UMEME INVESTMENT VERIFICATION REPORT

2015

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1 INTRODUCTION

In accordance with its supply License No. 048, Umeme Ltd is entitled to earn a Return on Investment (ROI) on the investments made on the network, as approved by the Authority in any particular period. The Authority developed the Investment Approval and Verification Guidelines 2013, to streamline the planning, submission and verification of completed investments in any particular period. 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 and the Umeme Supply License as amended.

On 11th December 2014, Umeme submitted an Investment Plan for 2015 of US$ 155.75 million. The Authority made approvals as summarized in Table 1 totaling to US$ 78.730 million.

Table 1: UMEME'S APPROVED INVESTMENT PLAN FOR 2015

S/N	Date of Approval	Amount Approved (US$ million)
1	February 4, 2015	30.487
2	May 27, 2015	31.066
3	July 29, 2015	17.177
TOTAL		**78.730**

Further to the above, and in line with Umeme's Power Supply license, a total of US$ 1.121 million and UGX 550 million was approved for the year 2015 as emergency capex.

Umeme through its letter Ref: ERA/2016.02/024 dated 10th February 2016 submitted completed/executed investments totaling to US$ 72.56 million for verification to earn a return on investment upon approval.

Umeme further submitted its audited financial statements to support the investments completed in the year 2015. Table 2 shows the

summary of Umeme's submission as compared to the Authority's approval.

Table 2: UMEME'S SUBMISSION OF COMPLETED ASSET ADDITIONS IN 2015

Description/Category	Umeme's submission Ugx equivalent ('000)[1]	Umeme's Submission US$	ERA'S Approved Investment plan[2] (US$)
Sub-Stations and Integrating Lines	35,555,168	10,528,625	7,620,000
Protection Systems	2,560,279	758,152	795,000
Load Growth	20,791,948	6,156,929	9,116,476
Emergency CAPEX	3,126,054	925,690	1,239,086
AMR Project	25,672,552	7,602,177	8,000,000
Prepayment Retrofit	43,067,437	12,753,165	13,232,000
New Connections	52,015,234	15,402,794	10,304,000
Hand Held Meter Reading System	315,371	93,388	297,000
Transformer Injections	18,202,801	5,390,228	3,000,000
System Improvements	714,270	211,510	-
Technical Loss Reduction	23,127,116	6,848,421	723,000
Restoration	18,895,637	5,595,392	4,672,644
Loss Reduction Services	415,727	123,105	-
CESI	590,718	174,924	245,800
GRAND TOTAL	**245,050,312**	**72,564,499**	**59,245,006**

From the submission made, it was noted that whereas the Authority approved an Investment Plan amounting to US$ 78.730 million, the completed investments submitted when aligned to the approved project categories, amount to US$72,564,499. From the submitted completed investments, projects worth US$ 59.245 million of the approved Investment Plan total of US$78.73 million, were implemented.

[1] Exch. Rate 3,377

[2] Only projects for which Umeme has submitted for verification are reflected in this column.

The verification observed that some of the approved projects registered cost overruns as elaborated in the respective sections. The categories where the company overspent included; new connections, transformer injections, restoration projects and technical loss reduction. The details of overspending, with the respective recommendations are elaborated in the respective sections.

The review and analysis revealed that some of the approved investments for 2015, registered time overruns and were considered by the Authority as carryovers under the Umeme's 2016 investment plan. Therefore, these did not form part of the investments to be verified.

The major categories of investments as per Umeme's completed investments include;

I. New Connections US$15,402,794 (21%);

II. Prepayment retrofit US$ 12,753,165 (18%) and substations; and,

III. Interconnecting lines US$10,528,625 (15%).

These three constitute 54% of the submitted asset additions by Umeme. The remaining 46% constitutes the other categories of investments as elaborated in Table 2.

2 INVESTMENT VERIFICATION METHODOLOGY

The verification process was conducted in line with the Authority's Investment Approval and Verification Guidelines, 2013. The exercise started with a kickoff meeting attended by Umeme, UEDCL and ERA at ERA house. The kick off was followed by a desk review, field verification and the exit meeting which was held on May 10th 2016, to share the outcomes of the verification. In the spirit of ensuring transparency in the affairs of the Electricity Supply Industry (ESI), a stakeholder consultative meeting to discuss the findings was held on May 13th 2016, and Umeme was given an opportunity to provide feedback into the exercise before the Authority's decision was made by the end of May 2016.

2.1 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 and/or unreasonable in nature.

The following principles were followed during the verification:-

(a) Executed investments without prior Authority's approval were not considered for purposes of inclusion in the rate base EXCEPT for those implemented to address emergency conditions as provided for in the Company's Electricity Supply License;

(b) Transformers that did not live to the end of their useful lives (25 years) and were replaced with a higher rated transformer (upgrade), had the value of the upgraded new transformer reduced by the depreciated value of the old transformer for purposes of inclusion in the Rate Base;

(c) Provisions and journal vouchers not supported with the necessary accounting evidence were not considered for ROI. The approved amounts under provisions in 2014, that were not availed for verification in 2015 have been clawed back;

(d) An impairment charge of US$ 2.3 million has been recommended to be offset from the assets on the Rate Base based on the Audited financial statements 2015 (note 14);

(e) Replacement of low voltage (LV) poles has not been considered for ROI;

(f) Conductors that were replaced before their useful life span were impaired with the depreciated value of the old conductor;

(g) Borrowing costs, overhead absorption, labor and transport costs relating to supervision by Umeme staff were not considered as part of Capital Expenditure (CAPEX) for purposes of determining the Rate Base;

(h) No postpaid new connections were considered for ROI in 2015;

(i) Capital Work in Progress (CWIP) submitted was not been considered as part of investments for ROI;
(j) Variation of scope without prior Authority's approval was not been considered;
(k) Customer funded connections, grants and government funded investments were not considered for ROI.
(l) Investments that did not conform to the Company's procurement guidelines and/or those of their financiers were adjusted to reflect Value for Money;
(m) Investments which did not achieve the original company's justification and objective were not considered;
(n) Investments that were not implemented according to the gazette standard and/or contractual requirements were not considered;
(o) Investments where the consumer was not deriving the full benefit i.e. not used and useful were not considered; and
(p) Interest accruing from the ring fenced customer security deposits were deducted.

2.2 METHODOLOGY

The methodology involved two phases:

2.2.1 PHASE I – DESK REVIEW

In this phase, the Authority together with UEDCL considered all submitted documents on completed investments. These documents were audited to confirm the actual costs incurred. Documents confirming that the investments were done included procurement documents, the contracts, progress reports, testing (FAT[3], SAT[4]), commissioning and hand-over reports; as well as evidence that payments were actually done.

[3] FAT: Factory Acceptance Test
[4] SAT: Site Acceptance Test

All projects submitted with supporting documentation were verified to inform the decision of the Authority.

Investments relating to new connections and conversion of customers from post-paid platform to prepayment platform (retrofit), a test of detailed procedures was developed and agreed to by the Company to obtain reasonable assurance on the completeness and number of new connections and retrofits implemented for 2015. The details of the methodology are elaborated in section 4.3.7 of this report.

2.2.2 PHASE II – FIELD VERIFICATION

This phase was aimed at providing assurance to the Authority on the physical existence, condition, quality (i.e. compliance with contractual standards, workmanship) and proper operation of the submitted completed investments. A sample was obtained based on the desk review findings[5]. The field verification teams were composed of Engineers and Accountants from Umeme, UEDCL and ERA. Particularly, the teams looked out for the following:

(i) Physical existence of the assets;
(ii) Used and usefulness[6] of the assets, i.e. are the assets in proper operation and is the customer deriving benefit from the asset;
(iii) Material quantities as per the final project material reconciliation;
(iv) Classification of the asset and related costs; and
(v) Workmanship in line with contractual standards.

[5] Desk review findings in terms of materiality of the investments, inconsistencies noted, completeness of the investments and evidence of effective payment.
[6] Project met the intended objective.

3 ANALYSIS OF APPROVED INVESTMENTS FOR 2015

3.1 ANALYSIS OF SUBMITTED INVESTMENTS AGAINST THE FINANCIAL STATEMENTS

Umeme invests using funds generated from its operations and/or borrowing. According to the audited financial statements, US$87 million was added on to the Asset Base of which US$ US$86.5million represents capital investments for the year. These were funded 54% using borrowed funds while 44% was through the operational reserves.

The financial statements further indicated that the total investments pending Authority's approval were US$152.7 million contrary to US$113.8 million (based on the Umeme submissions to ERA). The difference of US$22.3 million is not known to the Authority but during the exit meeting, Umeme explained that these amounts relate to the 2009 and 2013 that the Authority disallowed for purposes of earning a return on investment. The response by Umeme in itself meant that the Authority had given a decision and therefore not pending any approval. Furthermore, the reported US$86.5 million capital investments was not submitted for verification but instead, US$72.6 million was submitted to ERA in 2015 for verification. Umeme explained that the Audited figure reported as "yet to be approved by the Authority" included "Work-in Progress". This therefore contravenes requirements in the Authority's Investment Approval and Verification Guidelines 2013, which clearly shows work-in progress projects should not be submitted for purposes of ROI.

3.1.1 NEW CONNECTIONS

The financial statements reported a total number of connections net of disconnections of 142,971. This number was represented by OBA customers, large and medium customers, commercial and domestic customers. Umeme submitted 68,825 new customer connections for purposes of ROI and 79,768 - OBA customer connections. The two sets of connection numbers total to 148,593, which is higher than the

reported net connections of 142,971 in the Company's financial statements. A breakdown of these customer numbers was provided for review and confirmed that the 142,971, is a derived figure including disconnections, de-activations and re-connections and activations. These categories under the prepayment metering platform will reduce but in the meantime they affect the figures considered for ROI purposes. A detailed extract of the deactivated and reactivated customers in 2015 was requested. The verification considered 148,593 customers net of 2,438 deactivated/disconnected customers. A detailed list of these numbers was submitted although Umeme did not provide a convincing justification for disconnecting prepaid customers.

3.1.2 CAPITAL CONTRIBUTIONS

Customer contribution in aid of construction is in respect of one-pole and no-pole service. According to the audited financial statements, customer capital contributions of Ugx 15,527 million was reported as received during the year, while connection services worth Ugx 14,766 million were completed. Connection services worth Ugx 5,731 million were carried forward. The capital contribution for the no-pole service and one-pole service submitted relating to new connections were Ugx 9,671 million. Umeme submitted that the audited figure of Ugx 14,766 million in the financial statement was consolidated, even though the Authority requested for a breakdown, it was not given. As a result, no details were provided to ascertain the actual capital contributions from the customer funded connections to derive the amount for ROI purposes. The Authority used the submitted customer categories to derive the capital contributions accruing.

3.1.3 CUSTOMER SECURITY DEPOSITS

Customer security deposits relate to the amounts required to be paid by customers before they are connected to the power distribution system. The deposits act as security for any unpaid bills in case of termination of the energy supply agreement. The deposits paid per

customer vary depending on the energy consumption of the customer. The Authority issued Customer Security Guidelines 201, streamlining the management of Customer Security Deposits.

During the year under review, Umeme received Ugx 789 million from customers, while Ugx 3,367 million was refunded to customers. The company closed the financial year with Ugx 998 million in customer security deposits excluding accrued interests. According to the Guidelines, Umeme is required to pay the customers an interest rate equivalent to the annualized rate on a 360-treasury bill as published by Bank of Uganda. The verified information provided no evidence that the Company had ring-fenced the customer security deposits and also computed/and paid the interest accruing to these deposits to customers. Based on the financial statements, Umeme opened the year with Ugx 3,576 million excluding accrued interest. The Authority will institute an audit of these security deposits and the interests accruing to them for further action on Umeme.

3.1.4 DISPOSAL AND IMPAIRMENT

Umeme reported a total cost of Ugx 7,418million, as impaired assets with an accumulated depreciation of Ugx 660million, making a loss of Ugx 6,758 million. These assets were disposed of as scrap at a cost of Ugx 130million. From the analysis, the following were observed;

(i) The detailed list of disposed/written off assets showed transformer replacements at Ugx 3,751 million and no pole and new pole impairments of Ugx 3,667 million,
(ii) Umeme did not provide the Disposal Procedural Guidelines followed while removing the asset from the network for disposal. Absence of this information limited the verification of the impairment values and the determination of the effect of the disposed assets to the environment,
(iii) The impaired assets had lived an average of one year (assume a 10% depreciation rate) before they were removed from the network.

3.1.4.1 AUTHORITY DECISIONS

(i) The Authority as a result offset disposal and impairment costs of Ugx 6,758 million from the Rate Base.

(ii) An independent audit on the impairment charges by Umeme should be undertaken.

3.2 APPROVED INVESTMENT CATEGORIES FOR 2015

The review of the submission is presented based on the approved investments in their respective categories. The following investments, in their respective categories were reviewed as shown in Table 3.

Table 3: APPROVED UMEME INVESTMENTS FOR 2015

S/N	Project Category	1st Approval US$ (Million)	2nd Approval US$(Million)	3rd Approval US$ (Million)
1	2014 Carryover Investments	12.015		
2	Load Growth and New Connections	13.257	17.070	4.134
3	Distribution Loss Reduction	4.250	5.750	7.588
4	Reliability and Quality of Supply Improvements	0.965	2.906	4.711
5	GETFiT Projects		4.175	
6	Non-Network Assets		0.365	
	TOTAL	**30.487**	**31.066**	**17.177**

3.3 2014 CARRYOVER INVESTMENTS

Table 4 shows a list of projects that were approved under this category.

Table 4: UMEME'S SUBMISSION AGAINST 2014 CARRYOVER INVESTMENTS

Project Category, Project	Umeme's Application (US$)	ERA's Approval (US$)
Load Growth		
(a) Namugongo Substation and Integration lines	6,448,447	4,000,000
(b) Ntinda Substation Upgrade	1,767,360	600,000
(c) Mukono Substation Upgrade		600,000
(d) Jinja Industrial Substation Upgrade		600,000
Reliability and Quality of Supply		
(a) Comprehensive Distribution Automation	0	2,700,000
(b) Substation Access Control and Fire Protection	0	1,000,000
(c) Switchgear Replacement at Bombo and Lira Spinning Substation	1,830,654	1,000,000
(d) Substation refurbishment of Magamaga Substation	29,731	15,000
(e) Underground Cable Works Upgrade	1,170,337	1,500,000
Total	**11,246,529**	**12,015,000**

3.3.1 NAMUGONGO SUBSTATION AND INTEGRATION LINES

The Authority approved a budget of US$ 4.5 million in 2014, for the construction of Namugongo Substation and its integrating lines. This budget was later revised to US$ 4 million by Umeme in its 2015 Investment Plan and approved by the Authority at its 243rd meeting held on February 4th 2015, as shown in table 4 under the 2015 approved investments. The substation was intended to relieve loading of the 11kV feeders on the Kireka substation (Namugongo and Seeta) and Ntinda substation (Naalya). The overall objective was to improve quality of

power supplied in the areas of Seeta, Kiira and Kyaliwajala and further cater for growth in demand.

The project works had two major components that were implemented separately. The first component involved the construction of the substation and associated transformers, switchgear and civil works; and the second one involved the construction of the integration lines (outgoing feeders and interconnecting lines).

Umeme submitted an application of US$ 6,448,447, representing an over expenditure of **61%** on the approved budget for verification. Umeme did not submit sufficient information to explain the high cost variation, but attributed the over expenditure to the historical budget costing that was done by Umeme based on previous similar projects. Umeme however did not provide the list of projects used as benchmark to justify the high cost increase.

3.3.1.1 Namugongo Substation works

The scope involved installation of two 15/20 MVA 33/11kV transformers and associated works as detailed below:

(a) Purchase of substation land;
(b) 11kV and 33kV switchgear to cater for 2 new 33kV feeders;
(c) Installation of telecommunication and SCADA at the substation;
(d) Metering of all feeders;
(e) Installation of safety systems at the substation;
(f) Installation of auxiliary transformer;
(g) Civil works;
(h) Installation of substation earthing and lightning protection; and,
(i) Installation substation signage.

DESK REVIEW

Umeme submitted technical documents as well as financial documents to support the transactions made.

Two contracts were awarded; one for the Supply, Installation, Testing and commissioning of equipment (ABB), signed on 08/09/2014; and the second for Civil and Electrical works (ABB & BABCON) signed on 07/08/2015.

The project consultant was London Power Associates Ltd, contracted on 25/04/2014 for design and supervision services for the substation. The substation was designed to have two 15/20MVA 33kV/11kV transformers and associated switchgear. Substation would be supplied via two 33kV interconnecting lines from Kawanda and Namanve substations with two spare incomer circuit breakers. Three 11kV feeders of Kira, Sonde and Kyaliwajala with 3 spare 11kV outgoing circuit breakers.

The design for civil works included a switch house, two transformer plinths, a firewall, guard house, boundary fence and drainage. Concrete cubes were tested by the chief materials engineer at the Ministry of Works and Transport. The substation was handed over after commissioning on 30/12/2015.

Commissioning tests were done for the two power transformers; however, only one transformer passed the commissioning tests. The commissioning of current transformers and protection systems (feeder, bus coupler, transformer and back up) was also done and documentation showed that they passed the tests. FAT tests for the transformers, Remote Terminal Units were verified to confirm their performance/accuracy levels.

