INTER-AMERICAN DEVELOPMENT BANK

Final Evaluation

"ENCOURAGING THE ESTABLISHMENT AND CONSOLIDATION OF AN ENERGY SERVICES MARKET IN CHILE"

Project No. CH-X1002

GEF ID: 3599

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

- **Table Project Information**

Project Name:	"Promoting and Strengthening an Energy Efficiency Market in the Industry Sector in Chile"		
GEF ID:	3599	IDB ID:	CH-X1002
country:	Chile		
GEF Focal Area:	Multi Focal	Strategic Program:	CC-SP2
Executing Agency (EA):	Chilean Energy Efficiency Agency AChEE		
Financing structure and disbursements:	GEF Confirmed at CEO Endorsement	US $ 2,636,364	
	Co-financing Amount Materialized as of Project Closing	US $52.555.076	
	Total Project Cost (GEF + Co - financing Amount)	US $55,133,954	
	GEF Amount disbursed as of Project Closing	US $ 2,578,878	
Project relevant dates:	IDB approval Date	October 4, 2010	
	Start of Implementation Date	March 22, 2011	
	Eligibility Date	November 9, 2011	
	Estimated Completion Date	September 22, 2015	
	Actual Completion Date	October 3, 2015	
Dates for evaluation of the Project:	Date of Midterm Review	June 2014	
	Date of Final Evaluation	August 2017	

- **Final Evaluation Ratings**

Sections 3 and 4 present in further detail the performance of the project and the achievement of the objectives, outputs and overall project results. The following table shows the summary of such analysis.

Table 1. Summary Rating FE

Measure	MTR Rating	Achievement Description
Project Implementation & Adaptive Management	Satisfactory	ACHEE demonstrated high capacity in the implementation of capacity building activities in EE to private sector companies, which was reflected in the satisfaction surveys provided by course assistants. However, with regards to the selection and implementation of the pilot projects, we consider that there is room for improvement.
Sustainability	Satisfactory	Pilot projects implemented under component II have shown that the measures undertaken by the ACHEE throughout the implementation of the MEE measures are viable and sustainable over time, and have demonstrated energy savings in the food industry as well as appetite for EE projects. However, a careful revision of the application of the IPMV and its implementation in the industry is necessary so that EE projects can demonstrate their viability and consequently become bankable by the financial industry and the private sector.

2. INTRODUCTION

2.1. Project Description

The objective of this project was to promote and strengthen Energy Efficiency (EE) in the industrial and commercial sectors in Chile, by supporting the establishment of an EE market that will create a ripple effect in these sectors, reducing energy consumption, increasing productivity and at the same time contributing to reduce carbon emissions.

The specific objectives of this project were to: (i) obtain a critical mass of trained government staff, EE auditors and consultants as well as representatives from the industrial and commercial sectors, with on-site practical experience of available technologies for EE, including their implementation, measurement and verification of energy savings; (ii) provide the necessary tools to provide financing options to end users and ESCOs; and (iii) provide practical experience in design and implementation of EE measures and verify EE projects in specific identified areas.

The main project activities were:

Component I – Institutional strengthening and capacity building:

Subcomponent I.1 – Technical Assistance: This subcomponent will finance technical assistance to provide institutional strengthening and capacity building to the AChEE, as well as a website and an information technology platform to access and store information and disseminate findings. This subcomponent will contribute to consolidate the AChEE as a "one-stop shop" by increasing the know-how in EE, establishing an EE strategy for the country and its implementation plan, and developing communication strategy to create awareness among the stakeholders.

Subcomponent I.2 – Workshops and Seminars on EE: this subcomponent will finance workshops and seminars on EE program design and evaluation, benchmarking and EE case-studies and lessons learned, risk perception for EE projects, as well as Measurement and Verification (M&V) techniques for energy savings to be delivered to the AChEE staff members, ESCOs and end-users. Complementary to this subcomponent, AChEE (as co-financing source) will finance the development and implementation of roundtables, bringing together industrial and commercial representatives to create awareness in terms of reducing energy costs by implementing EE projects.

