CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Bujagali Hydropower Project
Version 1.0, 16 July 2010

A.2. Description of the project activity:

>>

The Bujagali Hydropower Project ("the Project" or "Bujagali")[1] is a proposed hydropower facility on the Victoria Nile in the Republic of Uganda. The Project sponsor is Bujagali Energy Limited ("BEL"), a project-specific company owned by affiliates of Sithe Global Power, LLC and the Aga Khan Fund for Economic Development ("AKFED"). Total installed capacity of the Project will consist of five 50 MW turbines, which are estimated to supply 1,305 GWh per year to the local electricity grid.

Uganda has long suffered from lack of electricity, and the problem has become acute in recent years. While the emergency thermal generation program of the Government will help to address short term needs, the Project is needed to address the medium and long-term need for economical, large-scale, power generation in Uganda. The Project and power supply options for Uganda have been the subject of extensive planning and analysis by BEL and others.

The hydropower facility will consist of a 28 m high earth-filled dam and spillway works, and an associated power station housing five 50 MW turbines. It is located at Dumbbell Island, approximately 8 km downstream (i.e. north) of the Town of Jinja. The dam will impound a reservoir that extends upstream to the tailrace area of the Nalubaale and Kiira facilities, inundating Bujagali Falls. The reservoir will be 388 ha in surface area, comprised of the existing 308 ha surface of the Victoria Nile river, and 80 ha of newly inundated land. The amount of newly inundated land is small, as the reservoir waters will be contained within the steeply incised banks of the river. In total the Project will require a land-take of 125 ha for newly inundated land and permanent facilities. An additional 113 ha of land is needed temporarily for the construction of the facility.

In order to connect the Hydropower Plant ("HPP") to the national electrical grid, Uganda Electricity Transmission Company Limited ("UETCL") is developing the Bujagali Interconnection Project ("IP"). The IP will be constructed, owned and operated by UETCL.

Electricity in Uganda is very expensive compared to international benchmarks. The reason is Uganda's significant dependence on imported petroleum products. Uganda is a landlocked country and diesel and Heavy Fuel Oil ("HFO") are transported overland through the Kenyan port of Mombasa, 1150 km from the capital of Uganda, Kampala. The current generation mix of hydropower and thermal energy has an average cost of USD 0.27 per kWh in 2007[2]. The power price has been increasing in the period up to the middle of 2008. The Government of Uganda ("GOU") continues subsidising electricity to make it affordable to the end users. Reliance on imported oil has also created a supply risk to Uganda that was illustrated during the political unrest in Kenya in 2008. Since 2005, the subsidies provided have cost the

[1] www.bujagali-energy.com

[2] Bujagali II - Economic and Financial Evaluation Study, February 2007.

GOU USD 60 million per year. For the period 2008 – 2011, a loan was agreed with the International Development Agency ("IDA") of the World Bank for another USD 200 million for fuel subsidies. Through the subsidies, GOU has succeeded to reduce the average power tariff to the consumer to USD 0.17 per kWh, which is still high for many Ugandans, of which only 5% have access to the power grid. After commissioning of the Bujagali hydropower plant, the cost of power for the consumer in Uganda is expected to stabilise at USD 0.17 per kWh and therefore eliminate the need for the GOU subsidy.

In addition to high prices, the shortage of electricity has led to daily load shedding. During load shedding parts of the grid are disconnected to secure stability of supply in the remaining parts. Load shedding has increased substantially over the past three years as the effects of a drought and lower hydropower production have been felt, coupled with continuing load growth. Load shedding at peak periods was necessary in 2005 even following the commissioning of the 50 MW emergency diesel plant in Kampala in May 2005. Power shortage and subsequent load shedding is a significant barrier to further economic development of Uganda.

Emission reduction

The Bujagali Hydropower Project will reduce the emissions of greenhouse gasses in Uganda. Hydropower electricity does not cause emissions of the greenhouse gas CO_2. The electricity produced by the Bujagali Hydropower Project will displace the electricity produced in the baseline, which to a large extent is based on diesel and heavy fuel oil generators that emit considerable volumes of CO_2. It will also avoid the need for future oil fired generation.

Contribution to Sustainable Development, Economic & Social Benefits

The Project will provide access to electricity from renewable energy sources. Since the Project will stabilise or lower the power tariff in Uganda and will eliminate the need to load shed, it also stimulates sustainable economic development of the country, creating new jobs both directly and indirectly.

National benefits for Ugandans

When completed, the Project is expected to provide a significant boost to the Ugandan economy by sharply reducing the country's current power deficit and significantly reducing the present use of expensive and polluting oil fired thermal power generation and the use of private diesel fired gen-sets used during load shedding. The Bujagali Hydropower Project will support economic growth, create jobs and improve the country's competitive position both regionally and internationally. The Project is also expected to help meet the anticipated near-term increase in energy use in Uganda, estimated at 25-40 MW per year.

The Project's principal macro benefits for Uganda include:

- New supply of clean, reliable energy
- Lower electricity costs and tariffs
- Reduced electricity rationing
- Increase in economic investment and national income
- Increase in export revenues
- Stimulate support for rural electrification programs

Improving local communities

The Project will also benefit the residents and economies of local communities near the Project site. New jobs, primarily unskilled and semi-skilled, will create employment opportunities for Ugandan workers.

In addition to improving the local economy, the Project sponsors are committed to preserving the heritage and cultures of nearby villages. Meetings with representatives from the Kingdoms of Buganda and Busoga are helping identify actions needed to fulfil that commitment.

An estimated 1,000 - 1,800 workers will be employed at peak times during the four-year construction period. By closely interfacing with local village representatives and through newly established recruitment centres, the Project team is giving preference to local residents living in the area near the Project. This increase in employment and economic activity is stimulating the local economy, leading to investment in new and existing businesses and additional job opportunities for local residents.

BEL is committed to providing additional sustainable benefits, primarily for the local region affected by the Project. BEL's Community Development Action Plan supports long-term development initiatives on both sides of the river: Wakisi Subcounty (west bank) in the Mukono District and Budondo Subcounty (east bank) in the Jinja District. The Project Sponsor is working closely with local training institutes to implement vocational training programs for local residents. The Project will construct a new market center near the Project in order to foster grass roots economic growth in the area.

BEL plans to invest USD 2.4 million in community action initiatives. The major features of the current community development action plan includes:

- Improve local facilities, such as:
  - Funding the construction of a public water system;
  - Construction and refurbishment of schools;
  - Construction of a local market centre;
  - Refurbishment and equipping enhanced health care facilities; and
  - Construction of a waste water treatment facility.
- Support sustainable economic development through:
  - Enhanced job creation and worker training;
  - Improved agricultural productivity and marketing;
  - Providing support and partnership for tourism and eco-tourism;
  - Reforestation programs; and
  - Promotion of other business activities.
- Establish social/environmental programs such as:
  - HIV/AIDS prevention education programs;
  - Other health and sanitation improvement education programs;
  - Youth education programs;
  - Grievance and feedback process for project affected people and construction workers; and
  - Active engagement with local cultural groups (Buganda Kingdom and Busoga Kingdom).

BEL is also committed to complying with World Bank Policies regarding Project Affected People (PAPs). Although the resettlement of displaced PAPs on the project site was completed prior to BEL's involvement in the Project (i.e. previous development by AES Nile Power Ltd.), BEL has completed a survey of those PAPs displaced by the Project in order to ensure living standards are maintained or

improved. Special attention is paid to identify and monitor the livelihood of vulnerable PAPs affected by the Project.

The Project has implemented a robust community consultation program to actively engage the local communities and establish structured third party monitoring committees. Interfacing with these local committees will ensure good feedback of issues and ideas to BEL. These local groups are also essential in developing community needs assessments and implementation of BEL's Community Development Action Plan.

The Project is closely interfacing with several other third party monitoring entities including a panel of social and environmental experts (POE), lender social/environmental staff, lender engineers, and GOU agencies. BEL is being advised by an independent Witness NGO that closely monitors the Project activities in the local communities. Working closely with these various groups is providing BEL valuable expertise and feedback in order to improve the effectiveness of the Project social/environmental plans.

A.3. Project participants:

>>

Name of Party involved((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Uganda (host)	Bujagali Energy Limited	Yes

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

A.4.1.1. Host Party(ies):

Republic of Uganda

A.4.1.2. Region/State/Province etc.:

Eastern Region, Jinja District

A.4.1.3. City/Town/Community etc.:

Jinja

A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

The Project activity is located near the city of Jinja, the second largest city in Uganda. The Project site is located on the Victoria Nile River 8 km downstream of the Nalubaale and Kiira hydroelectric plants. Within the Project area, the river varies in width between 200m and 600m and slopes downwards as it surpasses the nearby Dumbbell Island. The geographical coordinates are 0°30'04.76" N and 33°08'20.22" E.

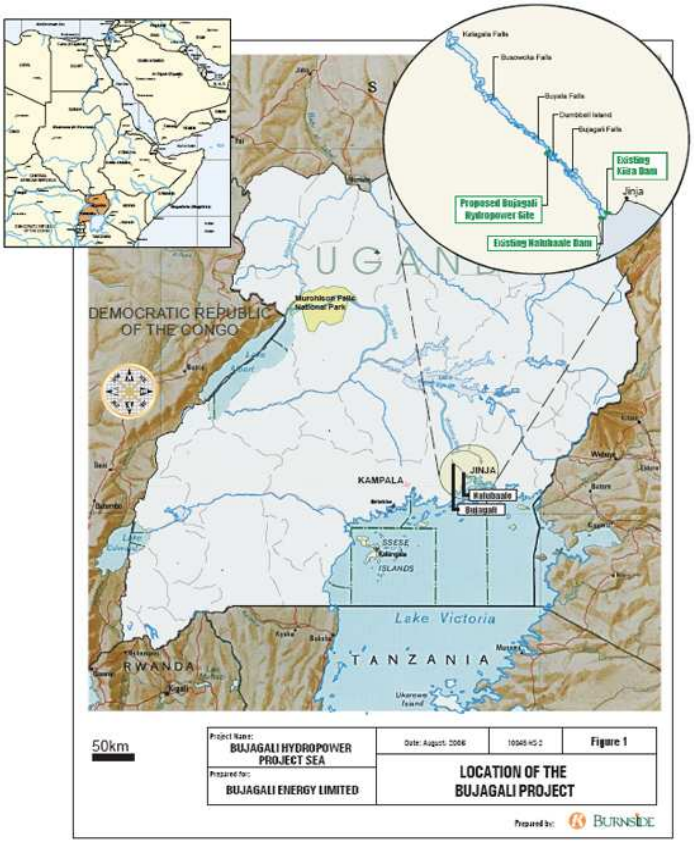

Figure 1: Map of the Project location

.

A.4.2. Category(ies) of project activity:

The Project falls under Sectoral Category number 1: Energy Industries (renewable/ non-renewable), as the activity is grid-connected electricity generation from a renewable source.

A.4.3. Technology to be employed by the project activity:

The Project uses water from the Victoria Nile River to generate electricity through five vertical Kaplan turbine generator units with an installed capacity of 50 MW each (total capacity of 250 MW) and total design flow of 1375 m^3/s. Based on predicted annual hydrology the average annual energy production is expected to be 1,305 GWh/year.

The water will be stored in a small reservoir with a surface area of 388 hectares, 88 ha greater than the existing surface area of the river, and is expected to provide live storage of 12.8 million m^3 of water at full supply. The regulating capacity of the reservoir is very small, therefore the water flow after the dam will generally be unchanged by the Project. Bujagali uses the water coming from the upstream Kiira and Nalubaale hydro power plants. The quantity and timing of water released from Lake Victoria will continue to be controlled by the operation of these facilities.

All power from the Project destined for the national grid will flow through a high voltage substation, which will be located on the west bank of the river. The generator transformers will increase the voltage from 9.5 kV to 132 kV for entry into the onsite Bujagali Substation which will connect to the Ugandan high voltage electric grid. New transmission lines (approximately 100 km total length) will provide improved transmission capacity between Eastern Uganda and Kampala. The new transmission upgrades will be operated at 132 kV, but will be designed for 220 kV to support a future planned regional transmission network.

Table 1. Technical details of the Bujagali HPP.

Dam Type	Clay core rock fill dam
Dam Height	28 m
Dam Crest Length	560 m
Spillway	Gated; 1 flap (300 m^3/s) and 2 radial (3000 m^3/s) gates
Type of Intake	Integral intake and power station
Installed Capacity	250 MW
Turbines	Kaplan (50 MW)
Number of Turbines	5
Maximum Discharge per Turbine	275 m^3/s
Generator Output	62 MVA
Power Station	Surface type in left channel around Dumbell Island
Reservoir Surface Area	388 ha

Figure 2 shows the layout of the Project, while Figure 3 indicates the future reservoir area.