Project close out report by the design and supervision consultant highlighted some outstanding issues to be completed by the contractor as well as some concerns and recommendations for better project management. Notable among the issues were the following:

(a) The short construction timeline of 5 months compared to a bench mark of 8 months;

(b) The fire suppression system needed to be updated;
(c) The 11kV transformer breaker did not have back-up protection;
(d) The need for installation of temperature/humidity sensors to sense AC system failure;
(e) The battery room needed to be temperature controlled;
(f) Proper installation of cables to avoid damage;
(g) The need for planning, approvals, land acquisition and way leaves before project commencement; and,
(h) As a result of the time restrictions, a number of activities were skipped during project delivery. These activities included the review and approval of civil works and electrical detailed designs prior to construction works starting, identification of clear milestones at which inspection of works on site against detailed designs to check for inconsistencies or design, and physical separation between completion of civil works on site and starting of electrical installation works.

A detailed extract for the Namugongo substation totaling US$ 5,802,768 is shown in Table 5.

Table 5: CATEGORIZATION OF NAMUGONGO SUBSTATION COSTS

S/N	Description	Ugx	US$	% contribution
1	Borrowing costs	2,052,637,133	607,829	10%
2	Absorption of CCD costs	1,193,625,533	353,457	6%
3	VAT on Imported Service	87,598,192	25,940	0%
4	Provisions	657,196,619	194,610	3%
5	Materials	773,029,109	228,910	4%
6	EPC Contractor	14,072,196,696	4,167,070	72%
7	Inception report for s/station	108,459,338	32,117	1%
8	Design & Supervision for Substation	651,204,347	192,835	3%
	Total	**19,595,946,967**	**5,802,768**	**100%**

(a) From the submission, 72% of the costs were EPC costs, while the rest was spent on the construction of the substation building. Borrowing costs, absorption of CCD costs, VAT on Imported Service, inception

costs and Provisions all totaling to US$ 1,213,952 were not included in the costs for ROI as per the Guiding Principles.

(b) The submission did not include the cost of land for the substation.

(c) The project had been contracted as a turn-key but the verified documents showed that the contractor "borrowed" materials from Umeme stores and these materials were submitted together with the turn-key contract values. The cost of borrowed materials were off-set from the overall submission.

(d) The financial extracts submitted were less than the original submission made by Umeme by US$7,408.

FIELD FINDINGS

The field verification confirmed the presence of both transformers. The following observations were made:

(a) One of the transformers (No. 2) failed the site acceptance tests due to failed insulation resistance between the core clamp and the core. The transformer was checked by both the EPC contractor and the supplier ABB Vietnam and confirmed to be faulty. The transformer is to be shipped back to the factory for repair and / or replacement within the defect liability period of up 31st December 2016;

(b) Similarly the civil works especially the trench covers, the bitumen and drainage system was not done to standards. (See verification report for details);

(c) The maximum demand at the substation during the inspection was observed to be 3MVA; the company however explained that most of the outgoing feeders were under maintenance;

(d) The design of the circuit breaker panels did not provide for indication which is an inherent operational risk;

(e) The transformers were still not labeled;

(f) There was no access to the transformer but the oil retainer wall was covered with inappropriate hardcore instead of the appropriate gravel;
(g) The civil cable trench cover finishing was poor and not done to standard and was to be redone;
(h) The gravel is not of the same size and not of the same type;
(i) The drainage of the substation is poor; water collects near the soak pits and does not drain properly;
(j) The bitumen layer was not done to standard and it was peeling due to heat.

CONCLUSION

The substation is operational, although some project components were still work in progress and there were a number of defects as outlined in the findings above. The Company should remedy the above identified defects, complete the outstanding project components and submit a completion report to be used for verification.

AUTHORITY DECISION

The Authority considered the completed project components which were fully operational and where customers were deriving benefit. The cost for the completed project components of **US$ 3,678,632** was approved to earn a Return on Investment (ROI).

The incomplete and sub-standards project works were rejected and were to be considered upon evidence of completion and /or remedying of the substandard works and verification by ERA.

3.3.1.2 Namugongo substation Integration lines

The Authority approved that Umeme should construct the following lines for integration with the substation:
(a) Two 33kV interconnector lines; one to connect with Namanve substation and the other to connect with Kawanda substation; and

(b) A new 11kV outgoing feeder to integrate with the two existing 11kV feeders. These feeders would serve the areas of Seeta, Kiira and Kyaliwajala.

Umeme submitted a cost of US$645,679, towards the construction of one 33kV interconnector, i.e. Namanve -Namugongo 33kV Interconnector. The details of the work done included:

(a) Construction of a new 33kV line of route length 8.7km;
(b) Construction of a double circuit 33kV line of route length 5.4km along an existing 11kV line. The 11kV line was also upgraded from 50mmsq to 100mmsq using 28,591m of 150mmsq conductor and 17,929m of 50mmsq conductor.
(c) Installation of 960m of one core 33kV cable 300mmsq and 80m of three core 33kVcable 240mmsq;
(d) Installation of one 100kVA 33kV/LV transformer; and
(e) 3 (16m) poles, 160 (14m) poles, 6 (12m) poles and 3 (10m) poles were erected.

DESK REVIEW

The project was also done as a turnkey project contracted to HASO Engineers. The contract was awarded on 21st September, 2015. Documentation showed that the contractor procured the poles from UEDCL pole plant; while critical items were borrowed from Umeme to complete the works. These were 100mmsq conductor, 150mmsq conductor, one core 33kV cable 300mmsq and three core 33kVcable 240mmsq. The project was handed over on 31/12/2015.

Umeme submitted financial extracts totaling to US$ 638,271. A review of the extract showed that US$ 156,235, related to borrowing costs, overhead absorption costs and way leaves while additional cost of US$ 10,530 related to borrowed materials for the project. All these costs were not included in the recommended amount for ROI purposes.

FIELD FINDINGS

Field verification identified flying angles which were to result into conductor clearance violation (phase to phase space) due to the increased sag with load, age and wind loading over a period. This was to be redone before the approval could be made.

CONCLUSION

The company has to replace the flying angles with section structures which will enhance the line strength and ensure reliability. Umeme in the exit meeting explained that the defects on this interconnector had been corrected and that the line was operational. However, field verification is required to confirm that works have been completed according to standard.

AUTHORITY DECISION

The Authority rejected this investment based on the defects found during the verification exercise and instructed Umeme to correct the anomalies identified, and submit the completed documentation which would be verified before further consideration.

3.3.2 NTINDA, MUKONO AND JINJA SUBSTATION UPGRADES

The Authority approved US$1,800,000, for upgrading transformers to cater for load growth at the substations of Ntinda, Jinja and Mukono. The details are as follows:

(a) At Jinja Substation – Upgrade one 5MVA 33/11kV transformer to 10/14MVA 33/11kV and associated cables to allow for parallel operation with the second transformer;
(b) At Mukono Substation – Upgrade one 5MVA 33/11kV transformer to 10/14MVA 33/11kV and associated cables to allow for parallel operation with the second transformer;
(c) At Ntinda substations – Upgrade one 5MVA 33/11kV transformer to 10/14MVA 33/11kV and associated cables.

Umeme submitted technical and financial documents including a total cost of US$ 1,767,360, for the transformer upgrades as per the approved scope.

In as much as Umeme submitted US$ 1,767,360, officially to ERA for verification, the detailed schedules availed totaled to US$ 2,559,139.36, hence a difference of US$ 791,779.36. Included in the detailed submission were borrowing and overhead absorption costs of US$166,402, Labor and Transport (L&T) for the contractor of US$ 346,235, materials of US$63,656 excluding the purchase of transformers at US$ 1,982,846.

The desk review further observed that included in the submission was the cost of Port Bell transformer that was not part of the approved transformer upgrades at about US$ 544,363. This cost had not been included in the recommended amount for ROI purposes.

Below is a technical analysis of for the respective substations.

3.3.2.1 JINJA SUBSTATION

DESK REVIEW

Umeme rehabilitated the entire substation (i.e. worked on the drainage, cable trenches, re-gravelling, painting, and fencing). A new 10/14MVA 33/11kV was installed; new 11kV cables were laid, 11kV switchboard installed and 33kV conductors were laid. 50m of 150mmsq conductor and 900 meters of cable single core 185mmsq were installed. Commissioning reports for the transformer and protection system showed that the equipment passed all the tests. Designs, as built and electrical wiring drawings were also verified to confirm that the works were professionally completed and handed over on 31/12/2015.

FIELD FINDINGS

Field findings showed that a 10/14MVA transformer was installed at the substation. However, it was observed that the transformer was not being operated in parallel with the second transformer as per the intended objective. Umeme did not provide any explanation to justify the change in the Authority's approved design.

Umeme reported in the exit meeting that the anomalies identified on this substation in form of lack of paralleling had been corrected and it was agreed that the company submits evidence of paralleling of the new transformers at Jinja to enable the Authority conduct the verification exercise to inform further decision.

The company submitted the requested information, which was reviewed and a physical verification was conducted to ascertain the completeness of the substation according to the scope in line with the Authority request.

The second field verification revealed that the transformers at Jinja Industrial substation had been paralleled. Umeme also submitted additional financial information on Ntinda substation works with regards to the labor and transport costs for the contract that had not been considered earlier. This information was also reviewed and the costs were considered as incurred.

CONCLUSION

The transformer upgrade works for Jinja Industrial substation qualified to earn a return on investment.

3.3.2.2 MUKONO SUBSTATION

DESK REVIEW

A new 10/14MVA 33/11kV was installed; plant house was extended with a new ceiling, new 11kV cables were laid, 11kV switchboard installed

and 33kV conductor were constructed. Commissioning reports for the transformer and protection system were carried out and all tests were passed. Designs, as built documentation and electrical wiring drawings were seen. The project was handed over to Umeme on 30/12/2015.

FIELD FINDINGS

The transformer was commissioned to standard; however, the objective of improving power supply reliability was not achieved as was intended due to lack of parallel operation with the second transformer.

CONCLUSION

During the exit meeting, Umeme stated that it had since corrected the anomalies on the substation and the transformers were operating in parallel. Further verification follow up was done and confirmed that the anomalies were corrected at the substation and it was operating in parallel.

The investment for Mukono substation upgrade qualified for ROI since the intended objective of power supply reliability was achieved at this substation.

3.3.2.3 NTINDA SUBSTATION

DESK REVIEW

Umeme rehabilitated the entire substation (i.e. worked on the drainage, cable trenches, re-gravelling, painting, and fencing).

A new 10/14MVA 33/11kV was installed; plant house was extended with a new ceiling, new 11kV cables were laid, 11kV switchboard installed and 33kV conductor were laid. Commissioning reports for the transformer and the protection system were seen and it passed all tests. Designs, as built and electrical wiring drawings were seen. Project was handed over on 30/12/2015.

FIELD FINDINGS

The transformer was installed, commissioned and was in proper operation. Works were up to the contractual standard; however, it was noted that the transformer was not operating in parallel due to the different transformer sizes. The substation is located between two nursery schools, therefore the Company was required to invest in safety fire walls to mitigate the risk of exposure.

CONCLUSION

The transformer investment qualified for ROI.

AUTHORITY DECISION

(i) The Authority is hereby requested to approve investments of that **US$ 1,237,251** for Mukono, Ntinda and Jinja Industrial works Substation transformer upgrades to earn a return on investment.

(ii) The Authority further instructed the company to invest in safety fire walls to mitigate the risk of exposure to the two nursery schools bordering the substation.

3.3.3 BOMBO & LIRA SPINNING MILL SUBSTATIONS

The Authority approved a total budget of US$ 1million to replace obsolete switchgear at the substations of Bombo and Lira Spinning mill. Works to be done included the following:

(a) Supply, installation, testing and commissioning of 11kV switchgear at the respective substations;

(b) Provision for six 11kV feeder bays for lines, two 11kV feeder bays for Transformers, one 11kV feeder bay for bus coupler and one 11kV feeder bay for bus riser at the respective substations;

(c) Demolishing of the old plant house and construction of a new plant house at each respective substation.

DESK REVIEW

Umeme submitted that US$ 1,830,654 was spent on the implementation of the approved investments in Bombo and Lira substations. Technical documents relating to the proposed designs, specifications, scope of works and wiring diagrams were provided, reviewed to confirm their conformity to the approved scope of works.

The submitted general ledger financial documents totaled to US$ 1,831,153. The submission included the cost of the substation transformers at US$ 1,233,765, other material costs US$71,380, Labor and Transport US$347,313, and overhead costs absorption of US$ 178,695.

Documentation provided showed that the procurement of the switchgear was combined with procurement of ABB equipment for Namugongo substation together with transformers for Ntinda, Mukono and Jinja Industrial. ABB did cold commissioning of all the switchgear at Bombo and Lira, while the other commissioning tests were done by the respective contractors for the substations. Umeme supplied only the cables, while the other materials necessary for the replacement of the switch gear were provided by the contractor. Below is a detail per substation on the desk review and field findings.

3.3.3.1 THE BOMBO SWITCHGEAR

A new plant house was constructed and had a switchgear room, battery room and an auxiliary room. Cable trenches were also constructed for the power and control cables. As-built drawings and wiring diagrams were provided to confirm the state of the works done.

Two (2) transformer bays, six (6) line feeder bays and one 11kV bus coupler were installed. A 110 DC charger and battery bank were installed. The commissioning reports (i.e. cold and hot) for the switchgear, protection systems, CT ratio, over current and associated works were reviewed and confirmed that the switchgear was in a working condition. The project was handed over on 30/12/2015. An

increase in project cost was noted during the desk review and this was attributed to additional works beyond the Authority approved scope of switchgear replacement and general uplift at cost of **US$1,000,000** for both Bombo and Lira.

The field verification confirmed that the works were done within the switchgear room, transformer bays, charger and battery banks and six (6) line feeder bays. The verification observed that additional works were done outside the approved scope; these included the access road to the substation, spraying and painting of the remaining structures. The works done on the access roads were observed to have been substandard and needed to be redone.

The field verification further observed that Umeme decommissioned the outdoor bays on the 11kV feeder to Kawanda that were installed in 2012. The decommissioned items were returned to stores and its impairment deducted in the impairment loss reported in the audited financial statements.

It was further observed that the upgraded switchgears at the substation were not connected to SCADA system just like the old one. Umeme had reported that the SCADA is working and it would be verified in the second quarter verification study.

3.3.3.2 LIRA SPINNING MILL

A new plant house was constructed which had a switchgear room, battery room and auxiliary room; cable trenches were also constructed for the power and control cables. The as built drawings and wiring diagrams were also provided to support the documents. Two (2) transformer bays, six (6) line feeder bays and one 11kV bus coupler were installed. In addition, one 110 DC charger and battery bank and an AC distribution board were installed.

Commissioning reports (i.e. cold and hot) for the switchgear, protection systems, CT ratio, over current and associated works were reviewed

and findings showed that the equipment passed the tests. The handover report was provided showing that the project was handed over a day before Christmas (24/12/2015).

The field findings showed that the substation was renovated, and the switch gear upgraded as per the approved scope. It was further observed that the substation was not connected to SCADA and Umeme was aware and working to have it connected. However the timelines for completion was not provided. The two transformers at the substation were observed not operating in parallel which lowers the substation reliability. Furthermore, line diagrams and operating procedures were not pinned on the wall or panels to enable safe operations as required under the best utility management practice. Overall the substation was complete.

CONCLUSION

Overall, the substations were upgraded and works were completed as per the scope save for Bombo substation, where the additional civil works (access road) were done.

AUTHORITY DECISION

The investment cost of **US$ 1,374,769,** was approved net of overhead absorption and borrowing costs to earn a return on investment.

3.3.4 MAGAMAGA SUBSTATION

Umeme submitted US$ 29,731 for the renovation and the construction of a guard house and a toilet, gravelling and fencing, drainage improvement and repair of access gate of the above substation.

DESK REVIEW

Technical documentation on works done were submitted and reviewed. The proposed drawings and scope of works confirmed that Umeme constructed a guard house and toilet, a fence, access gate

and graveled the substation yard. Umeme also submitted that they replaced plywood ceilings with concrete ceilings to enhance the useful life of the substation. A certificate of completion of works was submitted and reviewed to confirm that works were done and completed within the year under review.

CONCLUSION

The works for Magamaga were carried out according to scope. Absorption costs totaling to US$ 2,887 were not included for ROI.

AUTHORITY DECISION

The Authority approved the investment cost of **US$ 26,844,** for works done on Magamaga substation, less absorption costs to earn a return on the investment.

3.3.5 UNDERGROUND CABLE WORKS UPGRADE

The Authority approved US$ 1,500,000 to feed the Lugogo – Naguru area with the objective of improving power handling capacity, improving reliability and stability of supply. Umeme planned to upgrade power cables at the substations of Kampala North, Mutundwe and Lugogo. Umeme submitted two projects under this category of investments i.e.

(a) Kampala North and Mutundwe substations; and,
(b) Lugogo substations.

3.3.5.1 KAMPALA NORTH & MUTUNDWE SUBSTATIONS

Umeme submitted US$ 379,767 relating to the project. Included in this submission were materials costing US$ 247,952, contractor labor and transport of US$ 96,416, absorption of Capital Contracts Division (CCD) costs US$ 21,797 and absorption of borrowing costs of US$ 13,602.

DESK REVIEW

The following cable upgrades were done at the respective substations:

(a) On Kampala South 1, 2 & 3, 33kV interconnector cables at Mutundwe substation were upgraded from 150mm^2 to 300mm^2;

(b) Queensway 33kV interconnector cables at Mutundwe substation: Cables were upgraded from 185mm^2 to 300mm^2;

(c) Kabusu 11kV feeder cables at Mutundwe substation were upgraded from 95mm^2 to 185mm^2;

(d) Bunamwaya 11kV feeder cables at Mutundwe substation were upgraded from 185mm^2 to 240mm^2;

(e) The 33kV interconnector cables (1, 2 and 4) between Mutundwe and Kampala South substation were upgraded from 150mm^2 to 300mm^2;

(f) The 33kV interconnector cables between Lugogo and Kampala North were upgraded from 150mm^2 to 300mm^2.

