

Chile Renewable Energy Self-Supply
and Energy Efficiency Program (RESSEE)
Preparation Grant Proposal

A Joint IDB/IFC Private Sector Proposal
for Submission to the CTF Trust-Fund Committee

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<i>Name of Project or Program</i>	Chile Renewable Energy Self-Supply and Energy Efficiency Program Preparation Grant
<i>CTF amount requested</i>	USD 213,000 grant for IFC-executed activities USD 740,000 grant for IDB-executed activities USD 10,500 fee for IFC implementation costs USD 36,500 fee for IDB implementation costs TOTAL: USD 1,000,000
<i>Country targeted</i>	Chile
<i>Indicate if proposal is a Project or Program</i>	Private Sector Preparation Grant

EXECUTIVE SUMMARY

1. By submitting this CTF preparation grant proposal, the Inter-American Development Bank (IDB) and the International Finance Corporation (IFC) seek to further develop the Chile Renewable Energy Self-Supply and Energy Efficiency Program (RESSEE) included in the CTF Chile Investment Plan.
2. The grant support for USD 1 million includes five activities: (1) Market development, intended to define the target market and to develop concrete actions to reduce the entry barriers for energy efficiency (EE) and renewable energy (RE) self-supply production schemes; (2) Capacity development, aimed to increase awareness, knowledge and expertise of key stakeholders in the market; (3) Project development, to develop a series of EE and RE self-supply production pilot projects ready for financing, by documenting the entire process so as to provide guidance for future projects; (4) Identification of possible financial structures and mechanisms; and (5) Program evaluation, to develop the design of a randomized experiment or other methodology to evaluate the impact of the intervention. Note that activities will be implemented concurrently, though the results of Activity 1 will provide input to the other components.
3. Both the Preparation Grant and the subsequent RESSEE Program will be executed by the two Multilateral Development Banks (MDBs) in close coordination with the relevant agencies of the Government of Chile.

LIST OF ABBREVIATIONS

AChEE	<i>Agencia Chilena de Eficiencia Energética</i> (Chilean Energy Efficiency Agency)	GEF3	Promotion and Development of Local Solar Technologies in Chile (IDB Project CH-X1007)
AGR	<i>Asociaciones de Garantía Recíproca</i> (Reciprocal Guarantee Associations)	GHG	greenhouse gases
CDM	Clean Development Mechanism	GoC	Government of Chile
CER	<i>Centro de Energías Renovables</i> (Renewable Energy Center)	HVAC	heating, ventilation and air conditioning
ChSEF	Chile Sustainable Energy Finance Program (IFC Project #581587)	IDB	Inter-American Development Bank
CNE	<i>Comisión Nacional de Energía</i> (National Energy Commission)	IFC	International Finance Corporation
CORFO	<i>Corporación de Fomento de la Producción de Chile</i> (Production Development Corporation)	IP	Investment Plan
CTF	Clean Technology Fund	LFI	local financial institutions
CTFPG	Clean Technology Fund Preparatory Grant	M	million
EE	energy efficiency	M&E	monitoring and evaluation
EF	engineering firm	MDBs	multilateral development banks
EPC	energy performance contract	MW	megawatt
ESCO	energy services company	MWh	megawatt hour
EVO	Efficiency Valuation Organization	NCRE	non-conventional renewable energy
GEF	Global Environment Facility	O&M	operation and maintenance
GEF1	Promoting and Strengthening an Energy Efficiency Market in the Industry Sector (IDB Project CH-X1002)	PCGP	partial credit guarantee program
GEF2	Encouraging the Establishment and Consolidation of an Energy Service Market in Chile (IDB Project CH-X1009)	PPEE	<i>Programa País de Eficiencia Energética</i> (National Energy Efficiency Program)
		PV	photovoltaic
		RE	renewable energy
		RESSEE	renewable energy self-supply and energy efficiency
		SE	sustainable energy
		SEF	sustainable energy finance
		SME	small and medium-sized company
		SWH	solar water heating
		TA	technical assistance
		USD	United States Dollars

PROBLEM STATEMENT

4. A recent study by the Energy Studies and Research Program of the University of Chile assessed the potential for energy efficiency in the largest consumption sectors in the economy, and concluded that without energy efficiency measures, energy demand in these sectors could double in the period from 2007 to 2021, placing increased pressure on the need for power generation and affecting the competitiveness of these same sectors. However, if energy efficiency measures are added, this demand could be reduced by 20% at the end of this same period.
5. For Chile's electricity requirements alone, projections indicate that without energy efficiency (EE) measures, the economy will need an additional 14,500 MW of installed capacity by 2020. Reducing incremental consumption by 20% in the 2008-2020 period will decrease the additional installed capacity needed by 1,600 MW (or slightly more than 11% of the total). Despite these compelling factors and the apparent profitability of EE measures, investment in this sector has not yet taken off. Considering the relevance of EE, the Government of Chile (GoC) included EE as a central tenet of its recently launched National Energy Strategy, seeking to decouple economic growth from energy consumption. The goal of this pillar is to reduce 12% of the projected energy demand by 2020, equivalent to a reduction of 1,122 MW or 4,150,000 tons of oil equivalent (toe).
6. Chilean government support of mechanisms for energy investment has not had a significant impact on the development of small-scale energy self-supply projects in the industrial, public and commercial sectors. This is primarily due to the fact that these projects have smaller financing needs and are often not connected to the grid, so have not been able to benefit from existing support policies. For example, the Production Development Corporation (CORFO) covers the costs of pre investment studies for NCRE projects, but it requires a minimum investment of USD 400,000, a threshold out of reach for most self-supply systems in small and medium-sized companies or local authorities.
7. The need for increased use of EE in Chile is evident and paramount. Factors such as high energy prices, growing public concern for the environment and the carbon footprint, reduction of domestic energy resources and concerns about national energy security contribute to a growing impetus and interest in EE.
8. Empirical evidence has shown^{1,2} that EE is not implemented to its full potential (including a number of measures whose implementation costs are much lower than its benefits) due to the existence of certain barriers, including lack of available information, as well as economic, technical, institutional and cultural barriers. For example, a lack of similar commercial experiences in the country makes it difficult to learn from other experiences.
9. A relevant barrier to EE and self-supply is that the initial investment is often substantial, encompassing high risks that are then reflected in higher interest rates or other terms and conditions for financing that create further obstacles. This results in a higher opportunity cost of capital for these projects, which are therefore not prioritized within the investment portfolio of a company. In the industrial sector, for example, companies aware of the potential benefit of EE measures will evaluate such investments against a portfolio of other possible investment projects, including projects focused on increasing production or contributing to increased sales. Often EE projects are not selected for inclusion in the annual budget, because it seems more attractive to allocate the company's limited capital on growing the core business, even if EE measures would be more profitable. In this case, access to alternative ways to finance these initiatives can be an opportunity for their development.

