
Impact investing as a way to solve social problems

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Abstract

Objective of the study: This paper examines the role of the capital market, with a specific focus on fixed-income securities, in solving global social challenges.

Methodology / approach: This research relies on case studies and the efficient market hypothesis to develop a roadmap for creating an efficient social bond instrument.

Originality / relevance: Despite the willingness of some charities, foundations and government agencies to fund social projects, there is a huge gap between the need to finance social projects and the availability of resources to support them. Existing literature does not adequately address the role of the global capital market in closing this gap.

Main results: The paper recommends the use of a revenue participation bond, as adopted by the World Bank regarding green bond structure to address the financing need of the social challenges. The study also recommends that a set payback period is established and a multilateral approach is taken when issuing social bonds.

Theoretical / methodological contributions: The results of the study imply that the current capital market is capable of offering more financial instruments to address the funding need of some of the key global social challenges.

Social / management contributions: This research focuses on the case for social bonds as a means of bridging the gap between social need and the capital markets ability to issue a stable, liquid, fixed-income instrument that promotes social good. The contribution of this research is to identify the key characteristics of a tradable social bond as a vehicle of funding social problems.

Keywords: Impact Investing, Social Bonds, Revenue Participation Bonds, social challenges, fixed income securities

Investimento de impacto como forma de resolver problemas sociais

Resumo

Objetivo do estudo: Este artigo examina o papel do mercado de capitais, com foco específico em títulos de renda fixa, na solução de desafios sociais globais.

Metodologia / abordagem: Esta pesquisa se baseia em estudos de caso e na hipótese eficiente do mercado para desenvolver um roteiro para a criação de um instrumento eficiente de vínculo social.

Originalidade / relevância: Apesar da disposição de algumas instituições de caridade, fundações e agências governamentais de financiar projetos sociais, existe uma enorme lacuna entre a necessidade de financiar projetos sociais e a disponibilidade de recursos para apoiá-los. A literatura existente não aborda adequadamente o papel do mercado de capitais global no fechamento dessa lacuna.

Principais resultados: O documento recomenda o uso de um título de participação nas receitas, adotado pelo Banco Mundial em relação à estrutura de títulos verdes para atender à necessidade de financiamento dos desafios sociais. O estudo também recomenda que seja estabelecido um período de retorno definido e seja adotada uma abordagem multilateral ao emitir títulos sociais.

Contribuições teóricas / metodológicas: Os resultados do estudo implicam que o mercado de capitais atual é capaz de oferecer mais instrumentos financeiros para atender à necessidade de financiamento de alguns dos principais desafios sociais globais.

Contribuições sociais / gerenciais: Esta pesquisa enfoca o argumento dos vínculos sociais como um meio de preencher a lacuna entre a necessidade social e a capacidade do mercado de capitais de emitir um instrumento estável, líquido e de renda fixa que promova o bem social. A contribuição desta pesquisa é identificar as principais características de um vínculo social negociável como veículo de financiamento de problemas sociais.

Palavras-chave: Investimento de impacto, Títulos sociais, Títulos de participação na receita, desafios sociais, títulos de renda fixa.

La inversión de impacto como una forma de resolver problemas sociales

Resumen

Objetivo del estudio: Este documento examina el papel del mercado de capitales, con un enfoque específico en valores de renta fija, en la resolución de desafíos sociales globales.

Metodología / enfoque: esta investigación se basa en estudios de casos y en la hipótesis de mercado eficiente para desarrollar una hoja de ruta para crear un instrumento de enlace social eficiente.

Originalidad / relevancia: a pesar de la voluntad de algunas organizaciones benéficas, fundaciones y agencias gubernamentales para financiar proyectos sociales, existe una gran brecha entre la necesidad de financiar proyectos sociales y la disponibilidad de recursos para apoyarlos. La literatura existente no aborda adecuadamente el papel del mercado de capitales global para cerrar esta brecha.

Resultados principales: El documento recomienda el uso de un bono de participación de ingresos, como lo adoptó el Banco Mundial con respecto a la estructura de bonos verdes para abordar la necesidad de financiamiento de los desafíos sociales. El estudio también recomienda que se establezca un período de recuperación establecido y se adopte un enfoque multilateral al emitir bonos sociales.

Contribuciones teóricas / metodológicas: los resultados del estudio implican que el mercado de capitales actual es capaz de ofrecer más instrumentos financieros para abordar la necesidad de financiamiento de algunos de los desafíos sociales globales clave.

Contribuciones sociales / de gestión: esta investigación se centra en el caso de los bonos sociales como un medio para cerrar la brecha entre la necesidad social y la capacidad de los mercados de capital para emitir un instrumento estable, líquido y de renta fija que promueva el bien social. La contribución de esta investigación es identificar las características clave de un vínculo social negociable como vehículo para financiar problemas sociales.

Palabras clave: Inversión de impacto, Bonos sociales, Bonos de participación de ingresos, desafíos sociales, valores de renta fija

II. Introduction

Numerous studies have sought to evaluate the increase in social impact bond (SIB) investment and measure social outcomes in terms of social return on investment. Studies have focused on methods for measuring social return on investment, risk reduction through incorporation of SIB in a portfolio of assets, and the challenges of socially responsible investing. Despite the numerous studies that have been completed, impact investing is a relatively new discipline and many areas are left unexplored. Furthermore, the determinations of completed studies are varied and a roadmap for creating a sustainable, safe social bond has been left largely unexplored. This study aims to shed more light on this newly developing field of interest by examining the current social bond vehicles that exist and offering a new framework which could increase the attractiveness of these current vehicles.