Subcomponent I.3 – Training Courses: this subcomponent will finance training courses both for EE monitors (trainers) and general public (energy consultants, ESCOs, financing entities, energy end-users, etc). The courses will comprise the following subjects: M&V of energy savings, energy service performance contracts, financing of EE projects, EE technologies investments, mainly for industrial sector. This subcomponent will also finance the development of EE contract model templates adapted to the Chilean market.

Component II – EE pilot projects in selected and prioritized areas: this component will finance consulting services and procurement of goods for the following activities: design, prefeasibility studies, detailed engineering, and implementation of at least 5 (five) EE pilot projects in the areas of agri-food, wineries, metal-mechanic, plastics & chemicals, and retails.

In addition, a white paper will be prepared including one fact sheet for each of the pilot projects. The white paper will include success stories, lesson learned & recommendations to disseminate the outcomes of the pilot projects.

Each phase of the pilot projects implementation will constitute part of the on-site practical experience of the EE training courses developed in Component I, which includes the development of the M&V plans and drafting of the M&V reports in order to generate trust amongst end-users on the potential of EE technologies.

Component III – Financial Mechanisms to promote EE Projects: This component will finance: (i) an evaluation and barrier study of CORFO's EE Credit Line and partial Guarantee fund. This study will provide recommendations for smooth and sound operation of both financial instruments; and (ii) the necessary measures to implement the recommendations of the study. This will include: informative marketing initiatives for the Credit Line, sessions to commercial banks and the development, testing, and dissemination of a standardized process for assessing loan application for EE investment.

The AChEE is the current Executing Agency (EA) of the Project. The selection and contracting of consulting services financed with GEF resources have been the responsibility of AChEE. The AChEE reports to the IDB on technical and administrative activities, prepares and submits progress reports, controls and supervises the management of financial resources, requesting disbursements and maintains communication channels with the IDB. The AChEE is in charge of technical and operational aspects of project implementation, including: (i) selecting and contracting consulting services required under procurement policies of the Government of Chile; (ii) review and approve products consultancies; (iii) accounting of project funds; (iv) managing consulting contracts and process payments for consulting services and procurement of goods and (v) submit periodic reports to IDB through progress reports.

A Project Manager (PM) was hired to provide technical oversight, coordination and supervision for the Project. The PM was based at the AChEE's facilities in Santiago-Chile, and his activities (among others) included: (i) prepare Annual Work Plans (AWPs); (ii) prepare Terms of Reference (TOR) and bidding documents; (iii) provide technical monitoring and evaluate performance of the activities, objectives, and targets established in the AWP; (iv) conduct processes related to the procurement of goods and services and contracting of consultants following the procurement policies of the Government of Chile; (v) maintain a record system on eligible expenditures; (vi) keep records for Project operations, including accounting and financial management of the GEF grant proceeds and the co-financing resources; (vii) prepare disbursement requests, financial and accounting statements for audits; and (viii) establish operational and contracting controls for external audits.

Table 2. Project Cost by Component (including Cofinancing)

Component	Implementation Agency	GEF	Cofinancing	Total
Component and 1. Institutional strengthening and capacity building on EE	AChEE	US $ 978.780	US $ 4.318.000	US $ 5.296.780
Component and 2. EE pilot projects in priority industries and technologies	AChEE	US $ 1.142.683	US $ 5.117.000	US $ 6.259.683
Component and 3. Funding Mechanisms for EE projects	AChEE	US $ 225.916	US $29.860.000	US $30.085.916
Project Management				US $583. 985
other costs Audit and contingencies	UD $ 100,000	US $ 0	US $ 100,000	UD $ 100,000
TOTAL PROJECT		US $ 2.636.364	US $ 39.690.000	US $ 42.326.364
Percentage		6%	94%	100%

The estimated cost of the project is US$ 42,352 millions of which the Fund for Global Environment Facility (GEF) funded (through a grant) US $ 2.64 million, to be administered by the Inter -American Development Bank (IDB). In addition, the US$ 39.7 million co - financing, US $ 3.694 million was contributed by the AChEE, US$ 31.89 million for the CORFO of Chile (CORFO), US$0.975 million by the IDB and US$3.2 million for SMEs beneficiaries.

