Risk Mitigation Strategies for Renewable Energy Project Financing

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ABSTRACT

Project finance has emerged as a preferred financing vehicle for renewable energy projects. Advanced application of project finance (structured finance) can further spur investment from institutional investors. A key challenge is the perception of renewable energy projects as high-risk. This article attempts to cover the entire breadth of risk factors and spell out the corresponding risk mitigation strategies. Risk mitigation strategies mentioned in the article cover a wide spectrum, ranging from standard insurance covers/contracts to the judicious selection of project attributes. The key, broad areas that influence project selection and attractiveness are credit worthiness of project participants; attractiveness and guarantee of future cash flows; host country profile; and the legal, political, and market environment. This article should help project developers and investors alike to select/structure good projects and improve their investment worthiness.

INTRODUCTION

Financing of large, renewable energy projects has been a challenge, given the perception of them as high-risk with regards to technology and future cash flows. We begin with a background on project finance and why it is suitable for large renewable energy projects. Then the risks associated with renewable energy projects are explored in detail, as well as how they can be mitigated. Lastly, key considerations that influence the perception of renewable energy projects as high-risk from an investor's point of view are listed.

WHAT IS PROJECT FINANCE?

Project finance involves the creation of a legally independent project company financed with nonrecourse debt for the purpose of investing in a capital asset, usually with a single purpose and a limited life.

In the context of an electric power project, the company that owns the power project is the legally independent entity; it is separate from its sponsoring firms. These sponsoring firms (typically 1-3) can include an engineering procurement and construction (EPC) company, a fuel (for power plant) company, an electrical utility, or others. The sponsors contribute equity to the project company, typically up to 30% of total capitalization. This equity appears as investments in the balance sheet of sponsors. The remaining 70% comes in the form of nonrecourse debt.

Nonrecourse debt means that in the event of default, the debtholders have no claim on sponsors' assets. This is in stark contrast with debt on corporate balance sheets, where debtholders have claim on corporate assets. In the case of project finance, the debtholders have claim only on the assets and the cash flows of the project company. A renewable energy project finance deal is characterized by numerous contracts covering supply of inputs (e.g., fuel supply such as biomass, landfill waste, etc.), purchase of outputs (power off-take agreement), EPCs (e.g., for wind turbine installation, solar thermal installation, a biomass plant, etc.), operations, insurance, and numerous other areas.

In-depth analysis, including financial modeling, from Dr. Woodroof and Mr. Thumann demonstrates that *performance contracting*, an application of project financing in the context of energy saving projects, is a better alternative than other financing options for energy management projects (Thumann & Woodroof, 2009). Further, project finance has emerged as one of the most important financing vehicles for investments in infrastructure sectors such as power plants, toll roads, mines, pipelines, airports, railways, and telecommunications systems (Esty, February 14, 2003). Hence it is a natural choice for financing renewable energy projects.

BENEFITS OF PROJECT FINANCE

Project finance involves the creation of a separate legal entity, which is complex and takes considerable time (6-18 months). Transaction costs are high for structuring such deals. Using a corporate balance sheet to finance a project appears to be much cheaper, yet project finance reduces the total financing costs for a firm, as discussed below (Esty, February 14, 2003) (Harvey, et al., 2009).

Reduced Agency Costs

Assets that are tangible and generate regular and high free cash flows run the risk of managerial mismanagement, wasteful expenditures, and suboptimal investments. Renewable energy projects have tangible assets in terms of land, equipment (wind turbines, photovoltaics, etc.), and guaranteed cash flow with a power off-take agreement in place. Project finance provides a separate asset governance system, decoupling it from corporate adventurism. Numerous contracts reduce the discretion of those managing the project entity and make the cash flow easily verifiable. High debt structure reduces free cash flow, and the mechanism of allocating cash flows to debtholders (*cash flow waterfall*) provides monitoring control on managers.

Agency costs may also rise due to opportunistic behavior of the partners (such as the supplier of critical inputs, the buyer of outputs, the host country, and others). A power plant positioned near the fuel supply point (reduces fuel transportation cost) can provide bargaining power to the fuel provider in the future. Project finance eliminates these risks by joint ownership, a higher debt level, and long-term contracts.