Works that were varied included construction of new cable trenches, cable ladders and reorganization of cables at Mutundwe substation. For the upgrade, 1,427m of single core 33kV cable 150mm^2, 3,076m of single core 33kV cable 300mm^2, 280m of three core 11kV cable 240mm^2 and 252m of three core 11kV cable 185mm^2 were used. Material returns showed 73m of 150mm^2, 482m of 300mm^2, 20m of 240mm^2 and 268m of 185mm^2 of unused cables were returned to stores. Material returns also showed that the recovered cables were returned to stores. Commissioning/test reports for the installed cables were seen and they all passed. As built drawings and project handover report were all availed. The project was handed over on 02/12/2015.

According to the financial review, materials accounted for US$ 247,952, of which 58% was spent on 33kV single core 300mm^2 copper, at US$47 per meter. Material returns No. 33,808 shows 26 Pfisterer Connect T/Kit 150mm^2 were returned to the Umeme stores. However, the materials general ledger had only 24 Kits with an average price of US$ 777. The total project cost of US$ 342,814 including materials, contractor labor

and transport costs were verified and supported. Borrowing costs and overhead absorption totaling to US$ 35,399 were included in the submission but these had been excluded for purposes of ROI.

CONCLUSION

The investment qualified for ROI as it was done as per the approved scope. Costs relating to borrowing and overhead absorption were not considered for ROI.

AUTHORITY DECISION

The Investment cost of **US$ 342,814** for the upgrade of Mutundwe - Kampala North substation cables was approved for ROI.

3.3.5.2 LUGOGO SUBSTATION

Umeme submitted US$ 790,570 relating to the project comprising of material cost – US$ 399,398; labor and Transport cost US$ 288,201; CCD Absorption Cost US$ 44,904; and borrowing cost US$ 35,850. The total project cost was 52.7% of the approved value.

DESK REVIEW

The followings cable upgrades were done at the respective substations:

(a) Kireka 1 & 2 33kV interconnector cables at Lugogo substation were upgraded from 150mm^2 to 300mm^2;
(b) Kisugu 33kV interconnector cables at Lugogo substation were upgraded from 150mm^2 to 300mm^2;
(c) Ggaba 33kV interconnector cables at Lugogo substation were upgraded from 150mm^2 to 300mm^2;
(d) Britania 11kV feeder cables at Lugogo substation were upgraded from 185mm^2 to 240mm^2;
(e) Naguru 11kV feeder cables at Lugogo substation were upgraded from 185mm^2 to 240mm^2;

(f) Jinja road 11kV feeder cables at Lugogo substation were upgraded from 185mm^2 to 240mm^2; and

(g) Kampala Industrial 11kV feeder cables at Lugogo substation were upgraded from 95mm^2 to 185mm^2.

Variation of works included construction of new cable trench, cable ladders and re-routing of cables at Lugogo substation. 135m of single core 33kV cable 150mm^2, 2,871m of single core 33kV cable 300mm^2, 2,745m of three core 11kV cable 240mm^2 and 231m of single core 11kV cable 185mm^2 were used in the upgrade of cables. Material returns showed that 55m of 150mm^2, 2640m of 300mm^2, 120m of 240mm^2 and 309m of 185mm^2 of unused cables were returned to stores. Umeme explained that some cables were laid very deep along already existing construction site foundations and thus were not recovered as this would affect the respective foundations. Commissioning/test reports for the installed cables were seen and they all passed. As built drawings and project handover report were provided. The project was handed over on 17/11/2015.

On the financial review, materials accounted for US$ 399,586 and the total amount verified for labor and transport was US$ 288,201. Total value which was verified for the project excluding borrowing costs and overhead absorption costs was US$687,787.

AUTHORITY DECISION

The Investment cost of **US$ 687,787** was approved for ROI, for the upgrade of Lugogo substation cable.

3.4 LOAD GROWTH AND NEW CONNECTIONS

The Authority approved load growth projects amounting to **US$ 34,460,473** as shown in Table 6. Umeme submitted a completed total of US$ 20.04 million. The projects of New Moniko Substation, Kampala Industrial Business Park, Hima Cement Tororo, dedicated line to BMTS

Factory Mbarara and Namanve Quality of Service amounting to US$ 17.78 million were carried forward to 2016.

Table 6: APPROVED LOAD GROWTH PROJECTS BY THE AUTHORITY

S/N	Investment Category	ERA Approval	Umeme's Submission
1	Lugogo Jinja Road- Kireka Port Bell	300,000	235,449
2	Mutundwe – Lubowa Interconnector	812,497	882,801
3	New Moniko Substation	7,950,000	0
4	UETCL – Fort Portal Integrating Lines	1,205,078	821,275
5	Kampala Industrial Business Park	4,270,000	0
6	Namunkekera Industrial Park	2,032,063	927,040
7	REA Recommended Projects	2,000,000	1,745,721
8	Hima Cement Tororo	800,000	0
9	Sebitoli Research Camp, Kibale N.P	22,370	24,095
10	Dedicated Line to BMTS Factory, Mbarara	764,465	0
11	Namanve Quality of Service	4,000,000	0
12	New connections	10,304,000	15,402,794
	TOTAL	**34,460,473**	**20,039,175**

3.4.1 LUGOGO – JINJA ROAD AND KIREKA – PORT BELL FEEDERS

The Authority approved US$ 0.3 million in investment for interconnecting Lugogo- Jinja Road and Kireka- Port Bell feeders. The projects were expected to relieve these feeders that were loaded 96% and 87% respectively. The scope of the project was to construct a new line from Lugogo substation to feed Jinja road, Britania and Port Bell from Lugogo substation. The new line was constructed using 5.28km of 150mm^2 conductor and 1.050km of underground cable with 54 medium Voltage poles.

DESK REVIEW

Umeme submitted US$ 235,449 for verification on the execution of the above works. Included in the submission, was US$ 25,226 for borrowing costs and CCD overhead absorption costs.

The new line was constructed using 150mm^2 conductor for a route length of 5.28km of and 1.050km of underground cable and 54MV poles were installed. The desk verification had the following findings:

(a) During project execution, there was a change in scope whereby the planned spare bay at Lugogo substation had been utilised for Mulwana feeder. Umeme's new proposal included the installation of an extensible Ring Main Unit (RMU) and combining the new proposed line to the existing Kitante Road 2 feeders, which had a smaller load of 29.83A;

(b) The line construction included installation of mixed cable sizes (185mm^2 and 240mm^2) at different sections. This was attributed to the shortage of the planned 185mm^2 cable before completion of works; therefore the 240mm^2 which was available in store was used for the remaining sections. This is poor practice due to the fact that many joints were installed on the line and smaller cable sizes when connected to bigger conductors behave as fusing elements leading to feeder losses;

(c) Combined Request Issue Vouchers (CRIVs) were verified and it was found that the following key materials were issued: thirteen (13) poles of 10 meters, thirty one (31) poles of 14m. Cables: 618m of 185mm^2 and 432m of 240mm^2. Conductor: 5,280m of ACSR 150mm^2;

(d) The load for Kitante road 2 after reconfiguration increased to 139.43A which is still within safe limits for feeder operation;

(e) Umeme indicated that it had learnt the need to carry out comprehensive project review before submission of the project to ERA for approval and the need to procure long lead materials early.

No field verification was done on the investment as the desk review was enough to inform the decision for approval.

CONCLUSION

The project was implemented and the Jinja road, Britania and Port Bell feeders were relieved by 50.28A, 79.52A and 39.41A respectively. Poor planning and workmanship was noted due to the use of mixed cables which were attributed to shortage of materials in stores. Even though the project achieved its objectives of relieving the overloaded feeders, constructing the line with so many joints was to lead to increased losses on the feeder, which would require remedial measures in the short to medium term. The project was recommended to earn a return on condition that future upgrade within a span length of 10 years shall be done by Umeme using its DOMC.

AUTHORITY DECISION

This investment of **US$ 210,223** was approved for ROI. The company was informed that any remedial measures in the short to medium term was to be implemented using the Company's DOMC budget.

3.4.2 MUTUNDWE – LUBOWA INTERCONNECTOR

The Authority approved a budget/plan of US$ 0.812 million to relieve the current Entebbe I and Entebbe II feeders that were overly loaded at 84.7% and 80% respectively. The project was intended to among others;

(i) Increase capacity at Lubowa Substation;
(ii) Improve reliability of the customers in the areas of Lubowa, Zana and Ndejje;
(iii) Relieve Entebbe 2 feeder to improve reliability; and,
(iv) Relieve Kampala South substation.

The scope of the project involved the construction of a 33kV interconnection line (double circuit configuration) from Mutundwe substation to Lubowa substation. A route length of 3500m was to be

done using the existing Mutundwe – Bunamwaya 11kV existing line and that they use the 33kV spare bays at Mutundwe and Lubowa. Upgrade the existing conductor of the 11kV line to ASCR100 and laying of underground cable in sections where 132kV crosses.

Umeme submitted US$ 882,801 relating to the project representing 96% spending on the approved item budget. The proposed drawing, scope of works, CRIVs, and L&T contract were seen. The Company constructed a double circuit line of route length 3,500m; the new 33kV line was constructed with 150mmsq conductor and the existing 11kV was upgraded to 100mm^2. 16,500m of 150mm^2, 5,095m of 100mm^2, 3,810m of single core cable 300mm^2, and 1,516m of single core cable 185mm^2 and 2,536m of three core cable 185mm^2. A 33kV outdoor switchgear was installed at Umeme. Material returns show that 406m of cable single core 300mm^2, one ABS, 8 surge arrestors, 9,975m of conductor 100mm^2 and five 14m poles.

There was need to check whether the clearance of the yellow phase along the line was to standard as it was highlighted in the project documentation as an issue necessitating a need for change in specifications. The project was handed over on 31/12/2015.

The financial review showed that whereas the initial contract for the project was Ugx 190 million, this amount was revised twice to Ugx 581 million representing over 200% increase. The submitted figures included US$ 50,213 in CCD absorption costs, US$ 44,984 in borrowing costs and US$ 4,996 in way leaves all totaling to US$ 100,194. These were considered with respect to the guiding principles laid in section 2.1 of this report. The material submissions were also adjusted with returns that were not financially adjusted to reflect the effect of returns made.

The field verification observed the following;

(i) The feeder was operational and in generally good condition.
(ii) The conductor sizes matched the ones issued in store.
(iii) Clearance of yellow phase conductor from the pole where there was combined construction on Bunamwaya 11kV was still pending.

(iv) Cable trenches and cable alignment to cover the gantries were not yet fully done and Umeme confirmed to work on them.
(v) Take off structures and cables had not been clearly labeled for proper identification and sequencing. Umeme confirmed that this was to be done.

CONCLUSION

From the field findings above, a number of outstanding technical hitches during the construction had not been rectified and these are very critical to the proper operation of the interconnector.

Umeme indicated during the exit meeting that these hitches were corrected. A follow up verification confirmed that Umeme had rectified the poor phase clearances at the respective structures that had been identified and works were confirmed as completed.

AUTHORITY DECISION

The investment for Mutundwe – Interconnector of **US$ 754,348** was approved to earn a return on Investment.

3.4.3 UETCL FORT PORTAL 33KV INTEGRATION LINES

The Authority approved a plan total of US$1.21 million for interconnection and integration lines to the UETCL 132/33kV Fort Portal substation. The project was meant to address the load growth due to rising developments attributed to the construction of new tea factories. The proposed project scope was to:

(a) Construct two 33kV feeders from the new substation on a double structure to the Umeme Fort Portal substation and one 33kV to Rugombe substation with a route length of 7.4km and 8.9km respectively;
(b) Install open points between the new substation and Fort Portal and also between Fort Portal and Rugombe; and,
(c) Interconnecting the Kijura feeder to cater for growing industries.

DESK REVIEW

Umeme submitted a total value of US$ 821,275 for execution of the above project. The financial as well as the technical documents were submitted for verification to confirm accuracy. The following works were done:

(i) Three interconnector lines were constructed from UETCL 132/33kV substation; one interconnecting Fort Portal 33/11kV substation along the Nkenda - Fort Portal 33kV interconnector (4km), the second interconnecting Rugombe substation along the Fort Portal - Rugombe 33kV interconnector (7km) and the third feeding Kijura 33kV line (10km).

(ii) Upgrade conductor along the 11kV Rugombe feeder from 50mmsq to 100mmsq route length 9km.

Variation of works included revision of the cable size from 185mm^2 to 300mm^2 as the latter was out of stock. 67,650m of conductor 150mm^2 and 21,450m of conductor 100mm^2 were strung. 297 (14m) poles, 1 (12m) pole and 7 (10m) poles were erected and no material returns were made to the store. The decommissioned conductor should have been returned.

The review did not find commissioning/test reports for the installed cables on file to which Umeme explained that the installation of cable was pending the completion of works on UETCL side to avoid the risk of theft of the cable. All other works as far as Umeme is concerned were concluded. Final material reconciliation, as built drawings and partial acceptance certificate were provided. Partial acceptance certificate was signed off on 10/12/2015.

CONCLUSION

It was observed that the lines were not in operation due to the delayed completion of UETCL 132/33kV substation which according to UETCL was planned for completion in September, 2015. During the stakeholder's meeting, UETCL confirmed to the members that the project would be commissioned in June 2016.

AUTHORITY DECISION

The investment of **US$ 700,582** was approved for ROI since the failure to interconnect with the UETCL substation was not in the control of Umeme.

3.4.4 NAMUNKEKERA RURAL INDUSTRIAL PARK 33KV

The Authority approval of US$ 2.032 million was granted for the development of Namunkekera Rural Industrial Centre (NRIC) in three phases. Namunkekera had grown into an industrial park and had potential growth for power load that needed to be catered for.

Under phase 1, Umeme proposed to construct a new line of 33kV of route length 36,000m with ACSR 100mm^2 of conductor. The second phase involved an upgrade of existing 11kV overhead line of route length 10,040m to 33kV overhead line with ACSR 100mm^2 of conductor. Umeme would also upgrade the existing transformers from 11kV to 33kV and install two 500kVA, two 200 kVA, two 100 kVA and two 50 kVA transformers.

DESK REVIEW

Umeme submitted US$ 951,072 for the project. The details are as follows:

(i) Under the first phase, Umeme constructed a 33kV line of route length 46,040m, upgraded six (6) existing transformers from 11kV to 33kV, repaired and installed a 33kV metering unit.
(ii) Under the second phase, Umeme upgraded the other two (2) existing transformers from 11kV to 33kV.
(iii) Phase III was to upgrade the tee-offs from 11kV to 33kV line in Kiziba, replace rotten poles and worn out insulators and upgrade other eight (8) transformers from 11kV to 33kV.

The company constructed an extension of route length 34km from Sanga to Kapeeka; upgraded the existing 11kV tee-off to Kiziba from

Kapeeka to 33kV of route length of 10km and upgraded 18 existing distribution transformers from 11kV to 33kV.
The proposed design shows that the line was supposed to be strung with 150mm^2 however, the actual BOQs show 100mm^2. Umeme explained that the design changed because the existing line where the extension would T-off is 100mm^2 hence the under sizing of the conductor. The challenge was that Umeme will in the short term be required to upgrade to 150mm^2 when they should have done it once and for all.

Eighteen 33kV transformers were taken from the stores (four-500kVA, six-200kVA six-100 kVA & two-50 kVA) and twelve 11kV transformers were recovered. Works were completed on 28/12/2015 and the 18 transformer commissioning reports were submitted and verified.

Umeme decommissioned 12 transformers of different sizes and commissioned 18 transformers. The company had not provided the asset movement schedule to confirm that the decommissioned transformers were installed on the network as an injection or reinforcements rather than replacements. The absence of the asset movement schedule led to the assumption that the transformers were decommissioned from the network, hence the recovery of their remaining useful life (impairment). Table 7 shows the impairment value of the decommissioned transformers.

Table 7: DESCRIPTION AND IMPAIRMENT OF DECOMMISSIONED TRANSFORMERS

Date	GRN	SN	Rating (kVA)	Qty	Mfr Date	Year	2015	Value In Use (UGX)
19-Jun-15	29086	1850816	11/100	1	2001	2002	13	3,892,233
18-Jun-15	29077	D-4400	11/100	1	2006	2007	8	6,672,399
19-Jun-15	29084	M 4303	11/200	1	2013	2014	1	29,313,695
19-Jun-15	29083	BT 2347	11/200	1	2010	2011	4	24,685,217
18-Jun-15	29076	BT 00276	11/200	1	2015	2015	0	30,856,521
9-Feb-16	33915	BT 00164	11/200	1	2014	2015	0	30,856,521
9-Feb-16	33914	BT 2724	11/200	1	2011	2012	3	26,228,043

Date	GRN	SN	Rating (kVA)	Qty	Mfr Date	Year	2015	Value In Use (UGX)
19-Jun-15	29085	M 3101	11/50	1	2008	2009	6	7,757,280
18-Jun-15	29080	1356271	11/50	1	2008	2009	6	7,757,280
18-Jun-15	29079	1LTR 0023352	11/50	1	2013	2014	1	10,527,738
9-Feb-16	33913	BT 2976	11/500	1	2013	2014	1	53,080,139
9-Feb-16	33912	T 35125	11/500	1	2011	2012	3	47,492,756
No date			11/500	1	2013	2014	1	53,080,139
				13				**332,199,962**
								US$ 98,371

From Table 7, Ugx 332,199,962 (US$98,371) was excluded and was not be considered in the rate base.

