



UMEME 2014 INVESTMENT VERIFICATION REPORT

JUNE 2015

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1. 1 INTRODUCTION

The Umeme Limited Supply License entitles Umeme to a Return on Investment (ROI) made on the network as approved by the Authority. The Authority developed the Investment Approval and Verification Guidelines to streamline the presentation and approval of investment plans and approval of completed investments. Upon verification and approval by the Authority, the costs prudently incurred by the utility are compensated through the retail tariff pursuant to Section 75 of The Electricity Act, 1999.

In January 2014, Umeme submitted an Investment Plan of US\$ 131.75million to which the Authority considered and approved US\$87.26 million (including 2013 investments carried forward). Umeme submitted US\$ 92,589,343 as completed Investments in 2014 for verification in accordance with the Supply License and Investment Verification and Approval Guidelines. Table 1 shows the summarized category of the submission.

Table 1: UMEME'S SUBMISSION OF INVESTMENTS UNDERTAKEN IN 2014

| S/N | Investment Category | Umeme's Submission (US\$) |
|-----|---|---------------------------|
| 1 | AMR Project | 3,359,118 |
| 2 | Customer Engineering Services Integration | 327,865 |
| 3 | Commercial Loss Reduction | 654,570 |
| 4 | Hand Held Meter Reading System | 600,317 |
| 5 | Load Growth | 1,795,339 |
| 6 | Distribution Automation | 21,921 |
| 7 | New Connections | 11,021,200 |
| 8 | Prepayment Metering | 12,356,937 |
| 9 | OBA Connections | 132,946 |
| 10 | Protection Systems | 166,277 |
| 11 | Restoration | 21,043,108 |
| 12 | Restoration With Safety Priority | 2,223,020 |
| 13 | Sub-Stations | 6,456,179 |
| 14 | System Improvements | 818,226 |
| 15 | Technical Loss Reduction | 29,797,237 |
| 16 | Transformer Injections | 1,815,085 |
| | TOTAL | 92,589,343 |

The Authority reviewed the annual Audited Financial Statements as audited by Ernest & Young. The statements showed a total of US\$ 96.8 million investments that were pending verification, of which US\$7.8m was Work in Progress (WIP), leaving US\$89 million eligible completed investments for verification to earn a return. The information in the financial statements contradicted the one submitted for verification.

For purposes of verification of completed investments, ERA based on the eligible investments as per the Audited Financial statements of Umeme for the FY ended December 2014.

2. INVESTMENT VERIFICATION PROCESS

The verification of investments for the year 2014 started with a kickoff meeting attended by the Management of Umeme, Electricity Regulatory Authority and Uganda Electricity Distribution Limited (UEDCL). This was followed by a desk and field verification exercise before conducting an exit meeting.

3. METHODOLOGY AND MAJOR PRINCIPLES

The Electricity (Tariff Code) Regulations, 2003 section 6 (1) requires the Licensee to justify any costs or investments included in the formulation of tariffs. The Authority may challenge such costs and where necessary reject them if it considers them not to be prudently incurred or are unreasonable in nature. The Authority verified the investments submitted by Umeme based on the major principles as outlined the section below.

3.1 MAJOR PRINCIPLES

During the verification, the following factors/investments as stipulated in the various legislations and guidelines were considered:-

- a) Executed investments without prior Authority approval were not to be considered for purposes of inclusion in the rate base;
- b) Transformers which did not last their useful lives and were replaced with a higher rated transformer (upgrade), the value of the new

transformer was to be offset with the cost of the old transformer for ROI purposes;

- c) Provisions were to be *considered for ROI subject to verification*;
- d) Insurance proceeds were offset from the asset base;
- e) Replacement of low voltage (LV) poles, transformers, conductor together with their associated labor and transport costs were not to be considered;
- f) Borrowing costs, overhead absorption, labor and transport costs relating to supervision by Umeme staff were not considered as part of Capital Expenditure (CAPEX) to earn a ROI. They were to instead be considered as O&M costs;
- g) Postpaid new connections from October 2014 were not considered for ROI;
- h) Capital for Work in Progress (CWIP) submitted has not been considered as part of investments for ROI purposes;
- i) Where there was a variation of scope, only the approved amounts were considered for ROI;
- j) No 10mm² solidal connections were submitted for verification; and
- k) Customer funded connections and other concessional funded investments were not considered in this report for ROI purposes.

Other detailed assumptions followed were included in the respective sections of this report.

3.2 METHODOLOGY

The investment verification process was undertaken in two phases:

3.2.1 PHASE I- DESK REVIEW

In this phase, all documentation of submitted completed investments were reviewed to check the justification given for the investments, the procurement processes, the respective contracts, the implementation and close-out reports, and any payments made against completed works. All documentation regarding each investment submitted was fully verified for consistence with the Investment Approval and Verification

Guideline, the License Terms and Conditions and the Electricity Tariff Code Regulation with regards to Investments.

In this phase, assumptions were undertaken while verifying the completeness and accuracy of the new connections. Detailed assumptions are as stipulated in the new connections sections.

3.2.2 PHASE II – FIELD VERIFICATION

After the desk review, the investment verification team sampled out particular investments based on the materiality of the investments to validate the works done in the field to confirm implementation and quality of works done.

3.2.3 PRESENTATION

The review of the submission made by Umeme are presented in two parts:

- a) Approved investments for 2014 including 2013 carryovers as per the Authority's approval; and,
- b) 2014 Investments carried out by the Umeme without prior Authority's approval.

For the purposes of this report, only approved investments were been considered.

3.3 CAPITALISED PROJECT FINANCIAL COSTS

The project financial costs that were finally capitalized and submitted as Umeme completed investments included four (4) categories.

3.3.1 MATERIAL COSTS

All Umeme projects are assigned specific project scheme numbers in the accounting system (SUN) under the Capital Work in Progress (CWIP). The required project materials are issued from the Umeme Central Stores

using approved Combined Requisition and Issue Vouchers (CRIV) on a moving Weighted Average Cost (WACC) method of pricing against the project scheme number and hence the entire project material costs are accumulated over the project life. At the end of the project, issued materials are reconciled against the usage and the remaining materials are returned to the Umeme Central Stores using Goods received Notes (GRNs) that are recorded against the project scheme number to offset these from the initial project cost.

The WACC prices are aimed at smoothening out unit costs without causing unnecessary spikes in price movements using the law of averages¹ which presupposes that future items into the basket will likely balance any past deviation. A review of submitted costs for some materials showed inconsistent price variations of over 200% as shown in table 2 that were shared with Umeme for an explanation.

Table 2: INCONSISTENT PRICING OF MATERIALS

| Description | Quantity | Cost | Period | Price | Variance |
|------------------------------|------------|-----------------|----------|--------|----------|
| Insulator Polymeric 33Kv | (22.00) | (927,784.00) | 2014/005 | 42,172 | 39% |
| Insulator Polymeric 33Kv | 120.00 | 7,033,200.00 | 2013/011 | 58,610 | -35% |
| Insulator Polymeric 33Kv | 30.00 | 1,149,990.00 | 2014/003 | 38,333 | |
| Insulator R90 Porcel.Pin | (20.00) | (1,594,040.00) | 2014/005 | 79,702 | -40% |
| Insulator R90 Porcel.Pin | 142.00 | 6,789,872.00 | 2013/011 | 47,816 | -3% |
| Insulator R90 Porcel.Pin | 72.00 | 3,335,976.00 | 2014/002 | 46,333 | -92% |
| Insulator 11Kv Stay | 440.00 | 1,545,280.00 | 2013/011 | 3,512 | 0% |
| Insulator 11Kv Stay | 500.00 | 1,756,000.00 | 2014/001 | 3,512 | 212% |
| Insulator 11Kv Stay | 221.00 | 2,424,812.00 | 2014/003 | 10,972 | |
| Clamp Strain OH Conc-10-16mm | (3,000.00) | (21,471,000.00) | 2014/006 | 7,157 | -2% |
| Clamp Strain OH Conc-10-16mm | 5,716.00 | 40,074,876.00 | 2013/012 | 7,011 | -40% |

The variations are expected to be in a reasonable range of (5-10%) based on the changes in micro-economic factors that costs of the items procured by Umeme and captured in the store. For purposes of this

¹ The law of averages is a layman's term for a belief that the statistical distribution of outcomes among members of a small sample must reflect the distribution of outcomes across the population as a whole. https://en.wikipedia.org/wiki/Law_of_averages

investment verification, price variations of more than 10% were considered as irregular.

3.3.2 LABOR AND TRANSPORT COSTS

A contractor that signed a contract with Umeme for a particular project was assigned both a Project Technician and Manager. The contractor receives materials and begins the execution of the project under the supervision of the Project Technician and the Manager. Periodically and for some projects at contractual milestones, the contractors raise invoices to Umeme for the completed partial works. After verification of the works done, the Project Technician raises an Interim Payment Certificate that has a series of approvals within the Capital Contracts Division (CCD) before it is sent to the Chief Financial Officer (CFO) for the final approval. The invoice is then captured as a cost on the CWIP against the specific project scheme number.

Supervision expenses like subsistence allowance and one off transport costs that are incurred by the Project Technician and Manager while upcountry on supervision duty have been included in the CWIP account. Inclusion of such costs as part of the asset base would lead to double counting since the costs of staff were approved under the DOMC parameters for Umeme. Such costs have not been considered for ROI purposes.

3.3.3 ABSORPTION OF OVERHEAD COSTS

CCD annual administration costs like temporary staff costs and transport costs for leased vehicles, and other administrative costs are apportioned to the project as expenditure and capitalized. Each project receives a cost based on its portion of the total costs of all projects completed in the period. The respective cost is then posted by increasing CWIP and reducing the Distribution Operations and Maintenance Costs (DOMC).

These costs were allowed as DOMC costs to Umeme and remain as such; their capitalization would call for unnecessary quest for accountability

on the use of DOMC by Umeme which in itself would require a revision of the DOMC allocation rather than capitalizing these DOMC expenses.

3.3.4 BORROWING COSTS

For the first time since 2005, Umeme included in the submission borrowing costs used to bring the asset to use. The recognition criteria followed by Umeme is in line with the International Accounting Standard (IAS 23) Borrowing Costs. This standard requires that to the extent that an entity borrows funds generally and uses them for the purpose of obtaining a qualifying asset, the entity shall determine the amount of borrowing costs eligible for capitalization by applying a capitalization rate to the expenditures on that asset.

The capitalization rate shall be the weighted average of the borrowed costs applicable to the borrowings of the entity that are outstanding for the period under construction.

Relatedly, Section 6 of the Tariff Methodology covering the Return on Investments states that; "Licensee's Investments in plant in services shall be equal to Licensee's total costs of installing capital assets, including costs of purchasing equipment and materials, import duties paid, labor costs, transportation and **costs of funds** used during construction, overheads and other costs incurred prior to placing the asset into commercial service less any capital contributions in aid of construction received from customers, any net salvage value from disposal of system assets, any subsidies received by the Company for purposes of capital investment, and any insurance proceeds received by the licensee for damaged or destroyed facilities as set forth in applicable accounting regulations of the Authority".

Umeme submitted that in arriving at the amount recorded as borrowing costs in the project costs of 2014 investments, the company used the methodology described in IAS 23 above. The capitalization rate used is 6.3% as shown in the table 3.

Table 3: CALCULATION OF UMEME'S CAPITALIZED BORROWING COSTS

| Loan | Amount Outstanding | No of Days | Weight 365 days | WATB |
|-------------------------|---------------------------|-------------------|------------------------|---------------------|
| Facility A ² | \$16,470,588 | 365 | 1.00 | \$16,470,588 |
| Facility B ³ | \$23,529,412 | 365 | 1.00 | \$23,529,412 |
| Facility A | \$14,411,765 | 266 | 0.73 | \$10,502,820 |
| Facility B | \$20,588,235 | 266 | 0.73 | \$15,004,029 |
| Facility A | \$10,294,118 | 161 | 0.44 | \$4,540,693 |
| Facility B | \$14,705,882 | 161 | 0.44 | \$6,486,704 |
| | \$100,000,000 | | | \$76,534,247 |

Interest Plus loan facility costs for Period \$4,827,188

$$\text{Rate} = \frac{\text{Interest}}{\text{WATB}} = \mathbf{6.31\%}$$

The qualifying assets for capitalization of borrowing costs were valued at US\$ 64,556,522 to which Umeme applied the capitalization rate to have the total borrowing costs of US\$4,071,726. This amount was apportioned to the respective projects as a borrowing to form part of the total project costs.

The Authority is aware that Umeme is entitled to a return on Investment of 20% on the verified and approved investments by ERA. The ROI is more of an assurance to the company that irrespective of the financing source, the company will receive a return of 20%. This return is guaranteed / fixed irrespective of the amount that is funded by either debt or equity.

It should also be noted that the financing mechanism of investments by Umeme Limited in terms of debt or equity is its preserve. The License only provides a guaranteed return on investment of 20% irrespective of the financing mechanism by the company. This arrangement is different

² Facility A Amount borrowed from International Finance Corporation (IFC)

³ Facility B-Amount borrowed from Stanbic Bank and Standard Chartered Bank

from a Return on Equity (ROE) structure where the utility is provided with a guaranteed Return on Equity and the debt service obligation and interest thereof are included in tariff determination.

Under the ROE arrangement, the financing structure is known and agreed by the ERA and debt service included in the tariff. In the case of Umeme Limited, the financing structure is not known or agreed by the Authority and it's therefore inconceivable that the Electricity consumers should pay this cost. Umeme Limited cannot have the preserve of choosing the capital structure (how much to borrow and at what rate) and expect electricity consumers to pay the costs arising from this arrangement.

The capital recovery charged and included in the Umeme Limited Tariff Methodology is meant to recover the investment capital and is not necessarily pegged on debt service obligation arising from financing of investment using debt. Additionally, there is no interest payment to be paid through the tariff since this is included as part of the ROI.

There are circumstances where borrowed costs have been considered as part of the capitalized cost. These are;-

- a) Where the debt funding agreements have been brought to the attention of ERA and are reviewed by the Authority to be fair and reasonable prior to execution of contracts;
- b) Where ERA is in control to determine the remedies for the failure to execute the project assignments in time (duration of the contract); and
- c) Where there is a split between the equity portion and the debt portion such that the debt repayment together with the duration is clear right from the start and is predictable on how much will be consistently paid through the contract period.

