Funding and Risk Mitigation for Cross Border Clean Energy Investment in Developing and Emerging Economies - Some Cases

Hilmar Þór HILMARSSON[1]

Abstract

In spite of all the discussion and alarming reports about climate change, the clean energy portfolio of international financial institutions (IFIs) still remains small. This article discusses some cases of clean energy investment in developing and emerging market economies. This includes geothermal cases from Indonesia, Kenya and Turkey and hydropower cases from Lao and Uganda. These cases represent an effort to build new infrastructure to generate electric power without carbon dioxide emissions and is thus part of the global battle against climate change; for a cleaner environment and a healthier environment. The project cases discussed in this article are important because they demonstrate how clean energy projects have been structured in various countries and continents, often under challenging circumstances. The cases also show innovative use of the funding and risk mitigation instruments offered by international financial institutions, including the World Bank Group as well as regional development banks.[2]

Keywords: *Clean energy investments, climate change, international financial institutions*

JEL classification: F30, G22, P18, Q40

1. Introduction

This article discusses some notable cases of clean energy investment in developing and emerging market economies. This includes geothermal cases from Indonesia, Kenya and Turkey and hydropower cases from Lao and Uganda. These cases represent an effort to build new infrastructure to generate electric power without carbon dioxide emissions and is thus part of the global battle against climate change; for a cleaner environment and a healthier environment.

[1] Hilmar Þór HILMARSSON, Ph.D., Professor, University of Akureyri, School of Business and Science, Iceland, E-mail: hilmar@unak.is

[2] Regional development banks include, e.g.: The African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank.

Robert O. Keohane (2015) has remarked that "[t]he politics of climate change could be reframed if there were an emphasis on huge infrastructural projects that create jobs" (Keohane, 2015, p. 22). Utilization of clean energy resources should certainly be part of the strategy for the battle against climate change and environmental degradation. In addition to important environmental benefits, clean energy investments generate jobs and profits important for developing and emerging countries to grow and eventually become high income and thus part of efforts to reduce poverty in the world. There will inevitably be large infrastructure investments in developing and emerging countries in the coming years and decades and it is urgent that these investments be climate and environmentally friendly.

The project cases discussed in this article are important because they demonstrate how clean energy projects have been structured in various countries and continents, often under challenging circumstances. The cases also show innovative use of the funding and risk mitigation instruments offered by international financial institutions in partnerships with other players, such as host governments, private sector, bilateral development institutions, export credit agencies[3] and multilateral institutions, etc.

2. Methodology

The methodology used in the article is the case study method (see, e.g. Yin, 2009). Among the sources of evidence used for analysis is secondary data, including analytical reports and scholarly literature. Direct observation also plays a role as the author draws on his home countries experience, Iceland, that has made a transition to clean energy for space heating and electricity production utilizing geothermal as well as hydropower energy. The author also draws from his experience as a staff member of the World Bank Group from for 12 years working in three continents, Africa, Asia and Europe. Furthermore, the author has also for several years as professor interviewed various staff of the World Bank Group as well as regional development banks on the challenges of clean energy projects in developing and emerging countries.

3. Indonesia Geothermal Development and Global Externalities

Indonesia has the largest estimated geothermal reserves in the world, and geothermal energy is an ideal option to diversify the country's power

[3] For discussion about the role of export credit agencies see, for example, Dinh and Hilmarsson (2012a, 2012b and 2012c).

generation mix. Over 80 percent of current electricity generation in Indonesia is based on fossil fuels and increased utilization of geothermal energy could be an important step to hedge against the volatility of fossil-fuel prices. According to the World Bank less than four percent of Indonesia's geothermal resources has been developed to generate electricity[4] (World Bank, 2014, p. 3).[5]

Progress on geothermal development in Indonesia is of importance, not only for Indonesians themselves, but also for Asia and the whole world. This is because carbon dioxide emissions from one country affect all countries through their impact on global climate.

In Indonesia the World Bank cooperated with Pertamina Geothermal Energy.[6] This cooperation represents an effort to build new infrastructure to generate electric power without carbon dioxide emissions. The World Bank helped Pertamina Geothermal Energy kick-start the program by immediately developing fields where preparation is advanced and also helped strengthen the company's capacity to successfully implement its investments. Indonesia is poised to become the world leader in geothermal power generation capacity when the program is successfully implemented (World Bank, 2014, p.3).