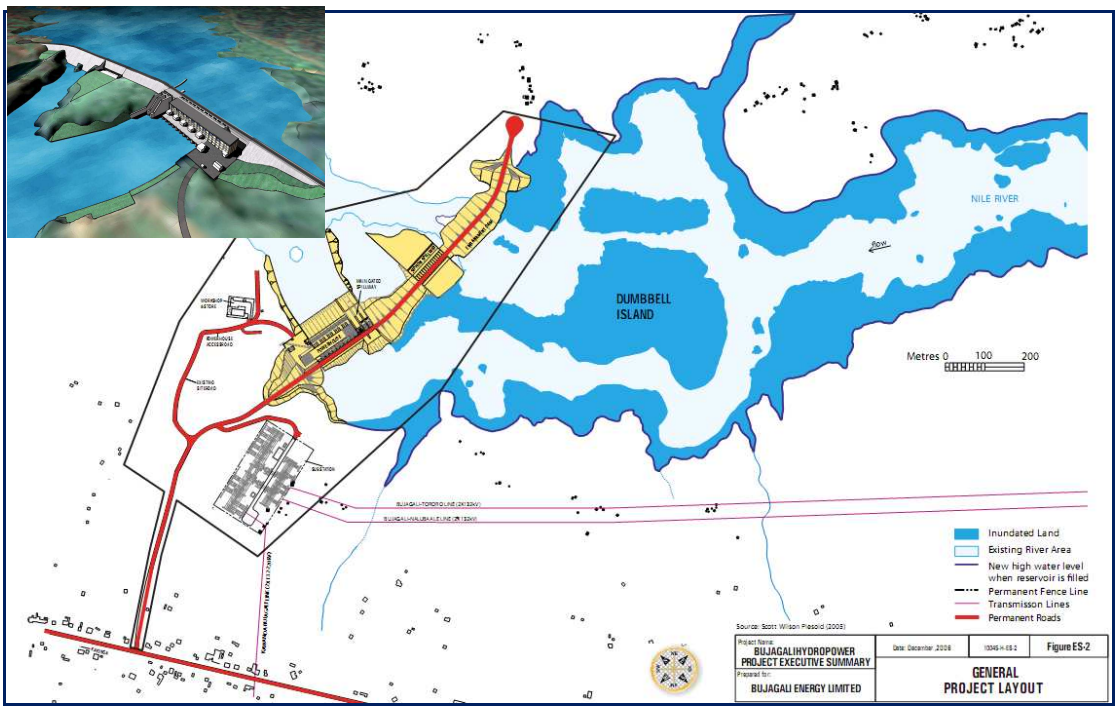

Figure 2. Layout of the Bujagali hydropower project.

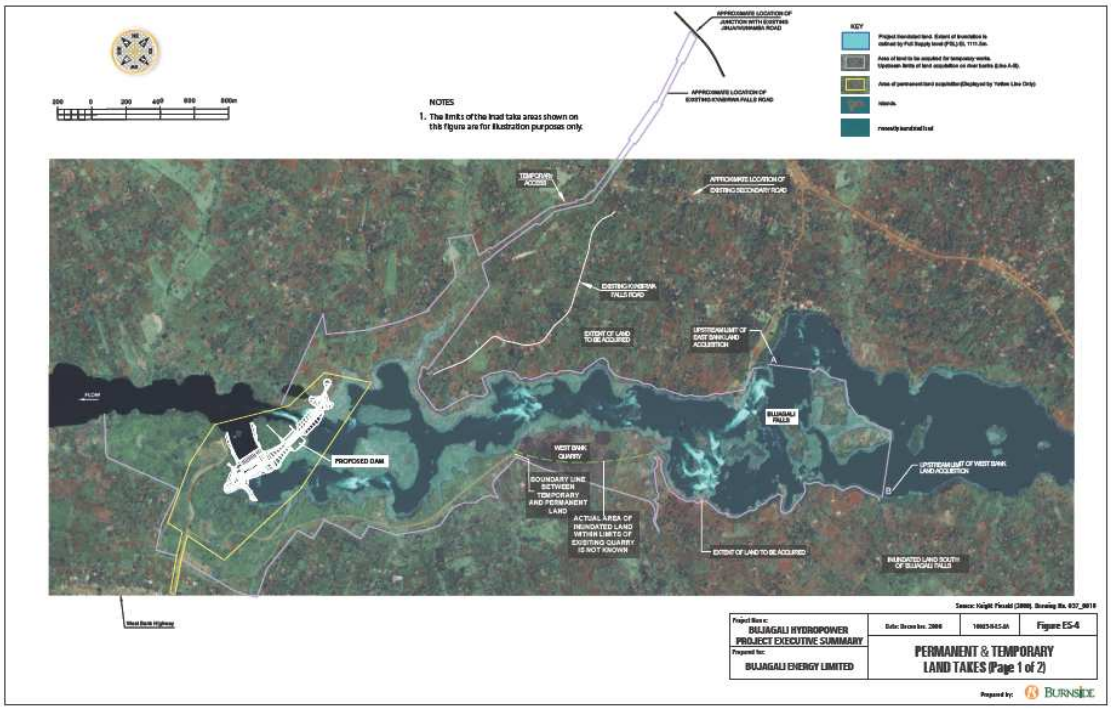

Figure 3. Reservoir area

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

The Project will displace electricity from the Ugandan national electricity grid with a combined margin emission factor of 0.693 t CO_2e/MWh (as calculated later in this PDD). On average the Project is expected to generate a net amount of 1,305 GWh of electricity per year. It is expected that the Project will reduce a total annual amount of greenhouse gas emissions of 904,000 tCO_2e.

Table 2. Estimated amount of emission reductions over the chosen crediting period..

Year	Annual estimation of emission reductions in tonnes of CO2e
8 April 2012 – 7 April 2013	904,000
8 April 2012 – 7 April 2014	904,000
8 April 2013 – 7 April 2015	904,000
8 April 2014 – 7 April 2016	904,000
8 April 2016 – 7 April 2017	904,000
8 April 2017 – 7 April 2018	904,000
8 April 2018 – 7 April 2019	904,000
Total estimated reductions (t CO_2e)	**6,328,000**
Total number of crediting years	3*7
Annual average over the crediting period of estimated reductions (t CO_2e)	904,000

A.4.5. Public funding of the project activity:

The funding from multilateral and national financing agencies will not lead to diversion of Official Development Assistance ("ODA"), see Annex 2.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

The Project will apply the following methodology and related methodological tools:

- ACM0002, Consolidated methodology for grid-connected electricity generation from renewable sources --- Version 11;
- Tool for the demonstration and assessment of additionality --- Version 5.2;
- Tool to calculate the emission factor for an electricity system --- Version 02);

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

ACM0002 the most appropriate methodology for the Project because:

- the Project is the installation of a grid connected hydropower plant with a run-of-river reservoir, and therefore a renewable energy Project with zero-emissions;
- the Project is a new hydropower Project with a reservoir which has a power density larger than 4 W/m^2. The reservoir area is 388 ha, plant capacity is 250 MW, resulting in a power density of 64.4 W/m^2 [3];
- It does not involve any fuel switching from fossil fuel to renewable energy at the site of the Project.
- The geographic and system boundary for the Ugandan national interconnected grid and the region where Bujagali is located is clearly identifiable and the characteristic information of the grid system is accessible.

B.3. Description of the sources and gases included in the project boundary:

The CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system takes into account all CO_2 emissions by all thermal power plants that will be displaced due to the Project. Therefore the spatial extent of the Project boundary includes:

- The Bujagali Project site;
- All grid-connected power plants;
- All off-grid power plants installed as backup that are used during planned load shedding.

Table 3 below elaborates on the sources and gases within in the Project boundary.

Table 3: Sources of Gases in Project Boundary

	Source	Gas	Included/ Excluded	Description
Baseline	Grid and off-grid electricity production	CO_2	Included	Only CO_2 emissions from grid connected electricity generation should be accounted for.
		CH_4	Excluded	
		N_2O	Excluded	
Project Activity	Hydro electric electricity production	CO_2	Excluded	According to ACM0002 V.10
		CH_4	Excluded	Power density of the Project is more than 10 W/m^2 so no emissions from the Project activity (and reservoir) have to be considered
		N_2O	Excluded	According to ACM0002 V.10

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

[3] The power density limits the applicability of the methodology to projects that inundate little land per MW installed capacity. This limitation is to exclude projects with high emissions from newly inundated land (e.g. methane emissions from anaerobic decomposition of vegetation). Please note that for this project in fact only 88 ha of land will be inundated outside the existing river bed, giving an even higher power density of 284 W/m^2

Following ACM0002, the baseline scenario for renewable energy projects is:

> "Electricity delivered to the grid by the Project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources".

This is reflected in the combined margin ("CM") calculations according to the "Tool to calculate the emission factor for an electricity system". For the calculation of the CM, data from the Ugandan interconnected grid to which Bujagali will be connected has been analysed. The baseline scenario is the electricity generated and delivered to the grid by the mix of:

- The grid connected operational power plants (recognized as operational margin or "OM") and
- The addition of newly built generation sources (referred to as build margin or "BM").

OM represents the operational power plants, and BM is an estimate of the likely future scenario based on the most recent expansion of the system. OM and BM together make up the combined margin.

This PDD has used publicly available information from the UETCL and data provided by Customs and Excise Department of Uganda Revenue Authority on fuel subsidies.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

>>

Following the "Tool for the demonstration and assessment of additionality – Version 5.2" it is demonstrated that the Project is additional because:

- The prospect of receiving CDM revenues has been an important factor in the decision to implement the Project (starting date test);
- There are various alternatives to the Project activity that are consistent with current laws and regulations in Uganda (step 1);
- The Project faces barriers to implementation that are relieved by the CDM (step 3a);
- The implementation of at least one alternative to the Project is not affected by the identified barriers (step 3b);
- No projects comparable to the proposed CDM project activity exist in the country (step 4).

Starting date test

The starting date of the Project activity (21 December 2007) lies before the date of validation, see Table 4 and Table 5.

Table 4: Project development time line

Date	Milestone
1994	The GOU and AES Nile Power Ltd first discuss the development of hydropower in Uganda
1997 – 2002	AES carries out numerous studies and preparatory activities to develop its project
September 2002	AESNP participates in the CDM procurement programme of the Dutch government to sell CERs from its project

Date	Milestone
2003	Withdrawal of AESNP from the project and GOU terminates the development of the project by AESNP
16 January 2004	GOU launches a Request for Proposals/Prospectus in relation to the Development of the Bujagali Hydropower Project
23 February 2005	GOU issues a revised version of the Request for Proposals/Prospectus, the Proposal Evaluation Criteria, the draft Implementation Agreement and the draft Power Purchase Agreement
23 March 2005	GOU receives three proposals for the development of the Project
April 2005	GOU selects the consortium led by IPS(Kenya) (which included a commitment from Sithe Global) to start negotiations on development of the Project
January 2006 – February 2007	Power Planning Associates carries out the Economic and Financial Evaluation Study by order of the International Finance Corporation
January 2006 – December 2006	R.J. Burnside International Limited carries out the Social and Environmental Assessment
April 2007 – December 2007	Project lenders and guarantors approve the financing package of the Project. Lenders and/or guarantors include the World Bank Group (IFC & MIGA), European Investment Bank, African Development Bank, Proparco, AFD, DEG, KfW and commercial banks
25 May 2007	Implementation Agreement and Power Purchase Agreement signed between Bujagali Energy Limited and the GOU
25 May 2007	Construction contract with Salini Hydro Ltd. Signed, and Initial ground activities began after a bridge loan issued from the GOU
21 December 2007	Amended and Restated Implementation Agreement and Power Purchase Agreement signed between Bujagali Energy Limited and Uganda Electricity Transmission Company Limited, and financial closure achieved
24 December 2007	Project Starting date. Full Notice to Proceed issued, and construction contract with Salini Hydro Ltd. and Salini Costruttori S.p.a. entering into force

All Project participants involved considered the incentives from the CDM long before the starting date of the Project. Documented evidence of consideration of the CDM revenues in the investment decision by BEL, its shareholders IPS and Sithe Global and the GOU includes:

- The main agreements between the GOU and BEL, being the Implementation Agreement and the Power Purchase Agreement, both dated 25 May 2007. The documents set out the intention by both parties to register the Project as a CDM project activity and share the ensuing CER revenue. The development of the CDM project activity is agreed in Article 14 of the Implementation Agreement. Reference is made in the preambles in both agreements;
- An early draft version of the PPA dated 31 July 2005, section 15.18;
- Presentation to the Investment Committee of one of the shareholders;
- A key investment memo relied upon by one of the shareholders.

Ever since the starting date of the project the project participants have engaged in continuing and real actions to secure the CDM status for the project activity in parallel with its implementation, see the overview in Table 5. The Implementation Agreement with the GOU obliges BEL to develop the "Emission Reduction Project", including the development of the PDD and the commercialisation of the

ensuing CERs, ERs and/or VERs. The Implementation Agreement further stipulates the distribution of CERs as follows: 60% to the GOU and 40% to BEL.

Table 5: Activities to secure CDM registration as from project starting date

Date	Milestone
24 December 2007	Project Starting date. Full Notice to Proceed issued, bringing into full force the Construction Contract and start date. Actual commitment to start construction.
March 2008	Request for PDD preparation proposals
18 June 2008	Contract for PDD preparation signed with Climate Focus
11 – 15 August 2008	Fact finding mission for PDD preparation
2 September 2008	PDD preparation plan presented
14 November 2008	Request for validation proposals
27 February 2009	First draft of PDD presented to project sponsors
28 May 2009	Further request for validation proposals
2 July 2009	First indicative price offer received
January 2010	Further request for validation proposals
July 2010	Start validation

Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity

Realistic and credible alternatives available to the Project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity are the development of:

1. The proposed project activity undertaken without being registered as a CDM project activity.
2. An equal capacity of decentralised medium and low speed diesels burning HFO with unit sizes of 10 MW to 50 MW net.
3. An equal capacity of decentralised open cycle aero-derivative gas turbines with unit sizes of 30 MW ISO rating (26 MW site rating) burning Automotive Gas Oil, or industrial gas turbines with a capacity 67 MW ISO rating (57 MW site rating).
4. Combined cycle gas turbine plant, burning either Industrial Diesel Oil with a unit size of 100 MW ISO rating (84 MW site rating).
5. Steam plant burning HFO with a unit size of 100 MW net.
6. Geothermal plants.
7. A Hydropower Plant at a different location.

Coal fired plants are not considered as this fuel is not available in Uganda. HFO would be 180cSt fuel oil, which is available in the region. Contrary to HFOs with a high viscosity, this fuel does not require heating before it can be handled and used. The alternatives are discussed in detail in

the Economic and Financial Evaluation Study (Bujagali II - Economic and Financial Evaluation Study, February 2007[4]).

Sub-step 1b: Consistency with mandatory laws and regulations

All of the mentioned scenarios are consistent with mandatory laws and regulations in Uganda.

