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Risk Mitigation Instruments for Renewable Energy in Developing Countries: A Case Study on Hydropower in Africa

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A CPI Report

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Executive Summary

There is growing evidence that risk mitigation instruments provided by public financial institutions can help reduce financing costs and mobilize private capital in financing infrastructure. However, these instruments still remain underutilized, especially for climate-related investment. Our analysis has shown the effectiveness of these tools in supporting low-carbon projects in high-risk environments but has also identified challenges to scaling-up their use.¹ To better understand how these instruments work individually and in combination, we have analysed in detail the financial structure of a large scale low-carbon project in a high-risk environment. The project chosen, the 250MW Bujagali Hydropower Project in Uganda, was able to raise close to \$300 million in commercial loans and private equity, an unprecedented amount of private finance in a low income country.

Bujagali's financial structure mobilized a higher level of private investment than in any other comparable hydro-project in the region

The construction of the Bujagali Hydropower project has been attended with controversy: The first attempt to build the project failed after difficulties related to the project's alleged social, economic and environmental impacts, and allegations of bribery led stakeholders to pull out. The second successful attempt to build the project has also attracted criticism on its expected environmental impacts, on resettling of affected populations, and about the estimated cost of the power for the countries. The criticisms led to internal investigations and scrutiny within the Development Finance Institutions (DFIs) that concluded with recommendations on a set of changes and improvements that the project company has since implemented (see Annex 2 for more details). The Ugandan government wanted and continues to want private investment in the energy sector to increase energy access and bring economic development. In

2007, before the plant was commissioned, only nine percent of the 38 million Ugandans had access to grid-supplied electricity.

This case study does not discuss the environmental and social aspects of the project. Instead, **we examine Bujagali Hydropower from the project finance perspective because it is one of very few examples of large project finance structures to use simultaneously different risk mitigation instruments provided by the World Bank Group:** a partial risk guarantee (PRG) from the International Development Association (IDA) and the Multilateral Investment Guarantee Agency's (MIGA) political risk insurance (PRI). It therefore offers an opportunity to analyze how these particular instruments interact and how effective they are in driving private investment and reducing the cost of renewable power in developing countries with high investment risks and very little private investment. In addition, we examine how they might be applied to drive private investment in other renewable energy projects in developing countries.

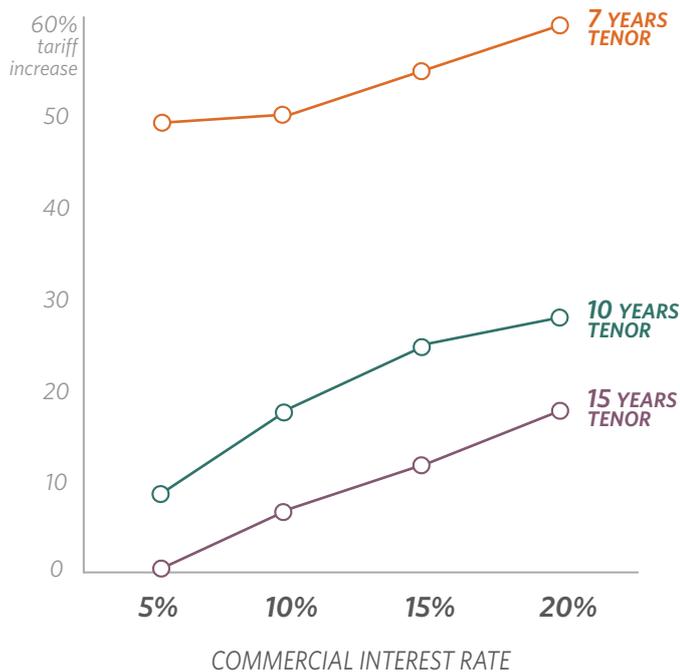
In brief, **the WBG's successful history of ensuring countries meet their payment obligations for infrastructure projects, supported by its efforts to better understand sector needs, its country relationships and its indemnity agreements with governments, significantly reduces the probability of payment revisions, payment default, or appropriation of assets. Coupled with the preferred creditor status typically enjoyed by DFIs, these factors significantly increased risk coverage effectiveness in this project both in terms of mobilizing financing and also in lowering the cost of the private capital.**

Effectiveness of unfunded capital commitments of risk mitigation instruments in mobilizing private investment

- The use of partial risk guarantees (PRG) and political risk insurance (PRI) helped to enable the largest private investment ever in Uganda, a country where, at the project financing date, little private capital was flowing to energy infrastructure.

¹ See, for instance, [our series of reports on Risk Gaps](#) and our [San Giorgio Group case studies](#) of climate-relevant projects.

Figure ES1: PRG impact: Tariff increase required with private sector loans provided at commercial market terms



- By combining resources from private sponsors with development bank financing and risk mitigation tools, Bujagali’s financial structure mobilized a higher level of private investment than in any other comparable hydro-project in the region. In a sector usually dominated by solely-publicly funded projects, its financial structure mobilized almost one U.S. dollar of private capital investment for every two U.S. dollars of public financing provided.

Effectiveness of the project finance model in reducing the cost of electricity

- Partial risk guarantees enabled commercial banks to lend at maturities and interest rates comparable to development lenders, more favorable terms than those available in the commercial market at the time. These terms allowed the required initial tariff to be reduced by at least 7% and up to 60%, depending on the assumptions made for available finance in the market (see Figure ES1).²

² Data on financing terms for commercial lending to infrastructure and power projects in Africa at the time of Bujagali Hydropower’s financial closure is scarce. Fernstrom (2011) suggests a typical term of 2 years for commercial lending in Uganda, while Eberhard et al (2011) reports maximum maturities varying from 5-20 years and interest charges going up to 20% for some countries in Sub-Saharan Africa.

- De-risking instruments drove down the cost of the power produced to around 105-110 USD/MWh. This is on the high range for the hydropower sector, but is less than half of the cost of the thermal fossil fuel power that the plant displaced and one third of the economic cost to Uganda of failing to meet electricity demand. Avoiding the costs of more expensive fossil fuel alternatives and of failing to meet electricity demand more than compensates the annual capacity payments needed to cover the cost of the project.

Effectiveness of the risk mitigation instruments used in managing risk and its impacts

- Financial ties between the World Bank Group and host country can greatly improve the perceived risk profile of projects for both lenders and investors, as adopting partial risk guarantees and political risk insurance, can significantly reduce the expected probability of a political risk event (e.g. revision of a power purchase agreement).
- In high-risk contexts, guarantees and political risk insurance reduce the expectation of losses compared to a risk management strategy that relies only on investors’ own resources. Even if a covered event occurs, the expected magnitude of losses is greatly decreased. For instance, in the Bujagali project, the PRI can reduce losses by over 70% in high-risk scenarios (see Section 4) greatly improving investors’ expectations of asset profitability.
- The combined use of PRG and PRI, when justified by a high level of risk perceived by private investors, allows synergies and reduction of transaction costs, improving expected returns for both equity and debt providers.
- Finally, de-risking instruments could be a more efficient use of limited public finance resources than more established loan issuance as they don’t require an immediate disbursement of public capital and often don’t require any disbursement at all.

These risk mitigation instruments have significant potential for other renewable energy technologies and smaller projects.

Increasing flexibility and reducing complexity of de-risking instruments could treble their market size from 500GW to almost 1,500GW over 20 years

The WBG has only used these tools in combination for a handful of projects and, overall, guarantees represent less than 5% of the total financing provided by the six main multilateral development banks since 2004. Instruments' design, their complex implementation policies and high transaction costs have so far greatly

limited their use, making them suitable for large-scale infrastructure assets only. Within the low-carbon infrastructure space, this has resulted in such instruments being used mostly for large hydropower and geothermal investments. While such findings in our analysis have been drawn mostly from the experience of the World Bank Group (WBG), literature indicates that similar conclusions hold for most development finance institutions.

Ongoing modernization of guarantees issued by the WBG and the development of new products offered by MIGA are an example of efforts aimed at increasing the potential use of these instruments by increasing their flexibility and making them suitable for smaller scale applications as well (e.g. a recently issued PRG for a series of small-scale hydropower investments in Uganda). By facilitating availability of risk mitigation instruments in non-OECD countries from large hydropower and geothermal projects to smaller projects and other renewable technologies like solar PV and wind, the WBG could triple these instruments' potential market size from the current 500GW to almost 1,500GW over the next 20 years.

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1. Introduction

In many least developed and developing economies in Sub-Saharan Africa and beyond, increasing energy access to meet the demand of economic and population growth requires power infrastructure investments that, if implemented, would account for a significant share of national economic resources: from an estimated average of 4% of regional gross domestic product (GDP), to more than 10% of GDP in a few countries (Rosnes and Vennemo, 2009).

Such high investment needs are typically combined with very low degrees of private capital penetration, due to these countries' high investment risk environments and low creditworthiness (Institutional Investors, 2013). These costs increase the perception of risk and exacerbate efforts to reduce these countries' emissions and to support the penetration of certain renewable energy technologies (Frisari *et al*, 2013). In such a context, risk mitigation instruments provided by development finance institutions (DFIs) could prove a useful way for reducing the cost of private investment to help meet growing energy demand by de-risking projects.³ However, the provision of such instruments has so far been below expectations (IEG, 2009) with several challenges impeding their wide-spread implementation (see Box 1 for more details).

This case study analyzes the financial structure of the Bujagali Hydropower project in Uganda. As one of very few examples of a project where various risk mitigation instruments have been used in combination, **Bujagali offers a unique opportunity to assess the effectiveness of these instruments in supporting private renewable energy investments in high-risk environments (such as least developed countries), and to consider their potential for replication at scale.**⁴

Bujagali's financial structure project, despite high country and project risks, this financial structure succeeded in attracting private equity investments and loans from commercial banks, resulting in the first large private hydropower plant in Sub-Saharan Africa, and the single largest private investment ever in Uganda (Eberhard *et al*. 2011, and UNFCCC, 2011). At the time of its construction, the Bujagali Hydropower plant was the

largest private initiative in the Ugandan energy sector in the previous 20 years, accounting for 67% of the total private investment in the country between 2003 and 2012 (WB, 2014). This project is then a very suitable testing ground to analyze how risk was allocated between the host government and private investors, and how risk mitigation tools work in practice, focusing on the key risks they need to mitigate in order to mobilize commercial resources for such projects.

While the de-risking instruments in this project focus on reducing political and credit risks in ways relevant to any infrastructure investment, we believe that a better understanding of their mechanisms and of the challenges to their wider application could prove valuable in supporting renewable energy investments.

This case study examines the benefits and costs of these risk mitigations tools, to draw lessons on how they might drive private investment in other renewable energy projects in developing countries, while lowering capital costs and increasing the affordability of power for the country. It does not evaluate the overall economic, social and environmental impacts of the Bujagali project,⁵ nor the controversies it generated. Finally, it does not aim to take a position on the merits and potential of large hydropower in the transition to a low-carbon economy.

The paper is structured as follows: **Section 2** introduces the context in which the Bujagali hydropower was developed and presents its main stakeholders and their contractual relationships. **Section 3** presents a summary of the financial inputs and financial and other benefits of the project's private and public stakeholders. **Section 4** discusses the risk allocation framework established for the project and quantifies the impact of the de-risking instruments on the cost of the project and investors' expected profitability. **Section 5** analyzes the effectiveness of such a model compared to other hydropower projects in the region, and discusses its potential to be replicated at scale. **Section 6** concludes and summarizes our key findings for policymakers.

3 In the Bujagali Hydropower example, de-risking efforts translated into improving public sector agents' risk taking ability and making them suitable counterparties for private investors, thereby allowing private sector investment at lower returns.

4 We note, however, that many of the findings and results of the analysis are relevant for any large and high risk infrastructure investment in a high-risk country.

5 This 250MW hydroelectric plant built on the Victoria Nile River in Uganda and commissioned in 2012 has indeed raised significant debate and criticism: the controversies linked to the project in the late 90s' and a summary of the environmental issues raised for the project are discussed in Annex 2.

Box 1: Risk Mitigation Instruments for Climate-Relevant Investments

For several decades, in high-risk environments DFIs mainly focused on the issuance of concessional loans to public institutions. The use of most publicly-provided risk mitigation instruments began only in the late 1990s: partial risk guarantees provided by the World Bank Group (WBG) together with a few governments in Sub-Saharan Africa were key to some successfully implemented independent power producers (IPP) regimes of the late 2000s, such as Kenya, Cote d'Ivoire and Uganda (Eberhard and Gratwick, 2013). At the same time, the Independent Evaluation Group at the World Bank confirmed the effectiveness of such tools in facilitating the flow of private investments in high-risk sectors and countries, but concluded that the volume of guarantees provided by the WBG had fallen short of reasonable expectations, recommending a strategic review of the internal policies for the provision of guarantees (IEG, 2009) and a dedicated evaluation of the WBG's Multilateral Investment Guarantee Agency's (MIGA) potential and scope in issuing political risk guarantees to catalyze financing (IEG, 2010). Overall, the guarantees issued by the six main multilateral development agencies - excluding trade facilities - represent only 4.2% of the total USD 700 billion issued for development projects between 2004 and 2013 (Humphrey and Pizzon, 2014).

Analysis shows that this under-utilization pattern for risk mitigation instruments holds also when financing climate-related investments (including adaption, disaster risk management, and mitigation). Using project-level data from operations funded by the World Bank Group between 1990 and 2013, Micale et al. (2013) shows that climate-related projects have represented on average 10% of the USD 2 billion per year that the WBG committed to projects through risk mitigation instruments, and only 1% of the overall financing issued by the group. More importantly, the majority of climate-related projects benefitting from these instruments were in energy efficiency¹ (40%), mature renewable energy technologies (e.g. geothermal, 14%, and hydropower, 18%), and adaptation (23.2%) with wind and other, less established, renewables representing only 1% of the total. In a World Bank public consultation on its guarantees in 2012, investors reported that accessing the instruments was complicated, and synergies when using instruments from different institutions of the WBG were under-exploited (WB, 2012a). This process resulted in a proposal for modernizing World Bank's guarantees that became effective on July 2014. It aims to increase the flexibility of the instrument to make it a practical alternative to more established financing and development tools. We discuss briefly these changes and their impact in Section 5.2.

¹ Mostly through risk sharing facilities as opposed to guarantees.

2. Bujagali Hydropower: The country and the project context

Bujagali Hydropower is a 250 MW dam on the Victoria Nile River. The project was competitively awarded in 2005 to a private consortium, following a previous unsuccessful attempt to develop the project in the early 1990s. Construction began in 2006, and the project reached commercial operation on July 2012, doubling Uganda's electricity production and increasing the country's installed capacity by 44% (New Vision, 2012; Observer, 2013).