The project, supported by the World Bank, includes development of two geothermal fields: Ulubelu, located in the Lampung district in the southern part of the island of Sumatra, and Lahendong (Tompaso), located in the northern part of the island of Sulawesi. Pertamina Geothermal Energy plans expansions of approximately 110 megawatts in Ulubelu and 40 megawatts in Lahendong (Tompaso) (World Bank, 2014, p. 3).

The project is budgeted at a total cost of US$ 574.7 million. Approximately half the costs associated with development of the upstream steam field will be funded by Pertamina Geothermal Energy's own resources (equity) through the support of its parent company, Pertamina. The World Bank is providing loans totaling US$ 300 million. The financing package includes a US$ 175 million loan from the IBRD with a variable spread, loan[7] maturity of 24.5 years, and a grace period of nine years. The

[4] Estimated geothermal power potential is 27,000 megawatts of which 1,189 megawatts had been developed by 2011 (World Bank, 2014).

[5] The World Bank Energy Sector Management Assistance Program and the Duke Center for International Development have prepared an excellent report entitled: Scaling-Up Renewable Geothermal Energy in Indonesia. The report was published by the World Bank.

[6] Pertamina Geothermal Energy (Indonesia) is a leading geothermal developer and a fully owned subsidiary of the state-owned oil and gas company, Pertamina.

[7] LIBOR + variable spread.

Clean Technology Fund, which is part of the global Climate Investment Funds, a group of funds established by the international community to promote climate-friendly and transformational investments, is providing a US$ 125 million loan on concessional terms, through the World Bank. The terms of the Clean Technology Fund loan are: 0.25 percent service charge (interest), total maturity of 40 years, and a grace period of 10 years (World Bank, 2014, p. 4).

According to the World Bank, the results of economic analysis of investment and operational costs suggest that the geothermal project is not competitive with an equivalent scale coal-based project when comparing the present values of the economic resource costs of investment and operations only. Based on the analysis, the present value of the investment and operational costs for geothermal is US$ 658 million, a full US$ 135 million more than the comparable coal-based option. However, these initial results do not take into consideration the environmental costs associated with utilizing coal or, conversely, the benefits of geothermal energy. Therefore, a complete economic analysis requires the inclusion of all externalities (World Bank, 2014, p. 5).

The problem that the government of Indonesia and the World Bank are faced with is that those who produce the emissions do not pay for that privilege, while those who are harmed are not compensated.

The emissions from coal based generation can adversely impact the health of people residing in the vicinity of power plants**.** This represents a negative local environmental externality that is costly. The appropriate response is to fix the market failure by repairing the flawed economic externality involved in climate change.

The development of geothermal energy also has global benefits, since it substantially reduces the emission of carbon dioxide when compared with a coal-fired power plant. The reduction in greenhouse gases, such as carbon dioxide, will positively impact global climate change. As the World Bank points out, it is important to note that this is a benefit that extends beyond the economy of Indonesia since the entire global community stands to benefit (World Bank, 2014, p. 6).

Due to the existence of a global externality (climate change benefits) and compensation provided by the international community through concessional financing, provided by the World Bank, the boundaries of the economic analysis were expanded to include the broader global community. The difference between the economic and the financial values represents externalities that accrue to a party other than Pertamina Geothermal Energy.

The economic analysis undertaken for this project confirms the rationale for undertaking the investment and explains why the international

community needs to share the costs, given the project's global environmental benefits. However, without financial support, the project is not financially viable since the international and domestic policy environments do not "internalize" the "externalities" that would have adequately compensated the project's investor. This global market failure was addressed through a financing package that included a concessional loan from the Clean Technology Fund, which was instrumental in bridging the financial viability gap of the project (World Bank, 2014, p. 15).

The action taken in Indonesia and supported by the World Bank is especially important given the urgency to address climate change issues globally. Moreover, as the World Bank states, if urgent action is not taken, the International Energy Agency predicts that by 2017 the world will lock in the emissions of existing capital stock, leaving little room to maneuver and only far costlier options to consider thereafter for curtailing greenhouse gas emissions. This is well exemplified in Indonesia, where delays in expanding geothermal power generation will lead directly to development of coal-based power to meet baseload energy needs. Thus, this innovative investment, as well as other similar geothermal energy projects, represents global and local development imperatives (World Bank, 2014, p. 15).