Based on the above considerations, the reviewed submission has rejected capitalization of borrowing costs for purposes of earning a ROI.

3.3.5 PROVISIONS

Provisions are costs incurred by Umeme but not yet paid by the time the project is closed. During project closure, a Journal Voucher (JV) is passed based on the outstanding invoices, contract amounts or indications of obligations to be met to allocate the total costs of the project. Supporting documents usually verified include supplier contracts, outstanding invoices, orders and any other agreements.

In the past, the Authority considered such provisions as part of the cost of the investment but on a number of occasions, suppliers return materials or opt not to reconcile instigating a deduction on the final payment. In instances where such an asset had been approved for ROI, this would imply that the ROI had been over stated to the extent of the deducted amount or material off-set amounts. Such cases were sighted in the project costs of Lumpewe substation and Waliggo substation.

In the 2014 verification report, provisions have been considered for ROI subject to a further verification during the half-year review after the company has reconciled with its contractors. The Authority shall thereafter disallow any provisions outstanding from ROI.

4 APPROVED INVESTMENTS 2014

The Authority approved a total investment budget for Umeme to undertake in 2014 amounting to **US\$ 87,262,000**. The approval was based on the submission of investment budget amounts in specific project categories. These project categories included:

- a) 2013 Carryover investments (investments that were approved by the Authority in 2013 which registered time overruns and as such were to be completed in 2014) totaling to **US\$ 20.837 million;**
- b) Load Growth investments: **US\$ 20.913 million;**
- c) Loss Reduction investments: **US\$ 15.71 million;**
- d) Reliability and Quality of Supply Improvement investments worth **US\$12.45 million;** and

e) Business Efficiency Improvement investments worth **US\$ 17.352 million**. **Annex 1 shows a summary of the recommended amounts against approved investments by the Authority and the details are elaborated in this report.**

4.1 2013 CARRYOVERS (US\$ 20.837 MILLION)

The Authority approved a total of US\$ 20.837 million for Umeme to complete investments that registered time overruns in 2013. Table 4 shows the investments that were approved by the Authority.

Table 4: 2013 UMEME CARRYOVER INVESTMENTS APPROVED BY THE AUTHORITY

| S/N | Project Name | ERA Approval (US\$) | Umeme's Submission (US\$) |
|-----|---|---------------------|---------------------------|
| | Category 1: Restoration | | |
| 1 | Hoima – Busunju | 2,300,000 | 2,322,481 |
| 2 | Mukono – Seeta T-offs | 500,000 | 337,786 |
| 3 | Kayunga – Kangulumira | 500,000 | 476,974 |
| 4 | Mbarara Central – Masaka west | 2,200,000 | 2,105,897 |
| 5 | Mutundwe – Mitala Maria | 1,350,000 | 1,108,819 |
| 6 | Masaka Central – Mitala Maria | | 842,857 |
| 7 | Mbale – Kumi | 3,400,000 | 996,203 |
| 8 | Opuyo – Kumi – Serere | | 1,683,877 |
| 9 | Mbale – Kapchorwa | | 1,036,752 |
| 10 | Tororo – Mbale 1 | 1,250,000 | 769,470 |
| 11 | Tororo – Mbale 2 | | 216,151 |
| 12 | Mbarara North – Ntungamo – Kabale | 930,000 | 15,895 |
| 13 | Mbarara North – Ishaka | 710,000 | 591,384 |
| 14 | Ishaka – Rukungiri | 1,080,000 | 845,437 |
| 15 | Masaka West – Masaka Central | 100,000 | 38,590 |
| 16 | Lira – Apac – Masindi | 1,430,000 | 1,683,877 |
| 17 | Lira 33kV Switchgear and Substation battery banks | 1,700,000 | 533,241 |
| | Category 2 Technical losses | | |
| 18 | Namugongo | 876,514 | 5,052,112 |
| 19 | Mutundwe – Kabowa | 260,000 | 272,138 |
| | Category 3: New & Load Growth | | |
| 20 | Queensway Substation | 2,250,000 | 4,159,964 |
| 21 | Jinja 33kV lines reconductoring | | 106,020 |
| | Total | 20,837,000 | 24,662,684 |

4.1.1 RESTORATION PROJECTS

Umeme submitted fifteen (15) out of the approved sixteen (16) projects as implemented to completion under this category. Only one project (Mbarara – Ntungamo – Kabale line) was declared to be incomplete as works were still on-going at the time of verification.

4.1.1.1 DESK REVIEW

The desk review was done on submitted projects with the following objectives;

- a) To verify that the project documentation submitted is in line with the projects as approved by the Authority in terms of scope and cost estimates as per the Authority's approval;
- b) Confirm whether the standard procurement process were done and there was value for money;
- c) Verify the accuracy, quality and appropriateness of the materials issued from stores;
- d) Confirm whether the payments were made in line with the material reconciliations and agreed contract terms and conditions; and
- e) Confirm whether the projects were duly commissioned within the investment period, handed over and do exist to give value for benefit of consumers.

To achieve the above objectives, the following documentations were reviewed:

- i) Planning documents including:
 - Project justification/initiation document warranting the need for the project in the locality; and
 - Project costing documentation i.e. proposed designs/drawings of the projects, scope of works, material requirements, and final costing.
- ii) Procurement documents including contract award documentation i.e. work purchase orders, notices to proceed.

- iii) Project implementation documentation including progress reports, material requisitions and movements as recorded on the CRIVs, contractor safety assessment reports, Interim Payment certificates to contractors for works done, variation orders in the event of increased scope of works, material reconciliations and material returns, testing and commissioning reports and the allocation of project financial cost in the SUN system.
- iv) Project closure documentation including project as built drawings, project handover reports, final material reconciliation and goods returned, partial completion certificates and final completion certificates.

All the documentation submitted for the respective projects was reviewed and informed the verification findings.

The following were revealed during the desk verification exercise:

- The scope of works under restoration was largely replacement of MV poles and associated assembly, and included a component of conductor upgrade from 25mm² conductor sizes to larger conductor sizes i.e. 50mm² and 100mm².
- The submission on project financial costs included the following categories namely material costs, labor and transport costs, absorption of overhead costs and borrowing costs. Table 5 shows the breakdown of the costs for the 2013 restoration projects under carryovers.

**Table 5: BREAKDOWN OF PROJECT FINANCIAL COSTS FOR RESTORATION
2013 CARRYOVERS**

| | Category 1: Restoration | ERA Approval (US\$) | Submission (US\$) |
|----|--------------------------------|----------------------------|--------------------------|
| 1 | Hoima – Busunju | 2,300,000 | 2,322,481 |
| 2 | Mukono – Seeta T-offs | 500,000 | 337,786 |
| 3 | Kayunga – Kangulumira | 500,000 | 476,974 |
| 4 | Mbarara Central – Masaka west | 2,200,000 | 2,105,897 |
| 5 | Mutundwe – Mitala Maria | 1,350,000 | 1,108,819 |
| 6 | Masaka Central – Mitala Maria | | 842,857 |
| 7 | Mbale – Kumi | 3,400,000 | 996,203 |
| 8 | Opuyo – Kumi – Serere | | 1,509,171 |
| 9 | Mbale – Kapchorwa | | 1,036,752 |
| 10 | Tororo – Mbale 1 | 1,250,000 | 769,470 |
| 11 | Tororo – Mbale 2 | | 216,151 |
| 12 | Mbarara North – Ntungamo – Kab | 930,000 | 15,895 |
| 13 | Mbarara North – Ishaka | 710,000 | 591,384 |
| 14 | Ishaka – Rukungiri | 1,080,000 | 845,437 |
| 15 | Masaka West – Masaka Central | 100,000 | 38,590 |
| 16 | Lira- Apac – Masindi | 1,430,000 | 1,683,877 |
| | | 15,750,000 | 14,897,744 |

4.1.1.2 FIELD VERIFICATION FINDINGS

All completed and submitted feeder restoration projects (fifteen in number) were verified to determine physical existence, assess the actual works done against approved scope, the materials issued, quality and standard of work done.

The field verification revealed the following:

- i) The quality of works done on the restoration feeders was generally good. All poles were upright and stringing of conductor was done well with allowable sags. There were cases of poles not having pole caps. This was evident on the feeders of Mukono – Seeta, Kayunga – Kangulumira where 31 poles did not have pole caps;
- ii) Material reconciliations of key cost drivers for each project were done with the field findings. Based on the field findings, the cost were

adjusted for the projects where significant variances were noted. The projects where significant variances were noted included:

- Tororo – Mbale 1: The material extract submission sheet showed that the company issued 161 (14m) poles from the store yet the field findings could only locate 45 (14m) poles leaving a total of 116 (14m) poles unaccounted for. Umeme explained that these poles were used on the Tororo – Mbale 2 feeders due to revision of the scope.
- Tororo – Mbale 2: The material extract submission sheet showed that Umeme issued 47 (12m) poles and 19 (14m) poles for this feeder. The field findings however, revealed that the company installed 409 (12m) poles and 57 (14m) poles, quantities that are significantly above what was issued. As mentioned earlier, Umeme increased the scope of works to be done on this feeder and used the balance poles on Tororo – Mbale 1 to complete the works on the two T-off of the Tororo – Mbale 2 feeder i.e. Kiyeyi and Kachonga. A review of the material reconciliations submitted by Umeme showed inconsistent results from what the field findings derived. Details can be seen in Table 6.

Table 6: RECONCILIATIONS FOR THE MOVEMENT OF 12M POLES AND 14M POLES ON TORORO – MBALE 1 AND TORORO – MBALE 2 FEEDERS

| Feeder | Pole categories | Treated Wood Poles 14mtr | Treated Wood Poles 12mtr | Totals |
|-------------------------------|------------------------|--------------------------|--------------------------|------------|
| Tororo Mbale 1 | Issued | 161 | 499 | 660 |
| | Installed | 161 | 396 | 557 |
| | Verified | 45 | 495 | 540 |
| Tororo Mbale 2 | Issued | 19 | 257 | 276 |
| | Installed | 19 | 387 | 406 |
| | Verified | 57 | 409 | 466 |
| Tororo Mbale 1 & 2 | Total issued | 180 | 756 | 936 |
| | Total installed | 180 | 783 | 963 |
| | Verified | 102 | 904 | 1,006 |

The reconciliations showed inconsistencies on the number of 14m poles and 12m poles verified. According to the submission, it showed that less 14m poles were verified (i.e. 78 less) in the field than what was reported as issued and installed. It further showed that more 12m poles (i.e. 148 more) were verified than what was reported as issued and installed. The findings show that Umeme reported more 12m poles installed (i.e. 27 more) than what was issued.

The verification observed that, the as-built drawings submitted were not reflective of the actual poles replaced which made the process of field verification extremely hard as it depended on the contractor judgment and memory as to which poles were actually replaced.

It was further noted that there was no formal authorization of the movement of the poles from one feeder to another. Umeme explained that since it was the same contractor doing both jobs, there was no need for authorization of the movement.

That notwithstanding, Umeme in its 2015 investment plan submitted the same T-offs (i.e. Kiyeyi and Kachonga) of the Tororo – Mbale 2 feeder for approval. These investments for Tororo – Mbale 1 and Tororo – Mbale 2 should be rejected until Umeme submits a consistent value and actual works done.

4.1.1.3 CONCLUSIONS

From the verification findings, only thirteen (13) investments undertaken under this category of carryovers with materials that match the submission were considered for ROI. Investments made on the Tororo – Mbale 1 and Tororo – Mbale 2 were to be set aside until a proper reconciliation of materials is done showing movement of materials in line with the field verification findings.

4.1.1.4 AUTHORITY DECISION

The Authority approved **US\$ 11,711,987** for this category which excluded costs considered as O&M in nature and provisional expenditure (US\$ 890,756).

4.1.2 TECHNICAL LOSSES

This category had two projects, Kireka – Namugongo feeder and Mutundwe – Kabowa feeder. The verification team reviewed the following documentation to meet the objectives set out in 4.2 above:-

a) Project planning documents included:

- Project justification/rationale for the project; and
- Project costing documentation i.e. proposed designs/drawings of the projects, scope of works, material requirements, and final costing.

b) Procurement documents including contract award documentation i.e. work purchase orders, notice to proceed.

c) Project implementation documentation including progress reports, material requisitions and movements as recorded on the CRIVs, contractor safety assessment reports, Interim Payment certificates to contractors for works done, variation orders in the event of increased scope of works, material reconciliations and material returns, testing and commissioning reports and the allocation of project financial cost in the SUN system.

d) Project closure documentation including project as built drawings, project handover reports, final material reconciliation and goods returned, partial completion certificates and final completion certificates.

4.1.2.1 KIREKA – NAMUGONGO FEEDER

The Authority approved an injection of 60 transformers at a cost of US\$ 876,514 in Namugongo area to reduce technical losses. In the same

approval, the Authority deferred the approval of the MV and LV costs until Umeme had submitted its separate request justifying the change of scope. Umeme later submitted a breakdown of the costs in the categories of MV and transformer works, ABC works and LV pole replacement works.

4.1.2.1.1 DESK REVIEW

Contrary to the approved scope of works, Umeme made a submission including Low Voltage (LV) components i.e. replacement of LV bare conductor to ABC and replacement of rotten LV poles on the feeder. The works were further divided into six zones as shown below. Table 7 shows the zone breakdown with the ERA approved costs and Umeme actual submission.

Table 7: UMEME'S SUBMISSION OF KIREKA – NAMUGONGO WORKS

| S/N | Zone | ERA Approval (US\$) | Submission (US\$) |
|-----|--------------|---------------------|-------------------|
| 1 | Zone 1 | 876,514 | 811,155 |
| 2 | Zone 2 | | 1,209,606 |
| 3 | Zone 3 | | 1,434,526 |
| 4 | Zone 4 | | 1,596,825 |
| 5 | Zone 6 | | 938,396 |
| | TOTAL | 876,514 | 5,990,508 |

The justification for the conversion was to reduce technical and commercial losses on low voltage lines.

