

## 資料-1 調査団員・氏名

## 1. 調査団員・氏名

### (1) 基本設計調査（第一次現地調査）

氏 名	担当業務	現 職
林 宏之	総 括	独立行政法人 国際協力機構 無償資金協力部
小川 忠之	業務主任/電力計画/配電計画Ⅰ /環境社会配慮	八千代エンジニアリング(株)
小宮 雅嗣	副業務主任/配電計画Ⅱ	八千代エンジニアリング(株)
玉井 昌幸	配電機材計画/運営維持管理Ⅰ	八千代エンジニアリング(株)
近藤 智則	配電機材計画/運営維持管理Ⅱ /調達計画/積算Ⅱ	八千代エンジニアリング(株)
谷津 哲夫	調達計画/積算Ⅰ	八千代エンジニアリング(株)
野上 一成	自然条件調査	八千代エンジニアリング(株)

### (2) 基本設計調査（第二次現地調査）

氏 名	担当業務	現 職
洲崎 毅浩	総 括	独立行政法人 国際協力機構 ウガンダ事務所長
松岡 秀明	計画管理	独立行政法人 国際協力機構 アフリカ部 東部アフリカチーム
小川 忠之	業務主任/電力計画/配電計画Ⅰ /環境社会配慮	八千代エンジニアリング(株)
小宮 雅嗣	副業務主任/配電計画Ⅱ	八千代エンジニアリング(株)
玉井 昌幸	配電機材計画/運営維持管理Ⅰ	八千代エンジニアリング(株)
近藤 智則	配電機材計画/運営維持管理Ⅱ /調達計画・積算Ⅱ	八千代エンジニアリング(株)
野上 一成	自然条件調査	八千代エンジニアリング(株)

(3) 基本設計概要説明調査

氏 名	担当業務	現 職
洲崎 毅浩	総 括	独立行政法人 国際協力機構 ウガンダ事務所長
小川 忠之	業務主任/電力計画/配電計画Ⅰ /環境社会配慮	八千代エンジニアリング (株)
小宮 雅嗣	副業務主任/配電計画Ⅱ	八千代エンジニアリング (株)

## 資料-2 調査行程

## 2. 調査行程

### (1) 基本設計調査 (第一次現地調査)

No	月日	曜日	調 査 内 容		宿 泊 地
			官団員(総括)	コンサルタント団員	
1	11月20日	月		移動(成田 1830 JL053 名古屋 1950) 移動(名古屋 2300 JL5097 ドバイ 0610+1)	機中泊
2	11月21日	火		移動(ドバイ 1430 EK721 エンテベ 2045)	カンパラ
3	11月22日	水		<ul style="list-style-type: none"> <li>在ウガンダ日本国大使館・JICAウガンダ事務所表敬訪問及び本調査行程・内容の説明・協議</li> <li>エネルギー鉱物開発省(MEMD)、地方電化庁(REA)、ウガンダ電力送電公社(UNETL)表敬訪問及び本調査行程説明</li> <li>Inception Report、Questionnaireの内容について説明・協議</li> </ul>	カンパラ
4	11月23日	木		MEMD、REA 及びUNETLと実務者レベルでの協議及びデータ収集 <ul style="list-style-type: none"> <li>国家開発計画、地方電化マスタープランにおける位置づけ</li> <li>電力需給状況及び地方電化事業の進捗状況確認</li> <li>サイト選定のための基礎資料(地図、系統図など)収集</li> </ul>	カンパラ
5	11月24日	金		(上記協議・資料収集に加え) <ul style="list-style-type: none"> <li>現地調査へのC/P同行に必要なアレンジ等</li> <li>NEMAと環境社会配慮に係る関連法規、手続きの確認</li> </ul>	カンパラ
6	11月25日	土		移動(カンパラ ジンジャ (200)) <ul style="list-style-type: none"> <li>前回の地方電化プロジェクトで供与された設備の稼働状況確認</li> <li>ナリバシ及びキイラ水力発電所の運転時間状況確認</li> </ul>	ジンジャ
7	11月26日	日		団内協議及びデータ整理	ジンジャ
8	11月27日	月		UMEME地域事務所表敬訪問と実務者レベルでの協議及びデータ収集 <ul style="list-style-type: none"> <li>現地調査(A地域)(33kV配電ルート踏査)</li> </ul>	ジンジャ
9	11月28日	火		<ul style="list-style-type: none"> <li>現地調査(C地域)(33kV配電ルート踏査)</li> </ul>	ジンジャ
10	11月29日	水		<ul style="list-style-type: none"> <li>現地調査(A地域)(33kV配電ルート踏査)</li> </ul>	ジンジャ
11	11月30日	木	移動(ルサカ 11:10 KQ424 ナイロビ 1635) 移動(ナイロビ 1810 KQ414 エンテベ 1925)	UMEMEスタッフと実務者レベルでの協議及びデータ収集 移動(ジンジャ カンパラ (200))	カンパラ
12	12月1日	金	<ul style="list-style-type: none"> <li>JICAウガンダ事務所表敬</li> <li>EQ表敬</li> <li>MEMD、UNETL表敬・協議</li> </ul>	(小川、小宮) 官団員の表敬訪問に同行 (谷津、近藤) 資機材調達関連のデータ収集 (玉井、野上) Questionnaireの回答収集	カンパラ
13	12月2日	土	移動(カンパラ マサカ (300)) <ul style="list-style-type: none"> <li>マサカ センtral サブステーションの状況確認</li> <li>現地調査(D地域:陸側)(33kV配電ルート踏査)</li> </ul>		マサカ
14	12月3日	日	<ul style="list-style-type: none"> <li>現地調査(D地域:カランガラ島)(33kV配電ルート踏査)</li> </ul>		マサカ
15	12月4日	月	(午前)移動(マサカ カンパラ(3:00)) (午後)MEMD、REAと現地調査結果の報告・協議	(午前)(玉井、近藤)移動(マサカ ホイマ(5:00)) (午前)(他団員)移動(マサカ カンパラ(3:00)) (午後)(玉井、近藤)(B地域33kV配電ルート踏査) (午後)(小川、小宮)官団員のM/D署名に参加 (午後)(谷津) 調達関連データ整理 (午後)(野上) CENSUSデータ収集	カンパラ (ホイマ)
16	12月5日	火	(官団員) カランガラ 総合開発計画に関する進捗状況確認	(小川)官団員に同行 (玉井・近藤)(B地域33kV配電ルート踏査) (野上) Questionnaireの回答収集 及び CENSUSデータ収集	カンパラ (ホイマ)
17	12月6日	水	(午前)(官団員、小川、野上)移動(カンパラ ホイマ(3:00)) (午後)(B地域33kV配電ルート踏査)		ホイマ
18	12月7日	木	(B地域33kV配電ルート踏査) 移動(ホイマ カンパラ(3:00))		カンパラ
19	12月8日	金	<ul style="list-style-type: none"> <li>在ウガンダ日本国大使館、JICAウガンダ事務所へ帰国報告</li> <li>移動(エンテベ 1620 EK724 ドバイ 0035+1)</li> </ul>	(小川)官団員に同行 (玉井・近藤)配電計画に関わる情報収集 (野上)REAとNEMAへ提出するProject Briefについて協議	カンパラ
20	12月9日	土	移動(ドバイ 0250 JL5090 関空 1640) 移動(関空 1830 JL1316 羽田 1940)	団内協議及びデータ整理	カンパラ
21	12月10日	日		団内協議及びデータ整理	カンパラ
22	12月11日	月		<ul style="list-style-type: none"> <li>エネルギー鉱物開発省(MEMD)、地方電化庁(REA)訪問及び本調査結果説明(小川)</li> <li>MEMD、UNETLの組織、予算措置に関する調査</li> <li>(玉井、近藤) 資機材調達関連のデータ収集</li> <li>(野上) REAとNEMAへ提出するProject Briefについて協議</li> </ul>	カンパラ
23	12月12日	火		<ul style="list-style-type: none"> <li>市場調査</li> <li>第一次フィールドレポート作成</li> <li>(玉井、近藤) 資機材調達関連のデータ収集</li> </ul>	カンパラ
24	12月13日	水		<ul style="list-style-type: none"> <li>市場調査</li> <li>第一次フィールドレポート作成</li> </ul>	カンパラ
25	12月14日	木		「ウ」国側より第一次フィールドレポートの承認取得 「ウ」国関係機関への帰国挨拶	カンパラ
26	12月15日	金		<ul style="list-style-type: none"> <li>在ウガンダ日本国大使館・JICAウガンダ事務所へ第一次現地調査結果報告</li> <li>移動(エンテベ 1620 EK724 ドバイ 0035+1)</li> </ul>	機中泊
27	12月16日	土		移動(ドバイ 0250 JL5090 関空 1640) 移動(関空 1830 JL1316 羽田 1940)	

## (2) 基本設計調査 (第二次現地調査)

No	月日	曜日	調 査 内 容		宿 泊 地
			官団員(計画管理)	コンサルタント団員	
1	1月29日	月	移動(成田 関空) 移動(関空 ドバイ)	移動(成田 1830 JL053 名古屋 1950) 移動(名古屋 2300 JL5097 ドバイ 0810+1)	機中泊
2	1月30日	火	移動(ドバイ エンテベ)	移動(ドバイ 0825 BK723 エンテベ1450)	カンバラ
3	1月31日	水	●在ウガンダ日本国大使館・JICA ウガンダ事務所表敬訪問及び 本調査行程・内容の説明・協議 ●エネルギー 鉱物 開 発 省 (MEMD)、地方電化庁(REA)、ウ ガンダ電力送電公社(UETCL)表 敬訪問及び本調査行程説明 ●現地調査へのC/P同行に必要な アレンジ等	●官団員に同行	カンバラ
4	2月1日	木	●MEMD、REA及びUETCLと実務者 レベルでの協議及びデータ収集	(小川、小宮、野上) ●官団員に同行	カンバラ フォートホール
5	2月2日	金	移動(カンバラ フォートホール)	(小川、小宮、野上) ●NFAにて保護森林の位置関係確認 ●労働・住居・通信省にて道路用地範囲の 確認 ●官団員に同行	カンバラ フォートホール
6	2月3日	土	団内協議及びデータ整理		フォートホール
7	2月4日	日	移動(フォートホール ホイマ) ●現地調査(Bt世域)(33kV配電ルー ト踏査、NFAが管理する保護森林の位置確認)		ホイマ
8	2月5日	月	移動(ホイマ カンバラ) ●MEMD、REAとWD内容について説 明・協議	(小川、小宮、野上) ●官団員に同行	カンバラ マサカ
9	2月6日	火	●MEMD、REAとWD内容について説 明・協議 ●MEMD、REAとWD署名 ●ワールドバンクにてREMPIに関する情報 収集	(小川、小宮、野上) ●官団員に同行	カンバラ マサカ
10	2月7日	水	●在ウガンダ日本国大使館へ帰 国報告	(小川、小宮、野上) ●NEMAより本計画の承認受理 ●水質・土質・環境省にて気象データ収集 ●財務省にて通関手続きについて確認 ●官団員に同行	カンバラ
11	2月8日	木	移動(エンテベ ドバイ)	(小川、小宮、玉井、近藤、野上) ●UETCLとの実務レベル協議 データ収集 ●道路局にて道路用地範囲の確認 ●NFAにて保護森林の位置関係確認 ●財務省にて通関手続きについて確認 ●現地調査(Bt世域 Dt世域)データ整理 ●ルゴニ給電指令所訪問	カンバラ
12	2月9日	金	移動(ドバイ 関空) 移動(関空 羽田)	(小川、小宮、野上) ●REAとの実務レベル協議 データ収集 ●UETCLとの実務レベル協議 データ収集 ●REAよりNFAにProject Briefを提出	カンバラ シンジャ
13	2月10日	土		(小川、野上) 移動(カンバラ シンジャ) (小宮) 移動(エンテベ 1620 BK724 ド バイ 0035+1)	シンジャ
14	2月11日	日		(小宮) 移動(ドバイ 0250 JL5090 関空 1640) 移動(関空 1830 JL1316 羽田 1940)	シンジャ
15	2月12日	月		●現地調査(At世域)(33kV配電ルー ト踏査)	シンジャ
16	2月13日	火		●現地調査(Ct世域)(33kV配電ルー ト踏査)	シンジャ
17	2月14日	水		移動(シンジャ カンバラ) ●財務省にて通関手続きについて確認	カンバラ
18	2月15日	木		●NFAより本計画の承認受理 ●REA及びUETCLと実務者レベルでの協議及びデータ収集	カンバラ

No	月日	曜日	調 査 内 容		宿 泊 地
			官団員(計画管理)	コンサルタント団員	
19	2月16日	金		<ul style="list-style-type: none"> <li>REA及びUETCLと実務者レベルでの協議及びデータ収集</li> <li>道路局にて道路用地範囲の確認</li> <li>水質・土質・環境省にて気象データ収集</li> </ul>	カンパラ
20	2月17日	土		<ul style="list-style-type: none"> <li>団内協議及びデータ整理</li> </ul>	カンパラ
21	2月18日	日		<ul style="list-style-type: none"> <li>団内協議及びデータ整理</li> </ul>	カンパラ
22	2月19日	月		<ul style="list-style-type: none"> <li>労働・交通省にて道路用地範囲の確認</li> <li>財務省にて通関手続きについて確認</li> </ul>	カンパラ
23	2月20日	火		<ul style="list-style-type: none"> <li>関係機関との協議 データ収集</li> <li>第二次フィールドレポートの内容について協議</li> </ul>	カンパラ
24	2月21日	水		<ul style="list-style-type: none"> <li>関係機関との協議 データ収集</li> <li>第二次フィールドレポートの承認取得</li> </ul>	カンパラ
25	2月22日	木		<ul style="list-style-type: none"> <li>「ウ」国別系機関への帰国挨拶</li> </ul>	カンパラ
26	2月23日	金		<ul style="list-style-type: none"> <li>在ウガンダ日本国大使館・JICAウガンダ事務所への第二次調査結果報告及び帰国報告</li> </ul>	機中泊
27	2月24日	土		移動(エンテベ 1620 EK724 ドバイ 0035+1) 移動(ドバイ 0250 JL5090 関空 1640) 移動(関空 1830 JL1316 羽田 1940)	

