the first month of quarter 3 2008 as a result of the rainy season experienced from April of the same year. However, the rainy season ended in July 2008 and the lake level dropped subsequently to 11.14m in August 2008. Following the favourable rainy season in the early part of 2009, and the restricted water release, the water level recovered to 11.4m by June 2009.

Regarding new generation projects, Electro-maxx had completed almost all major engineering work for their 20MW HFO plant in Tororo. The plant is expected to be commissioned by the end of September 2009. Invespro, a 50MW HFO plant stationed at Kimaka in Jinja district, was issued a license effective 1st April 2009, though little progress was observed during the period under review. Under the Large hydro projects, Bujagali Energy Limited who are developing a 250MW hydro power dam, have made significant progress on construction of the power house, concreting of the gated spillway, gravity dam and the erection bay. However some unforeseen geotechnical conditions emerged including; presence of schist, the need to carry out more geological investigations due to the risk of erosion and leakage and the re-occurrence of a slope failure at the left bank excavation in January and February 2009 due to the heavy rains in the area during the period. These factors have caused the extension of the commissioning from December 2010 to June 2011. Under the small renewable projects, Tronder power 13MW run-of-river project is ready for commissioning as all work has been completed. Hydromax 9MW run-of-river project on R. Wambadya has shown significant progress in completion of the excavation and penstock anchor blocks and the power house, staff quarters and fabrication work for the hydro-mechanical work. There is still a delay in reaching financial closure and the company applied for a two month extension to the earlier date for reaching financial close. The Eco Power 6.5 MW project on River Ishasha has been delayed by issues of securing loan funding for the project. As a result the developer has been using equity for the initial development which has caused delays. The 18MW run-of-river hydro project on River Mpanga has shown significant progress with substantial progress being made on the construction of the power house and the headrace, expected commercial operations date is February 2010. The WENRECo-Nyagak 3.5MW hydro project has been plagued with difficulties. The headrace is 60% complete,

however due to the delays, it is envisaged that the project costs will increase by more than 50% compared to original estimates. The 10MW hydro project on R. Kagera by China Shan Sheng is still being delayed by the cross-border issues between Uganda and Tanzania.

Eskom (U) Ltd supplied less energy to UETCL in the second half of the period due to the drop in water release levels as per DWD-GOU directive. There was a drop of hydro purchases from Eskom from 71% of total energy in the first half of 2008 to 63% in the second half of 2008 and further to 57% in the first half of 2009. UETCL increased thermal purchases from 30% of total energy to 34% in order to fill that gap caused by a drop in hydro generation. KCCL, one of the embedded generators increased their energy supply significantly during the first half of 2009 due to a slow down in cobalt smelting. Kilembe Mines Ltd recorded a drop in electricity supply due to wear and tear of their generation equipment.

UETCL remains the single buyer, single seller of bulk power in Uganda, most power is sold locally (about 96%) with some exports to Tanzania and Kenya. Energy exports to Kenya increased by about 17.1% whereas exports to Tanzania dropped by 7.1%. Increase in exports to Kenya was due to the higher demand caused by a significant drop in the hydro capacity in Kenya due to drought in the first half of 2009. Transmission system losses remained on average less than 4% throughout the period under review.

Umeme remained the largest electricity distributor by virtue of being the holder of the electricity distribution concession. However Ferdsult Engineering Services is an upcoming mini-grid distributor in areas not served by Umeme. Umeme purchased 12% more energy from UETCL during the period under review due to an increase in supply by IPPs and more generation capacity added on the system. During the period under review, the large industries accounted for 43% of total energy sales by Umeme. Domestic consumers remain the second largest consumers of electric energy. During the period under review, domestic consumers accounted for 25% of energy sales by Umeme. Distribution system losses remain a challenge to Uganda's electricity supply system. The loss level is still on average 35% despite efforts by Umeme to bring the losses down. Some of the measures embarked on include among others; installation of bulk meters in order to address areas with high distribution losses, installation of a new billing system to eliminate unbilled, unmetered customers and continued investment into improving the state of the network. On the connections side, there was a 5%

increase in domestic consumer numbers and a 9% increase in large industrial consumers during the period under review. The increase in those categories was mainly due to the establishment of a more efficient and timely application process for a new connection. On the side of distribution system line length, as at the end of the period under review, there was a 9,618km of Low Voltage lines, 4,436km of 11kV line and 4,307km of 33kV line.

Employment situation as at the end of the period under review reflected 120 staff in total as employed by Eskom Uganda, 486 staff employed by UETCL and 1,174 staff employed by Umeme.

In conclusion, despite the significant progress made, Uganda's Electricity sector is still faced with major challenges which include among many;

- Expensive thermal generation caused by increasing prices of fuel.
- Slow progress of licensed companies in reaching commissioning due the difficulties experienced in reaching financial closure.
- Increase in commodity prices used in civil works especially steel and cement.
- Poor hydrology due to adverse weather conditions.
- High distribution system losses which have remained between 31-35% despite efforts to curb these losses.
- Low electrification rates in Uganda – Uganda's electrification rate remains at about 9% and in the rural areas it is still below 2%.
- Institutional co-ordination is still weak.

## 1. INTRODUCTION

Electricity generation and supply situation in Uganda continued to show a steady recovery during the period under review. The stability of hydrology on Lake Victoria and the commissioning of the 50MW Aggreko-Mutundwe thermal plant played a significant role in the recovery. On the other hand, the 50MW Aggreko-Lugogo diesel fired generation plant was decommissioned at the end of August 2008. This was however replaced by a 50MW Heavy Fuel Oil (HFO) fired plant owned and operated by Jacobsen Uganda Power Plant Company Ltd (JUPPCL), commissioned at the beginning of September 2008 under a Build Own, Operate and Transfer (BOOT) arrangement. An additional 50MW diesel plant, Aggreko-Mutundwe, funded by World Bank was commissioned in August 2008.

For most part of the period under review, the water levels remained generally stable (11M on average). As such, there was no marked change in the amount of energy generated at both Nalubaale and Kiira Hydro dams.

During the period of review, a number of generation licensees who had already started the construction work continued to make progress. Bujagali (250MW), Tronder Power-Bugoye (13MW), Hydro-Maxx-Buseruka (9MW), Africa-EMS Mpanga (18MW), Electro-Maxx, Tororo(20MW) and Eco Power-Ishasha (6.6 MW) all made considerable progress. Construction work on the Nyagak dam by WENRECo came to a standstill due to financial constraints experienced by the company. A Heavy Fuel Oil plant, Invespro (U), was licensed effective April 2009, to generate 50MW. The Invespro plant is meant to replace 50MW diesel Aggreko-Kiira plant.

Oil prices on the world market, the main input cost driver for thermal electricity generation, reached a record high US\$147 per barrel in July 2008. The oil prices however, have since come down, reaching about US\$71 per barrel in June 2009.

The rest of the report is organised as follows; Section Two provides an overview of the macro economic assumptions. Section three provides information on generation performance during the period under review, while Section four provides information on the performance of Uganda Electricity Transmission Company Ltd as the only system operator in Uganda; Section five discusses the performance of the distribution segment of electricity during the



period under review; Section six provides information on the challenges facing the electricity sector in Uganda during the period under review, and the last section presents the challenges faced during the period of review.

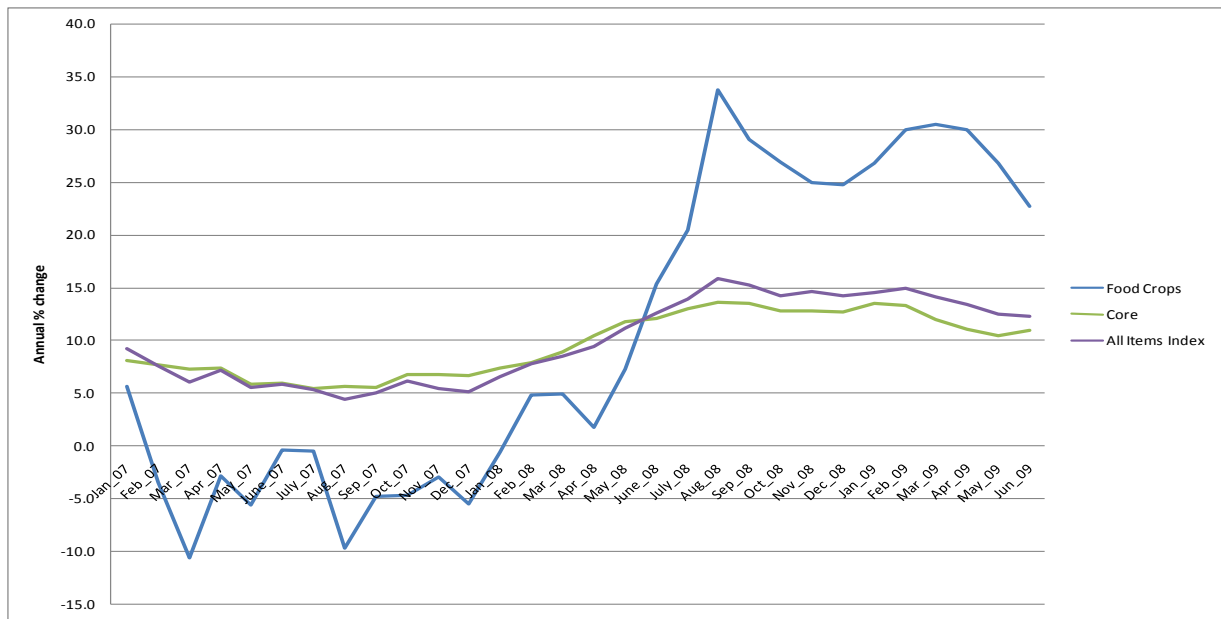
## **2. OVERVIEW OF MACROECONOMIC DEVELOPMENTS**

The Ugandan economy continued to show signs of resilience despite the global financial crisis and recession, registering a real GDP growth rate of 7.0% in 2008/9. However, this was less than the 9.0% growth that was achieved in 2007/08. This growth rate though was much higher than that experienced by many other developing countries. For the first time in many years, inflation jumped to a two digit figure. At the same time, the shilling depreciated by as much as 26.45% between July 2008 and June 2009. A detailed analysis is shown in the following section.

### **2.1 Inflation**

Inflationary pressures showed a strong degree of persistence during the period under review. The headline CPI (which is inclusive of food prices) increased by 12.3% between July 2008 and June 2009, compared to an increase of 13.9% in the previous period. The persistence in inflation for 2008/9 was largely driven by the high demand for food in the neighbouring countries which led to the increase in prices of food by 22.7% in the same period. The movement in inflation is as shown in Graph 1.