¹ United Nations Industrial Development Organization. 2011. *Las ERNC en la industria Chilena y algunas aplicaciones orientativas*, p. 237-239.

² Programa de Estudios e Investigaciones en Energía, Instituto de Asuntos Públicos, Universidad de Chile. 2010. *Estudio para el Desarrollo de la Cogeneración en Chile*, pp. 20, 109, 169.

10. The recent creation of the Chilean Energy Efficiency Agency (AChEE) represents a key milestone in the country and reflects the commitment by the government to design and implement its energy policy with a long-term vision. Nonetheless, the technical capacity available in the country in EE is low and remains a formidable obstacle. Even more crucial is the lack of available financing for such EE projects. In general, financial institutions in Chile have little, if any, experience with financing EE projects, as it is not considered to be an attractive area of finance due to the smaller size of the projects and transactions. Local financial institutions have yet to understand this particular niche and how it could be an effective means to offer new financing opportunities to existing clients and to attract new clients. Support is needed to demonstrate to financial institutions why this segment could be beneficial and how they could enter and expand financing for companies interested in reducing their energy use, decreasing their carbon footprint and improving their overall productivity and competitiveness.

RATIONALE FOR CTF FINANCING

11. The implementation of the preparation grant seeks to lay the foundation for a comprehensive program to address the barriers and thus to expand access to finance for Renewable Energy Self-Supply and Energy Efficiency (RESSEE). By implementing such projects, companies will improve their energy management and reduce their energy use, a key issue for increasing their productivity and competitiveness, especially considering the high cost of energy in Chile.

12. The grant program will also assist different sectors to identify and analyze the potential impacts that RESSEE projects have on their operational costs and other ancillary benefits that are not always considered in traditional economic evaluations of projects. This information is expected to increase interest from companies in EE and serve as a catalyst for the adoption of these technologies across multiple sectors in the Chilean economy.

IMPLEMENTATION AND FINANCING PLAN

Implementation Approach

13. *Executing Agencies:* The preparation grant will be managed by the MDBs, dividing the different tasks between the two participating organizations (IFC and IDB), as identified below. Throughout the development of the different activities of the preparation grant, different stakeholders will be involved, including project developers, energy service companies (ESCOs), technology vendors, equipment suppliers, financial institutions, consultants, and governmental organizations.

14. In order to coordinate and integrate other similar efforts and initiatives related to EE and NCRE in the country with the proposed RESSEE program, a Coordination Committee will be established and will include representatives of the MDBs, AChEE, the Renewable Energy Center (CER) and the Ministry of Energy.

15. The role of this committee is to oversee the results, budget, and schedule of the preparation grant. The committee will approve the criteria to be utilized for the pilot projects and will agree upon the specific pilot projects to be selected as part of Activity 3. In addition, the Committee will oversee any necessary changes to the activities included in the preparation grant. For this purpose, the Coordination Committee will schedule bimonthly meetings. A project manager located in Santiago, will support and follow-up on the activities and report the results to the Coordination Committee. The implementation schedule and financing plan are shown below (see Figure 1 and Figure 2).

Implementation Schedule

Figure 1. Implementation Schedule

Activity	Sub-activity	Timeline	MDB	
Activity 1. Identification of the target market (feasibility study)	1.1. Select a group of economic subsectors considered appropriate for the RESSEE component	2 weeks	January-April	IDB
	1.2. Analyze and classify different selected subsectors	5 weeks		
	1.3. Identify and propose financing potential and possible scenarios for RESSEE portfolio	4 weeks		
	1.4. Identify potential client companies in the different subsectors	3 weeks		
	1.5. Identify barriers and potential solutions	2 weeks		
	1.6. Regional consultation workshops intended to validate the proposed approach in the subsectors	2 weeks		
Activity 2. Capacity building for technical service providers	2.1. Regional training workshops aimed at increasing skills, knowledge and capacity of technical service providers	5 weeks	April-May	IFC
Activity 3. Development of pilot projects	3.1. Prepare and develop pilot projects	8 months	April-November	IDB
	3.2. Develop pilot project monitoring system	4 weeks		
Activity 4. Identification of possible financing mechanisms and structures	4.1. Carry out consultation/training workshops focused on generating interest among local financial institutions in RESSEE	4 weeks	April-July	IFC
	4.2. Identify and analyze possible financing mechanisms for the RESSEE component	5 weeks		
	4.3. Conduct outreach to identify specific financial institutions	4 weeks		
Activity 5. Design a system to evaluate the impact of the RESSEE Component	5.1. Design and develop the impact evaluation system	6 months	March-October	IDB
Activity 6. Project management and coordination	6.1. Overall project management	11 months	January-November	IDB

FINANCING PLAN

Figure 2. Financing Plan

Activity	CTF resources		GEF and other resources		GoC	Total
	IFC-executed	IDB-executed	IFC-executed	IDB-executed ³		
Activity 1. Identification of the target market (feasibility study)		88,000	61,000	0	0	149,000
Activity 2. Capacity building for technical service providers	48,000		140,000	0	20,000	208,000
Activity 3. Development of pilot projects		548,000	0	1,242,683	0	1,790,683
Activity 4. Identification of possible financing mechanisms and structures	165,000		0	359,916	0	524,916
Activity 5. Design a system to evaluate the impact of the RESSEE Component		46,000	0	0	0	46,000
Activity 6. Project management and coordination		58,000	0	0	0	58,000
Total	213,000	740,000	201,000	1,602,599	20,000	2,776,599

³ This includes three IDB-executed, GEF-funded activities. For activity 3, the activity *EE Pilot projects in priority industries and technologies* (included in the GEF1 Project, see Annex IV). For activity 4, two activities: *Financial mechanisms for EE projects* (also included in GEF1), and *Design of a financial mechanism geared towards engineering firms and energy service companies - ESCOs* (included in GEF2).

