



ISSUE BRIEF

CLEAN ENERGY FINANCE OUTLOOK: OPPORTUNITIES FOR GREEN BANKS AND GREEN BONDS IN CHILE

Acknowledgments

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About NRDC

The Natural Resources Defense Council is an international nonprofit environmental organization with more than 2.4 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world’s natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Montana, and Beijing. NRDC has worked in Chile since the nineties on various environmental and energy issues. NRDC is committed to working with stakeholders in Chile to generate and disseminate new information in order to help drive the dynamic growth of non-conventional renewable energy and energy efficiency for the benefit of Chilean citizens and their environment. Visit us at nrdc.org.

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INTRODUCTION

There is a broad consensus surrounding the need to increase the amount of clean energy in Chile’s electric grid. Nonconventional renewable energy (NCRE)^a and energy efficiency must play a leading role in the country’s energy future. As described in Chile’s national long-term energy policy, “Energía 2050,” the nation aims to generate at least 70 percent of its electricity from renewable sources by 2050, with a particular emphasis on solar and wind.¹ The 2014 Energy Agenda established a goal of reducing energy consumption by 20 percent by 2025 as compared with business as usual.² Moreover, at the 21st Conference of the Parties (COP21), the international climate change summit held in Paris in December 2015, Chile committed to reducing its CO₂ emissions per unit of gross domestic product by 30 percent, relative to 2007 levels, by 2030.³

Although Chile’s clean energy market has grown significantly in recent years, there are still barriers to the deployment of these technologies. In some subsectors, for example, clean energy project developers have trouble accessing financing at a reasonable cost. The types of projects and market segments that still face this obstacle include:

- Grid-connected NCRE projects when implemented by small and medium-size enterprises or when utilizing innovative technologies;^b
- Smaller-scale NCRE projects for distributed generation (net metering)^c or for self-supply^d at the residential, commercial, industrial, and agro-industrial level; and
- Energy efficiency projects.

For the purposes of this study, “clean energy” refers to these three categories of projects, based on the footnoted definitions.

International experience has shown that green banks and green bonds have the potential to help close clean energy financing gaps. The advantages of green banks include improved credit conditions for clean energy projects, aggregation of small projects to reach a commercially attractive scale, creation of innovative financial products, and market expansion through dissemination of information about the benefits of clean energy. Green bonds can provide long-term and reasonably priced capital to refinance a project once it has passed through the construction phase and is operating successfully. They can also be used to capitalize a green bank and build a portfolio of green assets to attract institutional investors in the capital market.

Green banks and green bonds have been shown to lead to profitable investments and attract private capital. They can also help implement clean energy policies, meet greenhouse gas reduction targets, and support economic development. The Green Bank Network (GBN)—a new initiative launched by six green banks in conjunction with NRDC and the Coalition for Green Capital—was created to help catalyze green investments. GBN’s main objectives are to facilitate the exchange of information and experience among existing green banks, help create new green banks, and leverage more private capital.⁴

This issue brief is based on the study “Clean Energy Finance Outlook: Opportunities for Green Banks and Green Bonds in Chile?” which was commissioned by NRDC. Preparation for this study included interviews with 34 public and private players in the Chilean electricity market and representatives from the domestic and international financial markets.

THE EVOLUTION OF CLEAN ENERGY FINANCE IN CHILE

Until 2010, Chile experienced low levels of investment in—and, therefore, implementation of—clean energy projects. This was largely due to the fact that the necessary funding for clean energy projects was essentially limited to the big players in the electricity market who could provide guarantees and corporate backing. However, starting in 2010, the NCRE sector experienced an unprecedented boom that resulted in market growth and expanded financing options. This upturn was the result of several factors, including improved market conditions, lower investment costs, and regulatory reforms.⁵

a In Chile, “nonconventional renewable energy” refers to all renewable technologies except hydroelectric projects with an installed capacity greater than 20 megawatts.

b Innovative technologies” refers to generation technologies based on geothermal energy, ocean power, storage technologies, *inter alia*.

c “Distributed generation” or “net metering” refers to any project incorporating clean technologies to replace traditional energy consumption and to eventually sell surplus energy produced by that project back into the grid.

d “Self-supply” refers to any initiative in which clean technologies replace traditional energy consumption for one’s own use.

As a result, Chile became one of the most attractive places in the world to invest in clean energy, particularly wind and solar projects. According to a report from the National Center for Innovation and Development of Sustainable Energy, or CIFES (the acronym for its Spanish name), in March 2016 the installed capacity of NCRE power plants represented 11.97 percent of the country’s total installed generation capacity, compared with 2.6 percent in 2007. These resources currently provide about 11.19 percent of the energy going into the electric grid every month.⁶ Table 1 below shows an estimate of investment and financing for NCRE projects carried out from 2007 through 2015. In the coming years it is projected that the financing needs for clean energy projects will reach between US\$1 billion and US\$1.4 billion per year.⁷