4. Geothermal Development in Kenya: Olkaria III Geothermal

Kenya's economy is more diversified than most other countries in Sub-Saharan Africa. About 55 percent of Kenya's Gross Domestic Product comes from services, transport, finance, tourism, information and communications technology and trade sectors that are critically dependent on a reliable electricity supply.[8]

Only 25 percent of Kenya's population has access to electricity. The World Bank Group has been supporting the government's Least Cost Power Development Plan, which calls for an increase in the number of independent power producers and a more diversified energy mix in Kenya. The program benefits from a combination of guarantees from the Multilateral Investment Guarantee Agency (MIGA), guarantees from the International Development Association (IDA) and financing from the International Finance Corporation (IFC), all three World Bank Group institutions. According to the World Bank, these instruments play an important role in increasing investor confidence and in mobilizing the long-term financing needed to construct power plants (World Bank, 2015).

[8] See, for example; http://www.worldbank.org/projects/P122671/partial-risk-guarantees-ipps-kenya?lang=en

The Kenyan government's plan called for a series of thermal and renewable independent power producers to replace the expensive, diesel-fired rental power plants currently in use. The first independent power producers in the program will be heavy-fuel oil plants, but subsequent independent power producers will use only low-carbon resources such as geothermal and wind, and the thermal plants will transition to peak-load operation. The challenge for the government of Kenya was attracting investors and lenders to deliver the program in the absence of sovereign guarantees, which was not possible under an agreed-on International Monetary Fund program (World Bank, 2015).

One private company that has been particularly active in the development of geothermal projects in Kenya is Ormat Technologies, a US-based development company that established a subsidiary, OrPower4, in Kenya and through this entity has developed and currently operates the Olkaria III plant (Cambridge Economic Policy Associates, 2015).

The Olkaria III project is the first privately funded and developed geothermal project in Africa. It was enabled by a phased development strategy, and a combination of public and private financing and risk mitigation instruments that ensured the viability of the project (Climate Policy Initiative, 2015a). The project is located in the Olkaria geothermal field of the Rift Valley and is one of a series of geothermal developments. It is the only privately operated plant in the field[9] (World Bank, 2015).

The Olkaria III project involved expansion of a base-load geothermal power plant. The plant came online with 8 megawatts in 2000. The plant has undergone several expansions, bringing current total generation capacity of the complex to 110 megawatts with the completion of phase three in February 2014. Electricity generated by the plant is sold under a power purchase agreement with the national power transmission and distribution utility—the Kenya Power & Lighting Company Limited. (World Bank, 2015).

Olkaria III cost US$ 445 million. Initially financed by equity in the late 1990s, the project was able to attract the debt needed for its expansion only in 2009 after renegotiation of the power purchase agreement and the attachment of a government security package to back the payments to the off-taker, the utility Kenya Power and Lighting Company (Climate Policy Initiative, 2015a).

According to the Climate Policy Initiative, the private developer Ormat provided equity financing with an initial US$40 million commitment

[9] Olkaria I, II, and IV are owned by Kenya Electricity Generating Company, a parastatal company 100 percent owned by the Government of Kenya (World Bank, 2015).

in the years 1998-1999, which reached US$150 million in 2006. Ormat had to extend its equity commitment for longer than originally expected, securing debt financing only 11 years from the inception of the project. The current project finance structure relies heavily on debt from Development Finance Institutions, which now accounts for 85 percent of overall investment costs. Germany's Deutsche Investitions- und Entwicklungsgesellschaft mbH, together with KFW Development Bank, headed a financing consortium that refinanced Ormat's equity in Phase I with a US$ 105 million loan. The US Overseas Private Investment Corporation provided a 19-year tenor senior loan of US$310 million disbursed in three tranches used to finance Phase II and Phase III development and refinance part of the equity and debt provided earlier (Climate Policy Initiative, 2015a). The Multilateral Investment Guarantee Agency (MIGA) has supported the facility since 2000. The agency first provided a guarantee to Ormat Holding Corporation for its equity investment in OrPower 4, Inc., the project sponsor in 2000. In 2011, MIGA issued a guarantee of US$99 million to Ormat Holding Corporation for its equity investment in phase three. The guarantee is for a period of up to 15 years and covers the risks of transfer restriction, expropriation, and war and civil disturbance. This guarantee replaced the earlier MIGA guarantee covering investments in the first and second phases of the project (World Bank, 2015).