Conclusion: All mentioned scenarios are consistent with mandatory laws and regulations in Uganda and therefore the Project satisfactorily passes Step 1

Step 2: Investment analysis

Not included

Step 3: Barrier analysis

Sub-step 3a: Identify barriers that would prevent implementation of the proposed CDM project activity

The turbulent history of the Bujagali Project in itself evidences that the Project had to overcome significant barriers to achieve financial closure and begin construction. The project was initially proposed in 1997 by the GOU and AESNP, an international power company based in the USA. The developers experienced a difficult development period with numerous parties debating the pros and cons of the project.

This first attempt to develop the Bujagali Project was unsuccessful after approximately six years of preparation. During this period the original Project developers discussed selling the anticipated emissions reductions to the Dutch government. These discussions took place in September 2002, in the early days of the development of CDM. In February 2003, the Dutch government decided to abstain from buying emission reductions from the Project. Shortly thereafter AES decided to discontinue the development of the Project.

Analysing the Project's history, it becomes clear that the prospect of CDM benefits was able to help lift at least two key barriers, which are elaborated below:

- A barrier due to the financial position of the Government of Uganda;
- Investment barriers.

The Project faced other barriers, like the insufficient infrastructure to transport the electricity from the Project to Kampala load centre. A transmission interconnection system is now being developed by The Bujagali Interconnection Project, a separate project sponsored by Uganda Electricity Transmission Company Limited (UETCL). BEL entered into an agreement to oversee and manage the development and construction of this power transmission line to ensure it is coordinated with the construction of the hydro project and with the approval of lenders. The transmission line is crucial for the successful operation of the Bujagali hydropower plant.

Barrier due to the financial position of the Government of Uganda

[4] http://siteresources.worldbank.org/EXTBUJHYDPOWPRO/Resources/BujagaliEconFnclEvalStudyMainText.pdf

Under the terms of a Power Purchase Agreement ("PPA"), UETCL, the state-owned electric transmission company in Uganda, is purchasing all power produced by the Bujagali Project. Under the terms of a Guarantee Agreement, the GOU has provided a sovereign guarantee of the performance of UETCL under the PPA, see Figure 4. The PPA is structured as a monthly capacity payment, based on availability of the plant. Once the Project is fully operational, the yearly payment amounts to approximately USD 116 million[5] excluding the annual payments on the loans associated with the transmission line.

This annual payment obligation constitutes a barrier to the implementation of the Project, for three main reasons.

Firstly, shortfall in collecting revenue: UETCL historically has had difficulties collecting payments from the network electricity customers which purchase the power from the distribution company Umeme, the national power distribution company, who in turn purchases the power from UETCL. This could make it difficult to raise the revenue to make the capacity payments. In 2005 only 47% of generation was paid for by end users[6]. Main issues are: high technical distribution losses, high unbilled energy(not metered and/or billed), and high unpaid bills. UETCL and Umeme are working to reduce losses, improve collection rates and bring down arrears. The Economic and Financial Evaluation study expects losses go down to 21% in 2012.

Whilst UETCL and Umeme are taking steps to reduce these losses it appears that there will continue to be a shortfall in collecting revenue. The payment of CER revenue will assist the GOU as the guarantor to UETCL to bridge this shortfall, see below.

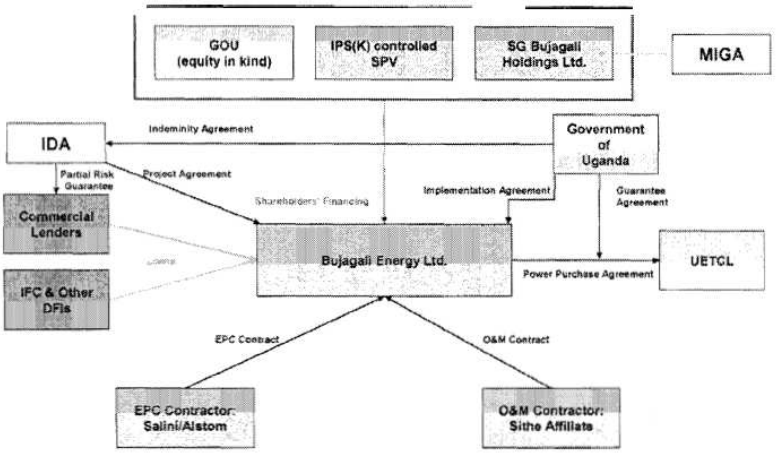

Figure 4: the principal project contractual agreements

Secondly, Foreign Exchange: UETCL is paid for electricity in Ugandan Shillings although UETCL will pay BEL in US Dollars. This creates an exchange rate risk for the GOU as the

[5] Economic and financial evaluation study, table 9-6

[6] Economic and financial evalutation study, table 2.2

Ugandan Shilling fluctuates significantly against the US dollar and has lost about 50% of its value since 2000, see Figure 5.

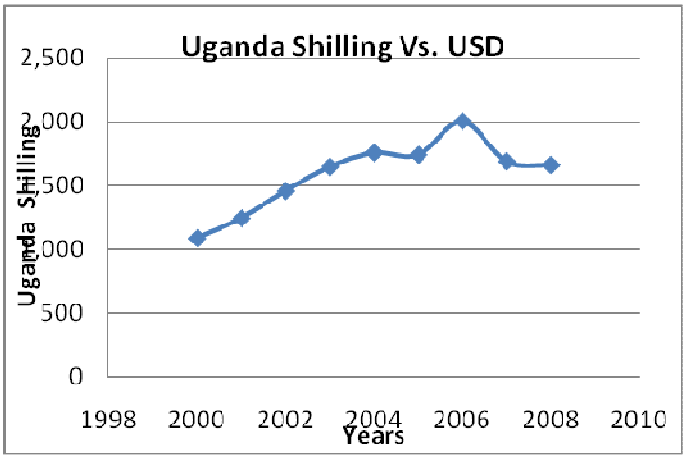

Figure 5: Exchange rate change over time: Uganda Shilling Vs. USD. Source: https://www.cia.gov/library/publications/the-world-factbook/fields/2076.html

Currently, the Ugandan Central Bank has enough US dollars to cover 5 months of foreign exchanged based imports[7]. The annual payment for electricity to BEL represents 5% of this.

The GOU has limited access to financial resources. Due to the current high cost of generating electricity, the GOU has borrowed funds from the World Bank to subsidise the price. This is not sustainable in the long run. The Project will lower the average cost of power for UETCL considerably, which may eliminate the need to subsidize the price and ease the strain on the country's financial resources and foreign exchange reserves since CERs will be sold in hard currency. This will assist in the repayment obligation to BEL.

Thirdly, Risk mitigation under the PPA: In addition to revenue collection risks and foreign exchange risk, the UETCL and consequently the GOU are also exposed to external risks like lower demand growth, low hydrology and capital cost escalation. These risks can affect the projected revenues or increase the anticipated costs.

The anticipated CER revenues contribute significantly to mitigating these risks. The GOU receives 60% of the CER income which is estimated at USD 10 – 17 million per year, depending on the amount of generation and CER prices. This revenue will help bridge the gap between electricity sales revenue and payments to BEL. Should collection rate remain at the 2005 level of 47%, and if the targeted average consumer price of USD 0.17 per kWh is attained, then the GOU will face a yearly shortfall of USD 12 million in payments to BEL. The CER income could bridge this gap (exclusive of the cost of the transmission line) completely.

Also the other aspects of payment risk are mitigated this way. The CER income will provide GOU with a cushion whilst they implement a plan to reduce distribution and commercial losses and improve the bill collection rate. The CDM revenues support the GOU in stabilising the

[7] Bank of Uganda: Monthly Economic And Financial Indicators, January 2009, http://www.bou.or.ug

average price for the consumer and will reduce the need by GOU to subsidise power and borrow funds.

At the same time, the risks assumed by the GOU represent a credit risk to BEL, the Project sponsor. The CER revenues to be received by GOU will substantially mitigate the anticipated shortfall and hence be an additional comfort for BEL for payment of amounts due under the PPA. Similarly, the 40% of carbon income received by BEL mitigates exposure to the payment risk, as offshore counterparties will make the payments in hard currency.

Investment barrier

Any large scale investment in Uganda faces significant investment barriers that prevent the investment from being implemented. The Project sponsors considered the CDM essential in mitigating the country risk for this large investment in Uganda. The CDM contributed to lifting the investment barrier.

Uganda is facing difficulties in attracting potential private sector investors. Large scale private investments do not occur. Rating agencies (Standard and Poors, Moody's) do not provide risk ratings for the country's investment climate. The only rating that is related to the country is the rating of the Government of Uganda from Fitch[8]: a B-rating implying five levels below Investment Grade. Also the lack of power available is a barrier affecting attraction of investments into the country. A private investment of the scale of the Project has never been made in Uganda. Previous large investments include hydropower plants (Nalubaale (1954) and Kiira (2000-2002)), and have been fully publicly financed by international grants and multi-lateral lender loans to the GOU.

Recent developments in grid connected power production in Uganda can be divided into two categories.

The first category includes grid connected diesel and HFO generators, typically 50 MW in size. These production facilities come as temporary portable units and are often installed, managed and operated by private companies. Investment and O&M cost are recovered through the tariff, typically on short-term power purchase agreements with UETCL. UETCL has contracted with several operators to install and operate such plants over the past 10 years in order to reduce the acute power shortage.

The second category includes privately owned small diesel generators, purchased and operated by private entities including local industries, hotels and offices. These generators are typically 1 – 5 MW and provide energy in times of load shedding.

In both categories the electric power investments in Uganda are financed by project owners. They aim at minimising the investment risk by requiring a very short pay-back term and having portable equipment. Obtaining project finance, especially for large projects, is very difficult in Uganda[9]. Project owners continue to seek to minimise their financial exposure. As a result,

[8] http://www.fitchrating.com/web_content/ratings/sovereign_ratings_history.xls

[9] http://www.doingbusiness.org/ExploreEconomies/?economyid=193

private investment in power generation projects in Uganda is financially constrained and only projects with extremely short pay-back times are implemented. Typical PPAs amount to 3-5 years (Aggreko, Jacobsen).

Compared to any other energy investment in Uganda, the Bujagali Hydropower Project is unique. The project is unique in size and the fact that a private company was willing to make the investment and was able to raise the equity and debt necessary to construct the project. Even though the Project was identified as the least cost option for providing a long-term energy solution to Uganda (Bujagali II - Economic and Financial Evaluation Study, February 2007), this does not necessarily attract private investors. In fact, the failure to attract an investor for the Bujagali project in the past demonstrates this point.

Investments in Uganda are generally not only determined by reference to being a low cost option or offering an appropriate return on investment. Investors in Uganda try to minimise investment risks by short pay-back times, fast asset recoverability and reducing currency risk. This is clearly demonstrated by the current development of the Ugandan energy sector, which is based on 10 – 50 MW mobile diesel and HFO power plants, based on PPAs paid in US dollars.

Asset Recoverability: For small thermal plants, investment risk is reduced because, in the event that UETCL defaults on payment for electricity, the asset can be physically moved out of the country and used elsewhere, thereby significantly reducing investment risk. This is not the case for the Project, which involves a permanent non-movable installation which relies totally on the sales revenue from UETCL. This is another factor that makes investment in the Project risky for investors.

Project scale: The history of the Bujagali Project demonstrates that investors willing to invest in a project of this size and of this risk profile are very limited. The Project was unsuccessfully developed by the previous Project sponsor, AESNP, which withdrew from the Project in 2003. In 2004 the GOU began searching for a new sponsor and publicly tendered the Project. The GOU received prequalification proposals from five groups of potential sponsors, out of which three qualified to submit a full proposal. Out of these three, proposals of only two were deemed satisfactory, indicating the very limited amount of qualifying groups.
The size of the Project and the level of long term debt required necessitates a sponsor consortium with strong credentials, both technically and financially, in order to be acceptable to the GOU and raise the funds to reach financial closure. This is confirmed in the Project Appraisal Document of the World Bank, IFC and MIGA. The previous unsuccessful attempts to develop the project demonstrate that few investors have the ability to successfully develop a project of this magnitude in Uganda. One of the factors that BEL's shareholders took into consideration when making the investment were the CER revenues, as discussed earlier in this section and below.

Return on Investment: Both the revenues from the CERs and the non-monetary benefits from the CDM were key considerations of the BEL consortium to invest in the Project. The CDM benefits were (and are) in particular important to Sithe Global, which holds 60% of the shares in BEL. Sithe Global is an international development company formed in 2004 to develop, construct, acquire and operate strategic assets around the world and is an affiliate of Blackstone Capital Partners.

Under the Implementation Agreement with the GOU, BEL will gain 40% of the CERs generated by the Project. The revenues from the sale of these CERs were estimated to contribute 140 bps to the equity-IRR of Sithe Global. Sithe Global considers the income from the CERs an important tool to mitigate the risks of the Project and to secure the revenues and the IRR of the investment. The risks of the Project are such that a solid package of potential upsides is required to offset potential downsides. This becomes clear from an analysis provided to a shareholder investment committee when equity approval was requested in May 2007. The importance of the CER income to the shareholders is also confirmed in a presentation to the shareholder investment committee in April 2007.

Furthermore, the CDM provides an instrument to secure the obligations of the GOU and to safeguard the payments under the PPA. The commitment of the GOU is crucial in this Project. During the contract negotiations it became clear to the BEL consortium that the GOU finds the development of the CDM and the ensuing CERs extremely important, which is evidenced by the extensive discussions on ownership of the CERs, the distribution of revenue generated and the strict reporting requirements included in the Implementation Agreement.

Conclusion: there are significant barriers that prevent the implementation of the Project without the benefits of the CDM. The revenues from the CDM overcome these barriers for both the GOU and BEL. The Project satisfies this step 3a.

Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

The identified barriers apply to most of the project alternatives that were identified in sub-step 1a of this additionality test. The barriers do not affect scenario 2 however, the implementation of diesel and HFO generators in the range of 10 – 50 MW. Scenario 2 is the scenario that is actually taking place in Uganda, evidencing that it is not affected by the barriers that have been identified for the Project, (see Table 6).

