FUNDING GEOTHERMAL PROJECTS: THE ROLE OF INTERNATIONAL FINANIAL INSTITUTIONS AND THE ABSENCE OF AN INTERNATIONAL REGIME FOR INVESTMENT

Hilmar Þór Hilmarsson[1]

University of Akureyri (Iceland)

ABSTRACT
As the global economy grows, so does the demand for energy. Investment in clean energy projects, including geothermal, is increasingly important to help meet these growing energy needs. Clean energy projects are also important for environmental reasons and as part of the battle against climate change. Many clean energy sources in the world are located in developing countries[2], including emerging market economies. Investors in developing countries are normally faced with higher risks than those investing in high income developed economies. Higher risks in turn reduce capital flows to developing countries. This is particularly true during times of economic and financial crisis. At the same time energy projects tend to be large and capital intensive with long repayment periods. Energy projects also often require partnership between the public and private sectors i.e. public private partnerships (PPPs). Efficient allocation of risks among the different partners in PPPs is important for success, generally results in more profitable projects, and is more likely to benefit all parties involved. This article discusses public private partnerships in the energy sector in developing countries, characteristics of developing countries, the risk faced by investors, the absence of an international regime for investment, and risk mitigation instruments offered by international financial institutions to manage risks[3].
KEYWORDS: *Clean and renewable energy investments, geothermal projects, developing and emerging market economies, risks and risk mitigation instrument.*

JEL CODES: F30, G20, G32, O22, Q20, Q40

Introduction

As the global economy grows, so does the demand for energy. Investment in clean energy projects is increasingly important to meet these growing energy needs. Considerable clean energy sources in the world, including geothermal, are located in developing countries. Investors in those markets often face higher risks than those investing in high income developed economies with a more favourable investment and business climate. Higher risks in turn reduce capital flows to developing countries.

The aim of this article is to discuss cross border clean energy projects in developing countries. The characteristics of developing countries will be discussed, as will the risks faced by investors and risk mitigation

[1] Hilmar Þór Hilmarsson – PhD, professor, School of Business and Science, University of Akureyri, Iceland. Scientific interest: international finance
E-mail: hilmar@unak.is
Tel. + 354 849 8380

[2] Developing countries in this article means countries that are eligible for financial assistance from international financial institutions. Those developing countries include countries classified by the World Bank Group as: low income countries, lower middle income countries and upper middle income countries. Emerging market countries, which are often in the middle income category, are also classified as developing countries in this article.

[3] The international institutions focused on are those such as the World Bank Group, and regional development banks, while the national institutions are export credit agencies (ECAs).

instruments offered by IFIs and ECAs to manage those risks. The main research questions are: How can risks be mitigated when investing in clean energy projects in developing countries? Does the international community offer a comprehensive framework for risk mitigation for investments in developing countries?

The methodology used in this article is the case study method. Compared to other research methods, a case study enables the researcher to examine the issues involved in greater depth. According to Yin (Yin, 2009: 101–102) six sources of evidence are most commonly used in case studies. These are: documentation, archival records, interviews, direct observations, participant-observation, and physical artefacts. Each of these sources has advantages and disadvantages and according to Yin one should "note that no single source has a complete advantage over all the others. In fact, the various sources are highly complementary, and a good case study will therefore want to use as many sources as possible" (Yin, 2009: 101). Among the sources of evidence used for the analysis in this article are secondary data, including reports and scholarly literature, articles and books. The author also interviewed and exchanged emails with various experts when writing this article.

1. Cross border investments in challenging business environments.

Utilizing clean energy resources is a global issue affecting both rich and poor countries. Many developing countries and emerging market countries in Africa, Asia and Latin America have large geothermal resources, but most are only in the early stages of development in using those resources. Future growth in demand for electricity is also likely to be strongest in those emerging regions. Transition to clean energy could be of great benefit to those regions as well as having global implications, environmentally, and in the battle against climate change.[4] However, it is not sufficient to have the natural resources and potential growth in future demand. Funding is also needed and energy investments tend to be large, capital intensive and with long repayment periods. In addition to government and donor contributions, private sector participation is important. However, developing countries often have challenging business and investment environments that discourage private sector cross border engagement.

The World Bank publishes the so called "Doing Business" report annually. The report presents quantitative indicators that can be compared across 189 economies—from Afghanistan to Zimbabwe—and over time. In its 2014 report the World Bank ranked 189 countries (World Bank, 2013a). The best performing country is ranked 1 and the worst performing country is ranked 189. The bank uses eleven indicators[5] that are then combined into one overall indicator: Ease of doing business. Table 1 shows some selected indicators for the business and investment climate in some developing countries that the World Bank[6] expects will have significant additions in installed geothermal capacity in the future (World Bank, 2012: 31). As Table 1 shows, most of these countries face challenging business and investment environments. African countries tend to be low income whereas Asian and Latin American countries tend to be middle income. In most countries companies have difficulty getting electricity and they also score low on indicators that are important for cross border energy investment, such as dealing with construction permits, protecting investors, enforcing contracts and trading across borders. Investors, especially those considering long term investments, will

[4] For a comprehensive discussion about the risks, uncertainty and the economics of climate change, see Nordhaus 2013, The Climate Casino. For an excellent analysis on the regime complex for climate change, see Keohane and Victor 2011.