However, 2015 brought evident changes in market conditions, with reduced electricity demand growth in the manufacturing and mining sectors and a significant drop in energy prices. These changes have contributed to a slowdown in the expansion of NCRE projects, partly due to lower development projections. At the same time, reduced electricity demand has led to fewer power purchase agreements (PPAs) offered by companies that traditionally use such contracts. These changes have resulted in an increased perception of risks associated with NCREs. Banks and financial institutions have become more reticent and have reestablished stricter funding requirements. Therefore, a significant amount of NCRE projects under development could suffer implementation delays or might not advance at all.⁸

FINANCIAL GAPS IN THE CLEAN ENERGY MARKET

Clearly, barriers and significant financing gaps for clean energy remain. In some subsectors, the commercial potential for clean energy solutions exists, but capital is not flowing. Therefore, project developers cannot access financing at a reasonable cost. These subsectors are seen as high risk—a perception that results in higher financing costs and thus acts as a barrier to the development of these types of projects.

Many of the NCRE projects necessary to reach Chile’s targets have relatively high up-front costs, despite the absence of fuel costs (except in the case of biomass). Therefore, they are especially sensitive to the availability of capital. Energy efficiency also faces funding challenges for many reasons. Indeed, lack of access to flexible financing options is one of the main barriers to the further development and implementation of efficiency projects. Therefore, the introduction of more financing options could play a key role in encouraging further growth in Chile’s clean energy sector.

Implementation of a green bank, or a green bank-like entity, and development of a green bond market could help close the aforementioned gap. A green bank can help traditional financial institutions remedy the sector’s lack of experience and dearth of clean energy market-responsive financing instruments. Through collaboration and risk mitigation, a green bank can also help financial institutions reach stakeholders, projects, and places that have been underserved. Green bonds represent another mechanism to channel low-cost financing to clean energy. These tools could help Chile meet its clean energy and carbon emission reduction goals. Table 4 (pages 10 to 12) shows key obstacles to clean energy finance in Chile, the benefits of green banks and green bonds, and possible applications in Chile.

TABLE 1: ESTIMATE OF INVESTMENT AND FINANCING FOR NCRE PLANTS INSTALLED, 2007–2015

TECHNOLOGY	CAPACITY (MW)	AVERAGE ESTIMATED COST/MW (B US\$)	TOTAL ESTIMATED INVESTMENT (B US\$)	ESTIMATED VOLUME OF FINANCING (B US\$)
Biomass/Biogas	329	\$2.970	\$977	\$684
Wind	907	\$2.250	\$2,042	\$1,429
Solar Photovoltaic (PV)	713	\$2.590	\$1,847	\$1,293
Hydro (<20)	286	\$3.100	\$886	\$620
Total	2,235	\$2.728	\$5,752	\$4,026

Source: Adapted from information from CDEC-SIC, CDEC-SING, CIFES, “Energía 2050.”

WHAT ARE GREEN BANKS AND GREEN BONDS?

GREEN BANKS

Green banks are public or semipublic financial institutions that facilitate access to financing at a reasonable cost and generally with longer maturities for clean energy projects. They focus on developing liquid financial markets for local clean energy projects whose development is constrained by financing costs. These institutions leverage various public funds and use a wide range of financial products to attract private investment. These products include direct long-term loans with below-market interest rates, credit enhancement techniques (e.g., insurance or guarantees), structured investment funds, subordinated debt, investment in existing funds, and bond issuances (to refinance bank investments).

Additionally, green banks can:

- Warehouse a set of smaller-scale projects for the purpose of securitizing them once a commercially attractive scale is reached,
- Standardize contracts to facilitate project aggregation, and
- Disseminate information and data about clean energy technologies and green financing mechanisms to expand investor awareness (referred to as “open-source” banking).

A key advantage of green banks is their capacity to adapt to the local market. To overcome financing barriers, they can offer a diverse set of financial mechanisms and adjust them to the type of project or interested investor (Table 2 on pages 3 and 4) shows examples of investment structures. Green banks seek not only to increase the total investment in the short term, but also to direct future flows of private investment into clean energy projects. A green bank’s mission, therefore, is to accelerate the maturation of clean energy markets through financial innovation. In addition, green banks can leverage public funds, which are usually limited, to attract significantly more private capital, strengthening their overall impact. For example, for every US\$1 that the Connecticut Green Bank invests, it attracts US\$10 in private investment.⁹