Barrier due to the financial position of the Government of Uganda: Scenario 2 is not affected by the barrier due to the financial position of the GOU. The 10-50 MW generators are installed on short term PPAs. Power purchase agreements are typically 3 – 5 years only. The GOU does not enter into long term financial obligations. Hence the obligations of the GOU are not long term as is the case for the Project and hence don't constitute a barrier for the GOU.

Investment barrier: Scenario 2 is not affected by the investment barriers. In the first place the small thermal plants are movable. In the event UETCL defaults on payment for electricity, the asset can be physically moved out of the country thereby significantly reducing investment risk.

Secondly these plants, because of the small scale and because of the limited term of the PPA, are able to negotiate high power prices of up to USD 0.30 per kWh, thus reducing the pay-back period and increasing the return on investment considerably.

Thirdly these plants don't need the major single investment of one private party investor, as the Project does. The plants are typically 10 – 50 MW in size only, and the investment is done by different single investors.

Table 6: Analysis how barriers affect the alternative scenarios

Scenario	Investment barrier	Barrier on GOU finance
1. The Project	Significant	Significant
2. Diesel and HFO	None, while investments by the Project sponsors are relatively small and are paid back in short periods.	None, while there would not be long term PPAs. The GOU does not engage in long term commitments.
3. Gas turbines	Considerable	Significant
4. Combined cycle gas	Considerable	Significant
5. Steam plant HFO	Significant	Significant
6. Geothermal	Significant	Significant
7. Other Hydro	Significant	Significant

Conclusion: There is at least one alternative scenario that is not affected by the identified barriers (scenario 2). The Project satisfies this step 3b and hence satisfies step 3.

Step 4: Common practice analysis

No projects comparable to the proposed CDM project activity exist in Uganda. The other large hydropower plants Nalubaale (1954) and Kiira (2000-2002), with a joint installed capacity of 380 MW and formerly known as Owen Falls and Owen Falls Extension, were publicly financed through grants and loans by the World Bank to the GOU. No private investment was involved, so they are not comparable to the proposed CDM project activity.

Conclusion: the Project satisfies this step 4 and hence is considered additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

In the absence of the Project, electricity would have been produced by a combination of grid connected power plants already in operation, newly established generation sources and small off grid power diesel generators in use during load shedding. Calculation of the grid emission factor follows the guidance from the methodological "Tool to calculate the emission factor for an electricity system".

As per the Tool, the calculation of the baseline emission factor was carried out through a six step process:

- Step 1: Identifying the relevant electric system
- Step 2: Choose whether to include off-grid power plants in the project electricity system
- Step 3: Select a method to determine the operating margin (OM)
- Step 4: Calculate the operating margin emission factor according to the selected method
- Step 5: Identifying the group of power units to be included in the build margin (BM)
- Step 6: Calculating the build margin emission factor
- Step 7: Calculating the combined margin (CM) emission factor

Step 1: Identifying the relevant electric system:

The power grid in Uganda consists of hydroelectric power plants and thermal plants fuelled by diesel or heavy fuel oil. Power is transmitted over 132kV lines to the various load centres where it is distributed further on the 33kV network, see Figure 6. The highest operating voltage of the current Uganda network is 132kV. The grid is managed by UETCL.

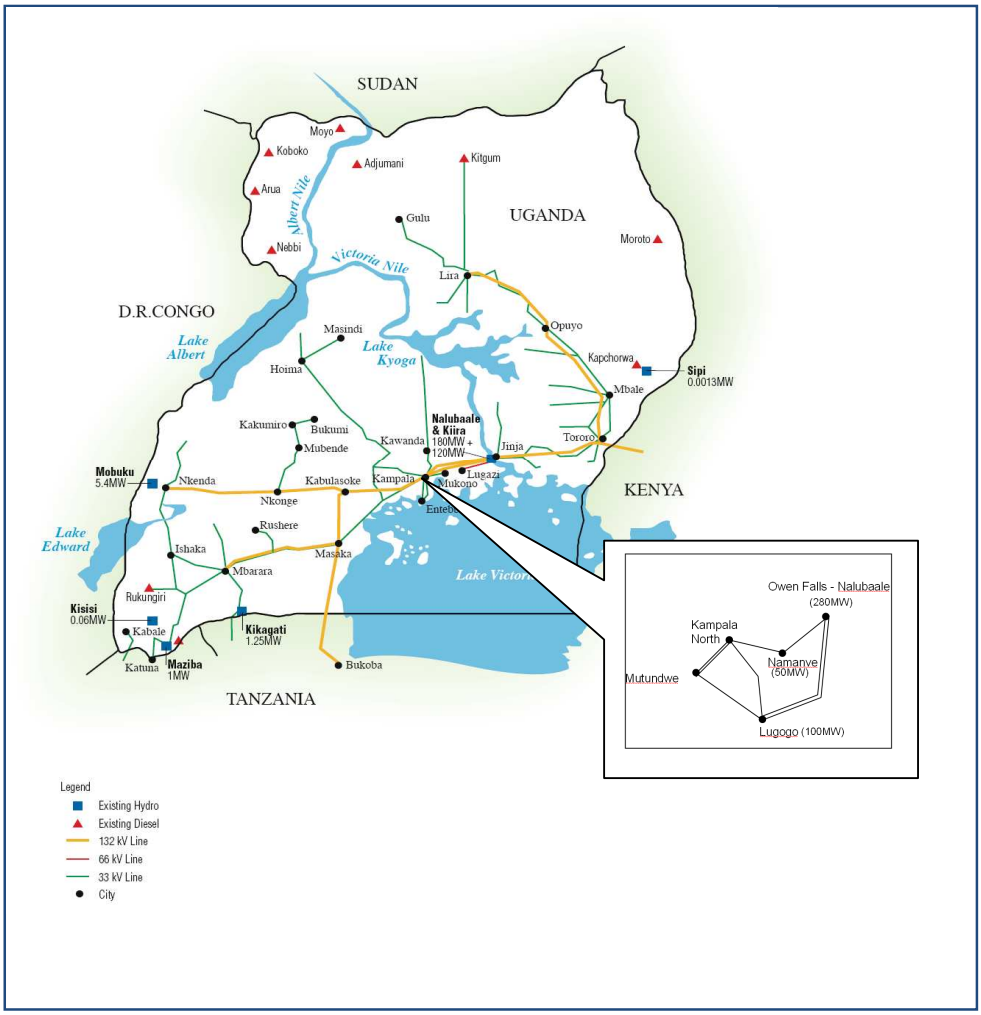

Figure 6: Uganda national electricity grid

The transmission backbone runs from from Jinja, where the Nalubaale, Kiira and Bujagali hydropower plants are situated, to Kampala. It will be upgraded to 220kV, but will initially operate at 132kV. Future plans call for a regional 220kV network around Lake Victoria. The new Bujagali lines will then be converted to 220kV by installing transformers at the main substations. It is expected that the backbone at

a later stage will be extended to Masaka in the south and to Tororo to the east. The 132kV network extends to Bukoba in neighbouring Tanzania in the south and to Kenya via Tororo in the east.

Total power production in Uganda averages 2000 GWh in the period 2005-2007, see Table 7.

Centrally dispatched power plants:

The main source of power generation in Uganda are two hydropower plants that were built in the mid 1950s (Nalubaale) and 2000-2002 (Kiira) respectively. Furthermore there are a number of small hydropower plants and a biomass plant.

To address a severe power shortage in the county, substantial thermal generation capacity was installed from 2005/6 to supplement the existing hydropower plants. Originally put in place to mitigate power shortages arising from seasonal low hydrology, the thermal power expanded in the following years to sustain the need for power in Uganda and to limit the effects of unpopular load shedding. These plants, typically 50 MW per plant, are operated by Aggreko and Jacobsen on short term (3 – 5 year) PPAs. They have produced up to 27% of grid connected power between 2005 and 2007 and are expected to produce more in the ensuing years.

Decentrally dispatched power:

In addition to the power centrally dispatched by UETCL, Uganda produces a considerable amount of electricity with privately owned small diesel generators with capacity below 5,000 KW that are connected to the grid and running during load shedding. The list of grid connected diesel generators along with diesel consumption per generator per month was provided by the Ugandan Revenue Authority.

In this PDD we have included these small diesel generators as part of the operating margin. Since specific data are not available for all small units, the calculations in this PDD consider only generators larger than 100 kW. According to off-grid generators database, the total capacity of generators above 100 kW that are connected to the grid and included in the baseline is 182 MW.

New and future Generation: The Namamve Jacobsen 50 MW HFO plant was commissioned in August 2008 on Build Own Transfer ("BOT") and will be transferred to UETCL after 6 years, where after it will serve as a peaking plant. In 2008 Aggreko Mtundwe, a diesel power plant with 50MW capacity started operation to partly replace. In 2009 Aggreko Lugogo was fully replaced by Aggreko Mtundwe. The recent discovery of oil in Lake Albert has opened up the potential for additional thermal generation. A thermal plant of 50 MW is being developed and will be operational towards the end of 2010 and its capacity may increase to 85 MW at a later stage. The Karuma Hydropower Plant is expected to be the next hydropower project after Bujagali, but its development is experiencing the same investment barriers as Bujagali has been suffering from. Construction may start in 7 – 10 years at the earliest.

Other sources of power:

Import/export: at the moment electricity trade between Kenya and Uganda is very limited (5 – 20 MW). It is expected to increase in the future when generation and transmission line constraints have been solved.

The net electricity import to the Ugandan national grid is not accounted in the grid emission factor calculations in this PDD, as the amount is negligible.

Standby generators and others: The rest of the country is scattered with small off-grid diesel and mini hydro plants, mainly to provide power to towns and regions not connected to the grid or small business and industrial regions suffering from power deficit and load-shedding. Most of them are not connected to the grid and are hence not included in the calculations in this PDD.

Table 7. Uganda current generation profile

Description	**Installed Generation Capacity 2009 (MW)**	**Agreement Type and Duration**	**Total Generation GWh**				
			2005	**2006**	**2007**	**2008**	**2009**
Nalubaale (Owen Falls) Hydro	180	Concession ESKOM	755	573	727	756	784
Kiira (Owen Falls Extension) Hydro	200	Concession ESKOM	960	610	551	633	480
Mobuko M/Hydro	9	UETCL	0	0	0	0	0
Kilembe Mines(KML) M/Hydro	5	Independent Power Producer ("IPP")	15	28	30	25	27
Kasese Cobalt Company(KCCL) M/Hydro	10.5	IPP	1.2	1.5	0.78	1.2	1.5
Kakira Sugar Works (KSW) Bagasse	12	IPP	0	0	0	54	86
Lugogo (Aggreko) Diesel	50	IPP (3y) May 2005 to Aug 2008	141	302	266	182	0
Kiira (Aggreko) Diesel	50	IPP (3y) Oct 2006 – Oct 2009	0	68	273	193	131
Namamve Jacobsen HFO	50	Build Own Transfer ("BOT") Sept 2008 to Sept 2015	0	0	0	116.5	364
Mtundwe (Aggreko) Diesel	35	IPP (3y) Mar 2009 to Sept 2011	0	0	0	100	409
Lake Albert HFO			-	-	-		
Generation during load shedding	40 - 100		58	443	145	48	5
Total generation	**592MW (2009)**		**1872**	**1582**	**1847**	**2060**	**2282**

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

In addition to the power centrally dispatched by UETCL, private entities in Uganda produce a considerable amount of electricity using small off grid diesel generators with capacity ranging between 100kW and 5,000kW that are running during planned load shedding periods. These generators provide peak load capacity when the grid capacity is insufficient.

This PDD uses Option II, which includes off-grid power plants for the calculation of grid emission factors.

In order to include off grid power generators in emission factor calculations, procedures related to off-grid power generation indicated in Annex 2 in the "Tool to calculate the emission factor for an electricity system", version 02 were applied as follows:

Step1: Obtain Data from on off-grid power generation

Data collection was done by direct use of data on a plant-by-plant basis. The extent of off-grid power generators only includes the business and industrial sectors.

Step1.1: Choose the data to be collected:

The following table gives an indication of the data collected.

Table 8. Data of off-grid power plants in Uganda

Data	Description
$TECH_p$	The technology of all off grid systems is Reciprocating Diesel Engines
CAP_p	The nominal electric Capacity of each off-grid power plant was determined
$FUEL_p$	All off-grid power plants fuel type is Diesel
$Grid_p$	All consumers supplied by off-grid power plants are also connected to the electricity grid which is capable of supplying their power demand entirely during time intervals where grid electricity is available, reliable and stable
$SWITCH_p$	Consumers supplied by their off-grid power plant can easily switch between electricity supply from the grid and off-grid power plants. The majority of the consumers have an automatic change-over-switch system in place
$EG_{p,y}$	Monthly and yearly electricity generated from the off-grid power plant
$FC_{p,y}$	Monthly and yearly amount of diesel consumed by every off-grid plant

Step1.2 Classification of off-grid power plants

The calculations in this PDD consider only the business and industrial sectors with generating capacities larger than 100 kW. Within this group, 83% of the generators are between 100 and 500 kW, 12% between 501 and 800 kW and only 5% above 800 kW with the maximum of 5,000 kW. The total capacity of generators above 100 kW included in this PDD is 182 MW.

Step1.3 Define the Sectors for which Data is collected

Since it was quite complex and cumbersome to gather off-grid generation data for residential sectors which is normally between 10 and 200kW it has been decided to focus on business and industrial sectors with sector sizes as indicated in Step 1.2.

Step1.4: Establish a survey design and management scheme.

The list of off-grid connected diesel generators were provided by the Ugandan Revenue Authority. This step is not applicable.

Step1.5: Collect the data sources or use existing data sources

Plants were excluded where not all necessary data could be collected.

Step2: Exclude Plants that do not qualify as off-grid plants

This step aims to exclude those power plants from the sample or other data source which cannot be considered as off-grid power plants according to the definition provided above. Plants were excluded from the sample or other source of information for which one of the three following conditions is not met:

• GRIDp: met;
• SWITCHp: met;
• Whenever the grid is reliable and stable, the consumers purchase electricity only from the grid and the off-grid power plant is not operating. This can be demonstrated in one of the following ways:
(a) OMCp,y > TEL,p,y; OMCp,y is variable operation and maintenance costs of off-grid power plants and TEL,p,y is tariff of purchasing grid electricity for consumers supplied by off-grid units.
(b) Log book data on the hours of operation and diesel consumption of the off-grid power plants were recorded as is available in a separate spreadsheet.
Option (a) was met because the grid tariff is subsidised by the government and is lower than power generation costs by diesel generators.