[5] Regulations affecting 11 areas in the life of a business are covered in the 2014 "Doing Business" report: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency, and employing workers. The employing workers data was not included in the ranking on the ease of doing business in the 2014 report.

[6] The World Bank Group represents five institutions. These are: (i) the International Bank for Reconstruction and Development, IBRD, established in 1944, (ii) the International Development Association, IDA, established in 1960, (iii) the International Finance Corporation, IFC, established in 1956, (iv) the Multilateral Investment Guarantee Agency, MIGA, established in 1988, (v) the International Centre for Settlement of Investment Disputes, ICSID, established in 1966. Four of these institutions issue insurance or guarantees, i.e.: IBRD, IDA, IFC and MIGA.

avoid difficult business and investment environments unless risks can be managed. Proper risk mitigation for operators and investors is thus a major challenge in most of the African countries listed below as well in many developing and emerging countries in Asia and Latin America.

Table 1 below only provides some indication for investors. The "Doing Business" report does not measure the full range of factors, policies and institutions that affect the quality of the business environment in an economy or its national competitiveness. It does not, for example, capture aspects of security, the prevalence of bribery and corruption, market size and macroeconomic stability[7]. A more thorough review would be needed for a company to make a decision about cross border engagement. Nevertheless the "Doing Business" report is a useful start to begin identifying challenges in each country. Gaining a fuller understanding of the broader business environment, and a broader perspective on policy challenges requires combining insights from "Doing Business" with data from other sources, such as World Bank Enterprise Surveys[8]. Other indicators more specific to the regulatory environment for energy investment also need to be studied and assessed. Moreover, political or non-commercial risks are associated with cross border investments. These will be discussed below.

Table 1. According to the World Bank, significant additions in installed geothermal capacity can be expected in the following African and Asian countries

Region	Income Level	Ease of Doing Business Rank	*Getting Electricity*	Dealing with Construction Permits	Protecting Investors	Enforcing Contracts	Trading Across Borders
Africa							
Tanzania	Low income	145	***102***	177	98	42	139
Eritrea	Low income	184	***95***	189	115	67	170
Sudan	Lower middle income	149	***113***	167	157	154	155
Somalia	N/A	N/A	***N/A***	N/A	N/A	N/A	N/A
Malawi	Low income	171	***183***	173	80	145	176
Zambia	Low middle income	83	***152***	57	80	120	163
Burundi	Low income	140	***161***	126	34	177	175
Rwanda	Low income	32	***53***	85	22	40	162
Uganda	Low income	132	***178***	143	115	117	164
Congo, Dem. Rep.	Low income	183	***142***	90	147	177	171
Mozambique	Low income	139	***171***	77	52	145	131
Madagascar	Low income	148	***187***	157	68	160	115
Comoros	Low income	158	***109***	44	138	159	146
Mauritius	Upper middle income	20	***48***	123	12	54	12
Pacific Asia							
Malaysia	Upper middle income	6	***21***	43	4	30	5
Papua New Guinea	Lower middle income	113	***24***	165	68	168	134
Latin America							
Guatemala	Lower middle income	79	***34***	61	157	97	116
Honduras	Lower middle income	127	***125***	83	170	182	84
Panama	Upper middle income	55	***16***	62	80	127	11
Columbia	Upper middle income	43	***101***	24	6	155	94
Ecuador	Upper middle income	135	***138***	64	138	99	122
Bolivia	Lower middle income	162	***128***	136	138	131	126

Source: World Bank, 2012 and 2013a

7 Including whether the government manages its public finances in a sustainable way.

8 See, http://www.enterprisesurveys.org

2. Geothermal resource risk constraints

In addition to the risks associated with cross border investments and operations, geothermal power projects also suffer from risks not found in other thermal power generation projects, including higher upfront development costs associated with uncertainty as to site capacity (Delmon, 2009). Risks associated with geothermal projects are high during the pre-survey, exploration and test drilling phases[9]. Validating geothermal resources through test drilling is capital intensive. Commercial financing for test drilling is generally hard to find and private equity and government support are often the only sources of capital to undertake test drilling. These risks are not specific to developing and emerging markets, but it is often more challenging to obtain private and public capital in these markets than in high income countries. IFIs have so far done little to mobilize funding for resource risk mitigation for geothermal projects in developing countries (see Table 2). They have mostly spent their resources on the less risky production phase after the more risky exploratory phase is completed. Here IFIs are failing in their role to promote geothermal development in developing countries.