The project's main objectives are to reduce the severe power shortages and load shedding occurring in the country since the mid-1990s (WB and IFC, 2001), to provide stable power generation capacity at significantly lower costs than the country had been paying for emergency thermal power plants running on imported fossil fuel, and to reduce the power system's CO₂ emissions (WB, MIGA and IFC, 2007).⁶ In order to promote private sector ownership in the country's power sector, the project was designed as a public-private partnership (PPP) between the government and a private producer. To support private investments, the financing package included a blend of loans from several DFIs and four⁷ commercial banks.

2.1 Country context: energy and infrastructure financing in Uganda

2.1.1 POWER GENERATION AND ENERGY ACCESS.

Three issues characterized Uganda's energy sector in the late 90s: very low energy access; severe power shortages; and high production costs.

In 2007, before the plant was commissioned, **only nine percent of the 38 million Ugandans had access to grid-supplied electricity**, much lower than the average level of 23% in Eastern Africa (WB, MIGA and IFC, ; UNECA, 2013).

Large technical losses and an inadequate power supply that relies mainly on two old hydropower plants resulted in acute power shortages. Most of the country's power was supplied by two hydro plants on the Nile, built in the mid-1950s and expanded in 2002, with the remainder provided by a number of small hydropower plants, a biomass plant, and four 50MW fossil fuel plants installed as a temporary emergency solution starting in 2005 to address severe power shortages (UNFCCC, 2011). In 2006, a prolonged drought reduced the availability of the 380MW of installed capacity of the two large hydroelectric plants to 120MW, requiring a much larger contribution from thermal generators to meet the rising demand for electricity (WB, MIGA and IFC, 2007).

The thermal plants reduced power shortages but increased power generation costs by more than 50% to USDc 26/kWh in 2007 (WB, MIGA and IFC, 2007), a level higher than the USDc 18/kWh average production cost for the continent (AfDB, 2013a), and **much higher than what the state-owned utility was able to pass on to consumers** given its legal obligation to provide affordable power. This meant financial health of the state-owned utility Uganda Electricity Transmission Company Limited (UETCL) deteriorated (WB, IFC and MIGA, 2007) and prompted the Government of Uganda ("GOU") to re-introduce subsidies to lower the tariff (ERA, 2015).

2.1.2 INVESTMENT CLIMATE IN THE ENERGY SECTOR.

Despite a robust average economic growth rate of 6.4% and Foreign Direct Investment (FDI) increasing from USD 800 million in 2000 to USD 2.3 billion in 2006 (UNCTAD, 2013) in the years before award of the project, Uganda remained one of the poorest countries in the world with 31% of the population below the poverty line (WB, MIGA and IFC, 2007).

6 The project's outcome indicators are indeed (a) BEL'S electricity generated (GWh) from the proposed 250 MW power station; (b) Levelized cost of electricity (\$/kWh) from the plant; and (c) amount of unmet demand (GWh/month) (WB, IFC and MIGA, 2007).

7 Two commercial banks participated in the initial financial closure, but their loans were soon syndicated to two other institutions.

Obtaining project finance, especially for large power projects was challenging (UNFCCC, 2011). Despite the privatization of the energy sector in 1999,⁸ private investment in the sector had been relatively constrained, limited only to smaller thermal plants operated on short-term (3–5 year) contracts with the grid operator (UNFCCC, 2011).⁹

The Bujagali Hydropower project is the single largest private investment ever made in Uganda

Furthermore, the low energy access rate of only 9% and poor quality and unreliability of the power provided were regarded as the most severe barriers to private investments in other sectors of the economy (WB, MIGA and IFC, 2007). In this challenging investment climate, private investments in the energy sector carried two additional risks: the low level of recoverability for non-movable assets; and a high counterparty risk due to the reliance on UETCL, the government-owned power transmission company, as designated purchaser of all power fed to the Ugandan grid (UNFCCC, 2011).

2.2 Bujagali Hydropower project background and main features

The hydropower station is a run of the river power plant with five turbines offering an installed total capacity of 250 MW. In average conditions,¹⁰ it is designed to produce 1,305 GWh/year using water coming from the upstream Kiira and Nalubaale hydro power plants (UNFCCC, 2011). The project required the construction of about 100 kilometers of transmission lines, built as a separate project to improve transmission capacity between Eastern Uganda and Kampala (World Bank, IFC and MIGA, 2007; UNFCCC, 2011).

2.2.1 PROJECT BACKGROUND AND MAIN STAKEHOLDERS

The **Bujagali** project is the single largest private investment ever in Uganda (UNFCCC, 2011). Because of its size, and relevance for the entire country's economy, it was complex to design and involved stakeholders from both the private and the public sectors of more than ten countries. The failure of the initial project (see Annex 2) highlighted the importance of a strong project sponsor and a robust financing plan, the need for a transparent and competitive procurement process (World Bank and IFC, 2005), and the need to strengthen social and environmental assessment (World Bank, IFC and MIGA, 2007). In January 2004, the government issued an open tender soliciting the interest of prospective private sponsors in the Bujagali Hydropower Project. In April 2005 a private consortium was selected, including Industrial Promotion Services (IPS - Kenya) Ltd, the development arm of the Aga Khan Fund for Economic Development (AKFED), and Sithe Global, owned by U.S. company Blackstone (World Bank, IFC and MIGA, 2007; New Vision, 2012). **Bujagali Energy Ltd. (BEL)**, the special purpose company established through the **public-private partnership between the consortium and the Government of Uganda** as minority owner (New Vision, 2012), then developed the plant.

8 Before 1999, power was a government monopoly implemented by the Uganda Electricity Board (UEB), funded by government equity, debt and accumulated reserves (World Bank and IFC, 2000). At the time, no private investments were allowed. The power sector was reformed when Parliament passed the new Electricity Act, which unbundled UEB into three companies, one each for generation, transmission and distribution. The assets of the Uganda Electricity Generation Company Ltd (UEGCL) and the Uganda Electricity Distribution Company (UEDCL, now UMEME) were licensed to private investors, while the Uganda Electricity Transmission Company Limited (UETCL) remains owned and managed by the government (World Bank and IFC, 2001).

9 Total energy investments with private participation amounted to only USD 170 million between 2003 and 2006 (WB, 2014a).

10 Power production forecasts have been produced by lenders in both high and low hydrology scenarios, on the basis of Lake Victoria's water levels of the last 100 years, and then weighted for the expected probability of occurrence of each scenario.

Table 1: Bujagali Hydropower investment flows at time of financial closure

SOURCE	FINANCING TYPE	AMOUNT (USD M)	SHARE
DEBT			78%
IFC	SENIOR/SUB LOANS	130	14%
AFDB	SENIOR LOAN	110	12%
EIB	SENIOR LOAN	136	15%
ADB/FMO/KFW/PROPARCO	SENIOR/SUB LOANS	216	24%
ABSA/STANDARD CHARTERED	COMMERCIAL LOAN	115	13%
EQUITY			22%
IPS	EQUITY	60	7%
SITHE	EQUITY	116	13%
GOVERNMENT OF UGANDA	EQUITY	20	2%
TOTAL PROJECT COST		903	
RISK MITIGATION INSTRUMENTS			
IDA	PARTIAL RISK GUARANTEE	115	
MIGA	POLITICAL RISK INSURANCE	120	

BEL was responsible for financing, building and operating the plant, and would sell electricity to UETCL under a 30-year Power Purchase Agreement (PPA), at the end of which it will transfer the plant to the government (Build-Own-Operate-Transfer model). The project also involved commercial lenders like Absa Capital, of South Africa, Standard Chartered Bank, of the UK (New Vision, 2012) as well as Fortis and Nedbank as syndicated lenders (Eberhard and Gratwick, 2011b). The bulk of project financing and risk management support was, however, provided by multilateral and bilateral development agencies such as the International Finance Corporate (IFC) and the World Bank Group, the African Development Bank (AfDB), the European Investment

Bank (EIB), the Agence Française de Développement (AFD), Proparco, Netherlands' Development Finance Company (FMO), and Germany's KfW Development Bank and DEG – see Table 1 and Annex 1 for more details (World Bank, IFC and MIGA, 2007).

Members of the WBG aimed to mitigate the risks associated with long-term financing through a partial risk guarantee for commercial lenders issued by the International Development Association (IDA), political risk insurance provided by MIGA for equity investors, and IFC's long term loans. This resulted in a total exposure for the group of USD 360 million (World Bank, IFC and MIGA, 2007).

2.2.2 PROJECT CONTRACTUAL STRUCTURE

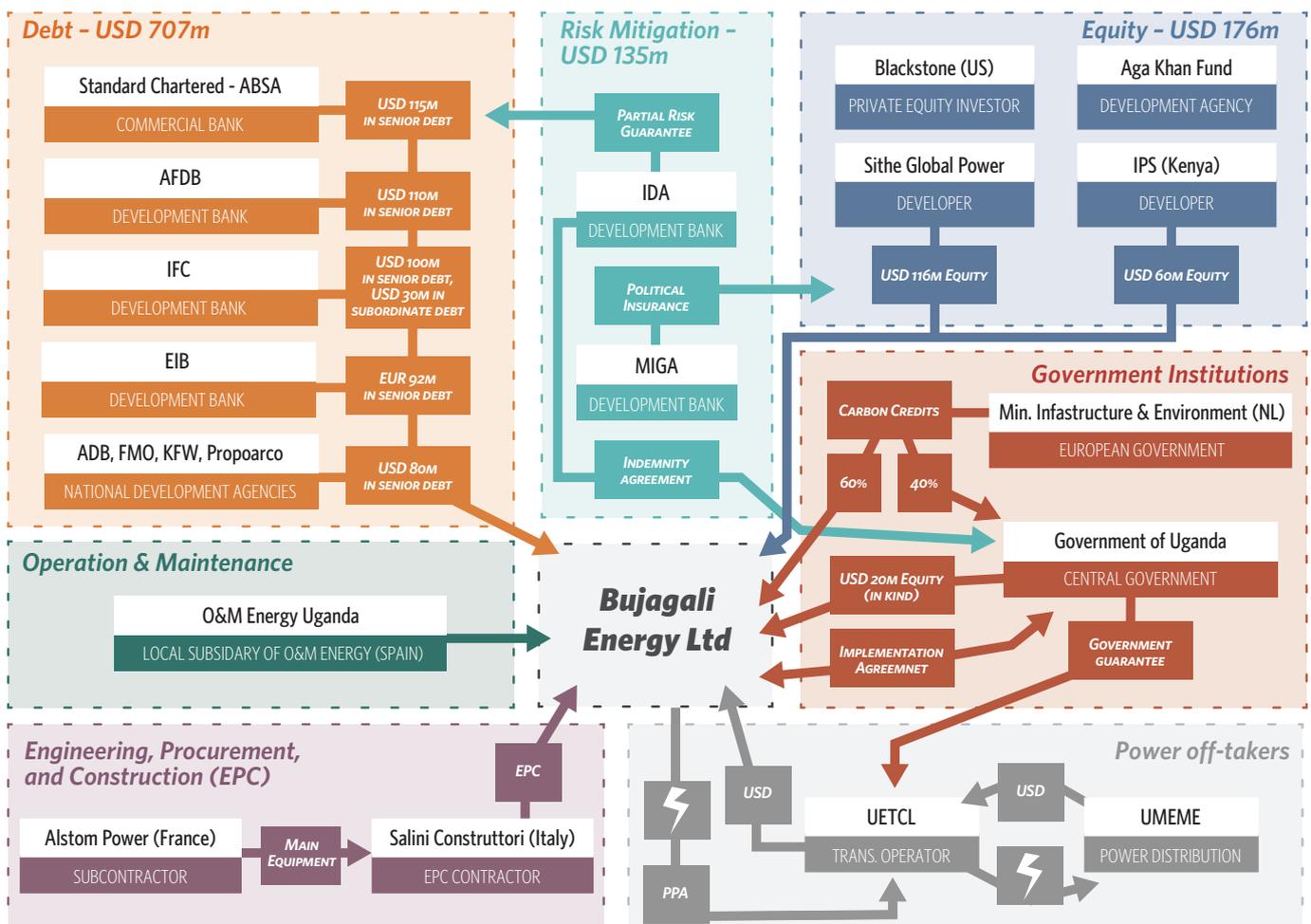
Figure 1 depicts the four sets of contractual arrangements establishing the relationships between the project's stakeholders:

- **The power purchase agreement** between BEL and the national transmission company (UECTL) that is, in turn, guaranteed by the government
- **The implementation agreement** between the project company and the Ugandan Government setting also the terms of the Government backing of the off-taker's obligations
- **Financing agreements** between the project company and its equity sponsors and lenders
- **Two sets of guarantee agreements** between the project's investors, lenders and the providers of the guarantees and political insurance

In addition, the regulations of the International Development Association's (IDA) guarantee requires that the partial risk guarantee be backed by an **indemnity agreement** between the agency and the government.

The structure is completed by agreements within the private sector: the Engineering, Procurement and Construction (EPC) contract establishes the obligations for the contractors to procure equipment and build the power station; the Operation & Maintenance (O&M) contract defines the terms for its maintenance and regular servicing. Finally, a **carbon credit purchase agreement** signed with the Netherlands Ministry of Environment and Infrastructure establishes credits selling prices and the revenue distribution between the Government of Uganda and the project company.

Figure 1: Bujagali Hydropower Stakeholders and contractual structure



Bujagali Hydropower Project

3. Bujagali Hydropower Project Financial Structure and Returns

- **Most of the financing comes from DFIs , which we here categorize as public finance institutions** – as there is little domestic private capital available for investment in the country and scarce appetite from international investors
- **Risk mitigation instruments** offered by the World Bank Group were **instrumental in raising private finance from both equity sponsors and commercial lenders**
- **Public guarantees on private debt enabled commercial lenders to offer loans for the same length of time and for lower interest rates than DFI lenders.** Commercial banks typically offer shorter term loans for infrastructure finance in the region, and at substantially higher interest rates
- **De-risking efforts reduced the estimated cost of the power produced by the plant to 107 USD/MWh**, approximately half of the average cost of electricity production in the country once emergency thermal power is included (260 USD/MWh) and one third of the economic cost to the economy of failing to meet electricity demand
- **The project's costs are higher than the average for a large hydropower plant in developing countries, driven by complex logistics and the difficult geology of the site**

This chapter analyses the financial structure of the project, with a particular focus on the resources committed by both public and private stakeholders, and on the benefits and returns which accrue to them. It begins with a quantification of financial inputs and project costs; then models the project's estimated cash-flows and the expected financial returns for its private and public investors.