Step 3: Aggregate data according to classes of off grid power plants.

This step is addressed in the spreadsheet attached to the PDD.

Step4: Assess the extent of off-grid power.

The inclusion of off-grid power plants in the grid emission factor is only allowed if one of the following two conditions are met:

- The total capacity of off-grid power plants (in MW) is at least 10% of the total capacity of grid power plants in the electricity system; or
- The total power generation by off-grid power plants (in MWh) is at least 10% of the total power generation by grid power plants in the electricity system.

The total capacity of off-grid generators connected to the grid amounts to 182MW which is 30% of the total UETCL capacity of 592MW in 2009.

Step 5 Assess the reliability and stability of the grid and that this is primarily due to constraints in generation, and not to other aspects such as transmission capacity

The average daily load shedding figure ranges between 40 and 60 MW and increases to 100 MW during the evening peak between 20:00 and 22:00. Determining the load-shedding figure is done by reading the hourly energy consumption during normal operation of each transmission and satellite station i.e. when all circuit breakers feeding feeder cables to the various load centres are switched on and no pre-determined load-shedding is executed. When a certain energy deficit is declared by the Grid Operator (normally on a day ahead basis), feeder cables and lines are then switched off until the deficit is met.

The load shedding figure is determined on a day ahead basis. It is determined as the difference between the expected demand and the available generation. If for example 60MW needs to be shed then small off grid generators shall contribute to compensate the grid power shortage up to 60MW or a portion thereof. Load shedding happens on a rotational basis, thus the contribution by small standby generators changes from hour to hour. As can be seen in the spreadsheet attached to the PDD document load shedding varies from 0.1% to 28% primarily due to shortage in generation.

The factors that negatively affect the reliability and stability of the grid in Uganda are primarily due to constraints in generation and not to other aspects.

Step 3: Selecting an operating margin (OM) method

The "Tool to calculate the emission factor for an electricity system" allows four different approaches for calculating the OM emission factor.

1. Simple OM,
2. Simple adjusted OM,
3. Dispatch data analysis OM, or
4. Average OM.

Option 1 ("simple OM") is allowed only when total generation of low-cost/must-run power plants comprise less than 50% of total generation of the grid. In 2007, 70% of the electricity in Uganda came from hydropower stations that are considered low-cost/must-run power plants[10]. Therefore the simple OM method cannot be used for OM emission factor calculation.

This PDD chooses the simple adjusted OM calculation, which best fits the data requirements and the data available from verifiable sources in Uganda. The OM emission factor can be calculated using either of the two following data vintages:

- *Ex-ante*: based on the 3-year generation-weighted average by using the most recent data available at the time of submitting the PDD to the DOE for validation. If this option is used there will be no need for monitoring and recalculating the emission factor during the crediting period.
- *Ex-post*: The emission factor should be updated for the year in which the power plant displaces grid electricity. This emission factor should be updated annually for the rest of the crediting period during the monitoring.

This PDD uses *ex ante* vintages.

[10] From data provided by Uganda Electricity Transmission Company Ltd.

Step 4: Calculating the operating margin emission factor according to the selected method

The simple adjusted OM emission factor is calculated as the CO_2 emission per unit net electricity generation (tCO_2/MWh) where the power plants/units are separated in low-cost/must run power sources (*k*) and other sources (*m*). The simple adjusted OM calculates the net electricity generation of each power unit and an emission factor for each power unit as follows:

$$EF_{grid,OM-adj,y} = (1-\lambda_y).\frac{\sum_m EG_{m,y} .EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y.\frac{\sum_k EG_{k,y} .EF_{EL,k,y}}{\sum_k EG_{k,y}} \quad (1)$$

Where;

$EF_{grid,OM-adj,y}$	=	Simple adjusted operating margin CO_2 emission factor in year y (tCO_2/MWh)
λ_y	=	Factor expressing the percentage of time when low cost/must run power units are on the margin in year *y*.
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y*
$EG_{k,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *k* in year y
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$EF_{EL,k,y}$	=	CO_2 emission factor of power unit *k* in year *y* (tCO_2/MWh)
m	=	All grid power units serving the grid in year *y*, except low cost must-run power units
k	=	All low-cost/must run grid power units serving the grid in year *y*
y	=	The relevant year as per the data vintage chosen in step 3

Off-grid power plants are included in the operating margin emission factor and are treated as other power units *m.*

The parameter λ_y is defined as follows:

λ_y (%) = (number of hours low-cost/must-run sources are on margin in year *y*) / 8760 hours per year

According to the methodology λ_y should be calculated as follows:

- Step i) Plotting a load duration curve. Collect chronological load data (typically in MW) for each hour of the year *y*, and sort the load data from the highest to the lowest MW level. Plot MW against 8760 hours in the year, in descending order.

- Step ii) Collecting power generation data from each power plant / unit. Calculating the total annual generation (in MWh) from low-cost/must-run power plants / units.
- Step iii) Filling the load duration curve. Plot a horizontal line across the load duration curve such that the area under the curve (MW times hours) equals the total generation (in MWh) from low-cost/must-run power plants / units (i.e. $\Sigma_k EG_{k,y}$).
- Step iv) Determining the "Number of hours for which low-cost/must-run sources are on the margin in year *y*". First, locate the intersection of the horizontal line plotted in step (iii) and the load duration curve plotted in step (i). The number of hours (out of the total of 8760 hours) to the right of the intersection is the number of hours for which low-cost/must-run sources are on the margin. If the lines do not intersect, then one may conclude that low-cost/must-run sources do not appear on the margin and λ_y is equal to zero.

In determining λ_y only grid power units (and not off-grid power plants) are considered.

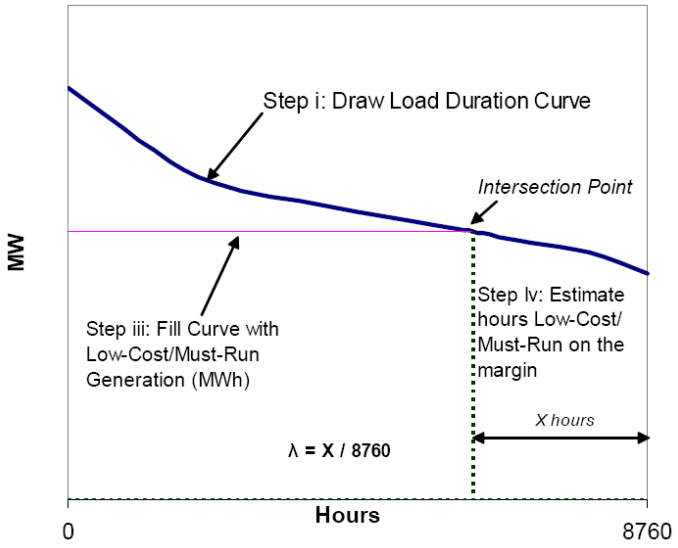

Figure 7: Load duration curve

Table 9: Lambda calculation.

Year	Low-cost/must-run/Margin intersection (hours)	X (hours)	Lambda	Total net generation by low-cost/must-run MWh	Total net generation MWh
2005	3,780	4980	0.568	1,715,148	1,855,731
2006	8,521	239	0.027	1,195,031	1,565,029
2007	8,747	13	0.001	1,293,965	1,833,209
2008	>8,760	0	0	1,456,267	2,069,719
2009	>8,760	0	0	1,357,909	2,241,814

Table 10: OM emission factor

Year	Emissions (tCO_2)	(1-Lambda)	Gen. MWh power plants other than low-cost must-run	OM EF (tCO2/MWh)
2005	103,452	0.432	140,583	0.318
2006	296,222	0.973	416,333	0.692

2007	427,262	0.999	592,527	0.720
2008	458,456	1	610,923	0.750
2009	670,063	1	905,520	0.740
Average OM emission factor (tCO2/MWh) 2007, 2008 and 2009				0.737
OM emission factors were calculated based on raw data submitted by UETCL. The process of calculation can be found in spreadsheets available for validation.				

Step 5: Identifying the group of power units to be included in the build margin (BM)

The methodology requires that the sample group of power units *m* used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently, or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The option that comprises the larger annual generation should be chosen. Power plants registered as CDM project activities should be **e**xcluded from the sample group m as long as the power plants in the sample group are not older than 10 years.

As per Table 11 below, the five most recently built power plants comprise more than 20% of total generation in 2009.

Table 11. Sample group of power plants used for BM emission factor calculation.

Power Plants for BM calculation year 2009		**Start Year of Operation**	**Installed Capacity (MW)**	**Type of Fuel**	**Generation 2009 (MWh/yr)**	**Accumulative annual generation ratio**
Thermal						
1	Namanve-Jacobson	2008	50	HFO	364,289	16.1%
2	Aggreko-Mutundwe	2008	35	Diesel	409,591	18.1%
3	Aggreko-Kiira	2007	50	Diesel	131,639	5.8%
Hydro						
4	KCCL	2005	10.5	Hydro	1,455	0.06%
Biomass						
5	KSW	2007	12	Biomass	86,049	3.8%
Total generation percentage						43.87%
TOTAL grid Generation in 2009 (MWh)						2,263,430
Source: UTECL annual electricity generation data base 2005-2009						

The BM emission factor can be calculated using either of the two following data vintages:

Option 1. For the first crediting period, the build margin emission factor is calculated ex-ante based on the most recent information available on units already built for sample group m at the time of PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period,

the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2. For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the Project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

For this Project calculation of the BM with *ex-ante* data as in option 1 has been chosen.

Step6: Calculating the build margin emission factor

The build margin emission factor is the generated-weighted average emission factor (tCO_2/MWh) of power units in sample group *m* during the most recent year *y* for which power generation data is available. BM is calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y}.EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (13)$$

Where

$EF_{grid,BM,y}$ =the build margin emission factor (tCO_2/MWh) in year *y*,
$EG_{m,y}$ =the net electricity generated by power plant *m* in year *y*,
$EF_{EL,m,y}$ =the emission factor of a power plant *m* in year *y*,
m =the power plants included in BM sample group,
y =the most recent year in which historical data regarding electricity generation is available.

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) should be determined as per the guidance in step4(a) of the simple OM, using options A1 or A2 or A3, using for y the most recent historical year for which power generation data is available, and using m the power units included in the build margin.

Off-grid power generators are not considered for BM emission factor calculation.

Table 12. Summary of BM emission factor calculation

Power Plants for BM calculation for the year 2009		Generation 2009 (MWh/yr)	CO2 Emission (tCO2/yr)
Thermal			
1	Namanve-Jacobson	364,289	249,166
2	Aggreko-Mutundwe	409,591	299,294
3	Aggreko-Kiira	131,639	96,191
Hydro			
4	KCCL	1,455	0.00 (renewable)

Biomass			
5	KSW	86,049	0.00 (renewable)
TOTAL		993,023	644,652
BM Emission Factor 2009 (tCO2/MWh)			0.649
BM emission factor calculation was based on data from UTECL			

The BM emission factor was calculated at 0.649 tCO_2/MWh for 2009. This year was the most recent year for which the grid generation data was available and complete.

Step 7: Calculating the combined margin (CM) emission factor

After calculating the OM and BM emission factors the combined margin emission factor or the baseline emission factor (EF_y) was calculated using the following equation:

$$EF_{grid,CM,y} = w_{OM} . EF_{grid,OM,y} + w_{BM} . EF_{grid,BM,y} \quad (14)$$

Where, $EF_{grid,CM,y}$ is the baseline emission factor (tCO_2/MWh), w_{OM} and w_{BM} are the weight factors for OM and BM emission factors and in any condition the sum of both should be equal to 1 . $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are operational and build margin emission factors (tCO_2/MWh).

For hydropower projects w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period , and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period.

Table 13. Final result of OM, BM and CM emission factor calculations

Factor	Value (t CO_2e/MWh)
Operating Margin Emission Factor (OM EF)	0.737
Build Margin Emission Factor (BM EF)	0.649
Combined Margin Emission Factor (CM EF)	**0.693**

The combined margin emission factor for the Project is 0.693 tCO_2/MWh.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$EG_{m,y}$, EG_y, $EG_{k,y}$, $EG_{n,h}$
Data unit:	MWh
Description:	Net electricity generated by power plant/unit *m, k or n* (or in the project electricity system in case $EG_{y,}$) in year *y* or hour *h*
Source of data used:	Raw data supplied by UETCL
Value applied:	Different values per power plant
Justification of the choice of data or description of measurement	For BM emission factor calculation above parameter should be used along with emission factor of five most recently built power plants. These data were available through the database of UETCL.

methods and procedures actually applied :	
Any comment:	Details of BM emission factor calculations are available in spreadsheets.

Data / Parameter:	$EG_{i,h,y}$, $EG_{k,h,y}$
Data unit:	MWh/h, MWh/y
Description:	Net electricity generated and delivered to the gird by low-cost/must-run (k) and non-low-cost/must-run (j) power plants per hour *h* and year *y*
Source of data used:	Raw data supplied by UETCL . Electricity generation data for small diesel generators were acquired through the Ugandan department of Commissioner, Customs and Excise.
Value applied:	Different values per power plant/power company (data available in spreadsheets)
Justification of the choice of data or description of measurement methods and procedures actually applied :	For OM simple adjusted emission factor calculation above parameters should be used in order to calculate lambda by which the OM emission factor will be calculated. These data was available through the database of UETCL for years 2007, 2008 and 2009 in which the most recent historical data was available.
Any comment:	All data is available in spreadsheets.