Scaling up geothermal by addressing the resource risk through sustained international effort is being discussed at the World Bank, including raising US$500 million for exploration and drilling activity.[10] This is a modest number given the global needs but recently the World Bank has made progress in its capital mobilization efforts. In Europe a European Geothermal Risk Insurance Fund is being established (GEOELEC, 2013).

Table 2. Three decades of cumulative lending for geothermal energy development (US$ million)

International financial institutions (IFIs)	Exploratory Phase	Production Phase	Technical Assistance	Total
World Bank	117	1,544	48	1.710
African Development Bank	4	124	–	129
Asian Development Bank	–	554	3	557
European Investment Bank	–	256	–	256
Inter-American Development Bank	3	403	11	416
Total	124	2,881	62	3.068

Source: World Bank, 2013b

3. Private sector cross border investment in developing countries

Private sector funding and participation in clean energy projects is a challenge for many reasons. One of these is that the host government is often the only buyer of the electricity or hot water produced i.e. it is the so called offtake purchaser[11]. Many developing countries with large clean energy potential have limited creditworthiness. They have low per capita income and are often going through economic and political transition. In these cases the sponsors[12] of a project might hesitate to fund the project because of uncertainty with the income stream from the investment made. Lenders, including commercial investment banks, would also

[9] Until the first borehole has been drilled into the geothermal reservoir, developers cannot be sure about the exact parameters (temperature and flow rate) of a planned geothermal electricity project. Once drilling has taken place, in situ pump tests, temperature and hydrological measurements then reduce the resource risk and can make it easier to attract external capital (GEOELEC, 2013: 6).

[10] On March 6, 2013, World Bank Managing Director Sri Mulyani launched the Global Geothermal Development Plan (GGDP) in Reykjavik, Iceland. The GGDP is a call to all donors and sponsors of geothermal energy to join hands in mobilizing additional concessional resources and fund a pipeline of geothermal resource validation projects. According to the World Bank this is a way to address a critical financing gap and to help scale up geothermal energy and expand clean energy access (According to an email from the World Bank on February 17, 2014).

[11] An off take purchaser is a purchaser of the product produced by a project. In the case of a power project the product produced is the electricity generated.

[12] A sponsor of a project is a party wishing to develop or undertake a project. A sponsor would normally provide financial support for the project e.g. early equity capital.

often hesitate to provide loans to such projects because of uncertainty whether the project company, whose income stream is at risk, can service its loans.

One possible institutional arrangement to address this situation is to form a PPP and use the Build-Operate-Transfer (BOT) scheme. The PPP becomes a venue for the public and private sectors to cooperate on a project that would traditionally have been in the public domain. The BOT arrangement means that the project is transferred back to the government when the concession[13] agreement ends. In this situation efficient and effective risk allocation is key to success and the international community can play a constructive role, e.g. through IFIs that can offer a variety of risk mitigation instruments. Among the remedies that investors can apply to manage risks is partnership with IFIs and/or participation in a consortium with stronger partners. National institutions such as ECAs, which support trade finance, can also play a constructive role in reducing the risks taken by private sector investors, see for example Hilmarsson and Dinh (2013).

4. Public Private Partnerships. Some definitions and theoretical considerations

Public private partnerships (PPPs) can be a feasible platform to fund infrastructure development and to increase the efficiency of public sector service delivery. Infrastructure projects in the energy sector are often large, capital intensive and long term. Repayment periods are also often long. It can take a private investor 10 to 25 years to recover the investment and the project returns.

The private sector is recognized as a significant financing source for meeting developing country investment requirements, but financial markets remain largely untapped for this purpose and have yet to live up to their potential (Asian Development Bank, 2006). PPPs are one platform worth considering for the private sector to engage in infrastructure projects. Private capital, donor support (including IFIs) and public funds can be combined in a PPP project. A well designed policy and institutional framework for PPPs offers the opportunity to leverage and combine all three sources of financing and expertise without crowding out private investment. By forming a PPP both public and private sectors can share the risks and rewards of infrastructure projects.

There are many different definitions for PPPs. One definition is “any public sector service provided partially or wholly by the private sector” (Delmon, 2009: 601). Another definition is “co-operative institutional arrangements between public and private sector actors” (Hodge and Greve, 2009: 33). Yet another definition of a PPP is “the transfer to the private sector of investment projects that traditionally have been executed or financed by the public sector” (World Bank, 2008: 93).