Annex I. Scope of Work and Rationale

ACTIVITY 1: IDENTIFICATION OF THE TARGET MARKET (FEASIBILITY STUDY)

Rationale

1. In order to optimize the use of the CTF resources, defining a target market is needed. In Chile, the market size of energy efficiency and self-supply projects exceeds USD 3 billion⁴. A well-defined target market is needed to make sure that adequate information regarding the market potential and opportunities can be identified for participating financial institutions and that the main barriers to unlock any barriers to finance EE and RE projects are adequately addressed. A variety of research studies already exist to identify economic sectors for energy efficiency and renewable energy self-supply projects, including some commissioned by the participating MDBs.
2. As a result of a cost-benefit analysis (see Annex II), which identifies projects that require less financial resources per energy saved —EE projects— or energy produced —self-supply—, a group of subsectors was identified. However, a well-defined target market takes into account other variables such as product (e.g., energy solution), place (distribution), promotion (market strategy to sell the product), price, and market segments that can be grouped and targeted with a comprehensive approach (supported by CTF), as well as level of familiarity by interested financial institutions. For this reason, it is important to identify the most appropriate subsectors, building on the experience of the MDBs with similar programs.

Scope

Sub-activity 1.1. Select a group of economic subsectors considered appropriate for the RESSEE component

3. Taking into account the subsectors⁵ selected by the GoC (see Annex II), validate the inclusion of these target subsectors or identify alternative ones.

Sub-activity 1.2. Analyze and classify different selected subsectors

4. Categorize the target market subsectors by market size in terms of energy consumption and capital requirement, project readiness, financial feasibility, project size⁶, interest and experience of local financial institutions in the sector as part of their existing portfolio, and potential for GHG emission reductions. Such criteria will be useful to ensure an adequate allocation of financial resources from CTF.

Sub-activity 1.3. Identify and propose financing potential and possible scenarios for RESSEE portfolio

5. Taking into account the sectors and subsectors validated in the previous point, identify the market potential by subsectors, type of project (EE or RE), average size, GHG abatement, geography, and type of energy (thermal or electric). When designing the portfolio benchmark, consider prioritizing those subsectors that are attractive to invest in both EE and RE projects, namely, “hybrid projects”. Also, take into account the costs and risks needed to identify feasible projects.

⁴ *Usos finales y curva de oferta de conservación de la energía en el sector industrial y minero de Chile*. “Universidad Técnica Federico Santa María, Centro de investigación, Sept 2010” p. 114-116: http://www.acee.cl/576/articulos-62050_doc_pdf.pdf

⁵ Paper and cellulose, fishing, milk products, agro pulp drying, agro cold, meat products, chemical, non-metallic and basic metal, forest and paper, sugar, and tourism.

⁶ Identify opportunities for demand management by each economic sector, to coincide with the addition of NCRE.

6. In addition, propose general investment guidelines to be considered as part of this RESSEE Component, such as: (i) minimum level of GHG emissions reduction for every USD invested; (ii) minimum level of energy savings per USD invested, and (iii) minimum level of energy generated per USD invested.

Sub-activity 1.4. Identify potential client companies in the different subsectors

7. Based on the different subsectors identified in sub-activity 1.2, potential client companies will be identified that are considered suitable candidates for RESSEE related work and in particular as potential candidates for the pilot projects contemplated in Activity 3. It is estimated that approximately 30 companies would be identified as possible candidates for the pilot work. These same companies will be used to identify the specific barriers and potential solutions indicated in sub-activity 1.5 below.

Sub-activity 1.5. Identify barriers and potential solutions

8. Conduct a desk review of the entry barriers for every subsector separately, considering the barriers mentioned in Activity 2 at a minimum.⁷ Additionally, identify any public and private sector initiatives that aim to eliminate the identified barriers. For those barriers identified, propose a series of recommendations as to what CTF resources could be used to intervene and unlock the obstacles (see Activity 2).

Sub-activity 1.6. Regional consultation workshops intended to validate the proposed approach in the subsectors

9. Building on the identified market barriers (from Activity 1) and in collaboration with of the entities listed in the Rationale, validate the identified barriers, including the following (see Annex III as reference):

- Availability of financial resources (limited internal resources; limited borrowing capacity, or competing use of available financing).
- Information, awareness and communication (limited information or knowledge among companies as to the benefits of RESSEE; lack of understanding of benefits such as reduced operating costs, improved reliability of energy and associated costs, decreased carbon footprint, etc.; difficulties due to information asymmetry or lack of understanding of technical risks between project developers and financial institutions).
- Project development and transaction costs (smaller project size; high project development costs; high soft costs including services such as installation costs, O&M, etc.).
- Risk assessment and management (collateralization, performance risk, technology risk; monitoring and evaluation related obstacles and risks, difficulties for defining baselines and methodologies for tracking results).
- Lack of capacity (credit officers and risk managers; energy service providers; internal capacity of energy end-users; monitoring and evaluation support).

ACTIVITY 2: CAPACITY BUILDING FOR TECHNICAL SERVICE PROVIDERS

Rationale

10. In order to pave the way for RESSEE-related activities, consultation training workshops (primarily focused on the subsectors selected in Activity 1) are needed to increase awareness and ensure that the

⁷ Building on the research done by the IFC P#581587 that analyzes the regulatory barriers.

perspective of other market actors is being considered, including prospective client companies⁸ (clients in different subsectors), project developers⁹ (for different market sizes), ESCOs, technology vendors, equipment suppliers, and public sector officials, among others.

Scope

Sub-activity 2.1. Regional training workshops aimed at increasing skills, knowledge and capacity of technical service providers

11. These workshops will be aimed at increasing awareness to prospective client companies, project developers, ESCOs, technology vendors and equipment suppliers about the potential opportunities and benefits of RESSEE related activities, including environmental, energy, and economic perspectives.

12. The barriers identified above (and others) should be validated via a questionnaire and a consultation process in order to better understand the perspective of the different stakeholders. As part of the consultation process, a diagnostic test should also be used to assess the skills and capacities of the actors in the market (ESCOs, vendors, financial analysts and company clients). The purpose of the test is to identify the concepts needed to be strengthened in the workshops of the prep grant and in the technical assistance (TA) of RESSEE. This is especially relevant in order to increase the capacity to develop new commercial approaches and models. These workshops will be held in different regions of Chile, to be selected depending on the sectors and subsectors identified in Activity 1.