### (3) 基本設計概要説明調査

No	月日	曜日	調 査 内 容	宿 泊 地
			コンサルタント団員	
1	5月28日	月	移動(成田 1830 JL063 名古屋 1945) 移動(名古屋 2245 JL5097 ドバイ 0445+1)	機中泊
2	5月29日	火	移動(ドバイ 0825 EK723 エンテベ1445)	カンバラ
3	5月30日	水	● 在ウガンダ日本国大使館・JICAウガンダ事務所表敬訪問及び基本設計概要書の内容説明・協議 ● エネルギー・鉱物開発省(MEMD)、地方電化庁(REA)、ウガンダ電力送電公社(UETCL)表敬訪問及び現地調査行程説明	カンバラ
4	5月31日	木	● 基本設計概要書、機材仕様書(案)の内容説明・協議(MEMD) ● 基本設計概要書、機材仕様書(案)の内容説明・協議(REA) ● M/P策定、先方負担事項実施スケジュールの確認 ● 現地調査へのC/P同行に必要なアレンジ等	カンバラ
5	6月1日	金	同 上	カンバラ
6	6月2日	土	移動(カンバラ フォートポータル)	フォートポータル
7	6月3日	日	● 現地調査(B地域)(33kV配電ルート踏査) ● 相手国負担工事によるAVR据付工事現場(カクミロ市)確認	フォートポータル
8	6月4日	月	移動(フォートポータル カンバラ)	カンバラ
9	6月5日	火	● 協議議事録(M/D)案の説明・協議	カンバラ
10	6月6日	水	● 協議議事録(M/D)案の署名	カンバラ
11	6月7日	木	● 在ウガンダ日本国大使館・JICAウガンダ事務所へ調査結果報告 移動(エンテベ 1615 EK724 ドバイ 0445+1)	機中泊
12	6月8日	金	移動(ドバイ 0250 JL5098 名古屋 1740)	

### 資料-3 関係者(面会者)リスト



### 3. 関係者（面会者）リスト

<u>所属及び氏名</u>	<u>職位</u>
<b>エネルギー鉱物開発省</b> <b>Ministry of Energy and Mineral Development (MEMD)</b>	
Mr. Hon. Amb. Dr.Cos Kamanda Bataringaya	Minister of State Energy & Mineral Development
Mr. Hon.Eng.Simon D’Ujanga	Minister of State for Energy
Mr. Fred Kabagambe - Kaliisa	Permanent Secretary
Mr. Michael J.Odongo	Under Secretary
Mr. Watuwa Bwobi	Director, Directorate of Energy and Mineral Development
Eng. Paul Mubiru	Commissioner for Energy Resources Department
Ms. Cecilia Nakiranda Menya	Senior Energy Officer (Electrical)
Mr. Henry Bidasala	Ag. Assistant Commissioner, Electrical Power
Mr. Sajjabi J. Fredrick	Senior Energy Officer
Mr. James Baanabe Isingoma	Ag. Asst. Comm. Energy Efficiency
<b>地方電化庁</b> <b>Rural Electrification Agency (REA)</b>	
Mr. Godfrey Turyahikayo	Executive Director
Ms. Grania Rosette Rubomboras	Manager, Project Planning
Eng. Moses Murengezi	Manager, Project Monitoring & Evaluation
Mr. Charles Sabiiti	Manager, Finance & Administration
Mr. Philip F.P.Ggayi	Senior Planning Engineer
Mr. Werikhe K.Godfrey	Senior Construction Engineer
Mr. Muguwa Andrew	Senior Planning Engineer
Mr. Richard Muhangi	ICT/GIS Officer
Ms. Nantume Deborah Pamela	Trainee Engineer
Ms. Becky Kalyango	Receptionist
<b>ウガンダ電力送電公社</b> <b>Uganda Electricity Transmission Company Ltd. (UETCL)</b>	
Mr. Kiyemba Eriasi	Managing Director
Mr. Gerald Muganga	Manager, Engineering (Services)
Mr. William K. Kiryahika	Manager, Engineering (O&M)
Mr. Buhanga Boneventura	Principal Planning Engineer
Mr. Mukwaya Paul Mathew	Technical Officer (Maintenance)
Mr. Andrew Omalla Geno	Technical Officer Projects
Mr. Okot Dennis	Senior Dispatch Engineer
Mr. Ssekidde Moses	Protection Technician

ウメメ 株式会社  
**Umeme Limited**

Mr. Zach Human	Chief Technical Officer
Mr. Joseph Sempebwa	Network Service Manager (Lugogo Office)
Mr. Oryang M. Thomas	Delivery Controller (Hoima Office)
Mr. Onen Richard Lutaka	Technical Service Officer (Hoima Office)
Mr. Krispus Kitugwanidde	Technical Service Officer (Masaka Office)
Mr. Julius Mawejje	Technical Service Officer (Jinja Office)
Mr. SSenyonjo Michael	Technical Service Officer (Mubende Office)

環境管理局  
**National Environment Management Authority (NEMA)**

Dr. Festus Bagoora	Natural Resource Management Specialist
Mr. Waiswa Ayazika Arnold	Environmental Impact Assessment Co-ordinator
Mr. Lufafa Dick	Environment Audit & Monitoring Officer

森林局  
**National Forestry Authority (NFA)**

Ms. Hope Rwaguma	Ag. Executive Director
Mr. Samwiri Rwabwogo	Coordinator, Law Enforcement
Mr. Acaye Godfrey Jao	Law Enforcement Specialist
Mr. Ssekitto Rashid	Assistant GIS Specialist

労働・住居・通信省  
**Ministry of Works, Housing and Communication**

Mr. Nelson Omagor	Principal Environment Officer
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労働・交通省  
**Ministry of Works and Transport**

Eng. Karuma Kagyina	Assistant Commissioner Engineering
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道路局  
**Road Agency Formation Unit (Ministry of Works, Housing and Communications)**

Eng. Emmanuel T. Ojuka	BSc, (Civil Eng), Dip. Housing Studies, MUIPE, ERB Senior Project Engineer
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財務計画経済省  
**Ministry of Finance, Planning and Economic Development**

Mr. Moses Kaggwa	Tax Policy Department
------------------	-----------------------

**水質・土質 環境省****Ministry of Water, Lands and Environment**

Mr. Bauayana Musoke

Mr. Aloysius Kagoro

Mr. Asizaua Fax Agadribo

Mr. Kabundama Richard

Senior Meteorological Specialist

Principal Meteorologist

Senior Mapping Expert

Cartographer, Lands &amp; Surveys Department

**地域行政代表****Representatives of Local Council, etc****Project Site A**

Mr. Godfrey Taire

Mr. Kadubira Wilberforce

Chairperson LC I

(Kawate)

Ministry of Agriculture,

(Nawandara)

Iganga District

Mr. Waiswa Moses

Officer Nawandara

(Kilinga)

Mr. Mirimo Michael

Chairperson LC II

(Kiwanyi)

Mr. Kyebalala Jowal

Chairperson LC II

(Bugono)

Mr. Kayendeke Anney

Chairperson LC II

(Itanda)

Mr. Ksuule Akubu

Chairperson LC III

(Nabitende)

**Project Site B**

Mr. Byakagaba John William

District Planner

(Munteme)

Mr. Majare Leomond

Chief Administration Officer

(Munteme)

Mr. Christopher Columbus Asiimme

District Health Inspector

(Munteme)

Mr. Afgonza Hannington

General Secretary Irobe LC I

(Mabaale)

Mr. Kabagambe Justice

Secretary of Sub-County

(Mabaale)

Mr. Katusabe Wilson

Secretary LC I

(Kiryane)

Mr. Afgonza Hannington

General Secretary LC I

(Kibale)

**Project Site C**

Mr. Ngobi Freddie Aggrey

Chief Administrative Officer

(Bugiri)

Bugiri District Local Government

Mr. Kyondha.M

District Planner

(Bugiri)

Mr. Mukuve Jimmy

Sub Accountant, Iwemba

(Iwemba)

Mr. Bin Masaba John

Secretary Finance, LC III

(Buyala)

Mr. Byakika Falaku

Chairperson LC

(Iwenba)

Mr. Jsollica Jackson

Chairperson LC III

(Iwenba)

**Project Site D**

Mr. JJuuko Alosios

Chairperson LC III

(Bukakata)

Mr. Jumwesige David Amooti

Fish Inspector

(Lambu)

Mr. SSeremba Hood

Sub-County Chief

(Bukakata)

Mr. Gyoloba Eddie Nyadzi

Secretaty

(Bukakata)

フェルドサルト・エンジニアリング  
**Ferdsult Engineering Services Ltd.**

Mr. Mugisha Ferdinand

Mr. Waiswa David Mukova

Mr. Enoch Kaggwa Mukuye

Managing Director

Director of Engineering/Company Secretary

Director of Technical Services

スウェーデン大使館  
**Embassy of Sweden**

Ms. Maria Selin

First Secretary

世界銀行ウガンダ事務所  
**The World Bank Uganda Country Office**

Mr. Paul Baringanire

Energy Specialist

在ウガンダ日本国大使館  
**Embassy of Japan in Uganda**

菊地 龍三 氏

亀田 和明 氏

柳田 勝也 氏

特命全権大使

参事官

二等書記官

JICA ウガンダ事務所  
**JICA Uganda Office**

洲崎 毅浩 氏

吉田 耕平 氏

加納 大道 氏

JICA ウガンダ事務所長

所員

所員

## 資料-4 討議議事録(M/D)

**Minutes of Discussions  
on the Basic Design Study on  
the Project for Rural Electrification Phase II  
in the Republic of Uganda  
(First Field Survey)**


In response to the request from the Government of Republic of Uganda (hereinafter referred to as "Uganda"), the Government of Japan decided to conduct the Basic Design Study (hereinafter referred to as "the Study") on the Project for Rural Electrification Phase II (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Uganda the Basic Design Study Team for the first field survey (hereinafter referred to as "the Team"), headed by Mr. Hayashi Hiroyuki, Senior Project Administration Officer of the Transportation and Electric Power Team of the Project Management Group I, Grant Aid Management Department, JICA, and is scheduled to stay in the country from November 21 to December 15, 2006.

The Team held discussions with the concerned officials of the Government of Uganda.

In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the second field survey.

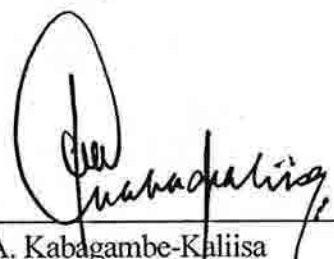
Kampala, December 4, 2006

  
\_\_\_\_\_  
Mr. Hayashi Hiroyuki

Leader

Basic Design Study Team

Japan International Cooperation Agency

  
\_\_\_\_\_  
Mr. F. A. Kabagambe-Kaliisa

Permanent Secretary

Ministry of Energy and Mineral Development (MEMD)

Republic of Uganda

  
\_\_\_\_\_  
Mr. Godfrey Turyahikayo

Executive Director

Rural Electrification Agency (REA)

Republic of Uganda

## ATTACHMENT

### 1. Objective

The objective of the Project is to install power distribution system in rural areas shown in Annex-1.

### 2. Project Sites

The sites of the Project are shown in Annex-1.

### 3. Organizations concerned in Uganda

- (1) The Responsible Ministry for the Project is the Energy Resources Department, Ministry of Energy and Mineral Development (MEMD).
- (2) The Implementing Agency is the Rural Electrification Agency (REA).

The organization charts of MEMD and REA are shown in Annex-2.

### 4. Components Requested by the Government of Uganda

After discussions with the Team, the following components were requested by the Ugandan side.

The final components of the Project including name of the villages/towns to be electrified under the Project will be decided after further studies, and JICA will assess the appropriateness of the request and will report to the Government of Japan.

- (1) Project Site A: Nabitende / Itanda Area in Iganga District (Eastern Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 30km)
  - Supply and installation of Distribution Transformers (33kV/415-230V)
  - Replacement of 33kV Switchgear at the existing 33/11kV Iganga Substation
- (2) Project Site B: Kagadi / Munteme Area in Hoima and Kibale District (Western Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 65km: to be confirmed)
  - Supply and installation of Distribution Transformers (33kV/415-230V)
- (3) Project Site C: Bugeso / Iwemba Area in Bugiri District (Eastern Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 25km)
  - Supply and installation of Distribution Transformers (33kV/415-230V)
- (4) Project Site D: Bukakata / Kalangala Area in Masaka and Kalangala District (Central Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 110km)
  - Supply and installation of Distribution Transformers (33kV/415-230V)

### 5. Japan's Grant Aid Scheme

- (1) The Ugandan side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Uganda explained by the Team as described in Annex-3.

- (2) The Ugandan side promised to take necessary measures as described in Annex-4, for smooth implementation of the Project as a condition for the Japan's Grant Aid to be implemented.

## **6. Environmental and Social Considerations**

The Team explained the outline of JICA Environmental and Social Considerations Guideline (hereinafter referred to as "the JICA Guideline") to Ugandan side. The Ugandan side understands the necessary procedures for implementation of the Project in accordance with the JICA Guideline and related environmental regulations in Uganda.

MEMD/REA shall obtain the approval of the project brief document as the Initial Environment Assessment from National Environmental Management Authority (NEMA) by the end of February, 2007.