To engage in cooperation, the public and private sectors can employ several different schemes[14] including the so called BOT, i.e. Build-Operate-Transfer (IMF, 2004). In BOT projects the private sector is responsible for financing, constructing and operating the project. Under this arrangement the host country grants a concession, i.e. the right for a private firm to undertake a public sector project and operate it over an agreed period. When the concession expires the ownership of the project is transferred back to the party granting the concession. For a comprehensive discussion on BOTs see Jeffrey Delmon’s outstanding book on Private Sector Investment in Infrastructure (Delmon, 2009).

The partners typically involved in a BOT project are: the project company that undertakes the project, the host government (that can also be the offtake / power purchaser), the shareholders, the lenders, the grantor, the construction contractor, the operator, the offtake purchaser/power purchaser, and the input supplier. Figure 1 below shows a typical PPP BOT contractual structure.

[13] A concession is the right granted by the host government for a private company to undertake a public sector project and operate it over an agreed period.

[14] PPP schemes and modalities other than Build-Operate-Transfer (BOT) include for example: Build-Own-Operate-Transfer (BOOT), Build-Rent-Own-Transfer (BROT), Build-Lease-Operate-Transfer (BLOT), Build-Transfer-Operate (BTO).

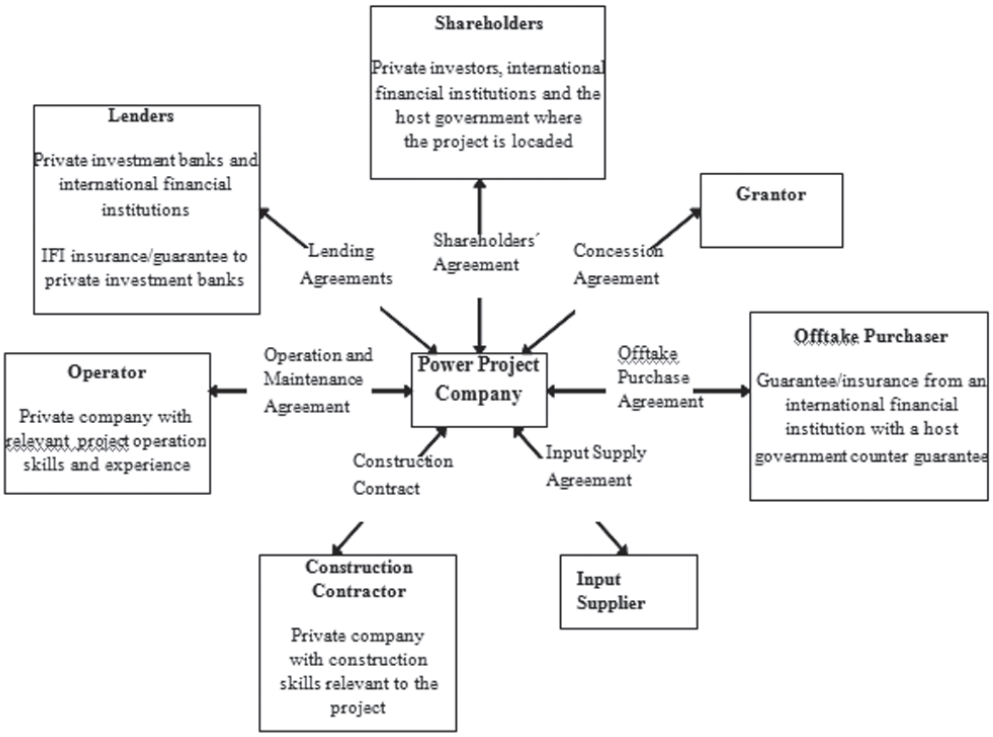

Figure 1. Typical PPP BOT contractual structure

Source: Constructed by the author

The project company uses the income stream from the project to service its debt and to pay returns to its investors (i.e. the equity contributors to the project company). The lenders to a BOT project might, for example, be commercial investment banks, IFIs and bilateral agencies. The IFIs and ECAs could also serve as guarantors e.g. for payment to the lenders, including commercial investment banks. The lenders would be keen to manage their risks (i.e. only take measurable and measured risks) and would receive a fixed margin on their loan whereas the shareholders (i.e. the equity holders in the project company) maximize the profits on their equity investment. In addition to obtaining funding for the project, the project company procures the design and coordinates the construction and operation of the project in line with the requirements of the concession agreement. Project company shareholders often include firms with construction and operation experience, and with offtake purchase capabilities (Delmon, 2009: 98).

The offtake purchase agreement secures the project payment stream. The offtake purchaser will be looking for guaranteed long term output from the project. The credit risk associated with the offtake purchaser will be of particular concern to the project company and the lenders. This is where guarantees from host governments or IFIs, including the World Bank, become important.