During distress there can be a conflict between debtholders and equity holders. In the corporate world, the equity holder tends to go for risky reinvestments to bring the company out of distress, whereas the debtholder tends to look forward to lower risks and return on debt through liquidation of assets. These conflicts are avoided by a cash flow waterfall, which removes any doubt of claims on cash flow. Strong debt contracts prevent any discretionary acts on the part of equity holders or debtholders. Since the debt is often bank debt and not bonds, the restructuring is easier.

Prevention of Underinvestment (Debt Overhang)

Renewable energy companies are lacking deep pockets to finance a project on their own or by raising debt. In fact, the ability of any corporation to take up debt and increase leverage is limited. A highly leveraged company may not be able to raise debt at reasonable rates. Equity expansion is not preferred for various reasons, such as dilution of equity, tax issues, and the high cost of equity. The limited ability of renewable energy companies to raise financing may lead to abandoning investment opportunities in positive NPV projects.

Nonrecourse debt is not dependent on a corporate balance sheet but on the underlying cash flows that will be created by the project. As a result, a renewable energy company can preserve its debt capacity and still generate the required financing for large projects with positive NPV.

Reduced Risk Contamination

Renewable energy projects often carry a perception as high-risk, especially ones with emerging technologies such as wave, tidal, offshore wind, etc. A high-risk project can increase the whole corporate risk, and a failing project can drag down the whole organization with it. The volatility of project cash flow will add to the volatility of corporate cash flow, undermining both the ability of the firm to raise capital and the confidence of suppliers and customers.

Project finance separates the risky project cash flows from corporate cash flows, hence preserving the risk profile of the project sponsor. Also, in case of project failure the loss is limited to the equity in the project company.

Suitability for Emerging Markets

Large, renewable energy projects in emerging markets can be optimally financed locally, as foreign equity is generally in short supply.

Tax Benefits

Highly leveraged structure provides a tax shield. Also, there are ways to create legally independent project companies that are tax neutral and thus avoid a double tax on returns on investments (Loughran, 2011).

A NOTE ON STRUCTURED FINANCE

Structured finance (Harvey, et al., 2009) shares the structure of project finance and can be utilized towards power projects. A special purpose vehicle (SPV) is created, which is a legally independent entity. The project future cash flows are the assets of the SPV and are securitized and sold in the open market to investors, or privately placed. The securities are often split into tranches, with each tranche having a different level of credit protection or risk exposure. There is a senior ("A") class of securities and one or more junior, subordinated ("B," "C" etc.) classes. The senior classes have first claim on the cash that the SPV receives, and the more junior classes only start receiving repayment after the more senior classes have been repaid. This arrangement is the same as the cash flow waterfall mentioned before.

If there is a default on payments, the loss is absorbed first by the most subordinated tranches, followed by other senior tranches. The senior securities are typically AAA rated, signifying a lower risk, while the lower-credit-quality subordinated classes receive a lower credit rating, signifying a higher risk. The most subordinated tranche, also known as the equity class, may be retained by the originator as a potential profit flow, consisting of the residual cash flow after all the other classes have been paid.

Securitization can bring insurance companies and pension funds to invest in renewable energy projects. Subsequent securitization of investments under master purchase agreements (MPAs) can provide an exit strategy to equity investors (Sidell, 2009).

RISK CONSIDERATIONS FOR RENEWABLE ENERGY PROJECTS

Project finance has been increasingly used for financing renewable energy projects. Due to high administrative costs involved in project finance, the application is limited to large-sized projects. For successful financial closure of a project, all the risks attributed to renewable energy projects need to be avoided or mitigated.

Risks in renewable energy projects and available risk management strategies will influence the choice of country, location, and renewable technologies in which to invest. For instance, a country with high margins (high promised feed-in-tariffs) may have a perceived high political and regulatory risk that will deter investors.

Following are the key risk factors, along with corresponding risk mitigation strategies, for project finance of large-scale renewable energy projects (Sidell, 2010) (Rodenhuis, 2009) (Marsh, 2009) (United Nations Environment Program, 2006) (GCube, 2011).

Renewable Resource Risk and Technology-specific Risks

The sources of energy are natural sources, and their availability imposes certain risks. Technology risks relate to renewable energy technologies that are not yet mature and reliable. These risks vary with individual renewable technologies.