**Graph 1: Inflation Trends**



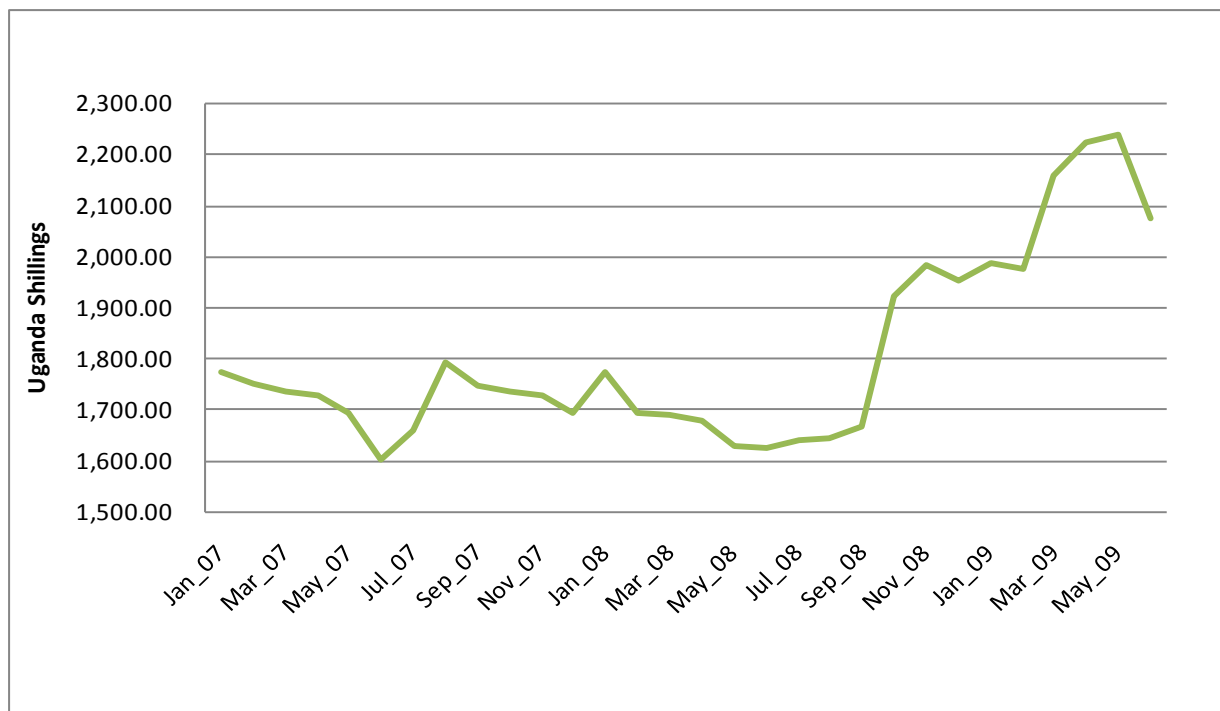
The annual core inflation (excludes food crop items, fuel, electricity and metered water), rose from a single digit figure of 9.0% in May 2008 to 13.8% in August 2008 before easing to 12.7% in December 2008. Inflation levels reached 13.7% in January 2009, before dropping to 11.0% in June 2009.

In the coming period, the inflationary pressures are expected to ease, moving back to single digit figure. This is due to the drop in the world oil prices and the slowdown in the world growth and demand.

## 2.2 Exchange rate

The shilling registered mixed trends during the period under review. Having appreciated by about 8.4 % in the first half of 2008, it depreciated by as much as 26.45% from shs1,640.64 per dollar as at the end of July 2008 to shs2074.61per US\$ as at end of June 2009. The weakening of the Shilling was as a result of increased in demand for foreign currency from both corporate and off shore investors in the face of the global economic crisis. The increase in demand for imports was another factor that contributed to the weakening of the shilling; the movement is as shown in Graph 2 below.

**Graph 2: Movement of Exchange Rate Ug Shs to the US Dollar Jan 2007 – May 2009**



The Shilling has been depreciating since May 2008, reaching Shs2237 per US\$ at the end of May 2009. It then appreciated to Shs2075 per US\$ at the end of June 2009.

### 2.3 Oil Prices

Oil prices are an important factor in the electricity subsector for the reason that more than 40% of the electricity generated and sold to the grid is from thermal plants. The oil price movements therefore are a significant determinant of the electricity prices.

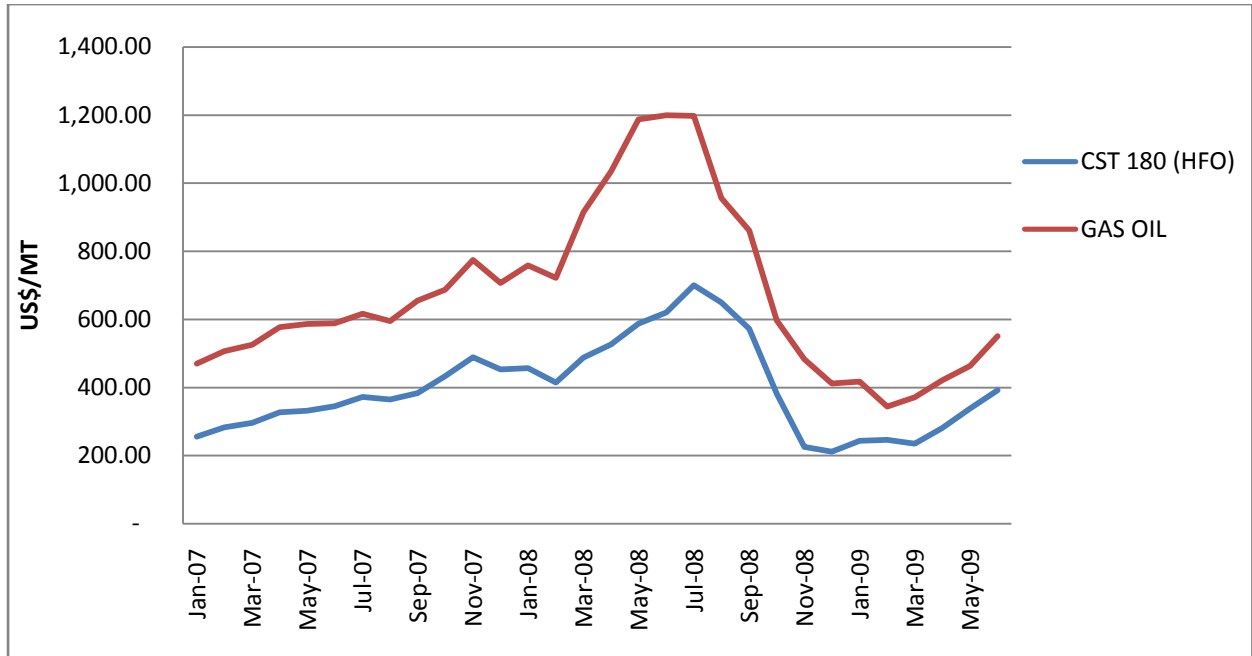
The upward movement in the crude oil prices continued into the review period. Whereas the World market price for a barrel of crude oil closed at US\$142.99/barrel in June 2008, the oil prices reached a record high of \$147 per barrel in July 2008. The high crude oil prices were largely due to increased demand especially from emerging economies like China and India, and the constrained refinery capacity.

The high global crude oil price translated into high domestic fuel pump prices as well as high prices for the fuel used for thermal generation. The oil prices however plummeted to below \$70 per barrel in October 2008 as a result of the low global demand for oil due to the slowdown in global economic growth following the global financial recession.

The introduction of wheel axle weight limits and the continued depreciation of the Shilling against the US\$ meant that the effect of reduction of world oil prices took long to be felt. The continued problems with the Kenyan Pipeline and the threats of pirates on Somali waters further delayed the effect of falling world oil prices on pump prices in Uganda.

The Mean of Platts figures for July 2008 stood at US\$669.94/MT for CST 180 and US\$1,197.15/MT for Gas Oil before registering a downward trend in the subsequent months. The lowest figures were experienced in December 2008 for CST 180 (US\$211.13/MT) and in February 2009 for Gas Oil (US\$343.59/MT). Graph 3 shows the oil price movements from 2007 to 2009.

**Graph 3: Oil Price Movement based on Mean of Platts (2007-2009)**



The reduction in oil prices, however, appears to have been short lived. Since February 2008, international oil prices have since started edging upwards. This has been partly due to the

reduction of the quotas by OPEC member countries and while at the same time, several countries approved rescue packages to stir the economies out of the effects of the financial crisis.

### **3 ELECTRICITY GENERATION IN UGANDA**

#### **3.1 Generation Capacity in Uganda**

##### **3.1.1 Hydro Generation**

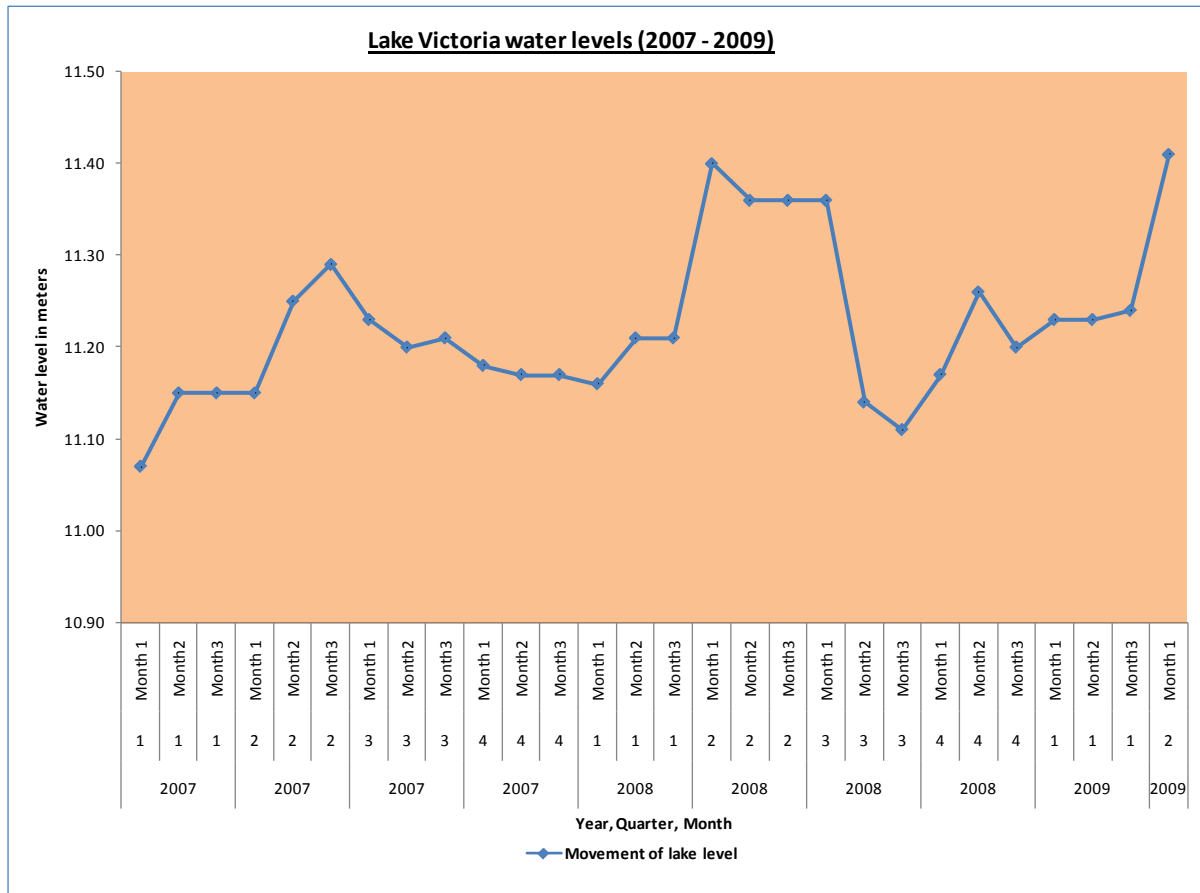
The composition of hydro electricity in the generation mix during the period under review dropped from 651GWh (which is about 67% of total generation in the quarter ending September 2008), to 628GWh (which is about 58% of total generation) in the period ending June 2009. The drop in hydro generation was mainly due to a change in water release policy from 1000 cubic meters per second to 800 cubic meters per second as directed by the Directorate of Water Development (DWD) in the quarter ending December 2008 which policy remained in effect up to the end of the period under review (June 2009), and the increase in thermal generation capacity and dispatch<sup>1</sup>.