The three social impact bonds examined in this paper were all issued by the World Bank between 2007 and 2010. The study focuses on social bonds issued by the World Bank primarily because of the massive amount of data collected and reported for each social impact bond project undertaken by the World Bank. When studying a financial vehicle as new as social impact bonds, it was very challenging to find ample, reliable data from other sources. Furthermore, the strong reputation of the World Bank in pioneering international initiatives and its mission to promote sustainable growth and investment in people has made it an innovator in the field of social impact bonds and thereby a great candidate for my analysis. The study incorporated projects from three different countries and various sectors in order to capture a diverse range of challenges and designs. Projects were only considered if they were completed and had undergone final evaluation by the World Bank. After reviewing all social impact bonds issued by the World Bank and narrowing the pool of projects by the specified criteria, three social bonds were chosen to be evaluated in the following case studies.

III. Literature Review

A study conducted by Jackson (2013) explores the relationship between SIBs and community development, looking specifically at the challenges, outcomes, and possibilities created by supplementing public financing of social programs with impact investing. The study

found that incorporation of SIBs is a fast growing trend among advanced economies, and public policy objectives have started to increasingly intersect with impact investing. Public policy such as the Community Reinvestment Act finance a massive network of community development institutions focused on augmenting social infrastructure. An increasing number of these institutions have started to invest in SIBs, highlighting a transition from government financing to impact investing as a means to solve social issues. Furthermore, the study emphasizes the risk-reduction qualities of SIBs in a portfolio.

A report released by the Center for International Climate and Environmental Research – Oslo (CICERO) in 2015 examined the World Bank’s framework for selecting green bond projects. The report found the thorough selection process of the World Bank included an environmental categorization, social classification, at least two management reviews, and approval from the Board of Directors. CICERO found no obvious weaknesses in the current structure of the World Bank’s selection process. However, the review pointed out the rebound effect as a potential problem for calculating social return on investment (SROI); CICERO noted a project that reduced energy costs may have the unintended effect of inducing more energy use, effectively reducing the energy cost saving calculated as part of the expected social return (CICERO, 2015).

Fujiwara (2015) studied the problems that currently exist in regards to measuring and evaluating social return on investment. The study found the principal problem with SROI to be a lack of clear, consistent guidelines that could be applied to social investment projects. The study suggested incorporating welfare-weighting factors heavily used in cost-benefit analysis as a means of creating clear guidelines for evaluating SROI. Fujiwara noted the vague framework currently used to evaluate SROI could lead to bias, unintended focus on a narrow subset of stakeholders, and incomplete valuation of a project. Furthermore, the study identifies the challenge of quantifying societal interests and good ethics in business. The author suggests that in order to develop a solid framework for measuring SROI, normative theory of the good should be used as the consistent measure of societal interest and ethics.

A study released by the Social Impact Taskforce in 2014 offered practical advice for investment management to incorporate into its impact investing framework. The study found the importance of setting goals, selecting quantifiable performance metrics, collecting and storing key data, analyzing and reporting the data in a clear fashion, and making data-driven investment management decisions. The report also identifies three external trends that may

impact measurement in the future. The trends are the convergence of the market, emerging unexpected external shocks, and changing quantification methods. The study presents the need for continued learning in the field of impact investing and calls for the development of a shared impact measurement agenda (Social Impact Investment Taskforce, 2014).

Aviva released a white paper aimed at providing policy makers with suggestions on how to most effectively mobilize the capital markets, specifically in regards to discussions within the UN Framework Convention on Climate Change on the replacement of the Kyoto Protocol in 2015. The report highlights the benefits of focusing on the trillions of dollars of private capital that can be utilized for social good rather than the billions of dollars of official government assistance handed out. The report accentuates the need for changes in the cost of capital structure to incorporate firm sustainability, alterations in capital raising objectives, and capitalizing on different ownership vehicles (Aviva, 2014).

IV. Evolving Role of Financial Markets

The role of the financial markets has expanded throughout history. What started as a mechanism for connecting net borrows with net savers has evolved today to include an extensive web of investment options, hedging instruments, and speculative vehicles. The markets continue to adapt, and new instruments are created in order to meet investor demand and increase efficiency in the market. Today, the financial markets are experiencing a shift towards social responsible investing, as government agencies and charity organizations clearly do not have the necessary capital to solve the augmenting social problems plaguing society. The increasing social need without a matching sustainable governmental or charitable solution, presents the opportunity for the financial markets to evolve yet again to meet the growing demand for a stable, liquid, fixed-income security that promotes social good.

Current Vehicles

There are a number of financial vehicles that currently exist for advancing social good, including venture capital investment, microfinance, and bond instruments. Each of these vehicles has a unique set of advantages, disadvantages, and challenges. The current market for impact investing is around \$250 billion; global microfinance captures about \$102 billion, U.S. community finance takes about \$61 billion, green bonds account for nearly \$50 billion, international development vehicles make up about \$20 billion, and U.S. economically targeted

investment is between \$10 billion and \$20 billion (Thornley et al., 2015). This paper will specifically focus on green bonds, looking closely at their current structure and framework.