Solar Photovoltaic

Photovoltaics are made of semi-conductor material that when exposed to sunlight generates electricity. There are practically no resource risks associated, as there is substantial data on solar isolation at various parts of the world. Technology has matured over time for both Crystalline-Si and Amorphous-Si.

Risk Mitigation: PV manufacturers generally provide a guarantee for 25 years. Insurance covers are also available for other risks, such as SolarPro from G-Cube Insurance.

Solar Thermal

Solar energy is concentrated to produce heat, which is then used to produce steam and generate electricity. Resource risks are low, as are the technology risks because the components are generally standard and easily available.

Risk Mitigation: Manufacturers' guarantees and standard insurance covers are available, such as SolarPro from G-Cube Insurance.

Wind

Wind power is harnessed by rotor blades and converted into electricity. Resource risk includes long-term wind power reliability. Technology and operational risks include wind turbine breakdown by failure of a control unit or electrical parts, as well as pitch control.

Risk Mitigation: Resource risk can be reduced by looking into past wind history data. Wind-based derivatives and insurance covers are available to financiers. Insurance covers are also available for technology and operational risks, such as WindPro from G-Cube insurance. Insurers' experience with offshore technology has been limited, so deductibles are high.

Hydro

The technology is mature and risks are low. Availability of historic water flow data lowers the resource risk.

Risk Mitigation: Weather insurance or derivatives are available to minimize resource risks. Standard insurance covers for other risks are available, such as HydroPro from G-Cube insurance.

Biomass Gasification/Biogas/Landfill Gas

Biomass gasification refers to gasification of farm / wood waste in a reactor. The gas so produced is burned to generate electricity.

Landfill gas refers to synthetic gas (syngas) generated from incineration of waste in a landfill.

Biogas is gas produced from anaerobic decomposition of animal waste.

Resource risk related to the availability of input fuel is a major risk, affecting the long-term performance of the power plant. Technology risks exist; there is ongoing research in various gasification systems.

Risk Mitigation: A long-term contract with input fuel suppliers is key to minimizing resource risk. Fuel supply contracts need to be in place, and fuel suppliers must be bankable (credit worthy). Contracts with more than one fuel supplier reduce risk. Customized insurance covers, such as BioPro from G-Cube insurance, are available for fuel supply risks. Machine breakdown insurance, manufacturers' guarantees, and other standard insurance covers are available to cover technology risks.

Geothermal

The heat below the surface of the earth is brought to the surface in a primary circuit and, using a heat exchanger, the heat is transferred for power generation. The heat is available in the form of hot aquifers or hot-dry-rocks, up to a depth of more than 400m. A major risk is uncertainty about the quantity and temperature of the geothermal resource until first drilling is completed. Apart from geothermal resource risk, there are risks associated with geothermal drilling operations. (Blowout is a major risk, involving uncontrolled release of underground pressurized fluid during drilling that can damage rig equipment and cause human fatalities.)

Risk Mitigation: Insurance covers are available for geothermal resource risk and drilling risks.

Ocean

This can be further classified as tidal and wave. Tidal technologies include building dams or installing tidal turbines, similar to wind turbines. Wave technologies include oscillating water columns, collecting water in basins, and floating buoys anchored to the sea bed. These technologies have not yet matured, so technology risks are high compared to resource risk.

Risk Mitigation: Ocean renewable technologies are in the demonstration stage, and insurance covers are not readily available. However, some customized insurance covers are provided, such as WavePro from G-Cube.

Construction Risks

These include risks associated with a project not meeting its specifications, as well as cost and time overruns.

Risk Mitigation: Ensuring that the construction contractor has a good reputation and is bankable helps to minimize this risk. Also, there are standard insurance covers (GCube, 2011) available to cover these risks. Construction contractors are required to give performance guarantees/surety bonds.

Performance Risks during Operations

There are risks of equipment theft, damage, accidents, and fire. In addition, O&M contractors may fail to perform as per contract terms.

Risk Mitigation: There are standard insurance covers for equipment-related risks. Bankable O&M contractors and surety bonds/performance guarantees reduce contractor performance risks.