Graph 2 below shows the Lake Victoria water level during the period under review. During the first month of quarter 3 of 2008, the water level recorded was at 11.36m, as a result of the rainy season experienced from April of the same year. However, the rainy season ended in July 2008, and the lake level subsequently dropped to 11.14m in August 2008. Following the favourable rainy season in the early part of 2009 and the restricted water release, the lake level recovered to above 11.4 meters by June 2009. The varying lake levels had a direct impact on the water dispatch regime and consequent electricity generation. The Nalubaale and Kiira dams were dispatched more at peak and less at off-peak in order to optimise the generation at the complex and address power supply needs.

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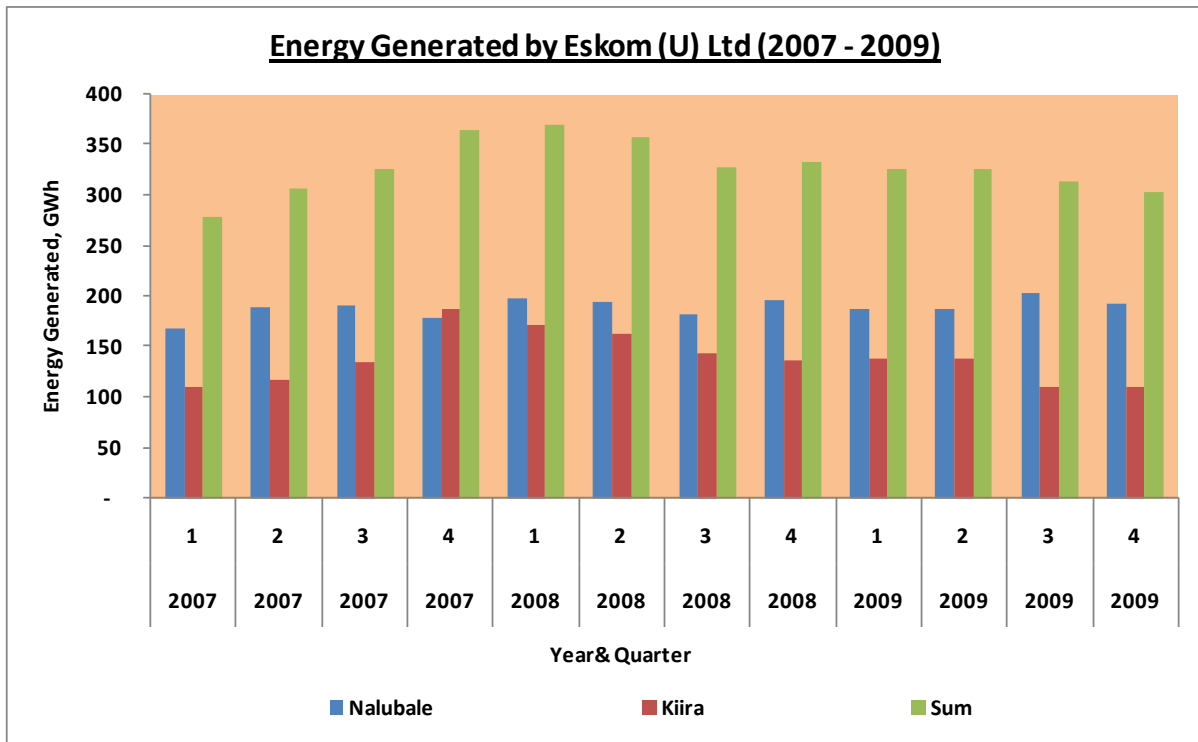
<sup>1</sup> Source: Uganda Electricity Transmission Company Ltd quarterly reports

**Graph 2: Lake Victoria water levels; 2007 – 2009 (m)**



The water dispatch regime at the hydro-power plants of Nalubaale and Kiira was varied due to the changing water levels as highlighted above. In July 2008, the allowed dispatch was 1,000m<sup>3</sup>/s compared to 960m<sup>3</sup>/s in the previous period, translating into a monthly average generation capacity of 172MW. The increased dispatch was to mitigate the shortage in power generation from thermal generation that was brought about by the shortage of fuel. In August, the water release was reduced to 800m<sup>3</sup>/s due to a drop in the Lake Victoria water level, therefore the monthly average capacity was 138MW. Following the improvement in the lake levels, the allowed water discharge was increased to 1,012m<sup>3</sup>/s. This was the highest dispatch for the year 2008, translating into monthly average generation capacity of 174MW. From February 2009, the average dispatch was reduced to 800m<sup>3</sup>/s translating into a monthly average generation capacity dropped to 138MW. This dispatch was maintained to the end of the period under review.

**Graph 3: Energy generated by Eskom (U) Ltd**



Hydro generation from the Owen falls complex by Eskom (U) Ltd was generally lower in 2008/09 compared to 2007/08. Due to the persistently low lake levels, hydro generation by Eskom (U) Ltd amounted to 328GWh in Q3 2008 and improved only marginally to reach 334GWh in Q4 2008. The generation dropped back to an average of 325GWh during Q1 and Q2 2009 as the water release was restricted to 800 m<sup>3</sup>/s. Other sources of hydro generation remained the KCCL and KML plants which exported 1,027MWh and 28,929MWh in 2008/09.

### 3.1.2 Thermal Generation

At the end of August 2008, Aggreko International projects decommissioned one of its 50MW diesel-based generating plants. This was replaced by another 50MW plant using heavy fuel oil (HFO) based at Namanve and owned by Jacobsen Uganda Power Plant Company Limited under a BOOT arrangement. This ensured that there was no disruption in power supply.



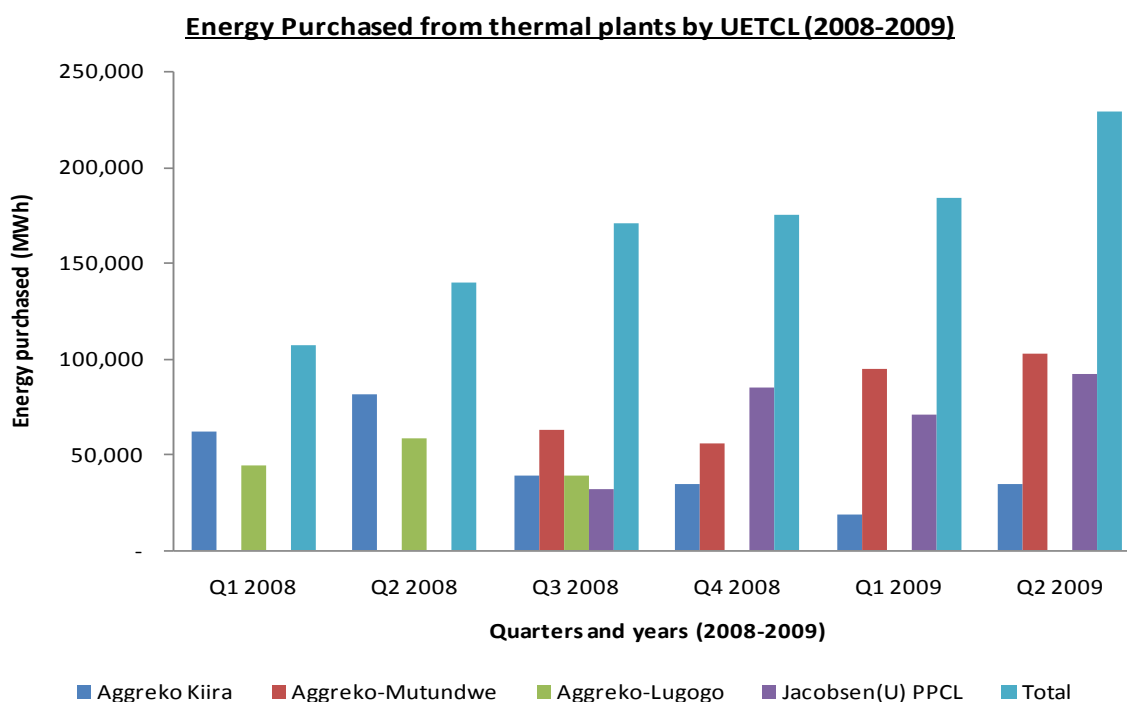
Another significant occurrence in the sector was the complete halt of electricity generation in Arua due to financial constraints that were faced by West Nile Rural Electrification Company Ltd (WENRECo). The company could no longer pay their fuel supplier and as a result, the fuel supplier halted HFO delivery to their plant. GOU intervened by providing a subsidy towards fuel purchase in order to give an opportunity to WENRECo to re-organise itself. The subsidy extended by GOU towards fuel was for a six (6) months period effective May 2009. As a result of this intervention measure by GOU, electricity supply resumed in West Nile in May 2010 after almost two (2) months of no electricity.