13. Based on specific barriers validated as part of the consultation process (see Annex III), identify training services that are needed, as well as additional advisory services that should be contemplated as part of the implementation of RESSEE's broader program to help overcome these obstacles.¹⁰

14. Following a consultation and needs assessment process, a series of workshops will be carried out to increase the capacity of project developers, ESCOs, and other technical service providers so that they are better equipped and able to present financially viable projects to financial institutions.¹¹

15. It is expected that these workshops will touch upon a variety of areas, including but not limited to the following:

- legal documentation and contracts;
- guarantee mechanisms and collateral alternatives;
- use of performance-based contracting and other results-based financial instruments;
- leasing as an instrument for energy efficiency financing;
- incorporation of tax and other fiscal incentives for sustainable energy financing;
- methodologies for measuring results of energy efficiency (e.g., EVO protocol);
- project risk assessment and mitigants;
- corporate financing and project financing, and
- fundamentals of presenting energy efficiency projects for financing.

⁸ Other, similar workshops will be carried out in December 2012, as part of the GEF 1 project, such as methodologies for measuring results of energy efficiency (EVO protocol), and workshops included in the ChSEF project,(see Annex IV).

⁹ *ibid.*

¹⁰ This should also consider the AChEE activity to develop and implement a training plan related to energy efficiency for the industrial and mining sectors (#623663-1-LP12).

¹¹ This activity will take into consideration workshops carried out in the ChSEF and the GEF1 projects (see Annex IV).

ACTIVITY 3: DEVELOPMENT OF PILOT PROJECTS

Rationale

16. To demonstrate the technical and financial feasibility of RESSEE projects, pilot projects are needed. In order to provide detailed information on the actual costs, and on the economic, financial and environmental benefits of RESSEE related projects in Chile, 6-10 projects will be developed from pre-feasibility through engineering design, and technical support will be provided to company clients/developers during implementation (financing for the projects themselves is not included).

17. In addition, as part of this process, best practices will be identified to help all players in the market (energy end-users, off-takers, project developers, local financial institutions, and ESCOs). This will include tools such as templates and worksheets to facilitate the learning process.

Scope

Sub-activity 3.1. Prepare and develop pilot projects

18. This sub-activity seeks to provide a detailed analysis of the process for each project. The entire process will be described as part of a report for each project, which will include standard templates for each point that will be used as a reference by the company clients, project developers and financial institutions. As part of this process, documentation required by commercial banks, following the methodologies presented in the training component 2, will be used such that, for each project, the end result is the development of “bankable” financial models that will fulfill the due diligence requirements of local financial institutions.

19. The projects contemplate both pre-feasibility and feasibility studies, which include:

Pre-feasibility studies

- Detailed technical study and analysis of resources:
 - generation/savings estimate on a daily, weekly and monthly basis;
 - preliminary sensitivity study with different capacities;
 - conceptual design of any civil and/or electromechanical works;
 - analysis of the type of technology to be utilized;
 - approximate cost structure (capital and variable costs);
 - minimum number of engineering drawings, or plans, and layout, and
 - permit information, institutions, and background requirements involved in the project.

Feasibility studies

- Economic feasibility studies
- Engineering:
 - development of civil and mechanical plans;
 - development of technical specifications;
 - study of electromechanical equipment, and
 - study of monitoring equipment, operation and protection.
- Application to the Environmental Assessment System if required (*Sistema de Evaluación Ambiental*)
 - environmental impact study and
 - environmental impact statement.

Additional information needed to present pilot projects for financing:

- financial analysis and projections and
- assessment of technology and other operational risks.

20. Specific activities contemplated as part of this component include carrying out feasibility studies for pilot projects for the replacement, modernization and optimization of energy intensive production systems in private companies, including but not limited to heating, ventilation and air conditioning (HVAC), refrigeration systems, boilers and steam distribution, and industrial air compression, among others.

21. Eligible companies can come from a variety of sectors, but preference will be given to those companies that are found in the sectors identified in Activity 1. Preference will also be given to projects that already have some initial pre-feasibility studies completed and available. Participating companies would have to allow sharing the project information, so as to have a demonstration effect.

22. The program would support the costs associated with the feasibility studies project, with a maximum amount of USD 100,000 per company. The program will not finance any company personnel or any type of overhead related expenses of the participating company. All financial contributions would be explicitly documented in the cooperation agreement to be signed between the program and the participating company.

Sub-activity 3.2. Develop pilot project monitoring system

23. A well-designed monitoring system is necessary to give continuity to the projects and programs of the CER and AChEE¹². This sub-activity involves proposing a system that helps to monitor and assess the pilot projects. This system must include how the information is collected and published. For instance some aspects to consider or define are:

- the monitoring system;¹³
- the procedures for maintenance of records and reporting;
- the financial, social and technical indicators;
- the outline of evaluation reports, and
- the procedure for undertaking the evaluation.

ACTIVITY 4: IDENTIFICATION OF POSSIBLE FINANCING MECHANISMS AND STRUCTURES

Rationale

24. A specific analysis of the financial structure and approach to best utilize CTF funds will be developed. This activity, therefore, will be focused on local financial institutions as a means to unlock the potential for expanding access to finance for RESSEE. Participation of banks and other local financial institutions active in the targeted market segments or that have an interest in being involved in the program will be included in this activity.¹⁴

¹² Additional guidance and input for this will come from the recently launched public bid from AChEE to “develop and implement methodology for the measurement and evaluation of the impact of AChEE in the industry, mining, transport and commercial sectors (#623663-18-LP12)”.

¹³ Include the M&E required by CTF.

¹⁴ Take into account the results of the GEF2 Project. Through the early results of the project, it has been identified that local financial institutions (LFIs) are not willing to take operational risk in energy efficiency (EE) projects because of the uncertainty and the additional costs involved in analyzing such projects, which is not cost-effective because of the small size of the loans. As a result, the GEF project is focused on a partial credit guarantee program to transfer the operational risk to reciprocal guarantee associations.