Phase III of the project involved upgrading of the tee-offs from 11kV to 33kV line in Kiziba, replacing rotten poles and worn out insulators. The company did not provide evidence of the disposal process of the decommissioned assets. Umeme needed to put in place a disposal procedure to cater for such assets whenever they are removed from the network.

FIELD FINDINGS

From the field verification, the following were observed:

(i) Material extracts from Umeme submission tallied with the field findings;
(ii) Transformers were all seen as submitted with exception of one 500kVA transformer which failed on commissioning and was returned in store but not offset from the submitted expenses;
(iii) One asset was noted as redundant, that is a 33kV/500kVA transformer intended to serve one customer was found terminated two kilometers away; it had been powered at commissioning and then terminated. Further to this, the decommissioned 11kV/500kVA that was upgraded never returned to stores; and,

(iv) A number of structures missed pole caps while the LV feeders observed were poorly maintained with many joints, having shrubs that required line clearance and sagging conductors.

CONCLUSION

Overall, the MV feeder worked on was in good condition and operational. Umeme needed to explain the whereabouts of the 11kV/500kVA transformer and support the upgraded 33kV/500kVA with the consumption data from this particular customer.

The change in conductor size from the proposed design of 150mm^2 to 100mm^2 was to result in reinvestment on the same line in the short run due to the already growing industrial loads. A current case in point is the Nile fiber board factory which is experiencing quality of supply challenges and requires an extension of the same line and 150mm^2 is the proposed conductor size.

Umeme committed to undertake any further upgrades on this feeder within the next ten years using its DOMC budget, since the implemented project deviated materially from the Authority's approval.

AUTHORITY DECISION

(i) The Authority approved a project cost of **US$ 760,981** net of overhead absorption cost, impairment of decommissioned transformers, lost transformer and borrowing costs**.**

(ii) The Authority informed the company that any further upgrades on this feeder within the next ten (10) years shall be carried out using its DOMC budget since the implemented project deviated materially from the Authority's approval.

3.4.5 WEALTH CREACTION PROGRAMME PROJECTS

The Authority approved US$ 2 million for eight (8) projects in different parts of Western Uganda to improve the quality and reliability of electricity supply. The projects approved included; Misozi Trading Centre and Community, Bugongi Village-Kabale, Kiyaga Community Bushenyi, Kaharo Health Centre and Environs in Kabale, Mwirwa Health Centre, Bwooma Trading Centre Bushenyi, Kakanju Village and Nyakahita areas in Bushenyi District. For this category of investments, only desk review was done.

DESK REVIEW

Umeme submitted a total expenditure of US$1.75 million for implementation of these projects. The 33kV overhead lines were converted from ACSR25mm^2 to ACSR50mm^2 while the LV overhead lines were strung with ABC 70mm^2. Below is a detailed review of the respective projects and recommendations thereof.

3.4.5.1 MISOZI TRADING CENTRE AND COMMUNITY

The Misozi project was approved to extend power to Misozi health center in Maddu and the surrounding areas. The project involved the construction of an 11kV overhead line of route length 9.05 km, installation of three 100kVA transformers and two 50kVA transformers and strung ABC 70mm^2 of route length 4.6 km.

Umeme submitted total costs of US$ 262,323, for the construction and installation of the above feeder. Included in the submission is US$ 26,956, relating to overhead absorption costs, borrowing and supervision costs.

The technical documents relating to the project were submitted and reviewed. The company constructed an MV extension of route length 9,050m using 27,935m of 100mm^2 conductor while three new 50kVA 11kV/LV transformers and one new 100kVA 11kV/LV transformer were installed. 3,694m of ABC 70mm^2 and 4,972m of ABC 35mm^2 were strung.

Thirteen 14m poles, eighty five 12m poles and one hundred forty five 10m poles were erected. The project was handed over on 29/02/2016 but is not yet energized due to unavailability of supply power.

CONCLUSION

Although the works were fully completed, the project is not energized due to unavailability of the supply line which is under construction. The project qualifies for ROI except for the overhead absorption costs, borrowing and supervision costs amounting to US$ 26,956.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 235,367** for ROI.

3.4.5.2 BUGONGI VILLAGE-KABALE

Under this project, Umeme was to construct an 11kV overhead line route of length 1.5km to relieve an already overloaded 25kVA 11kV/LV transformer in Bugongi TC and install a new 50kVA transformer. The company relocated the existing 25kVA transformer and upgraded the LV conductor from 25mm^2 to 50mm^2.

The company constructed an MV extension of route length 1,480m with 8,888m of 50mm^2 conductor. A new 50kVA transformer was installed at Bugongi and the existing 25kVA transformer relocated. Three 14m poles and thirteen 12m poles were installed. Twenty three LV poles were replaced under the scheme. Commissioning report, as built drawing and final material reconciliation were audited and found to be matching the final material extract charged on the project. The project was handed over on 15/12/2015.

Umeme submitted a request of US$ 50,975 under the Bugongi Kabale project for verification. The submitted cost included costs related to overhead absorption, borrowing and operational cost relating to transformer commissioning, totaling to US$ 5,354. The verification team was not provided with the payment documents/Voucher for the

contractor worth US$ 18,549. Included in the submission were also twenty three LV pole replacements which would have been covered under the allowed DOMC.

CONCLUSION

The project qualified for ROI except for the overhead absorption costs, borrowing and supervision costs amounting to US$ 5,354, DOMC costs of US$ 3,649 for the replaced twenty three LV poles.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 41,972** for ROI.

3.4.5.3 KIYAGA COMMUNITY, BUSHENYI

The Authority approved the extension of power to Kiyaga village and the surrounding areas in Bushenyi District. The project included the construction of a new 33kV overhead line ACSR 50mm^2 of route length 290m, an 11kV overhead line ACSR 100mm^2 of route length 9,000m, installation of one 50kVA 33kV/LV transformer and nine 100kVA 11kV/LV transformers and stringing ABC 70mm^2 of route length 18.2km.

The works included: the stringing of 957m of 50mm^2 conductor and 27,052m of 100mm^2 conductor on the line extension; installation of a 50kVA 33kV/LV transformer and nine 50kVA 11kV/LV transformers. Thirty three 14m poles, ninety 12m poles and two hundred ninety two 10m poles were erected and 9,983m of ABC 35mm^2 and 8,164m of ABC 70mm^2 LV conductor were installed. Material returns were reviewed and reconciled with the financial extracts. The project was handed over on 14/12/2015.

The total borrowing costs were US$ 17,380, while the absorption costs and supervisory costs for the project were US$ 21,770 and US$185 respectively. These were netted off the recommended amount for ROI purposes.

CONCLUSION

The project qualified for ROI, less the borrowing costs, absorption costs and supervisory costs amounting to US$ 39,335.

AUTHORITY DECISION

The Authority approved the investment cost of **US$ 343,756** for ROI.

3.4.5.4 KAHARO HEALTH CENTRE AND ENVIRONS, KABALE

The Authority approved the construction of a 33kV overhead line of route length 3km, installation of two new 50kVA transformers, relocation of the existing 50kVA transformer and convert LV bare conductor to ABC route length of 1.3km. The objective was to improve the quality and reliability of electricity supply in the area by relieving an overloaded 50kVA 11kV/LV transformer in Kaharo.

The company constructed a 33kV MV extension of route length 3,000m using 9,900m of 50mm^2 conductor on the line extension. Two new 50kVA transformers were installed while the existing 50kVA transformer was relocated. Two 14m poles and thirty four 12m poles were installed. LV bare conductor of route length 1,430m was converted to ABC under the scheme. The project was handed over on 15/12/2015.

Umeme submitted a total cost of US$88,389 of which US$9,568 (borrowing costs, overhead absorption and transformer commissioning costs). The material logs also had additional forty four (44) poles that were issued from the store, not used and again not returned. These total to US$9,758 had been set aside for ROI purposes.

CONCLUSION

The investment qualified for ROI, except for borrowing costs, overhead absorption costs, commissioning costs and unaccounted for poles amounting to US$9,758.

AUTHORITY DECISION

The Authority approved an investment cost of **US$ 69,062** for ROI.

3.4.5.5 MWIRWA HEALTH CENTRE

The Authority approved a budget of US$77,781 towards the construction of Mwirwa Health Centre extension line and the surrounding areas in Kisoro District to extend power to the community. The scope of the project included the construction of a new 33kV overhead line 50mm^2 of route length 2.2 km, installation of two 50kVA 33kV/LV transformers and stringing ABC 70mm^2 of route length 0.9km.

Umeme submitted documents worth US$ 75,268.15 together with technical documents for verification to earn a return. Analysis of the submitted costs showed that the amount included in the asset additions included US$ 8,083 in borrowing costs, over heads and other operational maintenance costs. These were set aside as per principle (f) in section 2.1 of this report. The accuracy of the other costs was verified and confirmed.

The company constructed a 33kV MV extension with a route length of 2,200m using 7,260m of 50mm^2 conductor. Two new 50kVA transformers were installed, while five 14m poles, twenty nine 12m poles and fifteen 10m poles were also installed. ABC amounting to 990m was strung under this scheme. The project was handed over on 14/12/2015.

CONCLUSION

The project qualified for ROI except for borrowing costs, over heads and other operational maintenance costs amounting to US$ 8,083.

AUTHORITY DECISION

The Authority approved an investment cost of **US$ 67,185** for ROI.

3.4.5.6 BWOOMA TRADING CENTRE BUSHENYI

The Authority approved an extension of a power line to Ryeishe Health Centre and an addition of transformers to relieve the overloaded 100kVA 33kV/LV transformer that was supplying the areas of Katabi, Bwooma and Ryeishe Trading centres. The scope of the project was to construct a new 33kV overhead line 50mm^2 conductor of route length 1.3km, install three 50kVA 33kV/LV transformers and string ABC 70mm^2 of route length 4.1km and finally install two Time of Use (TOU) meters.

The company constructed a 33kV MV extension of route length 2,100m using 11,220m of 50mmsq conductor. Three new 50kVA 33kV/LV transformers were installed while nine 14m poles, thirty four 12m poles and eighty five 10m poles were installed. The project used 2,915m of ABC 70mm^2, 2,918m of ABC 35mm^2 were also strung under the scheme. Commissioning reports for all the three transformers were seen, although the material extract was charged on four (4) 50kVA transformers instead of three as seen from the CRIVs and material reconciliations. The project was handed over on 14/12/2015.

Umeme submitted US$ 132,618, for verification to be added on the rate base. The costs included US$ 13,738, for borrowing costs, overhead absorption costs and other operation and maintenance related costs. These were disallowed in accordance with the guiding principles in section 2.1. The material extract further included US$ 5,189 an additional transformer that was issued from store but not used or returned as per the drawing and final reconciliation. This amount was also disallowed.

CONCLUSION

The investment qualified for ROI, except for the borrowing costs, overhead absorption costs and the cost of additional transformer amounting to US$ 18,928.

AUTHORITY DECISION

The Authority approved an investment cost of **US$113,691** for ROI.

3.4.5.7 KAKANJU VILLAGE – BUSHENYI

The Authority approved amounts of US$161,935, to extend power to Kakanju health centre, Kakanju village and the surrounding areas. The project involved the construction of a new 33kV overhead line 50mm^2 conductor of route length 3.1km, installation of three 50kVA 33kV/LV transformers and stringing ABC 70mm^2 of route length 5.3km.

The company constructed a 33kV MV extension of route length 2,100m. 11,220m of 50mm^2 conductor were strung on the line extension; and three new 50kVA 33kV/LV transformers were installed. Nine 14m poles, thirty four 12m poles and eighty five 10m poles were installed using 2,915m of ABC 70mm^2, 2,918m of ABC 35mm^2 were strung under the scheme. There was a variation of the project from the original design of feeding from an unfinished REA project. During the construction of the project, it became apparent that the REA project's completion was not in near sight and an alternative feeder (line) was opted which varied the previous costs. The variation cost was US$23,838 including materials. The project was handed over on 14/12/2015.

Umeme submitted US$166,781 in investments. The submission included costs not allowed as part of the Rate Base totaling to US$17,318 which had been extracted from the recommended amount. Technical documents were seen including commissioning reports which were reviewed and found to be sufficient to enable the Authority make a decision.

CONCLUSION

The project qualified for ROI except for costs amounting to US$ 17,318.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 149,463** for ROI.

3.4.5.8 NYAKAHITA AREA- BUSHENYI

The Authority approved extension of power to Nyakahita in Bushenyi due to the growing number of potential customers. Umeme proposed to construct a new 33kV line of route length 12.3km, install twelve 50kVA transformers and string ABC of route length 15.4km.

Umeme constructed an MV extension of route length 12,300m using 40,590m of 100mm^2 conductor and twelve new 50kVA 33kV/LV transformers were also installed. Umeme used 8,470m of ABC 70mm^2 and 8,476m of ABC 35mm^2 to string the line. Thirty three 14m poles, one hundred thirty nine 12m poles and two hundred forty eight 10m poles were erected on the feeder. The project was handed over on 15/12/15.

Umeme submitted US$586,276 for the construction and installation of transformers in Nyakahita area. The financial support documents were submitted except for one of the invoices for labor and transport which had been set aside together with the capitalized borrowing as well as overhead absorption costs of US$65,458.

CONCLUSION

The investment qualified for ROI, except for the costs regarding to borrowing costs, overhead absorption costs and unsupported labor and transport costs amounting to US$ 65,458.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 520,818** for ROI.

3.4.6 TRANSFORMER INJECTION FOR SEBITOLI TOURIST ACCOMMODATION

The Authority approved a total amount of US$ 22,370 for a transformer injection in Sebitoli (UWA) tourist accommodation to improve power supply quality. The scope was to construct a new 11kV line of route

length 0.6km from Rugombe to Sebitoli, install a 50kVA transformer and install ABC for the LV network.

DESK REVIEW

Umeme submitted supporting documents for US$ 24,095. Included in this cost was US$2,980 for borrowing costs, overhead absorption, project supervision costs and costs of LV pole replacement of US$ 1,110.

The company constructed an extension of route length 0.6km using 1,980m of 50mm^2 conductor on the line extension, a 50kVA transformer was installed and ABC was installed within the camp. Four (14m) poles and four (12m) poles were installed while seven (10m) poles were replaced.

CONCLUSION

The investment amounts qualifed for ROI except for the O&M cost worth US$ 1,110 and borrowing costs, overhead absorption and project supervision costs worth US$ 2,980.

AUTHORITY DECISION

The Authority approved an investment cost of **US$ 20,004** for ROI.

3.4.7 NEW CONNECTIONS

The Authority approved US$ 10.304 million for 92,000 new customer connection in 2015 at a standard cost of US$ 112. This was after ERA had issued an OBA directive on the standard connection for a no pole service customer to be applied across the sector by all the distribution companies licensed from March 1, 2015. The directive included standard material listing of sixteen (16) items that each connection must have to qualify for both safety and ROI at a cost per connection of US$ 112 excluding capital/customer contributions. The directive

further stated that Umeme should charge US$ 7.62 less the standard due to its ability to purchase solidal cables in bulk.

UMEME'S SUBMISSION

Umeme submitted a total of 68,825 customers having been connected at a total cost of US$ 15,402,794 net of customer contributions made. Umeme submitted the customer categories, standard costing for the different categories and detailed customer information as extracted from their billing system. The submitted customer numbers were subjected to the following process to provide ERA and UEDCL with confidence that there were no material inconsistencies/inaccuracies in the submitted customer numbers.

3.4.7.1 NEW CONNECTION VERIFICATION PROCESS

The following procedures were followed in verifying the new connections:

(a) All the submitted customers were verified against the previous three year (2012, 2013 and 2014) customer numbers to weed-out possibilities of duplication of customers;
(b) Every new connected customer was confirmed to have paid a connection fee. This meant that the connection fees had to tie up with the number of new connections submitted;
(c) All new connections on prepayment platform had to be with a NIL payment on customer security deposit;
(d) All capital contributions must have been as approved by the Authority (98,000 for no pole service and 326,000 for one pole service);
(e) It is possible to track the new connection per category (Single phase one pole service, Single Phase – No pole Looping, Single phase – No pole less than 30 meters, Single phase – No pole up to 35 meters and Single phase customers connected on 10mm^2 solidal) using location of the connection;

(f) All new connections in 2015 must have been prepaid connections following the approved schedule by the Authority that gave a deadline of 30th September 2014 for connection of postpaid customers;

(g) For every new connection made, there had to be confirmation that a meter number was assigned to the customer, a connection date, receipt amount and date of payment would be held in the Umeme database;

(h) New connections that required more than one pole were paid for 100% by the customer and Umeme did not contribute to the creation of that asset and therefore these do not constitute eligible investments for ROI and thus were left out in the verification.

(i) 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.

(j) A comparison was made of what the findings were with the Umeme submission and investigation of any variances made by the Company;

(k) All commercial schemes (paid for by the customers) have not been submitted in the list of investment additions;

(l) All materials listed in the standard cost are installed at all the customer premises,

(m) Umeme submitted a list of customers connected with support from the GoU under the OBA project,

(n) The list of OBA submitted to ERA by Umeme was forwarded to REA to confirm the consistency of data and invoices and paid by REA.

These procedures were discussed and shared with the Umeme team and there was no objection. The verification embarked on detailed review tests to ensure that commercial schemes were not included in the new connections submitted.