The Least Cost Power Development Plan is expected to move Kenya away from historical reliance on hydropower energy for the bulk of its power generation, alleviating power shortages that have slowed economic growth in Kenya. According to the World Bank the government goal is to triple the national electricity supply of dependable energy to 3,000 megawatts by 2018, with emphasis on the development of alternative power sources—especially geothermal. This project is a step in that direction (World Bank, 2015).

5. Geothermal Development in Turkey

Turkey is a growing market for geothermal. In fact, in recent years installed capacity of geothermal power plants grew faster in Turkey than anywhere else in the world.

The European Bank for Reconstruction and Development (EBRD)[10] is becoming increasingly active in geothermal development. The EBRD was

[10] EBRD is owned by 65 countries and two inter-governmental institutions, with a capital base of €30 billion.

created in 1991 with its stated objective to promote transition to market economies in 34 countries from Central Europe to Central Asia. Since 2009, the EBRD has expanded its operations to include Turkey (2009) Egypt, Morocco, Tunisia, Jordan (2011) and Cyprus (2014). So far it has participated in financing eight geothermal power projects, seven of which are in Turkey.[11] Installed geothermal capacity in Turkey is 310 megawatts or 7 percent of the 4 gigawatt estimated potential. Western Turkey currently holds the greatest potential for development of geothermal resources, with Central and Eastern Anatolia largely unexplored (Herrera-Martínez, 2014).

Turkey clearly has strong potential in geothermal development but according to the EBRD suffers from technical, financial and legislative barriers (see Herrera-Martínez, 2014, p. 7). Among technical barriers are: limited expertise in project development and risk management; mid to low enthalpy resources; limited number of geothermal developers (infant market) despite strong potential. Financial barriers include: lack of financing for initial exploration and drilling phases; need for a strong balance sheet or pay high license premiums to overcome drilling risks; no VAT exemption guaranteed to the sector. Legislative barriers include: unclear regulatory framework; long administrative process prior to operation; difficult and heterogeneous licensing process; and difficulties for private sector involvement at initial levels of project development (e.g. surface exploration and drilling). EBRD's engagement in Turkey includes financing, technical assistance and policy dialogue.

According to the Climate Policy Initiative (2015b) case study, the Turkey Gümüşköy Geothermal Power Plant is the first case where the private sector financed exploration of an unproven field in Turkey. The 13.2 megawatt project developed by BM Holding, a Turkish infrastructure company, was commissioned in 2013. The company demonstrated significant risk appetite in undertaking early-stage exploration. BM Holding invested up to US$12 million (24% of total investment costs) in exploration and development prior to financial close, when debt financing of up to US$ 34.5 million (70% of the total costs) was secured from Yapikredi, a local commercial bank. Yapikredi sourced US$24.9 million of this debt from the Medium Size Sustainable Energy Finance Facility, an on-lending facility managed by the European Bank for Reconstruction and Development. The Government of Turkey's provision of a ten-year feed-in tariff ensured the project was financially viable (Climate Policy Initiative, 2015b).

[11] Those Geothermal Power Plant projects are: Tuzla (2010), Gümüşköy (2012), Pamukören (2012), Babadere (2014), Germencik (2015), Alaşehir (2015) and Umurlu (2015). One project, Mutnovsky, is in the Kamchatka region (Herrera-Martínez, 2015).

Despite this growth, Turkey faces issues comparable to other countries seeking to develop geothermal capacity – specifically the ability of the private sector to take on the high risks associated with exploring and developing geothermal resources. Until 2013, 11 out of the 12 projects developed in Turkey were on sites where the government had already demonstrated that the resource was suitable for generating electricity and then put it out for tender. According to the Climate Policy Initiative, Turkey is now pushing for more private investment in the energy sector and the government has reduced drilling activity for geothermal exploration. More ambitious policy targets and a transition to a more private-sector led development model could help the sector realize its potential and would fit well with Turkey's current policy priorities (Climate Policy Initiative, 2015b). Like other IFI's, the EBRD is reluctant to fund geothermal exploration costs including initial drilling.