## **7. Schedule of the Study**

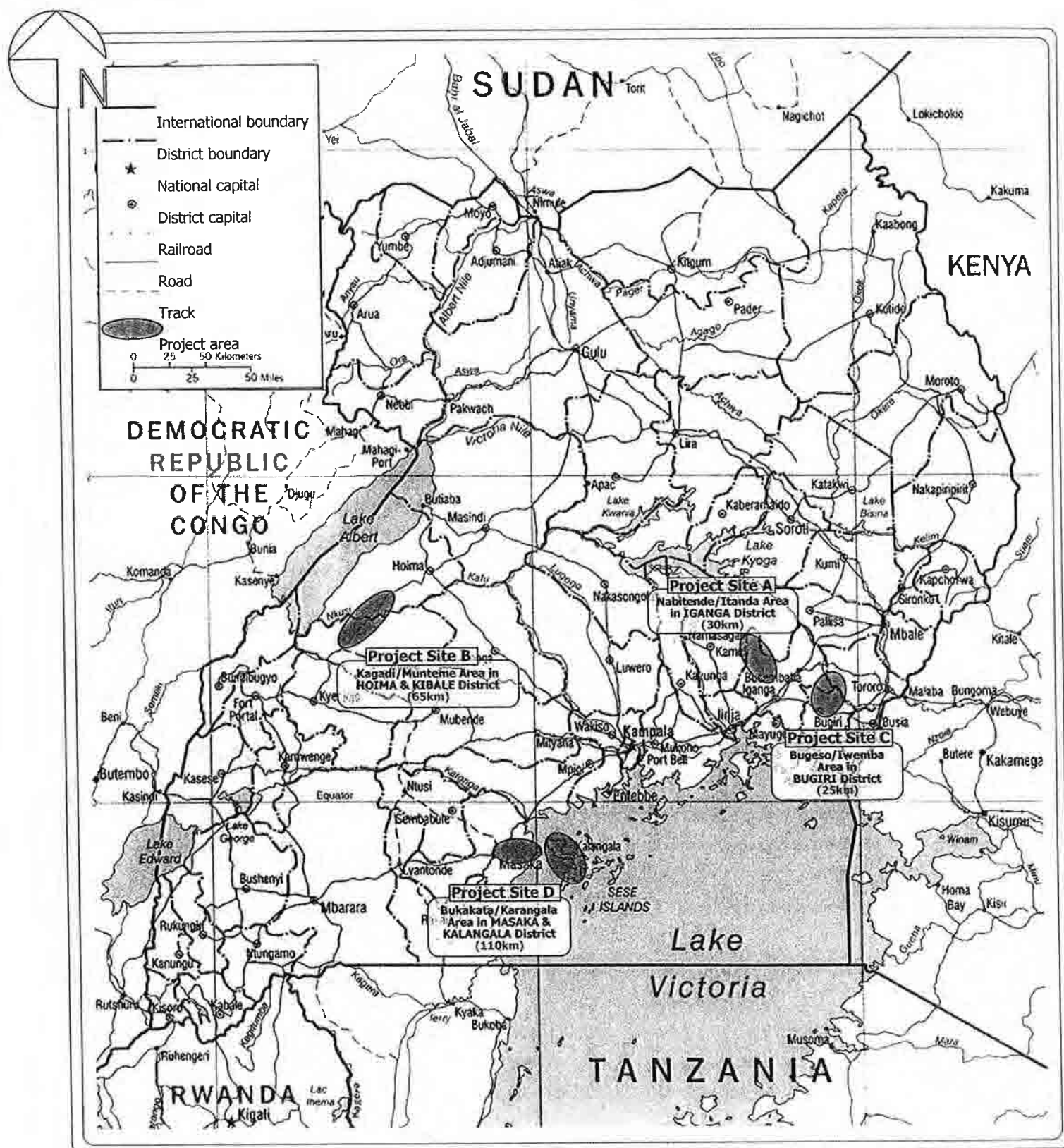
- (1) The Team will proceed to further studies until December 15, 2006.
- (2) JICA will dispatch the second field survey to conduct basic design and cost estimation of each component in the end of January 2007.
- (3) JICA will prepare the draft report in English and dispatch a team to the Ugandan side in order to explain its contents in the middle of May 2007.
- (4) When the contents of the draft report are accepted in principle by the Government of Uganda, JICA will complete the final report and send it to the Government of Uganda around July 2007.

## **8. Other Relevant Issues**

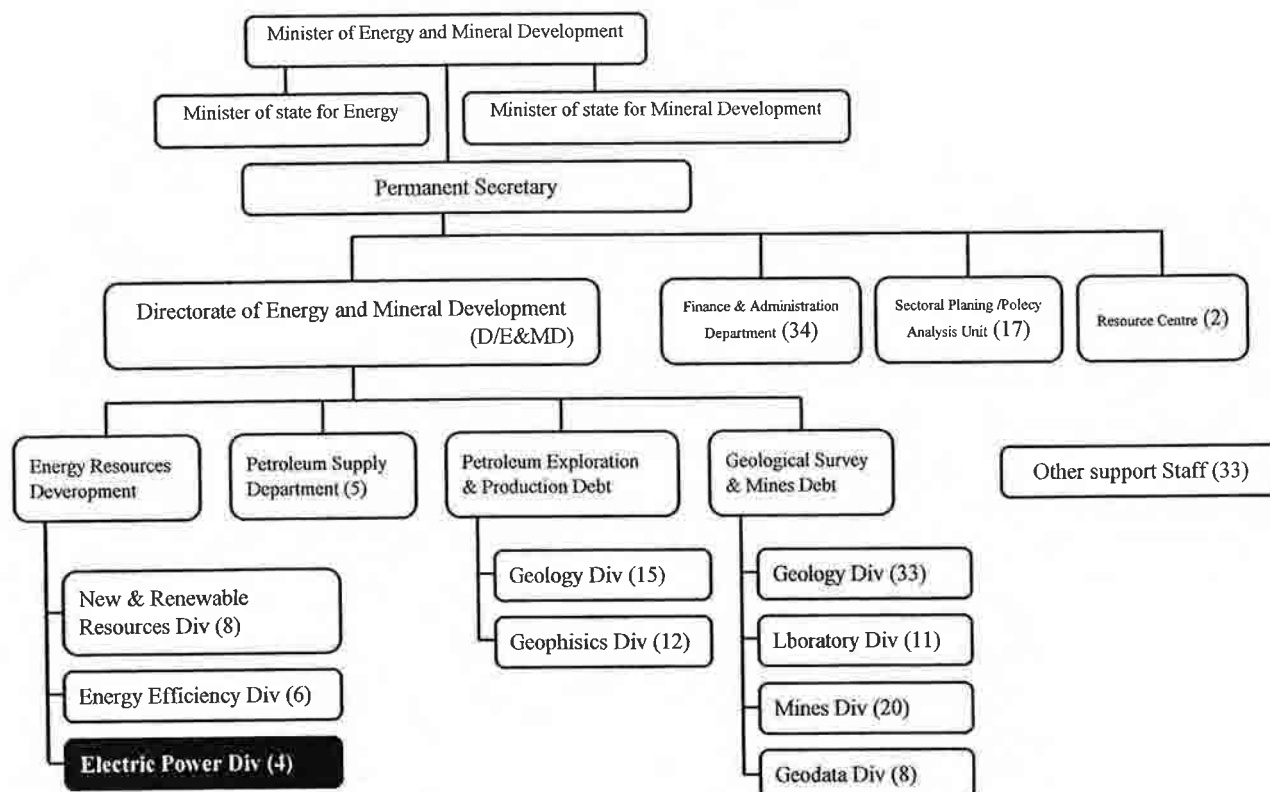
- (1) The Ugandan side should submit answers in English to the Questionnaire, which the Team handed to the Ugandan side by December 6, 2006.
- (2) The Ugandan side should provide necessary number of counterpart personnel to the Team during the field survey.
- (3) The Ugandan side should arrange the budget allocation for securing lands, undertakings shown in Annex-3, and others described in this Minutes of Discussion.
- (4) The Ugandan side requested the Team to carry out the training to the REA in Japan on operation and maintenance of new facilities as technical cooperation by JICA. The Ugandan side should submit the official request regarding training with concrete contents of trainings through the JICA Uganda Office by the end of May, 2007.
- (5) The Ugandan side explained the status of the organizations concerned and the ownership of the property provided under the Project as follows;
  - The Implementing Agency of the Project (REA) shall own the property provided under the Project during and after implementation of the Project.
  - REA shall not be privatized in the foreseeable future.
  - Ownership of the property provided under the Japan's Grant Aid shall not be transferred to private sector after implementation of the Project.
- (6) The Low Tension (415/240 V) distribution lines beyond secondary terminal of Distribution Transformers shall be, in principle, designed, procured and installed by the Ugandan side for the Project.
- (7) Both sides confirmed that 33kV Submarine cable between Bukakata and Kalangala (7km) in the Project Site D should be excluded from the Project by following reasons;



- The 250 kVA diesel engine generator as well as distribution system will be installed in year 2007 under finance of REA for electrification of District Headquarter of Kalangala town.
  - In addition, large scale generators will be installed by private company in Kalangala town for supplying the power to palm oil factory as well as local residents. This project has been approved by the Government of Uganda in year 2005 and it is planned to commence the operation from the beginning of year 2008. Therefore, the power source for distribution network in Kalangala town will be secured without interconnection to the main grid.
  - Benefit to Cost ratio will be much lower due to high initial cost of submarine cable.
  - If the said submarine cable is to be covered under the Project, the interconnection line will be eventually used to purchase power from the co-generation plant in Kalangala town.
- (8) The Ugandan side strongly requested to the Team that the installation of 33kV distribution lines could be covered under the scope of works by Japanese side since the human resource and budget for Ugandan side has been reduced after introduction of power sector reform.
  - (9) The Ugandan side explained all the requested Project Sites will be listed as high priority areas for the electrification in the final the Indicative Rural Electrification Master Plan (IREMP) which will be prepared by the end of March, 2007.
  - (10) The Ugandan side explained that the new 33kV feeder from Iganga Substation to Kaliro town shall be commissioned by the end of year 2007.
  - (11) The Ugandan side is requested to confirm necessary Right of Way (ROW) for the new road to be constructed in Project Site D by the end of January, 2007.
  - (12) Both sides agreed that further technical examination shall be necessary to determine whether voltage compensation facility, e.g., Booster Station, etc., need to be introduced or not, taking the economic viability, power demand forecast, voltage drops, etc., into consideration.



LOCATION MAP OF REPUBLIC OF UGANDA

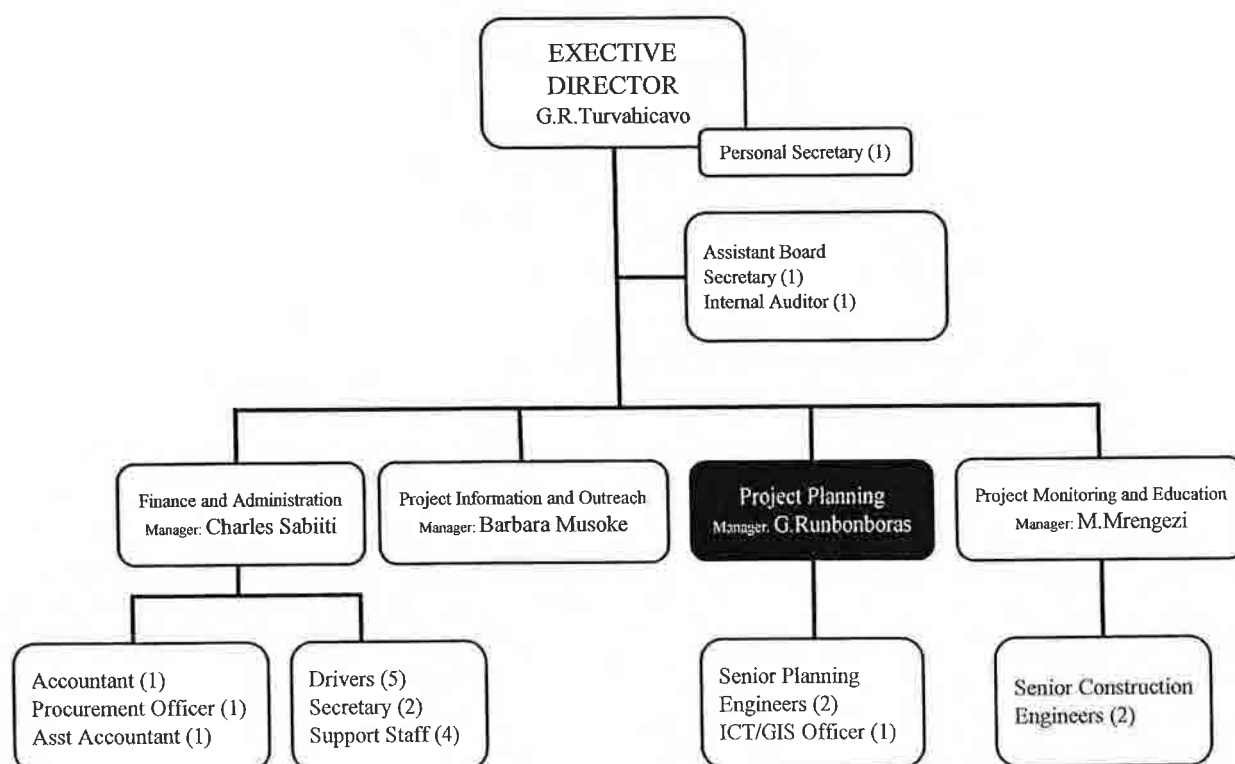


source: Annual Report 2005 - for Ministry of Energy and Mineral Development

**Total Number of staff: 230**

### Organization Chart of

## The Ministry of Energy and Mineral Development (MEMD)



source: Annual Rural Electrification Report - for the 2004/2005 Financial Year

**Total Number of Staff: 27**

### Organization Chart of

## Rural Electrification Agency (REA)

## JAPAN'S GRANT AID SCHEME

The Grant Aid Scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

### 1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by the recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by the Cabinet)
Determination of	(The Note exchanged between the Governments of Japan and
Implementation	recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study) using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

### 2. Basic Design Study

#### (1) Contents of the study

The aim of the Basic Design Study (hereafter referred to as "the Study") conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

## (2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consultant firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

## 3. Japan's Grant Aid Scheme

### (1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as national disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

- a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,
- b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- c) To secure buildings prior to the procurement in case the installation of the equipment,
- d) To ensure all the expenses and prompt excursion for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- f) To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(6) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

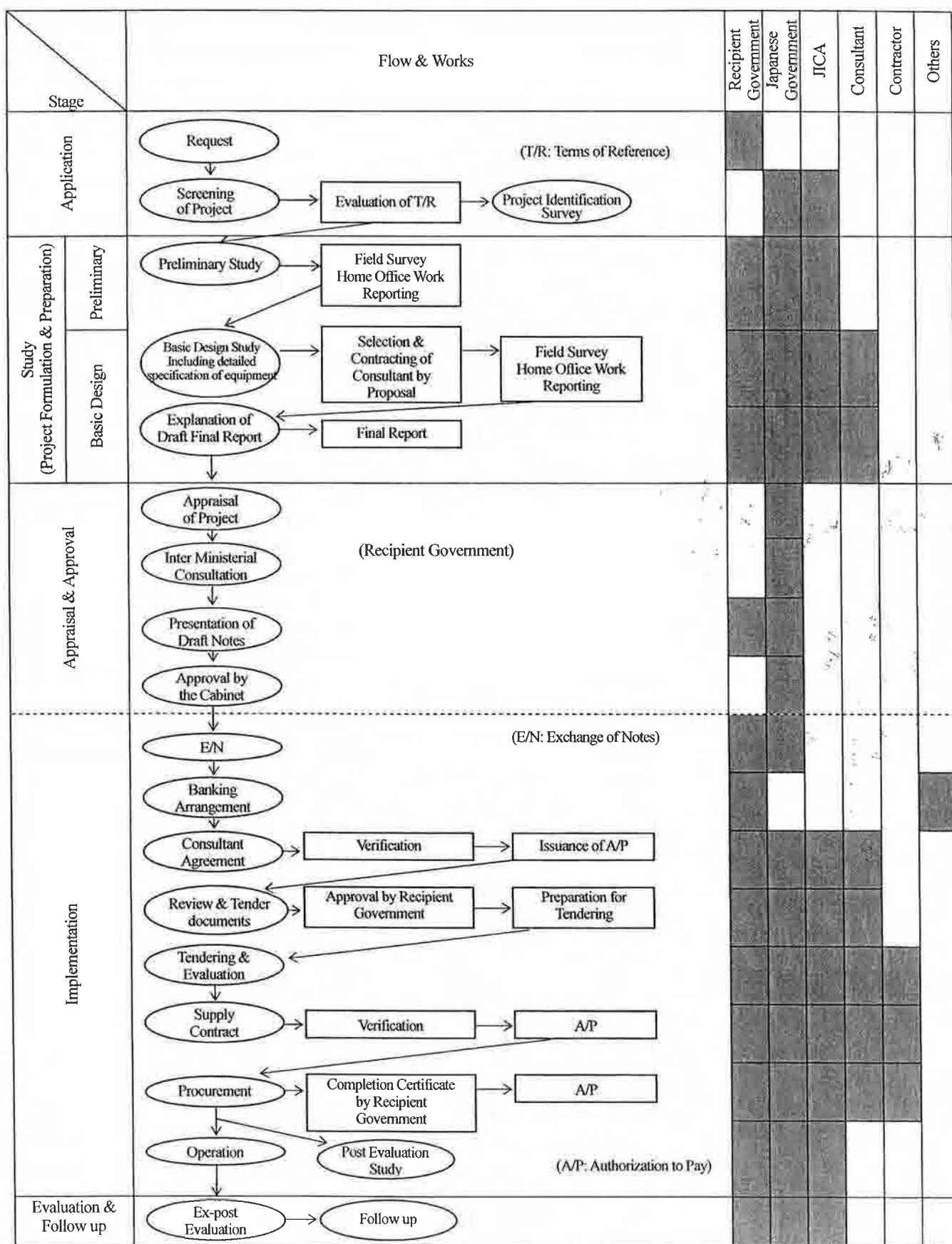
(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(end)