Critical to the design of PPPs is the way risks are allocated between the partners in the PPP. A general principle is that risk should fall on the party that is more able to do something about it. Risks in PPP tend to be allocated on the basis of commercial and negotiating strength. The stronger party will allocate risk that it does not want to bear to the weaker party. Efficient allocation of risk will generally result in a more successful and profitable project and will benefit each of the parties involved (Delmon, 2009).

In order to minimize the market risk from the project company and the project lenders, an offtake purchase agreement, or in the case of a power project, a power purchase agreement, may be made. This is to create a secure payment stream which will be an important basis for financing the project. The offtake purchaser

may also be the grantor, or a government entity such as a public utility, in which case the offtake purchase agreement and the concession agreement may be one and the same document (Delmon, 2009).

The lenders will want project risks to be allocated to project participants, i.e. the construction contractor and the operator and not the project company, which is their debtor.

The project company will enter into a contract with the construction contractor in order to divest its obligations to the grantor to design, build, test, and commission the project. Completion risk for the project should be allocated to the construction contractor. In the case of a turnkey project, completion and performance risk should be on the construction contractor.

If the main risks are associated with poor management of the service, shifting the risk to the operator could provide the right incentives to ensure that the project delivers. If risks are related to changes in policies, then the government should bear the risk. This is because the project company will not generally be able to manage political risk. The project company will ask the government to bear those risks, not necessarily to claim compensation at a future date but to pressure the government to avoid such risks and to minimize the probability that such risks will occur.

5. The absence of an international framework for mitigating political risks

When discussing international investors' efforts to manage political risks Wells (2005) discusses four options: (i) international arbitration, (ii) official political risk insurance, (iii) home government support, and (iv) official credit.

In the absence of a global investment agreement like the GATT and later the WTO[15], investors have turned to piecemeal solutions when protecting their rights in risky countries. According to Wells, "these agreements set out rules for trade, but they provided few rules for investment... They did nothing to manage the political risks that could hinder foreign investment. Starting with the aborted International Trade Organization of the immediate post-World War II era, several efforts to create a similar global framework for investment came to naught. The history of failure did not encourage renewed efforts to create a comprehensive approach". Further, Wells states that "[t]he resulting system, however, was not the product of any grand design but the result of uncoordinated steps by various parties. Certainly, some of the problems of the new system derive from the lack of a single framework; even more important problems can be attributed to the lack of explicit negotiation and mutual acceptance among the affected parties" (Wells, 2005: 89–90).

This failure described by Wells is especially serious if one considers clean energy projects that tend to be large, capital intensive and long term. Furthermore, energy resources are to a large extent located in developing and emerging countries that are also currently growing faster than high income industrialized countries both in terms of GDP and population, and thus energy use. When host governments cannot make credible long term commitments to foreign investors, those investors will tend to avoid these projects. This becomes especially troubling during times when there is a global need for transition to clean energy projects. As Wells points out, "the need to satisfy the demand for security grew as the international community became increasingly eager to encourage private foreign investors to build infrastructure – roads, power plants, water systems – in the developing world" (Wells, 2005: 89). "Without external protection, direct investors in these industries would have to be very brave, or perhaps ignorant, to enter these industries, where they would have little bargaining power once their capital was committed" (Wells, 2005: 89).

The international community increasingly emphasizes clean energy investment for environmental reasons and as part of the battle against climate change. To promote those investments the international community uses for example IFIs. Table 3 shows that there is currently a focus on clean and renewable energy, and climate action among most IFIs. Some institutions (the African Development Bank, and IFC and MIGA from the World Bank Group) do not mention this specifically, but presumably those kinds of investments

[15] As Salacuse (2010) has pointed out, an international regime is normally „supported by a multilateral international organization. For example, the global trade regime rests upon the WTO, a robust international organization. The international investment regime has nothing similar" (Salacuse, 2010: 467).

would fall under infrastructure investments that they as well as all the other IFIs mention as key private sector focus areas.

Table 3. International financial institutions and key private sector focus areas

Institution	Key Private Sector Focus Areas
Asian Development Bank	*Infrastructure*, capital markets, and financial sectors, **with increasing focus on clean and renewable energy**, frontier markets, and underserved economies.
African Development Bank	*Infrastructure*, financial sector, industry, agribusiness, services, regional integration, and inclusive growth.
European Bank for Reconstruction and Development	Industry, commerce and agribusiness, natural resources, **renewable energy**, *infrastructure*, financial institutions, and SMEs.
European Investment Bank	*Infrastructure*, **energy, climate action,** financial markets, SMEs, microfinance, and industry.
Inter-American Development Bank. Nonsovereign Guaranteed Operations.	*Infrastructure*, **energy,** transport, water and sanitation, industry, agribusiness, natural resources, financial institutions, capital markets, trade finance, health care, education, tourism, corporate governance, corporate social responsibility, and **climate change.**
International Finance Corporation – World Bank Group	Frontier markets and International Development Association countries, sustainability, *infrastructure*, agribusiness, health and education, financial markets, and SMEs.
Multilateral Investment Guarantee Agency – World Bank Group	International Development Association and conflict-affected countries, *infrastructure*, and South-South investment projects