6. Investing in Hydropower Projects in Africa and Asia

Some cases indeed demonstrate that International Financial Institutions, bilateral Development Financial Institutions and export credit agencies can work with host governments and the private sector to mobilize funding for clean energy projects in difficult business and investment environments, where the private sector would generally hesitate to engage alone, and where local governments alone would have difficulty in mobilizing sufficient funding for large projects that require long term commitments. Among those cases are two hydropower projects in Asia and the other in Africa. One project is Nam Theun 2 (NT2) in Lao PDR and the other is the Bujagali project in Uganda.

Geothermal projects are different from hydropower projects, especially regarding initial development costs, but both have common characteristics in the form of large initial investment commitments with long repayment periods. The projects in Lao and Uganda, both developing countries, are located in challenging environments. The financial solutions for these projects demonstrate how funding and risk mitigation instruments from various multilateral and bilateral institutions can be successfully used to mobilize private sector funding for clean energy projects under challenging circumstances.

6.1 The Nam Theun 2 Hydropower Project in Lao PDR

Lao PDR is one of the poorest countries in South East Asia, with weak human capacity, governance, institutions and physical infrastructure. Nam

Theun 2 is an example of how the public and private sectors can form a partnership and construct a major infrastructure project in the energy sector in a developing country with limited creditworthiness with support from IFIs and export credit agencies. Estimated project costs were US$1.25 million at financial close (excluding contingencies), equity 28 percent (US$350 million) and 72 percent debt (US$900 million).

The NT2 hydropower project was implemented by the Nam Theun 2 Power Company Limited (NTPC). The shareholders (equity holders) in NTPC were: Électricité de France International (35%), Italian-Thai Development Public Company Limited of Thailand (15%), Electricity Generating Public Company Limited of Thailand (25%) and Lao Holding State Enterprise (25%). Several IFIs provided loans to NTPC and/or guarantees to the private sector lenders: (i) multilateral institutions including the World Bank Group's IDA and Multilateral Investment Guarantee Agency (MIGA), (ii) bilateral agencies, and (iii) export credit agencies. Notably, a consortium of 16 commercial banks supported the project.[12]

A shareholders' agreement signed by Électricité de France International, the Government of Lao PDR, Electricity Generating Public Company Limited of Thailand, and Italian-Thai Development Public Company Limited sets out the rights and obligations of the shareholders, provides for the objective, establishment, management, and operation of the project company, NTPC, and agrees on the Articles of Association of NTPC. The shareholders' agreement lasts for 45 years from signing (World Bank, 2005). In the concession agreement, the Government of Lao PDR granted NTPC a concession to develop, own, finance, construct, and operate the hydroelectric plant and related facilities, and to transfer the project to the Government of Lao PDR at the end of the concession period, i.e. after 25 years (World Bank, 2005).

Nam Theun 2 is the largest ever foreign investment in Lao PDR and was the Asia Power Deal of the Year 2005. The project has an electric generating capacity of 1070 megawatts, of which 995 megawatts of the power was for export to Thailand and 75 megawatts for domestic use in Lao PDR. The power purchase agreements are between NTPC and the Electricity Generating Authority of Thailand, and between NTPC and Electricite du Laos.

[12] The international commercial banks were: ANZ Bank, BNP Paribas, Bank of Tokyo Mitsubishi, Calyon, Fortis Bank, ING, KBC, SG and Standard Chartered.
The Thai commercial banks were: Bangkok Bank, Bank of Ayudhya, KASIKORNBANK, Krung Thai Bank, Siam City Bank, Siam Commercial Bank and Thai Military Bank.

A Head Construction Contract was signed between NTPC and Électricité de France International (the head contractor). This was a turnkey, price-capped engineering, procurement and construction contract (World Bank, 2005). The subcontractors were Italian-Thai Development Public Company Limited of Thailand, Nishmatsu Contracting Company of Japan, General Electric of the USA and Mitsubishi-Sumitomo Electric of Japan. The head contractor and the subcontractors are all reputable international companies.

IFIs played an instrumental role in enabling this project. In fact, the international dollar lenders to the project informed the NTPC that without political risk mitigation they would not be able to lend to the project. The Government of Lao PDR requested the World Bank Group to provide risk mitigation to support the international lending package (World Bank, 2005). IFI guarantees were thus key in lowering the project's risk profile sufficiently to attract the commercial financing needed.