3.1 Project investments and costs

3.1.1 PROJECT INVESTORS

Given the high risks, private sector engagement was possible thanks to risk mitigation instruments

Due to the project's financial size, limited presence of private investors in the country and the lack of track record of private power development, most of the financial resources had to be sourced from offshore, and in case of debt, from public financial institutions (DFIs). However, the role of private investors (especially on the

equity side) remains significant, especially if compared with projects of a similar size in the region, which are usually developed and financed with public money only (see Section 5.1 for a more detailed comparison with other large scale hydropower projects in Africa).

Equity Investors

Public Equity: the Government of Uganda (GoU) contributed physical assets in exchange of a minority interest (USD 20 million) in the project company, with no management responsibilities in the project and no right to receive dividends until all senior and junior loans have been fully repaid - to minimize the project's tariff and therefore, its impact on the final consumer bills (WB, IFC and MIGA. 2007).

Private Equity: Sithe Global Power - the majority owner of BEL (60% of the equity contributions) - is a private company for the construction and management of power infrastructure. Bujagali is its first project in Africa.

Industrial Promotion Services (IPS), through its Kenyan subsidiary, owns 40% of BEL equity. IPS is the industrial development arm of the Aga Khan Fund for Economic Development (AKFED) and has already developed several projects in Uganda (WSJ, 2013), often together with World Bank Group institutions (WB, IFC and MIGA, 2007).

Debt Investors

Public debt providers: The project's significant debt financing mostly comes as long maturity senior loans provided by public development financial institutions (DFIs), however, without concessionality.¹¹ All senior loans have maturities of 16 years while subordinated loans (USD 68 million) have maturities up to 20 years. The long maturity of these loans allowed the national utility (and ultimately the government) to spread the significant project costs over a number of years and made it affordable for the country's budget (WB, IFC and MIGA, 2007). Three large international finance institutions (IFC, EIB and AfDB) have collectively provided almost half of the overall financing (USD 376 million) while a group of European bilateral institutions have provided slightly over USD 200 million.¹²

Private debt providers: Two commercial banks (Standard Chartered Bank and ABSA Bank) jointly provided a senior loan of USD 115 million under the IDA Guarantee, importantly, with the same long-term maturity of the public loans (16 years). This long maturity compares with an average maturity from private lenders in the region that ranges from just two to five years (Fernstrom, 2011). Subsequently, these two banks syndicated their position dividing it with Fortis and NedBank (Eberhard and Gratwick, 2011b). The financing terms have not been disclosed in detail, but project insiders report that, thanks to the IDA partial risk guarantee's coverage of key government and country risks, private lenders were able to provide financing at interest rates far below what would have been typically available in the market (Fernstrom, 2011 and Eberhard et al. 2011) and below those of the DFIs involved in the project, that didn't benefit from the de-risking offered by the guarantee.

Risk Mitigation Instruments

Given the high risks perceived with the project (see Section 4 for a more detailed treatment of project risks), private sector engagement was possible thanks to risk mitigation instruments provided to both equity and debt investors by the World Bank Group.

IDA Partial Risk Guarantee (PRG) was provided to private lenders covering both interest and principal repayment for the entire debt amount (USD 115 million) and enabled the long maturity of 16 years. The PRG covers the debt repayments to private lenders in case the off-taker or the government (via its implementation agreement and guarantees) is unable or unwilling to honor their payment obligations to the project company under the PPA or the Implementation Agreement. The PRG contractually links the Ugandan government directly to IDA via a (counter) guarantee in the form of an indemnity agreement: if the PRG payments are triggered, any amount paid by IDA to the commercial banks would need to be reimbursed to IDA by the government.

MIGA Political Risk Insurance (PRI) provided "Breach of contract coverage" for 90% of the equity investment made by Sithe Global – for a total value of USD 120 million and a maturity of 20 years.¹³ MIGA's insurance covers the equity holder should the state-owned off-taker (or the government as a guarantor) not comply with its obligations arising from the implementation and the power purchase agreements. The initial project appraisal reports the involvement of MIGA as a precondition for the engagement of Sithe Global (WB, IFC and MIGA, 2007).

11 Concessional finance is usually offered at terms preferable to those prevailing on the market, for the effect of certain grant elements included in the instrument. The concessionality is delivered through e.g., interest rates below those available on the market and/or longer loan tenor, grace periods or a combination of those.

12 The Government of Uganda also provided a USD 75 million interest-free bridge finance to allow construction to start before all loans had been disbursed (Power Technology, 2003). The loan was later repaid with the proceeds of the project finance loans.

13 MIGA's total exposure to equity holders includes a USD 5.3 million increase to the initial contract agreed in 2012 (MIGA, 2013).

3.1.2 PROJECT COSTS

Total cost for the final project amounted to approximately USD 900 million - 13% higher than the USD 798.6 million estimated when the project was re-launched in 2005 due to geological risks.¹⁴ These costs were also 55% higher than the contract negotiated with AESNP in 2001, mainly, according to our estimations, due to inflation (20%) and cost increases in raw materials (17%) over the years (Figure 2).¹⁵

Engineering Procurement and Construction (EPC) costs represent 62% of total costs, the majority paid out for civil construction and equipment. Of the balance, interest during construction and financing charges account for more than 10% of total costs (see Figure 3).

The unit value of the project stands at USD 3,600/kW; roughly in the middle of the range estimated by IRENA for large hydropower projects (USD 1,050-7,650/kW) (IRENA, 2012), but more than double the average cost for run of river power plants in developing countries in the Clean Development Mechanism database, estimated around USD 1,250/kW (UNEP Risø Centre, 2014).

3.2 Project returns

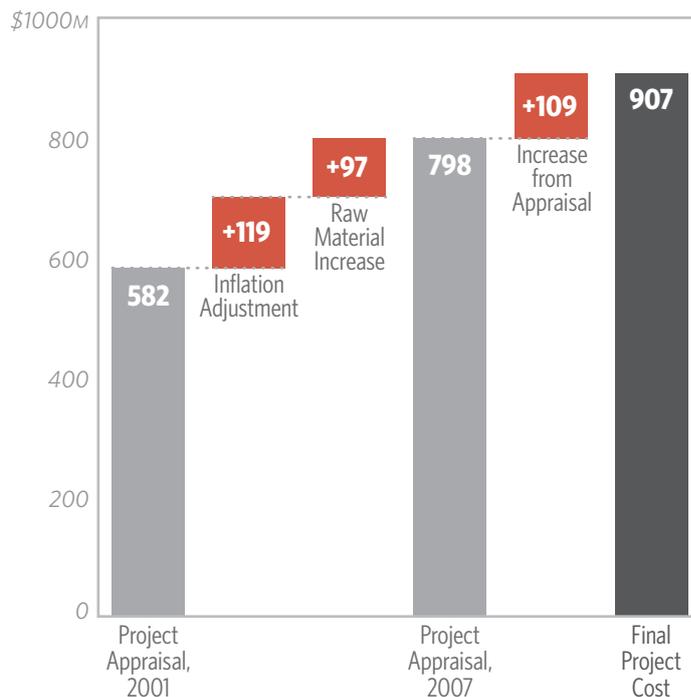
The simulation and mapping of the cash-flows, derived from project's financial appraisal and interviews, allow us to estimate the project's outputs and returns to each stakeholder (Table 2 and Figure 4). Estimates of capacity payments and the power generated under an average hydrology scenario¹⁶ imply a levelized cost of energy of 107 USD/MWh. This appears higher than the average estimate for large hydropower plants published by IRENA - 67 USD/MWh; but it still remains well within the range of reported plants - 25-180 USD/MWh (IRENA, 2012). The width of this reported range signals how site-specific issues (geology of the site and the river hydrology) and financing terms impact the final electricity cost of large hydropower projects. In the Ugandan national power context, this

14 WBG's project appraisal reported that the increase of project costs since the first project evaluation were due to increase of raw materials' price, the complex logistics of the site and to the type of ground and rock found underneath the surface that proved different and more complex to treat than anticipated (WB, MIGA and IFC, 2007).

15 The breakdown of the cost increase has not been officially disclosed by the sponsors, nor the EPC provider.

16 We have used estimates and probability assessment performed by the World Bank during the project appraisal (WB 2007) - these estimates however cannot take in account potential changes to rainfall patterns due to climate change, due to high uncertainty of these forecasts.

Figure 2: Project cost evolution from 2001 to 2011



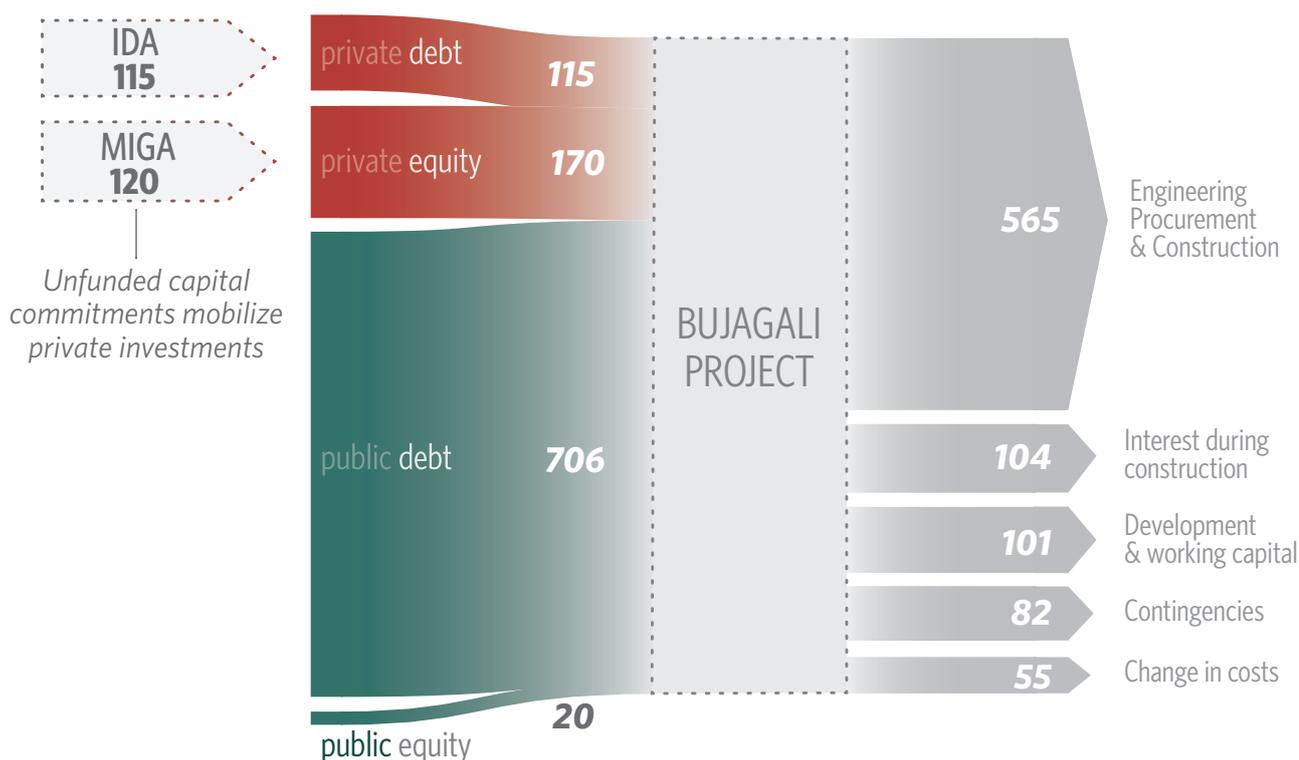
Source WB, IFC and MIGA (2007)

107 USD/MWh cost is half of the average high cost of electricity production once emergency thermal plants are included (260 USD/MWh), and one third the cost to the economy of unserved electricity (i.e. the cost of significant load shedding) estimated by the World Bank at USD 389 USD/MWh (WB, IFC and MIGA, 2007).

3.2.1 THE PRIVATE INVESTOR PERSPECTIVE

The main source of revenues for the private investor is the payments from the power off-taker - the national utility company (UETCL) - stated in the Power Purchase Agreement (PPA). The contract sets a monthly capacity payment denominated in USD. Payment is not linked to the power produced but only conditional on a certain minimum capacity being made available by the project company to the grid. These capacity payments have been set to ensure the project can repay its debt, its operating costs and remunerate equity sponsors with a regulated annual rate of return that we estimate at around 15.6%. Carbon credits, 40% of which accrue to the project, represent a much smaller stream of revenues (+/-1% of total revenues) for the investor (60% of the proceeds from carbon sales accrue to the government).

Figure 3: Bujagali Hydropower financing sources and final uses - Figures in USD millions



3.2.2 PROJECT RETURNS: THE UGANDAN PUBLIC SECTOR PERSPECTIVE

Avoiding the costs of more expensive fossil fuel alternatives and of failing to meet electricity demand more than compensates the annual capacity payments needed to cover the cost of the project

From the public sector perspective, we estimate the project will require an average **annual payment from the national off-taker of USD 175 million**¹⁷ (ERA, 2015) until project loans are repaid, and around USD 90 million thereafter until the PPA expires after 30 years (see Figure 4).¹⁸ From the power sector point of view, these

17 The annual capacity payment has increased from the initial appraisal of USD140-170mil to face higher than expected project costs (WB, IFC and MIGA, 2007).