Green bonds

Green bonds were created in order to promote environmental responsibility. The bond instruments are issued for the development of brownfield sites, meaning the bonds support projects that promote renewable energy, sustainable transportation, energy efficiency, watershed management, pollution reduction, or climate change resistance.

The first green bond was issued in 2007 by the European Investment Bank (EIB) and the World Bank. From 2008 to 2012, nearly \$2.5 billion were put into the green bond market. 2013 saw a huge jump in issuances as \$11 billion was pumped into the green bond market. By 2015, \$42 billion was in the market, and by September of 2016 over \$50 billion was in the green bond market (Climate Bonds Initiative, n.d.). In order to analyze the current green bond vehicle, three green bond issuances by the World Bank are highlighted.

V. Case Studies

a. Xining Flood and Watershed Management Project

History

In 2009, the World Bank authorized a loan in the amount of \$100 million U.S. dollars to the Peoples Republic of China with the purpose to improve water supply, sanitation and waste management, social protection, and water conservation (The World Bank – Xining, 2016). The money would be spent to improve city-wide infrastructure and service delivery, advance water resource management, and prepare for natural disasters. The project objectives as outlined in the loan agreement were to improve protection of property and the safety of people in the event of a flood and to introduce sustainable methods for utilization of land and water resources to the Xining Municipality of Qinghai Province (Independent Evaluation Group, n.d.). The appraised cost of the project was US \$207.57 million and the actual cost was US \$216.62 million; US \$100 million was provided by the IBRD loan with the remaining US \$116.62 million being financed by the Xining Municipality, Datong County, Huangyuan County, and

Huangzhong County (The World Bank – Xining, 2016). The original project closing date was scheduled for December of 2014; however, after a revision in May 2014 the project deadline was extended until December 2015. The May 2014 stipulation stated that the project was to be restructured due to lack of available local financing. Several project activities were dropped and others were added to replace them. The added activities complemented the original design of the project, while only their locational was revised.

Identifying the Need

Xining is the capital of the Qinghai Province in China and is located in the Huangshui River Basin, a part of the upper Yellow River system. The majority of the province's population live in the river basin and the neighboring floodplains. The area is extremely vulnerable to soil erosion, intense rainstorms, and flash flooding. The population living in this part of China is negatively affected by property damage, loss of life, and destruction of the environment. The situation is aggravated by a lack of sufficient sewer systems, a lack of drainage collection structures, and water pollution. Furthermore, a key pillar in the World Bank's Country Partnership Strategy for 2006-2010, which was pertinent at the time of project assessment, was managing environmental challenges and resource scarcity (Independent Evaluation Group, n.d.).

Project Development Objectives and Key Performance Indicators

The design of the project extended beyond the narrow focus of flood control and incorporated a comprehensive approach to mitigate a variety of impacts of severe flooding, including sewage problems, infrastructure deterioration, population and livestock devastation, and soil erosion. The project aimed to create sustainable flood and soil erosion control by incorporating operation and maintenance (O&M) arrangements and educating local communities on water and land conservation techniques. Techniques included structural and non-structural interventions as well as short and long-term applications in order to create a comprehensive scope.

The Project Development Objective (PDO) was to effectively increase property protection and safety for the people of the Xining Municipality while simultaneously augmenting sustainable utilization of land and water in the region. The primary beneficiaries were determined as the population dwelling in the 17 watersheds within the Xining Municipality and downtown area, Huangyuan County, Huangzhong County, and Datong

County — areas that housed a total of approximately 414,300 people (The World Bank – Xining, 2016).

In order to quantify the Project Development Objective, Key Performance Indicators (KPIs) were developed, as shown in the following chart.

KPIs	
(A). Population protected from flooding	414,300 people
(B). Annual reduction of urban wastewater (directly discharged into rivers in Xining)	2,000,000 tons
(C). Annual reduction of soil erosion	898,000 tons

Figure 1: Chart of Key Performance Indicators

Furthermore, the project was further broken down into six components including flood control and management, wastewater collection, participatory watershed management, institutional strengthening and capacity building, resettlement and environmental management, and project management (The World Bank – Xining, 2016). Each of the six components listed specific goals associated with the completion of the component and the subsequent performance indicators mentioned above. Each component was also allocated a certain allotment of money from the US \$100 million loan.

Preparation, Implementation, and Review

The World Bank relied on the strategic plan outlined in the 2002 Country Assistance Strategy (CAS) when developing the project design. The key themes of the 2002 CAS were integrated into the framework of the loan provisions; there was an emphasis on the structural components such as construction of check dams and dikes as well as nonstructural resolutions such as flood warning alert systems. The project also used top-down and bottom-up approaches to collect data and record progress. Strong partnerships with local governments were arranged prior to project approval and community involvement was encouraged throughout project discussion and implementation. As part of the projects management component, community associations were formed in order to provide feedback and help in project implementation. Prior to entry, vertical and horizontal institutional makeup was assessed to ensure all necessary actors were present and supportive of the project. In order to increase cultural awareness and

sensitivity, expert panels were formed at local levels to provide insight on economic, social, environmental, procurement, engineering, and design issues.

Strong political leadership at various levels of government was utilized in order to ensure smooth operation of the project. The project relied on the heavy oversight and strict guidelines of the World Bank, as well as the mutual trust established between World Bank officials and local representatives. A midterm review (MTR) of the project was conducted to ensure the project was on track to achieve the KPIs and reach the PDO. The MTR led to a project restructuring in May 2014. After restructuring, the project budget and timing were adjusted as needed and new strategic documents were drafted in order to provide direction for the completion of the project.