2.2. Project Context

Chile's electricity sector has led this growth. Electricity demand, measured in terms of annual gross generation, grew from 33,226 GWh in 1998 to 56,697 GWh in 2009, an increase of almost 70% over 10 years. This is similar to the 68% increase in generation capacity experienced over the same period. In addition to growth in capacity and demand, the sector has also undergone a number of reforms, beginning with privatization in the 1980s, which divided the sector into

three distinct businesses: generation, transmission and distribution. Currently in Chile, electricity supply in Chile is characterized by a matrix wherein the main source of primary energy in terms of share of national installed capacity is hydroelectric (38.2%) followed by natural gas (36.8%), coal (15.9%) and diesel (7.4%).

Owing to the composition of the energy matrix, the two interconnected electrical grids in Chile, the SING and SIC, are highly vulnerable because they are highly dependent on natural gas from Argentina and weather conditions. Thus, in 1998 the country faced an energy crisis, mainly due to the lack of water resources resulting from a severe drought. In 2008 the situation was similar, but with an exacerbated impact caused by the shortage of natural gas from Argentina.

To mitigate this vulnerability and increase energy security, the GoCh has developed a series of initiatives to diversify the country's energy matrix, with the introduction of legislative changes to create incentives for and encourage investments in renewable (RE) and non-conventional energy sources (NCE), including mechanisms to accelerate the introduction of renewable and non-conventional energy technologies in power generation and energy efficiency (EE).

In 2004 two important studies were published which have had a significant influence on the prioritization of public policies to promote energy efficiency (EE): a) the assessment by Chile's National Energy Commission (Comisión Nacional de Energía, or CNE) which showed the extent of savings that could be achieved through EE, and, b) the OECD overview report, published in 2004, which recommended better integration of EE into the country's development efforts.

The GoCh has shown its commitment to make a quantum leap in the development of EE in Chile transitioning from the current demonstration model towards the creation of a legal framework turning EE into a long-term policy. Its broader energy policy has included strategic priorities such as strengthening of the institutional framework, promotion and development of EE, optimization of the energy matrix, compatibility with sustainable development, support for equitable use, and preparation for contingencies.

A series of critical events since 2005, where the Bank along with GEF funds has played a critical role, have been instrumental in this transition process. From launching the first public initiative in 2005, called "the National Energy Efficiency Program (Programa País Eficiencia Energética, PPEE)", which aimed to promote EE by encouraging lifestyle changes, and energy savings technologies in the main sectors of consumption including transport; industry, commerce and mining; housing and construction; household appliances and public sectors, to the development of new and more focused public policies on energy and EE in 2008 and 2009, to strengthen the government´s regulatory capacity, including the creation of a Ministry of Energy and the advancement on clear action plans to make EE a government priority, to the creation of the Chilean Energy Efficiency Agency (AChEE) in 2010, a completely separated institutional body, dedicated to articulate private sector industries and the government around EE priorities and to create a market in line with international protocols and government energy policies.

The main milestones in this transformation are:

- In 2005, the National Energy Efficiency Program (Programa País Eficiencia Energética, PPEE), the first public initiative to promote EE, was created as part of the Ministry of Economy;