In graph 4, a snap-shot of the trend of thermal power sold in the period under review has been presented. The movement of total energy sold to UETCL by all thermal plants was determined by three major factors; the decommissioning of Aggreko Lugogo plant in August 2008, a significant drop in generation from Aggreko Kiira of about 70% from 25,403MWh in August to 7,595MWh in September 2008, The Aggreko-Mutundwe plant is dispatched as a base load plant due the availability of funding from the IDA loan. As a result, the Aggreko-Mutundwe plant exported more energy to the grid compared to other thermal generators. At the same time, the Jacobsen-Namanve HFO plant was also dispatched as a base load plant and is ranked next in the thermal dispatch order after the Aggreko-Mutundwe plant. After the initial challenges related to HFO supply in the early days of its commissioning, the electricity supply from the Jacobsen plant subsequently stabilised and the plant exported 91.6GWh to the grid in Q2 2009 compared to 71.1GWh in Q1 2009 and 85.1GWh in Q4 2008.<sup>2</sup>

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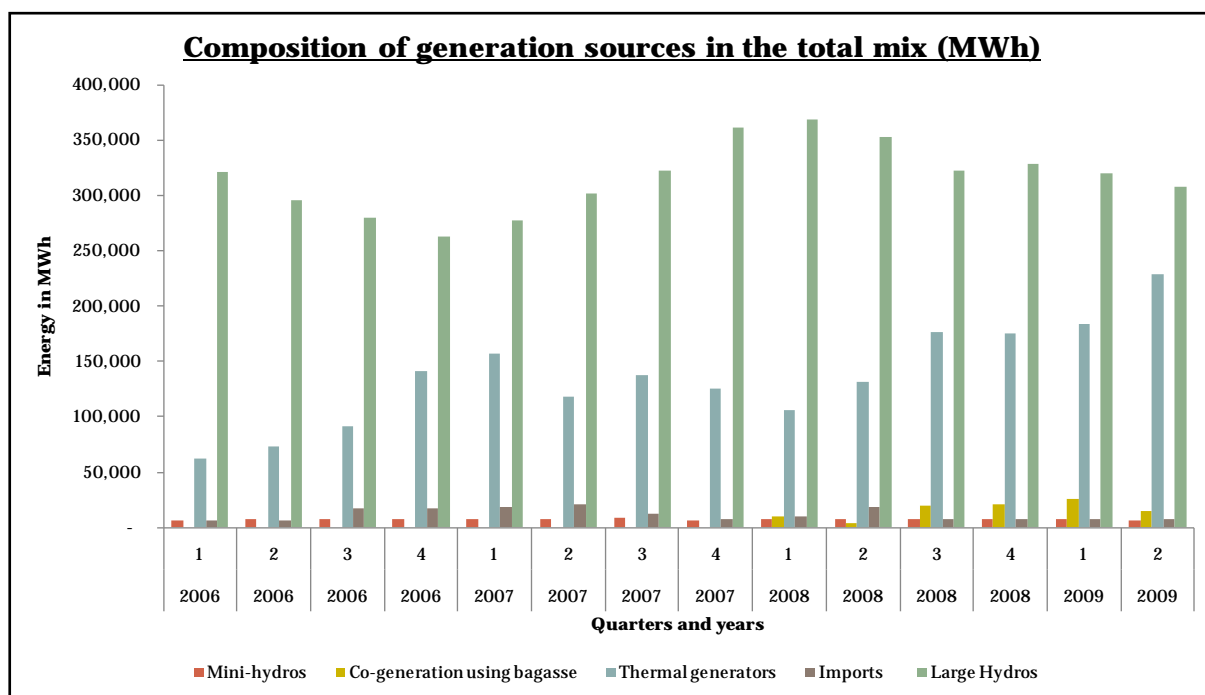
<sup>2</sup> Source: UETCL Business Statistics 2008-2009

**Graph 4: Energy Purchased from thermal plants by UETCL (2008 – 2009)**



In spite of the increased procurement of thermal generation, hydro generation has remained a significant component of our energy mix. The share of large hydro generation in the total energy exported to the grid has only reduced from 68% in Q2 2008 to 54% in Q2 2009, while the share of thermal generation has correspondingly increased from 26% to 41% over the same period respectively. There was no notable change in generation from mini-hydros during the period under review. Most of the mini hydro plants already licensed by the Electricity Regulatory Authority (that is Tronder-Bugoye, East Asia Energy Management Systems-Mpanga, Ecopower-Ishasha, and Hydromax-Buseruka) are expected to start being commissioned by the end of 2009 with the majority of them being commissioned in mid 2010.

**Graph 5: Total Composition of generation by type (2006 – 2009)**



### 3.2 Status of New Generation Projects

#### 3.2.1 Thermal Generation Plants

##### a) *Electro-maxx*

Electro-Maxx was originally licensed effective 1<sup>st</sup> March 2008 to generate and sell 10MW of thermal power using heavy fuel oil. However, Electro-Maxx subsequently applied for a license amendment to upgrade to 20MW, implying the need to amend the Power Purchase Agreement as well. Electro-Maxx also wanted an upward adjustment in the capacity price sighting increase in leasing costs of the generators. For this reason, there was a delay in the implementation of the project. The earlier anticipated commissioning period of December 2008 had to be revised. Electro-Maxx also submitted fuel supply and transportation agreements for approval by the Authority in May 2009.

Civil works commenced in March 2009, and by June 2009, the generators were already on site, the powerhouse was under construction and the foundations for the fuel tanks were being prepared. The plant is expected to be commissioned in Q3 of 2009.

***b) Invespro (U) Ltd***

Invespro (U) was offered a license, effective 1<sup>st</sup> April 2009 to generate and sale 50MW of thermal power using Heavy Fuel Oil. The Invespro plant is meant to replace the 50MW Aggreko-Kiira diesel thermal plant. Other than the erection of a fuel storage tank, limited activity has been carried out at the site yet, although the company is expected to commission the plant 10 months from the effective date of the license.

### **3.2.2 Large Hydro Generation Projects**

***a) Bujagali Energy Limited (BEL)***

BEL was licensed effective 1<sup>st</sup> June 2007 to generate and sale 250MW to the grid. The Limited Notice to Proceed (LNTP) was issued on 26<sup>th</sup> June 2007 and construction works commenced the same month. The plant was expected to be commissioned in December 2010.

As at June 30<sup>th</sup> 2009, the following progress had been made:-

- Powerhouse construction was ongoing with focus on all the five units;
- Concreting of the gated spillway, gravity dam and erection bay were ongoing;
- Excavation of tailrace and approach channels was complete to the current design;
- Contractor's offsite project features completed;
- Site offices, workshops, warehouses, medical clinic and storage yards were complete;
- Aggregate crushing plant had also been completed;
- West channel upstream and upstream cofferdams were complete and dewatering between the cofferdams was continuing;
- The basic engineering design was complete and detailed design was estimated at 71.5% completion;
- The electro-mechanical subcontractor showed an overall progress of 62% in engineering, procurement, manufacturing progress, and transport;
- The actual procurement progress was 77% complete.

However, a number of factors have affected the progress. These are;

- Presence of schist that has affected the power house, gated spillway and siphon spillway areas. This has been resolved by removing the fractured material and replacing it with mass concrete.
- Geological investigations have necessitated the extension of jet grouting curtain at the right and left abutments by 80M and 25M respectively. This was to minimize leakage and erosion in these areas.
- Reoccurrence of a slope failure at the left bank excavation in January and February due to the heavy rains. Because of this, the contractor decided to discontinue jet grouting operations on the left bank and mobilize this operation on the right bank, where they are currently operating.

Due to the above unforeseen factors, the commissioning of the plant is now scheduled for June 2011 and not December 2010 as earlier envisaged.

### **3.2.3 Small Renewable Projects**

#### ***Tronder Power Ltd–Bugoye***

Tronder Power Ltd was licensed effective 1<sup>st</sup> April 2008 to generate and sale 13MW. As at end of June 2009, engineering designs had been completed and production of electro-mechanical equipment was estimated at 60% completion. Major civil works were in progress, with headrace and powerhouse construction in advanced stages.

The commissioning of the plant is scheduled for September 2009.

#### ***Hydromaxx Ltd-Buseruka Hydro Project***

Hydromaxx was granted a 20 year license on 1<sup>st</sup> November 2007 to generate 9MW along River Wambadya in Hoima district.

The following had been achieved as at June 30<sup>th</sup> 2009;

- The excavation and footing for penstock anchor blocks were completed;
- Power house excavations completed;
- 9 units of staff quarters completed;
- 70% of bending steel bars for fore bay completed;
- Fabrication works for hydro-mechanical works completed;

- Manufacturing of the turbines was 60% completed and the procurement of transmission line materials and accessories were in progress as at 29<sup>th</sup> June 2009.

As far as the financial closure is concerned;

- Loan agreements with the project financiers (African Development Bank and PTA Bank-Nairobi) were signed on April 7, 2009.
- All security and finance agreements were signed by the developer on June 8, 2009 and sent to the lenders for signing.

Despite the effort put towards achieving the financial closure, the delay in the execution of direct agreements with the government has affected the possibility of achieving the financial closure by June 30<sup>th</sup> 2009 as earlier anticipated. The company requested for the extension of financial closure by two more months which was granted by the Authority.

### ***Eco Power –Ishasha***

Eco Power was granted a license in July 2007 by ERA to generate and sale 6.6MW on River Ishasha. A license amendment was sought by Eco Power and granted by the Authority on the basis of increased global prices particularly costs of construction materials like steel and cement, and oil.

The following was the progress as at 30<sup>th</sup> June 2009;

- A new power house road of 1.2km has been completed and a dam road of 700 meters is being built.
- A rock outcrop of about 50m length was encountered and was being removed by blasting. So far, 40% of the rock has been removed.
- The power house construction commenced in April 2009.
- Construction of the 110m tail race also commenced. 10% of the tail race canal has been completed.
- Location setting was completed and the blasting of the rock in a section of the penstock line started in June 2009.
- The dam clearing location was completed and the construction of the dam has been planned to commence from July 2009.

- A contract for the supply of the electro mechanical equipment package was signed with the supplier.

Financial closure has not been reached yet. There have been delays in arranging loan funding and as a result Eco Power was using equity.

### ***Africa EMS-Mpanga***

Africa EMS Mpanga Ltd was granted a license effective 1<sup>st</sup> May 2008, to generate and sale 18MW from River Mpanga. The licensee applied for a license amendment to have the tariffs adjusted upwards, which was granted by the Authority in February 2009 to put into consideration factors such as the high price of construction materials that had not been envisaged at the start of construction.

By March 5<sup>th</sup> 2009, substantial progress had been made with the construction of the power house and headrace underway. The expected Commercial Operations Date is 17<sup>th</sup> February 2010.

### ***WENRECo-Nyagak***

West Nile Electrification Company Ltd was granted a license to generate, distribute and sale electricity in West Nile in 2003. The company has started construction of a 3.4MW hydro power dam at Nyagak in 2007.

The power house is almost complete and the electromechanical equipment has been on site for over a year, casting doubt on the manufacturer's guarantee. The penstock pipes are yet to be installed. The headrace is 60% complete.

However, due to financial difficulties, the activities have come to a halt. There is an envisaged increase in the project costs of more than 50% compared to the original cost estimates.

***China Shan Sheng Industry International (U) Ltd***

China Shan Sheng Industry International (U) was awarded a 30 year license to generate 10MW at Murongoro Cascade, Kikagati-Isingiro. Since the award of the license in 1<sup>st</sup> January 2007, not much progress has taken place due to trans-boundary issues. Government of Uganda and Tanzania are working closely to resolve these issues so that construction can commence.



## **4.0 ENERGY DEMAND AND SUPPLY SITUATION**

### **4.1 Energy Purchases by UETCL**

During the second half of the year 2008, UETCL purchased 651,436MWh of energy from Eskom (U) Ltd compared to the 721,907MWh purchased in the first half of the year. The energy purchased in the first half of the year 2009 from Eskom dropped to 627,850MWh. The gradual decrease in energy purchased was on account of a drop in the water release regime. The percentage of hydro electricity energy purchased dropped from 71% in the first half of 2008 to 63% in the second half of 2008 and further to 57% in the first half of 2009.

The other major source of energy purchases by UETCL was from thermal electricity suppliers. The major source of thermal power was from the IDA-funded plant operated by Aggreko International in Mutundwe and the Namanve based HFO plant operated by a Norwegian firm, Jacobsen Uganda Power Plant Company Limited (JUPPCL). During the second half of 2008, UETCL purchased a total 351,941MWh of thermal generators which accounted for 30% of the total energy purchased in the same period.