Scope

Sub-activity 4.1. Carry out consultation/training workshops focused on generating interest among local financial institutions in RESSEE

25. This includes:

- Design new finance products or develop templates to share with local financial institutions, regarding financial products used previously, including those from other countries (structure of financing, including terms, conditions, pricing, security and documentation requirements).
- Build capacity to originate EE and RE project-related financing within the financial institutions.
- Analyze past efforts and existing programs that provide financial support to RESSEE-related areas to learn from these experiences.

Sub-activity 4.2. Identify and analyze possible financing mechanisms for the RESSEE component

26. Some actions and possible mechanisms are listed below:

- In the case of risk-sharing facilities, consider options such as (i) first-loss guarantee; (ii) pro-rata guarantee, and (iii) second-loss guarantee. For these options, propose the amount or percentage of the loss covered by the project or portfolio guarantees.
- In the case of a dedicated credit line, propose (i) ratio of donor:bank, and (ii) term of the loan recommended for RESSEE projects.
- Identify potential financial institution partners, potentially including bank interviews: (i) Produce an LFI landscape analysis for RESSEE investments; (ii) identify strengths of LFIs and willingness to implement innovative financing programs, and (iii) survey the sector-specific specialization of each LFI and match its portfolio with that of the RESSEE targets (as identified in Activity 1), or interest of banks to enter those areas.
- Identify technical assistance needed to coordinate work between LFIs and reciprocal guarantee associations.¹⁵

27. The financial mechanisms identified as optimal to be implemented by the RESSEE component should be consistent with the financial barriers identified in the barrier analysis matrix (see Annex III).

Sub-activity 4.3. Conduct outreach to identify specific financial institutions

28. Support the identification of financial institutions that could be considered as potential candidates for the RESSEE component. This process would include interaction and review of different financial institutions as a preliminary assessment of their interest and capacity.

ACTIVITY 5: DESIGN A SYSTEM TO EVALUATE THE IMPACT OF THE RESSEE COMPONENT

Rationale

29. There are uncertainties with regards to the actual impact of EE interventions such as those planned under the RESSEE Program. It is difficult to know what is the difference between the energy consumption or GHG emissions that will happen with the program, and those that would have happened otherwise. The best way to find this out is to carry out an impact evaluation, be means of a randomized experiment or other evaluation methodology, such as a quasi-experimental study. This activity will design such evaluation of the CTF and the GoC interventions.

¹⁵ Building on the GEF2 project with AChEE, which aims to develop a guarantee mechanism for EE projects.

Scope

Sub-activity 5.1. Design and develop the impact evaluation system

30. Design a randomized experiment to be developed during the RESSEE program to assess the government and CTF intervention. To that end, determine a methodology for selecting two samples for each project: a treatment sample of individuals directly benefitting from the CTF program; and a control group of individuals very similar to the treatment sample, but who would not have access to the CTF program for the duration of the experiment. The methodology should ensure that both samples should be as similar as possible, matched on key socioeconomic considerations of the companies and other characteristics deemed relevant, such as type of economic sector, region, and access to alternative sources of energy. The methodology would define how to conduct a baseline analysis at the time of the first application with both groups through a mix of quantitative (e.g. surveys) and qualitative (e.g. focus groups) methods to measure the starting point of different outcome variables of interest. After a certain pre-determined number of years, the quantitative and qualitative methods would be repeated in order to compare the changes in the outcome variables for both samples. The methodology would need to consider, among other aspects, the following:

- key evaluation questions and hypotheses to be tested;
- major evaluation parameters and indicators;
- who will conduct the evaluation;
- outline of the evaluation reports, and
- major factors affecting implementation.

31. The design and definition of this evaluation approach will be carried out with the preparation grant, though the actual implementation will be included as part of Component 3 in the broader CTF Program. As part of the design, consultations with different stakeholders, including prospective financial institution partners, will be undertaken to ensure that the approach being proposed is both feasible and cost-effective.

Annex II. Project Context – Target Market

1. Several studies have been done regarding the potential of economic sectors in implementing self-supply and energy efficiency projects. Building on these studies, a cost/benefit analysis was carried out by the CTF project team (MDBs and GoC) to select the most promising subsectors for this RESSEE program. For the case of self-supply using renewable energy technologies, the objective was to identify those projects that require less capital per energy generated (to minimize USD/MW). Similarly, for energy efficiency projects the objective was to minimize (USD/MWh/year). Given that implementing programs in subsectors with low energy potential is expensive in terms of effort, the relative energy potential among the alternatives was also considered. The following tables summarize the results:

Figure 3. Cost-Benefit Analysis for Energy Efficiency (Thermal and Electric) Interventions

subsector	thermal			electric		
	investment	energy savings	cost	investment	energy savings	cost
	USD	MWh/year	USD/(MWh/year)	USD	MWh/year	USD/(MWh/year)
agri pulp drying **	10.208.000	131.344	78	20.606.080	24.649	836
agri cold**	2.666.640	61.345	43	5.204.080	45.924	113
paper and cellulose ***	537.960	375.332	1	4.221.000	142.171	30
wood and furniture	14.650.020	32.490	451	14.650.020	65.139	225
paper, paperboard and printing	49.099.663	26.575	1.848	154.733.280	13.694	11.299
fishing ***	6.121.440	342.088	18	98.641.200	254.393	388
milk products ***	4.108.900	135.492	30	67.310.650	280.201	240
flour	16.558.000	10.618	1.559	20.593.800	8.775	2.347
meat products **	12.303.480	90.095	137	5.163.896	82.375	63
bakery products	1.808.100	2.795	647	4.725.756	5.893	802
wine	3.168.000	24.738	128	16.278.750	16.960	960
beer and drinks	9.960.000	32.951	302	13.442.100	21.654	621
sugar	11.480.000	711	16.146	1.479.260	2.291	646
snuff	55.625	816	68	757.568	784	966
chemical **	8.923.200	73.326	122	1.702.954.000	131.443	12.956
non-metallic and basic metal **	2.690.000	62.216	43	1.103.000	28.066	39
metal products, machinery and equipment	-	-	-	4.933.500	155	31.829
iron and steel	188.768.000	57.658	3.274	171.408.000	82.555	2.076
copper mines	206.474.240	321.054	643	88.800.000	1.131.331	78
mines others	48.710.000	32.881	1.481	9.120.000	187.639	49
total	598.291.268	1.814.525	330	2.406.125.940	2.526.092	953

The most interesting subsectors are labeled with (***) . Source: Final uses and conservation offer curve. Centro de Innovación Energética, Universidad Técnica Federico Santa María; p. 114 & 116.