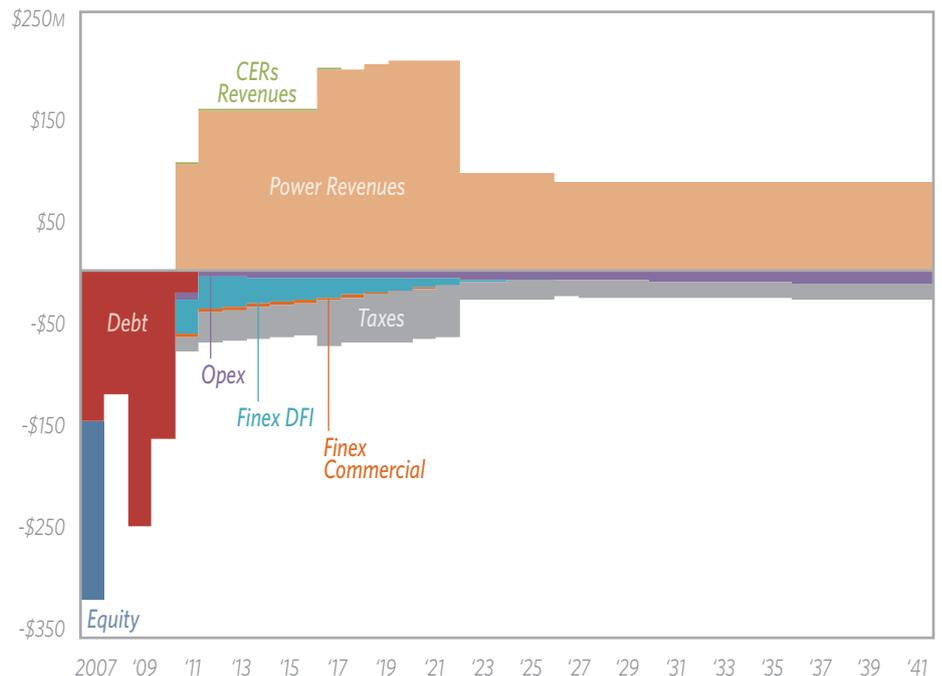
18 This is based on our own estimates of a nominal tariff implied by the capacity payments of USDc 11.7-15.4/kWh and loan repayments of USDc 6-7/kWh afterwards.

payments would need to be compared with the avoided cost of the interim thermal generation the hydropower project helps to displace, and the avoided cost of lost load for the additional capacity it contributes to the grid. Using the estimated cost of supply for the diesel generators - USDc 22/kWh for 2005 (PPA, 2007) and thermal power displaced - 738 GWh (WB, IFC and MIGA, 2007), **we estimate the avoided cost for the interim thermal generation at USD 127 million per annum.** At the same time, taking into consideration the capacity added to the grid, net of the 34% technical and non-technical losses estimated by UMEME, and the value of unserved power estimated at USc 38.9/kWh (WB, IFC and MIGA, 2007), **we estimate the annual avoided cost of lost load at approximately USD 161 million.** The future value of both displaced diesel generation and avoided load shedding is very hard to predict – the first depends on the cost of fossil fuels, the second on the growth of Ugandan economy – however, they indicate that, **at least for the first years of operation of the Bujagali Hydropower, the avoided system costs more than compensate the annual capacity payments.**¹⁹

19 It's not, however, possible to directly link these estimated savings with the value of the final tariff given the influence of other factors: the gradual removal of the public subsidy to electricity (ERA, 2014), the depreciation of the local currency and the remuneration of the private power distributor (UMEME).

Figure 4: Project estimated cash-flows under the PPA agreement

Furthermore, the project will **generate tax revenues for USD 38 million** (on average) for the first 12 years of project operation **and USD 16.4 million** thereafter. During the first seven years of operation, the project will also generate carbon credits that will be sold to the Netherlands and generate revenues of USD 2.6 million per annum for the Ugandan government (ERA, 2014).



Source: CPI estimates

Table 2: Bujagali Hydropower cost and output summary

BUJAGALI HYDROPOWER PROJECT (ESTIMATED VALUES AT THE TIME OF FINANCIAL CLOSURE)		COMMENT
ANNUAL ENERGY GENERATED	1,338 GWh	Probability-weighted average of values estimated by lenders for the low and high hydrology scenarios.
TOTAL ANNUAL REVENUES		Project revenues depend on UETCL payments under the PPA, with a much lower contribution from the sale of carbon credits. 60% of carbon revenues go to the country's government.
- POWER SOLD THROUGH PPA	USD 155-200 million (for 12 yrs) USD 85-95 million thereafter	
- SALE OF CARBON CREDITS (TO BEL)	USD 1.7 million	
- SALE OF CARBON CREDITS (TO GOU)	USD 2.6 million	
INVESTMENT COSTS	USD 905 million USD 3,600 /kW	Construction costs and interest during the building phase represent the largest share of investment costs.
LEVELIZED COST OF ELECTRICITY (LCOE)	USD 107 /MWh	LCOE appear in the middle of range of most large hydro plants (25-180 USD/MWh) but higher than the median value (67 USD/MWh) (IRENA 2012). Capital costs represent the largest share, with financing and operation costs making the balance.
- CAPEX	81%	
- OPEX	5%	
- FINEX	14%	
INTERNAL RATE OF RETURN (IRR) AT COMMISSIONING DATE	Project 10% Equity 15.6%	Equity returns are in line with those reported by Government of Uganda (19%) and with commercial infrastructure projects in the region (Eberhard and Gratwick, 2005)

4. Bujagali Hydropower risk allocation framework

- **The scale of the project, its financial needs, the complex hydrology and geology of the site and the financially weak energy sector make the project high-risk**, despite hydropower being a very mature technology
- **Most of the risks are allocated to the local public sector with DFIs bearing a large portion of financial risks**
- **The availability of de-risking instruments, i.e., a partial risk guarantee and political risk insurance, enabled the single largest private investment ever in Uganda**, a country where typically little private capital flows to energy infrastructure, and significantly reduced the cost of power
- **DFIs risk mitigation instruments appear very effective in reducing both the impact of a risk event on the investors' financial position, and the probability of such an event occurring**

To ensure we capture all significant sources of project risk (very low probability risks are excluded from the analysis), we categorize all risks that could affect the project technical and economic performance, systematically assess those risks according to their probability of occurrence (from low to very high) and their impact on the project's financial and non-financial objectives (again from low to very high). We then analyze and present the risk response for the most important risks and outline the final risk allocation among the major stakeholders. Finally, we model the impact of the risk mitigation instruments provided by the World Bank Group on the project's financial metrics.

4.1 Risk identification

HIGH-RISK EVENTS

Risk events with moderate probability of occurrence, and medium to high impacts:

- **Access to capital/financing:** The lack of private investors and commercial lenders in Uganda (see section 2) made the risk of failing to secure the right cost and maturity capital very high. Such failure could lead to project abandonment or to more expensive financing solutions that would increase the cost of the power.
- **Hydrology risk:** The risk that substantially less water than planned flows through the dam is high given the variability of meteorological conditions in the region and evaporation levels

in Lake Victoria (WB, IFC and MIGA, 2007).

The impact of climate change on precipitation patterns is increasing hydrology volatility and making the risk a significant one (Kumar et al, 2011)²⁰. As the dam is downstream from two existing stations and reuses the water flowing from them, its hydrology is also influenced by the decisions they take on the amount of water to be drawn from Lake Victoria (WB, IFC and MIGA, 2007).

- **Political and off-taker risk:** the risk that the country public entities (national utility and government) are unwilling or unable to honor their off-taker obligations - the capacity payments - and/or act against the rights of the investors (asset expropriation, nationalization, currency convertibility) is classified as medium-high given the high political risk measured for the country (AON, 2014); and the precarious financial health of the national utility as off-taker (see Section 2). The impossibility of selling the power to an alternative purchaser increases the risk further.
- **Commercial credit risk:** significant levels of debt leverage (see Section 3) and high off-taker risk mean the project's lenders bear a substantial credit risk.

²⁰ Large-scale climate models estimate that hydropower potential in the African continent will be reduced by the impact of climate change on precipitation patterns and river flows. However, the Eastern part of the continent might be less affected (Kumar et al, 2011). Local factors such as topography, volume and seasonal distribution of the flow might also significantly alter these estimates.

- **Currency depreciation risk:** The volatility of the Ugandan shilling means that the value of the capacity payments fixed in U.S. dollars in the PPA can significantly increase relative to the local currency, thereby making the electricity produced much more expensive in local terms.
- **Construction delays:** A large-scale project in a land-locked country increases the risk of construction delays that would result in financial penalties for the project developer (WB, IFC and MIGA, 2007). Construction delays actually occurred, with the project commissioned one year behind schedule.
- **Geological risks:** If the type of ground and rock found underneath the surface is different (and more complex to treat) than anticipated, it can result in higher construction costs, longer construction times (as it did in this case [IFC, 2013b]) or make construction impossible.

MEDIUM-RISK EVENTS

- **Social opposition:** the history of the project, its scale and the well-known environmental and social impacts of large hydropower plants increase the risk of local and international opposition that could result in disruption of construction and operations. These could delay construction, make it more expensive and make it impossible to operate the asset.
- **Environmental impacts:** the environmental risks of large hydro-plants are always quite high (WCD, 2000), though the amount of due-diligence already performed by DFIs for the project that was then cancelled are deemed to have decreased the risks to some extent (IFC; 2011a).

LOW-RISK EVENTS

- **Technical performance:** the asset operator is required to maintain and guarantee a minimum technical availability of 95% in the first year and 96% thereafter (WB, IFC and MIGA, 2007). Although the technology is very mature, the scale of the project is significant, hence the risk is deemed medium-low (WB, IFC and MIGA, 2007).

- **Power affordability:** the risk that higher than expected costs, lower performance and power generation would compromise the goal of the project to lower the overall cost of power generation on the national grid and reduce either power tariffs or government's subsidies.

4.2 Risk response and risk allocation framework

Figure 5 depicts the main risks identified and traces their allocation from the initial to the final bearer of risk via key project contracts (such as the PPA and the Implementation Agreement) and via risk mitigation instruments. **The riskiness of the project and the lack of private capital available in the country (IFC, 2011b) required the Ugandan government and IDA and MIGA to provide risk mitigation, to enable private equity investors, DFIs, and commercial lenders to commit resources.**

We discuss here in more detail the effectiveness of this reallocation of high-risk events and its impact on the project's financial metrics. A risk allocation framework is effective if the risk is transferred to a party more suitable to carry it because of: 1) access to better information; 2) greater carrying capacity; and 3) higher influence on the outcome (Frisari et al. 2013).

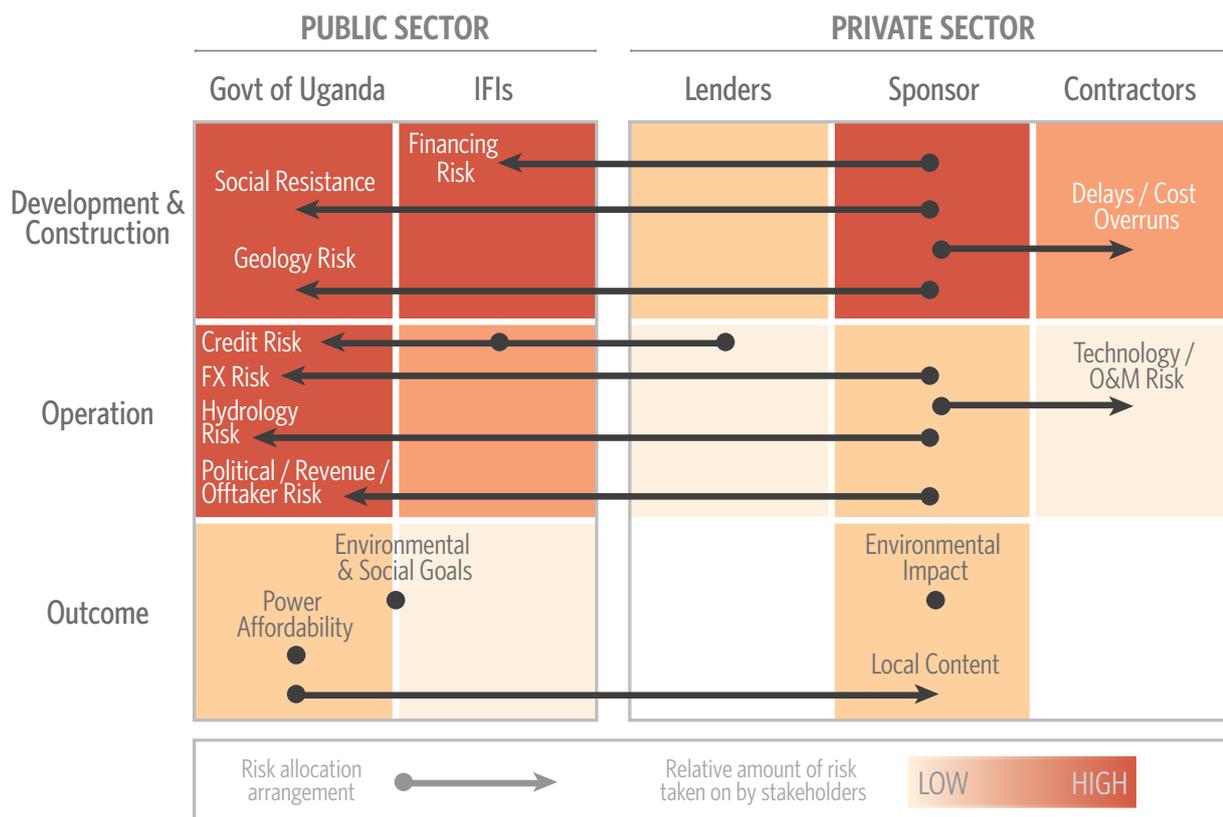
Access to capital and financing risk: Multilateral and bilateral development banks provided low-cost,²¹ long-term debt to ensure the viability of the project and its affordability for the country. The capital base of these entities is much larger than Uganda's public budget or private lenders and investors' risk appetite for the Ugandan infrastructure sector. Their experience of investing in the country allows these institutions to accept and manage the risk at a lower cost than their private counterparties.²²

Hydrology risk: The PPA transfers the risk of lower than expected volumes of water to UETCL, the government-backed off-taker, by linking payments to the capacity made available and not to the power actually generated. This was deemed appropriate as Bujagali is downstream from two government-owned dams whose intake from

21 Despite being non-concessional and based on the institutions' cost of capital.

22 It should be noted, however, these official lenders appraise the project on a commercial basis and will not extend debt if the risk allocation between the host government and the project company is assessed as being not acceptable.

Figure 5: Bujagali Hydropower Risk Allocation Framework¹



1 We categorize risk according to the three typical project finance stages: 1) Development and Construction: all the risks incurred before the project begins to operate, including risks related to project design, procurement, construction, and financing. 2) Operation: all the risks related to project output availability, operating and maintenance (O&M) costs, and revenues (delivery risks relative to the associated or expected benefits). 3) Outcome: risks related to not meeting public policy and investor objectives. They include the risk of not meeting renewable energy deployment and emissions reduction targets, of not lowering the country's cost of electricity or not increasing the reliability of its electricity supply.

Lake Victoria determines the amount of water that flows through Bujagali's turbines and hence the power that the latter generates.