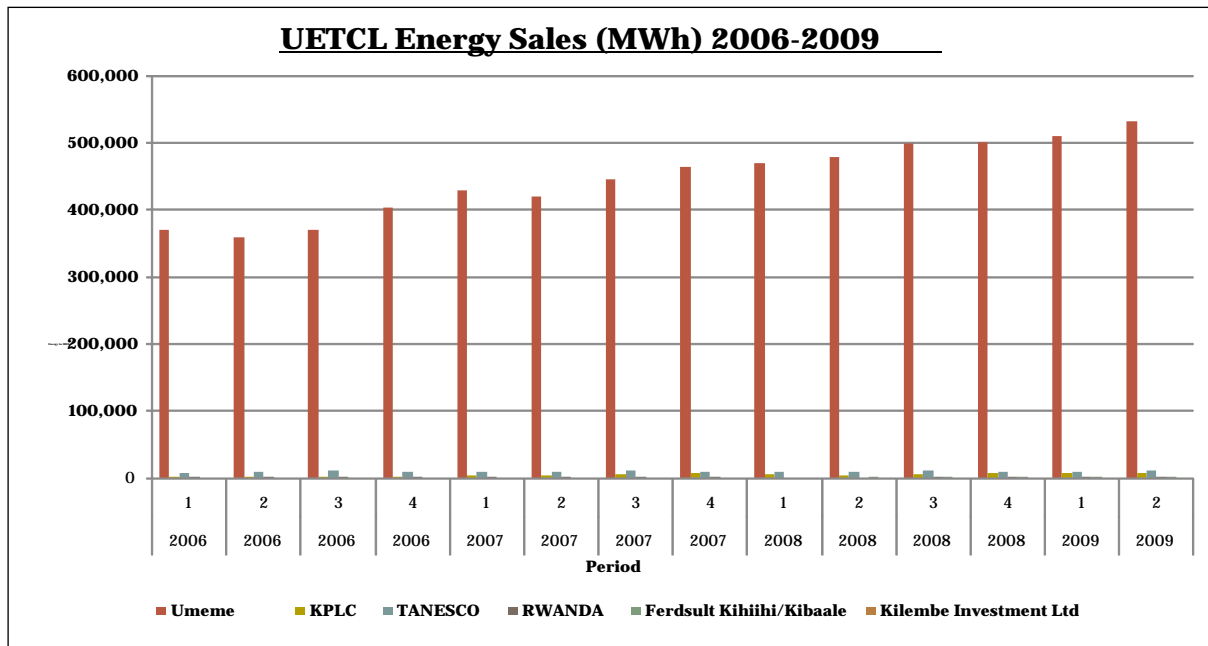
There was an increase in the thermal energy purchased by UETCL in the first half of the year 2009 to 412,952MWh, which accounted for 34% of the total energy purchased by UETCL in the same period. The increase in thermal energy purchases was to make up for the drop in hydro energy due to a reduced generation from a lower dispatch regime. The Aggreko-operated IDA-funded Mutundwe plant was commissioned in the month of August 2008.

**Table 2: Energy Purchases by UETCL for 2006 – 2009 (MWh)**

Total Volumes Purchased across all suppliers of Electricity (MWh) 2006-2009												
Year	Quarter	Embedded Generators					Thermal Generators		Imports		Large Hydros	Totals
		KCCL	KML	Bugoye	Kinyara	KSW	Jacobsen Namanve	Aggreko	Kenya	Rwanda	Eskom	
2006	1	401	6,588			-	-	62,743	6,031	475	321,655	397,893
2006	2	428	7,137			-	-	73,469	6,452	511	296,155	384,152
2006	3	629	6,675			-	-	91,803	16,848	799	279,836	396,590
2006	4	164	7,999			-	-	141,484	17,397	514	262,810	430,368
2007	1	104	7,142			-	-	156,622	18,402	517	277,066	459,853
2007	2	78	8,013			-	-	118,592	20,830	517	301,822	449,852
2007	3	454	8,267			-	-	138,033	11,474	414	322,664	481,306
2007	4	108	6,221			-	-	125,760	7,578	567	361,992	502,226
2008	1	400	6,892			10,473	-	106,572	9,450	541	368,630	502,957
2008	2	432	7,737			4,149	-	131,761	17,888	588	353,377	515,931
2008	3	137	7,790			19,996	32,077	144,982	6,505	582	322,580	534,648
2008	4	185	7,379	-	-	20,498	85,134	89,748	7,079	587	328,857	539,467
2009	1	228	7,487	-	-	25,905	71,088	112,984	6,611	586	320,109	544,997
2009	2	477	6,273	-	-	14,530	91,543	137,337	6,363	640	307,741	564,904

Other sources of supply include purchases from the embedded generators of Kasese Cobalt Company Limited, Kilembe Mines Limited and Kakira Sugar Works. Kasese Cobalt Company Limited supplied 322MWh in the second half of 2008 compared to 705MWh in the first half of 2009, this represented a 119% increase in energy supplied, the significant increase in energy sales is attributed to the slow down in cobalt smelting activities in the first half of the year 2009 therefore more energy was available for sale to the national grid. KML supplied 15,169MWh in the second half of 2008 compared to 13,760MWh in the first half of 2009 which was a 9.3% drop in energy sold; this is attributed to a drop in hydro capacity due to wear and tear of generation equipment. The company is in the process of procuring services for the repair, restoration and rehabilitation of their complex. Kakira supplied 40,494MWh in the second half of 2008 compared to 40,435MWh in the first half of 2009. It should be noted that the lower energy sales for the latter period are attributed to the shut down of the plant for maintenance work that usually takes place beginning April for 60 calendar days every year. (See table 2 above for lower energy as reflected in Q2 2009 for Kakira).

**Graph 6: UETCL Energy Sales (MWh) 2006 - 2009**



#### 4.2 Energy Sales by UETCL

UETCL is a single buyer of all power and a system operator and operates the transmission grid above 66kV. At the same time, UETCL is a holder of the import and export licenses.

During the period under review, UETCL sold power to Umeme Ltd (the largest distribution company to date in Uganda), Ferdsult Engineering Services Ltd, (the operator of the mini-grid in Rukungiri-Kanungu and Kagadi-Kibaale). UETCL also exported electricity to Rwanda (Electrogaz), Kenya (KPLC) and Tanzania (TANESCO). It is important to note that exports to Kenya were largely tie line flows meant to ensure stability of the network.

**Table 3: UETCL Energy Sales in MWh (2006 – 2009)**

UETCL Energy Sales-(MWh)-(2006 - 2009)								
Period		Umeme	KPLC	TANESCO	RWANDA	Ferdsult Kihiihi/Kibaale	Kilembe Investment Ltd	Totals
Year	Quarter							
Energy Sales (MWh)								
2006	1	370,601	3,105	8,666	833	-	-	383,205
2006	2	359,293	2,680	9,167	740	-	-	371,880
2006	3	369,678	1,647	12,041	561	-	-	383,927
2006	4	403,438	3,009	10,154	341	-	-	416,942
2007	1	429,207	3,436	10,154	341	-	-	443,138
2007	2	419,365	4,591	10,453	207	-	-	434,616
2007	3	446,645	6,036	12,037	41	-	-	464,759
2007	4	463,988	7,908	10,201	61	-	-	482,158
2008	1	468,891	6,280	9,956	-	-	-	485,127
2008	2	479,153	4,440	10,446	-	158	-	494,196
2008	3	498,480	5,842	12,299	7	545	-	517,173
2008	4	502,019	7,319	10,320	72	704	-	520,434
2009	1	510,725	6,976	10,209	26	788	-	528,724
2009	2	532,291	8,433	10,729	163	1,030	-	552,646

As shown in table 3; most of the electric energy produced is sold locally to Umeme Ltd, Ferdsult (96%) and the remainder is exported to Kenya, Tanzania and Rwanda. Domestic energy sales constitute the largest share of energy sold by UETCL (about 96%) of all energy produced in Uganda is consumed locally, the remaining portion which is about 4% is sold as exports. The energy sold to Umeme has increased gradually from 1,000MWh in the second half of 2008 to 1,043MWh in the first half of 2009, representing an increase of 4.3%. The increase was due to increased thermal generation and a steady growth in demand for electricity. The energy sales to Ferdsult has increased from 1,249MWh in the second half of the year 2008 to 1,818MWh in the first half of the year 2009 which is a progressive sign of growth of the mini-grid network operated by Ferdsult and a direct indication of the growth of connections in their concession areas.

Energy exports to Kenya increased by 17.1% from 13,161MWh in the second half of 2008 to 15,409MWh in the first half of 2009. Energy exports to Tanzania decreased by 7% from 22,619MWh in the second half of 2008 to 20,938MWh in the first half of 2009, as shown in table 3.

The increased supply was for the first time in a period of over three (3) years able to meet the demand.

### 4.3 Transmission system losses

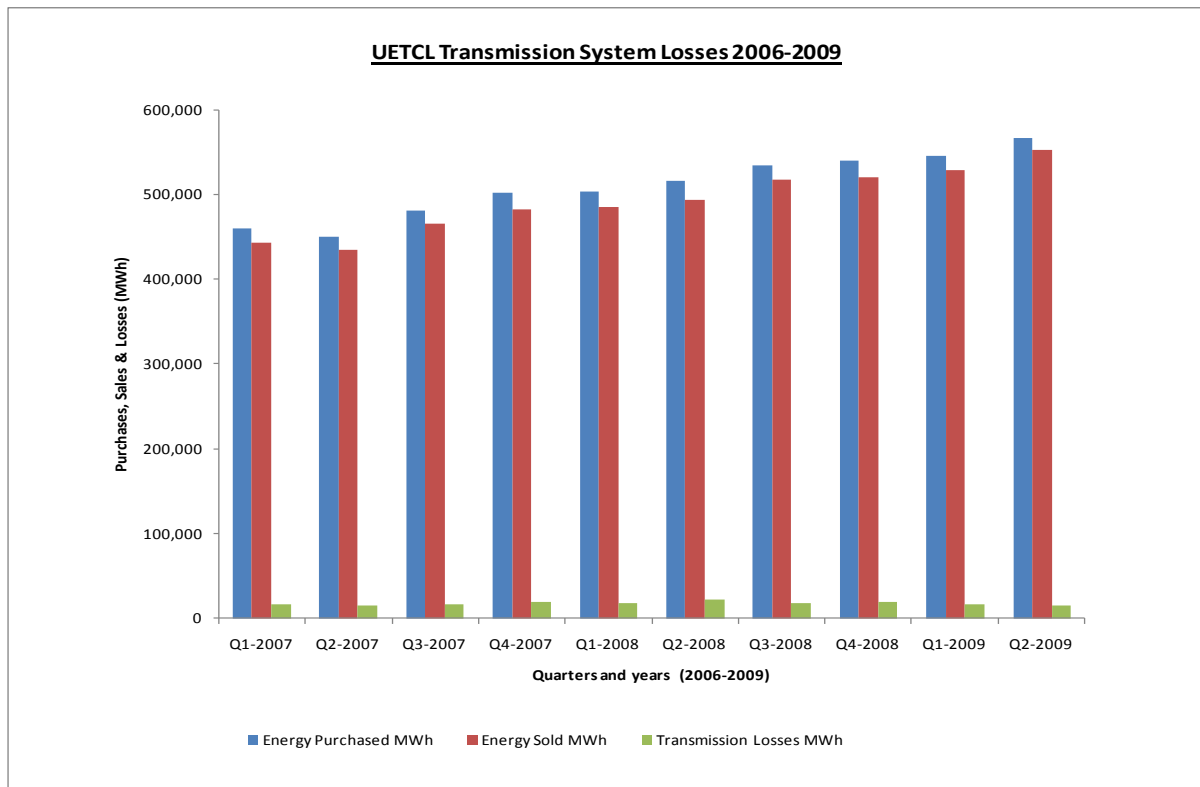
Transmission system losses have shown gradual decline over the period under review. Transmission system losses as shown in table 4 have reduced drastically from an average of 3.4% in the third quarter of 2008 to an average of 3.0% in the first half of 2009.