Source: International Finance Corporation, 2011

Partnership with private investors has for a long time been a central part of IFI support to the private sector. Most IFIs limit their participation in a project investment to well under 50 percent, thus requiring partnership with other investors. The structure of IFI finance substantially leverages the capital provided by governments. Not only do IFIs borrow significantly from outside to support their operations, but they also invest in projects alongside private financiers and sponsors. Indicatively, the net result is that one dollar of capital supplied to an IFI by governments can lead to $12 of private sector project investment (IFC, 2011).

IFIs generally need to demonstrate that their financing is essential, beyond what commercial finance would provide on its own, and that they can add value through risk mitigation and improved project design that leads to better overall development outcomes. They need to ensure that they crowd in investment and do not harm development of private financial markets. Most IFIs recognize this need, and many call their special role "additionally", that is, the value they bring to a project beyond what private sector financial institutions could typically offer (IFC, 2011).

IFI participation can help projects in developing countries in two ways: (1) making them more commercially viable through, for example, better finance, improved risk mitigation, advice; and (2) improving their developmental outcomes by, for example, providing the advice and standard setting that lead to better operations, products, and services; stronger environmental, social, and corporate governance activities; or projects that are more inclusive (IFC, 2011). IFIs also tend to provide finance with longer maturities, which is generally beyond the risk appetite of private capital (IFC, 2011).

IFIs clearly can be catalysts to support PPP projects, including in the energy sector; however, as stated above they tend to be bureaucratic and this can cause problems and be costly for the private sector.

6. The need for IFIs to make more use of their guarantee powers.

The ongoing debate about the role of IFIs increasingly recognizes the importance of making greater use of the risk mitigation potential inherent in their unique multilateral structure (Asian Development Bank, 2006). The World Economic Forum (WEF)[16] has, for example, argued strongly for IFIs to better use guarantee and risk mitigation instruments and capabilities to attract increased commercial investment in development projects. In 2006 the WEF issued a report entitled "Building on the Monterrey Consensus: The Untapped Potential of Development Finance Institutions to Catalyze Private Investment". In this report the WEF specifically asserted that: "…the weight of DFI [development finance institutions] activities should shift over time from direct lending to facilitating the mobilization of resources from the world's large private savings pools – international and domestic – for development – oriented investment through: wider use of risk mitigation instruments to alleviate part of the risk faced by investors; and stronger direct support for capacity building to strengthen the enabling environment for investment" (World Economic Forum, 2006: 9).

Furthermore the WEF argued that development financial institutions should "adapt their services, culture and capital allocation to the imperative of "crowding in" domestic and foreign private investment by placing much more emphasis on such risk mitigation instruments as partial guarantees as transitional strategy and on capacity building" (World Economic Forum 2006: 10) and that "an international consensus has emerged, embodied by the Monterrey Consensus, that a deeper partnership between the public and private sector is needed if we are to achieve common development objectives" (World Economic Forum, 2006, p. 10). In its final recommendations the WEF says: "The overwhelming majority of expert participants in the project recommended a major expansion of risk mitigation activity by DFIs…" (World Economic Forum, 2006: 15).

While there is a clear need for risk mitigation in developing countries for sectors like the energy sector, it seems that IFIs, including the WBG, have some way to go to make those instruments widely used. IFIs need to do a better job in coordinating risk mitigation activities within themselves and spend more effort in marketing those products and to make them more efficient and more cost effective for the private sector and shorten their processing time. The use of political risk insurances has also not always resulted in favourable outcomes for developing counties as documented in detail by Wells and Ahmed in the case of Indonesia (Wells and Ahmed, 2007).

7. Overview of some sources of funding for cross border geothermal energy projects

This final section provides an overview of some possible sources of funding for cross border geothermal projects at an early, middle and late stage of project development. As discussed earlier in this article, high upfront development costs are associated with geothermal energy projects. At the initial phase risks are high but at the middle stage risks are medium and at the late stage the risks are low and projects may become bankable. Table 4 below provides an indication as to what funding sources and risk mitigation instruments might be feasible at each of the three stages of geothermal project development. Exploration and initial drilling costs are especially difficult for developing countries with small fiscal budgets and a weak tax base. Unfortunately, as shown in Table 2, IFIs have been avoiding this high risk at the early phase of geothermal development. Here they could and should do much more offering, for example, grants and concessional loans. Other donors should also get involved with grants or subsidized loans. During the middle and especially the late stage of project development IFIs should make more use of their guarantee and insurance instruments for capital mobilization attracting for example loans from international investment banks. Guarantees and insurance instruments could also attract equity contributions from international investors and investment funds.