Flow Chart of Japan's Grant Aid Procedures



Note: This chart shows the procedures in case of the Basic Design Study will include preparation of detailed specification of equipment

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## Major Undertaking to be Taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To Clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct temporary roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the buildings	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distribution line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone system		
	a. The telephone trunk line to the Main Distribution Frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project Equipment	●	
8	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imported in the recipient country with respect to the supply of the products and services under the verified contract.		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)







**Minutes of Discussions  
on the Basic Design Study on  
the Project for Rural Electrification Phase II  
in the Republic of Uganda  
(Second Field Survey)**

In November to December 2006, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team (First Field Survey) on the Project for Rural Electrification Phase II (hereinafter referred to as "the Project") to the Republic of Uganda (hereinafter referred to as "Uganda"), and through discussion and preliminary field survey, JICA examined the appropriateness of each requested component.

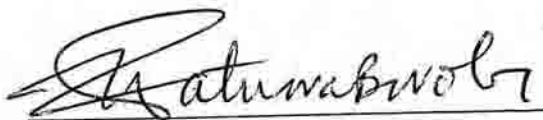
In order to conduct further study on each component, JICA sent to Uganda the Basic Design Study Team for the second field survey (hereinafter referred to as "the Team"), headed by Mr. Susaki Takehiro, Resident Representative of the JICA Uganda Office, and is scheduled to stay in the country from January 30 to February 23, 2007.

The Team held discussions with the concerned officials of the Government of Uganda. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to carry out further works and prepare the draft report.

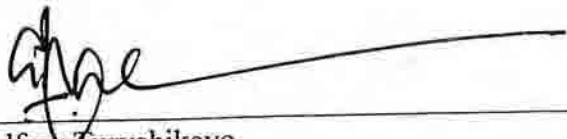
Kampala, February 6, 2007



Mr. Susaki Takehiro  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency



Mr. Watuwa Bwobi  
Director  
Directorate of Energy and Mineral Development  
Ministry of Energy and Mineral Development  
(MEMD)  
Republic of Uganda



Mr. Godfrey Turyahikayo  
Executive Director  
Rural Electrification Agency (REA)  
Republic of Uganda

## ATTACHMENT

### 1. Components to be studied in the Basic Design Study

Both sides confirmed that the 33 kV distribution lines inside Kalangala Island, which were included in the Project site D in the Minutes of Discussions signed on December 4, 2006, shall be excluded from the Project to avoid duplication with other projects by the Government of Uganda.

Both sides also confirmed that the Team would conduct the Basic Design Study on the following components, and JICA will assess the appropriateness of the request and will report to the Government of Japan.

- (1) Project Site A: Nabitende / Itanda Area in Iganga District (Eastern Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 30 km)
  - Supply and installation of Distribution Transformers (33kV/415-240V)
  - Replacement of 33kV Switchgear at the existing 33/11kV Iganga Substation
- (2) Project Site B: Kagadi / Munteme Area in Hoima and Kibale District (Western Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 65 km)
  - Supply and installation of Distribution Transformers (33kV/415-240V)
- (3) Project Site C: Bugeso / Iwemba Area in Bugiri District (Eastern Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 25 km)
  - Supply and installation of Distribution Transformers (33kV/415-240V)
- (4) Project Site D: Bukakata Area in Masaka District (Central Region)
  - Supply and Installation of 33kV Distribution Lines (approximately 60 km)
  - Supply and installation of Distribution Transformers (33kV/415-240V)

In case the Project is officially approved by the Government of Japan, the Project will be implemented in two phases as follows;

- (1) Phase-1: Project Site B and Project Site D
- (2) Phase-2: Project Site A and Project Site C

### 2. Environmental and Social Considerations

REA shall obtain the approval of the project brief document as the Initial Environment Assessment from National Environmental Management Authority (NEMA) by the end of February, 2007.

The Ugandan side shall also obtain permission from NFA (National Forestry Authority) for bush clearing on the Right of Way for 33kV distribution lines in the Forest Reserve Area in the Project Site D by the end of March, 2007, and complete bush clearing works for all project sites prior to distribution line's route survey by Japanese contractor.

### 3. Schedule of the Study

- (1) The Team will proceed to further studies until February 23, 2007.
- (2) JICA will prepare the draft report in English and dispatch a team to the Ugandan side in order to explain its contents in the middle of May 2007.
- (3) When the contents of the draft report are accepted in principle by the Government of Uganda, JICA will complete the final report and send it to the Government of Uganda around July 2007.



#### 4. Other Relevant Issues

(1) The Ugandan side should submit answers in English to the Questionnaire, which the Team handed to the Ugandan side by February 16, 2007.

(2) The Ugandan side should provide necessary number of counterpart personnel to the Team during the field survey.

(3) The Ugandan side shall provide funds for securing lands, undertakings shown in Annex-1, and others described in this Minutes of Discussion.

(4) The Ugandan side explained that the operation and maintenance works shall be carried out by introducing private operators under supervision by REA. The operator in charge of each Project Site shall be selected by the Ugandan side and informed to the Japanese side through JICA Uganda Office preferably before concluding Exchange of Notes (E/N) for the Project. The ownership of the property provided under the Japan's Grant Aid shall remain under the Government of Uganda after commencement of the Project.

(5) The Ugandan side informed the Japanese side that all the proposed Project Sites will be classified as high priority areas for the electrification to be connected to the national grid by the end of Year 2010 in the final Indicative Rural Electrification Master Plan (IREMP). The Ugandan side is requested to issue the letter which indicates all the requested project sites are included in the priority sites for electrification under the Final IREMP. The Ugandan side is requested to submit the Final IREMP to JICA Uganda Office soon after it is finished. The Ugandan side agreed to inform the latest status of preparation of the Final IREMP to JICA Uganda Office by the end of March, 2007.

(6) The Ugandan side shall secure enough budget and human resources for following undertakings in accordance with the implementation schedule shown in Annex-2;

- Secure ownership of the land for the proposed 33kV distribution lines.
- Bush clearing along the proposed 33kV distribution lines.
- Demolishing existing equipment and materials of 33kV switchyard including foundations in Iganga Substation.
- The design, procurement and installation of Low Tension (415/240 V) distribution lines beyond secondary terminal of Distribution Transformers.
- Other undertakings as described in the 1<sup>st</sup> and 2<sup>nd</sup> Field Report.

(7) The Ugandan side confirmed that the new 33kV feeder from Iganga Substation to Kaliro town shall be commissioned by the end of year 2007.

(8) The Ugandan side is kindly requested to start procurement of the Automatic Voltage Regulator (AVR) and related equipment at Mubende for the Project Site B by June 2007 and all installation works shall be completed by June 2008.

(9) The Load Break Switch (LBS) shall be procured under the Project for the existing 33kV distribution lines at Pole No. 1090B for the Project Site D. The Ugandan side is requested to install the LBS and relocate existing LV lines on the same pole (Pole No. 1090B).

(10) The Ugandan side requested the Government of Japan to procure and install Bulk Metering Units for Project Site A, B and D to measure power demand and consumption for the proper operation and maintenance at the connection point of new 33kV distribution lines to be constructed under the Project.

## Major Undertaking to be Taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To Clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct temporary roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the buildings	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distribution line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone system		
	a. The telephone trunk line to the Main Distribution Frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project Equipment	●	
8	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imported in the recipient country with respect to the supply of the products and services under the verified contract.		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

## TENTATIVE IMPLEMENTATION SCHEDULE FOR UGANDAN SCOPE OF WORKS

(In case the Project is approved by the Government of Japan)

(In case the Project is approved by the Government of Japan)																																												
Item	2007				2008												2009												2010			Remarks												
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2		3											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		32											
1 Equipment supply and installation works by Japanese side.																																												
(1) Transportation of equipment and materials from Japan and/or the third countries to the Project Site (Ocean and inland) by the Contractor																																												
(2) Inland transportation of materials (wooden poles) procured in Uganda																																												
(3) Installation works for poles of 33kV distribution lines by Japanese side.																																												
(4) Installation works for 33kV distribution lines by Japanese side.																																												
(5) Testing and adjustment of distribution equipment.																																												
(6) Total commissioning test.																																												
(7) Handover and handing over to Ugandan side from Japanese side.																																												
2 Equipment supply and installation works by Ugandan side.																																												
(1) Supply of equipment for 33kV distribution lines.																																												
(2) Supply of equipment for 33kV distribution line routes.																																												
(3) Supply of equipment and materials and installation works for LV distribution lines by Ugandan side (operator).																																												
(4) Supply of equipment and materials and installation works for LV distribution lines by Ugandan side (operator).																																												
(5) Supply of equipment and materials and installation works for LV distribution lines by Ugandan side (operator).																																												
(6) Supply of equipment and materials and installation works for LV distribution lines by Ugandan side (operator).																																												
(7) Supply of equipment and materials and installation works for LV distribution lines by Ugandan side (operator).																																												

Rainy Season

Selection of Local Contractor by REA

**Minutes of Discussions  
on the Basic Design Study on  
the Project for Rural Electrification Phase II  
in the Republic of Uganda  
(Explanation on the Draft Report)**

In November to December 2006 and January to February, 2007, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team (First and Second Field Survey) on the Project for Rural Electrification Phase II (hereinafter referred to as "the Project") to the Republic of Uganda (hereinafter referred to as "Uganda") and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

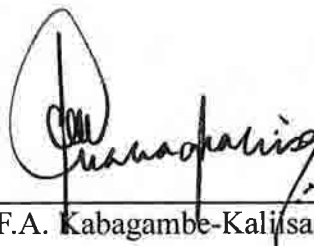
In order to explain and consult the Government of Uganda on the components of the draft report, JICA sent to Uganda the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Susaki Takehiro, Resident Representative of the JICA Uganda Office. The Team is scheduled to stay in the country from May 29 to June 7, 2007.

As a result of discussions, both sides have confirmed the main items described in the attached sheets.

Kampala, June 6, 2007



Mr. Susaki Takehiro  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency



Mr. F.A. Kabagambe-Kalisa  
Permanent Secretary  
Ministry of Energy and Mineral Development  
(MEMD)  
Republic of Uganda



Mr. Godfrey Turyahikayo  
Executive Director  
Rural Electrification Agency (REA)  
Republic of Uganda

## ATTACHMENT

### 1. Components of the Draft Report

The Ugandan side agreed and accepted in principle the components of the Draft Report explained by the Team.

### 2. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the Ugandan side around July 2007.

### 3. Other Relevant Issues

(1) The Ugandan side confirmed that the following major undertakings should be taken by the Ugandan side at its own expense;

- The Ugandan side shall select the operator for each Project Site and shall inform the Japanese side through JICA Uganda Office preferably before concluding Exchange of Notes (E/N) for the Project. The ownership of the property provided under Japan's Grant Aid shall remain under the Government of Uganda after commencement of the Project.
- Secure ownership of the land for the proposed 33kV distribution lines.
- Bush clearing along the proposed 33kV distribution lines.
- Demolishing existing equipment and materials of 33kV switchyard including foundations at Iganga Substation.
- Installation of 33kV Jumper cables between 33kV distribution lines and 33/11kV Main Transformer at Iganga Substation.
- The design, procurement and installation of Low Tension (415/240 V) distribution lines beyond secondary terminal of Distribution Transformers.
- Procurement and Installation of the Automatic Voltage Regulator (AVR) at Kakumiro for the Project Site B.
- Procurement and Installation of the new 33kV feeder from Iganga S/S to Kaliro town for the Project Site A.
- Other undertakings as described in the 1st and 2nd Field Reports.

Table.5-1 on the 2nd Field Report shows the minimum requirement for the budget allocation for Ugandan Scope of works.

(2) The Ugandan side is requested to secure the necessary budget for the above Ugandan scope of works, including the budget for VAT and Import Duties which will be exempted from the Supplier under Japan's Grant Aid scheme. MEMD is requested to issue 'Commitment to Pay Deferred Taxes on Imports' to be submitted to Uganda Revenue Authority for exemption of VAT and Import Duties for equipment and materials procured under the Project.

(3) The Ugandan side should provide the necessary number of counterpart personnel to the Team during the survey.

(4) The Team handed one copy of the draft detailed specifications of equipment and materials to be procured and initial cost estimation shown in Annex-1. Both sides agreed that the draft specifications and above-mentioned initial cost estimation were confidential and should not be duplicated or released to any outside parties.



(5) With reference to preparation of the Indicative Rural Electrification Master Plan (IREMP), the Ugandan side explained to the Team that the submission of the final IREMP will be postponed for several months due to the delay of completion works. The Ugandan side, however, emphasized again that all of the proposed project sites should be classified as Priority Rural Electrification Projects during the period 2008 – 2012 under Energy for Rural Transformation programme Phase II as shown in the letter ref. no. 111/6/001 dated May 4, 2007. The Project Sites were selected for the proposed sites for Japan's Grant Aid based on the criteria shown on Annex-2.