Hydrology risk is also linked to climate change impacts on precipitations patterns (over which UETCL has no control). This climate change risk has been assessed and deemed minimal during the project lifetime, but, in our view, should be re-assessed for the whole life of the assets, given that at the end of the PPA term, the project would be transferred to the government and produce power at very low cost.²³

23 The World Bank Group project appraisal document states, "The risk of climate change on the hydrology of Lake Victoria was taken into consideration: the conclusion of both the economic study and the Strategic/Sectoral, Social and Environmental Assessment (February 2007) under the Nile Basin Initiative, is that there will be no adverse effect on water release due to climate change during the life of the proposed project".

Political - off-taker risk: The Ugandan government's guarantee, the political risk insurance offered by MIGA and the partial risk guarantee provided by IDA means that these organizations mitigate the significant risk²⁴ that the project's financial viability will be undermined by the off-taker's inability or unwillingness to pay the monthly capacity payments. DFIs have a much stronger influence on governments' contractual compliance than private companies, making these risk guarantees very effective (see next section for more details).

Credit risk: As the project's only revenues come from PPA payments, the risk that the project developer fails to pay back its loans is closely linked to political and off-taker risks. The risk is contractually borne by commercial lenders and DFIs through their loans and, for the commercial banks, mitigated by the IDA guarantees (PRG), as these cover them against certain

24 IFC 2011 reports Uganda's political risk as "High". AON 2013 Political Risk Map highlights the following main risks: sovereign non-payment, political violence and interference increased by instability in neighboring countries, and weak infrastructure, energy in particular (AON, 2014).

government risks resulting in debt service default. However, the IDA PRG does not cover other commercial risks such as non-performance of the project company and resulting borrower default that remain with the lenders and DFIs.

Currency depreciation risk: Public entities can be considered in a better position to control their currency and manage its fluctuations than a private company,²⁵ however, the impact of this risk on the project's costs (as seen by the government) could be substantial. Considering the plant displaces imported fossil fuels, this risk is not additional and represents, ultimately, a trade-off with more expensive local currency loans with much shorter maturities (and hence leading to a higher project generation tariff) and potentially in insufficient amounts to fund a project of this size and scale.

4.3 Impact of de-risking instruments on the project's financial profile

The presence of risk guarantee instruments and financing provided by the World Bank Group proved essential in attracting private equity and debt investment. **On the debt side in particular, PRGs mobilized loans from commercial banks at maturities and interest rates comparable to development lenders: these terms allowed a reduction of the required initial tariff of at least 7% and up to 60%** (see Figure 6).²⁶ Building a scenario in which the debt from commercial banks is provided at more expensive terms and assuming unchanged **equity returns of 15%** (Section 3) and a **minimum debt service ratio of 1.3**; the tariff resulting from the simulated financial model (for the initial years until debt is repaid) would have **needed to be several times larger than the one estimated for the project.** For example, reducing commercial loans' maturities from 16 years to 10 years would require a tariff almost 30% higher to cover the debt service of the loans, while with maturities of 7 years, the tariff would have needed to be more than 50% higher than the agreed one. The effect of lower interest rates is less dramatic but still considerable, an average interest rate of 10% or 15% (at 15 years maturities) would have demanded a tariff increase of approximately 10%.

25 Especially in a country with undeveloped capital markets and very limited possibility to use financial instruments to hedge currency risks.

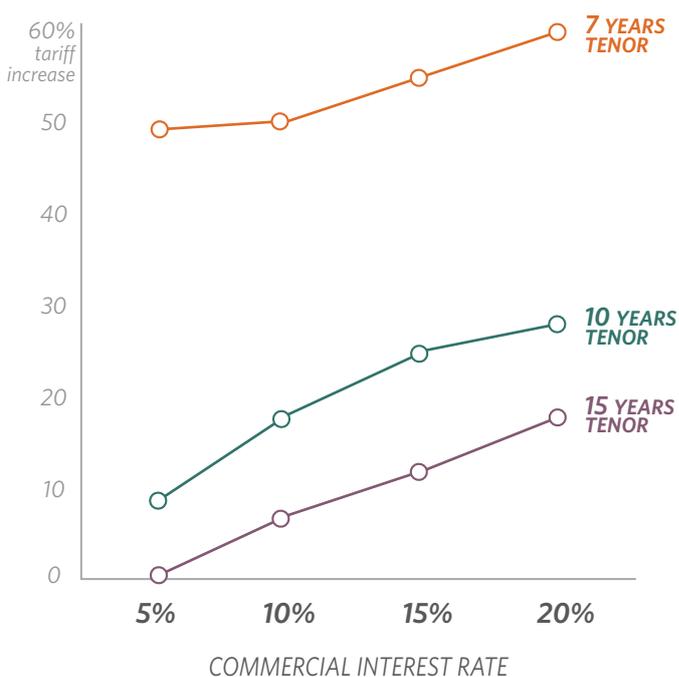
26 Data on financing terms for commercial lending to infrastructure and power projects in Africa at the time of Bujagali Hydropower financial closure is scarce. Fernstrom (2011) suggests a typical term of two years for commercial lending in Uganda, while Eberhard et al (2011) reports maximum maturities varying from 5 to 20 years and interest charges going up to 20% for some Sub-Saharan countries such as Zambia and Ghana.

PRGs managed to mobilize loans from commercial banks at terms that allowed a reduction of the required initial tariff of at least 7% and up to 60%

The presence of several DFI lenders, together with the IDA PRG and MIGA PRI, reduced investors' perceived risks, and would limit any losses from a potential political risk event. Several factors contribute to such de-risking:

- DFIs' control over significant finance flows to developing countries deters their governments from defaulting on their obligations
- DFIs' experience in mediating with both governments and the private sector to prevent political risk events from occurring
- DFIs' status as preferred creditors gives them preferential access to a country's foreign currency reserves and priority order in repayments of the loans (S&P, 2000)

Figure 6: PRG impact: Tariff increase required with private sector loans provided at commercial market terms



We have made a quantitative assessment of the effectiveness of risk mitigation instruments in mitigating the impact of political and policy risks on the overall financial performance of the project. To simplify the analysis, we consider only the risk of a “unilateral” PPA revision from the Government of Uganda because this is the sole source of revenue for the project and it is the most important factor affecting its debt repayment and equity performance.²⁷

To capture the uncertainty around a risk event occurring and the outcome of risk mitigation efforts, we simulate the ability of the project to continue to remunerate debt and equity investors under different risk scenarios where the probability and magnitude of a PPA revision increases (more details in Annex 3).

To measure the effectiveness of each instrument individually and in combination, we simulate four different risk management strategies: 1) the use of only internal resources to manage risk; 2) the use of the PRG; 3) the use of the PRI; and 4) the combined use of both PRG and PRI. Figure 7 presents the impact of PPA revisions on debt investors under different risk management strategies. Figure 8 shows the impact of the same PPA revisions and risk management strategies on equity investors.

For debt investors, risk mitigation is effective if it improves the ability of the project to avoid debt default (frequency of default in Figure 7); while for equity investors, if its profitability is maintained even in presence of a risk event (expected net present value – or NPV - losses in Figure 8).

Figure 7: Risk mitigation impact on the probability of default

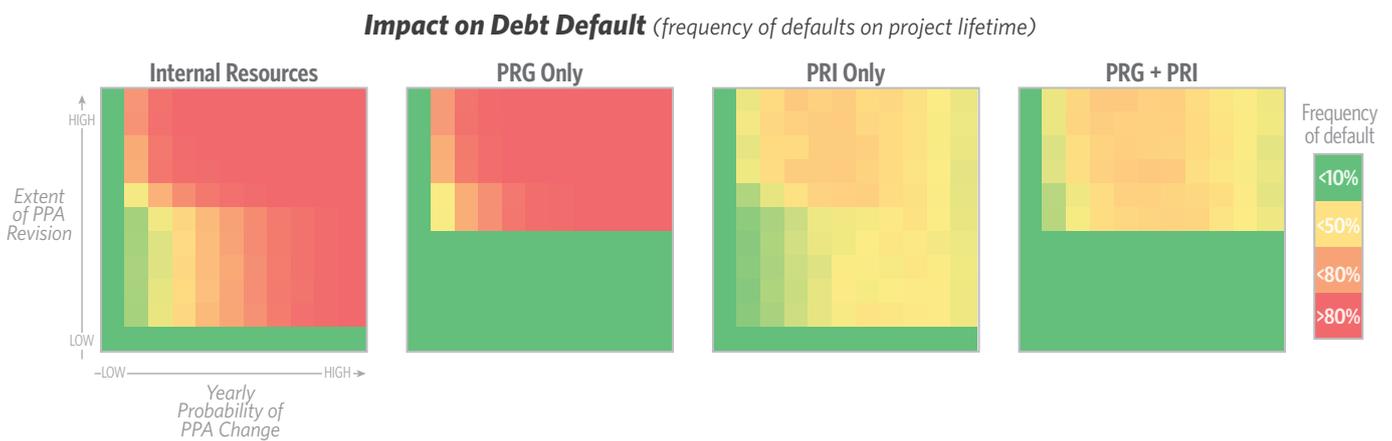
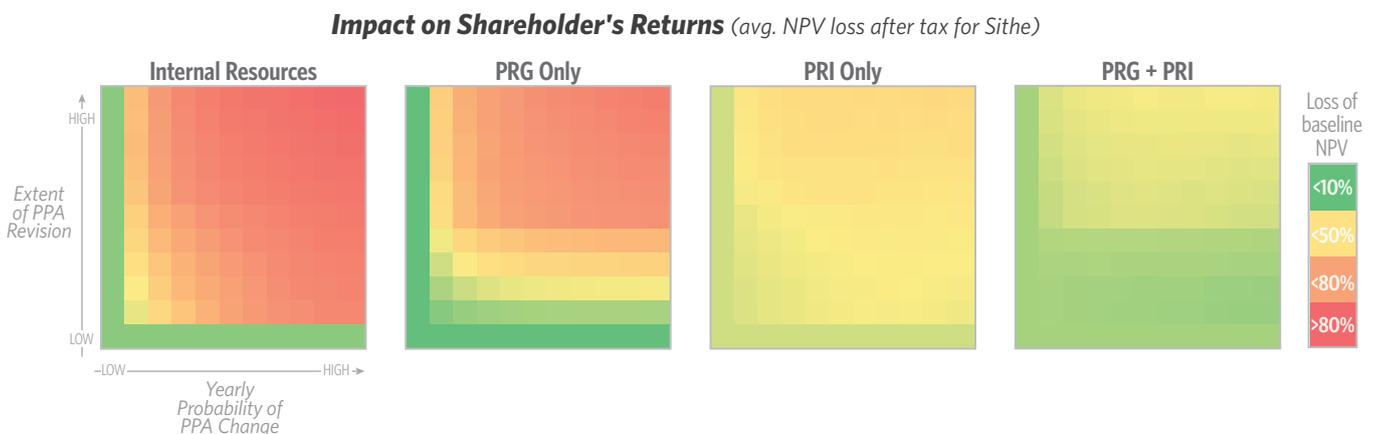


Figure 8: Risk mitigation impact on shareholders' returns



27 Risks covered by political risk insurance also include several other types of risk such as expropriation, war and civil disturbance, transfer restriction and currency inconvertibility (MIGA, 2015).

The frequency of debt default and the losses for equity holders both increase rapidly when the probability of a PPA revision increases (moving towards the right end of each chart), as this is directly correlated to the proximity in which the political risk event is likely to occur. **Importantly, if the project company defaults on its debt repayments because of a PPA revision, then, under the terms of the WBG's risk mitigation instruments, IDA would repay the covered lenders on schedule, but the government would be liable to reimburse the WBG for any sums paid under the indemnity agreement. This is such a strong deterrent that PRGs have never been called by the relevant guaranteed entities (the commercial lenders in this case) since their inception.**

The financial ties between the World Bank Group and the host country can greatly improve the perceived risk profile of the project for both lenders (commercial and DFIs) and equity investors, as it would be fair to assume that, when adopting a strategy that includes PRGs and PRIs, the probability of PPA revision can be significantly reduced. In graphical terms, this change of risk perception would translate in moving horizontally towards the left of the charts in Figure 7 and 8, with a clear improvement of the risk perception for private lenders and shareholders, as both expected NPV losses and frequency of defaults are greatly reduced.

Impact of IDA PRG: PRG's ability to enable longer debt tenors mitigates the impacts of political risk on both the project debt performance, and shareholders' returns. The level set for the tariff represents the first level of protection, as, in our simulations, it provides revenues that allow its sponsors to meet their debt repayments even in the case of the PPA being revised downwards by up to 50%.

Its cost is however covered by the power consumer through the electricity tariff or by the public budget if electricity is subsidized by the government. As seen above, by facilitating commercial loans at longer maturities, the PRG allows such a buffer to be maintained with a tariff (hence at a cost) significantly lower than would have been otherwise (see Figure 6 for more details). However, once revenues are reduced to a point where the project company cannot service all its debt, the guarantee by itself may be unable to prevent the lenders putting the project in default,²⁸

28 Payments from the PRG can actually start before a project is declared in default, hence avoiding the default itself. However, when the PRG covers only a portion of the debt (as for the example of Bujagali), those early payments cannot prevent other (uncovered) lenders from placing the project in default.

but would enable commercial loans to continue to be paid on schedule. In such instances, with the PRG eventually called, covered lenders would be paid in full, while the government would be liable towards IDA under the indemnity agreement for any amounts paid by IDA to the commercial lenders under its guarantee (WB, IFC and MIGA, 2007). As discussed in Annex 3, such liability represents such a strong deterrent factor for the government that, so far, PRGs have never been called. In contrast, uncovered lenders would rely on either a subsequent renegotiation of the PPA to reestablish the project revenue to acceptable levels or on the enforcement of their security package (e.g. sale of assets, sale of shares in the project company, termination payments that may be due from the government) as the only means to recover their loans.