Umeme submitted that the LV conductor as well as the poles had lived their useful lives and thus the salvage value of conductor was zero. ERA's view is that the value of bare conductor replaced cannot be zero since the network had been gradually growing over the years and has shown an increase in new domestic connections for which bare conductor installed is new.

The desk review showed that the MV feeder was last worked on in 2004 and the LV network had been evolving over the years including 2013

pole connections for new consumers. Table 8 shows the materials used to replace and inject on to the network.

Table 8: MATERIALS USED PER ZONE FOR KIREKA – NAMUGONGO FEEDER

| Material | 10m poles | 12m poles | ABC 35mm² | ABC 70mm² | 50KVA Transformer | 100KVA Transformer | 200KVA Transformer |
|-----------------|------------------|------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|---------------------------|
| Zone 1 | 435 | 96 | 29,006 | 25,450 | 10 | 5 | 2 |
| Zone 2 | 921 | 41 | 55,000 | 50,534 | 7 | 5 | 3 |
| Zone 3 | 984 | 90 | 51,327 | 39,012 | 3 | 3 | 13 |
| Zone 4 | 619 | 77 | 64,194 | 24,960 | 5 | 12 | 20 |
| Zone 6 | 710 | 101 | 69,407 | 43,890 | 2 | 2 | 10 |
| Total | 3669 | 405 | 268,934 | 183,846 | 27 | 27 | 48 |

The desk review further revealed the following about the works done on the feeder:

- i) Of the 3,669 (10m) poles installed, 2714 poles were replaced LV poles;
- ii) Umeme injected a total of 102 transformers; and,
- iii) Umeme replaced a total of 452,780m of conductor with ABC.

From the review, the MV conductor component submitted had earlier alone in 2013 been submitted and approved for ROI from that year.

4.1.2.1.2 CONCLUSIONS

The Authority only approved investments for the company to carry out transformer injections. Despite several reminders from the Authority that Umeme provides justification for the change in scope, the company still went ahead to carry out the unapproved works.

ERA observed that the change in scope from injection of transformer zones to replacement of LV poles and conversion on bare conductor to ABC was not approved by the Authority. A formal submission was sought in the retrospective approval by Umeme. The change in scope was still pending approval by the Authority.

The amount of works to be approved for ROI have included only the costs for the MV network and the transformer injections as approved by

the Authority and the rest shall be considered under the Company's application for retrospective approval.

4.1.2.1.3 AUTHORITY DECISION

The Authority approved amounts of **US\$ 876,514** as the cost of the approved works on this feeder including MV works and transformer injections pending provision of cost breakdown of MV works, LV and transformer injections.

4.1.2.2 MUTUNDWE – KABOWA

The Authority approved US\$ 260,000 for this project to inject transformer zones so as to reduce technical losses. Umeme submitted a cost of US\$272,137 for review to earn ROI in 2014.

4.1.2.2.1 DESK REVIEW

The company injected two (2) 100KVA transformers and ten (10) 200KVA transformers. Contrary to the Authority's approval, Umeme went ahead and converted the LV bare conductor to ABC and replaced 248 LV poles and injected 76 new LV poles. Furthermore, the company did not avail the detailed cost breakdown for this project to be reviewed.

The field findings showed that all the transformers were injected and ABC installed.

4.1.2.2.2 CONCLUSIONS

The Authority only approved for the company to carry out transformer injections. Despite several reminders from the Authority that Umeme provides justification for the change in scope, the company still went ahead to carry out the unapproved works.

The team observed that the change in scope from injection of transformer zones to replacement of LV poles and conversion of bare conductor to ABC was not approved by the Authority. A formal

submission was sought in the retrospective approval by Umeme. The change in scope was to be reconsidered under the retrospective approval.

The amount of works to be approved for ROI was to include only the costs for the MV network, including the transformer injections as approved by the Authority until the Authority considered the additional request to approve the change in scope. It was further noted that although the project was completed, the detailed extraction of financial transactions was not submitted for verification. This made it difficult to recommend investment amounts for approval.

4.1.2.2.3 AUTHORITY DECISION

The Authority had rejected the approval of **US\$272,137** until Umeme submitted the detailed cost breakdown of the project finance costs to allow for the segregation of costs.

4.1.3 LOAD GROWTH

This category had two investments which included Queensway substation and Jinja 33kV interconnecting lines.

The following documentations were reviewed during the desk review:

- a) Project justification;
- b) Project costing documentation i.e. proposed designs/drawings of the projects, scope of works, material requirements, and final costing;
- c) Contract award documentation i.e. work purchase orders, contract award to main equipment suppliers and main contractor.
- d) Project implementation documentation i.e. progress reports, material requisitions and movements in the form of CRIVs, contractor safety assessment, payments to contractors in the form of Interim Payment certificates, procurement documentation of key equipment like switchgear and power transformers, variation orders in the event of

increased scope, material reconciliations and material returns, commissioning reports and the allocation of project financial costs; and

e) Project closure documentation i.e. project as built drawings, project handover reports, final material reconciliation and goods returned, partial completion certificates and final completion certificates.

4.1.3.1 QUEENSWAY SUBSTATION

The justification for Queensway substation was to address the growing load in the Central Business District (CBD). The Authority approved for the installation of one (1) 40MVA 33/11kV transformer at the substation.

4.1.3.1.1 DESK FINDINGS

The desk review findings showed that the project was handled as a turnkey and contracted out to M/s Mott MacDonald and Umeme spent a total of US\$ 4,159,964 which was above the approved amount of US\$ 2,250,000. The findings further showed that the company installed 2x20MVA 33kV/11kV transformers which was not as the per the Authority's approval.

The field findings showed that the substation does exist and all the works were completed. The substation was commissioned and was fully operational.

4.1.3.1.2 CONCLUSIONS

The Authority's approval was for Umeme to install one transformer but the company went ahead and installed two (2) x 20MVA transformers. However, since the Authority had not approved the construction of Nakasero substation which the company had been proposing to install; ERA observed that the installation of the second transformer was able to address the load requirements in the city center without Nakasero substation. This would make this investment a viable option.

The investments verified were treated as per the principles already laid down in Section 3.1.

4.1.3.1.3 AUTHORITY DECISION

The Authority has approved costs amounting to **US\$ 2,446,299** for installation of one 20MVA 33/11kV transformer excluding borrowing costs and Overhead absorption costs.

4.1.3.2 JINJA 33KV INTERCONNECTING LINES

Umeme submitted two projects under this category. There are; Jinja industrial – Owen Falls 3 and Owen Falls 3 – Njeru 33kV interconnectors. The justification of these projects as provided by Umeme was to increase conductor capacity to address the growing load in the area.

The scope of each project included upgrading the conductor size from 100mm² ACSR to 150mm² AAAC and replacing the rotten poles in order to enable line stability due to the increase in conductor size.

4.1.3.2.1 DESK REVIEW

The desk review findings revealed the following:

- i) Information provided for Jinja Industrial – Owen Falls 3 showed that the line was re-conducted from 100mm² ACSR to 150mm² AAAC conductor size.
- ii) Information provided for Owen Falls 3 – Njeru showed that the conductor size was already at 150mm² AAAC conductor size. This was replaced with the same rating and old conductor was recovered.

4.1.3.2.2 FIELD FINDINGS

The field findings confirmed that the works for the two feeders were actually done and quality of work done was to standard.

4.1.3.2.3 CONCLUSIONS

The Authority's approval was specific on the feeder to be worked on i.e. Jinja Industrial – Owen Falls 3 and the works done were in line with the Authority's approval and thus qualified for ROI. Umeme however submitted also Owen Falls 3 – Njeru 33kV interconnector where replacement of the same conductor was done. The Authority had treated the investment in Owen Falls 3 – Njeru 33kV interconnector as O&M costs and thus did not qualify for ROI.

4.1.3.2.4 AUTHORITY DECISION

The Authority has approved **US\$ 82,085** as the investment costs of Jinja Industrial – Owen Falls 3 to earn ROI. The recommended costs exclude the costs (Borrowing costs, staff costs and absorption costs) considered as O&M in nature of US\$ 23,934.

4.2 LOAD GROWTH INVESTMENTS 2014

The Authority approved a total of **US\$ 20.913 million** budget for the load growth projects. Table 9 shows the investments that were approved by the Authority.

Table 9: APPROVED LOAD GROWTH INVESTMENTS 2014

| S/N | Investment Category | ERA Approval (US\$) | Umeme's submission (US\$) |
|-----|---|---------------------|---------------------------|
| | Substations and Overhead lines | | |
| 1 | Namugongo substation and lines | 4,500,000 | No submission |
| 2 | Nagongera substation and lines | 870,000 | 884,978 |
| 3 | Queensway 2 11kV evacuation lines | 600,000 | 1,234,808 |
| 4 | Interconnection between Lugogo, Naguru, Ntinda and Bukoto feeders | 70,000 | No submission |
| 5 | Nyabwina – Kiyaga, Bugarama TC and Rwashamaire Nkongorongo TC | 297,000 | 86,298 |
| 6 | Namunkekeru Industrial park | 1,976,000 | No submission |
| | Distribution transformer Injections | 3,000,000 | 2,633,311 |
| | Power transformer upgrades | 1,600,000 | No submission |
| | New connections | 8,000,000 | 11,021,200 |

| S/N | Investment Category | ERA Approval (US\$) | Umeme's submission (US\$) |
|-----|---------------------|---------------------|---------------------------|
| | TOTAL | 20,913,000 | 15,860,595 |

4.2.1 SUBSTATIONS AND OVERHEAD LINES

The Authority's approval of projects under this category was specific to projects as indicated in Table 9.

The following documentation was reviewed during the desk review:

- a) Project justification;
- b) Project costing documentation i.e. proposed designs/drawings of the projects, scope of works, material requirements, and final costing;
- c) Contract award documentation i.e. work purchase orders, contract award to main equipment suppliers and main contractor;
- d) Project implementation documentation i.e. progress reports, material requisitions and movements in the form of CRIVs, contractor safety assessment, payments to contractors in the form of Interim Payment certificates, procurement documentation of key equipment like switchgear and power transformers, variation orders in the event of increased scope, material reconciliations and material returns, commissioning reports and the allocation of project financial costs; and,
- e) Project closure documentation i.e. project as built drawings, project handover reports, final material reconciliation and goods returned, partial completion certificates and final completion certificates.

4.2.1.1 NAMUGONGO SUBSTATION AND LINES

The Authority approved the construction of a new 33/11kV substation at Namugongo and associated lines to cater for the increase in load in the area. No information was submitted regarding this project as it was work in progress.

Umeme in a communication to the Authority on the 2015 investment plan treated this investment as a carryover from 2014. As such, this investment had not been submitted to the Authority for consideration.

4.2.1.2 NAGONGERA SUBSTATION AND LINES

The Authority approved this investment on the basis that it was going to improve the voltage profile in the area of Mbale and reduce losses in the affected areas as well. The substation was further to relieve the Town Ring feeder from Tororo Rock substation.

4.2.1.2.1 DESK REVIEW

The desk review documentation showed that Umeme constructed a 33/11kV substation. A 2.5MVA transformer and accompanying switchgear as well as auxiliary equipment was installed. Two 11kV feeders were created from the substation supplying areas that were previously supplied by Town Feeder in Nagongera town and Butaleja Districts. All the works were done as per the Authority's approval.

The commissioning reports showed that the substation passed the commissioning tests and was in operation.

4.2.1.2.2 FIELD FINDINGS

The field findings showed that the substation did exist and the two feeders were constructed. The field findings also showed that some materials were missing on ground; the missing materials were:

- 22 LV poles against 44 LV poles issued;
- Three (3) air break switches 11kV against six (6) issued; and
- Two (2) air break switches 33kV against six (6) issued.

4.2.1.2.3 CONCLUSIONS

The field findings showed that the investment was done as per the approval. An adjustment was to be made on materials that were not found on ground at the time of field verification.

4.2.1.2.4 AUTHORITY DECISION

The Authority had approved **US\$ 800,651** for the above investment excluding costs deemed O&M and the materials not found in the field.

4.2.1.3 QUEENSWAY 2 11KV EVACUATION LINES

Under this category, the Authority approved investments in the following feeders as a result of the construction of the new Queensway substation:

- i) 11kV feeder to relieve Wilson lane;
- ii) 11kV feeder to relieve Namirembe road;
- iii) 11kV feeder to feed Nakasero Market; and
- iv) 11kV feeder to feed South Street area.

These investments were done to cater for the load growth in the central business district and improve power supply reliability.

4.2.1.3.1 DESK REVIEW

The desk review findings revealed that Umeme created three (3) new feeders supplying from the new Queensway substation i.e.

- Queensway 2 – Nabugabo road to relieve Wilson lane;
- Queensway 2 – Namirembe road 2 to relieve Namirembe road 1;
- Queensway 2 – Motor Mart 2 to act as an interconnector between Motor Mart substation and Queensway 2 substation.

Other works were re-routing Namirembe Road 1 and Wilson road to allow for the construction of UETCL transmission substation. Umeme also created a feed from Amber House to Nakasero Market transformer, to create a ring with South street feeder from Motor Mart.

The feeders under this investment were run with mainly underground cable (8.529km of 11KV XLPE 185 3-core) and 1km of 11kV ACRS100 overhead line. Eight (8) Ring Main Units (RMUs) were also installed for feeding transformers and extending the network in the city center.

On the financial side, the Authority approved a budget of US\$ 600,000; Umeme submitted actual costs for the works amounting to US\$ 1,234,806.

4.2.1.3.2 FIELD FINDINGS

The field findings revealed that these works were actually done; the materials verified were as stated in the material reconciliations.

4.2.1.3.3 CONCLUSIONS

The desk review and field findings revealed that the works were done as approved by the Authority.

4.2.1.3.4 AUTHORITY DECISION

The Authority had approved **US\$ 1,093,838** excluding O&M costs of US\$107,368.

4.2.1.4 INTERCONNECTION BETWEEN LUGOGO – NAGURU AND NTINDA – BUKOTO 11kV FEEDERS

This investment was approved to link the two interconnectors. Umeme did not submit any information regarding this feeder and as such no evaluation was made on the feeder.

4.2.1.4.1 CONCLUSIONS

No submission was made on this investments and it was to be treated as CWIP until Umeme submits information.