(6) The Ugandan side requested the Team that JICA provides training to the Ugandan side in Japan related to the Project as technical cooperation by JICA. The Ugandan side understands that the official request regarding training will be needed to be submitted to the Japanese side. The Ugandan side should submit the official request with the concrete contents of trainings in line with the Japanese official procedure (following Annual Survey on technical cooperation conducted by the Government of Japan in 2007).





### Initial Estimation for the Project Cost

The total cost of the Project to be implemented in accordance with the Japan's Grant Aid scheme will be ¥1,653 million. According to the following estimated conditions, the breakdown of expenses for both sides based on the scope of work between Japan and Uganda described earlier is estimated to be as follows. However, the estimated project cost is a provisional and does not reflect the limited assistance in accordance with the Exchange of Notes (E/N).

- (1) Expenses to be taken by the Japanese side: Total Estimated Project Cost: Approx. ¥1,293 million.

- 1) Phase 1: Project Site B (Kagadi / Munteme Area in Hoima & Kibale District in the Western Region) and Project Site D (Bukakata Area in Masaka District in the Central Region)

Item		Estimated Project Cost (¥ million)
Equipment and Materials	33kV Distribution Lines	657
Detailed Design & Procurement Supervision		56

Estimated Project Cost (Subtotal)

Approx. ¥ 713 million

- 2) Phase 2: Project Site A (Nabitende / Itanda Area in Iganga District in the Eastern Region) and Project Site C (Bugeso / Iwemba Area in Bugiri District in the Eastern Region)

Item		Estimated Project Cost (¥ million)
Equipment and Materials	33kV Switchgears and 33kV Distribution Lines	536
Detailed Design & Procurement Supervision		44

Estimated Project Cost (Subtotal)

Approx. ¥ 580 million

- (2) Expenses to be taken by Ugandan side: 5,579 million U.shs (Uganda shillings) (Approx. ¥360 million)

The components and amounts to be taken by Ugandan side are as follows.





## Annex-1

- 1) Phase 1: Project Site B (Kagadi / Munteme Area in Hoima & Kibale District in the Western Region) and Project Site D (Bukakata Area in Masaka District in the Central Region)

- ① Land acquisition for distribution lines (33kV and low voltage) route:  
53 million U.shs (Approx. ¥3.4 million)
  - ② Bush clearing on distribution lines (33kV and low voltage) route:  
90 million U.shs (Approx. ¥5.8 million)
  - ③ Land acquisition for stockyard for 33kV distribution line facilities:  
10 million U.shs (Approx. ¥0.6 million)
  - ④ Procurement and installation of Automatic Voltage Regulator (AVR):  
350 million U.shs (Approx. ¥22.6 million)
  - ⑤ Procurement and installation of equipment and materials for low voltage distribution lines:  
1,326 million U.shs (Approx. ¥85.5 million)
  - ⑥ Procurement and installation of consumer kWh meters:  
198 million U.shs (Approx. ¥12.8 million)
- Phase 1 Subtotal: 2,027 million U.shs (Approx. ¥130.7 million)

- 2) Phase 2: Project Site A (Nabitende / Itanda Area in Iganga District in the Eastern Region) and Project Site C (Bugeso / Iwemba Area in Bugiri District in the Eastern Region)

- ① Land acquisition for distribution lines (33kV and low voltage) route:  
53 million U.shs (Approx. ¥3.4 million)
- ② Bush clearing on distribution lines (33kV and low voltage) route:  
38 million U.shs (Approx. ¥2.5 million)
- ③ Land acquisition for stockyard for 33kV switchgears and distribution line facilities:  
10 million U.shs (Approx. ¥0.6 million)
- ④ Procurement and installation of 33kV distribution lines (Iganga to Karilo):  
1,418 million U.shs (Approx. ¥91.4 million)
- ⑤ Removal of existing equipment and temporary cable installation (Iganga Substation):  
141 million U.shs (Approx. ¥9.1 million)



## Annex-1

- ⑥ Procurement and installation of equipment and materials for low voltage distribution lines: 1,581 million U.shs (Approx. ¥102.0 million)
- ⑦ Procurement and installation of consumer kWh meters: 311 million U.shs (Approx. 20.0 million)
- Phase 2 Subtotal: 3,552 million U.shs (Approx. 229.0 million)

### (3) Estimated Conditions

- ① Date of Estimation: February 2007
- ② Exchange Rate: 1 US\$ = ¥118.79  
(TTS average value between August 2006 and January 2007)  
1 U.shs = ¥0.0645  
(TTB average value between August 2006 and January 2007)
- ③ Implementation Period: The period for detail design and equipment procurement and installation are shown in implementation schedule by dividing into two phases for each project site.
- ④ Other: The Project will be implemented in accordance with the Japan's Grant Aid scheme.



## Priority Rural Electrification Projects for the Period 2008 - 2012

PREP Area/Line description	Network Strengthening Prior to Connection	Criteria to select the project sites for Japan's Grant Aid				
		Security Risk <sup>*1</sup>	No District HQ	Development Partner	Commitment	Other Reasons <sup>*2</sup>
<b>1. Mubende PREP Expansion</b>						
Mubende-Kyenjojo	Recloser (Mubende-Kyenjojo)			WB	No	
Mityana-Lusallira				AIDB	No	
Ssekanyonyi-Kikonge			No DHQ			
Bulera-Kyanusisi			No DHQ			
Muhororo-Rugashari			No DHQ			
Isunga-Kyainaisoke			No DHQ			
Kyegegwa-Bujubuli			No DHQ			
Kiyuya-Madudu			No DHQ			
Katera-Muwanga			No DHQ			
Kiboga-Kapeke				GoU	No	
Bukuya-Kiboga						Regional Balancing
Katooke-Kagadi				GoU	No	
Myanzi-Mubende	Reclosers at Myanzi and Mubende			AIDB	No	
Nalweyo-Kakindu-Kisala	Voltage Regulator at Kiyuya, between Mubende and Kakumiro		No DHQ	AIDB	No	Community Request
Kibale-Kyebando-Kasimba	Voltage Regulator at Kiyuya, between Mubende and Kakumiro		No DHQ			Regional Balancing
Mubende Mining loop	Voltage Regulator at Kiyuya, between Mubende and Kakumiro		No DHQ			
Kakumiro-Hoima	Voltage Regulator at Kiyuya, between Mubende and Kakumiro		No DHQ	AIDB	No	
Kitaganya-Buhuka	Commission Nkusi Hydro or similar project		No DHQ			
Bukwiri-Kyankwankazi	Commission Nkusi Hydro or similar project		No DHQ	GoU	No	National Political School
<b>2. Bushenyi, Ibanda, Kamwenge PREP</b>						
Kemikyeri-Bihanga		X	No DHQ			
Nyabulobo-Kakindu		X	No DHQ			
Bushenyi-Kakanju		X				
Bumbala-Kabushaho		X	No DHQ			
Ruharo-Kitabi		X	No DHQ			
Kitagala-Kasana		X	No DHQ			
Kyambura-Katerere		X	No DHQ			
Bubangizi-Kanyabwanga	Commissioning of the Nengo Bridge Hydro Station or similar project	X	No DHQ			
Igorora-Rwomuhoro			No DHQ			
Ruhoko-Rukin Bwanga			No DHQ			
Nyabuhike-Kigunga			No DHQ			
Kiruhura-Ruhumba				WB	No	
Ibanda-Rushere-Kazo-spur Rwemikoma				WB	No	
Kabirizi-Kyarumba		X	No DHQ			
Butare spur			No DHQ			
Rwashamirwa-Nyabihoko			No DHQ			
Niuntu-Nyabane	Construct a 33kV 100ACSR line from Nkenda to Kamwenge	X	No DHQ			
Ruhoko-Muhoro LS	Construct a 33kV 100ACSR line from Nkenda to Kamwenge	X	No DHQ			
Kamwenge-Bigodi	Construct a 33kV 100ACSR line from Nkenda to Kamwenge	X	No DHQ			
Kigale-Kahuungu TC	Construct a 33kV 100ACSR line from Nkenda to Kamwenge	X	No DHQ			
Rwenshama T- Kishenyi	Commissioning of the Nengo Bridge Hydro Station or similar project	X	No DHQ			
<b>3. Fort Portal, Hoima, Masindi, Bundibugyo</b>						
Fort Portal-Kihondo	Construct 2nd Nkenda substation - Fort Portal 33kV 100ACSR line	X				
Fort Portal-Kihondo (Alt)	Construct 2nd Nkenda substation - Fort Portal 33kV 100ACSR line	X				
Hoima-Buseruka-Toonya				PIP	No	Mini-hydro Connection
Kyesiga-Buseruka			No DHQ			
T- Butaba TC LS	Commission Nkusi Hydro or similar project		No DHQ			
Bulissa-Wasenko	Commission Nkusi Hydro or similar project		No DHQ			
Ihangu-Kyanjuba	Commission Nkusi Hydro or similar project		No DHQ			
Bwijanga-Ntooma	Commission Nkusi Hydro or similar project		No DHQ			
FP-Rugumbo - Kyenjojo - Katoke	Install AVR at Kakumiro			SIDA	Yes	
Muntere-Kagadi	Install AVR at Kakumiro			GoJ	No	a, b, c & d (close to the previous project)
Masindi-Waki-Bulissa	Commission Waki Hydro or similar project			NORAD	No	Mini-hydro Connection
<b>4. Mbarara-Ntungamo</b>						
Mbarara-Kyabirukwa-Kikagati						
Ntungamo with tee off to Mirama Hill and Kyabirukwa (under procurement) For ERT Phase 1	Feeder bay at Mbarara North Sub Station, recloser at Ntungamo			WB	Yes	
<b>5. Mbarara-Ntungamo Prep Expansion</b>						
Rakai-Kabingo	Partially supplied from Kabingo, partially from Rakai			WB	No	
Kakukuru-Nyakyeri	Commission Nsongezi Hydro or similar project		No DHQ			
Kabuyanda-Rwoho	Commission Nsongezi Hydro or similar project		No DHQ			
<b>6. Masaka-Kalangala Prep 1</b>						
Kyotera-Mutukula (with tee off to Kasher)	Recloser (Kyotera-Mutukula) (New 132/33kV Substation at Kibale)			WB	No	
Masaka-Bukakata				GoJ	No	a, b, c & d
<b>7. Masaka Prep Expansion</b>						
Masaka-Njabyajwe-spur						Project size is too small
Bikira-Namirembe			No DHQ			
Ssembabule-Lwemyaga						Regional Balancing
Ssembabule-Lyantonde						Regional Balancing
Lumbugu-Lyantonde						Project size is too small
Rakai-Kabingo	Partially supplied from Kabingo, partially from Rakai					Project size is too small
Bugoma-Kalangala Town				PIP	No	
Kalangala Town-Bidco				GoU	No	
<b>8. West Nile Expansion</b>						
Paidha-Zombo-Wart-Vurra with tee off to Nebbi-Angal-Packwach with tee off to Panyimur via Parombo	Commissioning of Nyagak SHP	XX	No DHQ	GTZ	No	
Arua-Koboko	Commissioning of Nyagak SHP	XX	No DHQ	GTZ	No	
Koboko-Yumbe	Mvepi Hydro Station or similar strengthening	XX		GTZ	No	
Yumbe-Udupi-Arua	Mvepi Hydro Station or similar strengthening	XX		GTZ	No	
Wandi-Rhino Camp	Mvepi Hydro Station or similar strengthening	XX	No DHQ			
Rhino Camp-Pakwach	Mvepi Hydro Station or similar strengthening	XX	No DHQ			
Koboko-Oraba	Mvepi Hydro Station or similar strengthening	XX				
Adiraka-Midigo	Mvepi Hydro Station or similar strengthening	XX	No DHQ			
Arua-Adumi-Odmachaku-Abirachi	Mvepi Hydro Station or similar strengthening	XX				
Ovisoni spur	Mvepi Hydro Station or similar strengthening	XX	No DHQ			
Okavu - Logiri	Mvepi Hydro Station or similar strengthening	XX	No DHQ			

\*1. XX: Very High Security Risk

X: Security condition must be considered when a project is planned.

\*2 Following reasons should be noted.

(a. Regional Balancing, b. Economic Potential, c. Requests from the people, d. Socio equity)