The project was supervised using Monitoring and Evaluating (M&E) targets and tracked using a Results Framework. The Results Framework measured the PDO by way of three outcome indicators. The indicators were thoroughly defined and methods to track the progress of the indicators were established. During the midterm review, M&E targets were adjusted in order to account for the changing scope of the project. Periodic reports were drafted in order to track progress and ensure compliance. The World Bank further required a full-scale Environmental Management Plan and Environmental Assessment Report were drafted, and progress reports were required in order to ensure compliance with World Bank environmental practices. Ethnic Minorities Development Plans (EMDPs) were also prepared in order to comply with the World Bank’s policies on Indigenous Peoples. Internal audits were required to be submitted throughout the project cycle, and intense training was provided in order to teach local officials the proper financial management skills (The World Bank – Xining, 2016).

The project fulfilled all KPIs and subsequently reached its PDO, allowing the project to achieve an overall PDO achievement rating of ‘Substantial’. The following chart shows the ratings summary as provided by the Implementation Completion and Results Report (ICR):

Outcomes:	Satisfactory
Risk to Development Outcomes:	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

Figure 2: Implementation Completion and Results Report Ratings Summary

Furthermore, Figure 3 shows the economic benefits table which categorizes the benefits of the project. The economic benefits are significant because they are directly connected to the financial savings that can be expected from the project; however, the economic benefits are not easily measurable. The designation of ‘moderate’ or ‘high’ economic benefit was determined by use of cost-benefit analysis and scenario analysis.

Type of Benefits	Flood Control and Wastewater Component	Watershed Management Component
Avoided flood damages	++	+
Amenities and land value increase in urban areas	++	+
Environmental health improvement by wastewater collection	+	—
Agricultural production and livelihood increase	—	++
Watershed ecosystem improvement	+	++
Soil erosion protection and resulting sediment reduction in the lower reaches of Yellow River	—	++

Figure 3: Economic Benefits Rating (The World Bank – Xining, 2016)

Note: “+” for moderate economic benefits and “++” for high economic benefits

b. Mexico Efficient Lighting and Appliances Project

History

A loan granted to the United Mexican States in the amount of US \$250.63 million was approved by the World Bank in 2010 as part of a combined financial effort to promote the efficient use of energy and alleviate climate change through use of introducing energy efficient appliances residentially. The loan is one part of a three-step plan to finance efficient technologies with a Global Environmental Facility Grant for US \$7.12 million and Clean Technology Fund Loan for US \$50 million also promised (The World Bank – Mexico, 2016). The loans and grant would be spent in order to exchange incandescent bulbs (IBs) with the more sustainable and efficient compact fluorescent lamps in impoverished residential sectors in Mexico. Furthermore, incentives would be created to persuade community members to replace their old, inefficient appliances such as refrigerators and air conditioners. The appraised cost of

the project was US \$710.09 million and the actual cost was US \$973.84 million (Independent Evaluation Group, n.d.). The additional money necessary to complete the project was funded through the Global Environmental Facility Grant and the Clean Technology Fund Loan. The project was restructured five times in order to extend the project closing date, reallocate funds, and remove the Energy Efficiency Trust Fund as one of the signatories. The project was finished about 13 months behind schedule and was completed in July of 2015.

Identifying the need

At time of appraisal, the financial health of the energy sector was one of the key predictors of success in the Mexican economy. The strategic importance of the energy sector, and specifically non-renewable fossil fuels like crude oil, were monumental. Leading up to 2010, there was a significant downturn in global oil production. Output fell from 3.4 million barrels per day in 2004 to 2.6 million barrels per day in 2009 (Independent Evaluation Group, n.d.). Upon appraisal, nearly 80% of Mexican power generation capacity came by means of non-renewable fossil fuels. A mere 3.3% of capacity came from wind, geothermal, and hydropower (Independent Evaluation Group, n.d.). Additionally, domestic energy consumption had been significantly increasing during the same time period, and domestic consumption of crude oil started to grow at a faster rate than Gross Domestic Product (GDP) growth. In order to promote the long-term sustainability and financial health of the energy sector, enhancing energy efficiency was seen as a major priority in Mexico. At the same time, Mexico's energy sector was responsible for contributing to over 60% of Mexico's total greenhouse gas emissions, making increasing energy efficiencies a priority of the Mexican government as part of their climate change agenda. The project also addressed two of the five World Bank Country Partnership Strategy (CPS) pillars for the 2008-2013 period; the pillars addressed were environmental sustainability and competitiveness (The World Bank – Mexico, 2016).

Project Development Objectives and Key Performance Indicators

This project went beyond the goal of promoting the use of energy efficient technologies in low-income Mexican communities; it also incorporated a climate change provision, and two financial programs in order to help low-income families finance the new refrigerators and air conditioners. The financial components incorporated into the project design were distribution

of vouchers that would work as instant rebates, and offering a short-term line of credit at a reasonable interest rate.

The Project Development Objective (PDO) was to promote a stable climate and energy efficiency in Mexico by introducing efficient refrigerators and air conditioners at the residential level. The targeted population was the low to middle income household sector, including low-income social groups — namely indigenous people. The project had Key Performance Indicators (KPIs) in order to measure the PDO, and Global Environmental Objectives (GEOs) were used in order to ensure climate change goals were achieved. Figure 4 shows the KPIs and GEOs for the project.