- In 2005, the first National Action Plan for EE was adopted;
- In 2006, the CNE's Plan for Energy Security reinforced EE as one of the priority actions to undertake in the short term in Chile (CNE, 2009);
- In 2008, as part of the GoCH´s decision to create a unique institution in charge of energy policy, the PPEE became part of the CNE, chaired by the Minister of Energy;
- Between 2006 and 2010, the PPEE budget was increased by almost 60 times:
- In 2009, the CNE published new guidelines for energy policy in a document entitled Transforming the Energy Crisis into an Opportunity" (Tokman, 2009);
- In 2009, Chile participated in the Peer Review on EE conducted by Asia-Pacific Economic Cooperation (APEC) to evaluate existing EE initiatives and obtain recommendations for medium- to long-term policy development (APEC, 2009);
- In 2009, the International Energy Agency (IEA) reviewed Chile's energy policy; In its report, the agency emphasized the development of a GEF project in order to address energy efficiency project financing and establish the foundations for developing an energy efficiency market (IEA, 2009) ;
- On February 2010, the Ministry of Energy was created. The reform of the institutional framework for energy in Chile also considers EE an important part of the country's long-term energy strategy; and
- On April 21, 2010 the Chilean Agency for EE was created as a non-profit organization in charge of designing and delivering EE programs for different sectors. The Agency constitutes the institutional consolidation of PPEE and will be responsible for carrying out the projects and programs which are currently being developed by PPEE.

Most recently, the GoCh launched the "Energy 2050" initiative in July 2014, conceived as a participatory process to build Energy Policy. Energy 2050 sets a goal of generating 70% of national electricity generation from renewable sources by 2050. To reach that goal, the Energy 2050 roadmap points to a higher penetration of solar and wind technologies, with targets to deploy more than 20 GW of each. In this way, 19% of the electric demand will be met with solar energy, 23% with wind energy and 29% with small hydro, run-of-river hydro or hydroelectric reservoirs. The roadmap also indicates the need to install mechanisms for intelligent regulation of demand and storage technologies as the percentage of wind and solar increase.

The National Energy Strategy (ENE) 2012-2030, whose first pillar is defined as "Growth with Energy Efficiency: A State Policy." To achieve this target, it states that "it is essential to set a specific goal for Energy Efficiency to align all available measures to achieve them". Thus, the EE Action Plan aims to achieve a 12% reduction in energy demand projected by 2020, based on 2010. This would achieve an estimated 43,000 Tcal decline in 2020, which represents, only on electrical energy savings, a displaced power of over 1,100 MW, along with the associated economic benefits for the country. Achieving this goal will generate additional benefits such as higher levels of industry production and lower CO2 emissions, among others.

Another significant example of policies created by the GoCh to encourage EE, included the draft Law on Energy Efficiency, currently pending approval in Congress, and expected to be implemented in 2017. The project law provides for the identification of EE measures in three

main areas: i) EE Industry and Mining; ii) EE for homes, small industries and businesses; and iii) EE in the public sector.

Studies indicate that there is an untapped potential of EE in all sectors: industrial, commercial, residential, public, and transportation. A study conducted by the National Comission of Energy (CNE) in 2008, indicates that Chile could cover almost 15% of its energy demand growth with EE, particularly through measures for the industrial sector. According to the National Energy Balance 2008, the productive sector (industry and mining) consumes 27% of energy, while the commercial, public and residential together, and consume 17.5%. In electricity, the same sectors consume 66% and 29% respectively.

Problem Addressed. From an institutional point of view, in Chile there is no regulation on EE applicable to productive companies, and very limited amount of companies which have specialized units in energy management. Finally, there are economic barriers, which are directly related to the above mentioned and are showed in a limited availability of resources to finance investments in EE. In addition, there is a significant lack of information and application of EE strategies and technologies and there is no adequate baseline for calculating the EE potential. In the case of the industrial sector, according to the University of Chile (PRIEN6 2008), there are technical barriers associated with lack of technologies, the limited technical capacity to define the technical specifications for equipment required in production processes.

Expected Benefits. This project contributes to the sustainable development process of Chile, mainly in two areas, the energy sector and the environment, with an overall positive effect on the economy. On the energy sector side, it will contribute to foster the efficient use of energy resources and on the environmental side, the use of EE practices will help reduce GHG emissions by reducing energy consumption. It will also contribute to generate Global Environmental Benefits in the form of carbon emission reductions as well as overall energy consumption reduction. The expected direct and indirect environmental benefits over a period of 10 years are presented in the following table.

Table 3. Expected Environmental Benefits over 10 years.