The following desk verification tests were conducted:

(i) Analysis of the submitted data to ensure that all the customers fall within the ambit of the discussed process;
(ii) Review of the submitted costs against the approved standard costs under Output Based Aid (OBA);
(iii) Review of the procurement process for the key cost drivers for New Connections; Poles, Meters, MCB, Preformed Dead Ends and Landing Brackets;
(iv) Checked the standard material usage included within the standard cost profile of specific categories of new connections e.g. Landing brackets; and,
(v) Checked the standard contractor costs and agree to the Standard Cost profile.

3.4.7.2 FINDINGS OF THE DESK VERIFICATION

The following were the findings of the desk verification exercise:

(a) Umeme uses two systems to capture customer information that is to say; Open Integrated Customer Management system (OICS) and Ultima. OICS is used to capture customer primary information while Ultima is used for prepayment vending.

(b) The submitted sixty eight thousand eight hundred twenty five (68,825) new connection customers included one hundred twenty three (123) contractor job customers of which one hundred twenty (120) were no pole customers, while the remaining three (3) customers were under one pole service customers.

(c) Six thousand, five hundred seventy six (6,576) were under prepayment category 'do not use'. This category according to Umeme was an erroneous category and ought not to have been used. However, a further analysis showed that five thousand five hundred and sixty one (5,561) were no pole service customers, while

one thousand fifteen (1,015) were one pole service customers. These were allocated to their respective categories.

(d) The rest of the categories were as per the approved categories and Umeme further reported that no customer was connected using 10mm^2 solidal cables.

(e) The tariff billing category of the submitted data showed that nine hundred twelve (912) customers were commercially billed customers, twelve thousand six hundred seventy nine (12,679) were domestic billed customers while fifty five thousand two hundred thirty three (55,233) customers did not return a billing category. However, they were confirmed to have been active accounts i.e. customers were loading YAKA tokens and were considered in the computation for new connection numbers for ROI.

(f) The analysis of metered customers showed that five hundred twenty seven (527) customers were new connections with postpaid meters and customer security deposits of which four (4) customers paid a security deposit of one shilling. Umeme explained that all one shilling capital contribution customers were OBA customers erroneously submitted. On the other deposits, Umeme explained that these were customers that had been connected in earlier years but not entered in the system and were captured during the clean-up exercise. The Company was given an opportunity to present capital contribution receipts, security deposit receipts and account for these funds in those years when they were connected. This information was not submitted.

(g) One hundred (100) customers did not return their prepaid meter numbers. Of these fifty seven (57) were for no pole services and forty three (43) for one pole services. The Company did not submit any explanation to this finding. These customers were not considered in the computation for the new connection number.

3.4.7.3 OTHER OBSERVATIONS

(a) On OBA and customer numbers

Umeme submitted according to their end of January 2016 report that 149,532 new prepaid customers (OBA and ordinary new connections) had been connected in the year 2015. The company separately submitted that the total new connections for ROI were 68,825, leaving a total of **80,707** OBA connections.

Umeme also submitted a detailed number of OBA customers made during the year totaling to **79,768** customers. The corroborative evidence from Rural Electrification Agency (REA) confirmed a total of 40,223 as eligible connections invoiced and paid for the two years up to September 2015. This information was not a complete submission for the year 2015; the computation of new connections therefore took note of it but did not apply these numbers in its computation. The verification team obtained a list of customers that were connected under the Output Based Aid (OBA) arrangement for the year 2015. The purpose for this list was to establish whether the submissions were mutually exclusive and to test it against the previous years' submissions.

VERIFICATION

(a) The unique feature used on all the lists is the Service point number since each new connection must have a unique service point in the OICS billing system that is used to maintain customer data;

(b) All the service points submitted for OBA customers were tested against those submitted in the previous years (2012, 2013 and 2014) and none of them was returned as a resubmission. This was also done for the 2015 submission with similar results;

(c) The final test was to confirm that none of these customers paid capital contribution which was also done through a confirmatory extraction.

FINDINGS

The OBA list that was submitted contained 79,768 OBA new customers.

On the discrepancy of the numbers submitted, Umeme explained that the extraction was made from the OICS rather than Ultima, a system that is more up-to-date with prepaid customer information. A final and updated data set was submitted still with 79,768 connected customers.

a) Comparison with the Audited Financial Statements

Umeme submitted the end of year financial statements for 2015. The financial statements showed that the total new connections, net of disconnections were one hundred forty two thousand nine hundred seventy one (142,971[7]). Table 8 shows the new connections as reported in Umeme's audited financial statement and the computation used to arrive at the new connection number that qualified for ROI. Umeme explained that the reported customer movement, net of disconnections is a derived figure from active customers.

A breakdown of these customer numbers was provided for review and confirmed that the 142,971 is a derived figure including disconnections, de-activations and re-connections and activations. The deactivated/disconnected customer categories under the prepayment metering platform will reduce but in the meantime they affect the figures considered for ROI purposes. A detailed extract of the deactivated and reactivated customers in 2015 showed 2,438 deactivated and disconnected customers.

A detailed list of these numbers was submitted but Umeme did not provide a justification for disconnecting prepaid customers. In addition, these "deactivated" customers included 16 customers without meters while their supply profile was "active". The computation of connections for ROI purposes had therefore not included these 2,438 customers.

[7] This includes all customer categories including customer funded connections.

Table 8: Summary of new connections

Detailed Connections	No#
Verified New Connections[8]	146,155
Reported OBA customers for Umeme	(79,768)
Net New connections	66,387
Allocation among no pole and one pole	
No pole	46,641
One pole	19,746
Submitted and analyzed data	
No Pole Service no meter installed	(57)
Postpaid meters Installed	(413)
One Pole Service no meter installed	(43)
Postpaid meters Installed	(114)
Overall considered New Connections	65,760

b) Standard cost of materials used

It was discussed and noted that the additional cost for retrofitting a meter is the cost of a no pole connection plus a decommissioning cost.

Umeme submitted different standards of materials used on a no-pole from a pole connection and yet the additional costs of a pole connection are the materials associated with the pole. The verification considered the cost of a no-pole and added materials that the engineers agreed to be associated with a no-pole for connecting a customer.

The standard material costs were verified against the material listing received from stores.

FIELD FINDINGS

The sampled materials on the sampled connections returned all the materials to a greater extent except the parallel groove (PG) clamps and landing brackets. These were not seen on all the connections

[8] Verified customers less the disconnected or deactivated customers.

sampled and were not been included in the standard cost since they were never used.

CONCLUSION

The investment qualified for ROI, less the adjustments amounting to US$ 1,970,694.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 13,432,100** for ROI.

3.5 TECHNICAL AND CUSTOMER SERVICE

The Authority approved **US$ 17,619,987** in investments, aimed at technical loss reduction. Details of the approved projects are shown in table 9.

Table 9: APPROVED PROJECTS BY THE AUTHORITY FOR TECHNICAL AND CUSTOMER SERVICE

S/N	Investment Category	ERA Approval US$	Umeme's Submission US$
1	Prepayment infrastructure and meter for government TOU	2,000,000	0
2	Prepayment metering Retrofit	13,232,000	12,750,000
3	Lugogo - Kibuli 11kV feeder	1,835,237	0
4	Gaba – Kansanga feeder	312,250	109,313
5	Kireka – Kyambogo feeder	240,500	90,282
	TOTAL	**17,619,987**	**12,949,595**

Under this category, only one investment that is Prepayment metering retrofit was submitted for the review. The other two investments that is, prepayment infrastructure and meters for government TOU and Lugogo - Kibuli 11kV feeder were submitted to ERA as carryover investments under the 2016 Investment Plan.

3.5.1 PREPAYMENT METERING RETROFIT

The Authority approved a total budget of US$13,232,000 in prepayment metering retrofit investments for conversion of 80,000 customers from seven selected Umeme Districts. Initially, the approval provided US$ 100 to retrofit a customer (US$12) less than the OBA approved standard cost of US$112. This standard was revised to US$165.4 per connection for 80,000 customers in the seven selected districts.

UMEME'S SUBMISSION

Umeme submitted that seventy eight thousand five hundred thirty (78,530) customers were retrofitted with Prepayment meters at a cost of USD 12.75 million in 2015. The retrofits were done at an average of USD 162.40 which is US$ 2.8 less than the approved standard retrofit cost of US$165.4.

3.5.1.1 VERIFICATION PROCESS

The verification process involved the following:

(a) Confirm that every retrofitted customer had a previous account number and that it is not part of the 2015 new connections.

(b) Agree on standard connection cost methodology as adopted and used in verification of new connections as a basis for verification of retrofits.

(c) Obtain and verify the detailed list of all customers whose premises were retrofitted in the year 2015.

(d) Verify standard connection materials as detailed by the Authority vide Ref: ECR/38/39/1 dated 10th March 2015 as a basis for the standard materials used by Umeme to retrofit a customers' premises.

(e) Verify item costs as used in the standard cost against the Umeme stock price list as at December 2015. Based on the weighted average cost methodology that SUN system uses for valuation of stock, a variance of +/- 10% was considered to be acceptable.

(f) Perform system checks on a sample of transactions and a walk through test on the data extraction process.

(g) Based on a sample, confirm physical existence of all connection materials as per the retrofit standard cost materials profile at the premises of the sampled customers.

3.5.1.2 VERIFICATION FINDINGS

Umeme's submission was for seventy eight thousand five hundred thirty (78,530) retrofitted premises at a cost of US$ 12.75 million. The cost submission was based on the standard cost methodology at a cost of USD 165.45 for every retrofitted premise.

Table 10 shows the verified retrofitted numbers against the targeted and submitted numbers by Umeme district.

Table 10: SUMMARY OF PLANNED, SUBMITTED AND VERIFIED RETROFIT CUSTOMERS

District	Target	Submission	Verified
Kabalagala	4,158	4,457	4,536
Nakulabye	7,200	2,912	2,674
Najjanankumbi	28,008	23,951	24,034
Wandegeya	15,000	13,950	14,068
Banda	10,042	10,074	8,902
Mukono	12,245	11,763	11,806
Mbale	3,347	3,569	3,625
Others		7,854	8,885
TOTAL	**80,000**	**78,593**	**78,530**

Umeme submitted details for seventy eight thousand five hundred ninety three (78,593) customers that were retrofitted for prepayment metering. The verified customer numbers were seventy eight thousand five hundred and thirty (78,530). Analysis of the details revealed the following:

(a) Accounts with prepaid meter numbers appearing as previous meters

For the case of retrofits, the assumption is that a prepaid meter replaces a postpaid meter. After the analysis of the database, the verification however found that one thousand one hundred and thirty six (1,136) customers had returned the previous meters as prepaid.

(b) Repeated entries

The submission included customers that appeared more than once. Four (4) customers were under the category of those whose current meter was a postpaid meter while twenty eight (28) customers appeared under those whose previous meter was prepaid. The total duplicate/repeated entries were thirty two (32) customers and were not considered in computation of ROI.

(c) Blank/no previous meter number

The analysis further found out that twenty customers (20) did not return their current meter numbers. These had also been offset from the recommended amount.

(d) Accounts with Postpaid meters appearing under current meters

The database received had four hundred and twenty five (425) meters with postpaid meters appearing as the current meters. These customer details were incorrect with respect to supporting documents provided for the number of customers that were retrofitted in the 2015.

(e) Benchmarking of costs of retrofitting a customer

The standard cost profile was benchmarked against the Umeme Stock pricelist as at Dec 2015 as well as against the total project costs extracted from the general ledger with the following findings:

(i) **Cost Comparison to Umeme materials stock price list as at December 2015:** The item standard costs compared to those as reflected on the pricelist are not significantly different except for one item code 1321023, galvanized Prepayment Cross Arm with Bolts and Nuts. The price as used in the standard cost was USD 18.23 higher than that indicated on the materials stock price list. The standard cost had been adjusted for this and capped at the pricelist cost.

(ii) **Marketing Costs:** The component of marketing costs in the standard cost profile compared to the actual costs incurred as posted in the general ledger were significantly different. The standard cost profile indicated that the project marketing costs as per budget was USD 8.75 per retrofitted customer premises. However, a comparison with the actual marketing costs incurred revealed expenditure less than 1 USD per retrofitted customer premises which was below the budget

cost. This marketing and advertising cost had also been provided for under the DOMC budget.

(f) Impairment of Recovered Materials

Post-paid Meters recovered from customer's premises were collected and delivered to Umeme Central Stores Lugogo. The verification proposed one of the following:

(i) That the cost of these meters be accelerated from the asset base since the conversion of post-paid to prepaid metering was an initiative of Government rather than Umeme, or

(ii) The useful life of these old meters is impaired and the remaining useful life offset from the rate base to allow the current asset in use values.

None of the above options had been utilized as we were still limited by information on the useful lives of the old meters, separation of previously UEB meters from the Umeme meters and treatment of previously single metered customers. In this verification, the impairment value provided by the company in the audited financial statement was been used.

(g) Service Cable

The project costs as submitted did not put into consideration the impairment costs related to the recovered materials from the customers' premises. The items recovered from the premises were service cables and meters. This was also related to the treatment of decommissioned meters.

Table 11 shows a summary of the findings and the outcomes of the verification process for the retrofit customers.

Table 11: Summary of recommended amount on retrofitted customers

Valuation	Count	Cost (US$)	Value (US$)
Submission with support	78,530	165	12,993,021
Less			
-Repeated entries	- 32		
-Blank/no previous meter	- 20		
- Prepaid Mtrs under Previous	-1,136		
- Postpaid Mtrs under Current	- 425		
	76,917	**145**	**11,167,429**

CONCLUSION

The information submitted by Umeme and the verification steps taken to verify the number of retrofitted customers returned a value of **US$ 11,167,429** for 76,917 customers.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 11,167,429** for ROI.

3.5.2 GABA – KANSANGA FEEDER

The Authority approved US$ 312,250 to upgrade the conductor from 25mm^2 to 50mm^2 on the T-offs of route length 5.6km, upgrade the conductor from 50mm^2 to 150mm^2 on the main line with a route length of 1km and replace rotten poles.

DESK REVIEW

Umeme submitted US$ 119,702 relating to completion of the project. Detailed financial extracts were submitted together with available supporting documents. From the submitted financial extracts, US$ 17,073 relating to an L&T voucher that was not availed for verification, US$3,314 in materials issued after the project had been handed over while US$ 3,080 and US$ 6,561 related to borrowing costs and overhead absorption costs respectively. The rest of the costs were verified and found to be justifiably incurred.

Umeme upgraded 1km of the main line from 50mm^2 to 150mm^2, 5.7km of the T-offs were upgraded from 25mm^2 to 50mm^2. 3,344mm of 150mm^2 and 19,860m of 50mm^2 were strung. Twenty seven (27) 14m poles, thirty four (34) 12m poles and six (6) 10m poles were erected. Material returns showed that two (2) 14m poles and ten (10) 1m poles were returned. The project was handed over on 31/12/2015.

No field verification was done on this investment because the information submitted during the desk review was sufficient to enable the Authority make a decision.

CONCLUSION

The investment qualifies for ROI less the US$ 9,640 in relation to borrowing costs and overhead absorption costs.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 110,061** for ROI.

3.5.3 KIREKA - KYAMBOGO FEEDER

The Authority approved US$ 240,500 to upgrade the conductor from 25mm^2 to 50mm^2 on the T-offs of route length 3.8km and upgrade conductor from 25mm^2 to 100mm^2 on the T-offs of route length 0.5km as well as replacement of rotten poles.

DESK REVIEW

Umeme submitted US$ 90,282 for the conductor upgrade and pole replacement. The verification showed that vouchers worth US$8,008 in L&T could not be verified while US$7,563 relating to 1,010 m of single Core PVC Cable - 120mmsq and 70m of 3 Core Cable, 185Mmsq Copper X could not be traced to the project.

The verification established that 0.5km was upgraded from 50mm^2 to 150mm^2 while 3.8km was also upgraded from 25mm^2 to 50mm^2. 12,542m of 50mm^2 bare conductor and 1,670m of 100mm^2 still bare

conductor were strung. 46 MV poles were decommissioned; eight 14m poles, thirty nine 12m poles and nineteen 10m poles were erected. The project was handed over 28/12/2015.

No field verification was done because the information provided during desk verification was sufficient to aid the Authority to make a decision.

CONCLUSION

The investment qualifies for ROI less US$7,682 in overhead absorption costs, borrowing costs and staff related costs.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 82,600** for ROI.

3.6 RELIABILITY AND QUALITY OF SUPPLY IMPROVEMENTS

The Authority approved a total of US$ 8.582 million towards investments under this project category. Table 12 shows the list of investments and their respective approved amounts.

Table 12: APPROVED INVESTMENTS UNDER RELIABILITY AND QUALITY OF SUPPLY IMPROVEMENTS

S/N	Description	ERA's Approval (US$)	Umeme's Submission (US$)
1	Restoration Projects	4,312,127	4,663,372
2	Protection Systems	965,000	758,152
3	Substation Ceiling Facelift	305,000	363,757
4	Distribution transformer Injections	3,000,000	3,053,893
	TOTAL	**8,582,070**	**8,839,174**

3.6.1 RESTORATION PROJECTS

The Authority approved US$ 4.865 million for refurbishment of the following feeders as shown in Table 13.

Table 13: APPROVED RESTORATION PROJECTS FOR 2015

S/N	Description	ERA's Approval (US$)	Umeme's submission (US$)
1	Masaka West - Rakai MV Line	851,004	1,080,005
2	Lira – Lake Kwania	336,759	646,321
3	Busunju – Kiziba feeder	1,415,738	1,404,055
4	Tororo main – Tororo Rock	302,556	272,851
5	Bulangira – Pallisa	379,437	0
6	Gulu – Layibi	239,176	484,298
7	Mityana – Kasanda	596,587	775,842
8	Nkenda—Kabale feeder	40,973	0
9	Mukono - Nakifuma	149,897	0
	Total	**4,312,127**	**4,663,372**

The following sections provide a detailed review of the respective submissions.