Data / Parameter:	Plant name of the set of plants *m* representing the build margin.
Data unit:	Text
Description:	Identification of power plants for the Build Margin.
Source of data used:	Data supplied by UETCL.
Value applied:	Different names and dates of becoming operational.
Justification of the choice of data or description of measurement methods and procedures actually applied :	For BM emission factor calculation it is needed that either a) five most recently built power plants or b) recently built power plants that comprise 20% of total annual power generation, is considered for calculations. The option that has a larger share in power generation should be selected.
Any comment:	This data are available in spreadsheets.

Data / Parameter:	Energy companies representing the operating margin.
Data unit:	Text
Description:	Identification of power plants for the Operating Margin.
Source of data used:	Data supplied by UETCL.
Value applied:	Different names.
Justification of the choice of data or description of measurement methods and	Annual electricity generation and emissions of these power plants were used in order to perform OM emission factor calculations.

procedures actually applied :	
Any comment:	This data are available in spreadsheets.

Data / Parameter:	$FC_{i,m/j/k/,y}$
Data unit:	liters
Description:	Fuel type *i* consumed in power plant *m*, *j* or *k* in year *y*
Source of data used:	Raw data supplied by UETCL and was processed in spreadsheets. Fuel consumption data for small diesel generators were acquired through Ugandan Department of Commissioner, Customs and Excise.
Value applied:	Different values per power plant/power company.
Justification of the choice of data or description of measurement methods and procedures actually applied :	For OM and BM emission factor calculation above parameter should be used in order to calculate emission factor of the power plant. As described in page 7, equation 3 of "Tool to calculate the emission factor for an electricity system". These data were available through the database of UETCL.
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	$\boldsymbol{NCV_{i,y}}$
Data unit:	GJ/liter
Description:	Net calorific value (energy content) of fossil fuel type i in year y.
Source of data to be used:	IPCC
Value of data applied	Diesel= 0.03655 GJ/Litre (43 TJ/kt, 0.85kg/l) HFO= 0.03757 GJ/Litre (40.4 TJ/kt, 0.93kg/l)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is used together with fuel consumption and emission factor of diesel in different power plants in order to calculate the emission factor of each plant unit for the calculation of OM and BM emission factors.
Any comment:	Default values from IPCC.

Data / Parameter:	$\boldsymbol{EF_{CO2,i,y}}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fossil fuel type i in year y.
Source of data to be used:	IPCC
Value of data applied	Diesel= 0.0741 tCO_2/GJ HFO= 0.0774 tCO_2/GJ
Justification of the choice of data or description of	Calculated from carbon contents of different fuels and relations of molecular mass of carbon and carbon dioxide.

measurement methods and procedures actually applied :	
Any comment:	Data compared to default values from IPCC.

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	Build margin (BM) emission factor.
Source of data used:	Calculated based on the data supplied by UETCL as per the "Tool to calculate the emission factor for an electricity system".
Value applied:	0.649 (2009)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The BM emission factor together with OM emission factor is needed to calculate the combined margin emission factor which is used to estimate the amount of Project's emission reductions. BM emission factor was calculated using the data provided by UETCL.
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO_2/MWh
Description:	Operating margin emission factor.
Source of data used:	Calculated based on the data supplied by UETCL as per the "Tool to calculate the emission factor for an electricity system" plus the data received from Ugandan Revenue Authority regarding fuel consumption of grid connected small diesel generators.
Value applied:	0.737
Justification of the choice of data or description of measurement methods and procedures actually applied :	The OM emission factor is needed together with BM emission factor to calculate the combined margin emission factor which is used to estimate the amount of Project's emission reductions. OM emission factor was calculated using the data provided by UETCL.
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin emission factor (the baseline emission factor)
Source of data used:	Calculated based on the data supplied by UETCL as per the "Tool to calculate the emission factor for an electricity system".
Value applied:	0.693
Justification of the choice of data or description of	The baseline emission factor is needed to estimate the amount of Project's emission reductions. CM emission factor was calculated using OM and BM emission factors as per the "Tool to calculate the emission factor for an

measurement methods and procedures actually applied :	electricity system".
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water after implementation of the Project activity and when the reservoir is full.
Source of data to be used:	Bujagali Hydropower Project Social and Environmental Assessment Report, by Burnside International Limited, December 2006.
Value of data applied	3,880,000 m^2 (388 ha)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Measured using topographical surveys, maps, satellite pictures etc. based on normal operating level of water behind the dam.
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

The amount of emission reductions due to Project activity is calculated as the difference between the amount of emissions in the baseline, emissions due to Project activity and possible leakage during the construction of the Project which can be formulated as the following:

$$ER_y = BE_y - PE_y \quad (6)$$

Where:

ER_y the emission reduction due to project activity (tCO_2e);
BE_y the baseline emissions (tCO_2e);
PE_y emissions due to project activity (tCO_2e);

Baseline emissions (BE_y) can be calculated as:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} \quad (7)$$

Where:

BE_y the baseline emissions (tCO_2e/yr);
$EG_{PJ,y}$ quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{grid,CM,y}$ the combined margin CO_2 emission factor of the grid connected power generation in year y (tCO_2/MWh)

Project emissions (PE_y) includes emissions from use of backup power and from the inundation of land. The Project does not include use of backup fossil fuel fired power capacity on the Project site, which will be very rare. Emissions from the inundation of land should be taken into account only if the power density of the Project is below 10 W/m^2. Since the power density of the Project is 64 W/m^2, possible emissions from land inundation are not taken into account as Project emissions.

$$PE_y = PE_{FF,y} + PE_{HP,y} \quad (8)$$

PE_y project emissions in year y (tCO_{2e}/yr)
$PE_{FF,y}$ project emissions from fossil fuel consumption in year y (tCO_2/yr)
$PE_{HP,y}$ project emissions from water reservoirs of hydropower plants in year y (tCO_{2e}/yr)

In the Project as described above, $PE_{FF,y}$ and $PE_{HP,y}$ are equal to zero. Therefore:

$$PE_y = 0 \quad (9)$$

According to ACM0002 version 10, project leakage such as emissions during Project construction are negligible and are not taken into account.

B.6.4 Summary of the ex-ante estimation of emission reductions:

For the emission reduction calculations, the annual electricity generation of the Project and baseline emission factor (combined margin emission factor) are required.

The combined margin resulting from the calculations in section B.6.1 amounts to 0.693 tCO_2/MWh. Annual expected power generation is estimated at 1,305 GWh, using the average of the high and low hydrology estimates in the Economic and Financial Evaluation Study. Annual emission reductions generated by the Project are therefore calculated as follows:

Table 14. Summary of annual emission reduction of Bujagali.

Year	Estimation of project activity emissions (t CO_2 e)	Estimation of baseline emissions (t CO_2 e)	Estimation of leakage (t CO_2 e)	Estimation of overall emission reductions (t CO_2 e)
8 April 2012 – 7 April 2013	0	904,000	0	904,000
8 April 2012 – 7 April 2014	0	904,000	0	904,000
8 April 2013 – 7 April 2015	0	904,000	0	904,000
8 April 2014 – 7 April 2016	0	904,000	0	904,000
8 April 2016 – 7 April 2017	0	904,000	0	904,000
8 April 2017 – 7 April 2018	0	904,000	0	904,000
8 April 2018 – 7 April 2019	0	904,000	0	904,000
Total	**0**	**6,328,000**	**0**	**6,328,000**

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:	
(Copy this table for each data and parameter)	
Data / Parameter:	EG_y
Data unit:	MWh/y
Description:	Electricity delivered to grid in year y
Source of data to be used:	Will be measured by two calibrated meters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In this PDD the value applied is 1,305,000 MWh based on the design documents of Bujagali hydropower station.
Description of measurement methods and procedures to be applied:	Continuous onsite measurement and monthly recording by the Project owner.
QA/QC procedures to be applied:	Meters will be checked and calibrated periodically and measured data will be cross checked by electricity invoices and sales documents. The most conservative data will be used to calculate CERs generated by the Project during the verification.
Any comment:	

Data / Parameter:	EG_X
Data unit:	MWh/y
Description:	Electricity supplied from the grid in year y
Source of data to be used:	Will be measured by two calibrated meters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In this PDD the value applied is 0.
Description of measurement methods and procedures to be applied:	Continuous onsite measurement and monthly recording by the Project owner.
QA/QC procedures to be applied:	Meters will be checked and calibrated periodically and measured data will be cross checked by electricity invoices and sales documents. The conservative data will be used to calculate CERs generated by the Project during the verification.
Any comment:	

Data / Parameter:	$FC_{project\ plant\ diesel,\ y}$
Data unit:	tons/y
Description:	Quantity of the diesel fuel used in the Project to back up any electric generator in year y.

Source of data to be used:	On-site recording by the Project owner.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	No diesel generator exists on site. In this PDD the value applied is 0.
Description of measurement methods and procedures to be applied:	Continuous onsite recording and will be archived up to 2 years after the crediting period.
QA/QC procedures to be applied:	Quantity of diesel consumption will be double checked with invoices and the value will be used that can cause more project emissions.
Any comment:	

Data / Parameter:	$NCV_{Diesel,y}$
Data unit:	GJ per mass or volume unit
Description:	Net calorific value of diesel consumed by back up generators in the Project.
Source of data to be used:	National data or IPCC values.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In this PDD the value applied for Diesel is 0.038824 GJ/liter from IPCC guidebook.
Description of measurement methods and procedures to be applied:	-
QA/QC procedures to be applied:	-
Any comment:	

Data / Parameter:	$EF_{CO2.\ diesel}$
Data unit:	tCO_2/GJ
Description:	Emission factor of diesel.
Source of data to be used:	National data or from IPCC guidebook.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In this PDD the value applied for Diesel is 0.0726 tCO_2/GJ.
Description of measurement methods and procedures to be applied:	-

QA/QC procedures to be applied:	-
Any comment:	

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the Project activity, when the reservoir is full.
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	3,880,000 m^2 (388 ha)
Description of measurement methods and procedures to be applied:	Measured yearly from topographical surveys, maps, satellite pictures, etc.
QA/QC procedures to be applied:	-
Any comment:	-

B.7.2. Description of the monitoring plan:

The approved monitoring methodology ACM0002 is used for developing the monitoring plan. Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the proposed Project is monitored and reported.

Responsibility:
The responsibility for monitoring and reporting lies with the Project owner. Trained staff will be dedicated to carry out the monitoring process including data recording, reporting, archiving and management.

Data monitored:
Required parameters to be monitored are listed as per subsection B.7.1.

Meters installation:
The metering equipment will be configured and checked annually in accordance with the requirement. Two meters will be installed to measure the net electricity delivered to grid separately.

Reporting:
The specific steps for data collection and reporting are listed below:

- The data of electricity supply to the grid will be recorded continuously electronically.
- The Project owner will read and collect the information from the main meter and records data every month.

- The grid company will provide sales documents for cross-checking.
- The Project owner will provide two meters' readings and photocopies of invoices to DOE for verification.
- The Project owner will record the consumption of diesel for backup power use and file invoices from suppliers.

Calibration and data management:
The metering equipment will be calibrated and checked periodically for accuracy. The metering equipment shall have sufficient accuracy so that any error resulting from such equipment shall not exceed 0.5% of full scale rating. Calibration will be carried out by the qualified staff according to manufacturer's recommendations. Both meters shall remain sealed according to requirements of the power purchase agreement.

All documents including maps, diagrams, engineering and environmental assessments will be kept in a central place, together with this monitoring plan. All information will be stored by the monitoring group and all material will have a copy for backup. And data including calibration records is kept until 2 years after the end of the total credit time of the CDM project. These monitoring and record keeping requirements will be incorporated into the overall Project information and compliance management system.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

>>

The baseline study was completed on 27 February 2009. The entity determining the baseline is Climate Focus. Climate Focus is not a project participant.

Contact information:

Climate Focus
Adriaan Korthuis
Minervahuis III, Rodezand 34
3011 AN Rotterdam
The Netherlands
Tel: +31 10 217 5999
Email: a.korthuis (at) climatefocus.com

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

24 December 2007. Full notice to proceed. Construction contract with Salini Hydro Ltd. entering into force.

C.1.2. Expected operational lifetime of the project activity:

50 – 100 years

C.2. Choice of the crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

>>
8 April 2012

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
NA

C.2.2.2. Length:

>>
NA

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Bujagali Energy Limited filed a "Social and Environmental Assessment" ("SEA")[11] for the hydropower project with the Government of Uganda and prospective project lenders in December 2006. The SEA underwent a comprehensive review by Uganda's National Environmental Management Authority ("NEMA")[12] and by project lenders including The World Bank[13], International Finance Corporation,

[11] http://www.bujagali-energy.com/bujagali_hydroDocuments.htm

[12] Nema House, Plot 17/19/21 Jinja Road, P.O.Box 22255 Kampala,Uganda

[13] http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/EXTPROJECTSPROGRAMS/EXTBUJHYDPOWPRO/0,,contentMDK:21206251~menuPK:3401120~pagePK:64168445~piPK:64168309~theSitePK:3323560,00.html

European Investment Bank[14] and others. The SEA for the associated interconnection project[15] sponsored by UETCL also underwent government review.

The purpose of the SEA process was to ensure that the proposed facility is designed and developed to maximize its benefits while minimizing potentially negative social and environmental effects. The Project will comply with strict environmental, social and other regulatory requirements during construction and operation.

Following their extensive review, the Ugandan government and project lenders approved the Project in April 2007. The Bujagali Hydropower Project achieved financial closing in December 2007 and is expected to take up to 52.5 months to construct. The associated interconnection project is scheduled to be completed prior to the commencement of hydropower facility operations.

Subsequent to the Project approvals, the sponsor developed an extensive Social and Environmental Action Plan ("SEAP") that elaborates on the mitigation and compensation measures discussed in the SEA. The SEAP is a working set of plans that describe in more detail the action plans under which the sponsor will implement measures identified in the SEA. The SEAP action plans were reviewed by project lenders and the sponsor has since begun implementing the plans. The SEAP plans are periodically reviewed by the sponsor team to ensure their effectiveness.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Full documentation on environmental effects are described in the documents presented in section D.1 and can be accessed via the internet following the relevant links.