TABLE 2: EXAMPLES OF GREEN BANK PRODUCTS

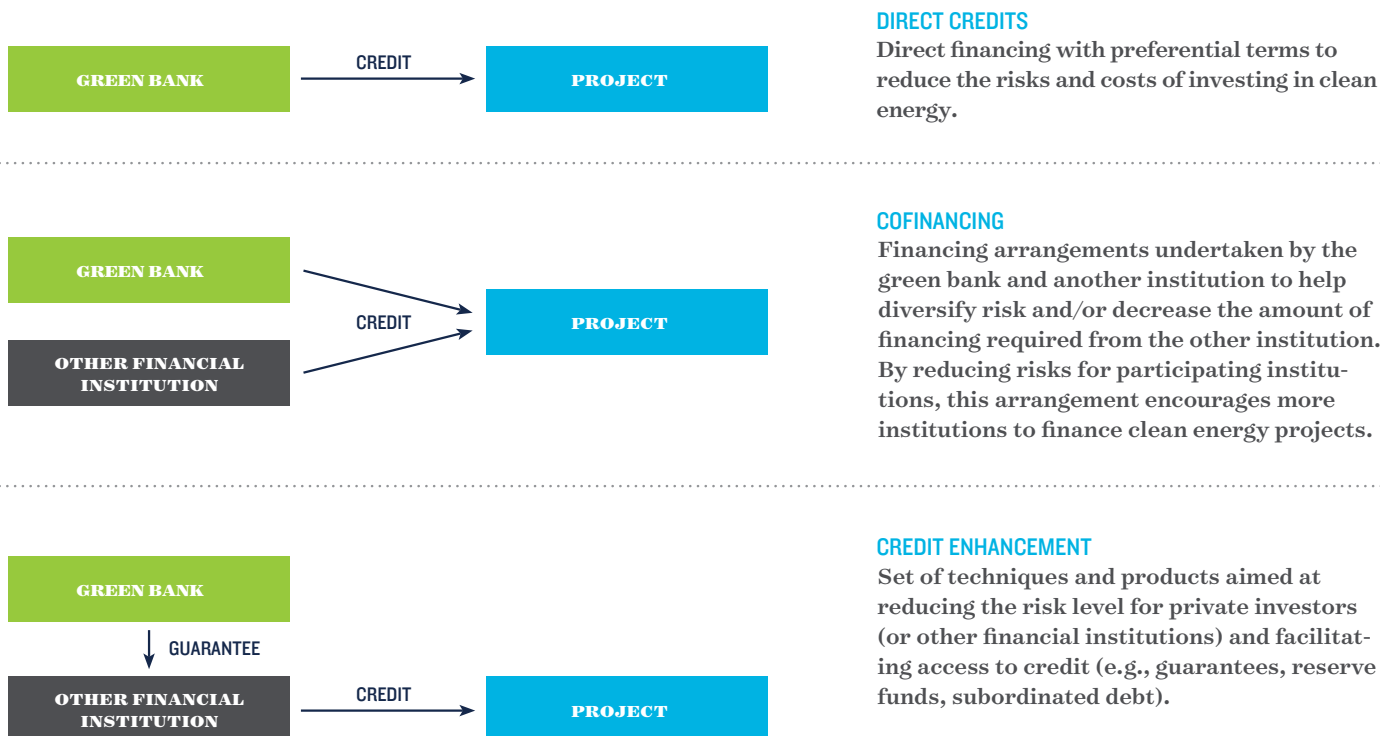
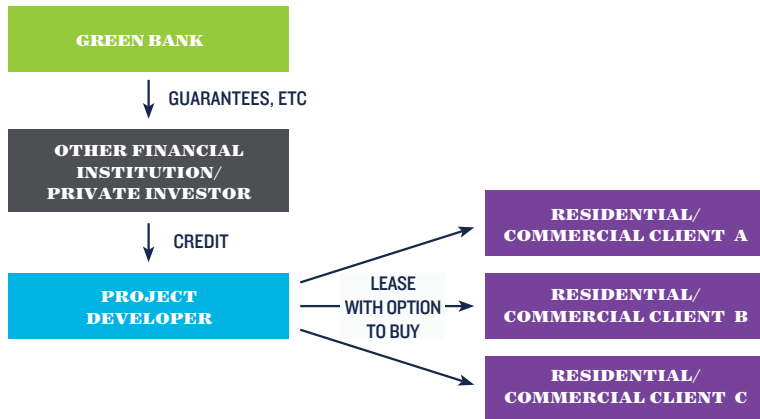
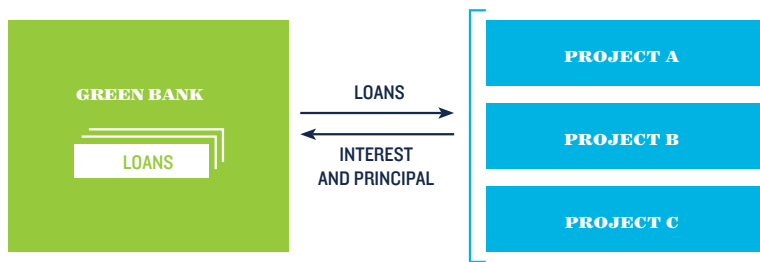