Political risk guarantees were provided by MIGA (World Bank) and the Asian Development Bank. IDA (World Bank) also provided a partial risk guarantee. The NT2 partial risk guarantee is the first IDA guarantee to support hydropower development and is also the first project to use a mix of IDA, MIGA and Asian Development Bank guarantees. Debt guarantees were provided by IDA, MIGA and the Asian Development Bank supporting about US$126 million of private financing. Direct loans from IFIs were about US$144 million provided to NTPC (World Bank, 2005).

Loans were also provided by the Asian Development Bank, the European Investment Bank, the Nordic Investment Bank, Agence Française de Développement, Proparco and the Export-Import Bank of Thailand. The IDA and Agence Française de Développement also provided grants.

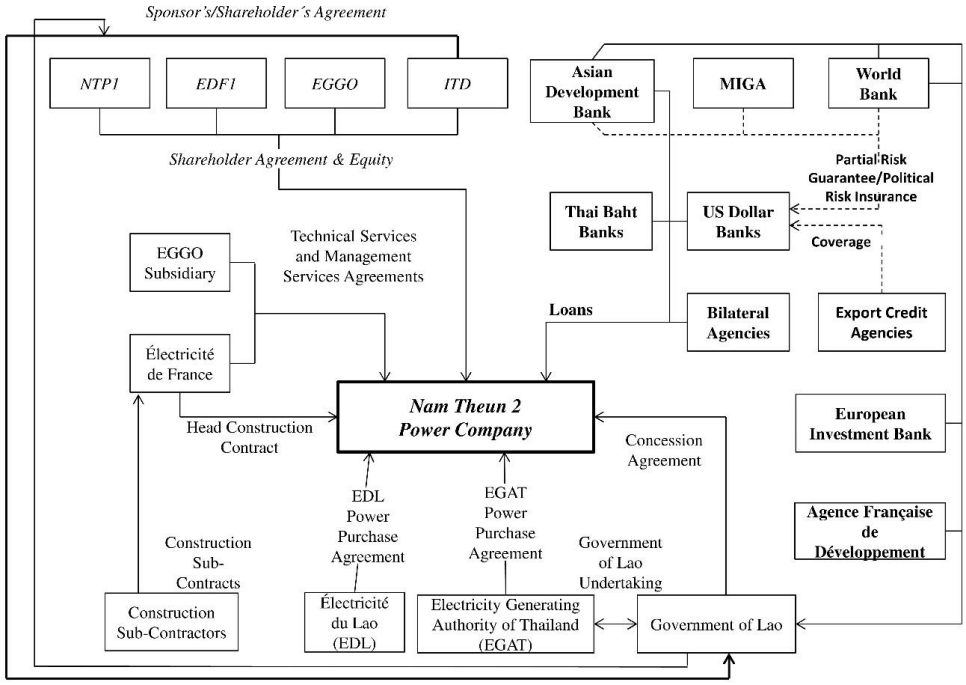
Nine International Commercial Banks and seven Thai commercial Banks helped fund the project. In addition, the NT2 project received export credit agency support from COFACE of France, Exportkreditnamnden of Sweden and its equivalent in Norway, Garanti-instituttet for eksportkreditt.

The Nam Theun 2 project can be viewed as a test case for infrastructure development in the developing world. It is an excellent demonstration of what is possible if the public and private sectors, supported by IFIs, team up and join forces. The use of IFI risk mitigation instruments is particularly interesting as it demonstrates how a modest commitment through such instruments can help mobilize much larger amounts of private funding.

The NT2 project was the world's largest private sector cross border power project financing, and the largest private sector hydropower project financing. Lessons learned from this landmark project would be a valuable

study for all companies that intend to participate in infrastructure projects in developing and emerging market economies. In 2010 two senior managers from the World Bank published a book with comprehensive discussion about the lessons learned from Nam Theun 2 (see Porter and Shivakumar, 2010).