**Table 4: The trend of transmission system losses**

<u>UETCL Transmission System Losses 2006 - 2009</u>									
	Units	2006	2007	Q1-2008	Q2-2008	Q3-2008	Q4-2008	Q1-2009	Q2-2009
Energy Purchased	MWh	1,609,003	1,893,237	502,957	515,931	534,648	539,467	544,997	566,854
Energy Sold	MWh	1,555,954	1,825,321	485,127	494,038	516,628	520,434	528,724	551,934
Transmission Losses	MWh	53,049	67,916	17,830	21,893	18,020	19,033	16,273	14,920
<b>Transmission Loss Factor</b>	<b>%</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>3</b>

The trend of transmission losses for the earlier periods is shown in table 4. It is evident that the level of losses has fluctuated between 3-4% over the years. The trend is shown in Graph 7.

**Graph 7: UETCL Purchases, Sales and Losses (MWh) 2006-2009**



As can be seen in the graph 7, the energy purchased by UETCL has gradually increased. The more energy purchased the more sales and the more transmission losses.

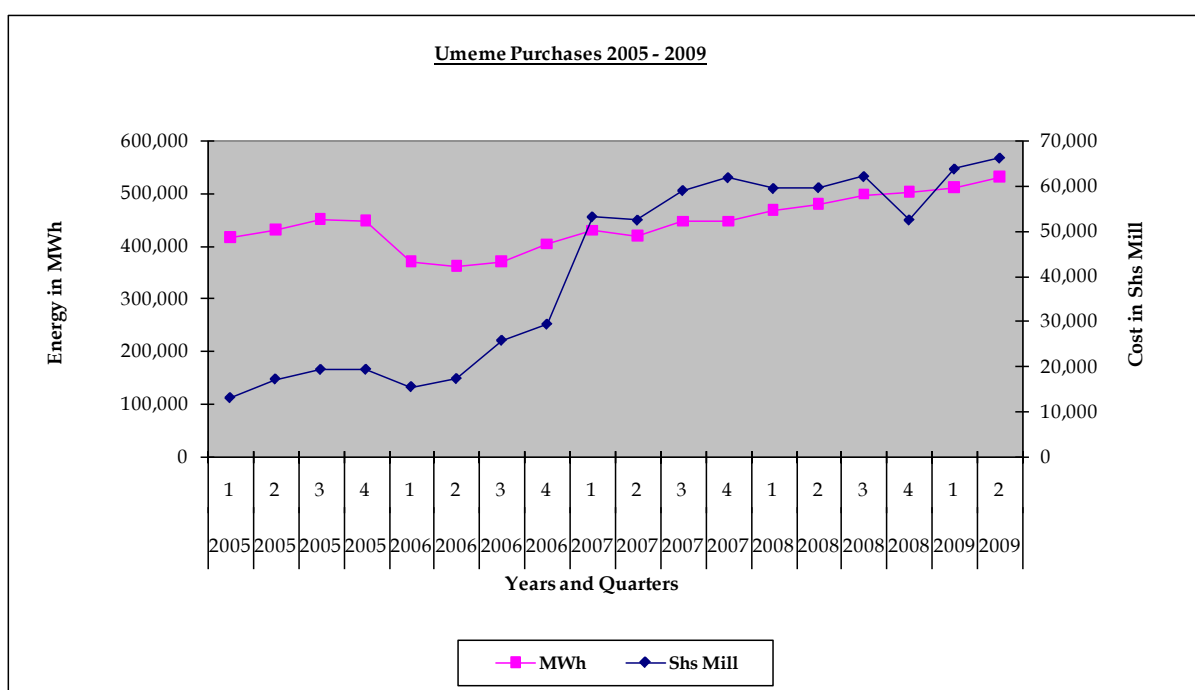
## 5.0 PERFORMANCE OF THE ELECTRICITY DISTRIBUTION SEGEMENT

Umeme Ltd is the biggest distribution company operating the national distribution grid in Uganda, Umeme accounts for 96% of the electric energy supplied in Uganda. In the recent past, another distribution company, Ferdsult Engineering Services has been contracted to supply power in the REA concession areas of Rukungiri-Kanungu and Kagadi-Kibaale. Ferdsult is the first company to operate the pre-payment metering system in Uganda. In addition to these two grid connected distribution companies, there are some off-grid generation and distribution systems in West Nile, Moroto and Adjumani.

## 5.1 Energy Purchases by Umeme

During the second half of 2008, Umeme purchased 1,000GWh of energy from UETCL at Shs 114.6 billion; this increased in the first half of 2009 to 1,043GWh but at a lower price of Shs 129.9 billion.

**Graph 8: Umeme energy purchases from UETCL (2005-2009)**



While the total shilling value of energy purchases has gradually increased as a result of increased energy purchases, the weighted average purchase price (bulk supply tariff) has not. On an annual basis, the total energy purchases from UETCL by Umeme Limited increased to 2,043.7GWh in 2008/09 compared to 1,841.3GWh in 2007/08, this increase is largely attributed to increased generation by IPPs.

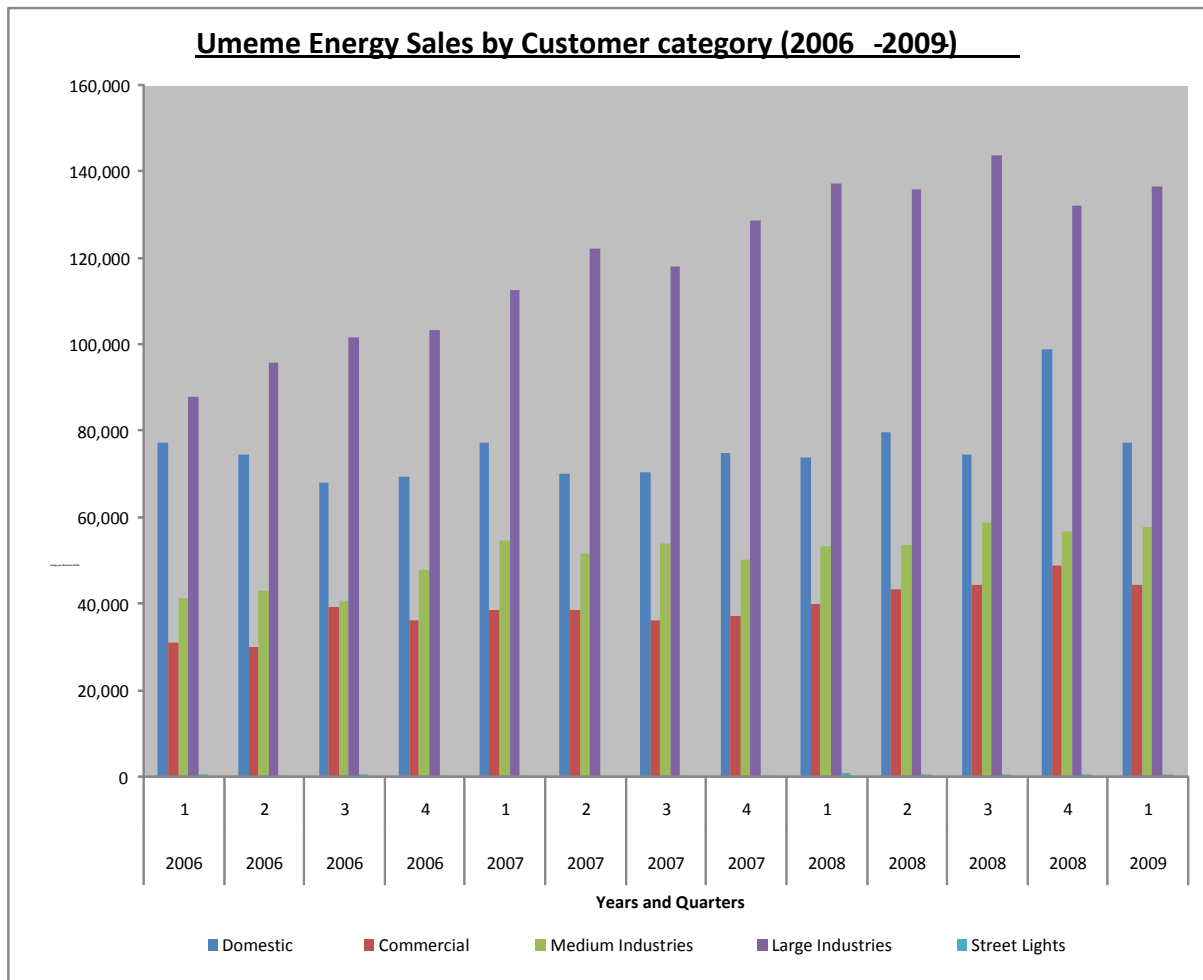
## **5.2 Energy Sales by Umeme**

Large industries continue to consume the largest proportion of bulk energy purchased by Umeme. During the period under review, consumption by this category (Code 30) increased from 40.65% of the total energy supplied in the second half of 2008 to 43.1% in the first half of the year 2009.

Domestic consumers (Code 10.1) have remained the second largest consumers of electric energy supplied by Umeme. The consumption by domestic consumers has dropped from 27.1% of the total energy supplied in the second half of 2008 to 24.5% in the first half of 2009. In absolute amounts, consumption by domestic consumers decreased from 173.7GWh to 162.2GWh. The drop in consumption by domestic consumers is attributed to the increased efforts by Umeme to deal with the distribution losses.