3.6.1.1 MASAKA - WEST RAKAI 33KV FEEDER

The Authority approved US$ 851,004 intended to improve quality and reliability of electricity supply, improve capacity for future load growth, reduce outage frequency and operational costs. The project scope included refurbishment of the feeder, replacement of rotten poles and worn out insulators, upgrade the conductor and install aerial earth on the main line.

DESK REVIEW

Umeme submitted US$ 1,080,004 representing an over expenditure of US$229,000 (27%) relating to the project of which materials cost US$ 663,097, labor and Transport cost US$ 304,093, CCD Absorption Cost US$ 61,373, borrowing cost at US$ 48,998, transport and staff related cost at US$ 2,443. The total submitted by Umeme equates to 127% of the approved amount.

Based on the information submitted by Umeme, the total value of material cost verified summed up to US$ 663,251.The difference was because of the price of Jumper Channel, 6'' ''4'' Sect summing to US$ 157 which was not part of the material extract provided though it appeared in the General Ledger.

The total number of poles installed was 996 of which 68 were 10m poles, 506 were 12m poles and 422 were 14m poles. The average unit cost of the 10m poles US$ 156, 12m poles US$ 224 and 14m poles US$ 278. However, seven (7) of the 14m poles were returned to stores as per the return form verified. 49,492m Conductor 50mm^2 was verified with an average unit cost of US$ 0.81; 22,110m Conductor 100mm^2 was verified with an average unit cost of US$ 1.303; 10,887m Conductor 150mm^2 was verified with an average unit cost of US$ 2.32. The total amount verified for labor and transport Invoice was US$ 303,938. The total value verified in relation to transport and staff related cost was US$ 1,702.

FIELD FINDINGS

The field findings showed that the material extracts for the sampled materials reconciled with what was on the ground and the quality of works done on the feeder was to standard.

CONCLUSION

The investment qualified of ROI less the borrowing costs, overhead absorption costs and staff related costs amounting to US$ 112,814.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 967,190** to earn ROI for the project.

3.6.1.2 LIRA - LAKE KWANIA 33KV FEEDER

The Authority approved a plan of US$ 336,759 intended to improve power supply reliability at Lake Kwania by upgrading conductors and

removal of unsuitable poles and overhead line hardware. The project scope included upgrading of conductor to 100mm^2 for 49km, replacing 389 poles and installing stay assemblies and other incidental works.

DESK REVIEW

Umeme submitted an expenditure totaling to US$ 647,062 related to material cost US$ 405,308, labor and transport cost US$ 171,059, CCD Absorption Cost US$ 38,001, borrowing cost US$ 30,339, transport and staff related cost US$ 2,355. The total submitted by Umeme equates to 192% of the Authority's approved amount.

The total value of material cost verified sums up to US$ 374,571. The value for material excludes 1,428, 33kV post polymeric insulators summing up to US$ 30,730. The total number of poles was 389 of which ten were 10m poles, seventy were 12m poles and three hundred nine were 14m poles. The average unit cost of the 10m poles US$ 156, 12m poles US$ 236 and 14m poles US$ 289. The 50mm^2 conductor value verified was 20,665m with an average unit cost of US$ 0.80 and 131,299m were verified for 100mm^2 conductor with an average unit cost of US$ 1.303. The amount verified for labor and transport was US$ 171,059 and staff related cost was US$ 1,973. However, while vouching two additional forms for subsistence allowance were found with US$ 333 and US$ 1,111 though these values were not corroborated with the values in the General Ledger.

FIELD FINDINGS

Field verification noted that the number of poles matched the ones issued from the store except the 14m poles where there was a deficiency of two poles that were never erected due to way leave issues. These were offset from the material submission. All other materials reconciled with the material extracts issued from stores. The verification further observed that clearance of the line near Amach

trading centre needed to be urgently rectified to mitigate safety concerns. The quality of works done was to standard.

CONCLUSION

The investment qualifies for ROI less the borrowing costs, absorption costs and staff related costs amounting to US$ 69,665.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 577,397** for ROI.

Umeme was instructed to address the line clearance issues identified near Amach trading centre.

3.6.1.3 BUSUNJU – KIZIBA 33KV FEEDER

The Authority approved a budget of US$ 1,415,738 for feeder restoration works on Busunju – Kiziba 33kV feeder. The project scope included an upgrade of conductor to 100mm^2 for a route length of 53km, 50mm^2 for 64km, replacement of 1,083 rotten poles and replacement of hardware.

DESK REVIEW

Umeme submitted US$ 1,244,267 towards restoration and refurbishment of the feeder. From the analysis, US$ 884,438 was on materials, US$ 212,751 on Labour and Transport, US$79,788 was spent on overhead absorption while US$67,291 was spent on borrowing costs, way leaves and suspensory costs.

Umeme upgraded the conductor from 50mm^2 to 100mm^2 for a route length of 53km, 50mm^2 for route length of 64km and replaced 1,083 rotten poles. CRIV issues were verified and reconciled with the material reconciliations made by the contractor. Five Air Break Switches (ABS) were installed; 174,356m of 100mmsq and 190,804m of 50mmsq of conductor were strung. Umeme returned 9,000m of 100mm^2 of conductor to the stores. One hundred and fourteen (114) 14m poles,

nine hundred eighteen (918) 12m poles and fifty three (53) 10m poles were installed. Included in the submission were LV works which remained as part of the scope implemented by Umeme. The computation for the recommended amount for ROI did not includ the labour and transport costs as well as the materials deemed to have been related to LV works.
The submission included borrowing costs, overhead absorption costs, staff and transport related costs and way leaves. These costs were not been included in the recommended amount.

FIELD FINDINGS

The restoration works were generally done to standard and the line was in a much better condition than previously observed. The following areas need to be addressed by Umeme:

(a) On some transformers, structures were left without HT protection (dropout fuses were not installed);
(b) A number of T-offs were directly connected which affects the reliability of the main line; and,
(c) The Capacitor bank at Mika TC was found disconnected.

CONCLUSION

During the exit meeting, it was agreed that Umeme corrects the identified snags on the line before the investment cost of **US$ 1,097,189 is allowed for ROI. Further field inspections confirmed that Umeme corrected the snags and the investment qualified** for ROI less the borrowing costs, absorption costs and staff related costs amounting to US$ 147,078.

AUTHORITY DECISION

The Authority approved investment of **US$ 1,097,189** to earn a return on Investment.

3.6.1.4TORORO MAIN – TORORO ROCK 33KV FEEDER

The Authority approved a plan of US$ 302,556 to refurbish the Tororo main- Tororo Rock line for restoration. The feeder was characterized by poor conductor, leaning poles, poor hardware and poor lines clearance. The project scope included:

(a) Construction of 33kV conductor 100mm^2 of route length 13416m;
(b) Laying 140m of 33kV 185mm^2 3 Core underground and 450m 33kV 70mm^2 3 Core underground cable;
(c) Installation of eight (8) 10m poles, one hundred and one (101) 12m poles, twenty six (26) 14m poles;
(d) Line clearance of route length 800m and to recovery of 40,248m of 100mm^2 conductor.

DESK REVIEW

Umeme submitted US$ 272,851 relating to the project comprising material cost – US$ 164,718, labor and transport cost US$ 79,386, CCD Absorption Cost US$ 15,505, borrowing cost US$ 12,379, transport and staff related cost US$ 864. The total project cost amounts to 90.2% of the approved value.

Based on the information submitted by Umeme, the total value of material cost verified sums up to US$ 164,714. The total number of poles was 135 of which 8 were 10m poles, 101 were 12m poles and 26 were 14m poles. The average unit cost of the 10m poles US$ 156, 12m poles US$ 222 and 14m poles US$ 278, 140m of 33kV 185mm^2 3 Core underground cable was verified with an average unit cost of US$ 99.02 and 200m of 33kV 70mm^2 3 Core underground cable of was verified with an average unit cost of US$ 53.

No field work was done on this feeder because the desk verification was sufficient to enable the Authority make a decision.

CONCLUSION

The investment qualified for ROI less the borrowing costs, absorption costs and staff related costs amounting to US$ 28,748.

AUTHORITY DECISION

The Authority approved investment cost of **USD$ 244,100** for ROI.

3.6.1.5 GULU - LAYIBI 11KV FEEDER

The Authority approved a budget of US$239,176 for Gulu - Layibi feeder for the company to replace rotten poles and upgrade conductor. The project scope included the configuration of the line from horizontal to staggered vertical to aid aerial earthing, upgrade of conductor for a route length of 10km to 100mm^2, 30km to 50mm^2, and replacement of two hundred eighty five poles and accessories.

DESK REVIEW

The company installed three (3) Air break switches, 131,299m of 100mm^2 conductor and 20,655m of 50mm^2 conductor were strung. Sixteen 10m poles, one hundred and two 12m poles and forty seven 14m poles were issued from the store.

The financial documents availed showed that more material were issued than what was used on the project by US$ 2,176. The cost of LV pole replacement together with its associated L&T (40%) were not included in the recommended amount, since the activities are of O&M nature and should have been implemented using the DOMC budget. The total project cost was US$389,280 as availed in the financial extracts.

The cost associated with borrowing, way leaves and overhead absorption costs of US$ 50,974 were not recommended for ROI.

The field findings showed that the construction works were done to standard and the material findings tallied with the material extracts in the desk review.

CONCLUSION

The investment qualified for ROI less borrowing costs, absorption costs and staff related costs amounting to US$ 50,974.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 338,306** for ROI.

3.6.1.6 MITYANA - KASANDA 11KV FEEDER

The Authority approved a total budget of US$ 596,587 to improve power supply reliability to Mityana – Kasanda 11kV feeder. The project involved upgrading conductors and removal of unsuitable poles and overhead line hardware.

The project scope included upgrade of conductor to 100mm^2 for 57kms, conductor upgrade to 50mm^2 for 18kms, replacement of five hundred and forty one poles, renew unsuitable stay assemblies and incidental works.

DESK REVIEW

Umeme submitted US$ 781,981 relating to the refurbishment of Mityana-Kasanda feeder. The project cost was overspent by 31.1% of the submitted project costs comprising; material cost US$ 526,057, labor and Transport cost US$ 175,008, CCD Absorption cost US$ 44,088, borrowing cost US$ 35,199, transport and staff related costs US$ 1,629.

The total number of poles was five hundred and forty one (541) of which twenty (20) were 10m poles, four hundred and forty seven (447) were 12m poles and seventy four (74) were 14m poles. The average unit cost of the 10m poles US$ 156, 12m poles US$ 233 and 14m poles US$ 291. 161,327m of 100mm^2 conductor were used with an average

unit cost of US$ 1.53, 62,949m of 50mm^2 conductor were strung with an average unit cost of US$ 0.75.

FIELD FINDINGS

The field findings showed that the construction works were done to standard and the material on ground tallied with the material extracts in the desk verification.

CONCLUSION

The investment qualified for ROI less borrowing costs, absorption costs and staff related costs amounting to US$ 80,916.

AUTHORITY DECISION

(i) The investment cost of **US$ 678,356** was approved for ROI.
(ii) The Authority directed Umeme to seek the Regulatory approval in future for projects where scope and costs change.

3.6.2 PROTECTION SYSTEMS

The Authority approved a budget of US$ 965,000 towards protection systems as shown in Table 14.

Table 14: APPROVED INVESTMENTS IN PROTECTION SYSTEMS

S/N	Item	Purpose	Qty	ERA Approval (US$)	Umeme's Submission (US$)
1	Battery banks/Chargers	24 VDC bank & Charger	3	45,000	758,152
		110V DC Battery bank & Charger	30	750,000	
2	CT Analyser	Testing Instrumentation transformers	1	120,000	Not submitted
3	Protection software	Power System Coordination analysis and web based Database software	1	50,000	Not submitted
	Total			**965,000**	**758,152**

Table 14 shows that Umeme only carried out one investment as per the approved investments in the protection systems. The CT Analyzer was submitted as a carryover investment under the 2016 investment plan while no information was given by the Company on the status of the protection system software.

3.6.2.1 BATTERY BANKS

The Authority approved a total budget of US$ 795,000 for Umeme to install battery banks and chargers. The details were as follows:

(a) Thirty (30) 110VDC battery banks and chargers; and
(b) Three (3) 24VDC battery banks and chargers.

DESK REVIEW

Umeme submitted a total of US$ 758,152 for investment in protection systems. Included in the submitted investments were a total of US$ 37,240 relating to borrowing costs for the project. Umeme submitted support documentation for verification and analysis.

The submission showed that two separate contracts existed; one was for the supply of the DC batteries (AB MATRA) and charging systems, and the other was for the installation of the DC batteries and charging systems (VOLEX). Twenty five (25) DC charging systems. Documentation also showed that at some substations (i.e. Kisugu, Njeru, Kamuli and Gulu) it was not possible to install the back-up systems due to space limitations. Instead the company opted to install them at the substations of Nile Breweries, Kabale, Masindi and Lira. At initial commissioning of the DC charging systems, a number of snags were observed which were later cleared by the supplier and signed off on 30/11/2015. No financial verification was carried out since Umeme did not submit any financial documents for the projects.

CONCLUSION

The submitted financial information were in support of US$720,911 net of borrowing costs and overhead absorption costs.

AUTHORITY DECISION

The Authority approved an investment cost of **US$ 720,911.**

3.6.3 SUBSTATION CEILING FACELIFT

The Authority approved US$ 305,000 to construct concrete ceilings at the following substations; Jinja Industrial, Ntinda, Kamuli, Gulu, Mukono, Kabale, Fort Portal and Mityana. The scope of works involved the replacement of plywood ceilings with concrete at the plant houses of these respective substations.

DESK REVIEW

Umeme submitted journals together with supporting documents showing that it had spent US$363,757 on replacement of plywood ceilings with concrete ceilings. The verification confirmed that US$326,583 was spent on replacing of ceilings and renovation of the substations. The verification further ascertained that the works done under Mukono, Jinja Industrial and Ntinda substations were not double counted under the power transformer upgrade costs previously verified. The borrowing and overhead absorption cost is US$ 37,174.

Documentation reviewed showed that the Company renovated the respective substations. The works included; drainage, fencing, painting, re-gravelling, rewiring, plant houses extensions and installation of AC systems. These were additional works over and above the approved scope.

CONCLUSION

The verified financial documents confirmed that the works were done although the technical findings revealed a change of scope from the approved scope.

AUTHORITY DECISION

The investment in substation facelift of **US$ 326,583** was approved by the Authority to earn a return on Investment.

3.6.4 DISTRIBUTION TRANSFORMER INJECTIONS

The Authority approved a budget of US$ 3 million for sixty three (63) transformer injections in areas where respective transformers were loaded beyond their rated capacities. The Company further indicated plans to convert bare conductor to ABC particularly around town centres to manage power theft.

DESK REVIEW

Umeme submitted a total of US$ 5,390,228 for two hundred and sixty nine (269) transformer injections. The Authority had approved sixty three (63) transformer injections at a cost of US$ 3,000,000. However, Umeme submitted US$ 3,053,893 as the cost of injecting the approved sixty three (63) transformers.

The remaining two hundred and six schemes (206) accounting for US$ 2,336,335 had not been approved by the Authority and these related to 2014 transformer injections. These were not reviewed for verification in line with the guiding principles. However, the exit meeting resolved that these projects be submitted and reviewed during verification of 2016 quarter two completed investments.

A detailed submission made by Umeme totalled to US$ 2,528,996 accounting for fifty four (54) projects. Information for the balance of nine (9) approved transformer injections was not submitted.

The following observations were made:

(a) All the transformer injections submitted were strung with ABC conductor and LV pole replacement were carried out. Only eight projects were approved by the Authority for conversion to ABC;

(b) There were no disposal proceeds for the recovered conductor to be impaired upon the upgrade to the current one;

(c) During the project implementation, a number of poles were injected on the network. In addition, some poles which were of Low voltage poles were also replaced, an activity that had always been considered an O&M in nature.

(d) 90% of the submitted transformer injections never had built drawings attached on file; and,

(e) Out of the sixty three (63) approved transformer injections, nine (9) transformer injections were not submitted for verification.

CONCLUSION

Table 15 shows a summary of approved amounts after deduction of costs, i.e. borrowing costs, absorption costs, staff related costs, impairment charges and O&M costs (LV replacements). The cost of replaced poles based on the submitted files had not been approved for ROI.

Table 15: Summary of review of approved transformer injections

S/N	Umeme's submission (US$) on approved transformer injections	Verified amount (US$)	Deductions (US$)	Approved (US$)
1	3,053,893	2,528,996	238,762	2,290,234

AUTHORITY DECISION

The investment cost of **US$ 2,290,234** was approved for ROI on this investment.

3.7 GETFiT PROJECTS

The Authority approved a plan of US$ 4.175 million for Umeme to carry out network refurbishments and network extensions to enable the evacuation of mini hydro power plants under the GETFiT program. These power plants are expected to start operations in 2016/2017.

Umeme did not submit any completed investments under this category as it was still work in progress and had been submitted to the Authority as part of the carryover investments under the 2016 investment plan.

3.8 NON-NETWORK ASSETS - CESI[9]

The Authority approved a budget of US$ 245,800 as part of non-network investments for Umeme for an annual license (US$ 25,000), Alula interface with OICS subscription (US$ 70,000) and an annual imagery license for satellite pictures at US$ 54,000. Additional funds were approved for customer sensitisation to allow access to data collection (US$ 30,000), transformer plates and marking (US$ 20,800). Umeme further submitted US$ 18,000 for training of staff with skills to deliver project.