PREP Area/Line description	Network Strengthening Prior to Connection	Criteria to select the project sites for Japan's Grant Aid				
		Security Risk <sup>1</sup>	No District HQ	Development Partner	Commitment	Other Reasons <sup>2</sup>
<b>9. Gulu Adjumani Moyo including expansion</b>				GoU	No	
Gulu-Adjumani-Moyo	Voltage Regulator on Gulu 33kV busbar (Extension of 132kV to Gulu?)	XX				
Pakelle-Ofua	Olwiyu 132/33kV substation with Olwiyu/Gulu 2nd 33kV line	XX	No DHQ			
Adjumani-Obongi	Olwiyu 132/33kV substation with Olwiyu/Gulu 2nd 33kV line	XX				
Paicho-Patiko-Paloro	Olwiyu 132/33kV substation with Olwiyu/Gulu 2nd 33kV line	XX	No DHQ			
Gulu-KochGoma	Voltage Regulator on Gulu 33kV busbar; 33kV Feeder bay	XX				
Awer-Pagak-Amuru	Olwiyu 132/33kV substation with Olwiyu/Gulu 2nd 33kV line	XX	No DHQ			
ParakMission-Awere-Corner Kilak	Olwiyu 132/33kV substation with Olwiyu/Pakwach 2nd 33kV line	XX	No DHQ			
Laropi-Duffie-Arra	Olwiyu 132/33kV substation with Olwiyu/Gulu 2nd 33kV line	XX	No DHQ			
Rackokoko-Awere	2nd Lira - Agago 33kV line	XX	No DHQ			
Acholibur-Gulu	Olwiyu 132/33kV sub with Olwiyu/Gulu 2nd line; 33kV feeder bay	XX				
<b>10. Moroto Prep expansion</b>						
Kokeris-Matany-triangle of hope	Voltage regulator at Usuk SCHQ	XX	No DHQ			
Kangole-Lolome	Voltage regulator at Usuk SCHQ	XX	No DHQ			
Katakwi-Kangole	Voltage regulator at Usuk SCHQ	XX				
Kangole-Moroto-Katikekile	Voltage regulator at Usuk SCHQ	XX				
<b>11. Kaberamaido prep expansion / Kab/Amolatar</b>						
Kalaki-Kipenel		XX	No DHQ			
Kaberamaido - Kangai		XX				
Kalaki-Otubol	fanle to check	XX	No DHQ			
Kaberamaido-Dokolo	Voltage regulator at Olio TC	XX				
Ochero-Akampala Landing Site	Voltage regulator at Olio TC	XX	No DHQ			
Amolatar-Abeja	Voltage regulator at Olio TC	XX				
Alemere-Awelo-Chakwara	Voltage regulator at Olio TC	XX	No DHQ			
Odiac-Muntu	Voltage regulator at Olio TC	XX	No DHQ			
Bangladesh spur	Voltage regulator at Olio TC	XX	No DHQ			
Amolatar-Aputi-Amal + spur	Voltage regulator at Olio TC	XX				
Kaberamaido-Kangai	Voltage regulator at Olio TC	XX				
Katine-Kabermaido-Ocherok	Voltage regulator at Olio TC	XX				
Ocherok-Nakasongola	Voltage regulator at Olio TC	XX				
<b>12. Tingey Kongasis, Nakapiririt</b>						
Tingey Kongasis spurs	Sironko - Tingey 33kV line; Sironko voltage regulator		No DHQ			
Nakapiririt-Amudat	Sironko - Tingey 33kV line; Sironko voltage regulator	XX				
Amudat-Loroo	Sironko - Tingey 33kV line; Sironko voltage regulator	XX	No DHQ			
Sironko-Nakapiririt	Voltage regulator at Usuk SCHQ	XX				
Kapchorwa-Suam	Sironko - Tingey 33kV line; Sironko voltage regulator			AfDB	No	
<b>13. Soroti, Katakwi, Amuria, Kumi, Palisa</b>						
Prep Intersect-Gwen		X	No DHQ			
Usuk-Ongongoja		X	No DHQ			
Aakum-Adacar		X	No DHQ			
Katakwi-Kokoro	Line from Upoyu substation to Toroma; no Katakwi T-off	X				
Toroma-Omodol		X	No DHQ			
Toroma-Lake Opete		X	No DHQ			
Magoro-Ngariam		X	No DHQ			
Toroma-Adodol		X	No DHQ			
Bukedea-Kanyum						Regional Balancing
Kachumbala-Ngora			No DHQ			
Kumi-Bukedea						Regional Balancing
Kumi-Omatenga						Regional Balancing
Kumi-Matera						Regional Balancing
Ngora-Acilia			No DHQ			
Ojkingai-Kamuda		X	No DHQ			
Soroti-Sapiri	Directly from Opuyo substation; Not from Soroti	X				
Sapiri-Kalela		X	No DHQ			
Serere-Mulondo-Bulondo		X	No DHQ			
Serere-Kagwara		X	No DHQ			
Opuyo-Wera (Amuria)-Katakwi	33kV Feeder bay (Amuria)	X		AfDB	No	
Amuria-Achwa		X				
Amuria-Kapelabyong		X				
Achumel-Oditel		X	No DHQ			
Amuria-Orungo		X				
<b>14. Bugiri, Busia, Buteteleja, Iganga, Mpigi, Mayuge</b>						
Nakivumbe-Bugiri						Regional Balancing
Namayanba-Buswale	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Mayuge-Namayingo						Project size is too small.
Bugiri-Namatumba				SIDA	Yes	Regional Balancing
Bugiri-Mulere			No DHQ			
Naluwerere-Kasokwe			No DHQ			
Nabukalu-Bugobi			No DHQ			
Kayango-Buwune			No DHQ			
Lutolo-Lufudu			No DHQ			
Buguri-Nankoma-Wakawaka				GoU/REF	No	
Busia-Butanda	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR					Upgrading of existing 33kV lines.
Busilema-Iyolwa	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Lumino-Namaingo	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Musafu-Lumino-E	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Masafu-Lumino-W	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Kalubube-Bugoto	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Mayuge-Kiseri	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR					Upgrading of existing 33kV lines.
Mayuge-Nakalanga-T-Kidibuli	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR					Upgrading of existing 33kV lines.
Lugoli- Bulwaga-Mpungwe	Re-build the 50Cu Tororo - Busia - Lumino feeder with 125ACSR		No DHQ			
Namadi - Bwondha	Re-build the 50Cu Tororo - Busia - Lumino feeder with 100ACSR		No DHQ			
Dhagusi Island			No DHQ			
Buteteleja-Busolewe-Mulanda-Tororo						Upgrading from 11kV to 33kV.
Ikiki-Kanginmina			No DHQ			
Ngogwe-Nalusonga-Ssenyi	Confirm capacity on 11kV network (Mukono)		No DHQ			
Nkozi-Kituntu	Confirm capacity on 11kV network (Mpigi)		No DHQ			
Buwama-Bufabo Pier	Confirm capacity on 11kV network (Mpigi)		No DHQ			
Nabyewange-Goru Point	Confirm capacity on 11kV network (Mpigi)		No DHQ			
Katende-Kiringente	Confirm capacity on 11kV network (Mpigi)		No DHQ			
Kasanyje-Mabamba-Namagobo	Confirm capacity on 11kV network (Mpigi)		No DHQ			
Namayanba-Kitalya	Confirm capacity on 11kV network (Wakiso)		No DHQ			
Namadi - Bwondha	Re-build the 50Cu Tororo - Busia - Lumino feeder with 100ACSR		No DHQ	AfDB	No	
Namuntere - Namayembe	Re-build the 50Cu Tororo - Busia - Lumino feeder with 100ACSR		No DHQ			

\*1. XX: Very High Security Risk

X: Security condition must be considered when a project is planned

\*2. Following reasons should be noted.

(a. Regional Balancing, b. Economic Potential, c. Requests from the people, d. Socio equity)

PREP Area/Line description	Network Strengthening Prior to Connection	Criteria to select the project sites for Japan's Grant Aid				
		Security Risk <sup>1</sup>	No District HQ	Development Partner	Commitment	Other Reasons <sup>2</sup>
Nabibende-Itanda				GoJ	No	a,b,c & d (close to the previous project)
Bugeso-Iwemba				GoJ	No	a,b,c & d (close to the previous project)
<b>15. Kitgum, Pader, Kotido, Kaabong</b>						
Madel Opei- Agoro	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
Nam Okora - Orom	Voltage regulator at Kwonkio TC East of Agago	XX	No DHQ			
Palabek/Gem- Kai - Ogiit	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
Padibe-Lokung	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
Kitgum/Matibe-Mucwini	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
Pajule-Lapul		XX	No DHQ			
Kitgum-Wol-Kalongo	Voltage regulator at Kwonkio TC East of Agago	XX	No DHQ			
Kwanjio-Pader IDP		XX	No DHQ			
Agago-Adwan-Abim		XX	No DHQ			
Adilang-Paimol-Kacciciru	Voltage regulator at Kwonkio TC East of Agago	XX	No DHQ			
Owar-Kalango H	Voltage regulator at Kwonkio TC East of Agago	XX	No DHQ			
Patango-Kalango H	Voltage regulator at Kwonkio TC East of Agago	XX	No DHQ	SIDA	No	
Abim-Kotido-spur Kalakala	Voltage regulator at Orwangu TC	XX				
Kotido-Kaabong	Voltage regulator at Orwangu TC	XX				
Kitgum-Padibe-Opei-Palabek-Pagimo	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
Kitgum-Nam Okora	2nd Lira - Agago 33kV line; Voltage regulator on Agago-Kitgum line	XX	No DHQ			
<b>16. Lira, Apac</b>						
Alito-Ngeita		XX	No DHQ			
Opeta-Acokora	Install a voltage regulator on the Gulu 33kV busbar	XX	No DHQ			
Loro-Otwa	Olwiyu 132/33kV substation with Olwiyu/Pakwach 2nd 33kV line	XX	No DHQ			
Dogapio-Atura	Install a voltage regulator on the Gulu 33kV busbar	XX	No DHQ			
Apac-alemi	fanle to check	XX	No DHQ			
Apac-Awila	fanle to check	XX	No DHQ			
Alenga-Kungu	fanle to check	XX	No DHQ			
Inomo-Nambieso	fanle to check	XX	No DHQ			
Aduku-Chawente		XX	No DHQ			
Aboko Corner - Kamudini	Install a voltage regulator on the Gulu 33kV busbar	XX	No DHQ			
Bob-Minakulu	Olwiyu 132/33kV substation with Olwiyu/Pakwach 2nd 33kV line	XX		GoU	No	
Aloi-Oromo		XX	No DHQ			
Aloi-Dokolo		XX	No DHQ			
Dokolo-Agwata	Voltage regulator at Olio TC	XX	No DHQ			
Dokolo-Kwera	Voltage regulator at Olio TC	XX	No DHQ			
Amugo-Omugo		XX	No DHQ			
Bweyale-Atura	Olwiyu 132/33kV substation with Olwiyu/Pakwach 2nd 33kV line	XX	No DHQ			
Lira-Odwan-Oilim	Voltage regulator at Orwangu TC	XX				
Spur-Oyam	Voltage regulator at Orwangu TC	XX	No DHQ			
<b>17. Luwero, Nakaseke, Nakasongola, Kamuli, Kayunga</b>						
Bbale-Galiraaya			No DHQ			
Kayunga-Busaana			No DHQ			
Galiraayi-Bukungu			No DHQ			
Kayunga-Nakifuma			No DHQ			
Kayunga-Busaana			No DHQ			
<b>18. SW Prep Kanungu, Rukungiri</b>						
Bulema-Matanda		X	No DHQ			
Kayanza-Bugoma		X				
Rukungiri-Kisizi		X				
Kisizi-Kyampene		X				
Rukungiri-Kayanza	Commissioning of the Nengo Bridge Hydro Station or similar project	X				
Katobo-Rwenshama	Commissioning of the Nengo Bridge Hydro Station or similar project	X	No DHQ			
<b>19. SW Prep Kisoro, Kabale</b>						
Kisoro-Nyarusiza	Commissioning of the Nyamabuye Hydro Station or similar project			WB	No	(i) Community Request (ii) Connection of Nyamabuye mini-hydro station
Karengere-Nteko	Commissioning of the Nyamabuye Hydro Station or similar project		No DHQ			
Muhanga-Kisizi			No DHQ			
Muko-Bufundi	Commissioning of the Nyamabuye Hydro Station or similar project		No DHQ			
Kabale-Hamurwa HC	Commissioning of the Nyamabuye Hydro Station or similar project		No DHQ			
HamurwaHC-Kanungu	Commissioning of the Nyamabuye Hydro Station or similar project		No DHQ			
Hamurwa HC-Busanza	Commissioning of the Nyamabuye Hydro Station or similar project		No DHQ			

GoU: Government of Uganda  
 SIDA: Swedish International Development Agency  
 GoJ: Government of Japan  
 AfDB: African Development Bank  
 PIP: Privately Initiated Projects  
 REF: Rural Electrification Fund  
 NORAD: Norwegian Agency for Development

\*1, XX: Very High Security Risk

X: Security condition must be considered when a project is planned.

\*2. Following reasons should be noted.

(a. Regional Balancing, b. Economic Potential, c. Requests from the people, d. Socio equity)

## 資料-5 事業事前計画表(基本設計時)

## 事業事前計画表（基本設計時）

1. 案件名
ウガンダ共和国 第二次地方電化計画
2. 要請の背景（協力の必要性・位置付け）
<p>ウガンダ共和国（以下「ウ」国と称す）では、1997 年に貧困撲滅行動計画（PEAP）を策定し、「農村貧困層の所得向上」を達成する手段として、地方電化事業を重点項目のひとつとして位置づけている。</p> <p>地方電化事業については、「全国電化計画調査（NEPS）」（1992 年）を策定し、地方電化の推進にも努力してきたが、十分な財政措置が取られないこともあり、2005 年時点では都市部電化率約 20% に対して、地方電化率は僅か 4%にとどまっている（全国電化率は約 6 %）。2001 年に策定された「地方電化戦略（Rural Electrification Strategy and Plan）」では、2012 年までに地方部の電化率を 10 %まで向上させ、約 48 万人の地方部住民に電力へのアクセスを可能とすることを目標としているが、財政難により収益性の低い地方電化事業の実施は遅れているのが実情である。</p> <p>「ウ」国の電気事業は、1948 年に設立されたウガンダ電力公社（Uganda Electricity Board: UEB）によって、発送配電事業の計画・運営・維持管理が垂直統合的に実施されてきた。しかしながら、1999 年に「電力セクター改革・民営化戦略（Power Sector Reform and Privatization Strategy）」が閣議承認され、また 1999 年電気法が制定され、電力公社 UEB による事業独占体制から、民間資本の導入を可能とする体制へ、段階的にセクター改革が進められている。同改革の一環として、2003 年に地方電化庁（Rural Electrification Agency: REA）が運営を開始し、長期業務委託契約に基づき、地方電化事業の運営・維持管理業務について、民間企業に委託する方式を採用している。</p> <p>本計画は、現在「ウ」国にて改訂が進められている「地方電化マスタープラン」に基づき、対象地域の電力供給を改善し、地域経済の発展を図ることを上位目標とし、「ウ」国の主要産業である農業及び漁業の地方拠点のうち 4 地域において、住民生活の向上並びに公共施設の安定した運営、社会経済活動の活性化を図るため、安定した電力を供給することを目標とするものである。本計画の基本構想は、上述の目標を達成するために必要な 33 kV 配電線資機材の調達と据付、既設 33/11 kV 変電所の更新を行い、「ウ」国側が低圧配電線の調達及び据付を行うことで、重要な社会基盤である配電線を整備することを目指すものである。</p>
3. プロジェクト全体計画概要
<p>(1) プロジェクト全体計画の目標（裨益対象の範囲及び規模）</p> <p>「ウ」国の主要産業である農業及び漁業の地方拠点である 4 地域において、安定した電力供給が確保され、住民生活の向上並びに公共施設の安定した運営、社会経済活動の活性化を図る。</p> <p>《裨益対象の範囲及び規模》          東部州イガンガ県ナビテンデ/イタンダ地区、西部州ホイマ県・キバレ県カガディ/ムンテメ地区、東部州ブギリ県ブセオ/イウェンバ地区、中央州マサカ県ブカカタ地区の住民約 7.6 万人。</p> <p>(2) プロジェクト全体計画の成果</p> <ol style="list-style-type: none"> <li>1) <u>33 kV 配電設備の調達・据付が行われる。</u></li> <li>2) 415/230 V 低圧配電設備の調達・据付が行われる。</li> <li>3) 公共施設に電力が供給される。</li> <li>4) 一般住宅に電力が供給される。</li> </ol> <p>(3) プロジェクト全体計画の主要活動</p> <ol style="list-style-type: none"> <li>1) <u>33 kV 配電設備の調達・据付を行う。</u></li> <li>2) 415/230 V 低圧配電設備の調達・据付を行う。</li> <li>3) 上記の変電・配電設備を使用して電力供給を行う。</li> </ol>