2. For the case of energy efficiency (thermal en electric) interventions, the criteria to identify the most efficient investments were the following:

- Cost <150 USD/MWh/year
- Energy savings > 50,000 MWh/year

Figure 4. Cost-Benefit Analysis for Self-supply (Thermal) Interventions

subsector	energy MW	Investment USDM	Cost USDM/MW	technology
forest and paper ***	990	440	0,44	boilers
preserved fruits, vegetables legumes	33	17	0,52	boilers
sugar **	129	66	0,51	boilers
wine	83	43	0,52	boilers
meat and milk	NA	NA	NA	biodigesters
copper	190	282	1,48	solar
chemical	53	78	1,47	solar
preserved fish	3,5	5,145	1,47	solar
tourism ***	357	71,5	0,20	biomass
tourism	62	57,6	0,93	solar
tourism	71	NA	NA	heat pumps
wine	43	NA	NA	heat pumps

Based on a preliminary characterization of the renewable energy market in Chile for the non-electrical industrial and commercial applications (PRIEN)

3. For the case of self-supply (thermal) interventions, the criteria to identify the most efficient investments were the following:

- Cost <0.5 USD/MW
- Energy generation > 100 MW

4. The benchmark portfolio is designed taking into account the previous analysis, summarized in the following table and graphs:

Figure 5. Capital allocation by subsectors, type of energy —thermal or electric— and project —EE or RE—

proposed investment -portfolio benchmark- USDM					
subsector	energy efficiency		self-supply		total
	thermal	electric	thermal	electric	
paper and cellulose	0,5	4,2			4,8
fishing	6,1				6,1
milk products	4,1				4,1
agri pulp drying	10,2				10,2
agri cold	2,7				2,7
meat products	12,3	5,2			17,5
chemical	8,9				8,9
non-metallic and basi	2,7				2,7
forest and paper			73,3		73,3
sugar			66,0		66,0
tourism			71,5		71,5
total	47,6	9,4	210,8		267,8

5. Notice that RESSEE resources are USD 421 million and the portfolio benchmark only sums up to USD 256 million. The remaining resources, USD 153 million, could be invested in electric self-supply solutions (currently, there are no studies about its potential), or in more thermal self-supply solutions in the forest and paper subsector, which has a market size of USD 440 million.

Figure 6. Market potential per subsector

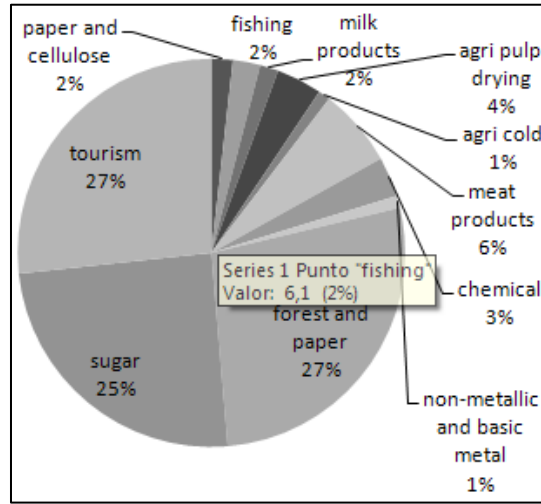
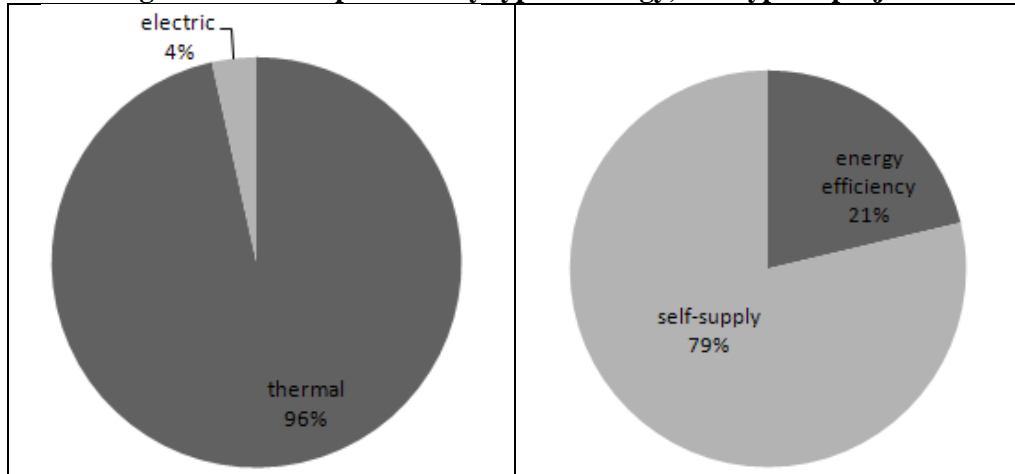


Figure 7. Market potential by type of energy, and type of project



6. An analysis of the ongoing self-supply RE projects suggests that there are market opportunities in the agricultural and service sectors, and in the subsector of hotels and restaurants (within the service sector). A similar analysis has not been made for EE projects.

Figure 8. Number of Self-Supply Projects

sector/subsector	in operation	in development			total
		thermal	electric	not defined	
agricultural	36	12	5	14	67
service	57		9	5	71
housing		1	1	4	6
industrial	11			2	13
public infrastructure		2		13	15
drinking water			1	15	16
hotel and restaurant	27				27
fishing	3		2	1	6
total	134	15	18	54	221

Source: CER, 2012

Annex III. Barrier Analysis Matrix

1. In order to identify common barriers across actors, and the level of capacity building needed per actor, the following matrix will be used, classifying each barrier from 1 to 3, where 1 is insignificant, 2 not an issue, and 3 significant.