KPIs	
(A). Accumulated amount of energy saved	10,000 GWh
(B). Number of IBs replaced with CFLs	45 million
(C). Number of appliances replaced	1.7 million
GEOs	
(A). Accumulated associated CO2 emissions reduction	5,140 metric tons

Figure 4: Chart of Key Performance Indicators and Global Environmental Objectives

The project had three main components that were broken down into sub-components. First, the project sought to replace incandescent bulbs with compact fluorescent lamps. Second, it encouraged purchasing energy efficient machines by use of financial incentives. Third, it provided the training necessary in order to construct strong institutional support around the program. Each component was given a budget (The World Bank – Mexico, 2016).

Preparation, Implementation, and Review

A thorough background analysis on the Mexican energy sector was completed prior to project implementation. Data was gathered in order to compute a baseline figure for energy consumption in the low-income residential sector. From there, analysts could determine the percentage of energy consumption that could be avoided through implementation of an energy efficiency program. The project design took a broad scope and focused on tackling a variety of

the barriers present in the energy sector; the project plan was developed to target consumer education and financial institutions incentives.

Before implementation, the World Bank sought the Mexican government's full support and commitment to the project. The government was eager to support the project, and had already committed a variety of resources towards an energy efficiency plan. Furthermore, the government took steps to pass legislation and enact policies on energy conservation. An institution framework was put in place through the National Commission for the Efficient Use of Energy, which had the sole purpose of promoting sustainable energy practices at residential and governmental levels. The project also asked for full support and cooperation from the Nacional Financiera (NAFIN), the Mexican Development Bank, in order to help handle the project's financial component. NAFIN also provided oversight and acted as the project's financial agent (The World Bank – Mexico, 2016).

A risk analysis and mitigation plan was developed in order to increase feasibility of the project. The largest identified risk was the lack of experience of the Trust Fund for Electricity Savings (FIDE), the implementing agency in Mexico. In order to overcome this risk, a training program was developed for FIDE employees. The other identified risk was maintaining a sustainable program once the free distribution of CFLs, vouchers, and financial incentives were terminated at the completion of the project. The World Bank worked with the Mexican government prior to project initiation in order to launch a communications campaign for consumers and promote policies that upheld energy efficiency practices. The commitment of the Mexican government to the project along with NAFIN's strong understanding of World Bank operating procedures allowed project coordination and risk management to proceed efficiently.

In April of 2013, a Midterm review (MTR) was conducted in order to track the progress of the project. The review found that the cost of the completed project components had been underestimated and that project disbursements were high. The project plan was altered to reduce remaining costs and determine the key issues that still needed to be addressed in order to complete the project successfully. The review identified a few areas of focus that still needed to be addressed including: recycling policies, social impact reporting mechanisms in indigenous communities, GEF fund allocation, and CO2 emissions savings measurement. Local banks also played an important supervisor role throughout the project's four-year implementation period;

the Country Office (CO) and Secretariat of Energy (SENER) played an important advisory role, especially in the 18 months leading up to project completion. The MTR also identified inconsistencies in reporting standards and led to the development of a single method for reporting energy savings and CO2 emissions avoidances (Independent Evaluation Group, n.d.).

Monitoring and Evaluation (M&E) was completed by a variety of institutions including SENER, FIDE, and NAFIN. In order to simplify the evaluation methods, the most important PDO and GEO were identified and used as the outcome indicator. Intermediate indicators were also identified in order to track smaller project component success. Upon evaluation the project was found to have no adverse social effects and minimal adverse environmental impacts; the adverse environmental impacts were counteracted by the environmental benefits being achieved through increased energy efficiency and recycling program initiatives.

After project evaluation, project relevance was given a rating of ‘High’. Project PDOs closely followed the Mexican government’s pre-existing five-year strategy on energy savings and complimented the government’s development objectives. Furthermore, the key project GEO aligned closely with the National Climate Change Strategy (ENACC) adopted by the Mexican government in 2007. Achievement of project PDOs and GEOs was similarly given a rating of

‘High’. The following chart shows achievement ratings by KPI and GEO:

KPIs	% Achieved
(A). Accumulated amount of energy saved	92.42%
(B). Number of IBs replaced with CFLs	101.78%
(C). Number of appliances replaced	106.44%
GEOs	
(A). Accumulated associated CO2 emissions reductions	98.72%

Figure 5: Achievement Rating

Project efficiency was determined by a post-completion financial and economic review. The review revealed a project Net Present Value (NPV) of \$1.6 billion, as determined by cost savings resulting from efficient electricity use and reduced CO2 emissions; a 6% discount rate

was used in valuating NPV. The economic rate of return was computed to be 62% and the financial internal rate of return was 9.01% (The World Bank – Mexico, 2016). The positive NPV and strong financial returns led to a project efficiency rating of ‘High’. Further assessment was completed in order to review bank and borrower performance. Figure 6 shows the areas assessed and the ratings provided:

Area Assessed	Rating
Bank performance in ensuring quality entry	Satisfactory
Quality of supervision	Satisfactory
Overall bank performance	Satisfactory
Government performance	Satisfactory
Implementing agencies performance	Satisfactory
Overall borrower performance	Satisfactory

Figure 6: Project Evaluation - Ratings by Project Area

All project areas achieved a rating of ‘Satisfactory’, lending to an overall project rating of ‘Satisfactory’.