The Authority requests Umeme to provide progress of this project in line with the Authority Approval.

4.2.1.5 NYABWINA – KIYAGA, BUGARAMA TC AND RWASHAMAIRE NKONGORORO TC

These investments were approved to cater for the respective new load centers. In Umeme's submission, only one scheme was submitted i.e. Nyabwina – Kiyaga TC amounting to US\$ 86,298.

4.2.1.5.1 DESK REVIEW

The desk review showed that Umeme installed 2 x 50 KVA 33kV/LV transformers; constructed 3.8km of 33kV of overhead ACSR50; constructed 2.2km of ABC LV 35mm² and 1.55km of ABC LV 70mm².

4.2.1.5.2 CONCLUSIONS

The Authority noted that only one investment i.e. Nyabwina – Kiyaga TC was submitted under this project. The project submitted was approved by the Authority and was recommended to earn ROI.

4.2.1.5.3 AUTHORITY DECISION

The Authority approved **US\$ 78,831** as the cost of the investment incurred on this project.

4.2.1.6 NAMUNKEKERA INDUSTRIAL PARK

The Authority approved for Umeme to construct power lines to supply a new industrial park in Namunkekera. No information was submitted regarding this project, as it was work in progress.

The Authority noted that the 2015 investment plan treated this investment as a carryover from 2014 and was still work in progress (WIP).

4.2.2 DISTRIBUTION TRANSFORMER INJECTIONS

The Authority approved US\$3,000,000 towards these investments. These investments were approved on the submission of Umeme that they were necessary to relieve 74 stressed distribution transformers on the network. The approval was conditional on Umeme to submit the current loading of the respective transformers and the transformer specifications.

The following documentation was reviewed during the desk review:

- a) Project justification including the status of the network in terms of load and transformers before transformer injection is proposed; and the reason for the injection or system improvement;
- b) Project costing documentation including proposed designs/drawings of the projects, scope of works, material requirements, and final costing;
- c) The age of the transformer being replaced in the event the transformer was reported faulty; and,
- d) Project implementation documentation including progress reports, material requisitions and movements in the form of CRIVs, contractor safety assessment, payments to contractors in the form of Interim Payment certificates, transformer test reports for faulty

transformers that were returned to stores, transformer allocation forms to confirm the transformers issued from stores were new, variation orders in the event of increased scope, material reconciliations and material returns, commissioning reports and the allocation of project financial costs.

Umeme submitted projects under this category as system improvements and transformer injections. These were considered under this section. All the works done under this category were done internally by Umeme staff. The review and recommendations for investments to earn ROI for this category was based on the desk review done on the submission; there was no field verification done on the investments. ERA considered the desk review of the submission as adequate to make prudent decisions.

4.2.2.1 TRANSFORMER INJECTIONS

Umeme submitted a list of 186 transformer injections amounting to US\$ 1,815,085. Of the 186 transformer injections submitted, the team received only information for 62 schemes and the desk review was based on these schemes.

4.2.2.1.1 DESK REVIEW

Based on the desk review, the team made recommendations for each project based on the technical information submitted. Table 10 shows the results of the review.

Table 10: DISTRIBUTION TRANSFORMER INJECTIONS

| S/N | Item | No. | Umeme's Submission (US\$) |
|------------|--------------------------|------------|----------------------------------|
| 1 | Approve | 8 | 198,519 |
| 2 | Approve with offset | 12 | 134,863 |
| 3 | Disallow | 42 | 412,475 |
| 4 | Information not provided | 117 | 1,121,566 |
| 5 | Negative values | 7 | (52,338) |
| | Total | 186 | 1,815,085 |

Below is an explanation of the findings in Table 10.

- a) The eight (8) schemes that were recommended for approval were justified on the basis that the existing overload transformers were still in use at the time of the injection and the injections were made to relieve the transformers;
- b) The twelve (12) schemes that were recommended for approval with offsets were justified on the basis that the existing overloaded transformer faulted as a result of the overload and were either upgraded with higher capacities or replaced with the same capacities with a new transformer injected to accommodate the load. For these schemes, the value recommended for approval excluded the impaired value of the faulted asset.
- c) The forty two (42) schemes that were disallowed were justified on the following basis:
 - i) Thirteen (30) schemes were disallowed due to high HV earth resistances of the newly installed transformers. This rendered the investments susceptible to lightning strikes leading to repeat investments;
 - ii) Nine (9) schemes were disallowed due to the fact that the company installed repaired transformers to replace the faulted transformers. These repaired transformers should come into the network as zero value. Of the nine (9), seven (7) also had poor earth values for the newly installed transformers;
 - iii) Three (3) schemes were disallowed because they had faulted due to lightning. Replacement of such assets should be O&M in nature;
 - iv) Two (2) schemes were disallowed due to lack of sufficient information;

- v) Five (5) schemes were disallowed on the basis that the information submitted had no justification for overload rendering the investments as O&M in nature.
- d) One hundred and seventeen (117) schemes had no information submitted and as such were not reviewed.

4.2.2.1.2 CONCLUSIONS

Transformer injections that were made before the stressed transformers could blow, would earn a return on Investment while those which were upgraded before their useful lives could expire, and were to be offset against the new transformers.

Transformers which blew as a result of failure within the control of Umeme like poor earthing were not recommended for ROI the same applies to transformers that were brought to the network after being repaired.

4.2.2.1.3 AUTHORITY DECISION

The Authority approved **US\$ 198,519** for the eight (8) schemes and differed **US\$ 134,863** for the twelve (12) schemes pending submission of the detailed material cost breakdown for each project.

The Authority further **rejected** the one hundred seventeen (117) transformer injections for which no information was submitted.

4.2.2.2 SYSTEM IMPROVEMENTS

Umeme submitted sixty two (62) projects under this category worth US\$ 818,226. Based on the desk review, the team made recommendations for each project based on the technical information submitted and verified under the desk review.

4.2.2.2.1 DESK REVIEW

Table 11 shows the findings of the desk review.

Table 11: SYSTEM IMPROVEMENTS

| Items | Number | Cost | Approve | Disallow |
|--|-----------|----------------|----------------|----------------|
| New System Improvements | 13 | 289,718 | 141,817 | 21,127 |
| Projects with Negative values | 8 | (27,610) | | (27,610) |
| Projects with no information provided | 15 | 179,846 | | 179,846 |
| Projects already considered in the 2013 appeal | 26 | 376,272 | | 376,272 |
| Total | 62 | 818,226 | 141,817 | 549,635 |

From Table 11, the following was deduced:

- i) Out of the 62 schemes, only 13 schemes worth US\$ 289,718 were reviewed for adequacy. Of the thirteen (13) schemes, Ten (10) schemes worth US\$ 141,817 were recommended for approval and three (3) schemes worth US\$ 21,127 were disallowed in their entirety.
- ii) Out of the sixty two (62) schemes submitted, twenty six (26) schemes worth US\$ 376,272 were already considered under the 2013 investment appeal and a decision made. These were not considered in the review.
- iii) Eight (8) schemes worth US\$ 27,610 were submitted with negative values.
- iv) Fifteen (15) schemes worth US\$ 179,846 had no information submitted and these were not considered.

4.2.2.2 CONCLUSIONS

Only schemes relating to transformer upgrades and injections before the supply was disrupted were considered for ROI.

4.2.2.3 AUTHORITY DECISION

The Authority approved **US\$ 141,817** for the ten (10) schemes which had adequate support data.

4.2.3 POWER TRANSFORMER UPGRADES

The Authority approved an amount of US\$ 1.6 million for Umeme to carry out investments in power transformer upgrades on the following substations:

- a) Jinja Industrial substation;
- b) Mbale substation;
- c) Mukono substation; and
- d) Ntinda substation.

The Authority further advised that for the upgrade of Port Bell substation, Umeme would use one of the 15/20MVA transformers meant for the new Queensway substation.

4.2.3.1 CONCLUSIONS

Umeme did not submit any information on the substation upgrades as per the approval and for this category there were no investments recommended for ROI.

4.2.3.2 AUTHORITY DECISION

The Authority requested Umeme to submit a progress report on the implementation of the Jinja, Mbale, Mukono and Ntinda substation upgrade.

4.2.4 NEW CONNECTIONS

Umeme submitted **US\$ 11,021,200** as the cost of new connected customers (81,097) in the year ended 2014. This number is contrary to the total increase in customer number recorded in the Audited Financial Statements of 76,108 including Industrial, street lighting and commercial customers. Umeme explained that the submitted number of new connections to ERA was the gross customer connection numbers including disconnections made during the year, while the Financial Report, reported the net change in customer numbers excluding

disconnections. Umeme was to submit a reconciliation showing the number of disconnected customers in 2014 for verification.

The above differences notwithstanding, the Authority set to confirm the existence, accuracy and the consistency in costing, a verification methodology was discussed and undertaken to arrive at the actual number of customers connected in the year 2014. The following assumptions were made;-

- a) All new connections must pay a connection fee. All new connection fees include capital contributions and this is true only for new connections, but not for reconnections;
- b) It is possible to track new connections by type in any given period through the connection dates and the amount of capital contribution paid;
- c) It is possible to track the new connection per category (no pole or standard connection) using location of the connection;
- d) For connections not made in the period of capital contribution payment, then that amount is reflected in the short term obligations at the reporting date (in this case 31st Dec 2014) and thus not a new connection for the period under verification;
- e) However, for every new connection made, a meter number is assigned to the customer, a connection date, receipt amount and date of payment will be held in the Umeme database;
- f) New connections that require more than one pole are paid for 100% by the customer and UMEME does not contribute to creation of that asset and therefore these do not constitute eligible investments for ROI and thus were left out in the verification;
- g) The connection charges for both no pole and one pole new services are standard. The standard cost was applied to the

number of connections made to arrive at the submitted costs of new connections by Umeme in the period under review;

- h) A comparison was made of what the findings were with the UMEME submission and investigation of any variances made by the Company;
- i) All materials listed in the standard cost are installed at all the customer premises.

Having made the assumptions above, detailed review test were done and signed off to avoid a repeat of the 2012 appeals and also to ensure that commercial schemes are not included in the new connections submitted. The following were recommended:

- i. Perform a system test on the billing system to cover valuation, cutoff, recognition;
- ii. Review Procurement process for the key cost drivers for New Connections; Poles, Meters, MCB, Preformed Dead Ends and Landing Brackets;
- iii. Sampled stocks of purchases of the key cost drivers and to confirm that actual costs mirror Standard Cost (SD) profile. Weighted Average Cost (WACC) deviation from Standard Cost of +/- 10% otherwise the Standard Cost would be revised to match WACC;
- iv. A billing system query was done under the direction and in the presence of the verification team. To corroborate the submission with the findings of the database query;
- v. For existence, make a billing cycle printout for Jan 2014 and Dec 2014 to establish that connections are valid;
- vi. The team performed a logical tests on the workbook provided for use by UMEME Ltd containing all new connections for 2014. These logical tests include checking Work Request Types, Standard Capital Contributions, Tariff Types and working by elimination to reduce the

total connections to only those that result in investment by UMEME that qualifies for ROI;

- vii. Checking standard material usage included within the standard cost profile of specific categories of new connections e.g. Landing brackets;
- viii. Check the standard contractor costs and agree to Standard Cost profile.

4.2.4.1 FINDINGS

The supporting schedules for the new connections submitted were not consistent⁴ with both the submitted audited accounts and the extract from the system. Whereas Umeme submitted 81,097 customer connections, the detailed extract returned a total of 78,104 customers while the audited financial statements and annual report indicated 76,108 customers broken down as in Table 12.

Table 12: UMEME 2014 CUSTOMER NUMBERS⁵

| Number of Customers | | | |
|----------------------------|-----------------------|-----------------------|----------------------|
| Customer numbers | 2014 | 2013 | Change |
| Domestic | 590,677 | 521,284 | 69,393 |
| Commercial/Industrial | 6,891 | 50,301 | 6,590 |
| Street Lighting | 307 | 359 | (52) |
| Industrial-Medium | 2,234 | 2,108 | 126 |
| Industrial- Large | 464 | 413 | 51 |
| Total | <u>650,573</u> | <u>574,465</u> | <u>76,108</u> |

From Table 12 above, different categories posted different increases and reductions during the year. Domestic customers who are mainly tariff funded, increased by 69,393 customers while commercial/industrial

⁴ Submitted Customers =81,097, Supported customer submissions =78,104, Audited Financial Statements = 76,108 Customers

⁵ Customer numbers as per Annual Report 2014 page 12.

customers who also include a portion of tariff funding e.g. kiosks or single phase customers increased by 6,590.

Secondly, audited domestic customers included OBA customers of 1,232 further reducing the expected tariff funded customer connections. The number of connections that qualified for tariff funding would ordinarily not exceed 74,751⁶ assuming all commercial and industrial connections were tariff funded which is rarely the case. For verification purposes, the Authority considered the audited financial statement amounts adjusted with Commercial/Industrial component and OBA customer connections to arrive at a total of 71,456⁷.

Also included in the submission were postpaid customers connected from October 2014 to December 2014 despite the cut off of September 2014 as per the approved roll out plan. These customers were also not been considered for ROI.

The verification analyzed the detailed customers submitted of 78,104. The analysis showed that 20 customers had been erroneously entered twice while one customer had already been submitted and considered in the year 2013. This left a total of 78,083 to be tested in the Umeme billing system to confirm existence and accuracy.

4.2.4.2 VERIFICATION OF OBA CUSTOMERS

The OBA customers submitted could not be independently verified by the Authority in the Umeme system. Umeme explained that the system had not been configured to capture customers with nil capital contribution a characteristic of OBA customers. The first connections were allocated capital contributions equivalent to the ordinary new connection capital contribution of Ushs 98,000 and paid by Umeme itself. This made it complicated for the verification team to design a

⁶ 69,393 + 6,590 less OBA 1,232

⁷ 69,393 + 1/2(6,590) less OBA 1,232 Customers

methodology based on non-payment of capital contribution as criteria for determining OBA funded customers.

The Authority therefore had to use corroborative evidence from Rural Electrification Agency (REA) to confirm the number of OBA customers invoiced by Umeme to avoid double counting. REA confirmed that 1,146 customers were connected and invoiced by Umeme as at December 31, 2014.