TABLE 2: EXAMPLES OF GREEN BANK PRODUCTS



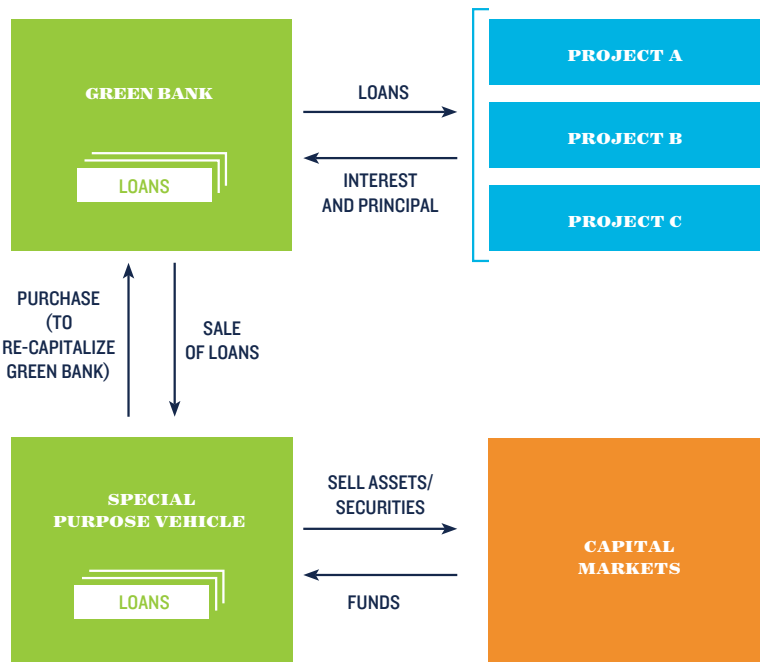
LEASE WITH OPTION TO PURCHASE

Arrangement in which a green bank provides cofinancing, guarantees, or other credit enhancement techniques to encourage project developers to offer leasing contracts to its clients. Clients then pay a monthly fee to lease energy efficiency solutions or self-supply systems within a defined time span. In the case of self-supply systems (e.g., solar panels), clients receive the power generated at no additional cost. At the end of the leasing period, customers generally have the option to buy the products and equipment or sign another lease. This arrangement helps encourage investment in clean energy solutions by familiarizing consumers with the products while reducing or even eliminating their up-front costs.



WAREHOUSING

Near-term financing that allows the green bank to aggregate a number of small-scale projects with the goal of eventually selling them off as securities. Aggregating loans or other financing assets to sell together this way can help lower transaction costs and bring smaller projects to a scale that is attractive to private investors, who often prefer purchasing a single portfolio of assets rather than many small assets.



SECURITIZATION

Process by which illiquid assets such as longer-term loans are transformed into marketable securities, which are more liquid and thus far easier to sell in the open market than individual loans. This helps increase the availability of lower-cost financing through capital markets (e.g., through green bonds). After the initial warehousing stage, the green bank transfers the assets to a special purpose vehicle (SPV), a legal entity that holds the assets on its balance sheet and issues the securities. The SPV then receives the proceeds from the securities issuance and transfers them back to the green bank, thereby recapitalizing it. Investors are remunerated via the interest income generated through loan repayments. The bank is therefore a mediator but does not assume the credit risk after the warehousing period. This financing system helps grow the market, reduce financing costs, and reach a more diverse group of investors.

GREEN BONDS

Green bonds operate like conventional bonds, except with the stipulation that funding be used only for “green” projects, such as clean energy. Like conventional bonds, green bonds are debt instruments offered to the market for a fixed term and usually at a fixed interest rate in order to raise capital to finance projects. Green bonds may be issued by multilateral development banks, government agencies, municipalities, financial institutions, and private enterprises.

Overall, green bonds will offer greater benefits to larger NCRE projects because bond issuances (both conventional and green) become profitable only on a large scale. However, it is also possible to aggregate small-scale renewable energy or energy efficiency projects into one portfolio so that these initiatives can also access capital in the bond market (mainly through asset-backed securities).¹⁰

In addition to facilitating access to various sources of capital to promote the development of sustainable projects, green bonds provide a way to measure and verify compliance with certain environmental performance standards. The key to making this market work is ensuring transparency and accountability by: 1) defining the use of funds; 2) defining the criteria for project evaluation and selection, 3) managing the proceeds from the bond issuance to ensure they are used only for projects that meet these criteria, and 4) reporting on the use of funds and the “green performance” of funded assets.¹¹ Some green bond investors also seek third-party verification to ensure that issuers are following appropriate procedures and that financed projects meet the standards developed by independent expert organizations, such as the Climate Bonds Initiative (CBI).¹² Figure 1 shows the steps for the issuance of green bonds.

In general, green bonds fall into the following four categories:¹³

- **General obligation bonds:** The proceeds from the bond issuance are used for green projects. These bonds are guaranteed by all of the financial resources of the issuer.
- **Revenue bonds:** The proceeds from the bond issuance are used for green projects. These bonds are backed by revenue generated by the issuer, e.g. through taxes and fees.
- **Project bonds:** The proceeds from these bonds are limited to financing specific underlying green projects. These bonds are secured only by the assets and the revenue stream of those specific projects.
- **Securitized bonds:** The proceeds derived from these bonds are used 1) for green projects, or 2) directly for underlying green projects. These bonds are backed by assets that have been grouped as collateral.

FIGURE 1: STEPS FOR ISSUING GREEN BONDS



INTERNATIONAL EXPERIENCE WITH GREEN BANKS AND GREEN BONDS

International experience has shown that green banks and green bonds can lead to profitable investments. They also attract private capital and expertise, assist in job creation, and help meet government energy and climate goals.