**Graph 9: Umeme Energy sales across all categories (2005-2009, MWh)**



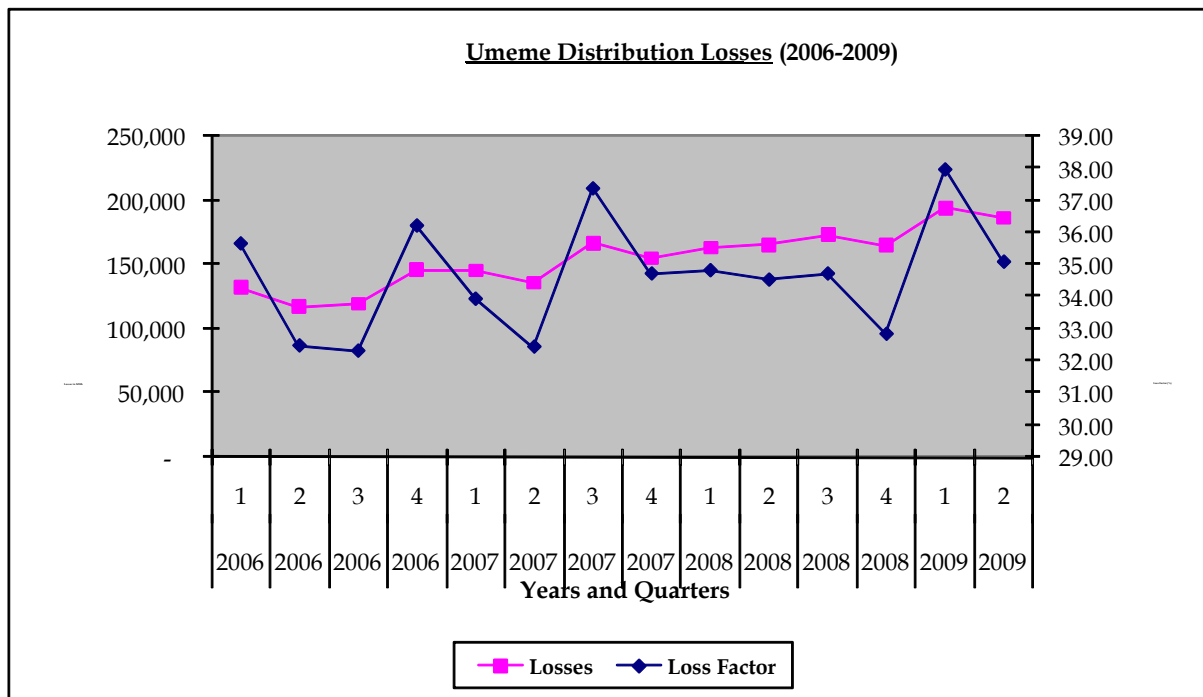
There were minimal changes in the consumption shares of the rest of the customer categories. Average percentage consumption for commercial consumers remained at about 14.5% whereas consumption for the medium industries and street lighting was on average 18% and 0.2% respectively. (See Appendix for table 6.)

### 5.3 Distribution System Losses

Distribution losses are made up of two (2) main categories of losses namely; technical and non-technical losses. Technical losses are engineering side losses caused by factors such as

resistance of the conductors in use and the transformers. Non-technical losses are caused by factors such as theft, non-payment of bills; incorrect customer databases, inaccurate billing, faulty meters, among others.

**Graph 10: Umeme overall distribution system losses 2006 – 2009 (%)**



During the second half of 2008, distribution losses averaged 33%, compared to an average of 35% in the first half of 2008. The losses increased in the first quarter of 2009 reaching 37%. On average, distribution losses averaged 36.5% in the 1<sup>st</sup> half of 2009. Umeme implemented a number of measures aimed at reducing technical and non-technical losses, for example on the side of technical losses; one measure was to carry out distribution system improvements while on the side of non-technical losses, Umeme installed bulk meters in very closely situated customers where it was difficult to monitor several meters over a small unit area an example of such customers is the maize millers.

**5.4 Umeme Number of Customers**

Table 4 shows the trend in the customer numbers by category for the period 2006 to 2009. There was a steady growth in domestic customers is realised from 275,599 in the second half of 2008 to 289,504 at the end of the first half of 2009, representing a 5% growth. There was also a notable increase in industrial customers from 169 at the beginning of the review period to 184 customers at the end of the second half of 2009 representing a 9% increase.

**Table 4: Umeme customer numbers for the period 2006 - 2009**

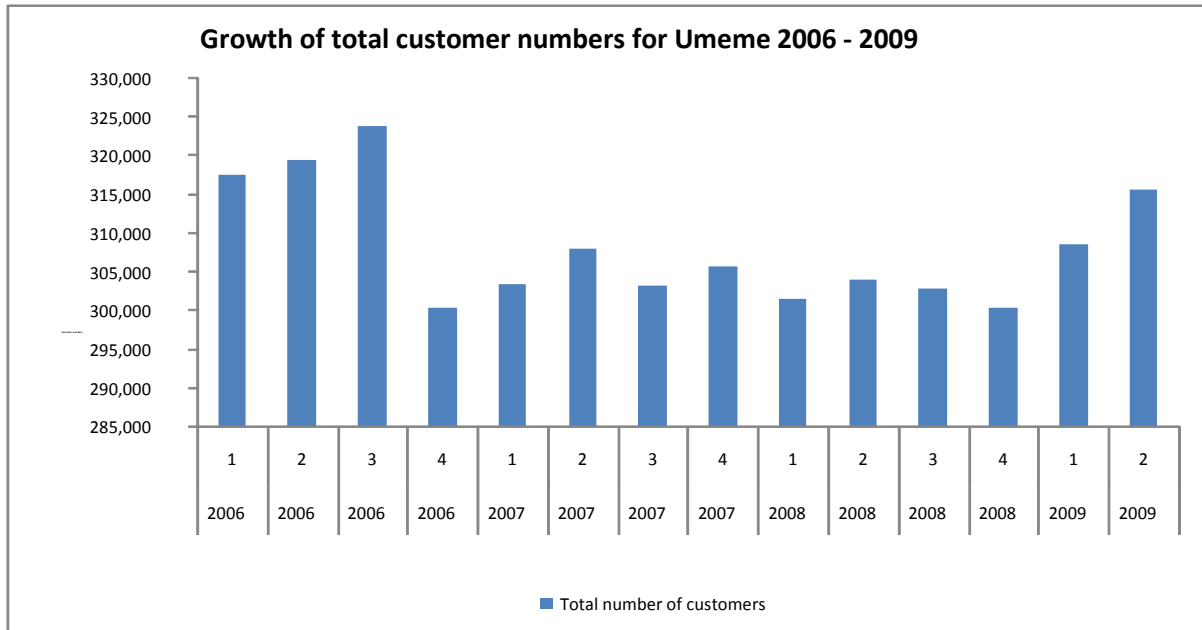
Umeme customer numbers (2006-2009)						
Period		Customer Numbers				
Year	Quarter	Domestic	Commercial	Medium Industrial	Large Industrial	Street Lights
2006	1	289,874	24,109	812	126	328
2006	2	291,724	24,099	836	130	314
2006	3	295,418	24,870	859	134	314
2006	4	296,702		870	139	315
2007	1	275,947	23,980	899	143	299
2007	2	279,439	24,922	933	148	314
2007	3	274,855	24,715	936	152	312
2007	4	277,393	24,602	954	161	334
2008	1	274,106	23,553	1,017	166	361
2008	2	276,447	23,627	1,034	170	346
2008	3	275,599	23,331	1,056	169	342
2008	4	276,255	20,484	864	159	291
2009	1	282,520	22,382	884	174	323
2009	2	289,504	22,382	913	184	316

The growth in customer numbers was driven by the efforts of Umeme to encourage more connections through establishment of a more efficient and timely application process for new connection which previously was a lengthy and cumbersome process. However the other customer categories have realised a slight drop in numbers. There was a drop in commercial customers by 4.1% from 23,331 at the beginning of the second half of 2008 to 22,382 at the end of the period under review. There was an 8% drop in the number of street lights from 342 to 316 at the end of the first half of 2009.

In graph 11, the growth in total customer numbers is shown. It should be noted that in the earlier period (2006), a higher total number of customers was reflected because of the existence of dormant, duplicated or inexistent customers on the customer register of Umeme. Efforts by Umeme to clean their customer database have led to a drop in customer numbers.

The biggest inconsistencies were in the domestic customer category. The bulk of the rectification of the database was completed in the first half of 2008.

**Graph 11: Growth in total customer numbers for Umeme (2006 – 2009)**



There was a total growth in customer numbers from 302,850 at the beginning of the review period to 315,626 at the end of the first half of 2009.

## 5.5 Umeme route line length in kilometres

There are three (3) types of distribution lines on the Uganda electricity distribution grid namely; Low Voltage which distributes up to 0.415kV of electricity, 11kV and a maximum line load of 33kV. Two forms of the lines are maintained; overhead wires and underground power cables.

By the end of the review period, there was a low voltage line length of 9,618km, 4,436km of 11kV line and 4,307km of 33kV line.

## **6 EMPLOYMENT IN THE ELECTRICITY SUPPLY INDUSTRY**

### **6.1 Generation Sector**

During the period under review, Eskom recruited more permanent staff from 109 at the beginning of the review period to 117 at the end of the review period; this was a 7.3% increase in the permanent staff employed. As at the end of the review period, Eskom employed 120 staff, of which 3 were expatriates. (See appendix table 3.)

### **6.2 Transmission Sector**

UETCL classifies its staff into two, namely; contract and casual staff. There was an increase by 9.3% of contract staff employed during the period under review. The number of casual staff grew by 2 from 237 at the beginning of the period to 239 at the end of the period. As at the end of the review period, UETCL employed a total of 486 staff, of which there were 247 contract staff and 239 casual staff. (See appendix table 3.)

### **6.3 Distribution Sector**

The number of permanent staff employed by Umeme dropped from 1,190 at the beginning of the period under review to 1,174 at the end of the period under review. This represented a 1.4% drop in permanent staff employed. By the end of the review period, Umeme employed a total of 1,174 staff. (See appendix table 3.)