Impact of MIGA PRI: The PRI can reduce losses by more than 70% in high-risk scenarios, as higher risk perceptions justify the instrument's cost for equity holders.²⁹ MIGA PRI more than halves the expected losses to NPV compared to a strategy which excludes the use of WBG risk mitigation instruments. Given its annual premium of around 1/1.25% – entirely borne in this case by equity holder Sithe Global – its contribution increases markedly as the probability of a PPA change increases: from reducing equity losses by 5% in low risk scenarios, to more than 70% reduction in high risk scenarios. In these simulations, the PRI is economically beneficial when expected probabilities of PPA revision are higher than 5% or the magnitudes of PPA revisions are above 30% (Figure 8).³⁰ Furthermore, while covering only a portion of equity assets, MIGA's deterrence factor and mediation capabilities, as long as they discourage governments to repeal their contracted obligations, could be able to enhance the financial performance of the entire project, including its credit performance. MIGA's track record in being able to solve disputes by negotiating with governments significantly improves the credit profile of the project, whose frequency of default is reduced by a half with the involvement of MIGA: MIGA has paid only six claims from 90 successfully resolved disputes (MIGA, 2011a). **However, in the event of a substantial PPA change, the provision of MIGA PRI might be insufficient to prevent debt default.**

29 This is confirmed by MIGA's higher share in of the PRI market in emerging and high risk countries below investment grade rating (MIGA, 2015).

30 In general if the PPA change involves minor changes, and if the project is still remunerative for the developer, the client would refrain anyway from contacting MIGA and going into arbitration to avoid clashes with the government (Kimber, 2014).

Without any provisional pay outs from the agency to support the project while the agency mediates with the government, the occurrence of default in such situations depends only on the project sponsor's ability to compensate revenues shortfalls until mediations are completed.

The combined use of PRG and PRI allows synergies by lowering transaction costs and further improving expected returns for lenders and equity providers.³¹ By leveraging skills available across its multiple agencies the World Bank reduced transaction costs for Bujagali Hydropower, saving on financial, environmental and social impact assessments. The effectiveness of the complimentary coverage could be improved by mainstreaming efforts to support projects' liquidity needs while the instrument providers attempt to mediate with national authorities. On this side, we note

that since the time the financing for the Bujagali project was completed two sets of instruments have been launched: PRGs are available to cover commercial banks issuing a letter of credit to the lenders, while MIGA can offer coverage (at the request of the investor) of temporary business interruption. In both cases, the instruments provide coverage for short time frames (1 to 3 months), typically associated with the off-taker experiencing liquidity issues or political risks events that can be solved in short time frames (e.g. temporary business interruptions). While such time horizons are significantly shorter than the time typically required for mediations with governments (from MIGA's track record this time can extend up to 2 years at times), these instruments are clearly an improvement of the effectiveness of coverage in those situations where a solution can be found quickly and the project can be kept running.

31 It's not possible to conduct a detailed efficiency analysis on the use of public money with the data available. We note here, however, that while the use of both PRG and PRI implies a higher engagement of public resources, savings in transaction costs and, more importantly, the lower tariff that the public off-taker would need to pay compensate this effect and represent a gain in efficiency.

5. Effectiveness, Replication and Scalability of the Financial Structure

- **The involvement of several DFIs and a combination of risk mitigation tools unlocked the largest mobilization of private resources among hydropower plants in Africa so far;**
- **The complexity of agreements related to Bujagali did not slow project development down - it reached financial closure in less time than most comparable hydropower projects in the region;**
- **The World Bank Group has used such a structure to finance projects on just five other occasions.** The high transaction costs associated with the structure mean its use is only justified for very few large projects that are also deemed highly critical by a country's government;
- **The ongoing modernization of the World Bank's guarantee policies and the launch of new instruments by MIGA provide an opportunity to improve the replicability of the model and greatly increase its market potential to eventually include smaller scale installations in solar and wind technologies**

In this section, we assess the effectiveness of the overall financial structure of Bujagali Hydropower in mobilizing private capital while ensuring construction and commissioning occur in a timely fashion; and the potential for its replication within the World Bank Group's / DFIs' portfolio of projects.

5.1 Effectiveness of the project's financial structure

To assess the effectiveness of the project's financing - in terms of private capital mobilized and time to financial closure - we compared its financial structure and performance to ten large-scale hydropower projects³² financed in Africa between 2005 and 2013, for which sufficient data is available (Table 3).

Effectiveness is measured using the following indicators:

- The overall amount of financing mobilized beyond national governments' budgets - an important measure of effectiveness in countries with fast-growing energy demand and limited public funds to meet it.
- The share of private investment mobilized compared to public finance, an indication of whether public institutions are driving private engagement effectively.
- The time required to complete the financing package - important because delays can drive up the costs for developers and make investment less attractive.

32 This sample includes both greenfield and expansion projects with a minimum capacity threshold of 50 MW.

In this data sample, we identify three main types of financing models for hydropower in Africa to compare with the financing of Bujagali: two models combining private investors with international public finance (development financial institutions - DFIs - in one case, and export credit agencies - ECAs - in the other), and a model using national public resources only.

The amount of private debt unlocked by risk instruments provided by the World Bank Group in Bujagali is unprecedented for Sub-Saharan Africa's projects

This cross-sectional comparison offers the following three insights:

First, the amount of private debt in Bujagali is unprecedented for Sub-Saharan Africa's projects (Eberhard et al. 2011) - for both commercial lenders and DFIs. The participation of both DFIs and ECAs to hydropower projects is typically associated with higher levels of leverage in the projects (with debt covering up to 80% of investment costs), compared to traditional forms of financing, mostly based on equity from national governments (adopted particularly in the past in Africa). However, as shown in Figure 9, in such projects the debt is provided by lenders from the public sector (e.g. DFIs), as commercial lenders' risk tolerance is usually too small to include large infrastructure projects in low income countries.

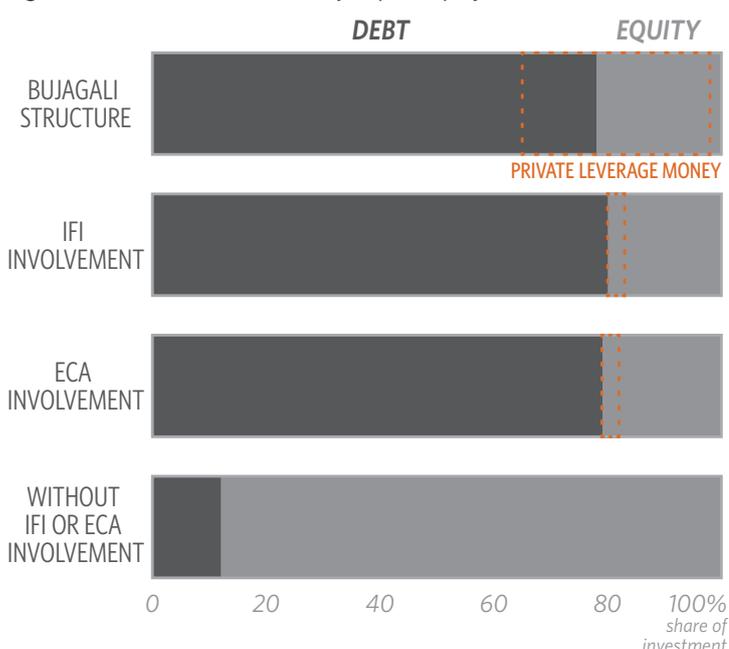
Table 3: Large Hydropower Plants financed in Africa between 2005 and 2013

INFRASTRUCTURE PROJECT	TECHNOLOGY TYPE	HOST COUNTRY	STATUS OF PROJECT	MW	FINANCING DATE
Bujagali Hydropower	Hydro - Run of River	Uganda	Operational	250	Dec, 2007
Itezhi Tezhi Hydro Power	Hydro - Reservoir (Expansion)	Zambia	Under Construction	120	Oct, 2013
Gilgel Gibe III Power Station	Hydro - Reservoir	Ethiopia	Under Construction	1870	May, 2010
Finchaa Amarti Neshe Power Station	Hydro - Reservoir	Ethiopia	Operational	97	Sep, 2007
Memve'ele Power Station	Hydro - Reservoir	Cameroon	Under Construction	200	May, 2011
Bui Power Station	Hydro - Reservoir	Ghana	Operational	400	Sep, 2008
Beles Power Station	Hydro - Run of River	Ethiopia	Operational	460	July, 2005
Merowe Power Station	Hydro - Reservoir	Sudan	Operational	1250	Sep, 2008
Capanda Dam	Hydro - Reservoir	Angola	Operational	520	July, 2005
Kiira Power Station	Hydro - Reservoir (Expansion)	Uganda	Operational	200	July, 2011
Sondu Miriu Hydro Power	Hydro - Run of River	Kenya	Operational	60	Nov, 2004

Second, by combining resources from private sponsors with DFI financing and risk mitigation tools, Bujagali's financial structure enabled the largest mobilization of private resources among comparable hydro projects in the region (considering equity sponsors and commercial lenders). The project is one of the few financed by the private sector, **mobilizing almost USD 1 of private capital investment for every USD**

2 of public financing committed, in a sector usually dominated by projects funded with public resources only. Despite hydropower being an established technology, few projects in Africa are financed without the overwhelming financial engagement of the public sector, either as national public equity investor or as international foreign debt provider (Figure 9).

Figure 9: Private sector finance in hydropower projects in Africa



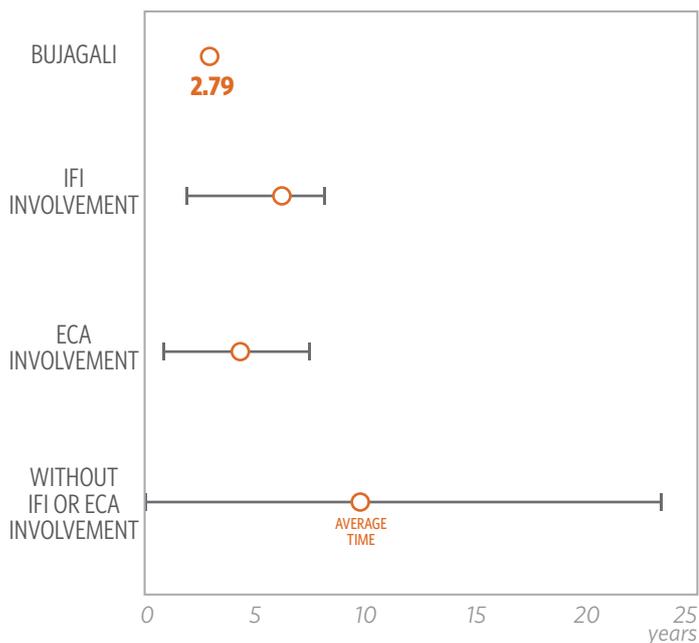
Note: in the figure, private resources include only investment resources from commercial lenders and private equity sponsors. Loans from DFIs are considered of a public nature.

Third, despite the complexity of transactions usually associated with the deployment of guarantees and risk mitigation instruments, the financial structure in Bujagali didn't require more time to reach financial closure as for comparable projects (for technology, size and location).

A comparison with a sample of large scale hydropower projects operating in Africa since 2005 suggests that lengthy negotiations to reach financial closure have been very common for this technology regardless of the financing model adopted - see Figure 10.³³ These long lead times have often been related to delays caused by a variety of factors that the financial structure in Bujagali managed to avoid: changes in laws affecting the PPAs (the Itezhi

33 Bujagali benefitted from some development work performed during the first attempt to develop the project, however, we have not included in the comparison the length of those negotiations as the project was cancelled and restarted with several new actors a few years later. Also the detail on which activities of the first phase were salvaged is not available.

Figure 10: Time to financial closure for large hydropower projects in Africa



Tezhi Hydro Power project in Zambia³⁴ among those financed with DFIs' and ECAs' support); institutional, governance, social and environmental concerns impacting on the participation of key actors in the project (Sundu Miriu Hydro Power Project in Kenya)³⁵; contractor performance (Kiira Power Station in Uganda financed with IDA loans to the government)³⁶, local funding shortages, and wars (Capanda project in Angola funded completely with national public finance)³⁷.

34 In Zambia, a statutory instrument stating that all deals between Zambian entities should be priced in local currency stalled negotiations delaying the signing of the PPA for the Itezhi Tezhi Hydro Power project. The deal became possible after the PPA was no longer categorized as a domestic transaction (Project Finance, 2013).

35 In the Sundu Miriu Hydro Power Project in Kenya, the Export Credit Agency JBIC initially withdrew from the funding due to institutional and governance concerns raised by financiers and by Africa Water Network and Climate Network Africa related to habitat loss due to the construction of the tunnel, and effects on health of the local residents. Social and environmental concerns were subsequently mitigated, and JBIC resumed financing in 2004 (UNFCCC, 2007).

36 Defects noted during commissioning tests of the Kiira Power Station in Uganda delayed commercial operation of the units by about 2.5 years (WB, 2009).

37 The Capanda project in Angola was supposed to start generating power in December 1993. However, the dam was attacked, occupied and damaged by rebels twice (1992-1994, and 1999-2000). Rehabilitation started in 1999 and construction was finally resumed in 2000 (International Rivers, 2010).

5.2 The replication and scalability of the Bujagali financial model

Despite an increase of their usage in the recent years, guarantees still represent a very small fraction of DFI's activity: ODI estimates that in 2013, across the seven main multilateral banks, guarantees represented only 4.5% of total financing (Humphrey and Prizzon, 2014).

World Bank Group institutions have jointly supported the issuance of guarantee instruments only in just over 20 projects, mostly in the energy sector but also to a lesser extent the transport, manufacturing, and financing sectors (see Annex 4). IBRD, IDA and MIGA have typically provided risk coverage, with the IFC, acting as lenders to increase the amount of financing available to projects (IEG, 2009). Nevertheless, **the combination of a MIGA PRI, WB guarantees and financing seen in Bujagali Hydropower have been applied to seven projects only, all in the energy sector and all very large projects** (see Table 4).

This limited replication is certainly due to only a few projects justifying the deployment of resources that such financial structure comprises – however, our analysis also indicates that high transaction costs are a significant constraint on demand, while the instruments' current design and the operation policies within DFIs have constrained their supply.

5.2.1 CONSTRAINTS TO GUARANTEES DEMAND

High transaction costs limit developers' demand for DFIs' risk mitigation instruments to large, high risk projects that involve significant upfront investments (averaging USD 900 million if we exclude the privatization project in Table 4) and, for their scale and complexity, require more than a single WBG agency to provide full risk coverage (IEG, 2009).³⁸ They are large-scale infrastructure projects and therefore highly sensitive to political interference relying as they do on power sector regulation and long-term off-taker agreements with state-owned utilities. In such instances, the use of explicit governments' counter-guarantees and the backing of the World Bank are seen as critical to mobilize private capital (WB, 2012a).

38 Additional complexity comes from the cross-border nature of some of these initiatives. See e.g. the Nam Theun 2 project in Lao PDR, with most of the off-take occurring in Thailand, and the West Africa Pipeline, involving Nigeria, Benin, Togo, and Ghana (IEG, 2009).