Figure 1. Nam Theun 2 Hydropower Project in Lao: Contractual Structure



Source: World Bank, 2005

i The US$ senior debt facilities include those covered by political risk guarantees from IDA (World Bank), Asian Development Bank and MIGA; export credit agency support from COFACE of France, Exportkreditnämnden of Sweden and Garanti-instituttet for eksportkreditt of Norway; and direct loans from the Asian Development Bank, Nordic Investment Bank (NIB), Agence Française de Développement, PROPARCO and Export-Import Bank of Thailand. Nine international commercial banks (ANZ Bank, BNP Paribas, Bank of Tokyo Mitsubishi, Calyon, Fortis Bank, ING, KBC, SG and Standard Chartered) and seven Thai commercial banks (Bangkok Bank, Bank of Ayudhya, KASIKORNBANK, Krung Thai Bank, Siam City Bank, Siam Commercial Bank and Thai Military Bank) are providing long-term loans to NTPC.

ii Including EGAT as an off-taker; Engineering, Procurement and Construction contractors; project lenders and Government of Lao, as a shareholder in NTPC. Some risks may not affect all of the listed parties but only some.

iii Excludes risks taken by GOL as an NTPC shareholder.

iv Natural force majeure: acts of God, earthquakes, fires, typhoons, and the like.

6.2 The Bujagali Hydropower Project in Uganda

Uganda is a developing country in Sub-Saharan Africa. Its first large scale independent power producer project, Bujagali Hydropower, was planned when the country was suffering from severe prevailing power shortages in the country slowing economic growth and reducing the wellbeing of its citizens. Bujagali is an example of how the public and private sectors can form a partnership and construct a major infrastructure project in the energy sector in a developing country with a challenging business and investment environment and with limited creditworthiness. In this case the project was built with support from International Financial Institutions and Development Financial Institutions. The total financing requirement for the project was US$798 million, of which US$ 627 million is financed by debt, and US$171 million financed by equity. The debt equity ratio is around 78:22 (World Bank, 2007).

The Bujagali 250 megawatt Hydropower project was implemented by Bujagali Energy Limited. The Implementation Agreement between the Government of Uganda/ Uganda Electricity Transmission Company Limited sets out the terms on which the Government grants to Bujagali Energy Limited the concession to design, finance, construct, own, operate, and maintain the project (World Bank, 2007). The sponsors of Bujagali Energy Limited are Industrial Promotion Services (Kenya) Limited and SG Bujagali Holdings Ltd, an affiliate of Sithe Global Power, LLC (USA). The sponsors provided US$151 million equity and the Government of Kenya US$20 million.

Several IFIs provided loans to Bujagali Energy Limited and/or guarantees to the private sector lenders: (i) multilateral institutions including the World Bank Group's IDA, IFC and MIGA and development finance institutions. Two commercial banks, Standard Chartered and Absa, supported the project.

The project was developed on an independent power producer basis. It is developed, built, owned, and operated by Bujagali Energy Limited. The project sells electricity to Uganda Electricity Transmission Company Limited under a 30-year power purchase agreement (World Bank, 2007).

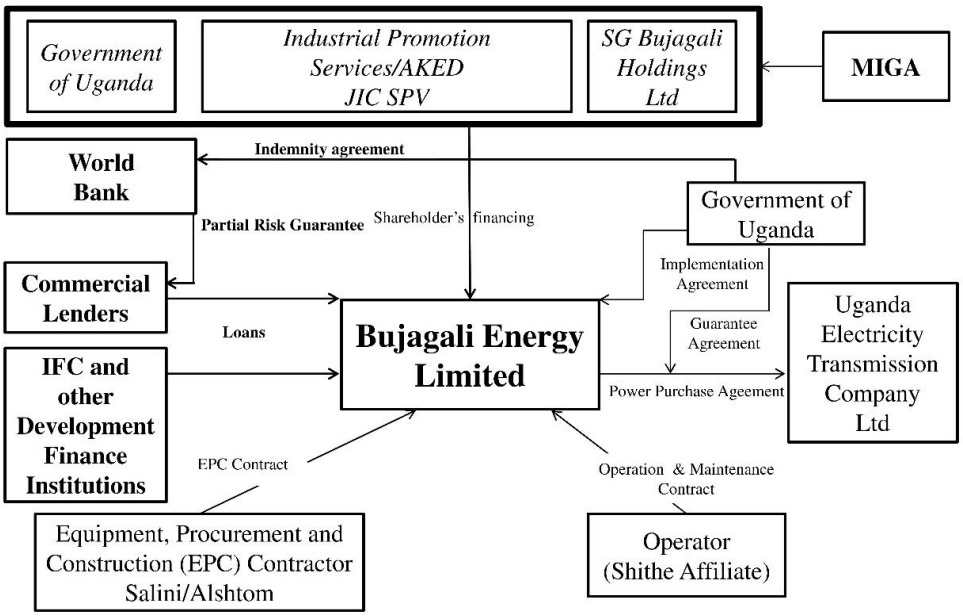
An engineering, procurement and construction contract was signed between Bujagali Energy Limited and Salini SPA. The proposed project was built pursuant to a fixed price, date certain, turnkey engineering, procurement and construction contract. The engineering, procurement and construction contractor, Salini SPA (Italy) (with Alstom Power Hydraulique (France) as a key subcontractor) was selected pursuant to a competitive engineering, procurement and construction contract selection process in