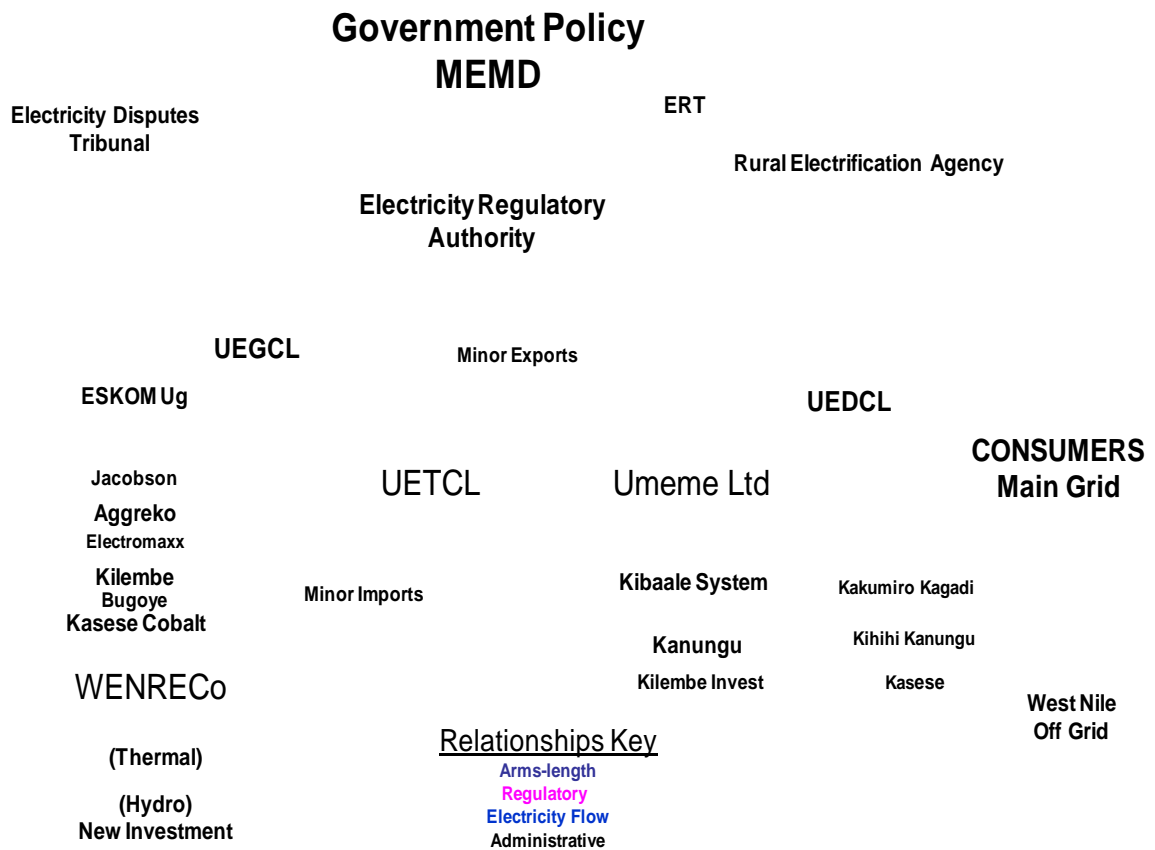
## 7 CHALLENGES AND THE WAY FORWARD

- i. Expensive thermal generation:** The energy crisis experienced at the end of 2005 necessitated the procurement of thermal plants as a short term measure (emergency capacity) to bridge the gap in generation. The biggest challenge faced now is how to phase out the expensive thermal plants and procure cheaper sources of energy, keeping in mind the need to meet the 9% growth in demand. It is projected that Bujagali would provide 250MW and a 50MW thermal plant at Kaiso Tonya using the locally produced gas and Heavy Fuel Oil (HFO) would be available earlier in order to replace the more expensive thermal plants. The government however has put more emphasis on the smaller renewable energy plants. Tronder Uganda, Eco Power Ishasha, Africa-EMS and Hydromax are expected to provide a total of 46MW of cheaper hydropower in the future. Cheaper thermal plants (Electro-maxx and Invespro U) are also expected in early 2010.
- ii. Slow progress of licensed companies in achieving commissioning due to lack of sufficient funding:** The financial crisis has severely affected a number of projects, making it difficult for companies to achieve financial closure in a shorter period and consequently delaying the commissioning of different plants.
- iii. Increase in commodity prices:** During the 2008/9 period, a number of developers had to apply for license amendments in respect of higher tariffs. The rise in prices of commodities, particularly in the construction industry, pushed up the costs of project development. The previous feed-in-tariffs for projects under 20MW could therefore not give an indicative price per unit. The Authority intends to engage a consultancy to come up with appropriate feed-in-tariffs given the current circumstances so that less time is spent on license amendments and renegotiation of PPAs.
- iv. Hydrology:** Issues of hydrology continued to present a challenge as far as generation of power at Kiira and Nalubaale Power Stations is concerned. Despite the installed capacity of 380MW, the effective capacity is only 138MW. This has led to continued reliance on the expensive thermal generators in order to keep a considerable supply of power.

- v. **High Distribution losses:** The distribution losses (both technical and commercial) remain very high. The distribution losses have oscillated between 31% and 35% since Umeme took over the concession, without any discernable pattern in loss reduction. The June 2009 losses were 35.2% while the corresponding figure for the previous year was 33.9%. Despite the efforts put in place by the utility in terms of increased investment towards loss reduction, there is a slower than anticipated reduction in losses. More effort is needed by Umeme, the Government of Uganda and consumers if the losses are to be brought down considerably.
  
- vi. **Low access levels/Low electrification rates:** Uganda's current electrification rate according to UNDP is estimated to be 9%. Electricity is still not accessible by most consumers because of the cost implication of grid extension and the inability of most households to afford the costs of connection. The extension of the grid needs a lot of money, limiting the efforts of the Rural Electrification Agency. The contribution from the communities for village schemes is equally high. The costs of electricity connection to households are deterrent to potential consumers.
  
- vii. **Institutional coordination:** The extension of schemes especially in the rural areas requires coordination by the sector players like Rural Electrification Agency (REA) and Electricity Regulatory Authority (ERA). However, the required coordination has been lacking. For example, licensees on a number of occasions operate schemes leased on to them by REA without obtaining licenses from the Regulator. In cases where disagreements arise between these 'leasees' and the consumer, ERA is usually the customer's first point of reference. However, without a valid license, handling such type of cases becomes a bit complicated.

**APPENDIX**

**1. Arrangement of Institutions within the Electricity Sector as at 2009**





2. Table 5: Umeme Energy purchases and cost (MWh, Shs million) 2005-2009

<b>Umeme Energy Purchases (MWh) and Cost(Shs Mill) 2005 - 2009</b>			
<b>Year</b>	<b>Quarter</b>	<b>Transmission</b>	
		<b>MWh</b>	<b>Shs Mill</b>
2005	1	416,840	13,154
2005	2	430,227	17,292
2005	3	451,726	19,401
2005	4	447,974	19,432
2006	1	370,601	15,590
2006	2	361,287	17,380
2006	3	370,192	25,847
2006	4	403,438	29,420
2007	1	429,207	53,159
2007	2	419,365	52,441
2007	3	446,664	58,991
2007	4	446,925	61,829
2008	1	468,890	59,440
2008	2	478,822	59,627
2008	3	498,344	62,073
2008	4	502,355	52,476
2009	1	511,243	63,749
2009	2	531,705	66,175

**3. Table 6: Umeme Energy Sales across all Customer categories (MWh, 2005-2009)**

<b>Umeme Energy Sales to Customer Categories 2005 - 2009 (MWh)</b>											
<b>Period</b>		<b>Domestic</b>		<b>Commercial</b>		<b>Medium Industries</b>		<b>Large Industries</b>		<b>Street Lights</b>	
<b>Year</b>	<b>Quarter</b>	<b>MWh</b>	<b>% Share</b>	<b>MWh</b>	<b>% Share</b>	<b>MWh</b>	<b>% Share</b>	<b>MWh</b>	<b>% Share</b>	<b>MWh</b>	<b>% Share</b>
2005	1	23,273	32.8	6,909	9.7	25,808	36.4	14,873	21.0	37	0.1
2005	2	101,268	34.7	39,538	13.5	57,135	19.6	93,831	32.1	179	0.1
2005	3	95,150	33.7	37,305	13.2	51,731	18.3	98,050	34.7	300	0.1
2005	4	112,059	30.3	44,379	12.0	71,117	19.3	141,331	38.3	403	0.1
<b>TOTALS</b>		<b>331,750</b>	<b>32.7</b>	<b>128,131</b>	<b>12.6</b>	<b>205,791</b>	<b>20.3</b>	<b>348,085</b>	<b>34.3</b>	<b>919</b>	<b>0.1</b>
2006	1	77,525	32.5	31,131	13.1	41,356	17.3	88,077	36.9	312	0.1
2006	2	74,732	30.6	30,083	12.3	43,189	17.7	95,768	39.3	128	0.1
2006	3	68,294	27.3	39,262	15.7	40,856	16.3	101,793	40.6	320	0.1
2006	4	69,635	27.1	36,301	14.1	47,908	18.6	103,321	40.2	104	0.0
<b>TOTALS</b>		<b>290,186</b>	<b>29.3</b>	<b>136,777</b>	<b>13.8</b>	<b>173,309</b>	<b>17.5</b>	<b>388,959</b>	<b>39.3</b>	<b>864</b>	<b>0.1</b>
2007	1	77,421	27.3	38,552	13.6	54,860	19.4	112,594	39.7	86	0.0
2007	2	70,204	24.8	38,581	13.6	51,886	18.3	122,457	43.2	134	0.0
2007	3	70,728	25.3	36,260	13.0	54,057	19.3	118,362	42.3	237	0.1
2007	4	75,142	25.8	37,237	12.8	50,377	17.3	128,690	44.1	231	0.1
<b>TOTALS</b>		<b>293,495</b>	<b>25.8</b>	<b>150,630</b>	<b>13.2</b>	<b>211,180</b>	<b>18.6</b>	<b>482,103</b>	<b>42.4</b>	<b>688</b>	<b>0.1</b>
2008	1	73,915	24.2	40,055	13.1	53,314	17.4	137,415	45.0	837	0.3
2008	2	79,794	25.5	43,448	13.9	53,880	17.2	135,957	43.4	336	0.1
2008	3	80,703	24.8	45,608	14.0	61,498	18.9	137,024	42.1	417	0.1
2008	4	98,927	29.3	48,855	14.5	56,859	16.9	132,329	39.2	353	0.1
<b>TOTALS</b>		<b>333,338</b>	<b>26.0</b>	<b>177,965</b>	<b>13.9</b>	<b>225,550</b>	<b>17.6</b>	<b>542,725</b>	<b>42.4</b>	<b>1,944</b>	<b>0.2</b>
2009	1	77,524	24.5	44,522	14.0	57,921	18.3	136,574	43.1	509	0.2
2009	2	84,640	24.5	53,246	15.4	58,123	16.8	148,561	43.1	485	0.1

4. Table 7: Employment in the Electricity Supply Industry (2006-2009)

<b>Employment in the Electricity Sector Industry (ESI) for 2006/9</b>					
<b>Year</b>	<b>Quarter</b>	<b>Expatriate</b>	<b>Permanent</b>	<b>Contract</b>	<b>Casual</b>
<b>GENERATION - ESKOM</b>					
2006	1	-	84	4	-
2006	2	-	84	4	-
2006	3	3	83	12	-
2006	4	3	82	11	-
2007	1	3	80	33	-
2007	2	2	94	6	-
2007	3	1	96	28	-
2007	4	1	96	28	-
2008	1	1	98	21	-
2008	2	2	98	25	-
2008	3	2	109	2	-
2008	4	1	112	2	-
2009	1	3	116	1	-
2009	2	3	114	-	-
<b>TRANSMISSION - UETCL</b>					
2006	1	-	196	36	190
2006	2	-	-	230	190
2006	3	-	-	228	193
2006	4	-	-	227	191
2007	1	-	-	224	191
2007	2	-	-	245	170
2007	3	-	-	224	209
2007	4	-	-	224	205
2008	1	-	-	223	231
2008	2	-	-	229	232
2008	3	-	-	226	237
2008	4	-	-	232	230
2009	1	-	-	233	232
2009	2	-	-	245	231
<b>DISTRIBUTION - UMEME (U) LTD</b>					
2006	1	-	1,191	21	157
2006	2	-	1,166	36	152
2006	3	-	1,094	41	44
2006	4	-	1,108	38	26
2007	1	-	1,118	44	46
2007	2	-	1,119	43	45
2007	3	-	1,157	77	65
2007	4	-	1,185	27	17
2008	1	-	1,179	46	18
2008	2	-	1,194	35	-
2008	3	-	1,190	37	-
2008	4	-	1,165	49	-
2009	1	-	1,172	15	-
2009	2	-	1,174	-	-