Table 4: Joint cooperation of WBG institution on risk mitigation through guarantees, 1994-2011

PROJECT	COUNTRY	YEAR OF GUARANTEE ISSUING BY WBG	PROJECT VALUE (USD M)	SUBSECTOR	IBRD / IDA	IFC	MIGA
S. African Regional Gas Project (SASOL)	Mozambique	2003	721	Oil & Gas	USD 20m & USD 10m PRGs	USD 18.5 m Equity	USD 72m PRI
West Africa Gas Pipeline	West Africa	2004	590	Oil & Gas	USD 50m PRG	---	USD 75m PRI
Nam Theun 2 Hydropower	Lao PDR	2005	1450	Hydropower	USD 42m PRG; USD 20m Grant	---	USD 91m PRI
Umeme Power Project	Uganda	2006	84	Power distribution (Privatization)	USD 5.5m PRG; USD 11m Loan	USD 25m A Loan	USD 40m PR
Bujagali Hydropower	Uganda	2007	904	Hydropower	USD 115m PRG	USD 100m A Loan; USD 30m C Loan	USD 115m PRI
Thika Power	Kenya	2012	146	Oil & Thermal	USD 45m	USD 36m A Loan	USD 61.5m
Gulf Power	Kenya	2014	108	Oil	USD 44m	USD 21.6m A Loan; USD 27m B Loan; USD 5.4m C Loan	USD 27.9m

5.2.2 CONSTRAINTS ON GUARANTEES SUPPLY

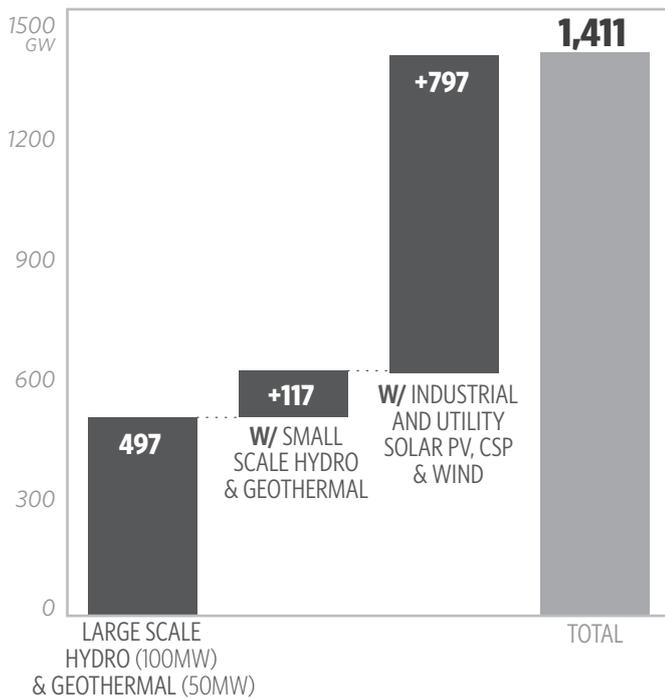
Previously, WBG saw guarantees as a last-resort solution, to be deployed only after market tools and MIGA and IFC instruments have been exhausted (WB, 2012a). Furthermore, guarantees could be issued only for projects highly dependent on government support, and would need a distinct approach and separate treatment.

The WBG has now modernized its policies for the provision of its guarantees, following an internal review that reported the tool as under-utilized (IEG, 2009) and a public consultation on what had been limiting demand from investors (WB, 2012b). We highlight here the **key changes to the governance of its guarantee instruments** that may significantly increase their uptake to include also smaller-sized and innovative projects (WB, 2013b):

- **Extend access to guarantees to all International Bank for Reconstruction and Development (IBRD) and IDA countries;** previously some of the guarantees were not available to IDA countries;
- **Make guarantees' policies similar to those for loans and other financing tools,** and integrate them with other financing and development tools. Guarantees will then become an easily accessed option within the same financing policy framework;
- **Allow guarantees to be applied to programs or a series of projects,** so as to lower transaction costs for each financing event and to make small projects eligible;
- **Allow guarantees to be used for additional financing needs,** enabling guarantees to also be used for ongoing investment projects, thus filling financing gaps;
- **Promote flexibility** of the instrument and lift operational limitations to its use.

An example of the implementation of such new policies is the recently approved project to provide a **series of IDA partial risk guarantees** for a total of USD 160 million to support the financing of several small scale private hydropower projects with a maximum capacity of 20 MW in Uganda (WB, 2014c).

Figure 11: New Expected RE Capacity Installations Eligible for Guarantees Provision (2035 IEA New Policies Scenario)



Source: IEA 2013, CPI

The guarantees would be provided either directly to commercial lenders, or via an umbrella agreement with a single commercial bank issuing letter of credits to each project, under standardized PPA and implementation agreements.

MIGA has also made significant changes to its policies and products, pursuing (among others) two specific strategic goals for the period from 2015 to 2017: “maximizing development impact by increasing collaboration with the WBG institutions”, and “increased investments in complex projects, including infrastructure” (MIGA, 2015). In particular, in 2012,

MIGA launched the Non-Honoring of Sovereign Financial Obligations (NHSFO) product with the aim to provide clients with protection against sovereign institutions that do not honor their financial obligations, without first requiring them to obtain an arbitral award (unlike for the Breach of Contract coverage) and hence reducing significantly the time needed to obtain a claim payment. Although this product is applicable only to “unconditional³⁹ sovereign obligations” and provides less robust coverage given the lack of the internationally binding arbitration award, it has generated most of the growth of MIGA’s portfolio, especially from private lenders and financial investors (MIGA, 2015). Beside the **increased timeliness of the claims determination period and payment of claims, such products have been designed to provide lenders with capital relief under BASEL II regulations;** hence allowing these banks to extend their borrowing capacity and to reduce the amount of capital they need to keep against their loans (MIGA, 2012c).

It is difficult and premature to estimate how much these changes will increase the uptake of risk mitigation instruments. However, it’s possible to assess how the size of the potential market could change following the greater flexibility of these tools, until now mainly confined by their high transaction costs to large scale hydropower and (possibly) geothermal projects. Considering new renewable energy installations expected by the International Energy Agency (IEA, 2013) until 2035 under the New Policies Scenarios, we estimate that **the annual market potential could triple from 497GW of new installations in non-OECD countries of large hydro and larger geothermal only, to almost 1,500 GW when smaller hydro and geothermal installations as well as wind, industrial and utility solar PV and concentrated solar power are considered** (Figure 11).

39 MIGA defines the unconditional obligation as the situation in which “there are no grounds on which the sovereign could defend legally against the fact that the obligation is due” (MIGA, 2012c).

6. Conclusions

Evidence is growing of the effectiveness of risk mitigation instruments provided by public financial institutions for mitigating risks and mobilizing private capital in the financing of infrastructure in high risk environments. However, several studies show they are underutilized in particular for low-carbon assets.

We analysed the financial structure of the 250MW Bujagali Hydropower Project in Uganda - a large-scale, low-carbon project in a high-risk environment that attracted an unprecedented amount of private investment in a low income country. This analysis does not aim to evaluate the overall economic, social and environmental impacts of the Bujagali project.⁴⁰ Instead, it examines the impact of such risk mitigation instruments on the cost of the power produced, the amount of private finance mobilized and the terms (cost and maturity) at which this private capital has been provided.

Our analysis of the effectiveness of risk coverage provided by partial risk guarantees (PRG) from the International Development Association (IDA) and political risk insurance from Multilateral Investment Guarantee Agency (MIGA) on the project shows **the instruments, used on their own or combined together, clearly reduce the expected impact of a risk event** on both the project's ability to pay its debt obligations on schedule, and investors' final remuneration. Importantly, **the WBG's successful history of ensuring countries do not repeal their obligations, supported by its efforts to better understand sector needs, its country relationships and its indemnity agreements with governments, significantly reduces the probability of such events.**

Coupled with the preferred creditor status typically enjoyed by DFIs, these factors significantly increased risk coverage effectiveness and helped mobilize financing for the project.

Furthermore, by offering an effective coverage of key risks (e.g. political, counterparty, off-taker) these **risk mitigation tools also reduced the project's cost of capital, hence the cost of the generated power for the public budget.**

Despite their effectiveness, **these risk management tools have shown limited replication potential to date, having been used only for a handful projects by the WBG, and representing in aggregate only 4.5% of total financing by the largest six multilateral DFIs. Both demand and supply side constraints seem to be limiting their application only to very large projects.** Recent changes to WBG policies for risk mitigation instruments could potentially improve their replication potential. The World Bank has recently completed a modernization effort of its guarantee products, aimed to reduce the transaction costs and the complexity involved with their provision to facilitate their use, including flexible payment guarantees to directly address payment risks and a guarantee series for standardized projects, small and big. MIGA too is increasing its collaboration with other WBG institutions and has increased its commitment to complex infrastructure projects. At the same time, a new product (Non-Honoring Sovereign Financial Obligations) now aims to provide more timely coverage to clients.

⁴⁰ The project has been the subject of significant debate and criticism. For a summary of the controversies linked to the project in the late 90s see Annex 2.

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8. Annexes

Annex 1: Bujagali Hydropower Stakeholders

STAKEHOLDER	DESCRIPTION AND ROLE	FINANCING ROLE IN THE PROJECT
EPC CONTRACTOR	Salini Costruttori Spa <ul style="list-style-type: none"> Private industrial Group specialised in the construction of major works; In 2007 Salini-Hydro, a subsidiary of Salini Costruttori Spa, was awarded with the EPC contract for the project; Alstom Power Hydraulique act as subcontractors, selected via tender under EIB's procurement rules. 	<ul style="list-style-type: none"> EPC represents the main share of costs for the project, corresponding to USD 564 million (up from the initial 520 assessed in 2007), or USD 618.5 million if fees due to changes in the project are included*.
PROJECT DEVELOPER (AND SPONSORS)	BEL (Uganda) <ul style="list-style-type: none"> It is responsible for the financing, developing, constructing, operating and maintaining the Bujagali hydropower plant. Overseeing also the work of the EPC contractor; As per Implementation Agreement with the Government it is responsible for environmental compliance and implementation of the environmental action plan as well as resettlement of related activities; Manages the design, procurement and construction process for the 100 km Interconnection Project on behalf of UETCL. 	<ul style="list-style-type: none"> Equity investment of USD 171 million in the project Under the PPA, BEL agrees to sell all of its production exclusively to UETCL
	Sithe Global Power LLC (USA) / World Power Holding (Luxembourg) <ul style="list-style-type: none"> International power development company formed in 2004 to develop, construct, acquire and operate strategic assets around the world; Controlled by Blackstone Capital Partners, Reservoir Capital Group, and Sithe Global's management, owns 100% of World Power Holding; 	<ul style="list-style-type: none"> Equity investment of USD 111 million in BEL, or 60% of project sponsors' share. Increased to USD 117 million in 2012.
	IPS (Kenya) <ul style="list-style-type: none"> Infrastructure and industrial development arm of the Aga Khan Fund for Economic Development (AKFED), an international development agency dedicated to promoting entrepreneurship in parts of the developing world lacking sufficient foreign direct investment. 	<ul style="list-style-type: none"> Equity investment of USD 60 million in BEL, or 30% of project sponsors' share.
PUBLIC SECTOR	Government of Uganda <ul style="list-style-type: none"> In 1999 starts the reform of the energy sector, which includes leveraging private sector investment; Uganda's 2002 Energy policy includes the goal to meet energy needs of Uganda's population for social and economic development in an environmentally sustainable manner; Uganda's 2007 Renewable Energy policy includes a 61% target of renewable energy generation by 2017 (from 4% in 2007), and an installed capacity for large hydro of 1,200 MW; Owns 100% of UETCL, through the Ministry of Finance, Planning and Economic Development; Set up and launched the tender for identifying the project sponsor; As per Implementation Agreement grants BEL the right to construct and operate the project at the plant site, providing protection against expropriation. 	<ul style="list-style-type: none"> Co-owner of BEL, the project SPV, with USD 20 million equity investment, mainly via assets inherited from the first contractor of Bujagali I AES; The Government also sanctioned a USD 75 million bridge fund for the project to take off; As per Government Sovereign Guarantee, guarantees UETCL payments obligation under the PPA to BEL.
	Government of the Netherlands <ul style="list-style-type: none"> The Ministry of Infrastructure and Environment issued a Letter of Approval for the CERs generated by the project in February 2011. 	<ul style="list-style-type: none"> The Ministry has agreed to purchase the CERs in hard currency. The revenues will be shared between the project company (40%) and the government (60%).

*The value of Bujagali dam provided by Salini and of hydro and electro-mechanical equipment provided by subcontractor Alstom Power Hydraulic are USD 284 million and USD 217 million (EUR 160 million) respectively (Salini, 2012; Alstom, 2012).

ENERGY SECTOR (PUBLIC/PRIVATE)	UETCL (Uganda)	<p>Uganda Electricity Transmission Company Limited</p> <ul style="list-style-type: none"> • Public limited liability Company operating under the policy guidance of the Ministry of Energy and operating as single buyer business and Transmission system operator; • Operates and owns Bujagali's interconnection project. 	<ul style="list-style-type: none"> • Purchases all power produced by the Bujagali Hydropower Project as per PPA signed in 2005; • Its revenues derive from the sale of power to UMEME, based on tariffs defined by ERA.
	UMEME (Uganda)	<p>Energy distribution network company in Uganda</p> <ul style="list-style-type: none"> • Private company operating under a concession with a structural monopoly on the distribution of 99% of electricity across Uganda, through a single buyer model; • Owned 60% by UMEME holdings limited and nominees. 	<ul style="list-style-type: none"> • Charges end-use customer tariffs; • Buys power from UETCL.
WORLD BANK GROUP INSTITUTIONS	MIGA	<p>Multilateral Investment Guarantee Agency</p> <ul style="list-style-type: none"> • International financial institution part of the World Bank Group, offering political risk insurance guarantees; • MIGA has so far supported 15 projects in Uganda, for a total commitment in infrastructure projects of USD 286 million; • MIGA verifies compliance of the project with environmental and social standards. 	<ul style="list-style-type: none"> • In 2007 approved a USD 115 million political risk insurance covering 90% of World Power Holding equity investment for up to 20 years against the risk of Breach of Contract by the Government of obligations under the IA and the Government Guarantee. • The amount of gross exposure has risen to USD 120.3 million in 2012.
	IDA	<p>International Development Association</p> <ul style="list-style-type: none"> • IDA is the World Bank's fund focused on poor countries; • IDA supported Uganda's power sector reform effort through financing of technical assistance and advisory support; • IDA has so far undertaken 2 risk mitigation initiatives in Uganda, for a total commitment in infrastructure projects of USD 121 million; • The WB verifies compliance of the project with environmental and social standards. 	<ul style="list-style-type: none"> • IDA provides a USD 115 million partial risk guarantee to commercial lenders, against debt service payment defaults resulting from the Government's failure to meet its obligations under the PPA and IA. The guarantee covers portion of principal and/or interest debt payment.
	IFC	<p>International Finance Corporation</p> <ul style="list-style-type: none"> • IFC is international financial institution, which finances and provides advice for private sector ventures and projects in developing countries. It is considered the "private arm" of the WBG; • Initiated the selection of lenders' advisors; • IFC coordinated environmental and social issues for the WB. IFC also verifies compliance of the project with environmental and social standards. 	<ul style="list-style-type: none"> • Provides USD 100 million 16-year senior A Loan to BEL • Provides USD 30 million 20-year subordinated C Loan to BEL • Through FMTAAS funds the project's economic analysis.