accordance with European Investment Bank procurement rules (World Bank, 2007).

IFIs played an instrumental role in enabling this project. After unsuccessful attempts to develop the project in the late 90s, the Government of Uganda initiated a new bidding process, with the support of the World Bank, seeking a new project sponsor to develop the Bujagali project (World Bank, 2007). The IDA guarantee reduced the perceived risk in the project to such an extent as to allow commercial debt to be mobilized.

The debt facility consisted of a commercial loan of US$115 million, from the Standard Chartered and Absa banks, covered by a World Bank partial risk guarantee. The rest of the financing came from other multilaterals, such as International Finance Corporation, which committed US$130 million in loans, the European Investment Bank lent US$140 million, and the African Development Bank US$110 million. European development finance institutions financing consists of French development agency Proparco, with a US$73m loan, Deutsche Investitions- und Entwicklungsgesellschaft mbH/KfW of Germany with US$45m, and Dutch financier FMO with US$73m (World Bank, 2007). The Multilateral Investment Guarantee Agency (MIGA) provided an equity investment guarantee of up to US$115m for a 20 year period.

Figure 2. Bujagali Hydropower Project in Uganda: Contractual Structure



Source: World Bank, 2007

The Bajagali project is one of the largest private sector financed projects in Sub-Saharan Africa so far and the first of its kind in Uganda. It was awarded the "The Africa Power Deal of the Year 2007" by Euromoney "Project Finance Magazine."

Along with the Nam Theun 2 project, also discussed in this article, it demonstrates what is possible if the government, the private sector and the international community use available multilateral and bilateral institutions to mobilize funding for clean energy in developing countries. The IDA guarantee reduces the risk faced by the commercial lenders. MIGA reduces the risk for the private equity providers. A loan from the International Finance Corporation further reduces the risk profile for this project. The other IFIs, the African Development Bank and the European Investment Bank and the development finance institutions also play a key role to make this project bankable.

7. Conclusions

In spite of all the talk about climate change and urgency to take immediate action, the clean energy portfolio of international financial institutions still remains small. This article discussed some notable cases of clean energy investment in developing and emerging market economies, including geothermal cases from Indonesia, Kenya and Turkey and hydropower cases from Lao and Uganda. These cases represent an effort to build new infrastructure to generate electric power without carbon dioxide emissions and is thus part of the global battle against climate change; for a cleaner environment and a healthier environment. The project cases discussed in this article are important because they demonstrate how clean energy projects have been structured in various countries and continents, often under challenging circumstances. The cases also show innovative use of the funding and risk mitigation instruments offered by international financial institutions in partnerships with other players, such as host governments, private sector, bilateral development institutions, export credit agencies and multilateral institutions.

Clean energy projects such as geothermal and hydropower projects are large, capital intensive and with long repayment periods. Clean energy sources are to a large extent located in developing and emerging economies. This is also where most of the economic and population growth is projected to take place in coming decades, and thus where most of the future demand for energy will come from. International financial institutions are uniquely suited to assist host governments as they offer various financial and risk mitigation instrument that can facilitate clean energy investment in

partnership with other players, private, public as well as bilateral and other multilateral institutions. They can also provide much needed technical assistance and assist developing and emerging countries with policy reform via and ongoing policy dialogue with host governments. There is an urgent need for IFIs to streamline their procedures when supporting clean energy projects and they should give immediate priority to enlarging their clean energy project portfolio.

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