[16] The World Economic Forum's Financing for Development Initiative comprises more than 200 global experts from financial institutions, corporations, governments, international organizations, universities, and nongovernmental organizations, who offer their views on improving the effectiveness of efforts to stimulate private sector investment in developing countries.

IFIs should be able to price guarantee and insurance instruments lower than the private sector because they often engage with governments in developing countries on multiple projects and programs, which gives them as multilateral institutions leverage *vis-à-vis* developing country governments. An example of additional risk mitigation is to allow the host governments to own a stake in the geothermal power plant, which gives them an incentive to help ensure project success.

As discussed above, IFIs, including the World Bank Group, have so far made little use of their guarantee powers to mobilize funding for clean energy projects. High costs and bureaucracy are cited as major reasons, not only by outside observers, but also by staff and managers within the World Bank. ECAs can also play an important role in facilitating trade of goods and services from providers in developed countries to geothermal projects in developing countries; see for example Dinh and Hilmarsson (2013).

Table 4. Overview of potential sources of funding for cross border geothermal projects

Stage of project development	***Early***	***Middle***	***Late***
Activities	Exploration Initial drilling	Resource confirmation Field development Production drilling	Power plant Construction Commissioning
Risk of failure	***High risk***	***Medium risk***	***Low risk***
Potential funding sources	Balance sheet financing from sponsors Private equity from shareholders/investors Government cost sharing, concessional loans, grants, loan guarantees Donor grants, IFIs and bilateral donors Concessional loans/funds from international donors, including IFIs* (e.g. World Bank IDA terms)	Balance sheet financing or corporate bonds from sponsors Public equity Construction debt Loan guarantee by government Long term loan from IFIs* Guarantees from IFIs against non commercial risk to facilitate commercial lending ECAs**/trade finance. Guarantees and insurance against commercial and non commercial risks. Buyer or Supplier credits. Direct loans	Long term loans from commercial sources/investment banks Long term loan from IFIs* Guarantees from IFIs to attract commercial loans (larger loan allocation, longer term, lower interest rate) ECAs**/trade finance. Guarantees and insurance against commercial and non commercial risks. Buyer or Supplier credits. Direct loans
*IFIs: International Financial Institutions: Lending, equity, guarantees, grants and policy reform **ECAs: Export Credit Agencies: Guarantees for trade finance and loans			

Source: Constructed by the author

Conclusions

Most future increase in demand for electricity is likely to come from developing and emerging market economies. This is also where most of the clean energy resources are located. This offers a tremendous opportunity for developing countries, but is also a challenge, including with funding. Sufficient private funds will not flow into these countries unless the risk profile of energy projects can be reduced.

To fill the tremendous energy infrastructure gap in developing countries the public and private sectors need to work in partnership, including via PPPs. Such partnerships can be supported by IFIs. For large en-

ergy project partnerships, pooling public, private and donor funds should not crowd out the private sector. Instead they offer the potential to crowd in private funds to risky markets that would not get private investment without proper risk mitigation.

In the absence of a global investment agreement, like the GATT and subsequently the WTO on trade, investors have turned to piecemeal solutions when protecting their rights in risky countries. This failure to create a global framework for investment is especially serious if one considers clean energy projects, which tend to be large, capital intensive and long term.

IFIs can be important partners not only with direct funding, i.e. loans and equity investments, but also increasingly through risk mitigation instruments. IFIs need to provide instruments that are more flexible and more cost effective for the private sector and with a shorter processing time. Better coordination is needed between World Bank Group institutions providing guarantees/insurances, as indeed is better marketing of those instruments. In a recent World Bank publication, two World Bank staff members who have been country directors, describe the World Bank as a high-cost/high-hassle partner of last resort. They also argue that the World Bank needs to better understand the constraints under which the private sector works (Porter and Shivakumar, 2010). Clearly the bank needs internal reform in order to achieve its potential in mobilizing private sector capital via its financial instruments, especially guarantees and insurance products.

ECAs can also play a constructive role in supporting exporters of equipment and services to developing and emerging markets by providing guarantees and insurance against commercial and non-commercial risk to facilitate longer term lending and at more affordable cost.