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">INTERNTL. FINANCE INSTITUTIONS</p>	<p>ADB, EIB, the AFD, Proparco, Netherlands' FMO, Germany's KfW and DEG.</p>	<ul style="list-style-type: none"> • AfDB is a multilateral development finance institution dedicated to the economic and social progress of its regional member states; • The EIB finances capital investment projects that further the European Union (EU) policy objectives; • AFD is a French bi-lateral development institution dedicated to support social and economic development, poverty reduction and preservation of the environment, with Proparco being its private sector arm; • KfW is a German government-owned development bank, DEG is its subsidiary; • FMO is the Netherlands Development Finance Company. 	<ul style="list-style-type: none"> • ADB provides a 16-years USD 110 million private sector senior loan, and also finances the interconnection project; • The EIB provides a 20-years USD 136 million loan; • AFD and PROPARGO are providing USD 73 million of 16-years senior loans, of which USD 13 million are AFD's subsidized loan used to mitigate social and environmental impacts; • KfW and DEG are providing USD 60 million of senior loans. • FMO is providing USD 55 million senior loan and USD 28 million subordinated mezzanine loan.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">PRIVATE LENDERS</p>	<p>Absa Capital (South Africa) / Standard Chartered Bank (UK)</p>	<ul style="list-style-type: none"> • Standard Chartered Bank is an international financial institution based in London; • ABSA Bank is the largest bank in South Africa and is a wholly-owned subsidiary of the Barclays Africa Group; • ABSA Bank Limited acts as the Agent for the IDA Guarantee lenders. 	<ul style="list-style-type: none"> • Absa Capital and Standard Chartered Banks provided USD 115 million of guarantee-backed senior loans, subsequently syndicated to Fortis and Nedbank in equal amounts.

Sources: AFD, 2011; AKDN, 2012; CNW, 2007; DEG, 2010; EIB, 2008 and 2012; FMO, 2012; Independent, 2012; Kasigwa, 2009; Micale et al., 2013; MIGA, 2006, 2012 and 2013; Mudoko, 2013; Ooska News, 2007; Power Technology, 2013; UETCL, 2013; UMEME, 2013; UNECA, 2013; UNFCCC, 2011; World Bank, IFC and MIGA, 2007; World Bank, 2013.

Annex 2: Social, environmental and financial controversies of Bujagali Hydropower

Bujagali 1st attempt and failure: The first project was originally scheduled to reach financial closure in January 2002. It envisaged the construction of a 200-250MW hydropower plant,⁴¹ and was awarded directly by the Government of Uganda to the US-based AES Nile Power Limited (AESNP). Financing for the USD 582 million project - approximately USD 700 million in 2007 terms - included loans from IFC and the African Development Bank, equity finance from AESNP, and guarantees from IDA and MIGA (World Bank and IFC, 2001, and World Bank and IFC, 2005) and three export credit agencies (ECAs) that guaranteed USD 234 million in debt. Controversies related to the project's social, economic and environmental impacts, and allegations of bribery levelled at a subcontractor's subsidiary attended the project's development (Project Finance Magazine, 2008). In 2002, all three ECAs withdrew their support as those controversies and new allegations of corruptions for one of the contractors led to an increase in the perceived country risk (WB and IFC, 2005). The financing gap created by the ECAs withdrawal coupled with the deterioration in AESNP's financial profile and its diminishing interest in investing in emerging countries led eventually to the termination of the contract with the government in 2003 (WB and IFC, 2005).

Complaints and investigations

Initial complaints filed in 2000 and 2001 to the World Bank and to the Office of the Compliance Advisor/Ombudsman (CAO), the independent recourse mechanism for IFC and MIGA, by the National Association of Professional Environmentalists (NAPE) and Save Bujagali Crusade, highlighted issues of compensation and resettlement of population, environmental impact assessment, and the lack of a comprehensive management plan for the Nile River. Once the project was re-launched in 2007, new issues were raised again in 2007 and 2009 by NAPE and other non-governmental organizations and individuals, which filed complaints to AfDB, the World Bank and the European Investment Bank (EIB), requiring a compliance review of the project by each of these institutions. These lenders' independent inspection panels published separate in-depth reports in 2008 and 2012 (IRM-CRP,

2008; Inspection Panel, 2008; EIB, 2012). World Bank's Inspection Panel, in particular, found that financial assessments of project alternatives and impacts, and the assessment of project costs, risks, and impacts on electricity tariffs could have been carried out in a better way, that the project did not achieve sufficient livelihood restoration for people displaced, and that it inadequately addressed the flooding of a significant cultural property of high spiritual value to a local community (WB, 2008).

Attempts to address concerns

Project owners have committed to investments in education, healthcare and social development for the people impacted by the project (Aga Khan IV, 2013). The World Bank, AfDB and EIB have also approved project-specific action plans to address several issues reported in the claims (EIB, 2012; World Bank, 2008; IBRD-IDA, 2008), that have been carried out and mostly completed since then (IBRD-IDA, 2013).

In 2011, community members and former employees filed additional complaints to IFC's CAO, claiming loss of livelihoods and lack of proper compensation for damages of houses and impacts to health related to blasting during construction, now partially addressed by settlement negotiations.⁴² Other ongoing claims filed in 2011-2015 include lack of compensation for assets during the land acquisition process, unpaid wages and lack of proper compensation for injuries sustained during construction work (EIB, 2012; CAO 2015). Non-governmental organizations still object to the inappropriate consultation of local population, and the failure in fully addressing resettlement of local communities (France Libertés, 2013). The project was also criticized in relation to its alleged impact on the end-user electricity tariffs, which were considered still too high for the country (Independent, 2012). However, this issue is mainly linked to foreign currency indexation - common to other energy projects as lending is done in USD and fuel supply is also USD linked. Hence the project remains cheaper than the emergency thermal plants that it replaced even though both got more expensive over time with the depreciation of local currency against USD.

41 The project also foresaw the construction of 100 km of the associated transmission lines, to be afterwards handed over to UETC for maintenance (World Bank and IFC, 2001).

42 See: http://www.cao-ombudsman.org/cases/case_detail.aspx?id=172

Annex 3: Methodology used to assess the impact of WBG risk mitigation instruments

We considered four strategies for the management of the risk of compliance or partial payment of the PPA's obligations: 1) risks are dealt with internal resources only; 2) the project benefits from an IDA PRG; c) the project underwrites a political risk insurance (PRI) with MIGA; d) the project underwrites a MIGA PRI and benefits from an IDA PRG. We tested the performance of each risk mitigation strategy in 100 scenarios – combining ten different levels of (yearly) expected probability of a PPA change (between 0% and 100%) and ten different magnitudes of PPA revision (between 0% and 100%). For each scenario, using a Monte Carlo approach, 1,000 random simulations were run to reflect uncertainties related to several input variables:

- Estimate of whether PPA revision occurs or not, based on defined level of PPA change probability;
- Estimate of the amount of time required for MIGA's mediation or by MIGA for negotiating a settlement, based on observed claims payments (MIGA, 2014);
- Estimate of the success of MIGA negotiations, based on the probability (93.7%) observed by confronting historic claims paid with resolved disputes (MIGA, 2011a);⁴³
- Estimate of the recovery of temporary lost revenues after MIGA negotiations simulated assuming all outcomes equally possible (0-100%);
- Estimate of the amount of time required for claim payment by MIGA, based on time ranges foreseen as per contract 6-13 months.⁴⁴

Other assumptions used in the simulation model include:

- Possibility to use, up to one year, of project's financial resources (equity or debt reserve) to cover temporary inability of the project to service debt;
- MIGA intermediation: we assume that MIGA would always intervene - exercising an informal deterrent action - in the mediation of the project during the waiting period in the context of a change of PPA contract. We thus assume every PPA change as potentially detrimental for the client, including marginal changes of the PPA. While this assumption may lack some realism as small losses may not justify transaction costs related with MIGA intervention (Kimber, 2014), it however allows assessing more effectively the impact of different magnitudes of PPA change on the project;
- MIGA payment: Unsuccessful mediation will result in the payment of the claim by MIGA, with full coverage of revenue losses, capped at the value of the asset covered (as provided by the contract). We assume that conditions for the payment by MIGA are always met;
- Trigger under which IDA PRG coverage is requested: this corresponds to the default on the payment of the senior loan.

43 The probability is related to several types of coverage (not only breach of contract). It has to be noted that mediation would not apply to the majority of cases of losses from war, terrorism, and civil disturbance.

44 MIGA aims to provide compensation within 6-13 months following the date of claim submission (MIGA, 2011b)

Annex 4: Projects with cooperation of different WBG member institutions, 1994-2011

PROJECT	COUNTRY	YEAR OF GUARANTEE ISSUING BY THE WBG	PROJECT VALUE (USD MILLION)	SECTOR	SUBSECTOR	IBRD / IDA	IFC	MIGA
UCH POWER PROJECT	PAKISTAN	1996	690	ENERGY	THERMAL POWER GENERATION	USD 75M PRG	USD 40M A LOAN; USD 75M B LOAN	
MOZAL	MOZAMBIQUE	1997	N/A	MANUFACTURING	ALUMINIUM		USD 108M A LOAN	USD 40M PRI
AZITO POWER PROJECT	COTE D'IVOIRE	1998	95	ENERGY	OIL & GAS	USD 30.3M PRG	USD 32M A LOAN; USD 30M B LOAN	
AEF FLECOL	ANGOLA	1998	1.9	MANUFACTURING	SOAP AND CLEANING COMPOUND		USD 0.61M A LOAN	USD 2.3M PRI
EUROTEL .BRATI.	SLOVAKIA	1999	250	TELECOM	MOBILE TELECOM		USD 27.5M A LOAN	USD 26M PRI
MANILA NORTH TOLLWAY CORPORATION	PHILIPPINES	2001	N/A	TRANSPORT	ROADS		USD 45M A LOAN	USD 85M PRI; USD 22M EQUITY
S. AFRICAN REGIONAL GAS PROJECT (SASOL)	MOZAMBIQUE	2003	721	ENERGY	OIL & GAS	USD 20M & USD 10M PRGS	USD 18.5 M EQUITY	USD 72M PRI
POWER DIST. PRIVATIZATION	ROMANIA	2004	208	ENERGY	POWER DISTRIBUTION (PRIVATIZATION)	EUR 60M PRG	EUR 170 M EQUITY	
WEST AFRICA GAS PIPELINE	WEST AFRICA	2004	590	ENERGY	OIL & GAS	USD 50M PRG		USD 75M PRI
NAM THEUN 2 HYDROPOWER	LAO PDR	2005	1450	ENERGY	HYDROPOWER	USD 42M PRG; USD 20M GRANT	USD 20.6M A LOAN	USD 91M PRI
KOUNOUNE POWER	SENEGAL	2005	103	ENERGY	ELECTRICITY EFFICIENCY	USD 7.2M PRG; USD 15.7M LOAN		
BASIC ENERGY	DOMINICAN REPUBLIC	2005	42.5	ENERGY	WIND POWER		USD 22.7M A LOAN	USD 11.1M PRI
BANCO GALICIA	ARGENTINA	2005	N/A	FINANCING	COMMERCIAL BANKING		USD 40M A LOAN	USD 58.9M PRI
BALAEF MBS	CENTRAL EUROPE	2005	N/A	FINANCING	SECONDARY MORTGAGE INSTITUTIONS		USD 7M A LOAN	USD 10.1M PRI
UMEME POWER PROJECT	UGANDA	2006	84	ENERGY	POWER DISTRIBUTION (PRIVATIZATION)	USD 5.5M PRG; USD 11M LOAN	USD 25M A LOAN	USD 40M PRI
KENYA-UGANDA JOINT RAILWAY CONCESSION	KENYA & UGANDA	2006	404	TRANSPORT	RAILROADS	USD 45M PRG (KENYA); USD 10M PRG (UGANDA)	USD 32M A AND C LOANS; ADVISORY SERVICES	
MERCATOR RETAIL	SOUTHERN EUROPE	2006	400	SERVICES	RETAIL		USD 51.2M A LOAN	USD 20.3M PRI
BEIMA WARRANTS	RUSSIAN FEDERATION	2006	521	MINING	GOLD		USD 39M A LOAN	USD 364.8M PRI
BUJAGALI HYDROPOWER	UGANDA	2007	904	ENERGY	HYDROPOWER	USD 115M PRG	USD 100M A LOAN; USD 30M C LOAN	USD 115M PRI
ORION	URUGUAY	2007	933	MANUFACTURING	PULP MILLS		USD 70M B LOAN	USD 300M PRI
LIMA JCI AIRPORT	PERU	2007	115	TRANSPORT	AIRPORT		USD 20M EQUITY	USD 11.5M PRI
OSSH ELECTRICITY DISTRIBUTION PRIVATIZ.	ALBANIA	2009	78	ENERGY	TRANSMISSION & DISTRIBUTION (PRIVATIZATION)	USD 78M PRG	ADVISORY SERVICES	
KRIBI POWER PROJECT	CAMEROON	2011	350	ENERGY	THERMAL POWER GENERATION	USD 82M PRG	USD 86M A LOAN	
THIKA POWER	KENYA	2012	146	ENERGY	OIL & THERMAL	USD 45M	USD 36M A LOAN	USD 61.5M
GULF POWER	KENYA	2014	108	ENERGY	OIL	USD 44M	USD 21.6M A LOAN; USD 27M B LOAN; USD 5.4 C LOAN	USD 27.9M