Type of Carbon emissions	SUB-TOTAL Comp. 2	SUB-TOTAL Comp. 3	Results (t CO2e)
Direct emissions reductions	28,613	265,077	293,690
Direct post project emissions reductions	0	0	0
Sub-Total direct emissions reductions	28,613	265,077	293,690
Indirect emissions reductions – Lower estimate[15]	85,840	795,230	881,070
Indirect emissions reductions – Higher estimate[16]	90,202	2,546,246	2,636,449
Total estimated carbon emission reduced			
Lower estimate[17]	114,453	1,060,307	1,174,760
Higher estimate	118,816	2,811,323	2,930,139

2.3. Methodology of the Final Evaluation (FE)

This Final Evaluation (FE) follows the "Guidelines for GEF Agencies in Conducting Terminal Evaluations" prepared by GEF, Document No.3 of 2008, where it sets forth the guidelines for conducting terminal evaluations of GEF-supported projects. The FE intends to evaluate the

efficiency of project performance and analysis based on the implementation of activities that have generated a number of services and products to produce the effects and impacts.

In the development of the FE three criteria are used to assess the level of achievement of results and project objectives:

- **Relevance** of the project: the extent to which the project results are consistent with the country 's priorities and focal areas / GEF strategies
- **Effectiveness** in achieving results: the average results of the project are or are consistent with the original or modified objectives of the project
- **Sustainability** of project results: the extent to which the results the project seeks to generate are sustainable from socially, environmentally and financially

2.4. Objectives of the Final Evaluation (FE)

This FE provides a comprehensive and systematic account of the performance of a completed project by assessing its project design, process of implementation, achievements vis-à-vis project objectives endorsed by the GEF including any agreed changes in the objectives during project implementation, and any other results. It has four complementary purposes:

- To promote accountability and transparency, and to assess and disclose levels of project accomplishment
- To synthesize lessons that may help improve the selection, design, and implementation of future GEF activities
- To provide feedback on recurrent issues across the portfolio and need attention, and on improvements regarding previously identified issues
- To contribute to the GEF Evaluation Office databases for aggregation, analysis, and reporting on the effectiveness of GEF operations in achieving global environmental benefits and on the quality of M&E across the GEF system

Other objectives of the FE include:

- A diagnosis that reflects the performance project implementation with reference to the implementation of activities and products as well as the final results achieved.
- Qualitatively and quantitatively identify the scope at technical, administrative and financial levels, and compliance indicators and key assumptions considered in the design stage, as well as lessons learned.
- Evaluate the effectiveness of Project Implementation Mechanisms and depending on the implementation performance of the components, the results obtained and resources used / invested, including the performance of enforcement mechanism.

2.5. Main FE Activities

The FE makes a report of the implementation of project resources as of July of 2016, with respect to the total project budget. This evaluation is done with respect to the updated project

budget presented in Annex 1. Development of the FE entailed three critical stages, as described below:

i) Phase I: review of documentation Project: This Phase included the review of the main documents of the Project set out in Annex 3. This stage took place at the beginning of March of 2016.

ii) Phase II: mission gathering information for FE and field visits: this mission was held from March 7-15 of 2016, in order to carry out a review and evaluation of the achievements of the project, and to collect inputs for the FE. The Mission held meetings with the Chilean Energy Efficiency Agency (AChEE), the Ministry of Mines and Energy, as well as field visits to project areas where interviews were conducted with beneficiaries of the project pilots of Component II. The list of meetings and interviews is presented in Annex 10.

iii) Phase III development of the draft and final report of the FE: This phase consisted of drafting the Report of the FE, for which IDB team was responsible for the necessary coordination for the review and collection of comments from the PEU and other stakeholders. This review was conducted in order to identify errors or inconsistencies in the information submitted and analysis as well as omissions of relevant aspects. All stakeholders mentioned had the opportunity to comment and to provide at this stage additional information relevant to the FE. The IDB team was in charge of collecting comments and additional information provided by stakeholders and these were incorporated and taken into account in preparing the Final Report of the FE.

2.6. Tracking Tools

The project must fill the Tracking Tools (TT) tools Climate Change in three different instances. The first was when requesting the approval by the GEF, the second is as part of the FE and the third and last is as part of the Terminal Review to be held at the completion of the project.