Table 15 summarises the environmental effects of the Project, the implemented impact mitigation and net effects.

Table 15: Environmental impacts, mitigation and net effects

Project Issue	Summary of Mitigation and Net Effects
Resettlement and Land Compensation	Corrective actions have been undertaken to ensure that those resettled by the previous project sponsor are no worse off as a result of the Project. Land required for the construction and operation of the hydropower facility totals 238 ha. Landowners were either resettled or provided cash compensation for loss of land by the previous project sponsor. Eighty-five households were displaced. An assessment survey of the resettled villagers was undertaken by BEL as part of this SEA process to confirm whether any unresolved issues remained. BEL has initiated an Assessment of Past Resettlement Activities and Action Plan ("APRAP") to resolve these remaining issues. Immediate corrective activities undertaken by BEL included: provision of new water

[14] http://www.eib.org/projects/news/bujagali-hydroelectric-project,-uganda.htm?lang=-en

[15] http://www.bujagali-energy.com/bujagali_interconnectionProject1.htm

Project Issue	Summary of Mitigation and Net Effects
	supply hand pumps at 17 existing bore hole locations in the surrounding communities; installing piped water system in selected areas; improvements to education facilities in the 8 affected communities; and improvements to the health facilities at the Naminya resettlement site.
Effects on Land	There will be permanent and temporary loss of agricultural land. Temporary land take areas will be reinstated to a condition that will make it possible for the land to be used for agriculture, forestry or industry. To minimise impacts to terrestrial habitat, BEL is: • Conducting enrichment planting to regenerate forest vegetation on island land not inundated but previously logged or cleared for agriculture, as well as 440 hectares of land along the mainland shore; and • Planting native and medicinal tree species in areas of the riparian strip that are currently bare or planted with cash and/or subsistence crops, in order to control erosion and to provide (in the long term) roosting sites for birds and bats. The portion of the quarry that will remain above water level, i.e. form the new riverbank, will be profiled and planted such that it has a similar landscape to equivalent areas above the water line prior to construction, and blends in with the profile of undisturbed areas.
Effects on Hydrology	The HPP is not expected to significantly alter or affect the hydrology of Lake Victoria or the Victoria Nile. The quantity and timing of water released from Lake Victoria will continue to be controlled by the operation of the Nalubaale and Kiira facilities. Because the reservoir for the HPP is small it can only hold back a few hours of flow, and therefore it will have little effect on the downstream water flow. A safety concern was raised stemming from fluctuations in water levels immediately downstream of the dam due to the pressure of released water. Further analyses and a stakeholder engagement program are proposed to address those concerns through a management plan. Fluctuations further downstream are not expected to be problematic.
Effects on Water and Aquatic Life	The Project is not expected to have any significant long term detrimental impacts on water quality or aquatic life. During construction there will be an increase in suspended solids resulting from coffer dam and other construction activities. These effects will be minimised by avoiding disturbance of soils during the clearing activities. Site drainage systems include sedimentation basins to trap sediments in runoff prior to release to the river. Indigenous aquatic grasses will be planted to control erosion that might occur as a result of the fluctuating water levels during the initial operation period. In the long term the banks are expected to stabilize and no significant erosion

Project Issue	Summary of Mitigation and Net Effects
	is expected. Trees and shrubs will be harvested prior to the reservoir being filled, to minimise water quality effects associated with decomposing vegetation and to prevent fouling of fishing equipment. It is expected that fish stocks will naturally increase in the reservoir compared to the situation prior to Project implementation. For Nile tilapia, habitat enhancement will be carried out as part of the quarry and river bank restoration. Stocking is not expected to be needed. The abundance of "Haplochromines" fish is also expected to increase as a result of the conversion of faster-flowing habitats to the slower-flowing habitats that are preferred by these species. Entrapment and entrainment of aquatic organisms is not expected to have a significant effect on fish or other populations. Access points to the river will be provided to ensure easy access by local inhabitants for washing, fishing or other purposes during the construction period.
Air Quality and Greenhouse Gases	The Project does not involve significant emissions of pollutants to air. Dust is generated during construction but is not expected to result in any significant offsite impacts. BEL is conducting routine inspections to confirm. Industry good practice is being used to limit dust, including grassing stockpiles to prevent wind raised dust, using wetting agents on roads, and using covering loads of friable materials on trucks using public roads. Vehicles and motors are regularly maintained to minimise exhaust emissions and black smoke. Bujagali will significantly reduce greenhouse gas emissions compared to generating the same amount of electricity from burning of fossil fuels.
Noise	Noise generated during construction is not expected to have any significant off-site nuisance effects. The main offsite noise is short term noise related to blasting during quarrying. A notification procedure was developed to ensure surrounding communities are informed about the procedures and timing of blasting.
Access Roads and Traffic	An existing two-lane, paved, public highway provides access to the site. The existing roads are of sufficient capacity to accommodate project related traffic. A Traffic Management Plan ("TMP") addresses all aspects of project related traffic including speeding, maximum loads on trucks, abnormal loads and management of connection points between access roads and main public highways. Consultations were held with community leaders to identify measures to ensure safety for pedestrians, including school children, that use the road as a walkway.
Environment Protection Areas	The Project will result in disturbance and loss of land that falls within the Jinja Wildlife Sanctuary. Consultations with the management authority for the Sanctuary have indicated that planned enhancement planting will offset

Project Issue	Summary of Mitigation and Net Effects
	the losses. The sponsor is assisting in the further development of the Kalagala Falls and Nile Bank CFRs to help offset impacts on Bujagali Falls and Jinja Wildlife Sanctuary.
Tourism, White Water Rafting and Aesthetics	The Project will result in flooding of Bujagali Falls and associated rapids. Consultations with WWR operators have indicated that the operators are generally well-advanced in their preparations to re-orient their operations downstream and expand operations beyond rafting. To facilitate the move BEL is providing new raft launching facilities downstream of the dam. BEL is involved in ongoing consultations with the WWR operators as to how it can further offset the impacts on their activities and support the relocation process. BEL will construct a visitor's centre at the HPP and a cultural centre near Bujagali Falls, and work with Jinja Tourism Development Association ("JITDA") on sustainable tourism activities for the new reservoir recreationally.
Effects on Cultural Property	Dwelling sites of spirits important to the local community have been addressed through transfer and resettlement ceremonies. Ceremonies for the Bujagali Rapids have been carried out and BEL continues to consult with the Busoga Kingdom as needed. The Project will result in flooding of household graves and amasabo (shrines). Where possible these have been relocated as part of the resettlement programme or through compensation payments. Remembrance services to commemorate those buried in the area have been completed. A structure or monument may be erected, either at site of remembrance or elsewhere, in accordance with wishes expressed by local communities.
Community Health, Safety and Security	BEL has developed public health related programs to combat spread of HIV/AIDS and other sexually transmitted diseases (STDs) and vector-borne diseases such as malaria amongst workers and the local communities. An emergency program has been developed specifying actions to be taken in the event of an outbreak of Ebola or other highly infectious disease. Improvements to health care in local communities are being addressed in the CDAP.
Dam Safety – Risk Assessment	An internationally recognized dam design engineer teamed with an experienced international dam and hydropower plant EPC contractor have been selected to construct the project. Additionally an independent set of experts has been commissioned to review and advise BEL on matters relative to dam design and safety. This Bujagali Dam Safety Panel ("BDSP") consists of three technical experts who are providing advice through final design, construction, initial filling, and start-up phases of the dam.
Labour and Working Conditions	The potential risks identified as having a regional prevalence and which have arisen from analysis of similar projects include: • Worker health and safety; • Forced labour and freedom of association; • Payment of minimum wage; and

Project Issue	Summary of Mitigation and Net Effects
	• HIV impact. BEL is committed to implementing various processes, business commitments and measures to address the various labour risks identified and additional issues required in lender policies. The contract and terms of reference agreed between BEL and the EPC contractor (that is employing the majority of construction workers) specifies labour and occupational health and safety commitments to be observed by the contractor and sub-contractors, as well as responsibilities for monitoring the implementation of these commitments, which lie primarily with the EPC contractor. BEL has established its own procedures and is monitoring the EPC contractor's procedures, as well as assessing the performance of both parties on these issues, including ensuring that sub-contractors' contracts commit them to compliance with relevant labour and health and safety legislation and guidelines.
Associated Facilities	A separate SEA has been completed for the Bujagali Interconnection Project. That SEA addresses the following key issues: • Resettlement and Compensation for the projected affected persons; • Impacts on Central Forest Reserve Lands; • Impacts on Lubigi Swamp and other wetlands; • Impacts on public health, including HIV/AIDS and Electric and Magnetic Fields (EMFs); • Aesthetics; • Labour Force Management; • General construction related issues; and • Cumulative effects. That SEA has been prepared in parallel with the SEA for the HPP, and included extensive stakeholder consultations.
Other Construction Related Issues	A number of construction-related issues were identified that are common to many large-scale construction projects, and for which potential effects are well-known and effective mitigation available. The issues identified are: • Public and Worker Health and Safety; • Management of Hazardous and Contaminating Material; • Management of Solid Waste; • Soils and Agriculture; • Air quality; and • Archaeological Sites. The EPC Contractor is responsible for measures to mitigate and manage the potential effects related to construction activities. These measures are specified in the Contractor's plans, which are incorporated into the SEAP.
Other Operations Related	A number of operational-related issues were identified that are common to

Project Issue	Summary of Mitigation and Net Effects
Issues	most large-scale hydro projects and for which the potential effects are well documented and effective management measures available. These issues identified are: • Public and worker health and safety; • Management of hazardous and contaminating material; and • Management of solid waste. BEL, as operator of the facility, is responsible for the implementation of measures to protect, mitigate and manage the potential effects related to the operation of the hydropower facility. Project specific plans and programmes developed by BEL for the operations phase have been incorporated into the SEAP.

Cumulative impacts

The potential cumulative effects of the Bujagali hydroelectric project were evaluated as part of the 2006 Social and Environmental Assessment in the context of other existing and proposed hydroelectric projects on the main stem Victoria Nile in Uganda. The projects assessed were Nalubaale (Owen Falls), Kiira (Owen Falls Extension), Bujagali and Karuma. A Kalagala scheme was not included as the Kalagala offset agreed by the Government of Uganda to offset the residual impacts of the Bujagali project precludes such development there.

In summary, the positive cumulative effects of Bujagali include:

- Developmental benefits at the local, regional and national levels, including economic benefits associated with the project's construction (short term) and the operation of the project (medium and long term).
- Increased supply of electricity, including poverty alleviation benefits to the extent that the new electricity is accessible to those living in poverty;
- Compensation to people economically affected or physically relocated by the project; and
- Employment and small business opportunities for Ugandans in the short, medium and long terms.

Project cumulative impacts of a negative nature were considered to be of an acceptable level, including:

- Relocation of people with compensation to accommodate the project's construction, facilities and operations;
- Aesthetic impacts from the presence of another dam with the potential for knock on tourism impacts (potentially positive, as well, however);
- Some disruption of the natural flow regime over an ~8-km stretch of the river Nile downstream of and as a result of Nalubaale and Kiira:
    - with associated impacts on aquatic organisms and communities (also potentially positive if productivity of reservoir increased); and
    - river users (fishers) – also potentially positive if increased productivity in reservoir is reflected in fishers' catches; and
- Loss of wildlife populations and habitats, as well as agricultural lands, due to inundation of terrestrial habitats.

Other cumulative effects of the Bujagali could include:

- Disruption of fish migrations in the river Nile in the vicinity of the project, given Nalubaale's impacts on fish movements between Lake Victoria and the river Nile since 1954;
- Insignificant changes in the levels of Lake Kyoga and in flows downstream of it; and
- Reduced operational need to increase flows through Nalubaale and Kiira due to efficiencies from Bujagali (a positive cumulative effect).

With respect to cumulative effects with other non-hydroelectric projects in the Ugandan energy sector, there should be a reduced need to dispatch thermal and emergency fossil fuel sources of electricity to the Ugandan grid and by individual consumers (generators) with cost savings, air emissions reductions and likely human health benefits (positive effect). Another such effect could be some reduced demand on other fuels (including firewood) where access to electricity is available and cost competitive.

A cumulative assessment was also included in the Strategic/Sectoral Social and Environmental Assessment (SSEA) conducted under the strategic planning for the Nile Equatorial Lakes Subsidiary Action Program within the Nile Basin Initiative (NBI)[16] The SSEA evaluated power generation options and associated transmission interconnections within the Nile River Basin. The outcome of the process features a power strategy that describes the power options, including their economic and engineering feasibility as well as environmental and social impacts, to facilitate informed and transparent decision-making in the selection of power investments by the Nile Basin riparian countries.

The NBI initiative recognized the need for early and upstream consideration of environmental and social impacts and public involvement in a program of collaborative action to promote cooperative management of the Nile River Basin. The SSEA analyzed and ranked potential future power options, based upon multiple criteria, including: assessment of direct, indirect/induced and cumulative impacts of multiple activities; additional costs and benefits through multi-purpose use of storage reservoirs; risk of rainfall variability; and sharing of benefits at the local and regional level.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

Since early 2006, the BEL Project team has implemented a comprehensive "Public Consultation and Disclosure Program" (PCDP). To date, numerous public meetings and discussions have been held with a wide range of stakeholders including (but not limited to):

- Local communities (including government officials and local residents);
- Government agencies;
- Non-government organizations (environmental and other interest groups);
- Businesses (including tourist-related interests in the area); and
- Cultural groups (the Kingdoms of Buganda and Busoga)

The PCDP was updated in late 2007 and consultation activities continue through project construction and operation.

The previous project sponsor (AESNP) had already begun some resettlement of project affected people, as well as other community development work. However some of those community measures were not

[16] http://nelsap.nilebasin.org/

completed when AESNP ceased its project development. BEL has taken care to review the previous development plans that were not completed and incorporated measures in the Project's Social and Environmental Action Plan ("SEAP") in order to complete those previous plans and appropriately address any remaining issues. Through the consultation efforts in 2006 and 2007, BEL identified other public concerns and project issues that were addressed in the SEA Report and further addressed in the SEAP plans developed and updated in late 2007. Specific planned actions and programs are included in the SEAP which continues to be used during project implementation.