This article shows that the global system to support cross border investment in developing and emerging markets is fragmented and the international community offers only piecemeal solutions, e.g. via IFIs such as the World Bank and regional development banks. However, internal evidence from the World Bank suggests that it is difficult for the private sector to use the instruments offered. The World Bank has so far hesitated to use its guarantee powers in any significant way and thus does less to help mobilize as much private sector capital to developing and emerging countries as it could. This is especially unfortunate for investment in clean energy infrastructure where investments tend to be large, capital intensive and with long repayment periods. IFIs are well suited to mitigating non-commercial risks in emerging markets e.g. because of their global nature and because they often engage in policy dialogue with host governments and can facilitate regulatory reform often needed in emerging markets. IFIs including the World Bank have also so far done little to help fund the high upfront development costs for geothermal projects in developing countries. Here they should team up with other development institutions with grants and concessional lending to help make geothermal projects in developing countries bankable.

IFIs have failed to provide efficient and effective support for cross border infrastructure investment in developing countries. Among the results is underinvestment in clean energy investment globally. In spite of all the talk from IFIs about clean energy and the battle against climate change, so far they have little to show when it comes to capital mobilization for clean energy projects.

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GEOTERMINIŲ PROJEKTŲ FINANSAVIMAS: TARPTAUTINIŲ FINANSINIŲ INSTITUCIJŲ VAIDMUO IR TARPTAUTINIO INVESTICIJŲ REGULIAVIMO AR REGLAMENTAVIMO TRŪKUMAS

Hilmar Þór Hilmarsson
Akureyri universitetas (Islandija)

Santrauka

Vystantis pasaulio ekonomikai, didėja ir energijos paklausa. Investicijos į švarios energijos, įskaitant geoterminės, projektus tampa vis svarbesnės siekiant padėti patenkinti šiuos augančius energijos poreikius. Švarios energijos projektai svarbūs ir aplinkosaugos tikslais, ir kaip kovos su klimato kaita dalis. Švarios

energijos šaltinių pasaulyje gausu besivystančiose šalyse, įskaitant kylančias rinkos ekonomikos šalis. Investuotojai besivystančiose šalyse paprastai susiduria su didesne rizika nei tie, kurie investuoja į aukštas pajamas turinčias išsivysčiusias ekonomikas. Didesnės rizikos savo ruožtu sumažina pinigų srautus į besivystančias šalis, ekonomikos ir finansų krizių laikotarpiu. Kartu energetikos projektai yra imlūs kapitalui, jiems būdingi ilgi grąžinimo laikotarpiai. Vykdant energetikos projektus dažnai turi bendradarbiauti viešasis ir privatus sektoriai, kitaip tariant, būtina viešojo ir privačiojo sektorių partnerystė (VPP). Efektyvus rizikų pasiskirstymas tarp skirtingų VPP partnerių yra svarbus, siekiant projekto sėkmės, paprastai tai tampa kitų pelningų projektų pagrindu ir dažnai būna naudingas visoms dalyvaujančioms šalims. Šiame straipsnyje aptariama viešojo ir privačiojo sektorių partnerystė energetikos sektoriuje besivystančiose šalyse, besivystančių šalių charakteristikos, rizikos, su kuriomis susiduria investuotojai, siūlomos rizikos mažinimo priemonės, siekiant jas valdyti. Straipsnyje atskleidžiama, kad pasaulinė tarptautinių investicijų palaikymo sistema besivystančioms ir naujoms rinkoms yra nesisteminė, nesuderinta, tarptautinė bendruomenė siūlo tik nesistemingus sprendimus, pvz., per tarptautines finansų institucijas (TFI), kaip Pasaulio bankas ir regioniniai plėtros bankai. Tačiau duomenys iš Pasaulio banko rodo, kad privačiam sektoriui sudėtinga naudoti siūlomas priemones. Pasaulio bankas iki šiol privataus kapitalo organizacijoms ir besivystančių šalių organizacijoms mažai tepadeda. Todėl nelengva užsitikrinti investicijų švarios energetikos infrastruktūrai, nes tai didelės, imlios kapitalui investicijos, kurių grąžinimo laikotarpis gana ilgas. TFI tinka, siekiant sušvelninti nekomercines rizikas augančiose rinkose dėl jų globalaus pobūdžio, nes bendradarbiauja su vyriausybėmis ir gali palengvinti reformų, kurios dažnai būtinos augančiose rinkose, reguliavimą. TFI, įskaitant Pasaulio banką, iki šiol nedaug tenuveikė, kad padėtų finansuoti pradines plėtros išlaidas geoterminiams projektams besivystančiose šalyse. Čia jie turėtų dirbti kartu su kitomis plėtros įstaigomis, gauti dotacijų ir lengvatinių paskolų, taip padėdami sėkmingai vykdyti geoterminius projektus besivystančiose šalyse.

PAGRINDINIAI ŽODŽIAI: *investicijos į švarią ir atsinaujinančią energiją, geoterminiai projektai, besivystančios ir kylančios rinkos ekonomikos, rizikos ir rizikų mažinimo priemonės.*

JEL KLASIFIKACIJA: F30, G20, G32, O22, Q20, Q40