GREEN BANKS

Green banks exist in places as diverse as the United Kingdom; Australia; Malaysia; Japan; and several U.S. states, including New York, California, Connecticut, and Hawaii. Launched at COP21, the GBN facilitates the exchange of information and experience among existing green banks and governments that seek to develop new institutions.¹⁴

The **UK Green Investment Bank (UKGIB)** and its offshore wind project investment program is one success story. Through the wind program it has participated in financing projects with a total installed capacity of 2.9 GW. After identifying a shortage of capital for offshore wind projects, the program has contributed to the industry's growth in the United Kingdom. And by making its investments under commercial terms, the UKGIB has proved to private investors that these projects are both viable and attractive.¹⁵ The UKGIB also actively invests in energy efficiency solutions, waste and bioenergy, and onshore renewable energy projects. As of March 2016, the UKGIB had invested in 66 green infrastructure projects and 7 funds. The institution has committed £2.6 billion (US\$3.6 billion) directly to transactions with a value of £10.6 billion (US\$15.2 billion).¹⁶

The **Connecticut Green Bank (CTGB)** offers various incentives and low-cost financing for clean energy projects. One of its initiatives is the Commercial Property Assessed Clean Energy (C-PACE) program, which aims to provide long-term financing to owners of commercial, industrial, or multifamily residential properties so they can improve their buildings and reduce energy costs through energy efficiency solutions without any up-front investment. Under this program, building owners can finance improvements through a voluntary special assessment on the property's tax bill. The capital invested by the program is secured by a lien on the property, allowing the cost of the improvement to be paid over time. This lowers the risk level associated with the investments, making these projects more attractive to the private sector.¹⁷

In Australia, the **Clean Energy Finance Corporation (CEFC)** created a bioenergy fund to unblock and accelerate investment in this sector. The fund supports a wide range of projects that produce clean energy in agriculture, forestry, and mining waste management and hopes to raise more than AUD\$200 million in capital (US\$153 million). The CEFC recognized that many of the sector's opportunities are small-scale initiatives that have trouble obtaining financing—a problem that the corporation seeks to resolve by attracting private capital.¹⁸

In 2013, the **Green Infrastructure Authority** of Hawaii established the Hawaii Green Energy Market Securitization (GEMS) program, which aims to put clean energy technologies within reach of all Hawaiians. While the deployment of clean energy had advanced significantly in Hawaii by that time, some citizens still did not have access to traditional financing for clean energy solutions, particularly renters and those with low credit scores. Consequently, one of the program's main objectives is to close this market gap and reach a wider customer base. The program has developed innovative products to finance solar photovoltaic (PV) home systems without the need for large up-front investments. Program funding originally came from a bond issuance of US\$150 million. The bonds are secured through a "green infrastructure fee" on utility bills. Although only the initial phase of the program has been launched to date, it is worth mentioning as an example of the use of innovative products for projects that are difficult to finance.¹⁹

Finally, in Japan, the **Green Finance Organization** has created a Green Fund to promote local investment in low-carbon initiatives. Its objective is to solidify the business case for low-carbon projects by making equity investments in these projects. The fund increases its own equity by attracting private capital, including investments and loans from local financial institutions. Investments are made in projects that not only reduce greenhouse gas emissions but also stimulate local economies. This is achieved by working with locally based companies and focusing especially on the project development phase during which there is no revenue generation.²⁰

GREEN BONDS

The green bonds market was created in 2007, making them a relatively new way to invest in clean energy projects. While most green bonds were initially issued by development banks, in recent years the green bond market has seen sustained growth with the participation of public and private institutions. In 2014, new green bond issuances totaled more than US\$38.8 billion.²¹ Today green bonds are issued by multilateral organizations such as the World Bank, the International Finance Corporation, the European Investment Bank, and the Germany-based KfW Development Bank. Government agencies, municipalities, commercial banks, and energy companies have also issued green bonds. Cities as diverse as Johannesburg, New York, Spokane, Tacoma, Gothenburg, and Washington, D.C., have issued green bonds to finance low-

carbon transportation and energy projects and to improve water quality and management.²² Through green bonds, cities can attract more diverse investors.

Although the green bonds market is new, it is important to expand it to facilitate future clean energy financing. It is worth noting that as banking regulations from the Basel III accords advance, they will put additional pressure on banks' balance sheets. Green bonds can help by increasing liquidity. For banks, it will be easier to finance clean energy projects and meet the requirements of Basel III if there is a functioning market for green bonds. In particular, there are great opportunities for green bonds in emerging markets due to the high growth potential of clean energy and the need for greater liquidity to meet Basel III.²³ Therefore, although green bond activity has been concentrated mainly in European and North American markets, examples are also emerging in Latin America.