The Authority had earlier communicated to Umeme on 19th September 2014, on the treatment of no pole connections; that these were to be given priority as OBA connections until Umeme's quarterly allocation is fully utilized.

Failure to accurately verify the submitted OBA customers and the inconsistency between the submissions made to ERA and REA, the Authority considered all no pole connections made effective October 2014 as OBA up to the allowed quarter and not to attract a return as per the communication from ERA.

4.2.4.3 SAMPLING

A random sample of 19,526 customer contract numbers representing 25% was given to Umeme. The sample was informed by the system's ability to extract customer information from the system in the presence of the verification team while serving other clients. Information on the sample relating to supplier point number, connection date and data service point created were extracted. From the sample, all the 19,526 customers returned the same references as earlier submitted by Umeme meaning that the customers did exist. The verified customers of 78,083 were assumed to exist basing the results of the sample.

However, the Authority could not confidently link the additional 78,083 customers to the reported new connections total on all classes of customers of 76,108 in the audited financial statements.

The Authority has therefore limited its new connections customer numbers to 71,456⁸ until Umeme submits a reconciliation of the audited FS report and the submitted connections. The team did not proceed to the field to verify the availability of items billed on the submitted standard connections due to resource constraints.

4.2.4.4 STANDARD COSTING

The standard cost was verified from the review of the procurement process and sampling of quarterly invoices for the cost drivers of the standard cost. The Authority received reasonable assurance from the documents reviewed that the costs stated and used are free of material misstatements and therefore reliable. A standard cost was also developed and used for a prepaid new connection.

4.2.4.5 CONCLUSION

Based on the above findings, it was concluded that Umeme connected 71,456 new customers, an investment which qualify to earn a return on investments.

4.2.4.6 AUTHORITY DECISION

The Authority approved **US\$ 10,126,828** towards new customer connections by Umeme for the year 2014.

4.2.4.7 CUSTOMER SECURITY DEPOSITS

Customer security deposits relate to amounts required to be paid by customers before they are connected. These act as security should a customer forfeit payment of energy bills. As Umeme rolls out prepayment mechanisms and converts customers previously on postpaid to prepaid arrangement, the risk of failure to pay the bill seizes to exit.

⁸ 69,393 + 1/2(6,590) less OBA 1,232 Customers

The Authority issued guidelines in 2010 to take effect from January 1, 2011 on treatment of such customer deposits. The verification set forth to verify compliance with the issued guidelines and below were the findings;-

- a) The customer security deposits together with accrued interests are ring-fenced from other funds of the company and deposited in Standard Chartered Bank;
- b) The licensee paid out/refunded customers with their capital contributions equivalent to Ushs 8.4billion. This amount excluded accrued interest earned as required by the guidelines. The team could not independently verify the accuracy of the numbers of customers refunded as this information was yet to be availed;
- c) The customer security deposit movement showed a decline in the customer security deposit understandably so because prepayment mechanism did not require a security deposit. This notwithstanding, the reduction in deposits did not match the increase in customer numbers during the period October to December 2014 when postpaid meters were replaced with prepaid meters under the prepayment rollout;
- d) During the year under verification, Umeme did not submit the end of year 2014 report by March 2015 to show the extent of the use of security deposits, interest earned and evidence of having ring-fenced the customer deposits as required by the guidelines.

4.2.4.8 AUTHORITY DECISION

The Authority has instructed Umeme to submit a report on the detailed customer security deposit refunds for the year ended December 2014 in line with the requirements of the guidelines, failure of which a compliance order would be issued.

4.2.4.9 CUSTOMER FUNDED CONNECTIONS

The customer funded connections related to capital contributions paid fully by customers for an electric supply service that is not subsidized

through the tariff. Umeme submitted a list of 62 projects funded fully by customers at a cost of Ushs 3.33 billion. During the year, projects worth Ushs 3.93 billion were completed although the details of completed projects were not available. The reported customer funded connections included a receivable's figure of Ushs 0.7 billion whose details were not available for verification.

The submitted list was compared with the list submitted by UEDCL on the projects fully funded by the Government to identify any duplication in reporting. The results showed a consistent reporting without duplication. Whereas the Authority had intended to publish the list to seek comments from the public before further analysis, this would not be possible due to time constraints.

4.2.4.10 10MM² SOLIDAL CUSTOMER CONNECTIONS

The Authority approved the use of 10mm² solidal connections to be used with load limiters for only domestic connections not expected to load in excess of 35A in the short and medium term. Following this approval, the associated connection costs were also accordingly revised to match the material usage.

Umeme did not provide any customers connected using the 10mm² solidal in the 2014 submission.

The application and the use of the 10mm² solidal connection depend on the technical assessment of the load areas in need of power. In the event that the utility does not assess this technicality, the enforcement of the use of the 10mm² solidal connection may not be easily achieved.

4.3 LOSS REDUCTION INVESTMENTS 2014

The Authority approved a total of **US\$ 15.71 million** budget for the Loss reduction investments. The following loss reduction investment categories were approved:

- a) Technical Losses: US\$ 7.71 million; and

b) Automated Meter Reading: US\$ 8 million.

4.3.1 TECHNICAL LOSSES

These investments were undertaken to address the issue of high losses on the network including technical loss reduction on the high loss feeders as recommended by the Emmerton report. The works done under this category were in the form of upgrade of existing conductor sizes to larger sizes (i.e. 50mm², 100mm² or 150mm²) of conductor in order to reduce the technical losses on the respective feeders. Table 13 shows the list of approved loss reduction investments by the Authority.

Table 13: APPROVED LOSS REDUCTION INVESTMENTS 2014

| S/N | Feeder Name | ERA Approval (US\$) | Umeme's submission (US\$) | Amt Reviewed (US\$) |
|-----|--------------------------------------|---------------------|---------------------------|---------------------|
| 1 | Kireka – Port Bell 11kV | 22,500 | 28,725 | 26,560 |
| 2 | Mutundwe – Kabusu 11kV | 18,600 | 30,855 | 27,586 |
| 3 | Lugazi – Namataba 11kV | 501,000 | 187,854 | 169,559 |
| 4 | Jinja Industrial – Iganga 33kV | 1,169,600 | 682,427 | 619,490 |
| 5 | Bombo – Namulonge 11kV | 2,352,000 | 589,881 | 532,341 |
| 6 | Bombo – Luwero 11kV | 2,128,800 | 1,384,475 | 1,246,363 |
| 7 | Mbarara Central – Kakoba Coffee 11kV | 221,850 | 235,165 | 189,004 |
| 8 | Masaka – Kalungu 11kV | 381,062 | 667,485 | 590,290 |
| 9 | Entebbe Airport 11kV | 100,000 | 53,384 | - |
| 10 | Entebbe Town 11kV | 140,000 | 177,091 | 161,502 |
| 11 | Entebbe – Kisubi 11kV | 250,000 | 245,087 | 202,846 |
| 12 | Kisubi – Kisubi Mission 11kV | 330,000 | 392,615 | 353,698 |
| 13 | Kampala South – Salaama Road 11kV | 90,000 | 103,040 | 103,031 |
| | TOTAL | 7,705,412 | 4,778,084 | 4,244,850 |

The following documentation was reviewed under the desk review:

i) Project justification;

- ii) Project costing documentation i.e. proposed designs/drawings of the projects, scope of works, material requirements, and final costing;
- iii) Contract award documentation i.e. work purchase orders, notice to proceed;
- iv) Project implementation documentation i.e. progress reports, material requisitions and movements in the form of CRIVs, contractor safety assessment, payments to contractors in the form of Interim Payment certificates, variation orders in the event of increased scope, material reconciliations and material returns, commissioning reports and the allocation of project financial costs; and
- v) Project closure documentation i.e. project as built drawings, project handover reports, final material reconciliation and goods returned, partial completion certificates and final completion certificates.

4.3.1.1 DESK REVIEW

All the approved technical loss projects were submitted for verification. The documentation submitted for the desk review was sufficient to allow the ERA make conclusions and recommendations.

The following was noted:

- i. The verified values excluded borrowing costs, project overhead absorption costs, staff costs and transport costs submitted as part of the project costs;
- ii. Kireka – Port Bell feeder works included upgrading of conductor from 25mm² to 100mm² (a route length of 1km) and to 50mm² (a route length of 0.5km). The Authority approved Umeme to carry out works as follows:
 - Upgrade 1km from 25mm² to 150mm²; and
 - Upgrade 6.8km from 25mm² to 100mm².
- iii. Mutundwe – Kabusu feeder works included upgrading steel conductor to 100mm² ACSR (a route length of 1.98); upgrading mixture of 25mm² SCA & steel to 50mm² ACSR (a route length of

- 1.4km); and replacement MV poles and associated hardware accessories. This was in line with the scope approved by the Authority;
- iv. Lugazi – Namataba works included upgrading the existing conductor from 25mm² to 100mm² (a route length of 33.4km) and replacement of MV poles. This was in line with the scope approved by the Authority;
 - v. Jinja Industrial – Iganga feeder works included upgrading the existing conductor on the main T-offs from 25mm² (22km) and 50mm² (47km) to 100mm² (a route length of approx. 69km); and replacement of MV poles (198) and associated hardware. This was in line with the scope approved by the Authority;
 - vi. Bombo – Luwero feeder works included upgrading of existing conductor on the main T-offs from 25mm² to 100mm² (a route length of approx. 75km) and from 25mm² to 50mm² (a route length of approx. 67km) and replacement of MV poles and associated hardware. This was in line with scope approved by the Authority;
 - vii. Bombo – Namulonge works included upgrading of existing conductor on the main line from 50mm² to 100mm² and on the main T-offs from 25mm² and steel to 50mm²; and replacement of MV poles and associated hardware. This was in line with scope approved by the Authority;
 - viii. Mbarara Central – Kakoba Coffee feeder works included upgrading of existing conductor on the feeder from 25mm² and steel to 100mm² (a route length of approx. 14km) and replacement of MV poles (103) and associated hardware. This was in line with scope the approved by the Authority;
 - ix. Masaka – Kalungu feeder works included upgrading of existing conductor on the feeder from 25mm² to 50mm² (a route length of approx. 11km) and 100mm² (a route length of approx. 65km) and replacement of MV poles (74) and associated hardware. This was in line with the scope approved by the Authority;
 - x. Entebbe Airport feeder was not re-conducted as was specified in the approved project scope to replace the existing 25mm² size of conductor with 150mm² AAAC conductor. Instead, only rotten poles were changed;

- xi. Entebbe township feeder works included upgrading of existing conductor size on the feeder from 25mm² to 100mm² (a route length of approx. 9.5km) and 25mm² to 150mm² (a route length of approx. 7km) and replacement of MV poles and associated hardware. The submission showed that works were done as specified in the project scope;
- xii. Entebbe – Kisubi works included upgrading of existing conductor on the feeder from 25mm² to 50mm² (a route length of approx. 12.3km) and from 100 mm² to 100mm² (a route length of approx. 9.7km) and replacement of MV poles and associated hardware. The submission showed that works were done as specified in the project scope;
- xiii. Kisubi Missions works included upgrading of existing conductor on the feeder from 25mm² to 100mm² (a route length of approx. 18.7km) and from 25mm² to 150mm² (a route length of approx. 9.6km) and replacement of MV poles and associated hardware. The submission showed that works were done as specified in the project scope. The losses were reduced 39% to 21%. Also no material return forms were seen;
- xiv. Kampala South – Salaama Road works included upgrading of existing conductor on the feeder from 100mm² to 150mm² (a route length of approx. 9km) and replacement of MV poles and associated hardware. The submission showed that works were done as specified in the project scope.

It was noted that in Umeme's submission, the achieved technical loss factor for each implemented technical loss project was not submitted for the Authority to assess whether the projects attained the projected loss factor.

4.3.1.2 FIELD FINDINGS

Of the thirteen (13) Technical losses projects submitted, eight (8) projects were inspected in the field; these included Jinja Industrial – Iganga, Bombo – Luwero, Masaka – Kalungu, Entebbe Airport, Entebbe Town,

Entebbe – Kisubi, Kisubi – Kisubi Mission and Kampala South – Salaama Road.

The field verification findings revealed that the works were done according to the approved scope for seven (7) projects except for the Entebbe Airport where only pole replacements were carried out without upgrading the conductor size.

We further noted that for the case of Kampala South – Salaama Road feeder, the T-offs were not protected which compromised the reliability of the line as the principle of protection discrimination was not practical. Umeme was to be instructed to install drop out fuses on the T-offs of the line.

The following feeder had significant material differences:

- i) Masaka – Kalungu feeder: Of the sixty five (65) 12m poles issued from the stores, only thirty four (34) 12m poles were verified as installed in the field. Of the fifteen (15) 10m poles issued from stores, only one (1) 10m pole was verified as installed in the field.

4.3.1.3 CONCLUSIONS

Of the thirteen (13) schemes approved, twelve (12) schemes were done according to the approved scope and qualify for ROI. One scheme, the Entebbe Airport for which works were not completed according to the approved scope was recommended for rejection since the project was not done for the intended purpose.

4.3.1.4 AUTHORITY DECISION

The Authority approved **US\$ 4,244,850** for the thirteen (13) schemes implemented by Umeme and requested the company to submit the achieved technical loss factor for each implemented technical loss project.

4.3.2 AUTOMATED METER READING (AMR)

The Authority approved a budget of US\$ 8 million towards the implementation of 2500 AMR meters.

The following documentation was submitted for review;

- The justification for the project: Problem statement and expected impact;
- The procurement documentation;
- The project implementation documents; and
- The project closure documentation.

4.3.2.1 DESK REVIEW FINDINGS

a) Desk review findings showed that the scope of the works to be done included the following:

- i. Procurement and installation of 1,327 pre-wired meter boxes;
- ii. Procurement and installation of an AMR/AMI system; and,
- iii. Set – up of and AMR team.

b) Umeme spent US\$ 3.2 million. The expenditure was mainly on the installation of the AMR system and the installation of 310 pre-wired meter boxes. Table 14 shows the details of the expenditure.