Umeme submitted an expenditure of US$ 174,924 on CESI project. The detailed extraction of the incurred figures and a detailed report on what the funds used was used as a basis for verification of amounts spent.

CONCLUSION

The verification ascertained US$8,967 as bowed costs and overhead absorption cost not legible for consideration by the Authority. The financial documents after verification supported the remaining amount of US$165,957 under the CESI project.

[9] Customer and Engineering System Integration

AUTHORITY DECISION

The Authority approved US$ 165,957 amount under non network assets.

4 OTHER INVESTMENTS

This category of investments included the following:

(a) Investments that Umeme carried out that were regarded as emergency in nature for which retrospective approval was sought;
(b) Investments that were approved by the Authority in previous years (2013 and 2014) that had not been submitted as carryover investments in the 2015 plan. These included Automated Meter Reading (AMR) project, Entebbe Airport feeder loss reduction, Lugogo – Naguru and Ntinda – Bukoto Interconnection and Kawanda (UETCL) – Bombo Industrial Park Phase II; and,
(c) System Improvement Investments.

4.1 EMERGENCY CAPEX

The Authority had approved a plan with a maximum of seven projects at a cost of US$1.0 million. However, Umeme submitted eighteen (18) completed projects with a total value of US$ 925,690 under the category emergency CAPEX. The projects listed in Table 16 were submitted for verification except for the systems upgrade project at Bombo Army Barracks.

Table 16: PROJECTS SUBMITTED FOR EMERGENCY CAPEX

S/N	**Project Description**	**Ugx**	**US$**
1	Power supply to Nakabango Village	165,133,194	48,899
2	Power supply to Itengeza Village	419,446,149	124,207
3	Power supply to Nalinaibili LC1 Busedde sub County	293,729,881	86,980
4	Power supply to Budumbili East LC1	238,866,488	70,733
5	Power supply to Mawuta Village	353,002,003	104,531
6	Power supply to Rehoboth Project - Namulesa	35,448,895	10,497
7	Power supply to Wakitaka Village - Jinja	126,117,394	37,346
8	Power supply to Musimba Village Bugembe town	91,137,101	26,988

S/N	**Project Description**	**Ugx**	**US$**
9	Power supply to Kabembe BTC	117,497,546	34,793
10	Power supply to Buwekula Village	121,951,464	36,112
11	Namatimbei TX upgrade 50KVA-100KVA	73,298,376	21,705
12	Buwanyanga upgrade 100KVA-200KVA	35,680,360	10,566
13	Namezi TX upgrade 50KVA-100KVA	87,838,773	26,011
14	Gibuzale TX-upgrade 100KVA-200KVA	82,157,360	24,329
15	Bumugibole Tx Upgrade 25KVA -200KVA	99,592,893	29,492
16	Kadua TC TX	85,219,601	25,235
17	Systems Upgrade - Bombo Army Barracks	529,838,428	156,896
18	Power Supply to Buwagi Agro Traders- Jinja Industrial	170,098,173	50,370
		3,126,054,079	**925,690**

DESK REVIEW

The following observations were made:

(a) Of the eighteen emergency CAPEX projects, ten (10) projects were identified by Rural Electrification Agency (REA) as priority projects to be completed within the year. The REA drawings submitted to Umeme for construction of the lines were designed to use bare conductor to string the line. However, Umeme used ABC conductor hence a change in scope. The explanation offered was that all these community applications received were surveyed and scoped in ABC given the advantages that come with ABC in village settings, in particular reduced power theft through tapping. Secondly that this batch of emergency projects came in alongside the Mbale projects where Umeme is experiencing a lot of power theft, and it was unanimously agreed within Umeme to scope these projects in ABC and also install transformer meters to evaluate the losses;

(b) For one of the projects, Rehoboth Project – Namulesa, works were not carried out.

(c) According to the verified documents, Umeme justified six of the transformer upgrades to have blown up due to over loading. However, the transformer test sheet to assess the cause of over load was not availed for verification;

(d) The documents further indicated that the six transformers had lived an average useful life of 5 years. Furthermore, the Bombo Army barracks file was also not availed for verification; and,

(e) The rest of the projects were related to transformer upgrades/ replacements. It was observed that six of the transformers that were submitted had blown due to overload and had never been replaced; one transformer at Kadua Trading Centre had a 315kVA transformer replaced with the same rating of transformer. The verification further observed that there were no previous records/attempts by Umeme to safeguard these transformers from overload before they eventually blew up. In all the submitted transformer upgrades, the transformer test sheet to assess the cause of failure was not availed.

CONCLUSION

From the analysis, the following conclusions were made:

(a) The emergency projects were completed, however some files were not complete enough to give ERA an opportunity to analyse the investment;

(b) No impairment was made on the decommissioned transformers hence the financial reported amount was considered representative of the impairment costs; and,

(c) The completed, executed and verified projects were recommended to earn a ROI.

AUTHORITY DECISION

This investment of **US$ 534,714** was approved by the Authority to earn a return based on the verified works.

4.2 AUTOMATED METER READING (AMR) PROJECT

The Authority rejected the submission made by Umeme to invest additional US$ 8million in AMR under the 2015 investment plans. This

followed the previous approval of US$ 3 million in 2013 to conduct a pilot project and submit completion reports for verification. The Authority in 2014 approved an additional US$ 8m towards the modification and improvement of the AMR system that could be operated in-house and could be integrated with the local systems.

The scope of the project involved the following:

(a) Installation of new AMR system (ecWINTM) as basic off-shelf system and develop UMEME specific requirements to be installed as the final version. The system would have a customer web-based read-only access platform and users (internal and external customers) trained on how to operate it.
(b) Installation of tamper proof meter boxes prewired with meters, current transformers, circuit breakers and modem systems for remote monitoring.
(c) In 2015, Umeme projected to convert 2,080 existing units and complete 18 out 25 Umeme districts.

DESK REVIEW

Umeme hired three consultants to undertake the job. These were Utility Design Services (UDS) to provide technical support on the system design i.e. the meter enclosure and the AMI system; Powertech System Integrators (PTSI) to supply an automated meter reading advanced metering infrastructure solution; and Power Process Systems of South Africa to manufacture, test and supply pre-wired metering enclosures with access control and monitoring systems. The pre-wire enclosures were for three categories of meters i.e. direct connect (Time of Use), Low Voltage (LV-kVA) and High Tension (HT).

Umeme submitted US$ 7,602,177 as the total expenditure incurred on the implementation of AMR together with available technical support documentation. According to the technical documents reviewed, the software was installed and is currently being utilised at 71%. Factory

Acceptance Tests (FATs) and System Acceptance Tests (SATs) were done. These covered access control, keys, tags, meter accessibility and enclosures for the Direct connect customer, LV-KVA customers and HT customers.

The commissioning report of the AMI system was provided to confirm that the system was commissioned on 22/05/2015 including a mini-Disaster Recovery System (DRS). The project completion certificate for AMI was also provided but the commissioning report was not detailed i.e. there were no results of the tests carried out. Site acceptance tests for the AMR/AMI were done and showed that the system passed; system functionality tests were also done. System report of the AMI as at end of December 2015 showed that 2,298 customers are installed on the database and Load Profile (LP) availability is 76.4% and the Billing Register (BR) availability is 87.8%.

For the case of 2015, Umeme installed 1,594 automatic meter readers. The installations were done in 7 scenarios depending on the additional material requirements save for the pre-wired boxes. 103 were HT customers, 262 were LV kVA customers and 1,229 were direct Time of Use (TOU) customers.

Umeme submitted a detailed cost breakdown of expenses incurred on installation of AMR totalling to US$ 7,691,309 (US$89,132 more than the summary submission). The detailed figures were broken down as shown in Table 17.

Table 17: AMR COST BREAKDOWN

Description	Amount (Ugx)	Amount (US$)
Opening balance	389,484,529	115,334
CESI	4,308,314	1,276
AMR 2012 & 2014	324,665,165	96,140
AMR 2015		
Pre-payment-Metering	64,819,364	19,194
AMR Project	25,190,271,669	7,459,364
TOTAL		**7,691,309**

From Table 17, included in the submission were opening balances which were not broken down and not supported. CESI project expenses were also included totalling to US$ 1,276 while expenses relating to 2012, 2013 and 2014 were also forwarded for consideration and these totalled to US$ 96,140. The Company explained that the 2012 and 2014 submitted amount of US$ 96,140 was an additional cost on the previously submitted figure of US$ 3,212,477 submitted in 2014.

After the exit meeting, additional submission of US$3,210,526 together with its justifications of the 2014 AMR costs were submitted and have been verified.

The expenditures incurred in 2015 were verified of which US$ 19,194 was set aside as it related to prepayment metering costs possibly under retrofit conversions. This therefore left US$ 7,459,364 as eligible expenditure for verification under the AMR investment which will hence forth be referred to as the 'submitted amount' under AMR.

The submitted amount included material expenditure of US$ 4,935,190 and labour and transport costs at US$ 622,299, while borrowing costs and overhead absorption and staff related costs were US$612,504 and US$ 205,716 respectively. The latter two were not considered for ROI as laid down under the section 2.1.

2014 AMR EXPENDITURES

During the verification of the 2014 submitted investments, the Authority rejected investments in AMR as work in progress. In 2015 submission, the 2014 investments considered were only the additions to the earlier submission made in 2014. After the exit meeting, Umeme submitted the investments in AMR totalling to US$3,210,526 for verification.

DESK REVIEW

The desk review showed that US$330,857 were in borrowing costs, staff and administration costs and tools that had been provided under the DOMC. Journal vouchers in support of provisions of US$227,965 made in

2014 were assumed to have been paid by the end of 2015 and as such not considered in computation of the ROI.

FIELD FINDINGS

The field verification was undertaken to confirm the existence of AMR meter boxes; to confirm the existence of meters, circuit breakers; to observe the system response to box opening; and to confirm with the server whether any action made on the box was captured and reported to the concerned Umeme staff for action. Field verification of the AMR system was done in the Umeme Districts of Gulu, Lira, Jinja, Entebbe, Bombo, Masaka and Mukono.

The following observations were made from the field findings:

(i) All the AMR boxes sampled existed in Bombo Umeme district except for Gentex and Chief Distributors which were not on the submitted conversion list. The boxes opened using a touch key with exception of Sekanusu where the battery was down and an access key was used to access the boxes;

(ii) In Mukono all the sampled AMR boxes were opened using a touch key and readings taken matched the ones recorded on the server in Kampala;

(iii) In Entebbe, the use of the touch key to open the AMR boxes failed in three out of four sampled boxes. The readings were taken for comparison with the server readings;

(iv) In Masaka, the touch key was found not to be configured or the battery was down on one out of two boxes sampled. However the boxes were accessed and readings taken to be matched with the readings on the server;

(v) In Gulu and Lira, the sampled AMR boxes were opened some physically while others were done using a touch key. Where the touch key had not been configured, Umeme informed the district and action was taken;

(vi) In Gulu and Lira, the Umeme staff received notification of opened meters using a touch key or override key. This was not observed by the teams in other districts though;

(vii) Another observation was that much as a notification could be received upon opening, the force used by ERA team to open the box physically was not enough to generate a notification of tamper to Umeme; and,

(viii) Lastly, it was found out that much as AMR configuration started in 2014 after completion of the pilot in 2013, Umeme continues to issue new customers with old meters. These meters are now being converted to AMR, having been on the network for less than two years.

CONCLUSION

Overall, the AMR system is operational and the investment qualified for ROI less borrowing costs, absorption costs and staff-related costs amounting to US$1,377,042.

AUTHORITY DECISION

The Investment cost of **US$ 9,306,642** in AMR for 2014 and 2015 was approved by the Authority for ROI.

4.3 ENTEBBE AIRPORT FEEDER

In 2014, the Authority approved a budget of US$ 100,000 towards loss reduction for Entebbe Airport feeder and to improve the reliability of supply. The project involved an upgrade of conductor to 150mm^2, replacement of rotten poles and upgrade of 11kV cable to XLPE 70mm^2.

DESK REVIEW

7.3km of the line was upgraded from 25mm^2 of steel to AAAC 150mm^2. 24,011m of 150mm^2 conductor were strung while 600m of 3 Core 11kV cable 70mm^2 were laid. Twelve (12) 14m poles, sixty seven (67) 12m

poles and four (4) 10m poles were erected. The project was handed over on 15/10/2015.

A total of US$ 139,760 was submitted for verification. The detailed financial extracts included borrowing costs, overhead absorption costs and the cost of the consultancy capitalised for ROI purposes. These costs amount to US$ 6,220.

FIELD FINDINGS

The field verification was done and observed that the works were done to standard and materials reconciled with the financial extractions.

CONCLUSION

The investment qualified for ROI less borrowing costs, overhead absorption costs and consultancy costs amounting to US$ 6,220.

AUTHORITY DECISION

The Authority approved the investment cost of **US$ 133,541** for ROI.

4.4 LUGOGO – NAGURU AND NTINDA – BUKOTO INTERCONNECTION

The Authority approved a plan of US$ 70,000 in 2014 for the installation of a switching station and associated lines to link these two feeders. Umeme expected that this investment would realise a loss saving of 0.87MVA. The Company needed to create an alternative feed to the Lugogo Naguru area and improve power quality, security and reliability in the area. This was largely due to the increase in demand to 5MVA along the feeder. The project necessitated the interconnection of Ntinda - Bukoto and Lugogo - Naguru 11kV feeders using and 11kV Ring Main Unit (RMU), upgrading the conductor along the respective feeders and construct an 11kV switching station at Naguru to link the two feeders.

DESK REVIEW

Works done included the decommissioning of ten (10) rotten MV poles, installation of two (2) 12m poles and sixteen (16) 14m poles. An 11kV RMU, one ABS were installed while 1,914m of 100mm^2 of conductor was strung. Umeme also laid 185mm^2 3 Core cable for a route length of 150m. The project was handed over on 31/07/2015.

The detailed financial information received totalled to US$ 58,274 contrary to the summary submission of US$ 60,042. It was further found that US$ 2,902 were borrowing and overhead absorption costs.

CONCLUSION

This investment qualified for ROI less borrowed costs.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 55,372** for ROI.

4.5 KAWANDA (UETCL) – BOMBO INDUSTRIAL PARK PHASE II

The Authority approved a plan for the construction of Kawanda (UETCL) – Bombo Industrial Park to improve the quality of power supply to the areas along Bombo road. The area had gotten prospective customer growth from the China Golden Roster, China Steel, Gentex, Best Park and other upcoming industries along Bombo road.

Umeme proposed to build a dedicated line from Kawanda to the industrial park to serve these industries and meet the anticipated demand. The proposal included the installation of 33kV AAAC 150mm^2 overhead line of route length of 12,700meters, construct 33kV LPE 300mm^2 line of route length 1,070meters, and install an MV breaker and a metering unit. Umeme contracted Cablesult Civil & Engineering Co. to undertake the job at a cost of US$ 77,348.

DESK REVIEW

Umeme submitted US$ 350,581 as an amount used for this investment. The financial review revealed that the cost submission included US$ 16,960 considered as DOMC.

The Company constructed an extension of a new 33kV line from Kawanda UETCL substation to Bombo with the following details:

(a) AAAC 150mm^2 overhead line of route length 13,400m; and
(b) 33kV 185mm^2 cable of route length 860m.

A new MV circuit breaker and metering unit were installed at Kawanda substation. Final material reconciliation shows that 47,659m of AAAC 150mm^2 were strung; 3,270m of single core cable 150mm^2 were laid; sixty (60) 14m poles and one hundred and four (104) 12m poles were erected. Handover report showed that the project was handed over on 29/06/2015.

FIELD FINDINGS

The following was observed during the field verification exercise:

(i) The verification observed that the connection was through an outdoor switch borrowed from another substation;
(ii) Much as the scope had an outdoor switch, the one meant for this project had not been received and its cost not included in the submission;
(iii) Much as the scope proposed the use of 185mm^2 3-core copper cable, the one found on ground was 150mm^2 single core cable;
(iv) The rest of the material matched as per the submission.

CONCLUSION

The investment qualified for ROI less the costs regarded as DOMC.

AUTHORITY DECISION

The Authority approved investment cost of **US$ 333,620** for ROI. The Authority directed the company that any further need for the cable upgrade on this line within 10 years will be executed using the company DOMC budget.

4.6 SYSTEM IMPROVEMENTS

Umeme submitted 18 projects worth US$ 211,510 under system improvements. This category involved projects done under safety priority projects around schools, university and other areas. Included in the submission, were projects completed in 2012, 2013 and 2014 as indicated in table 18.

Table 18: LIST OF SYSTEM IMPROVEMENT PROJECTS

S/N	Project Description	Umeme's Submission (Ugx)	Completion date
1	Safety Priority - Busoga University	27,831,773	2015
2	Makerere Masts LV Network Upgrade	45,587,856	2012
3	Safety Priority - St. Thereza Kitenga PS	16,429,857	2015
4	Safety Priority - New Generation School Lira	5,756,739	2015
5	Safety Priority - Bright Light Primary and Secondary School	13,357,154	2015
6	Safety Priority - Aduku Road Transformer Lira	6,702,829	2015
7	Safety Priority - Lango College ABC Project	7,336,247	2015
8	Safety Priority - Adyel Primary School	1,624,632	2015
9	Safety Priority - Ireda Primary School	1,603,788	2015
10	Systems Improvement - Manyangwa Transformer Proposal 1	95,429,211	2014
11	Systems Improvement - Manyangwa, Nalya magonga	55,127,793	2014
12	Systems Improvement - Namayima Trading Centre	61,249,050	2014
13	Systems Improvement - Kirinya Kito No.3 Transformer	3,212,398	2014
14	Separate circuits on installed 300kVA 11kV Transformer Aga khan	7,885,003	2014

S/N	Project Description	Umeme's Submission (Ugx)	Completion date
15	Install 6way Feeder Pillar for Kiganda Kasokoso	23,898,507	2014
16	System Improvement & Transformer Injection at Nakazadde Transformer Lugazi	324,936,621	2014
17	Systems improvement- Minister's village	14,070,339	2015
18	Construct parallel circuit Bata house on 5th Street to	8,376,731	2015
		726,563,065	

Umeme submitted these projects for consideration under their investment plans. The Authority disallowed these projects as works done under them were of Operational and maintenance in nature for which the funds to execute these activities were approved under Distribution, Operation and Maintenance Costs (DOMC).