In October 2015, the Mexican development bank **Nacional Financiera** (NAFIN) issued the nation's first green bond to finance renewable energy initiatives worth US\$500 million. NAFIN will use the proceeds to finance nine wind projects in Mexican states where private companies are beginning to invest. The issuance was highly successful, registering demand of more than US\$2.5 billion and attracting investors from Latin America, Europe, Asia, and the United States, including specialized green investment funds and institutional investors. In addition to expanding and diversifying the investor base, the NAFIN bond was the first Latin American green bond to achieve international certification by the Climate Bond Standards Board. As mentioned above, the CBI standards are evaluation tools that help investors identify high-quality climate solutions in need of financing.²⁴

Moreover, in December 2014, the private company **Energía Eólica S.A.** issued Peru's first corporate green bond, worth US\$204 million. This bond is an example of how green bonds enable low-cost project refinancing while attracting institutional financiers seeking investments with low risk and steady income flow. The bond allowed Energía Eólica to repay existing loans and credits used during the construction of two wind farms, which have a combined installed capacity of 114 MW. The projects have 20-year PPAs with the government, and the bonds are guaranteed by the company's present and future assets and its earnings. Although the bond attracted the participation of international investors, more than 80 percent of the notes went to pension funds and insurers from Peru.²⁵ At the regional level, the Inter-American Development Bank (IDB) approved a financing package of up to US\$450 million to establish an Energy Efficiency Green Bond in Latin America that will also receive up to an additional US\$217 million from the Green Climate Fund. By issuing securities backed by green assets, this initiative will provide an alternative financing mechanism for private energy efficiency projects, mainly those sponsored by energy service companies (ESCOs). Generally, funding for ESCOs is very limited, with high costs and short terms that are not feasible for energy efficiency projects. This IDB initiative will help overcome these common barriers. Green bonds seek to absorb the risks and initial costs (including costs to establish new financial structures and to build capacity), thus helping to develop the market and to leverage private funds. The bond structure includes a first phase to warehouse projects from several ESCOs, and then a second phase to securitize them. To facilitate the aggregation and securitization of these projects, they must be standardized. The project is being implemented first in Mexico and then will be replicated in the Dominican Republic, Jamaica, and Colombia.²⁶

OPPORTUNITIES FOR GREEN BANKS AND GREEN BONDS IN CHILE

According to our preliminary analysis, establishment of a green bank, or green bank-like entity, and development of a green bond market could help mobilize capital toward sectors that traditional financing does not currently reach. These two green finance solutions could encourage private investment and help standardize funding practices, thereby facilitating the implementation of clean energy projects in Chile. Green banks can leverage existing tools and adapt them or even create new products tailored to each sector. For example, targeted programs could spur clean energy deployment in rural communities. Furthermore, the implementation of such initiatives could help decentralize access to financing, which is currently concentrated in the Santiago metropolitan region. Given that a significant portion of the projects, industries, and sectors that could potentially benefit from a green bank or green bonds are located in other regions, innovative tools would help develop clean energy throughout the country.

It should be noted that the development of more clean energy in Chile would mean a greater diversification of the national electrical generation capacity, which should, in turn, help mitigate sharp fluctuations in energy prices due to fuel cost volatility and variations in hydrological conditions. Finally, an increased proportion of clean energy in the electric grid would bring Chile closer to its energy efficiency and climate change mitigation goals.

CONCLUSIONS AND RECOMMENDATIONS

For Chile to truly benefit from a diversified grid, a variety of clean energy projects must be systematically and continuously

developed and financed. These include utility-scale NCRE projects; small and medium-size residential, commercial, and industrial solutions; and energy efficiency options. Green banks and green bonds are two possible solutions to boost investment in these kinds of projects.

A green bank could be created in conjunction with existing Chilean institutions or agencies to take advantage of the country's previous experience. Table 3 (on page 9) shows the various stages of implementing a green bank. In addition, we recommend the following steps:

- Identify possible gaps in financing options already offered by various government institutions that could be filled by a green bank.
- Educate and train relevant stakeholders about green banks.
- Identify and define the subsectors or technologies that could benefit from a Chilean green bank and its specific program(s).
- Conduct a detailed legal analysis on: i) the feasibility and desirability of a green bank to take one form or another, including whether an existing institution should be transformed into a green bank; and ii) regulations that would impact a green bank and potential necessary regulatory changes for implementation in Chile.

For green bonds, we recommend the following next steps:

- Develop and disseminate information for bond issuers and investors specifically about green bonds, how to create them and market them based on appropriate standards, and the benefits for issuers.
- Facilitate the aggregation of projects to achieve the necessary scale to make them profitable (green banks and development institutions are particularly suited to help with the initial aggregation).
- Help to create initial green bond issuances through development institutions to serve as examples of the process and products (e.g., the NAFIN green bond).
- Examine possible legal and regulatory changes to create preferential treatment for green bonds that can incentivize their use (e.g., reduced withholding tax on green bonds to make them more attractive than conventional bonds).

Finally, Chile can collaborate with the international networks currently promoting and developing these green finance solutions to benefit from existing experience and expertise.