Figure 9. Barrier Analysis Matrix

Group barrier	Barrier	Project holder	Project developer	Banks	Project supplier
Availability of funds	Limited internal funds				
	Limited borrowing capacity				
	Lack of perceived initiatives				
Information awareness and communication	Information for project host, ESCOS or banks				
	Communication between project developers and financiers				
Project development and transaction costs	Small project size				
	Project development cost				
	Other soft cost				
Risk assessment and management	Collateralization				
	Monitoring and evaluation				
	Need for new financial products and appraisal tools				
Lack of capacity	Bank loan and risk managers				
	Energy service providers				
	Project hosts				
	Monitoring and evaluation agents				

2. Additionally, indicators such as the following will be collected
- current price of electricity per project host;
 - percentage of energy expenses over total expenses per project host;
 - core business gross profit margin per project host;
 - average investment payback times per project host;
 - average project size in the target market segment;
 - typical EE and RE technologies used;
 - availability and costs of alternative financing mechanisms;
 - long-term prospects of the market segment, and
 - level of development of the EE and RE supporting industry.

Annex IV. Inventory of Other Activities

SUMMARY OF RELATED PROJECTS

1. The following four projects are being prepared or executed by IDB and IFC and complement the activities of RESSEE and this Preparation Grant.

GEF1: Promoting and Strengthening an Energy Efficiency Market in the Industry Sector (IDB Number CH-X1002)

2. The general objective of this project¹⁶ is to promote and strengthen EE in the industrial and commercial sectors in Chile, by supporting the establishment of an EE market that will create a replication effect throughout the industrial and commercial sectors, reducing energy consumption, increasing productivity and at the same time contributing to reducing carbon emissions.

3. The project is divided in three complementary components. Component I, institutional strengthening and capacity building in EE, aims at obtaining a critical mass of trained government staff, energy efficiency auditors and consultants, as well as representatives from the industrial and commercial sectors. Component II, EE pilot projects in selected and prioritized areas, will provide practical experience to design, implement, measures and verify EE projects in the main areas identified by the National Energy Efficiency Program (PPEE). This component will complement the theoretical training of EE auditors, consultants and government staff provided in component I, with on-site practical experience of available technologies for EE, their implementation, as well as measurement and verification of energy savings of the pilot projects. Components I and II are necessary but not enough to jump start an EE market. Component III will support financial mechanisms to promote EE projects.

Figure 10. Indicative calendar for the GEF1 project

Milestones	Dates
Implementation Start	April 2010
Mid-term Evaluation	April 2012
Project Closing Date	September 2014

GEF2: Encouraging the Establishment and Consolidation of an Energy Service Market in Chile (IDB Number CH-X1009)

4. This Project¹⁷ will contribute to overcome the financial barriers faced by EE projects, through the design, structuring and implementation of a financial instrument which can support the financing of EE projects based on energy performance contracts (EPCs).

5. The project is divided into two complementary components:

- Component I: Design and structuring of a partial credit guarantee program (PCGP) to be used to support the participation of engineering firms (EFs) and ESCOs in promoting energy savings and energy efficiency projects whose payback is based on EPC.
- Component II: Implementation of the PCGP to support the activity of the EF/ESCOs. This component will address the creation of a guarantee to cover the technical risk associated to the EE project promoted by EF/ESCOs based on EPCs.

¹⁶ More information on the GEF1 project is available at: <http://bit.ly/ChGEF1>.

¹⁷ More information on the GEF2 project is available at: <http://bit.ly/ChGEF2>.

Figure 11. Indicative calendar for the GEF2 project

Milestones	Dates
Implementation Start	December 2010
Adjudication PCGP (AGR)	October 2012
Project Closing Date	December 2018

GEF3: Promotion and Development of Local Solar Technologies in Chile (IDB Number CH-X1007)

6. The general objective of this project¹⁸ is to provide support the GoC and in particular the Energy Ministry to develop a solar industry for both solar water heating (SWH) and power generation in Chile (power generation includes Photovoltaic (PV) panels and Concentrated Solar Power (CSP)). The specific objectives are to: (i) promote technology transfer, institutional strengthening and capacity building in solar technologies; (ii) develop pilot projects using solar technologies (SWH and power generation) and (iii) support the design of incentives and financial mechanisms, and carry out a public awareness campaign to promote solar projects with SWH and power generation technologies.

Figure 12. Indicative calendar for the GEF3 project

Milestones	Dates
Implementation Start	November 2012
Mid-term Evaluation	July 2014
Project Closing Date	July 2016

ChSEF: IFC's Sustainable Energy Finance Program (IFC Number P#581587)

7. The Chilean Sustainable Energy Finance (ChSEF) program has the objective of promoting the implementation of sustainable energy (SE) projects among private companies in Chile, leading to reductions of GHG emissions. To achieve this objective, ChSEF intends to address the market barriers that currently limit SE development in the country, by implementing the following components and activities:

- *Component I: Capacity-building of technical service providers* - Aim is to develop the skills and management of energy services companies, technology providers and equipment vendors for energy efficiency and renewable energy project developers to assist with improving the capacity of these service providers, enabling them to provide better services in support of SE projects and financing.
- *Component II: Regulatory analysis* - Objective is to carry out an analysis of possible regulatory reforms to improve the market conditions related to SE in the country.
- *Component III: Advisory service support to financial institutions* - Objective is to assist LFIs to better understand the opportunities presented by sustainable energy finance (SEF) in order to facilitate access to financing for enterprises.
- *Component IV: Knowledge management and dissemination* - Focus is on helping overcome the barrier presented by the lack of awareness among private companies, particularly SMEs, as to the benefits and opportunities related to SE.

8. This program is intended to be a two-year, comprehensive effort to increase awareness, support behavior change, build the SE market, support some early entrants among LFIs into the SEF business, and build the momentum for it to continue to grow. The program is expected to be carried out in close coordination with CER (for RE) and AChEE (for EE), both of which have expressed interest in collaborating with this program. The program is expected to lead to increased interest in the financial

¹⁸ More information on the GEF3 project is available at: <http://bit.ly/ChGEF3>.

sector, which will begin to view SEF as a standard business practice, as well as to transformed industrial and commercial enterprises, which view energy efficient technologies as standard ways of operating a business and competing in the market. This will help to steer Chile’s economic development into a low-carbon path with more sustainable use and management of resources.