Local and national stakeholder consultation activities were undertaken be BEL in cooperation with UETCL, beginning in January 2006. Consultations involved a wide range of stakeholders and affected groups and are summarized below.

Stakeholders	**Consultation Activities**
National Public	Project notices in national newspapers, web site and making documentation available to all interested parties.
Government Agencies	Meetings were held with various government agencies in early 2006 during the project development. SEA documentation was circulated to government agencies through NEMA, and feedback was provided to BEL through NEMA. Consultations with various government agencies continued during development to ensure project plans incorporated the necessary requirements. Consultations continue during project implementation.
NGOs (national and local)	Numerous NGOs were identified and contacted early in project development to discuss their concerns and interests. Project documentation was circulated to the NGOs and an email distribution was maintained to provide updates.
Local Communities	Contact was maintained with District and Sub-County level government representatives during project development to keep them informed of the Project. Sub-County Consultation committees, which included women and representatives from vulnerable groups, were established to assist in consultation activities with local villages. Public meetings were held in the affected communities to provide information updates about the Project and to receive their comments and concerns. Pubic concerns were documented and addressed in the SEA Report published in late 2006. Consultations continued through 2007 as project implementation plans were further developed. Close consultations with local villages continue during construction to inform them of construction activities and to receive feedback on any public concerns/issues. The Sub-County Consultation Committees remain in place to help facilitate local consultations.
Project Affected Persons	Project Affected Persons (PAPs) were resettled by the previous project sponsor (AESNP). Socio-economic audit surveys were undertaken by BEL in order to assess the livelihood conditions of the resettled PAPs. As part of this process an action plan was prepared to address remaining issues and planned actions were incorporated into the updated SEAP. Additional surveys were undertaken with the other PAPs (e.g. fishers' community in the

Stakeholders	Consultation Activities
	Project area). Consultations continue with project affected persons while the SEAP planned activities are implemented, and in order to monitor the livelihood conditions of the PAPs.
Vulnerable groups	Vulnerable group representatives, including women, were included on the Sub-county Consultation Committees (SCC Committees) in order to ensure appropriate contact with vulnerable PAPs. Consultation efforts with these groups are included in the SEAP plans, and the SCC Committees remain in place to help facilitate these efforts during project implementation.
Business Operators	As part of a separate tourism impact study that was undertaken by BEL, key affected businesses were consulted through individual meetings. Subsequent discussions between the tourism related business operators and BEL regarding mitigation and new tourism initiatives continued as project planning progressed. Discussions with the employees of the tourism industry also occurred and actions to deal with potential loss of income (either temporary or permanent) were incorporated into the SEAP. Consultations with business operators continue during project implementation in order to inform them of project activities and to advance some of the mitigation measures and tourism related initiatives.
Tourist/visitors	The interests of tourists were identified in a tourism study conducted by BEL. These interests were also discussed during consultations with the Ugandan government tourism agency and with tourism business operators.
Cultural Groups	The Kingdoms of Buganda and Busoga were closely consulted during project development and these consultations continue through project implementation. BEL worked closely with representatives of the Busoga Kingdom in order to address cultural interests surrounding the Victoria Nile River and Bujagali Falls. The Busoga Kingdom helped facilitate spirit relocation ceremonies. BEL is also working closely with both Kingdoms on other cultural programs that may include cultural information centres in the Project area.
Indigenous Peoples	In consultation with World Bank Group specialists, it was determined that no indigenous peoples, as defined for the purposes of World Bank and IFC policies and Performance Standards, were identified to be resident within the Project area of influence.

Throughout the project development, BEL worked closely with a witness NGO, InterAid Africa, in order to provide independent monitoring of the consultation activities, and to provide a mechanism for stakeholders to file grievances regarding the Project. InterAid Africa continues to provide this role during Project implementation. BEL maintains a grievance mechanism in order to record and address public grievances or concerns raised during project implementation. This program also incorporates worker and/or employment grievances associated with the construction activities. BEL continues to closely work

with government agencies, the SCC Committees, villagers, NGOs, and other stakeholders as it implements the project community development plans, mitigation plans, and other programs or initiatives associated with the project. BEL established an independent panel of social and environmental experts (Panel of Experts or POE) to monitor and periodically review BEL's SEAP activities. The POE provides its feedback through periodic reports to BEL. BEL continues to reassess its planning and activities in order to improve effectiveness and to focus on priority issues and programs during project implementation.

E.2. Summary of the comments received:

The consultation activities identified several issues that have been taken into account in the preparation of the 2006 SEA Report and the actions plans provided in the SEAP. Key stakeholder comments are outlined below.

Issue	**Response**
Issue 1: Past resettlement activities	The eight affected communities and people resettled by the previous project sponsor indicated that some of the commitments of the previous project sponsor (AESNP) were unfulfilled after the previous project development ended. An audit of the past resettlement activities was undertaken by BEL and an *Assessment of Past Resettlement Action Plan* ("APRAP") report was prepared that outlined the concerns/issues and proposed activities to be undertaken. BEL committed to resolve certain of these past resettlement issues. Most actions have already been completed such as the installation of new pumps at the boreholes in each village, agricultural assistance, upgrading home structures, reconciling land titles, and verifications of the PAP database. BEL also completed follow up checks of resettled persons. Further livelihood restoration programs are being implemented and consultations/follow up with affected persons continue during project construction.
Issue 2: Community development opportunities	The local residents and local governments clearly indicated an interest to take advantage of development opportunities as a result of dam construction. As an example residents have expressed interest in offering housing to the construction workers. BEL is supporting this through close consultations between the construction contractor and local village representatives. As part of the CDAP, a market area is being developed near the construction site to facilitate local product sales to the site workers and visitors. BEL is also working with local training institutes to provide skills development for local workers.
Issue 3: Cultural impacts	Local communities and the Busoga Kingdom indicated that spirits associated with the Bujagali Falls, and perhaps other sites in the area, had not been adequately appeased by the former project sponsor (AESNP). BEL consulted with the cultural leaders of Busoga Kingdom and is implementing a programme to address this concern. Formal ceremonies were conducted by the Busoga Kingdom in 2007 to relocate the spirits to a new site selected by the Kingdom. BEL and the Kingdom are considering further cultural projects

	including building a new cultural centre to highlight the story of the spirits and other cultural aspects of the Bujagali Falls.
Issue 4: Construction workforce impacts	Local residents expressed concerns in regards to the social and health consequences of migrant workers coming into their community. There are no camps or residential complexes suitable for housing a large workforce available in Jinja. A variety of housing is being used instead, including use of the existing housing stock and hotels in Jinja, and new purpose built housing. The specific size, design, and location for new built housing were determined by the EPC Contractor, under advisement from BEL and in consultation with local authorities. Some visiting workers also reside in local village housing as available. The housing plan is being implemented keeping in mind the objective to maximise local benefits and minimise negative community impacts. A comprehensive AIDS/HIV programme is also being implemented (with the assistance of the Ugandan AIDS/HIV NGO TASO) which involves education programmes for both the local community and the workers.
Issue 5: Local community access to electricity	Local communities have expressed interest in getting improved access to electricity as a community development initiative. It was explained to the communities that electrical distribution is the responsibility of Umeme, the private electrical distribution company. BEL is working with the communities and Umeme to facilitate improved access to electricity. This may include first providing electrical connections to community centres in affected villages.
Issue 6: Employment opportunities/ training	There was and is widespread interest in employment opportunities, and an expectation that local community members would receive priority in employment opportunities. As part of the CDAP, BEL is implementing training programmes (with the assistance of local institutions) to assist local people in gaining access to employment. BEL has also directed the EPC Contractor and its sub-contractors to give preferential treatment to the local community in their hiring practices. BEL and the EPC Contractor are working with local villages to enlist appropriate personnel, including a recruitment process that cover areas on both banks of the river. As of second quarter 2009, over 250 members of 8 immediate local communities have been employed by the Project, with the remaining labour workforce being supplemented by workers in the surrounding region.
Issue 7: The need to consult with Communities in implementing the CDAP	The communities and NGOs indicated the need to engage the communities in the finalisation of the CDAP and the formation of the implementation plan for it. BEL undertook consultation activities with the local community in advance of construction start-up to help prioritise community needs and to finalise the CDAP. BEL continues to work closely with the communities to implement the CDAP.
Issue 8: Potential for job	Tourism industry workers expressed concern that their jobs will be lost once

loss by the tourism industry employees and by self-employed and informal workers in the tourism industry	the dam project begins. As part of the APRAP and CDAP, BEL is supporting tourism initiatives, particularly those which will ensure continuity of employment of existing employees. Discussions with the tourism company owners indicated that with support many are anticipating growth. The APRAP includes provisions for monitoring this situation, and addressing issues as they arise.
Issue 9: Safety issues from construction traffic along the west bank road	West bank communities expressed concern about the safety risks associated with construction traffic along the main west bank roadway. The road is heavily used by pedestrians including school children. BEL recognized this issue and is working with the local communities to develop safety measures included. The EPC Contractor has implemented a safety plan to ensure road safety on and offsite. The Construction Traffic Management Plan includes measures to manage and monitor the traffic safety.
Issue 10: That the local community needs to benefit from the Project	BEL agrees that the local communities should benefit socially and economically from the Project. As such, a comprehensive CDAP is being implemented with a focus on the agricultural industry (as it is the dominant economic activity in the area). Overall, the employment benefits (direct and indirect) and induced economic benefits from the Project are expected to be significant for these communities.
Issue 11: Concerns from the east bank communities that they will not benefit as much as the west bank communities	As most of the Project facilities and the construction activities are focused on the west bank, east bank communities and the Busoga Kingdom were concerned that they receive much less benefit from the Project, even though the river and dam are within the Kingdom (the west bank is reported to be the boundary between the Busoga and Buganda Kingdoms). BEL is providing programmes and opportunities to both east and west bank communities in an equitable manner. As an example, resource/training centres are developed to engage individuals from both banks of the river. The east bank villages should also benefit from alternative tourism developments that are being implemented.
Issues 12: Local institution interest in participating in the Project	NGOs, CBOs and GoU agencies have all indicated an interest in participating in the Project such as through assisting in the delivery of the CDAP and environmental monitoring of mitigation/restoration activities. BEL engaged many of these institutions to develop the Project implementation plans leading up to construction and will continue to work with them during implementation.
Issue 13: Loss of access to the river	Some (particularly fishers) have indicated that river access has been limited (due to fencing) and were concerned about further access restrictions once the construction period began. Although some fencing along the west bank was installed for site security and safety, access to the river in the vicinity of the Project continues to remain open via access ways and landing sites that ensure access the river for the local villagers and fishers.
Issue 14: That the	There is concern that once operational, the Bujagali Dam would create

Bujagali project will exacerbate the low water levels in Lake Victoria	additional pressure for increased releases from Lake Victoria. The Bujagali Project will be a run-of-river operation using water discharged from the existing Kiira and Nalubaale dams located 8 kms upstream at the mouth of the Lake Victoria. The Bujagali Project will allow for the reuse of the same water that the existing hydro facility at Jinja uses and will lower pressure to draw water from Lake Victoria.
Issue 15: How have safety issues associated with the aging Nalubaale facilities been addressed?	To address safety issues at Bujagali, BEL has formed the Bujagali Dam Safety Panel (BDSP), which consists of three technical experts providing advice through final design, construction, and start-up phases of the dam. Safety risks are addressed as part of the Panel's terms of reference. Although BEL is not associated with or responsible for the upstream Nalubaale hydropower facility, BEL has consulted the operator of that facility and will incorporate specific communication and safety interface protocols for operation, safety and emergency planning.

E.3. Report on how due account was taken of any comments received:

See table in E.2.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bujagali Energy Limited
Street/P.O.Box:	P.O. Box 186 8 Kms Kayunga Road, Kikubamutwe
Building:	
City:	Jinja
State/Region:	Mukono District
Postcode/ZIP:	
Country:	Uganda
Telephone:	+256 (0)434-132-532/3
FAX:	+256 (0)434-132-534
E-Mail:	office@bel.co.ug
URL:	www.bujagali-energy.com
Represented by:	James McGowan
Title:	Senior Vice President
Salutation:	Mr.
Last name:	McGowan
Middle name:	
First name:	James
Department:	BEL Business Development
Mobile:	
Direct FAX:	
Direct tel:	+1-212-351-0044
Personal e-mail:	mcgowan@sitheglobal.com

Organization:	Government of Uganda, Ministry of Energy and Mineral Development
Street/P.O.Box:	PO Box 7270
Building:	
City:	Kampala
State/Region:	
Postcode/ZIP:	
Country:	Uganda
Telephone:	
FAX:	
E-Mail:	
URL:	www.energyandminerals.go.ug
Represented by:	Paul Mubiru
Title:	Director for Energy and Mineral Development
Salutation:	Eng.
Last name:	Mubiru
Middle name:	
First name:	Paul
Department:	Energy Resources Department

Mobile:	
Direct FAX:	+256(0)41-349342
Direct tel:	+256(0)41-349010
Personal e-mail:	mubiru@energy.go.ug

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The Bujagali Hydropower Project is funded by sponsor equity and lender debt. The lender provided debt total is USD 681.8 million, provided by the following lenders: Proparco; DEG; KfW; FMO; Standard Chartered Bank; Absa Bank; European Investment Bank; African Development Bank; International Finance Corporation (WBG); AFD; Fortis Bank; and Nedbank. The International Development Association (WBG) is providing a partial risk guarantee on a portion of the debt. In addition MIGA is providing insurance on a portion of the sponsor equity.

None of these public funds committed to the underlying finance of the Bujagali Hydropower Project result in a diversion of official development assistance. All public funds are separate from and do not count towards financial obligations under the UNFCCC and the Kyoto Protocol.

Annex 3

BASELINE INFORMATION

See section B6

Annex 4

MONITORING INFORMATION

See section B7

- - - - -