TABLE 3: GREEN BANK IMPLEMENTATION PHASES (INTERNATIONAL EXPERIENCE)

PHASE 1 SCOPING AND EDUCATION	PHASE 2 ANALYSIS AND RESEARCH	PHASE 3 ESTABLISHMENT	PHASE 4 OPERATION
<p>EXPLORATORY RESEARCH:</p> <ul style="list-style-type: none"> • Overview of local clean energy market (potential, trends, etc.) • Assessment of government support • Analysis of existing financial mechanisms and institutions and gaps that can be filled by a green bank • Identification of stakeholders <p>STAKEHOLDER EDUCATION:</p> <ul style="list-style-type: none"> • What is a green bank? • What are potential benefits? • Differences between green banks and existing local mechanisms/entities • International experience with green banks 	<p>MARKET ANALYSIS:</p> <ul style="list-style-type: none"> • Expected impact of green bank on local clean energy market • Which specific market sectors would benefit and how? <p>LEGAL ANALYSIS:</p> <ul style="list-style-type: none"> • Determine appropriate legal form for green bank • Does an appropriate structure or institution already exist? <ul style="list-style-type: none"> • YES: What changes are needed? • NO: What new legislation is needed to create one? • What regulatory changes are necessary? <p>FINANCING ANALYSIS:</p> <ul style="list-style-type: none"> • Amount of funding needed to establish a green bank • Source of funding • Amount of future funding needed to make the green bank sustainable 	<p>PRELIMINARY STEPS:</p> <ul style="list-style-type: none"> • Connect with existing green banks to learn from their experience (e.g., Green Bank Network) • Legal creation of bank <p>BUILD INSTITUTION:</p> <ul style="list-style-type: none"> • Definition of goals and capabilities • Initial capitalization • Staffing, office, etc. <p>PRODUCT DEVELOPMENT:</p> <ul style="list-style-type: none"> • Work with investors and other stakeholders to develop new products 	<p>LAUNCH OPERATIONS:</p> <ul style="list-style-type: none"> • Acquire customers • Launch products in marketplace • Lending in partnership with investors <p>RECAPITALIZATION:</p> <ul style="list-style-type: none"> • For example, loan repayments, green bond issuance <p>ONGOING OPERATIONS:</p> <ul style="list-style-type: none"> • Continually reassess market gaps and private investment success to modify products and interventions • Manage and monitor loans and other financing facilities
<p>PRIMARY STAKEHOLDERS:</p>	<ul style="list-style-type: none"> • Civil society groups • Renewable energy industry associations • Energy efficiency industry associations • Consumer protection groups 		<ul style="list-style-type: none"> • Relevant government ministries (energy, environment, finance) • Existing government financial institutions • Commercial/private lenders

TABLE 4: POTENTIAL GREEN BANK AND GREEN BOND SOLUTIONS TO OBSTACLES TO CLEAN ENERGY FINANCE

BARRIERS TO FINANCING	EXAMPLES OF GREEN FINANCING SOLUTIONS		INTERNATIONAL EXAMPLES	POSSIBLE APPLICATIONS IN CHILE
	GREEN BANK	GREEN BOND		
<p>NCRE PROJECTS SPONSORED BY SMALL AND MEDIUM-SIZE ENTERPRISES These companies often do not have the ability to offer guarantees, equity, track record, etc. Also, the high cost associated with the process of project finance* hinders access to resources.</p>	<ul style="list-style-type: none"> • Direct equity investment and loans to build track record • Risk mitigation through credit enhancement tools such as guarantees, loan loss reserves • Warehousing, contract standardization, and securitization to enable transactions 	<p>Once a project is built, green bonds provide an opportunity to refinance the project at a lower cost.</p> <p>Type of bond: Project bond</p>	<p>To address a gap in the availability of capital for smaller-scale projects, the UK Green Bank (UKGIB) committed a total of £80 million to two fund managers to invest in biomass projects that require less than £43 million. The fund managers were responsible for raising at least a matching amount from private-sector investors. These investments are helping to demonstrate to potential investors that there are appropriate returns available in the sector.²⁷</p>	<ul style="list-style-type: none"> • First-time NCRE projects (solar, biomass, wind, mini-hydro) sponsored by small and medium-size enterprises
<p>PROJECTS WITH INNOVATIVE TECHNOLOGIES Lack of familiarity with a project's technology contributes to banks' perception that the project is riskier, making it difficult and/or expensive to access credit.</p>	<ul style="list-style-type: none"> • Direct equity investment and loans to help jump-start technologies that are new to the market • Risk mitigation through credit enhancement tools (e.g., guarantees) to reduce losses to commercial banks in the event that a technology or project does not perform as expected • Sharing of information and data about project technology and performance to help expand the market 	<p>Green bonds are not the most appropriate tool for new technologies initially since they are geared toward mature technologies and low-risk investments. As a technology matures, there may be future opportunities for green bonds.</p>	<p>To accelerate the development and commercialization of an innovative wave power technology, the Clean Energy Finance Corporation (CEFC) provided the developer with an AUD\$20 million five-year loan facility (credit line) secured against the company's assets. For this transaction, CEFC developed a new financing structure designed to lower the financing risks. The new product combined a corporate loan with project finance. The transaction served as a model for private-sector lenders, and the developer was able to refinance and replace CEFC's loan facility with one from the Commonwealth Bank of Australia, representing the country's first wave energy financing deal by a commercial bank.²⁸</p>	<ul style="list-style-type: none"> • New energy storage technologies • First-generation marine energy projects • Risk mitigation for geothermal energy

* Financing method under which banks agree to give credit for the execution of a specific project based on that project's future cash flow.