Market Risk

This risk relates to the price at which power is purchased and the time duration for which it is available, in order to cover the project costs and provide a reasonable return. This is critical, as renewable power is costlier than conventional sources and the pool price (regular electricity market price paid to power generators). This is because the costs incurred in setting up conventional energy projects do not include the cost of negative externalities (carbon emission, pollution, etc.). Various governments, to promote renewable energy projects, provide incentives such as feed-in-tariffs with a guaranteed period or renewable certificate trading. These incentive schemes are a source of cash inflow for renewable energy projects.

Risk Mitigation: Entering a power off-take agreement, or a purchase power agreement (PPA), with the power utility minimizes the risk, ensuring steady cash inflow. There are no standard insurance products to cover these risks.

Credit Risks

There is always a risk that the power utility may not pay the price, as the payment commitments extend a long time into the future. Although these utilities are generally private, in some countries they are also government owned and have non-commercial interests.

Risk Mitigation: There are no standard insurance products for this risk; however, one can seek a credit default swap on an individual utility company. Major financial institutions can resort to credit derivatives by pooling their portfolio of renewable projects.

Financial Risks

Volatility in the interest rate and currency exchange rate, as well as inflation, can affect the economics of a project, more so in overseas finance.

Risk Mitigation: Standard derivative products are available in the market to hedge these risks.

Legal Risks

Poor legal infrastructure of the host country can increase the probability of default on contracts and renegotiations. The risk is generally higher in the least developed countries.

Risk Mitigation: There are no standard financial risk management products to mitigate the risk. Some agencies, such as U.S. based Overseas Private Investment Corporation (OPIC), provide political insurance. Obtaining a guarantee from the government on the contracts and involving multi-lateral agencies can reduce the risks.

Regulatory Risks

Incentive tariffs are decided by government regulators. In spite of a power purchase agreement (PPA) being in place, there is the possibility that regulators may revise the prices downward midway in the PPA period and renegotiate the PPA.

Risk Mitigation: There are no standard financial risk management products to mitigate the risk. The renewable energy policies of the country and assurances from the government with which they are pursued can give some confidence to financiers.

Political Risks

The associated risks are political violence in the host country, expropriation of the project assets, and restrictions on currency conversion.

Risk Mitigation: Political risk insurance is available from multilateral agencies that provide cover for expropriation of funds and conversion and transfer of currency.

Force Majeure Risks

There is a risk of natural disasters like earthquakes, floods, etc., which can hamper the project during the construction and operations phases.

Risk Mitigation: Standard insurance and reinsurance products are available to mitigate the risks.

An investment banking company that provides project finance evaluates project risks on numerous factors (Sidell, 2010). These factors can be condensed into following questions asked by them:

- Is there an off-take agreement in place?
- Is the off-take agreement bankable?
- Is a fuel supply agreement in place?
- Is the EPC contractor bankable?
- Is the O&M contractor bankable?

CONCLUSION & KEY OBSERVATIONS

Based on the study of project finance and risks involved in regard to renewable energy projects, the following observations are made:

- The credit worthiness of parties involved in a project is an important criterion. It gives confidence to investors to lend money based on future assets and cash flows that the project will generate.

- It is highly improbable that any firm has a higher credit rating than that of the country in which it is situated (Sidell, 2010). Also, a high country rating (sovereign rating) minimizes the credit risk associated with a power utility not meeting its payment obligations under a PPA.

- Legal, regulatory, and market risks do not have any standard insurance covers or any other standard financial instruments with which to mitigate risks. These risks are critical to project success, and their mitigation depends on the choice of the country for the renewable energy project. A country that has national level targets for renewable energy, as well as policies and an incentive framework, minimizes these risks.

- Future cash flows of the project form the underlying asset on which investors base their financing of the project. Renewable projects compete for finance, and the projects with attractive cash flows and minimal risk will win. Cash flows in renewable energy projects are a function of the cash grants, tax incentives, subsidies, and preferential tariffs provided by government; renewable resource density; and the cost of the setting up the power plant. Of these, tariffs play a major role, as they guarantee payment over the duration of the PPA.

When structuring a project, a project developer will do well to give due consideration to the above observation points. In addition, an impartial diagnosis of a project on the various risk factors discussed above will help a project developer to identify those risks that may concern the investors and then take the appropriate risk mitigation steps.

Investors can perform a similar analysis when selecting a project for financing and then proactively guide a project developer to improve the investment attractiveness of the project.

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