c. Rampur Hydropower Project

History

In 2007, the World Bank granted a loan of US \$400 million to Satluj Jal Vidyut Nigam Limited (SJVN) in India. SJVN is a joint venture in India held by the Government of India and the Government of Himachal Pradesh. The loan covered the majority of the US \$670 million appraisal cost of a project to enhance the energy and mining sector of India’s Rampur region (The World Bank – Rampur, 2015). The project specifically focused on improving hydropower infrastructure to combat climate change. The project objectives were two-fold: to increase the dependability of India’s northern electricity grid by adding sustainable, low-carbon energy from hydropower, and to enhance SJVN’s ability to effectively organize environmentally, socially, and economically beneficial hydropower projects. The project consisted on three main components including constructing hydropower tunnels and penstocks to improve electricity generation, investing in the nearby Nathpa Jhakri Power Plant to increase its reliability and support the availability of more power, and implementing institutional reform in India to strengthen the country’s hydropower organization and implementation systems. The project

was completed 21 months late and came to a close in December of 2014 (Independent Evaluation Group, 2016).

Identifying the need

In the mid-2000s, over 300 million people in India were estimated to be without access to electricity (The World Bank – Rampur, 2015). A large portion of India’s population suffering from the shortage of electricity was concentrated in the Northern region of the country. The increasing demand for electricity paired with deteriorating infrastructure and devastating monsoons, led to an increasing social burden in the Rampur region of India. It was estimated that nearly 60% of Indian businesses depended on back-up generators to maintain operations and approximately 25% of the grid infrastructure was in need of repair (The World Bank – Rampur, 2015). At the time of project implementation, the main source of India’s power supply came from coal, contributing to a massive carbon footprint; in 2007, nearly half of India’s carbon emissions came from the power sector. Low carbon, renewable options were in demand, but the expertise to initiate and operate this type of project was unavailable. SJVN was identified as an emerging joint venture with potential to implement hydropower projects, however, the company had very limited experience and lacked the current capacity to develop complex, sustainable projects. Furthermore, the project complimented India’s National Electricity Policy passed in 2015 and advanced the Government of India’s Eleventh Five-Year Plan of 2007 through 2012. Finally, the project was consistent with the hydropower objectives in the World Bank’s Country Assistance Strategy (CAS) for India in fiscal year 2005 through 2008 (The World Bank – Rampur, 2015).

Project Development Objectives and Key Performance Indicators

Although the Rampur hydropower plant had a small energy generation capacity (412 MW) when comparing its contribution to the entire Northern Electricity Grid, the plant was located in a key position; the Rampur plant was constructed 139 meters downstream from the larger Nathpa Jhakri Power Plant (Independent Evaluation Group, 2016). The Rampur plant acted as a strategic conductor for the Nathpa Jhakri Power Plant’s energy generation, allowing the energy flow from Nathpa to be more reliability relayed throughout the entire power grid.

Therefore, project goals not only focused on energy generation in the Rampur plant, but also on maintaining significant energy output from Nathpa.

The World Bank’s goals focused on more than just increasing hydropower energy supply in India; the Bank also saw itself as an experienced partner which could help India to address the key challenges it faced in the development of sustainable hydropower plants; considering that the majority of untapped hydropower potential was located in the geologically complex Himalayan mountains region, advanced implementation models and solid hydropower development framework was needed to tap into India’s potential. Furthermore, the capital-intensive and risky nature of hydropower projects required strong financial support, constant oversight, and careful planning.

The Project Development Objectives (PDOs) included the development of the Rampur hydropower plant in order to increase electricity output, and the training of SJVN in order to promote the development of sustainable, effective hydropower in the future. The main beneficiaries of the project were identified as the population living within the Northern Regional Grid, SJVN, and the local population that benefited from increased jobs, roads, and community enhancement measures. The following chart shows the five Key Performance Indicators (KPIs)

used to measure the success of the project:

KPIs	Target
(A). Increase power availability to Northern region off-takers	1770 GWh
(B). Frequency in the Northern Electricity Grid is in the operating band of Indian Electricity Grid Code	90.30% of the time
(C). Number of days of outage of Nathpa Jhakri Project in wet season	24 days
(D.) Improvement in off-taker satisfaction with respect to SJVN service	Strong evidence of upward trend
(E.) Improvements demonstrated in social development surveys	Strong evidence of upward trend

Figure 7: Key Performance Indicators

The project was broken down further into nine intermediate outcome indicators. The careful delineation of the project came as a result of complications encountered by the World Bank in

past hydropower projects, including the Nathpa Jhakri Hydropower Project (NJHP) in India nearly a decade prior to the Rampur project (The World Bank – Rampur, 2015).

Preparation, Implementation, and Review

A complete analysis was completed prior to project approval. A preparation team was constructed and run by a significant number of individuals who had served on the NJHP in India about ten years prior to the Rampur project. The team's past experience with hydropower in India was seen as a valuable resource and allowed for a thorough preparation process. Internationally recognized experts in the field of hydropower were utilized to support the Bank's project development, creating a solid foundation for the project to grow. Preparation aimed at intertwining international good practice with Indian institutional framework and standards.