Table 14: PROJECT COSTS FOR THE AMR

| S/N | Category | Expenditure (US\$) |
|-----|--|--------------------|
| 1 | Pre-wired meter boxes and installation | 1,147,816 |
| 2 | Software | |
| | a. Access Control System | 37,769 |
| | b. AMR System Implementation | 839,622 |
| 3 | Materials | 393,489 |
| 4 | Meters | 318,757 |
| 5 | Project Consultant | 159,201 |
| 6 | Staff Costs | 99,421 |
| 7 | Administration & Transport | 10,287 |
| 8 | Project Financing | 206,115 |
| | TOTAL | 3,212,477 |

- c) The company further reported that the installations done so far managed to achieve a loss reduction of 0.4% equivalent to 11.4 GWh;
- d) A review of the System Acceptance tests conducted between 9th and 13th February 2015 showed that the installed system was lacking on some aspects of the intended functionality. In its report, Umeme also observed that following the unsuccessful installation of the pilot project, the system could not be progressed to the next implementation phase until these variations were corrected;
- e) The submission included costs relating to; borrowing costs of (US\$ 181,383), staff costs (US\$ 9,678), over-head absorption costs (US\$ 168,161) and US\$ 17,120 as a provision costs whose justification and supporting documents were not submitted;
- f) Costs totaling to US\$ 164,670 that were administratively and operationally incurred in the process of implementation of the project, were also included. Costs to do with Stationery, DCM 2033 Digital Clamp meter, Crimping Tool and electric kettle that were not necessarily as a result of the project were verified;
- g) There was no project completion and hand over report submitted for verification.

4.3.2.2 CONCLUSIONS

The review showed that the project was fully concluded since only 310 pre-wired meter boxes were installed out the envisioned 1,327. The review further showed that the procured AMR system lacked a number of functions as per the intended scope which was supposed to have been installed in the system.

It is on this basis that ERA found the investment in the AMR system as work in progress particularly due to the fact that available information provided showed that the AMR system functionality was not as stated in the signed contract for the supplier of the system. The system did not

pass the functionality tests. Further to this, ERA recognized that the company in its 2015 investment plan requested for more money towards this initiative and part of the justification was that the company intended to procure another AMR system claiming the recently procured system was off shelf.

This notwithstanding ERA further recognized that the company had registered some loss gains due to the installation of the pre-wired meter boxes and proposed that approval of this investment be deferred until such a time when the backbone of the project i.e. the AMR system is fully functional as per the specifications.

During the exit meeting held on August 07 2015, ERA recommended that projects like AMR which could be completed in stages should be identified at planning stages and approved in stages. AMR was recommended for a special consideration upon separation of costs incurred by Umeme on the completed component.

Umeme had not yet submitted a separated cost breakdown of the completed component for AMR.

4.3.2.3 AUTHORITY DECISION

The Authority rejected **US\$ 3,359,118** for AMR project until Umeme provided a breakdown of cost of completed stages of the AMR system.

4.4 RELIABILITY AND QUALITY OF SUPPLY IMPROVEMENT INVESTMENTS 2014

The Authority approved a total of **US\$ 12.45 million** budget for reliability and quality of supply improvement investments. Table 15 shows the details of the investments:

**Table 15: APPROVED RELIABILITY AND QUALITY OF SUPPLY INVESTMENTS
2014**

| S/N | Project Name | ERA Approval (US\$) | Umeme's Submission (US\$) |
|----------|---|---------------------|---------------------------|
| 1 | Overhead lines | 2,440,000 | 2,471,876 |
| 2 | Protection System Upgrade | 200,000 | 166,277 |
| 3 | Feeder Automation | | 21,921 |
| | Procurement and Installation of 50 load break switches | 1,000,000 | No submission |
| | Procurement and installation of 160 Auto Air brake switches | 1,300,000 | No submission |
| | Procurement and installation of 2040 fault detectors. | 400,000 | No submission |
| | Remote Monitoring of capacitor banks | 100,000 | No submission |
| | 30 Automatic pole mounted reclosers | 900,000 | No submission |
| 4 | Substation fire protection | 250,000 | No submission |
| 5 | MV switchgear replacement | 250,000 | No submission |
| 6 | Underground network improvement plan | 300,000 | No submission |
| 7 | Substation refurbishment | 726,750 | 202,631 |
| 8 | Kawanda – Matugga – Sanga | 500,000 | 109,090 |
| 9 | Namanve Industrial Park | 80,000 | No submission |
| 10 | Roofings Power Supply Quality | 4,000,000 | No submission |

4.4.1 OVERHEAD LINES

The Authority approved for Umeme to carry out restoration works on four (4) feeders. These feeders are shown in Table 16.

Table 16: APPROVED OVERHEAD LINES INVESTMENTS 2014

| S/N | Project Name | ERA Approval (US\$) | Submission (US\$) | Reviewed (US\$) |
|-----|--------------------|---------------------|-------------------|-----------------|
| 1 | Njeru – Lugazi | 606,843 | 488,270 | 285,395 |
| 2 | Nkongge – Mubende | 934,665 | 722,056 | 655,971 |
| 3 | Mutundwe – Mityana | 750,000 | 723,006 | 476,919 |
| 4 | Mubende – Kakumiro | 148,406 | 538,544 | 285,395 |

4.4.1.1 NJERU – LUGAZI 11KV FEEDER

The works under this feeder included replacement of rotten MV poles (503) and upgrading approx. 40km of the line from 25mm² to 100mm² conductor sizes. All project documentation was provided and had adequate information.

The field findings showed that the works were done and completed as per the scope. The material extraction showed that the company issued 300 (12m) poles and 50 (14m) poles. The field findings revealed that the company installed 232 (12m) poles and 14 (14m) poles, quantities that are significantly less than what was issued. These material differences were excluded from the amount recommended for approval. Umeme submitted additional information showing that the contractor company that implemented the works made pole returns of 88 12m poles yet this materials return was not reflected in the financial extracts submitted for the project.

4.4.1.2 NKONGE – MUBENDE 33KV FEEDER

The works under this feeder included replacement of rotten MV poles (570) and upgrading of approx. 40km of the line from 25mm² to 100mm² size of conductor. All project documentation was provided and had adequate information.

The field findings showed that the works were done according to scope, however the new air-break switch installed at Lusalira was not working at the time of the field verification. Re-conductoring was done for the portion between Lusalira and Mubende substation.

4.4.1.3 MUTUNDWE – MITYANA 33KV FEEDER

The works under this feeder included replacement of rotten MV poles (717) and upgrading of a short distance of approx. 1km from 25mm² to 100mm² size of conductor. All project documentation was provided and had adequate information.

The field verification findings showed that MV poles were replaced on the main line as well as T-offs. Works on T-offs could have been handled under DOMC as the number of poles was few.

The load break switches were installed on the feeder but were not being operated remotely. This was because the communication cable and other interfaces were not yet installed. These were to be considered as work in progress.

4.4.1.4 MUBENDE – KAKUMIRO 11KV FEEDER

The works under this feeder included replacement of rotten MV poles (483) and upgrading of approx. 18km of the line from 25mm² to 50mm² size of conductor. All project documentation was provided and had adequate information.

The field verification findings showed that the feeder was over scoped. Three member structures were mainly used at spans of 150m in conjunction with H-structures. This meant that some structures were redundant and also the cost of the project increased. Many poles had missing poles and danger signs. The conductor was never replaced yet it showed visible signs of ageing and joints.

4.4.1.5 CONCLUSIONS

Investments in the feeders that matched the findings were to be recommended for inclusion in the Asset base. Those investments where there were material variances, the variations were to be offset from the submitted figures as is the case with Njeru - Lugazi feeder findings.

4.4.1.6 AUTHORITY DECISION

The Authority approved **US\$ 2,051,139** subject to the offsets on the submitted figures of costs for Njeru – Lugazi feeder.

4.4.2 PROTECTION SYSTEM UPGRADE

The Authority approved a budget amount of US\$ 0.2 million for Umeme to replace obsolete protection relays at several substations.

4.4.2.1 DESK REVIEW

The desk review findings showed that the Company installed new protection relays at ten (10) substations which include Kabale, Kampala North, Masindi, Port Bell, Kisugu, Ntinda, Namungoona, Kawanda, Kireka and Njeru at a total cost of US\$ 166,277. The total number of relays installed was 50 and this also included the housing for each relay.

All documentation was provided and found adequate. No field verification was done to ascertain the works done.

4.4.2.2 AUTHORITY DECISION

The Authority approved amounts of **US\$166,277** for ROI.

4.4.3 FEEDER AUTOMATION

The Authority approved a budget of US\$ 3.7million for the procurement and installation of 50 load break switches, 160 auto Air break switches and 2040 fault detectors, remote monitoring of capacitor banks and 30 automatic pole mounted reclosers.

Umeme submitted a cost of **US\$ 21,921** for distribution automation but no further information was provided towards this project despite several requests for details.

It was further noted that in the Umeme 2015 Investment Plan, this category of investments was submitted as carryover from 2014 and as such would be treated as work in progress.

4.4.3.1 AUTHORITY DECISION

Umeme did not submit further information regarding these investments and as such this cost was considered **as work in progress**.

4.4.4 SUBSTATION FIRE PROTECTION

The Authority approved the installation of fire protection equipment in substations listed in the Table 17.

Table 17: SUBSTATIONS APPROVED FOR FIRE PROTECTION

| No. | Substation | Cost in USD |
|-----|---|-------------------|
| 1 | Ggaba, Jinja Industrial, Kireka, Port Bell, Kitante, Mukono and Entebbe | 125,406.90 |
| 2 | Kampala south, Njeru And Queensway | 69,758.59 |
| 3 | Mutundwe, Lugogo, Kampala North | 54,834.48 |
| | Total | 249,999.97 |

Umeme did not submit any information on the approved works i.e. completion and commissioning reports for the said works.

It was further noted that in the Umeme 2015 Investment Plan, this category of investments was submitted as carryover from 2014 and as such would be treated as work in progress.

4.4.4.1 AUTHORITY

This category of investment was treated as **work in progress** and therefore did not qualify for ROI.

4.4.5 SUBSTATION REFURBISHMENTS

The Authority approved US\$726,750.45 towards substation refurbishment. The scope of works that was approved and what Umeme implemented is shown in the Table 18.

Table 18: LIST OF APPROVED SUBSTATIONS FOR REFURBISHMENT

| S/N | Substation | Works to be done | Budget (US\$) | What Umeme did | Cost (US\$) |
|------------|-------------------|---|----------------------|---|--------------------|
| 1 | Serere | Transformer oil sumps and stone pitching | 46,000 | No submission | 0 |
| 2 | Soroti | Transformer oil sumps and stone pitching | 46,000 | Remove grass and replace with stone chippings; repair of gate and fence; construction of security gate house; construction of sanitary facilities | 76,273 |
| 3 | Mukono | Oil sump, back retainer wall and repair access road | 32,000 | No submission | |
| 4 | Rukungiri | Stone pitch and build guard house | 40,750 | Repaired fence and gate house; Constructed and roofed toilet and showers and did plumbing | 40,621 |

| | Substation | Works to be done | Budget (US\$) | What Umeme did | Cost (US\$) |
|----|---|---|----------------------|---|--------------------|
| 5 | Kumi | Oil sump, Stone pitch and build guard house | 46,000 | Removed grass and stone pitched; repaired gate and fence; constructed transformer plinth and oil sumps; Extended busbar; and constructed of access road to substation | 85,737 |
| 6 | Magamag a | Build guard house | 22,000 | No submission | |
| 7 | Mubende | | 22,000 | No submission | |
| 8 | Mbale | | 22,000 | No submission | |
| 10 | Ntinda, Kireka, Ggaba, Kampala South, Motormart, Namungo ona, Port Bell, Kisugu, Queensway, Kawanda | Upgrade RTU 400 to GE | 450,000 | No submission | |
| | Total | | 726,750 | | 202,631 |

4.4.5.1 DESK REVIEW

Desk reviews showed that the company refurbished three (3) substations out of the ten (10) that were supposed to be carried out. These were Soroti, Rukungiri and Kumi. It was noted that the Rukungiri works did not include stone pitching which was contrary to ERA's approved scope. It

was further noted that the costs for Soroti and Kumi substation were more than 50%, above the approved cost as shown in Table 18.

No field work was done for these substations.

4.4.5.2 CONCLUSIONS AND AUTHORITY DECISION

Works done on Soroti and Kumi substations were **deferred until detailed material costing** had been submitted for verification by Umeme to justify the increase in cost.

4.4.6 MV SWITCHGEAR REPLACEMENT

The Authority approved the cost of US\$ 0.25million for Bombo switch gear upgrade. Umeme did not submit completion and commissioning reports to show that the switchgear at Bombo substation had been replaced despite several requests by the verification team.

Under this category of investments, Umeme was also supposed to have worked on Kumi switchgear and Lira switchgear as 2013 carryover investments.

No information was submitted regarding equipment replacement for these substations as well, despite several requests by the verification team.

It was further noted that in the Umeme 2015 Investment Plan, this category of investments was submitted as carryover from 2014 and as such would be treated as work in progress.

4.4.6.1 CONCLUSION AND AUTHORITY DECISION

This category of investments was treated **as work in progress** and therefore does not qualify for ROI.

4.4.7 UNDERGROUND NETWORK

The Authority approved investment in this category at a cost of US\$300,000 because Umeme had presented that a number of its

underground feeders were over 100% loaded and needed urgent relief by installing larger cable sizes.

Umeme had not submitted any information in the form of completion and commissioning reports to show that the underground network had been upgraded.

It was further noted that in the Umeme 2015 Investment Plan, this category of investment was submitted as carryover from 2014 and as such would be treated as work in progress.

4.4.7.1 CONCLUSION AND AUTHORITY DECISION

This category of investments was treated as **work in progress** and therefore did not qualify for ROI.

4.4.8 KAWANDA – MATUGGA – SANGA FEEDER

The Authority approved the budget of US\$ 0.5 million towards construction of the 4km, Kawanda – Matugga – Sanga 33kV distribution line. The project aimed at extending power to the Pilot Economic Zone gazetted by the Government as an industrial park to stimulate industrialization initiatives in line with the country's Vision 2040, towards a modernized and industrial economy.