As part of the scope of the present FE it has made an estimate to report the capture of CO2 in the TT on Climate Change. The tool contains a series of questions designed so that staff can respond by the AChEE. When applying, the TT is repetitive, it is recommended that people in the team that participated in the last gathering information for the TT. When this is not possible, consider the information obtained in the previous TT to guide the new gathering information and seeking consistency in the evaluation.

3. PROJECT PERFORMANCE AND RESULTS

3.1. Results Framework & Indicator Matrix

Project Objective	The objective of this project is to promote and strengthen Energy Efficiency (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 sector, reducing energy consumption, increasing productivity and at the same time contributing to reduce carbon emissions.

Outcome Indicators	Base Level	Target Level
One-stop shop provides efficiently high-quality information and technical assistance on EE to the market	Information and technical assistance scattered.	✓
AChEE designs, monitors and evaluates EE programs following standards, continuously adapting to market changes and systematically incorporating lessons learned	No documentation on program design can be found, scattered program data, no program monitoring, no systematic evaluation of all programs	✓
Improve energy performance indicators	Baselines for subsectors: 0 Benchmarks for subsectors; 0 Energy surveys for subsectors: 0	5 Baselines for subsectors of the industrial and commercial sector (e.g agri-food) 5 Benchmark established for the baseline above 5 Energy surveys
The energy management good practices index increases from 18% to 25% according to the industrial EE survey	18 %	25 % (defined after baseline is known)
Direct CO2eq emissions reductions of the pilot projects	No pilot project was undertaken.	891 tons CO2eq per year 10-year EE investment lifetime: 8,910 tons CO2eq
Direct CO2eq emissions reductions of pilot programs	0 tons CO2eq per year	Direct GHG emissions reduction: 19,191 tCO2e for 10-year useful investment lifetime.
Direct GHG emissions reductions in ton CO2eq of financial mechanisms	None.	255,655 tCO2e for 10-year useful investment lifetime.

Component I. Institutional Strengthening and Capacity Building

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
(i)Institutional Strengthening						
Outputs Plan for the transition of the ACHEE to a one-stop shop providing technical assistance, information and training in energy efficiency	Technical assistance is scattered and very few training providers	✓				✓
ACHEE transformed to a one-stop-shop (including one phone number, one email address with follow-up tracking features, one web address serving as entrance point for EE information, and staff trained in customer service.)	One-stop shop not existing		Website online 3-5 people trained in customer service			One-stop-shop operating
# of trained ACHEE officers in EE program design, monitoring and evaluation, and M&V (monitoring and verification of savings.	ACHEE officers lack know-how on the management of EE programs	8				8
Intermediate outcomes						
# of calls and email received per day	No call center		50	100	200	200
% of request for technical assistance and information satisfactory responded (based on customer satisfaction survey)	No call center		60%	70%	90%	90%
# of visits to the website per year	No current website		10,000	15,000	20,000	20,000
Each EE programs designed by ACHEE has proper design documentation and M&E Plan	Program design not documented and no systematic M&E		✓			✓

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
(ii)Dissemination, seminars and workshops						
Outputs # of round-table established with the following characteristics: one public communication plan and a minimum of 10 representatives from companies attending each meeting.	No round-tables.	3	5			5
# of sectors with energy benchmarking based on energy indexes collected in the sector in Chile	There is currently none		3	5		5
# of sector-wise good practice handbooks on EE based on consolidated EE reports, pilot experience generated in component 2, and energy benchmarking				3	5	5

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
(iii)Market strengthening						
Outputs						
# of trained trainers in Measurement and Verification	None currently existing	10				20