TABLE 4: POTENTIAL GREEN BANK AND GREEN BOND SOLUTIONS TO OBSTACLES TO CLEAN ENERGY FINANCE

BARRIERS TO FINANCING	EXAMPLES OF GREEN FINANCING SOLUTIONS		INTERNATIONAL EXAMPLES	POSSIBLE APPLICATIONS IN CHILE
	GREEN BANK	GREEN BOND		
<p>SMALL PROJECT SIZE This results in a general lack of interest from financial institutions. Also, developers are generally unable to provide guarantees or participate with equity. There is also a lack of targeted financial instruments.</p> <p>FINANCIAL INSTITUTIONS LACK TECHNICAL/ OPERATIVE KNOWLEDGE There is a significant lack of information regarding the potential of sustainable energy use. Furthermore, financial institutions have difficulty perceiving the economic benefits of these projects. In addition, in some cases there is no experience with financial instruments to channel resources toward these projects.</p>	<ul style="list-style-type: none"> • Financing and credit enhancement • Aggregation/ warehousing of multiple small projects to reduce transaction costs and achieve project scales that are commercially attractive • Standardization of contracts to facilitate aggregation 	<p>After aggregating several small projects, a green bank can issue a green asset-backed security.</p> <p>Type of bond: Securitized bond</p>	<p>The CEFC has worked with financiers and energy service providers to create a range of financing options for agribusinesses so they can generate power on-site and reduce their electricity bills. For example, the CEFC and National Australia Bank (NAB) cofinanced an innovative waste-to-energy project at a poultry business. Nearly half of the AUD\$2.86 million project was financed by NAB, and the balance was financed by CEFC, the Australian government, and the company. CEFC and NAB have also cofinanced a project by Australia's largest beef company to install solar PV units across 15 sites.²⁹</p>	<ul style="list-style-type: none"> • Residential or commercial-scale projects • Small-scale projects in rural communities (<3 MW) • Self-supply for industry and agribusiness sectors (e.g., dairy, meat production)
	<p>UNFAMILIAR TECHNOLOGY: Connecticut Green Bank (CTGB) helped research small-scale Archimedes screw hydro turbines already deployed in Europe and is in the process of designing a financing structure that will help implement the technology in the local market. Once a deal moves forward, CTGB will track performance and make information available.³⁰</p> <p>UNFAMILIAR FINANCING STRUCTURE: The CTGB Solar Lease program was a residential and commercial solar PV fund geared toward solar installers. It used US\$9.5 million from CTGB, including US\$3.5 million of federal funds, to enhance credit to lower the risk for private investors and attract an additional US\$50 million of private capital.³¹</p>	<ul style="list-style-type: none"> • Solar rooftop projects • Innovative mini-hydro projects • Net metering projects 		

TABLE 4: POTENTIAL GREEN BANK AND GREEN BOND SOLUTIONS TO OBSTACLES TO CLEAN ENERGY FINANCE

BARRIERS TO FINANCING	EXAMPLES OF GREEN FINANCING SOLUTIONS		INTERNATIONAL EXAMPLES	POSSIBLE APPLICATIONS IN CHILE	
	GREEN BANK	GREEN BOND			
Energy efficiency projects	<p>DIFFICULTY PERCEIVING ECONOMIC BENEFITS Financial institutions often do not know how to measure, verify, and quantify the economic benefits of implementing these projects. Likewise, there is a belief that the payment periods of these investments are very long.</p>	<ul style="list-style-type: none"> • Risk mitigation (credit enhancement) for commercial banks in initial transactions • Sharing of best practices on measuring/quantifying benefits of a project • Standardization to reduce costs of individual projects • Reporting on project outcomes 	<p>Using a standardized contract, a green bank can aggregate a series of energy efficiency projects that can be sold as a portfolio to other investors/banks.</p> <p>Type of bond: Securitized bond</p>	<p>In 2014, CTGB executed the first securitization of commercial energy efficiency assets. CTGB aggregated and sold US\$30 million of bonds backed by its portfolio of C-PACE loans (to fund energy improvement projects in commercial building). The portfolio also included 750 kW of solar PV systems. The proceeds of the bond issuance were used to recapitalize the green bank so it could fund new projects.³²</p>	<ul style="list-style-type: none"> • Any energy efficiency project or solution at the residential, commercial, or industrial scale • Residential green building projects • At the industrial scale, there is a wide margin and opportunities for energy efficiency projects in general
	<p>NASCENT DEVELOPMENT OF ENERGY SERVICE COMPANIES (ESCOs) Financial institutions are still not entirely familiar with the ESCO model, which hinders their access to credit.</p>	<ul style="list-style-type: none"> • Standardization to help with aggregation • Warehousing • Securitization • Credit enhancements (e.g., warranties) 			

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