AUTHORITY DECISION

(i) The costs relating to this category amounting to **US$ 211,510** were rejected because system improvements were approved under DOMC.

(ii) The Authority warned Umeme against submission of investments already rejected by the Authority.

4.7 OTHER SUBSTATION WORKS SUBMITTED

Umeme submitted US$ 4,080,178 under the substation category, the extract submitted for verification totaled to US$ 4,972,172 an excess of US$ 880,390.

DESK REVIEW

The desk revealed the following:

(a) The submitted projects had been replaced by others for instance DC converters for SCADA functionality, Environmental Impact Assessment study and Construction of Nagongera Substation;

(b) Over current protection housing, Cable Gantries for Transformers, Kiriri, rehabilitation of Mbale (Bugema) substation and 1km ADSS 48 Core Optic Cable fiber link for Mbarara substation initially submitted to ERA for verification were replaced by Construction of plant house concrete ceilings Plant house at different substations and substation works done on Kampala Metropolitan, Banda, Kitintale, Mityana, Mbale and Mbarara;

(c) Umeme submitted costs amounting to US$ 88,677 relating to different substation works done in the year. Some of the substation works had been reviewed in the previous years; such as the new Lubowa substation and the new Queensway substation. Other substation works in Kampala Metropolitan, Banda, Kitintale, Mityana, Mbale and Mbarara had not been approved by the Authority. Besides, Umeme also did not submit supporting documents on the kind of works done on these substations to warrant verification.

CONCLUSION

Verification of submitted vouchers confirmed the costs but no other information was provided to ascertain the kind of works done.

AUTHORITY DECISION

The Authority rejected this item due to lack of supporting information.

4.8 OTHER REFURBISHMENT PROJECTS

Umeme submitted additional costs incurred for projects that were implemented in previous years and had already been verified by the Authority. Table 19 shows the details of the projects.

Table 19: OTHER REFURBISHMENT PROJECTS

S/N	Description	Base Amount UGX	Approved (UGX)	Base Amount US$
1	North &West Region-Capacitor Banks on Feeders	26,704,799	0	0
2	Tororo- Busia 33kV Feeder Upgrade	46,383,222	46,383,222	13,735
3	Nateete feeder Upgrade - ABC LV Network Zone 3	12,065,476	0	0
4	Upgrade 200kVA Nansana west 2Tx-2-200kV	3,678,792	0	0
5	Lubowa integration Line Phase one - Bunamwaya fee	31,642,908	0	0
6	Mutundwe Kabowa Feeder - Zone 1	598,000	0	0
7	Luwero – Lumpewe Integration Lines	26,558,370	0	0
8	Restoration works- Mutundwe /Mityana Feeder	843,915	0	0
9	Restoration Kisubi – Sisa Feeder	36,194,130		0
10	Restoration- Nkonge – Mubende Feeder	1,238,000	0	0
11	Restoration- Mubende – Kakumiro Feeder	490,000	0	0
12	NR – Busunju - Hoima T-OFFS	8,949,282	8,386,782	2,484
13	Mbarara Central - Masaka West Feeder Refurbishment	8,040,468	0	0
14	Kangulumira 11kV Feeder Refurbishment	598,000	0	0
15	Ishaka – Rukungiri 33KV Feeder Refurbishment	616,759	0	0
16	Tororo – Mbale 2 33kV Line Refurbishment	30,816,266	0	0
17	Tororo – Mbale 1 33kV Line Refurbishment	44,193,828	0	0
18	Opuyo – Kumi – Serere 33KV Line Refurbishment	6,066,404	0	0
19	Network Restoration-Lira – Apac – Masindi Feeder	3,272,500	0	0

S/N	Description	Base Amount UGX	Approved (UGX)	Base Amount US$
20	Tororo Rock - Tororo Town Ring 11 kV Feeder	130,404	0	0
	Sub total	**289,081,523**	**54,770,004**	**16,219**
1	Network Restoration-Njeru Lugazi feeder	-59,024,706	-59,024,706	-17,478
2	Restoration- Kiriri - Kabulasoke 11Kv	-27,458	-27,458	-8
3	Load Growth - Queensway Integrating Lines	-42,253,175	-42,253,175	-12,512
4	Masaka Central – Mitala Maria Feeder Refurbishment	-231,257	-231,257	-68
5	Mbale – Kapchorwa Feeder Refurbishment	-35,030,332	-35,030,332	-10,373
6	Mbale – Kumi 33kV Line Refurbishment	-2,028,489	-2,028,489	-601
		-138,595,417	**-138,595,417**	**-41,040**
	Total	**150,486,106**	**-83,825,413**	**-24,821**

DESK REVIEW

A detailed ledger and material extracts for the refurbishments was submitted and reviewed. Included in the submission were projects with negative values which signified a reversal of the previously over provided capital costs for the respective projects.

The table above shows a net of US$ - 24,821 after reconciliations of the over spent and under spent in the respective projects. The costs submitted included wayleave clearances, material returns, ERA supervision costs during verification, staff supervision costs, among others.

CONCLUSION

The submitted supporting financial information to allow ERA make a decision as to whether the amounts qualify for ROI or not were provided.

AUTHORITY DECISION

The Authority approved an offset of **US$ 24,821** from the previously approved respective projects.

4.9 HAND HELD METER READING SYSTEM

Umeme submitted an expenditure of US$ 93,388. The company did not provide supporting documentation on this expenditure.

AUTHORITY DECISION

The Authority rejected the investment.

5 OTHER OBSERVATIONS

During the verification, the following were noted:

(i) Umeme continued to decommission UEDCL/GoU assets. However, the verification team could not independently confirm whether UEDCL was notified of the decommissioned assets in accordance with Section 2.9 of the Lease and Assignment Agreement (LAA).

(ii) Related to the above, we noted that Umeme had the potential to continue decommissioning transformers, poles and conductor. Proceeds as well as the useful life of these decommissioned assets would continue to remain a challenge if the company continues to record all the above items as one asset called a feeder.

(iii) The verification further found out that although Umeme started the implementation of AMR metering in 2014, all the new customers of 2014 to date had been connected on the old meters (not AMR) and later converted to AMR. The understanding was that the Company would replace only existing customers up to 2013 and that all new

consumers starting with 2014 going forward would pay the cost reflective charges for the connections;

(iv) The new connections standard as approved by the Authority under OBA (for no pole) had not been followed. Umeme has responded that the standard continues to vary depending on the type of technology used;

(v) The company continues to over spend on approved investments to more than 100% in some cases. This was not a prudent financial management practice and negates the rationale for investment planning and authorization;

(vi) On the operational side, it was observed that assets that are put in use by the Company were poorly maintained by the operational staff. Case in point is the general finding that most transformer circuit breakers were found either blown, missing or by-passed by the operational staff; and,

(vii) Umeme did not submit the asset movement schedules, updated Asset Register, a list of third party funded customers, list of disposed assets and impaired assets.

6 CONCLUSION

There had been a general improvement in the information flow from Umeme in aiding the verification of investments with the exception of Mbarara North – Kabale feeder that had been submitted and later withdrawn. In summary, all the submitted investments were by and large completed and verified.

The company had made improvements in executing the approved plan, although there was increased overspending on most of the approved investments, especially the big projects. Umeme should be requested to include the implementation methodology (turnkey or otherwise) at the planning stage.

Other than a few observations noted above, there was a great improvement.

7 SUMMARY OF THE AUTHORITY APPROVAL

A summary of the Authority's approval is indicated below. A summary of the approval amounts are also shown in table 20 and details of the approval amounts per category shown in table 21. A summary of rejected investments are presented in table 22.

The Authority approved:

i. The 2015 Umeme verified investments amounting to **US$54,251,438** to earn a Return on Investment;
ii. As provided in the tariff methodology, the accountability in non-network assets of **US$ 165,957;** and,
iii. An impairment charge/asset write-off from the 2015 Umeme audited accounts amounting to **US$ 2,288,094.**

The above approvals bring the net investments approved for Umeme to earn a return on investment for the year 2015 to United States Dollars, Fifty one million, nine hundred sixty three thousand, three hundred forty four **(US$ 51,963,344**).

Table 20: SUMMARY OF RECOMMENDED AMOUNTS FOR UMEME 2015 COMPLETED INVESTMENTS

UMEME LIMITED						
DETAILED ASSETS ADDITIONS FY 2015						
Description/Category	**Approved USD**	**Submitted US$**	**Un Supported (US$)**	**Disallowed in Principle (US$)**	**Un/Over Submitted**	**Recommended (US$)**
Sub-Stations and Intergrating Lines	7,620,000	10,528,625	650,096	1,163,046	1,551,862	7,163,621
Protection Systems	965,000	758,152	758,152	37,241		720,911
Load Growth	9,116,476	6,156,929	135,849	647,072	22,333	5,351,674
Emergency CAPEX	1,239,086	925,690	156,896	198,204	35,876	534,714
AMR Project*	8,000,000	7,691,309	-	7,705,102	(13,794)	9,306,642
Prepayment Retrofit	13,200,000	12,753,165		1,585,735		11,167,429
New Connections	10,304,000	15,402,794	1,150,736	819,957	-	13,432,100
Hand Held Meter Reading System	297,000	93,388	-	-	93,388	-
Transformer Injections	3,000,000	5,390,228	2,845,909	254,085	-	2,290,234
System Improvements	-	211,510	-	-	211,510	-
Technical Loss Reduction	723,000	6,848,421	593,461	5,512,542	360,843	381,574
Restoration Substation Facelift	4,672,644	5,595,392	1,167,221	490,196	35,437	3,902,538
Commercial Loss Reduction Services	-	123,105	-	-	123,105	-
Disposal and write-off**						(2,288,094)
GRAND TOTAL	**59,137,206**	**72,653,630**	**7,458,321**	**18,788,972**	**(5,356,139)**	**51,963,344**
NON -NETWORK ASSETS						
CESI	245,800	174,924	-	8,967	-	165,957
Exch. Rate 3,377						
*Includes the 2014 carryover						
* *Extract from FS 2015						

Table 21: DETAILS OF THE APPROVED AMOUNTS FROM THE UMEME 2015 INVESTMENTS VERIFICATION EXERCISE

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
Carry over					
Load Growth					
1	Namugongo Substation and Integration lines	4,000,000	6,448,447	3,678,632	Partial Approval of completed component. Identified defects to be corrected and verified before additional approvals
2	Ntinda Substation Upgrade	600,000	1,767,360	1,781,614	Approve
3	Mukono Substation Upgrade	600,000			
4	Jinja Industrial Substation Upgrade	600,000			
Reliability and Quality of Supply					
5	Comprehensive Distribution Automation	2,700,000	0	0	2015 Carry over investment
6	Substation Access Control and Fire Protection	1,000,000	0	0	2015 Carry over investment

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
7	Switchgear Replacement at Bombo and Lira Spinning Substation	1,000,000	1,831,153	1,374,769	**Approve:** Less Absorption costs and borrowing costs
8	Refurbishment of Magamaga Substation	15,000	29,731	26,844	**Approve:** Less absorption costs US$ 2,887.
9	Underground Cable Works Upgrade	1,500,000	1,170,337	1,030,601	**Approve**: Less Absorption and borrowing costs
	Sub total	**12,015,000**	**11,247,028**	**7,892,460**	
Load Growth and New Connections					
10	Lugogo Jinja Road- Kireka Port Bell	300,000	235,449	210,223	**Approve**: Less borrowing and absorption cost US$ 25,226
11	Mutundwe – Lubowa Interconnector	812,497	882,801	754,348	**Approve**
12	New Moniko Substation	7,950,000	0	0	2015 Carry over investment
13	UETCL – Fort Portal Integrating Lines	1,205,078	821,275	700,582	**Approve**

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
14	Kampala Industrial Business Park	4,270,000	0	0	**2015 Carry over investment**
15	Namunkekera Industrial park	2,032,063	951,027	760,981	**Approved , any Upgrades within ten years done at company cost**
16	Wealth Creation programme projects	2,000,000	1,745,721	1,541,314	**Approve**: Less overhead absorption costs, borrowing, supervision and DOMC costs
17	Hima Cement Tororo	800,000	0	0	2015 Carry over investment
18	Sebitoli Research Camp, Kibale N.P	22,370	24,095	20,004	**Approve**: Less O&M, borrowing costs, overhead absorption and project supervision costs
19	Dedicated Line to BMTS Factory, Mbarara	764,465	0	0	2015 Carry over investment
20	Namanve Quality of Service	4,000,000	0	0	2015 Carry over investment

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
21	New connections	10,304,000	15,402,794	13,432,100	**Approve**: Less PG Clamps and landing brackets
	Sub total	**34,460,473**	**20,063,162**	**17,419,552**	
Technical and Customer service					
22	Prepayment infrastructure and meter for government TOU	2,000,000	0	0	2015 Carry over investment
23	Prepayment metering Retrofit	13,232,000	12,750,000	11,167,429	**Approve**: Less the verified numbers in the system
24	Lugogo – Kibuli 11kV feeder	1,835,237	0	0	2015 Carry over investment
25	Gaba – Kansanga feeder	312,250	109,313	110,061	**Approve**: Less borrowing costs, overhead absorption costs
26	Kireka – Kyambogo feeder	240,500	90,282	82,600	**Approve**: Less borrowing costs, overhead absorption costs
	Sub total	**17,619,987**	**12,949,595**	**11,360,090**	
Reliability and Quality of Supply 2015					

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
27	Restoration Projects				
	Masaka West - Rakai MV Line	851,004	1,080,005	967,190	**Approve**: Less borrowing costs, overhead absorption costs
	Lira – Lake Kwania	336,759	647,062	577,397	**Approve**: Less borrowing costs, overhead absorption cost
	Busunju – Kiziba feeder	1,415,738	1,404,315	1,097,189	**Approve**
	Tororo main – Tororo Rock	302,556	272,851	244,100	**Approve**: Less borrowing costs, overhead absorption costs
	Bulangira – Pallisa	379,437	0	0	2015 Carry over investment
	Gulu – Layibi	239,176	484,668	338,306	**Approve**: Less borrowing costs, overhead absorption cost

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
	Mityana – Kasanda	596,587	759,273	678,356	**Approve**: Less borrowing costs, overhead absorption costs
	Nkenda—Kabale feeder	40,973	0	0	2015 Carry over investment
	Mukono - Nakifuma	149,897	0	0	2015 Carry over investment
28	Protection Systems	965,000	758,152	720,911	**Approve**: Battery banks less O&M costs
29	Substation Ceiling Facelift	305,000	363,757	326,583	**Approve**: Less borrowing and overhead costs
30	Distribution transformer Injections	3,000,000	3,053,893	2,290,234	**Approve**: Less borrowing costs, overhead absorption costs, staff related costs, impairment charges and O&M Cost-LV replacements
	Sub total	**8,582,127**	**8,823,976**	**7,240,266**	

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
31	GETFiT Projects	4,175,000	0	0	2015 Carry over investment
Other investments					
32	Emergency CAPEX	1,000,000	925,690	534,714	**Approve**: Less borrowing and absorption costs.
33	AMR	8,000,000	10,901,835	9,306,642	**Approve**: Less borrowing costs, overhead absorption costs and staff related costs
34	Entebbe Airport Feeder	100,000	139,760	133,541	**Approve**: Less borrowing costs, overhead absorption costs and consultancy costs
35	Lugogo – Naguru & Ntinda – Bukoto Interconnection	70,000	58,274	55,372	**Approve**: Less unsupported costs US$ 9,051
36	Kawanda Bombo Industrial Park Phase II	0	350,581	333,620	**Approve**: Less DOMC costs.
37	System Improvement	0	211,510	0	**Reject**: Treated as DOMC

Project Category	Project	approved Plan US$	Umeme' s Submission US$	Approved Amount US$	Remarks
38	Other substation works	0	88,677	0	**Reject**: costs not verified.
39	Other refurbishment works	0	(24,822)	-24,821	**Approve**: Less unsupported costs and DOMC
40	Hand held meter reading systems	0	93,388	0	**Reject**: No supporting financial information
	Sub total	**13,345,000**	**12,744,893**	**10,339,068**	
	GRAND TOTAL	**86,022,587**	**65,828,654**	**54,251,438**	
NON NETWORK INVESTMENTS					
CESI		245,800	174,924	165,957	**Approve**: Less Borrowing and absorption costs

Table 22: Projects Rejected by the Authority

No	Project	Authority Plan approval US$	Umeme' s submission US$	Remarks
1	Jinja Industrial Substation Upgrade	600,000		**Reject.** The intended objective of improving power supply reliability was not achieved.
2	System Improvement	0	211,510	**Reject**: Treated as DOMC
3	Other substation works	0	88,677	**Reject**: costs not verified.
4	Hand held meter reading systems	0	93,388	**Reject**: No supporting financial information
	GRAND TOTAL	**600,000**	**393,575**	