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
# of professionals trained in energy consumption reduction Measurement and Verification	None currently existing		15	30	50	50
# of trained trainers in EE auditing and management	Very few current EE consultants skilled enough to deliver such training	20				20
# of representatives from companies trained in EE management	Few companies have in-house energy manager		25	50	100	100
# of professionals trained in EE auditing	Trained: none.		25	50	100	100
# of registered advanced EE consultants trained in system optimization (refrigeration, industrial compressed air, boiler and steam distribution) including visits to pilot project sites (component 2)	EE consultants registered lack practical experiences and specialized knowledge on specific technologies and systems		15	25	40	40
# of PIEE dissemination seminars	Lack of knowledge about the PIEE program among possible beneficiaries	4	6	8	10	10
# of performance contract models adapted to Chile	None	2	3			3
# of EE audits that receive the PIEE co-financing package are carried out	62 EE audits finished	75	150	225	300	300

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
Intermediate outcomes						
Capacity building in place to offer training for professionals in EE audit, M&V, and EE management.	No capacity	20 trainers trained in EE audit and management 20 trainers trained in M&V				20 trainers trained in EE audit and management 20 trainers trained in M&V
# of new EE consultants registered for CORFO's PIEE program fulfilling the requirements	Registered for CORFO's PIEE: 60	60	70	90	100	100
# of professionals that fulfill requirement to be registered as M&V specialist	None are trained nor registered		15	25	30	30
Total savings (MWh-eq) from recommended EE measures in new EE audits that receive PIEE co-financing	71 GWh-eq per year in the first 3 years of PIEE operation (48 EE audits completed).[1]	71 GWh-eq	120 GWh-eq	160 GWh-eq	200 GWh-eq	200 GWh-eq
Outcomes						
The energy management good practices index goes from 18% to regarding the energy management assessment matrix according to the industrial EE survey	18 % (Data to be confirmed when the survey is published in July 2009).					25 % (defined after baseline is known)

Component II. EE pilot projects in selected and prioritized areas

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
(i) Pilot projects						
Outputs Number of pilot projects implemented with a M&V plan	None		2	4		4
Verified results and lessons learned from pilot projects published and disseminated	None			2	4	4
Intermediate outcomes Verified energy savings in MWh-eq of leading EE technologies demonstrated	Lack of demonstrated experiences			1.21 GWh-eq per year	2.43 GWh-eq per year	2.43 GWh -eq per year
Outcomes Direct CO2eq emissions reductions of the pilot projects	No pilot project was undertaken.			446 tons CO2eq per year	891 tons CO2eq per year	891 tons CO2eq per year 10-year EE investment lifetime: 8,910 tons CO2eq

	Baseline	Year 1	Year 2	Year 3	Year 4	Target
(ii) Pilot programs						
Outputs # brochures on energy efficient equipment and display counter	Not existing	1 factsheet on EE motors 1 factsheet on EE VFD				2
# of co-financing grants (40 % subsidy each) provided for purchase of EE motors	0 motors subsidized	2,000 Motors	Motors: 4,000	Motors: 6,000	Motors: 9,000	motor 9,000
Intermediate outcomes % of penetration rate of energy efficient equipment	5 % penetration rate for EE motors according to (Fundacion Chile, 2008) [2]	10%	20%	30%	40%	40%
Outcomes						
Direct CO2eq emissions reductions of pilot programs	0 tons CO2eq per year					Direct GHG emissions reduction: 19,191 tCO2e for 10-year useful investment lifetime.

3.2. Achievement of Project Outcomes

Table 6. Achievement of Outcomes Rating

Project Objective	Outcome Indicators	Target	Target Assessment	Achievement Rating
The objective of this project is to promote and strengthen Energy Efficiency (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 sector, reducing energy consumption, increasing productivity and at the same time contributing to reduce carbon emissions.	One-stop shop provides efficiently high-quality information and technical assistance on EE to the market	Completed	Achieved	Pendiente
	AChEE designs, monitors and evaluates EE programs following standards, continuously adapting to market changes and systematically incorporating lessons learned	Completed	Achieved	
	Improve energy performance indicators	5 Baselines for subsectors of the industrial and commercial sector (e.g agri-food) 5 Benchmark established for the baseline above 5 Energy surveys	Achieved	
	The energy management good practices index increases from 18% to 25% according to the industrial EE survey	25 % (defined after baseline is known)	This Indicator was eliminated from the Results Matrix	
	Direct CO2eq emissions reductions of the pilot projects	891 tons CO2eq per year 10-year EE investment lifetime: 8,910 tons CO2eq	Pendiente Tracking Tool	
	Direct CO2eq emissions reductions of pilot programs	Direct GHG emissions reduction: 19,191 tCO2e for 10-year useful investment lifetime	Pendiente Tracking Tool	
	Direct GHG emissions reductions in ton CO2eq of financial mechanisms	255,655 tCO2e for 10-year useful investment lifetime.	Pendiente Tracking Tool	