4.4.8.1 DESK REVIEW

Desk review findings showed that the total cost of the project was US\$ 109,090. Umeme extended power from a T-off on Kawanda - Bombo 33kV line to China Golden Rooster Steel Company Ltd located in Matugga. The scope of work involved constructing an overhead line 33kV100mm² ACSR of route length 5,700m and installed a metering unit.

4.4.8.2 FIELD FINDINGS

Field findings showed that works were done as per the approved scope and the quality of work done was good. There were no significant material variances to warrant offsetting of figures.

4.4.8.3 CONCLUSIONS

This project was done as per the approved scope and qualified to earn ROI.

4.4.8.4 AUTHORITY DECISION

The Authority approved **US\$ 94,206** which excludes borrowing costs, and overhead absorption costs.

4.4.9 NAMANVE INDUSTRIAL PARK

The Authority approved investment amounting to US\$ 80,000 for this project to address the need to provide adequate and reliable supply to industries in Namanve Industrial Park.

Umeme had not submitted any information on the works done on the project i.e. completion and commissioning reports to show that the Namanve Industrial Park project had been completed.

4.4.9.1 CONCLUSIONS AND AUTHORITY DECISION

Umeme did not submit further information regarding these investments and as such this cost was considered as ***work in progress***.

4.4.10 ROOFINGS QUALITY OF SUPPLY

The Authority approved investment amounting to US\$ 4 million for this project to address the quality of supply problems faced by the Roofings Steel Factory in Namanve.

Umeme had not submitted any information on the works done on the project i.e. completion and commissioning reports to show that the quality of supply solution was implemented. This investment was treated **as work in progress**.

4.5 BUSINESS EFFICIENCY IMPROVEMENT INVESTMENTS US\$ 17.352 MILLION

The Authority approved a total of **US\$ 17.352** million budget for Business Efficiency Improvement investments. Table 19 shows the details of the investments.

Table 19: APPROVED BUSINESS EFFICIENCY IMPROVEMENT FOR 2014

| S/N | Investment Category | ERA Approval (US\$) | Umeme submission (US\$) |
|------------|--|----------------------------|--------------------------------|
| 1 | Prepayment Metering | 12,366,876 | 12,356,937 |
| 2 | IT Systems | 1,890,000 | No submission |
| 3 | Customer & System Engineering Integration (CESI) | 430,000 | 327,865 |
| 4 | Hand Held Systems (HHS) | 827,000 | 600,317 |
| 5 | Infrared Cameras | 125,000 | No submission |
| 6 | Operational Vehicles | 1,000,000 | No submission |
| 7 | Tools | 732,784 | No submission |
| | TOTAL | 17,371,660 | 13,285,119 |

4.5.1 PREPAYMENT METERING

The Authority approved an amount of US\$ 12,366,873 for Umeme to retrofit 110,000 prepayment meters. These conversions were to be done in the Umeme districts of Wandegeya, Banda, Nateete and Metro. Table 20 shows the submission made by Umeme in terms of prepayment conversions.

Table 20: PREPAYMENT CONVERSIONS UNDERTAKEN BY UMEME IN 2014

| S/N | Prepayment Area | Submission (UShs) | Submission (US\$) |
|-----|--|-----------------------|-------------------|
| 1 | Prepayment retrofitting Eastern | 129,087,800 | 46,467.89 |
| 2 | Prepayment retrofitting Western | 18,845,716 | 6,783.92 |
| 3 | Prepayment retrofitting Wandegeya | 57,883,639 | 20,836.44 |
| 4 | Prepayment retrofitting Nakulabye | 494,262,572 | 177,920.29 |
| 5 | Prepayment retrofitting Kabalagala | 12,530,442 | 4,510.60 |
| 6 | Prepayment retrofitting Entebbe | 49,612,334 | 17,859.01 |
| 7 | Prepayment retrofitting Mukono | 37,101,685 | 13,355.54 |
| 8 | Prepayment retrofitting Najjanankumbi | 324,033,650 | 116,642.78 |
| 9 | Prepaid Metering – Wandegeya | 6,592,635,923 | 2,373,159.08 |
| 10 | Prepaid Metering – Government Accounts | 403,020,807 | 145,075.88 |
| 11 | Prepaid Metering Project Kampala Metro | 417,549,001 | 150,305.62 |
| 12 | Prepaid Metering Project – 2014 – Banda | 4,731,478,577 | 1,703,196.03 |
| 13 | Prepaid Metering project – 2014 – Nateete | 16,182,522,578 | 5,825,242.11 |
| 14 | Prepaid Metering – Masaka Nyendo area | 1,185,915,700 | 426,895.50 |
| 15 | Prepayment Metering project – Banda | 3,793,165,584 | 1,365,430.38 |
| 16 | Prepayment Metering – Kitintale – Phase 2 | (102,463,846) | (36,884.03) |
| 17 | Capitalization – Prepaid Metering Project – Nateete – 2012 | 390,000 | 140.39 |
| | TOTAL | 34,327,572,162 | 12,356,937 |

4.5.1.1 DESK REVIEW FINDINGS

The verification that revealed operational costs that are in their nature (Operations and maintenance) being capitalized. These costs would still be incurred by Umeme irrespective of the billing system, whether prepayment or post payment.

In addition, the detailed submission could not also be matched against the summary costs presented by Umeme. This anomaly was shared with the company and a revised submission was yet to be received.

4.5.1.2 AUTHORITY DECISION

The Authority approved **US\$ 9,823,928** from the matched cost summaries, pending a full audit of the prepayment retrofit investment.

4.5.2 CUSTOMER SERVICE AND SYSTEM ENGINEERING INTEGRATION

The Authority approved an amount of US\$ 430,000 for Umeme to integrate its systems in order to improve its customer service in terms of service delivery. The activities carried out under this project that were to achieve the desired objective were:

- a) Customer Data collection;
- b) Integration of systems; and
- c) Revision of processes and procedures to ensure data integrity going forward.

This project sought to end the need for data collection in future as new customers and transformers would be captured at inception.

4.5.2.1 DESK REVIEW

The desk review showed that the scope of the project covered six (6) Umeme districts of Entebbe, Kabale, Nateete, Kitintale, Kabalagala and Najjanankumbi. A review of the progress report dated 13th March 2014 revealed that out of the six (6) districts, four (4) districts had been completed by the end of December 2014 (i.e. Entebbe, Kabale, Kitintale and Kabalagala) with two (2) districts (i.e. Nateete and Najjanankumbi) yet to be completed.

The activities done under this project included:

- a) **Safety:** Through the safety senior manager, guidance was provided to Umeme staff on safe work methods which would be closely monitored through spot checks to ensure compliance;
- b) **Customer data collection:** Data was collected from the mentioned Umeme districts and validated against Umeme's OICS systems and

color coded depending on the outcome whether the customer meter was found:

- i. On the OICS and marked as installed;
- ii. On the OICS with any status other than installed; or
- iii. Non-existent on the OICS.

The customer data collection results revealed that of the 59,897 customers validated, 51,948 (87%) customers were found to be marked as installed; 1,903 (3%) customers were found to have a status other than installed; and 6,046 (10%) were found to non-existent.

c) Network data collection: Under this activity, the company captured transformer records as most of the networks expanded with transformer injections had not been captured on GIS. The review showed that 765 transformers were originally captured on GIS as compared to the 892 transformers that were captured during the exercise, giving an increase of 127 transformers.

It was also found out that several transformers were found to be captured on GIS under wrong feeders and these were reallocated to their rightful feeders.

The exercise had helped Umeme to capture the following:

- Accurate XY coordinates for network points;
- A display of customers on a map which are color coded based on status;
- Ease of navigation to network points and customer locations through the use of TomTom devices;
- Installed unique transformer location numbers;
- Accurate list of transformers in districts;
- Possibility of electronic survey;
- Transformer loading reports.

Umeme further reported that the exercise had provided the following benefits:

- Accurate measurement of reliability indices on the Umeme districts so far captured;

- Improved turnaround time thereby improving reliability of the network;
- Communication to customers is now accurate in the project area;
- Improved safety on the network due to quick response to network emergencies.

The financial review revealed that included in the submitted costs of US\$327,865, were staff costs, borrowing costs and transport costs all totaling to US\$38,365 and mobile mappers which had already been approved under another category totaling to US\$15,550. A file containing support documents was verified and supporting vouchers for the qualifying amount totaling to US\$191,384 were considered for ROI purposes.

4.5.2.2 CONCLUSIONS

From the desk review, the project achieved its set objectives.

4.5.2.3 AUTHORITY DECISION

The Authority approved **US\$191,384** towards customer services.

4.5.3 HAND HELD SYSTEMS

The Authority approved US\$600,000 for the purchase of Hand Held Systems (HHS) under phase 2 of the original HHS which aimed at:

- a) Addressing implementation issues encountered in phase 1, i.e. maintenance and integrity of meter-readings; and,
- b) Enhancing quality and timeliness of data, hence improving revenue collection.

The additional HHS systems were geared towards;

- i. Improving on the validation process of meter readers and their functionality;
- ii. Managing meters and their functionality;
- iii. Help in data cleanup system; and
- iv. Help in meter/customer identification.

4.5.3.1 DESK REVIEW

Umeme submitted a cost of US\$600,317, for inclusion in the asset base as the cost of HHS. A review was done on the submitted transactions and found that US\$48,825 relates to borrowing costs, staff costs, transport costs and Overhead absorption costs.

The HHS included ability to download meter-reading datasets directly from the servers, and automatically up-load meter-readings from the field in real time, hence enable supervisors to assess the meter-reading progress in real-time.

The meter-readings cached in the server were automatically downloaded to the billing application at a specified time; hence data-entry errors were reduced to the minimum. There were in-built systems to check the integrity of the data entered by the meter reader. Whereas the initial focus was on domestic consumers, they (HHS) are now being used to capture commercial Time of Use (TOU) meter-readings.

4.5.3.2 CONCLUSIONS

As the company continued the conversion drive of postpaid customers to prepaid arrangement, this expenditure was to be limited to this phase.

4.5.3.3 AUTHORITY DECISION

The Authority approved **US\$530,484**, net of borrowing costs, transport costs, staff costs and overhead absorption costs towards the Hand Held Systems.

4.6 NON NETWORK ASSETS

The Authority approved US\$1,000,000 for non-network assets. Whereas Umeme submitted a pdf document for expenditures under this category, there were no detailed excel sheet submitted for verification.

The Authority informed Umeme that **US\$1,000,000** would be clawed back from the tariff if no detailed excel submission was provided.

5 CONCLUSIONS AND RECOMMENDATIONS ON THE 2014 APPROVED INVESTMENTS

The total amount approved to earn a return on investment as 2014 Investment additions was **US\$ 45,944,065**. Table 21 shows the summary of the details per investment category.

Table 21: RECOMMENDED UMEME 2014 INVESTMENT AMOUNTS FOR ROI

| S/N | Category | Submission | Verified | Recommended | |
|-----|-----------------------------|--------------------|--------------------|--------------------|----------------------|
| | | Ugx'000 | Ugx'000 | Ugx'000 | US\$'000 |
| 1 | AMR Project | 9,331,629 | 7,388,971 | - | - |
| 2 | CESI ⁹ | 910,808 | 531,666 | 531,666 | 191,384 |
| 3 | Loss Reduction | 1,818,396 | - | - | - |
| 4 | HHS ¹⁰ | 1,667,681 | 1,480,275 | 1,473,684 | 530,484 |
| 5 | Load Growth | 4,987,452 | 3,257,676 | 3,257,676 | 1,172,670 |
| 6 | Distribution Automation | 60,896 | - | - | - |
| 7 | New Connections | 30,616,894 | 24,081,776 | 28,132,329 | 10,126,828 |
| 8 | Prepayment Metering | 34,327,572 | 27,290,871 | 27,290,871 | 9,823,928 |
| 9 | Oba Connections | 369,324 | - | - | - |
| 10 | Protection Systems | 461,916 | 461,916 | 461,916 | 166,277 |
| 11 | Restoration | 58,457,753 | 49,284,431 | 38,801,273 | 13,967 |
| 12 | Restoration Safety Priority | 6,175,551 | - | - | - |
| 13 | Sub-Stations | 17,935 | 10,892,501 | 9,036,931 | 3,253 |
| 14 | System Improvements | 2,273,031 | 1,773,420 | 393,967 | 142 |
| 15 | Technical Loss Reduction | 82,776,723 | 59,355,887 | 14,227,150 | 5,121 |
| 16 | Transformer Injections | 5,042,306 | 1,926,595 | 551,486 | 199 |
| 17 | Provisions | | 4,608,094 | 4,608,094 | 1,659 |
| 18 | Insurance Offset | | | -1,205,397 | (408) |
| | | 257,213,196 | 187,725,987 | 127,741,646 | <u>45,944</u> |

The findings and recommendations of the verification report as contained in this report were brought to the attention of Umeme,

⁹ Customer Engineering Services Integration (CESI)

¹⁰ Hand Held Meter Reading System

through an exit meeting held on August 7, 2015. Information was submitted on 25th August 2015 and this report incorporates the relevant explanations as agreed in the exit meeting. Specific consideration had been made on Prepayment retrofit, provisions and insurance off set.