<p>(4) 投入（インプット）</p> <p>1) <u>日本側：無償資金協力 12.93 億円</u></p> <p>2) 相手国側</p> <p>a) 施設建設用地の提供</p> <p>b) 415/230 V 低圧配電設備の調達・据付</p> <p>c) 運転・維持管理要員</p> <p>d) 調達された設備の運転・維持管理費用</p> <p>(5) 実施体制</p> <p>1) 主管官庁： エネルギー鉱物開発省（MEMD）</p> <p>2) 実施機関： 地方電化庁（REA）</p>																													
<b>4. 無償資金協力案件の内容</b>																													
<p>(1) サイト 東部州イガンガ県ナビテンデ/イタンダ地区、西部州ホイマ県・キバレ県カガディ/ムンテメ地区、東部州ブギリ県ブセオ/イウエンバ地区、中央州マサカ県ブカカタ地区</p> <p>(2) 概要 33 kV 配電線資機材の調達と据付</p> <p>(3) 相手国側負担事項 415/230 V 低圧配電設備の調達・据付、33 kV 配電線ルート上の樹木伐採、33 kV 配電線延長工事（イガンガ変電所からカリロ町まで）</p> <p>(4) 概算事業費 16.53 億円（無償資金協力 12.93 億円、「ウ」国側負担 3.60 億円）</p> <p>(5) 工期 詳細設計・入札期間を含め約 31 ヶ月（予定）</p> <p>(6) 貧困、ジェンダー、環境及び社会面の配慮 特になし</p>																													
<b>5. 外部要因リスク</b>																													
特になし																													
<b>6. 過去の類似案件からの教訓の活用</b>																													
特になし																													
<b>7. プロジェクト全体計画の事後評価に係る提案</b>																													
<p>(1) プロジェクト全体計画の目標達成を示す成果指標</p> <table border="1"> <thead> <tr> <th>項 目</th><th>現状（2007 年）</th><th>計画後（2010 年）</th></tr> </thead> <tbody> <tr> <td>世帯電化率（県単位）</td><td></td><td></td></tr> <tr> <td>（第 1 期）</td><td></td><td></td></tr> <tr> <td>（1）西部州ホイマ県</td><td>3%（11,700 人）</td><td>4%（13,100 人）</td></tr> <tr> <td>（2）西部州キバレ県</td><td>0.4%（1,600 人）</td><td>2%（13,000 人）</td></tr> <tr> <td>（3）中央州マサカ県</td><td>9%（71,700 人）</td><td>11%（87,100 人）</td></tr> <tr> <td>（第 2 期）</td><td></td><td></td></tr> <tr> <td>（1）東部州イガンガ県</td><td>4%（26,200 人）</td><td>7%（60,300 人）</td></tr> <tr> <td>（2）東部州ブギリ県</td><td>1%（5,800 人）</td><td>3%（19,200 人）</td></tr> </tbody> </table> <p>（注）カッコ内は電化人口概数を表す。</p> <p>(2) その他の成果指標 特になし</p> <p>(3) 評価のタイミング 2010 年以降</p>			項 目	現状（2007 年）	計画後（2010 年）	世帯電化率（県単位）			（第 1 期）			（1）西部州ホイマ県	3%（11,700 人）	4%（13,100 人）	（2）西部州キバレ県	0.4%（1,600 人）	2%（13,000 人）	（3）中央州マサカ県	9%（71,700 人）	11%（87,100 人）	（第 2 期）			（1）東部州イガンガ県	4%（26,200 人）	7%（60,300 人）	（2）東部州ブギリ県	1%（5,800 人）	3%（19,200 人）
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## 資料-6 参考資料 / 入手資料リスト

## 6. 参考資料 / 入手資料リスト

調査名: ウガンダ共和国 第二次地方電化計画 基本設計調査

番号	名 称	形態 図書・ビデオ・地図 ・写真等	オリジナル・コピー	発 行 機 関	発行年
1	Indicative Rural Electrification Master Plan - 2 <sup>nd</sup> Draft - (Vol.1.2.3)	図書	コピー	IT Power	2006
2	Annual Report 2005 - Ministry of Energy and Mineral Development -	図書	オリジナル	Ministry of Energy and Mineral Development	2005
3	Annual Rural Electrification Report - For the period July 2003 to June 2004 -	図書	オリジナル	Rural Electrification Agency	2004
4	Annual Report & Audited Accounts 2005 - Uganda Electricity Transmission Company Limited -	図書	オリジナル	Uganda Electricity Transmission Company LTD	2005
5	Corporate Business Plan 2005 – 2010 Financial Projection 2005 - 2020	図書	オリジナル	Uganda Electricity Transmission Company LTD	2004
6	Annual Report & Accounts 2004 - Uganda Electricity Distribution Company LTD -	図書	オリジナル	Uganda Electricity Distribution Company LTD	2004
7	2002 Uganda Population and Housing Census	CD-R	オリジナル	Uganda Bureau of Statistics	2002
8	2006 Statistical Abstract	CD-R	オリジナル	Uganda Bureau of Statistics	2006
9	Uganda National Household Survey 2002 / 3	図書	コピー	Uganda Bureau of Statistics	2003
10	Uganda National Household Survey 2002 / 2003 Report on the Socio-Economic Survey	図書	コピー	Uganda Bureau of Statistics	2003
11	The National Environment Statute, 1995	図書	コピー	The President and the National Resistance council	1995
12	The Environment Impact Assessment Regulations, 1998	図書	オリジナル	Minister responsible for the National Environment Statute, 1995	1998
13	Guidelines for Environmental Impact Assessment In Uganda	図書	オリジナル	National Environment Management Authority	1997
14	Draft Estimates of Revenue and Expenditure (Recurrent and Development) 2006 / 07	図書	オリジナル	Ministry of Finance, Planning and Economic Development	2006

資料-7 環境社会配慮に係る  
関係機関からの承認書簡



## NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

**NEMA/4.5**

**07 February 2007**

The Executive Director,  
Rural Electrification Agency,  
Plot 1, Pilkington Road,  
10<sup>th</sup> Floor, Workers House  
P.O. Box 7317  
**KAMPALA**

NEMA House  
Plot 17, 19 & 21, Jinja Road  
P.O. Box 22255, Kampala, Uganda  
Tel: 256-41 - 251064/251065/251068  
256-41 - 342758/342759/342717  
Fax: 256-41 - 257521/232680  
E-mail: info @ nemaug.org  
Website: www.nemaug.org

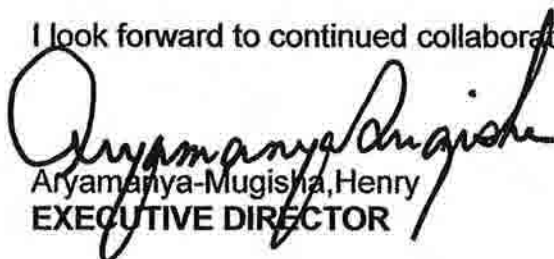
### **RE: PROPOSED EXTENSION OF ELECTRICITY INTO FOUR RURAL AREAS OF KALIRO, KAGADI, BUGIRI AND BUKAKATA**

Following the review of the Project Brief to the above referenced project, this is to issue **Approval** for the environmental aspects of the project. In implementing the project, however, you will be required to implement the mitigation measures contained in the Project Brief as well as the following conditions:-

- (i) obtain the necessary clearance from the National Forestry Authority in case certain sections of the transmission line are constructed in protected forest reserves (such as Kagadi-Munte);
- (ii) compensate all persons who are to be directly affected by the proposed project, either through loss of land/crops in line with national laws governing compensation before project implementation begins;
- (iii) ensure that awareness is carried out among the residents along the corridor of the power-lines against vandalizing the installations that could endanger their lives;
- (iv) ensure that any potential oil leakage from the transformers is monitored to enable timely detection for remedial action;
- (v) ensure that disturbance to other nearby ecosystems outside the transmission corridor is minimised during the installation and operation phase;

- (vi) ensure that waste oil drained from the transformers is collected and stored in special well-labelled waste-oil drums, and disposed of by a licensed agent in accordance with the National Environment (waste management) Regulations, 1999;
- (vii) ensure that any other wastes that may be generated during construction and implementation of the project are disposed in accordance with the National Environment (Waste Management) Regulations, 1999;
- (viii) ensure safety of workers during installation through provision of adequate personal protective equipment (PPE) including safety helmets, overalls and gloves;
- (ix) ensure that an STD and HIV/AIDS awareness and prevention program is instituted to sensitize installation related staff/workers;
- (x) implement the Environmental Monitoring Plan as contained in the Project Brief and ensure record keeping as required under Section 77 of the National Environment Act Cap 153, and their transmission to the Authority as required under Section 78 of the Act;
- (xi) in accordance with Section 22 (4) of the National Environment Act Cap 153, any other undesirable environmental impacts that may arise due to implementing this project but were not contemplated by the time of undertaking this environmental impact assessment are mitigated.

I look forward to continued collaboration

  
Aryamanya-Mugisha, Henry  
EXECUTIVE DIRECTOR

c.c. The Commissioner  
Energy Department  
Ministry of Energy and Mineral Development  
**KAMPALA**

The Executive Director  
Electricity Regulatory Authority  
**KAMPALA**

The Executive Director,  
National Forestry Authority,  
**KAMPALA**

The District Environment Officer,  
Kaliro District,  
**KALIRO**

The District Environment Officer,  
Kibaale District,  
P.O. Box 1  
**KIBAALE**

The District Environment Officer,  
Bugiri District,  
P.O. Box 37  
**BUGIRI**

The District Environment Officer,  
Masaka District,  
P.O. Box 634  
**MASAKA**

A handwritten signature in black ink, appearing to be a stylized name, possibly 'J. S.', written over the Masaka district information.



15<sup>th</sup> February 2007

The Executive Director,  
Rural Electrification Agency  
Ministry of Energy and Mineral Development  
P.O. Box 7317  
Kampala

Dear Sir,

**REF: JICA FUNDED RURAL ELECTRIFICATION PROJECT PHASE II**

Please refer to yours, ref 113/3/016 of 9<sup>th</sup> February 2007 on the above caption subject.

We have studied your power line construction document, the ground plan for the line distribution and held discussion with some members of the JICA appraisal team. It has been established that the Projects will have some effect, though not significantly, on Bugoma, Kasonke and Bukakata Central Forest Reserves, since Jubiya Central Forest Reserve has been dodged by changing the power line to the right side of the Masaka-Bukakata Road. We also made site observation of these areas to be affected in the Central Forest Reserves to add to the available information.

The National Forestry Authority has **no objection** to the construction of the distribution lines (Projects B and D) along the road reserves that form part of these Forest Reserves. However, to further mitigate the impact of ~~excessive clearing and to maintain health of the forest environment while~~ within the Forest Reserves, the following conditions will apply during the whole construction work.

1. Clearing within the Forest Reserve areas will be restricted to within 15.0 meters only from the center of the roads, the distance normally considered as Road reserve.
2. High integrity will be maintained by your servants, agents and workers during the whole construction activities to avoid excessive clearing of the Forest Reserves beyond the permitted distance from



the roads. Any misconduct in the Forest Reserves by your servants, agents and workers shall be dealt with according to the relevant laws.

3. High environmental standards will be adhered to at all times, while working within the Forest Reserve areas. In particular, no construction wastes in form of papers, containers of all types and all other forms of liter should be left within the Forest Reserve areas. Every care will be taken to avoid oil spills and other chemicals in the Forest Reserves.
4. All cleared and useful forest produce within the 15 meters in these Forest Reserves shall remain the property of the National Forestry Authority. The disposal of such produce shall therefore be directed by the Authority or its agents.
5. National Forestry Authority field staff managing these Forest Reserves will monitor compliance to these conditions once construction work reaches their areas.



Hope Rwaguma  
**Ag. Executive Director**

✓ c.c. Executive Director-NEMA

## 資料-8 電力潮流解析の検討

## 電力潮流解析の検討

### 1. 検討条件

#### 1.1 配電系統

既設 33kV 配電線から計画対象地域への配電ルートは、本文 3-2-3(1) に示す通りである。

#### 1.2 電圧、周波数 及び負荷の力率

- ・ 系統電圧： 33kV、三相三線式、電柱架空配電方式
- ・ 周波数： 50Hz
- ・ 負荷力率： 0.85

#### 1.3 負荷条件

計画対象地域の負荷は、本文表 3-3～3-6 に示す電力需要想定結果に基づき、本計画供用開始後 5 年後となる 2014 年～2015 年の想定最大電力需要を適用する。

#### 1.4 線路定数

既設及び新設配電線の種類及び線路定数は、以下の通りとする。

- ・ 電線・サイズ： 鋼アルミニウム合金より線 (AAAC) 100mm<sup>2</sup>
- ・ 線路定数： 以下の通りとする。なお、本系統では特に西部州ホイマ県・キバレ県カガディ／ムンテメ地区で長亘長の配電線となるため、静電容量の影響も考慮する。

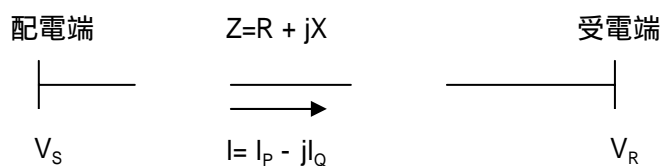
線種	公称断面積 (mm <sup>2</sup> )	交流導体抵抗 [Ω/km]	リアクタンス [Ω/km]			静電容量 [μF/km]		
			線間距離 [mm]			線間距離 [mm]		
			800	1000	1200	800	1000	1200
AAAC	100	0.365	0.317	0.331	0.343	0.012	0.011	0.011

#### 1.5 電圧降下の計算方法

##### (1) 計算手法

- ・ 線路定数 ( $R+jX$ ) 及び負荷電流 ( $I_P - jI_Q$ ) 共に、複素数として扱う。

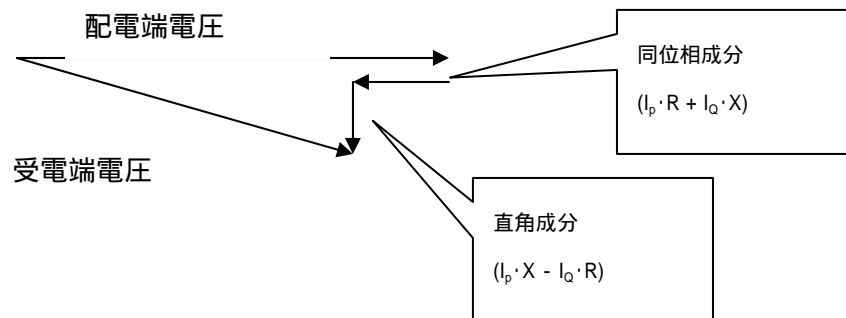
- ・ 電圧降下： $V=(I_P \cdot R + I_Q \cdot X) + j(I_P \cdot X - I_Q \cdot R)$