A large portion of preparation involved documenting, and in some cases quantifying, risk. Risk was broken into a few categories including: geological risk, environment risk, economic risk, social risk, and political risk. Sensitivity analyses were conducted in order to determine the projected delays and construction cost increases that could endure while still maintaining a financially and economically viable project. Political risk was reduced by the commitments from the Government of India and the Government of Himachai Pradesh to support the Rampur Hydropower Project (RHP); SJVN's ties as a government-owned joint venture also worked to further garner government support throughout the project's life (The World Bank – Rampur, 2015).

Throughout project implementation, the World Bank maintained a broad network of NJHP and RHP experts based in Washington D.C. and Delhi. This network was utilized as a consulting team and allowed for a strong, trustful working relationship between the World Bank and SJVN. SJVN exhibited cooperation and willingness to learn throughout the implementation process. The Indian joint venture worked closely with the World Bank to find innovative solutions, particularly relating to unexpected challenges in the RHP tunneling work. Furthermore, SJVN adopted proactive contract management policies to support the Bank's request for better project management.

Implementation support missions were conducted twice a year by the World Bank team, leading to the team's bi-annual site visits. However, during the key construction phases, the World Bank team would conduct site visits once a month. Periodic conversation with State Government Officials was also utilized to keep the project on track, and strong relationships with local media were maintained in order to control project perceptions in the local community. Finally, with the goal of maintaining strong connections with stakeholders, the World Bank altered its disclosure arrangements in order to allow for consistent status updates to be posted.

In 2010, a mid-term review (MTR) was conducted by the Bank. Upon review, large delays were identified and cost under runs were broken down by project components. The main contracts were renegotiated to allow for additional completion time. In October 2011, a level II restructuring was completed in order to allow for money reallocation and underestimated project components funneled the money that remained in excess (The World Bank – Rampur, 2015).

In the case of the Rampur Hydropower Project, the monitoring and evaluation (M&E) of project outcomes was slightly difficult to apply. The main area of conflict revolved around the second Key Project Indicator (KPI) — enhancement of frequency control in the Northern Electricity Grid. The frequency band on the northern grid was shifting due to factors beyond the jurisdiction of the project, preventing proper measurement. As an alternate form of evaluation, the Load Dispatch Center (LDC) was brought in to offer its expertise. The LDC evaluated the project independently and determined that the Rampur Hydropower Project would have a marginal contribution to the overall energy available, none-the-less, the project was important due to its ability to relay energy from the Nathpa plant. Additional M&E was conducted through use of off-taker surveys and safety reports. The project also sought to measure social impact by studying a control group of residents in a nearby city and a group of persons in the northern grid. Himachal Pradesh University conducted a baseline survey and a final impact report. The study showed increases in a variety of socioeconomic criteria including state of housing, assets, and income level. SJVN closely monitored the project by means of quarterly implementation reports and semi-annual overview reports (Independent Evaluation Group, 2016).

By project completion in 2014, the Rampur Hydropower Plant was fully operational and shown to operate at its target capacity of 412 MW. The plant was successfully harmonized with the Nathpa plant and enhanced the energy proliferation capacity of the Northern Electricity Grid. The number of outages at NJHP was reduced to 5 days per year, far exceeding the project target of 24 days per year. An impact assessment carried out after project completion showed satisfactory social impact; 87% of affected households reported their income had increased, and 99% of affected households reported an increase in income and/or assets (The World Bank – Rampur, 2015). SJVN has successfully developed internal controls and its project reviews were shown to have been reported accurately and with 100% compliance to World Bank standards. The joint venture has also seen a significant increase in overall satisfaction rating, as shown through off-taker satisfaction surveys. SJVN also has implemented a variety of training programs for staff and has incorporated the core international good practice standards utilized by the World Bank into its framework. The project will attain a 16.5% return on equity and a 14.1% economic rate of return, landing the project with an overall outcome rating of ‘Satisfactory’ (The World Bank – Rampur, 2015).

VI. Key Characteristics of a Tradable Social Bond

The three successful green bond case studies presented above showcase many good practices that are incorporated in the World Bank Framework, including extensive monitoring, research, evaluations, and planning. These projects were intensely watched from inception to completion. The extensive pre-evaluation also works to avoid green washing, and investors can be sure the green projects meet the highest standards. Although there are positives aspects that can be seen in this current framework, limitations were identified. The World Bank framework is extensive and, as the cases showcased, green bonds can be very socially and economically satisfying investments. The question then arises: if these investments provide good returns, why do not more investors put their money in them? The answer is that there is asymmetry in information regarding green bonds, and the market is lacking a vehicle that will provide investors with a safe, reliable return on green bonds. In the case of information asymmetry, it should be the role of institutional investors to provide private placements of green bonds. In regards to the current green bond vehicle, incorporating a more sophisticated, tradable financial vehicle could work to make green bonds much more attractive.

Limitations in current structure

One of the most obvious limitations of the current structure of green bonds, as seen through evaluation of the case studies, is the inadequate risk/return trade-off. All three projects were extremely risky and yet coupon payments were low or none existent. Furthermore, one can expect that it took a few years before the investments were profitable and the investor could start to receive a return. There are no real incentives for the investors to put their money in these vehicles unless they view this investment as a donation to a charity that may provide a small return; the current vehicle is concessionary. In order for green bonds to be more attractive, they need to offer investors a more reliable and stable return that compensates the investor for the projects high risk.