6 APPENDIX 1

UMEME 2014 INVESTMENTS VERIFICATION SUMMARY

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|-----------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|--|---|
| 2013 carry overs | Hoima – Busunju | 2.30 | 2.32 | 2.32 | 2.11 | Approved amount is net of borrowing costs, staff costs, and Overhead absorption costs of \$0.21m | As per the discussion on the principles |
| | Mukono – Seeta T-offs | 0.50 | 0.34 | 0.34 | 0.30 | Approved amount is net of borrowing costs, staff costs, and Overhead absorption | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|-------------------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | | | | | | costs of \$0.04m. | |
| | Kayunga – Kangulumira | 0.50 | 0.47 | 0.47 | 0.43 | Approved amount is net of borrowing costs, staff costs, and Overhead absorption costs of \$0.04m | As per the discussion on the principles |
| | Mbarara Central – Masaka west | 2.20 | 2.11 | 2.11 | 1.54 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs of \$0.19m and a | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|-------------------------------|--|---|---------------------------------------|---------------------------------------|---|--|
| | | | | | | provision of \$0.16m | |
| | Mutundwe – Mitala Maria | 1.35 | 1.11 | 1.11 | 0.91 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.2m | As per the discussion on the principles |
| | Masaka Central – Mitala Maria | | 0.84 | 0.84 | 0.66 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|-----------------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | | | | | | provision of \$0.18m | |
| | Mbale – Kumi | 3.40 | 1.00 | 1.00 | 0.83 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.17m | As per the discussion on the principles |
| | Opuyo – Kumi – Serere | | 1.51 | 1.51 | 1.27 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|----------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | | | | | | provision of \$0.24m | |
| | Mbale – Kapchorwa | | 1.04 | 1.04 | 0.89 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.15m | As per the discussion on the principles |
| | Tororo – Mbale 1 | 1.25 | 0.77 | 0.77 | 0 | Not approved pending proper reconciliation of materials from the field on the two | Data capture is being done to segregate 12m and 14m poles after which the feeders shall be verified. |
| | Tororo – Mbale 2 | | 0.22 | 0.22 | 0 | | |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|-------------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|---|---|
| | | | | | | <p>projects i.e. Tororo-Mbale 1 and Tororo Mbale 2 projects.</p> <p>It's further noted that part of the works done on Tororo-Mbale2 have been submitted as 2015 Investments</p> | This to be considered in the next verification exercise |
| | Mbarara – North – Ntungamo – Kabale | 0.93 | 0.02 | 0 | 0 | Still work in progress | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|---------------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | Mbarara North – Ishaka | 0.71 | 0.59 | 0.59 | 0.54 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.17m | As per the discussion on the principles |
| | Ishaka – Rukungiri | 1.08 | 0.85 | 0.85 | 0.66 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.19m | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|---|--|---|---------------------------------------|---------------------------------------|--|--|
| | Masaka West – Masaka Central | 0.10 | 0.04 | 0.04 | 0.04 | Approved | Approved |
| | Lira – Apac – Masindi | 1.43 | 1.68 | 1.68 | 1.53 | Approved amount is net of borrowing costs, staff costs, Overhead absorption costs and a provision of \$0.15m | As per the discussion on the principles |
| | Lira 33kV Switchgear and Substation battery banks | 1.70 | 0.53 | 0 | 0 | This was not submitted for verification | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|-------------------------|--|---|---------------------------------------|---------------------------------------|---|--|
| | Sub-Total | <u>17.45</u> | <u>15.44</u> | <u>14.89</u> | <u>11.712</u> | | |
| | Technical losses | | | | | | |
| | Namugongo | 0.876 | 5.99 | 5.37 | 0.876 | Umeme implemented a different scope than what had been justified and approved by the Authority. Amount is based on the approved scope of works by ERA | Amount based on Authority Approval |
| | Mutundwe – Kabowa | 0.26 | 0.27 | | 0 | Company changed the scope of | Approval is pending cost break-down |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|------------------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | | | | | | works as approved by the Authority. Approval is pending cost break-down of the approved scope of works | of the new scope |
| | New & Load Growth | | | | | | |
| | Queensway Substation | 2.25 | 4.16 | 4.16 | 2.446 | Approved amount is net of one 40MVA 33/11kV Transformer worth \$1.1m that was not | Umeme promised to submit payment vouchers on Monday 10 th August 2015. This |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|---------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|--|--|
| | | | | | | approved by the Authority, Labour and Transport costs vouchers worth \$1.33m not submitted and other O&M costs included in the submission of \$0.38m | information has not been submitted to date |
| | Jinja 33kV lines reconductoring | | 0.11 | 0.11 | 0.08 | Approved amount excludes \$0.02m arising from | The Owen – Falls Njeru was O&M |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|---|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|--|---|
| | | | | | | staff costs, transport, and absorption overhead costs | |
| | <u>Sub-total</u> | <u>3.386</u> | <u>10.53</u> | <u>9.64</u> | <u>3.402</u> | | |
| | <u>Total</u> | <u>20.84</u> | <u>25.97</u> | <u>24.53</u> | <u>15.112</u> | | |
| 2014 growth | Load Namugongo substation and lines | 4.50 | 0 | 0 | 0 | No Submission made on this category | WIP |
| | Nagongera substation and lines | 0.87 | 0.88 | 0.88 | 0.80 | Approved amount exclude materials not seen during the verification worth \$0.01m | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|--|---------------------------------------|
| | | | | | | and borrowing costs, staff costs and overhead absorption costs of \$0.08m | |
| | Queensway 2 11kV evacuation lines | 0.60 | 1.23 | 1.23 | 1.09 | Approved amount excludes the costs of O&M nature totaling to \$0.11m and provisions of \$0.12m | Exclude O&M costs and provisions |
| | Interconnection between | 0.07 | 0 | 0 | 0 | No submission made to ERA | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|---|--|---|---------------------------------------|---------------------------------------|---|--|
| | Lugogo, Naguru, Ntinda and Bukoto feeders | | | | | | |
| | Distribution transformer Injections and system improvements | 3.00 | 2.63 | 1.33 | 0.34 | Approved amount included only transformer injections and replacement of transformers which had lived their useful lives | Treated according to the agreed principles |
| | Power transformer upgrades | 1.60 | 0 | 0 | 0 | No submission was made | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--------------------|--|---|---------------------------------------|---------------------------------------|---|---|
| | | | | | | on this category | |
| | New connections | 8.00 | 11.02 | 11.02 | 10.127 | Amount based on the verified amounts, reports in the annual financial report, off-set made on the OBA customers and postpaid customers made from October 2014 | Umeme submitted that it was still WIP reports for postpaid connections by Friday 14th August 2015 |
| | Nyabwina – Kiyaga, | 0.297 | 0.09 | 0.09 | 0.09 | Approved amount | Rwashamaire and |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|---|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|---|---|
| | Bugarama TC and Rwashamair e Nkongorongo TC | | | | | excludes borrowing costs, staff and travel costs of \$0.007 | Nkongorongo TC are WIP |
| | Namunkeker a Industrial park | 1.976 | 0 | 0 | 0 | No submission made in this category | WIP |
| | SUBTOTAL | 20.913 | 15.85 | 14.55 | 12.444 | | |
| 2014 Loss Reduction | Kireka – Port Bell | 0.02 | 0.03 | 0.03 | 0.027 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Mutundwe – Kabusu | 0.02 | 0.03 | 0.03 | 0.028 | Borrowing costs have been excluded | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--|--|---|---------------------------------------|---------------------------------------|------------------------------------|--|
| | Lugazi – Namataba | 0.50 | 0.19 | 0.17 | 0.192 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Jinja – Industrial Iganga | 1.17 | 0.68 | 0.62 | 0.619 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Bombo – Namulonge | 2.35 | 0.59 | 0.53 | 0.532 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Bombo – Luwero | 2.13 | 1.38 | 1.25 | 1.246 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Mbarara – Central Kakoba Coffee | 0.22 | 0.24 | 0.19 | 0.189 | Borrowing costs have been excluded | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | Masaka – Kalungu | 0.38 | 0.67 | 0.59 | 0.590 | Approved amount is net of missing materials on this feeder | Missing materials have been removed |
| | Entebbe Airport | 0.10 | 0.05 | 0 | 0 | No submission, However this was submitted as part of 2015 Investment plans | WIP |
| | Entebbe Town | 0.14 | 0.18 | 0.16 | 0.162 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Entebbe – Kisubi | 0.25 | 0.25 | 0.20 | 0.203 | Borrowing costs have | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---------------------|---------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|---|---|
| | | | | | | been excluded | |
| | Kisubi – Kisubi Mission | 0.33 | 0.39 | 0.35 | 0.354 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Kampala South – Salaama Road | 0.09 | 0.10 | 0.10 | 0.103 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Technical Losses | 7.71 | 4.78 | 4.22 | 4.245 | | |
| | AMR | 8.00 | 3.34 | 3.36 | 0 | The project is still WIP. There were no project completion and hand over report submitted for | Umeme was to submit the completed phase for AMR for possible consideration by 14 th August 2015. To date |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---|-------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|---|---|
| | | | | | | verification. It has also been submitted in 2015 Investment plans | this information has not been submitted |
| | Commercial Losses | - | | | 0 | | |
| | SUBTOTAL | 15.71 | 8.12 | 7.58 | 4.245 | | |
| 2014 Reliability and Quality of supply improvement program | Njeru Lugazi – | 0.61 | 0.49 | 0.66 | 0.285 | Recommended amount is net of missing materials on this feeder | Missing materials excluded |
| | Nkonge Mubende – | 0.93 | 0.72 | 0.66 | 0.66 | Borrowing costs have been excluded | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--|--|---|---------------------------------------|---------------------------------------|------------------------------------|--|
| | Mutundwe – Mityana | 0.75 | 0.72 | 0.48 | 0.66 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Mubende – Kakumiro | 0.15 | 0.54 | 0.29 | 0.48 | Borrowing costs have been excluded | As per the discussion on the principles |
| | Overhead Lines | 2.44 | 2.47 | 2.08 | 2.07 | | |
| | Conversion of CBD feeders to underground: KLA North – Wandegeya feeder | - | | | | | |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--|--|---|---------------------------------------|---------------------------------------|--|--|
| | Protection System Upgrade | 0.20 | 0.17 | 0.17 | 0.17 | Ten substations as required had new installed protection relays. No offsets made on the submission as it reflected the capital expenditure | |
| | Procurement and Installation of 50 load break switches | 1.00 | | 0 | 0 | No submission | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|---|--|---|---------------------------------------|---------------------------------------|--------------------|--|
| | Procurement and installation of 160 Auto Air brake switches | 1.30 | | 0 | 0 | No submission | WIP |
| | Procurement and installation of 2040 fault detectors | 0.40 | | 0 | 0 | No submission | WIP |
| | Remote Monitoring of capacitor banks | 0.10 | | 0 | 0 | No submission | WIP |
| | 30 Automatic pole mounted reclosures | 0.9 | | 0 | 0 | No submission | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--------------------------------------|--|---|---------------------------------------|---------------------------------------|-------------------------------|--|
| | Distribution Automation | 3.7 | 0.002 | 0 | 0 | | |
| | Substation fire protection | 0.25 | 0 | 0 | 0 | No submission | WIP |
| | Switching stations | - | 0 | 0 | 0 | | |
| | MV switchgear replacement | 0.25 | 0 | 0 | 0 | No submission | WIP |
| | Underground network improvement plan | 0.30 | 0 | 0 | 0 | No submission | WIP |
| | Serere | 0.046 | 0 | 0 | 0 | No submission | WIP |
| | Soroti | 0.046 | 0.076 | 0.076 | 0 | No detailed material costings | Details were to be provided by Monday |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--------------------|--|---|---------------------------------------|---------------------------------------|--|---|
| | | | | | | were provided for the works on this substation | 10 th August 2015. To date this information has not been submitted |
| | Mukono | 0.032 | 0 | 0 | 0 | No submission | WIP |
| | Rukungiri | 0.041 | 0.041 | 0.041 | 0 | Not approved. Works did not include stone pitching which was an approval requirement | Needs to be verified after implementation before approvals |
| | Kumi | 0.046 | 0.086 | 0.086 | 0 | No detailed material costings were | Details were to be provided by Monday 10 th August |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--|--|---|---------------------------------------|---------------------------------------|---|---|
| | | | | | | provided for the works on this substation | 2015. To date this information has not been submitted |
| | Magamaga | 0.022 | 0 | 0 | 0 | No submission | WIP |
| | Mubende | 0.022 | 0 | 0 | 0 | No submission | WIP |
| | Mbale | 0.022 | 0 | 0 | 0 | No submission | WIP |
| | Ntinda, Kireka, Ggaba, Kampala South, Motormart, Namungoon a, Port Bell, Kisugu, | 0.45 | 0 | 0 | 0 | No submission | WIP |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--------------------------|--|---|---------------------------------------|---------------------------------------|--|--|
| | Queensway, Kawanda | | | | | | |
| | Substation refurbishment | 0.727 | 0.203 | 0.203 | 0 | | |
| | Kawanda - Matugga | 0.50 | 0.109 | 0.109 | 0.094 | Approved amount exclude material reconciliations on poles and conductor. It also excludes borrowing costs, overhead absorption costs | |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|---|-------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------------------|--|--|
| | Namanve Industrial Park | 0.08 | 0 | 0 | 0 | No submission | WIP |
| | Roofings Power Supply Quality | 4.00 | 0 | 0 | 0 | No submission | WIP (to be completed in September 2016) |
| | SUBTOTAL | 12.447 | 2.952 | 2.572 | 2.315 | | |
| 2014 Business efficiency Improvement | Prepayment metering | 12.367 | 12.357 | 12.357 | 9.824 | This shall be verified separately and approval made to that effect | |
| | IT systems | 1.89 | 0 | 0 | 0 | No submission | Umeme was to submit details by Friday 14 th August 2015 |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|--|--|---|---------------------------------------|---------------------------------------|---|---|
| | | | | | | | To date this information has not been submitted |
| | Customer and Engineering Systems Integration project | 0.43 | 0.328 | 0.328 | 0.191 | Approved amount excludes borrowing costs, overhead absorption costs | As per the discussion on the principles |
| | HHS | 0.827 | 0.600 | 0.600 | 0.530 | Approved amount excludes borrowing costs, overhead absorption costs | As per the discussion on the principles |

| Investment Category | Description | Authority Approval (US\$ Million) | Submission by Umeme (US\$ Million) | Verified Amount (US\$ Million) | Approved Amount (US\$ Million) | ERA Remarks | Agreed Action during the exit meeting |
|----------------------------|-------------------------|--|---|---------------------------------------|---------------------------------------|--------------------|--|
| | Operational vehicles | 1.00 | 0 | 0 | 0 | No submission | WIP |
| | Infra-red Camera | 0.125 | 0 | 0 | 0 | No submission | WIP |
| | Tools | 0.71 | 0 | 0 | 0 | No submission | WIP |
| | SUBTOTAL | 17.35 | 13.285 | 13.285 | 10.545 | | |
| | Provisions | | | 1.659 | 1.660 | | |
| | Insurance Offset | | | (0.41) | (0.41) | | |
| | GRAND TOTAL | 87.26 | 66.177 | 62.547 | 45.945 | | |