9. This Program includes an activity named “Support to Technical Service Providers and Technology Vendors”, which is particularly relevant for the purposes of RESSEE. The objective of this activity is to strengthen technical service providers in Chile, including energy service companies (ESCOs), local consultants (firms and individuals), and technology providers, so that they are better able to present financially viable projects for consideration to financial institutions. This activity has been structured into the following main sub-activities:

10. Training and technical assistance for technical service providers: The aim of this sub-activity is to develop the capacity of a cadre of technical service providers, and technology providers / vendors so that they are better equipped and able to present financially viable projects to financial institutions. The consultant will need to carry out two distinct kinds of training sessions: one focused on technical service providers (targeting at least 30 technical service providers), and another one focused on technology providers and vendors (targeting at least 15 technology providers and vendors) that operate in Chile. A subsequent step will be to deliver one-on-one technical assistance support to technical service providers operating in different parts of Chile.

11. Support for technology providers and vendors: The aim of this sub-activity is to develop the capacity of a cadre of RE project developers so that they are better equipped and able to present financially viable projects to financial institutions. The consultant will need to carry out training sessions targeting at least thirty (30) renewable energy project developers that operate in Chile. To determine which renewable energy project developers will be selected, the consultant will develop a detailed selection process and criteria, subject to IFC approval. A subsequent step will be to deliver one-on-one technical assistance support to at least ten (10) renewable energy project developers, operating in different parts of Chile.

MATRIX OF ACTIVITIES AND BENEFICIARIES

12. The purpose of this matrix is to identify the “activities” (workshops, consultancies, training courses, energy audits, demonstration projects, advertising and marketing, impact studies, and market research studies) that have been directed to the main energy players in Chile (ESCOs, banks, Renewable Energy Centre (CER), Chilean Association for Energy Efficiency (AChEE), Reciprocal Guarantee Associations (AGR) and the industry).

13. In the center of the matrix are the “programs” (GEF1, GEF2, ChSEF and CTF’s Prep Grant “CTFPG”) that provide the different activities to the different beneficiaries.

14. Blank positions indicate potential opportunities to provide activities. Positions with more than one program indicate activities covered by more than one program, where special attention will be required to avoid any potential overlap.

Figure 13. Energy Efficiency: Matrix of Activities / Beneficiaries

Activities	Beneficiaries						
	ESCOS	Technical service providers	Technology providers	Banks	AChEE	AGR	Industry
Consultation workshops	CTFPG	CTFPG	CTFPG	CTFPG GEF2 ^a	CTFPG		CTFPG
Training –finance-	ChSEF ^b	ChSEF ^b	ChSEF ^b	GEF1 ^c			
Training –contracts and proposals	ChSEF ^d	ChSEF ^d	ChSEF ^d				
Other training	GEF1 ^e CTFPG	GEF1 ^e CTFPG	GEF1 ^e CTFPG	CTFPG	CTFPG	CTFPG	CTFPG GEF1 ^e
Energy audits	N/A						GEF1 ^f CTFPG
Pilot projects							GEF1 ^g
Advertising and marketing	GEF1 & GEF2 ^h						
Project impact studies	ChSEF ⁱ	ChSEF ⁱ	ChSEF ⁱ		GEF1 ^j		
Market research objective	CTFPG ChSEF ^k						
Program monitoring and evaluation	CTFPG						
Regulatory analysis	ChSEF						

a/ Local financial institutions have indicated that they have no interest in taking technical risk in energy efficiency projects because the potential lending portfolio is very small. Banks are willing to lend only assuming credit risk. Therefore the GEF2 will give technical guarantees (performance contracts where there are measurement and verification protocols) through mutual guarantee associations.

b/ The objective of this consultancy is to strengthen technical service providers in Chile, including energy services companies (ESCOs), local consultants (firms and individuals), and technology providers, so that they are better able to present financially viable projects for consideration to financial institutions.

c/ Workshops for executives of banks on: the security instrument of GEF 2, energy performance contracts and other energy efficiency topics.

d/ Legal documentation and contracts and fundamentals of presenting energy efficiency projects for financing.

e/ Workshops for various beneficiaries on: (i) Diagnostic, Implementation and Monitoring Energy Efficiency Projects, (ii) Measurement & Verification and (iii) Energy Management. The development of workshops material was tendered, and was awarded to the U. PRIEN Chile. Courses begin on the fourth quarter of 2012.

f/ From late 2011 until the beginning of 2012, a competition was carried out to fund engineering studies. They were awarded to 13 companies.

g/ The GEF co-funded 5 pilot projects.

h/ The AChEE said that more financial resources are needed for this activity.

i/ Methodologies for measuring results of energy efficiency (e.g., EVO protocol)

j/ Measurement & Verification Protocol

k/ The study market is from the supply and demand perspective.

Figure 14. Self-supply Renewable Energy: Matrix of Activities / Beneficiaries

Activities	Beneficiaries						
	ESCOS	Technical service providers	Technology providers	Banks	AChEE	AGR	Industry
Consultation workshops	CTFPG	CTFPG	CTFPG	CTFPG	CTFPG		CTFPG
Training –finance-	ChSEF ^a	ChSEF ^a	ChSEF ^a				
Training –contracts and proposals	ChSEF ^b	ChSEF ^b	ChSEF ^b				
Technical training	GEF3 ^c	GEF3 ^c	GEF3 ^c				
Energy audits	N/A						CTFPG
Pilot projects							GEF3 ^d
Advertising and marketing	GEF3 ^e						
Project impact studies							
Market research objective	CTFPG GEF3 ^f ChSEF ^g						
Program monitoring and evaluation	CTFPG GEF3 ^h						
Regulatory analysis	ChSEF						

a/ The objective of this consultancy is to strengthen technical service providers in Chile, including energy services companies (ESCOs), local consultants (firms and individuals), and technology providers, so that they are better able to present financially viable projects for consideration to financial institutions.

b/ Legal documentation and contracts and fundamentals of presenting energy efficiency projects for financing.

c/ Training activities for implementing PV and CSP projects through technical missions and local seminars.

d/ Development of a pre-investment study for the deployment of at least 5 MW of CSP or PV plant.

e/ Public awareness campaign to promote solar projects with SWH and solar power generation technologies.

f/ Assessment of the potential for development of solar thermal projects (CSP) and for PV for distributed generation in SING and SIC.

g/ The market study is from the supply and demand perspective.

h/ Carry out the monitoring and evaluation assessment of operational variables and ex-post results of the projects through the installation of monitoring systems to assess the ex-post benefits.