Another limitation of the current green bond structure is the unilateral approach taken when issuing these bonds. Considering the three above examples, two of them were funded solely by the World Bank and the third project was funded primarily by the World Bank and only enlisted the financial support of two other institutions when the project costs turned out to be higher than expected. A more sustainable approach would incorporate shared responsibility between government, institutions/foundations, and individuals. By incorporating all three of these stakeholder groups into the financial support of green-bond projects, project risk is spread among a larger pool of players, and there is a broader range of stakeholders invested in the success of the project. There is also a more attractive vehicle created for investors. Figure 8 shows the support structure necessary to create a more attractive green bond:

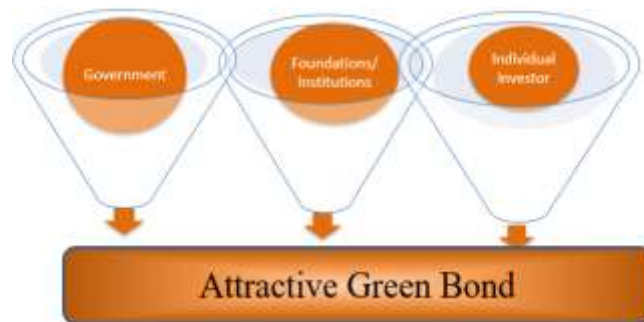


Figure 8: Proposed Green Bond Support Structure

Engaging governments, foundations/institutions, and individual investors into the green bond structure will allow each player to contribute to the creation of a successful green bond vehicle. Each player has a unique role that can decrease investor risk or increase investor return, creating a more attractive green bond vehicle. Governments can offer tax-breaks, institutions can offer their expertise, and crowd funding will offer the individual investor an option for investment.

The New Vehicle

An attractive green bond vehicle will need to offer investors a more attractive risk/return tradeoff. One method I propose in order to accomplish this is to adapt a revenue participation, or a quasi-equity, based vehicle. Instead of the current green bond vehicle which pays investors back from net income, a revenue participation based model reduces risk by paying investors straight from the top line — gross revenues. Figure 9 depicts the different types of responsible investing and shows how each type of investment can be concessionary or non-concessionary. By adopting a revenue participation model, impact investing vehicles like green bonds are more likely to be non-concessionary and attract more investors.

	Non-Concessionary	Concessionary
Negative Screening	Low, Fair	Low, Unfair
Environmental, social and governance (ESG)	Medium, Fair	Medium, Unfair
Impact Investing	High, Fair	High, Unfair

Figure 9: Types of Responsible Investing

*The first word in the matrix refers to the social benefit; the second word refers to the economic return. Unfair economic return refers to higher risk, less return, or a longer term than would otherwise be accepted.

Revenue participation models guarantee a fixed percentage of their future gross revenues goes directly to investors until a certain agreed upon rate is achieved by investors. A revenue participation impact note sponsored by the Social Enterprise Institute of Elizabethtown College agrees to pay the investor .8125% of gross revenues until the investor receives their initial investment plus an additional 135% of the principal. The company has been able repay investors within 72 months. This is effectively reducing investor risk as they will start to see returns as soon as revenue is generated, meaning investors will not have to wait until net income is achieved to get paid back. One important note, revenue participation investments do not guarantee that investors will get a certain return each year, they only stipulate the percentage of revenue that will be given straight to investors. This structure will effectively reduce risk for investors but at the same time allow the project to be self-sustaining regardless of its immediate success. Needless to say, revenue participation models will be most successful when revenues are high and relatively predictable. In order to identify the most attractive projects, I would propose for the adoption of a pre-screening evaluation of the projects using a method similar to the World Bank’s current structure. However, I would like to propose that in addition to the World Bank structure currently used, the framework should include an analysis of the roles other important players should play in the process, as well as, utilize revenue participation.

Considering many green bond finance projects, which focus in many cases on reducing existing costs and not increasing revenues, an attractive vehicle needs a payback structure that is more flexible than the traditional bond that requires the investee to pay fixed, semi-annual coupon payments. It is very likely green bond projects may not have enough net profit in the first couple years to pay a fixed coupon payment without the threat of default. Revenue participation investments bridge the gap between the equity and bond markets and if

applied to green bonds can provide the flexibility needed to allow the green bond market to be more successful.

Another aspect of my proposed new vehicle is the addition of a maximum payback period. The investor would be guaranteed to receive at least their original investment by this date. The length of the payback period should vary depending on the complexity of the project and the expected amount of time it will take the project to generate a positive net income. Regardless, the addition of this aspect will work to reduce risk so long as the project is healthy and profitable enough by the end of the period to pay back its investors without going bankrupt. Again, the inclusion of a vigorous pre-screening will be vital to ensure that the proposed project is capable of meeting the payback period. If a project does not generate the necessary profit by the expiration of the payback window, then the project risk is too high relative to the potential reward for investors.

Suggestions for further study include determining a more transparent, less subjective means for measuring social return on investment. Furthermore, additional research should be collected on revenue participation as a means of enhancing the social bond framework; revenue participation could be of vital aspect of the future social bond vehicle, and more research should be conducted regarding the potential role of revenue participation in this field.

VII. Conclusion

The creation of a more attractive green bond vehicle could pave the way for social justice in places all around the world. As social problems continue to plague our society, it is crucial that action is taken now. International organizations, governments, and charities do not have enough funds to solve the social problems around the world. An efficient bond vehicle can help pave the way for international peace, justice, and unity. By adopting the methods recommended in this paper, we can move one step closer to social peace.

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