(遅れ分を で扱う。)

$$\begin{aligned}
 V_R &= V_S - I \times Z & V &= I \times Z (\text{電圧降下}) \\
 V &= (I_P - jI_Q) \times (R + jX) \\
 &= I_P \cdot R + I_P \cdot jX - jI_Q \cdot R - jI_Q \cdot jX & j^2 &= -1 \\
 &= (I_P \cdot R + I_Q \cdot X) + j(I_P \cdot X - I_Q \cdot R) \\
 &\quad \text{同位相成分} \qquad \qquad \text{直角成分}
 \end{aligned}$$

・但し、上式の第2項目は電源電圧に対し直角成分であり影響が小さいため無視する。



・よって、三相三線式配電線の電圧降下は、 $V = 3(I_P \cdot R + I_Q \cdot X)$  として求める。

## (2) 均等配分負荷扱い

同一線種の配電線に均等に負荷が分布している場合の末端の電圧降下は、配電線中央点に全負荷が集中した場合の電圧降下に等しいものとする。

## 2. 解析結果

電力系統解析支援システム (Castle) を利用した潮流解析結果は、図 A8-1 から図 A8-5 に示す通りである。これより、B 地域の西部州ホイマ県・キバレ県カガディ／ムンテメ地区全系統においては、電圧降下の補償対策を実施しない場合、33 kV 配電線路の末端電圧降下が約 19% となり、規定値 (10%) を超過する事が確認された。このため、「ウ」国側の負担工事として、同地域に供給する配電用変電所に自動電圧対策装置を設置する、もしくは 33 kV 配電線の系統切替えにより、適正範囲に保持する必要がある。

図 A8-1： 潮流解析結果 (A 地域：東部州イガンガ県ナビテンデ／イタンダ地区)

図 A8-2： 潮流解析結果 (B 地域：西部州ホイマ県・キバレ県カガディ／ムンテメ地区)  
(電圧補償対策なしの場合)

図 A8-3： 潮流解析結果 (B 地域：西部州ホイマ県・キバレ県カガディ／ムンテメ地区)  
(ムベンデ S/S に自動電圧調整装置を設置した場合)

図 A8-4： 潮流解析結果 (C 地域：東部州ブギリ県ブセオ／イウェンバ地区)

図 A8-5： 潮流解析結果 (D 地域：中央州マサカ県・カランガラ県ブカカタ地区)

以上

Project Site A

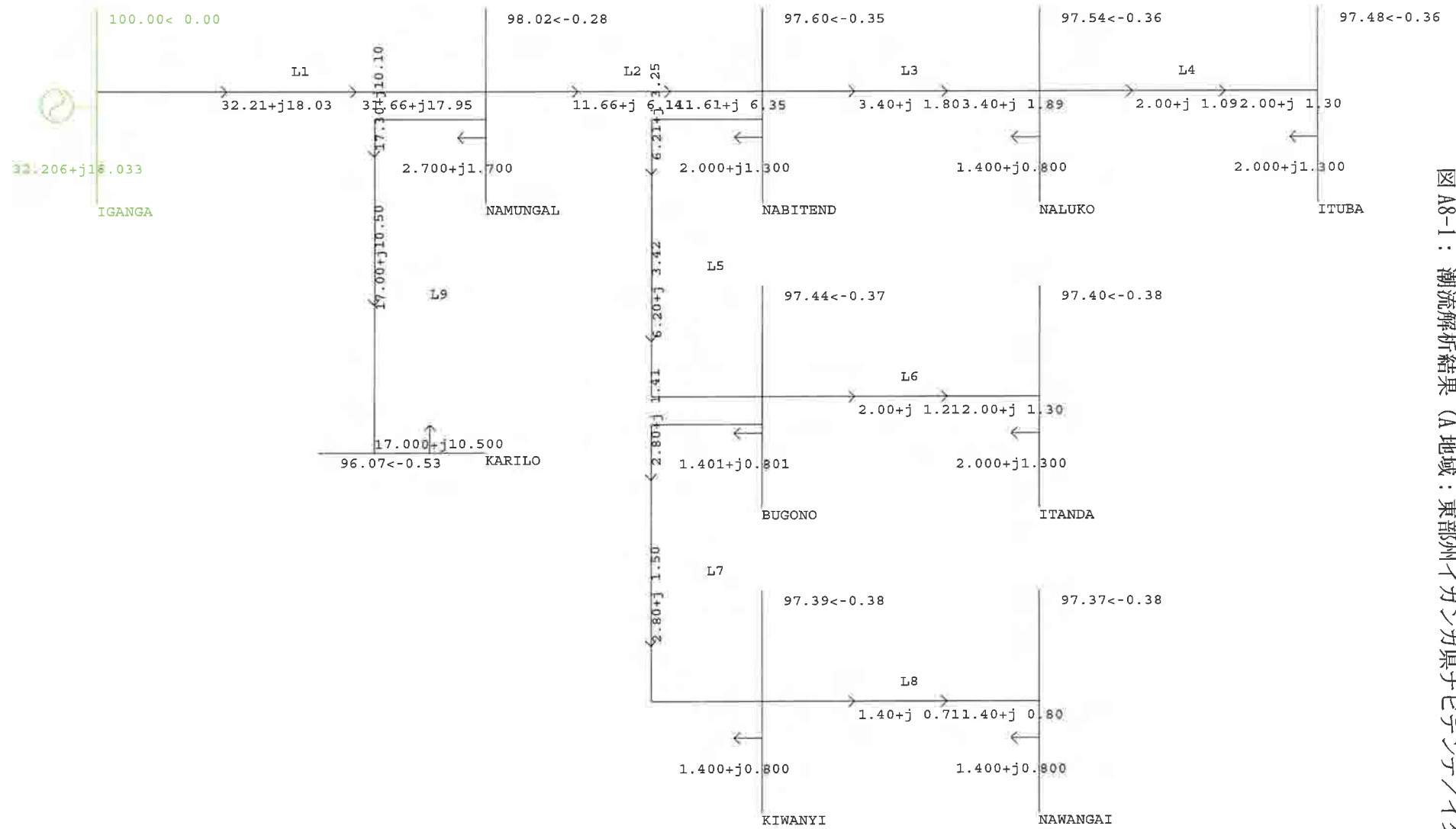


図 A8-1：潮流解析結果（A 地域：東部州イガンガ県サビテンデ／イタンダ地区）

Project Site B (without Automatic Voltage Regulator at Mubende S/S)

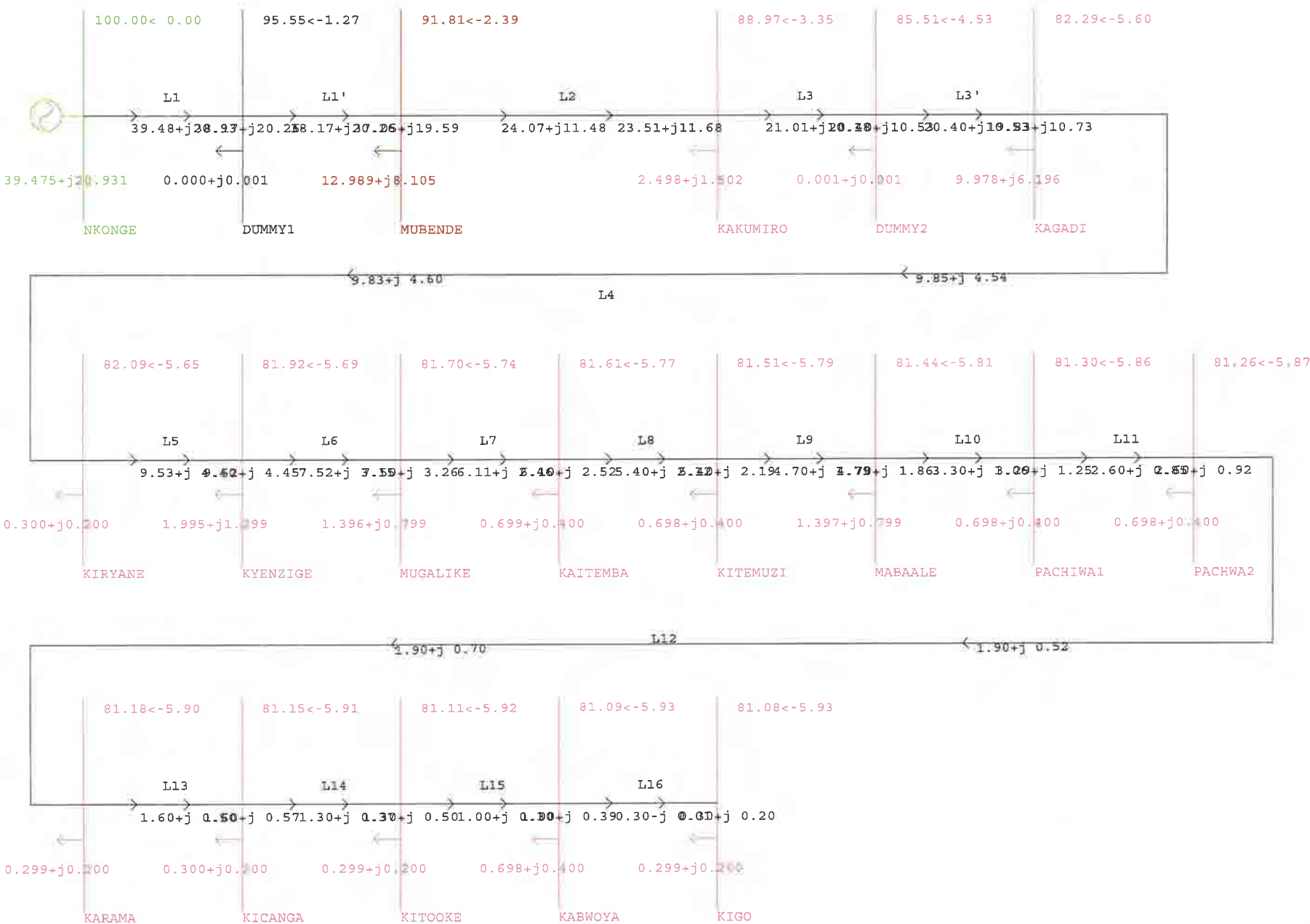


図 A8-2 : 潮流解析結果 (B 地域: 西部州ホイヤ県・キバレ県カガディ / ムンテム地区)  
(電圧補償対策なしの場合)

図 A8-3: 潮流解析結果 (B 地域: 西部州ホイヤ県・キバレ県カガディ／ムンテム地区)  
(ムベンデ S/S に自動電圧調整装置を設置した場合)

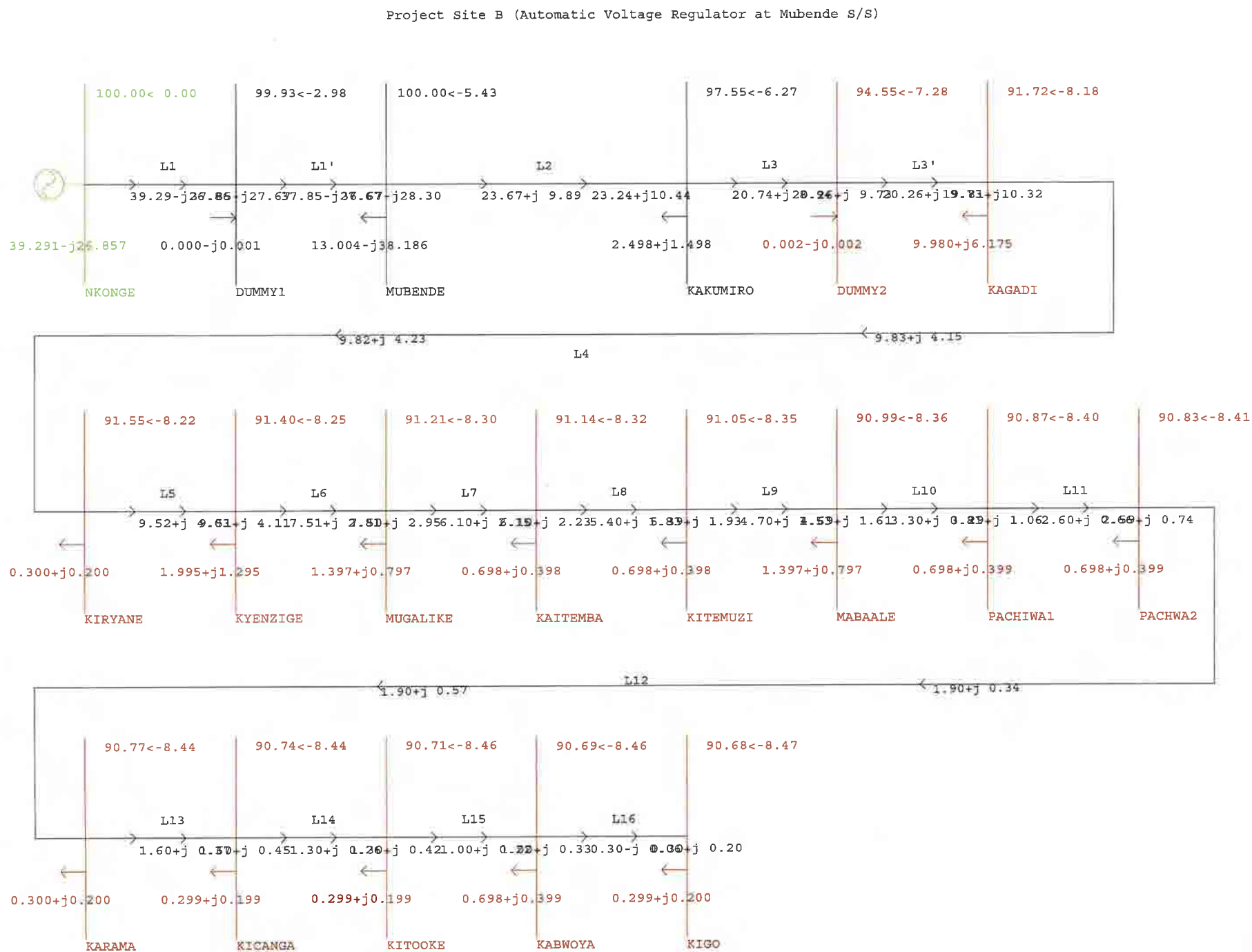


図 A8-4: 潮流解析結果 (C 地域: 東部州ブギリ県ブセオ/イウエンバ地区)