3.3. Indirect Emission Reductions and Further Outcomes Achieved by the Program

The GCh has set ambitious goals in Energy Agenda to promote the efficient use of energy as an energy resource, setting a 20% savings target by 2025, considering the expected growth in the country's energy consumption by that date. The implementation of different plans, campaigns and programs, as well as the future Energy Efficiency Law aims to achieve total savings of 20,000 GWh / year by 2025, equivalent to an installed coal capacity of 2,000 MW.

This GEF program has been instrumental in advancing the technical and the institutional capacities of AChEE and the Government of Chile, positioning this agency as the industry reference for Latin America. From launching the first public initiative in 2005, called "the National Energy Efficiency Program", to the development of new and more focused public policies on energy and EE in 2008, to the creation of the Chilean Energy Efficiency Agency (AChEE) in 2010, the GoCh has been able to advance and put EE in the government agenda, achieving international standard recognition and high leveled commitments.

This GEF program in particular supported the GoCh in the development and consolidation of the AChEE. Although, only created in 2010, today the agency has become a "one-stop shop" and industry reference for EE technical expertise to the private and the public sectors alike by making available sector-specific information and technical expertise across different industries, by providing technical assistance and capacity building to industry stakeholders on project development and Measurement and Verification (M&V) techniques, by providing an updated registry of EE consultants, and by supporting policy development through market adaptation and incorporation of lessons learned.

Government interventions in EE, between 2011 and 2014, totaled CL$1,892,738,636.00 in projects across the Mining & Industry, Public Infrastructure, Transportation sectors, as well as in capacity building of the private and public sectors and educational programs. Because of GEF, AChEE was able to leverage these technical capacities to design and implement important government interventions in EE, altogether responsible for over 43,239 MWh in energy savings, and 14,562 tCO2e avoided emissions. It is estimated that Government interventions in EE will achieve a Lifetime indirect GHG emissions avoided (top-down) of 1.291.387 tones of CO2, and Lifetime indirect GHG emissions avoided (bottom-up) of 29.124 tones of CO2 (See GEF Tracking Tool).

This GEF Program was instrumental in enhancing AChEE´s capabilities in M&V and in establishing industry standards and norms in EE, such as the implementation of the Energy Management Systems (SGE) based on ISO 50001, the Certified Measurement and Verification Professional (CMVP) International Certification, and the development of specific industry guidelines for Measurement and Verification.

Without the development of the aforementioned standards, the Government would have lacked the tools to promote further investments in EE. Proof of that is the fact that over 40% of all GCh investments in EE during that period were oriented towards the direct application of AChEE´s new built capacities, split in four main categories: a) Development of EE draft projects, b) Incorporation of EE in the design of projects and processes, c) Promotion of Energy Savings Measurement and Verification Plans in EE projects, and d) Promotion of Energy Management Systems (SGEs). For more detailed information on the government interventions on each specific sector, please visit **Annex 7**.

<u>Outcome Indicator 1</u>: One-stop shop provides efficiently high-quality information and technical assistance on EE to the market.

- **<u>SIGUEE Platform:</u>**

The AChEE created the online platform called "Platform for the Management of Energy and the Efficient use of Energy - SIGUEE" to provide EE sector-specific information and technical assistance to the market. The platform supports the implementation of audits, the evaluation of energy efficiency measures, and the management of energy in companies, according to the norm ISO 50001.

Table 7. Screenshot of SIGUEE´s Website

Source: www.acee.cl

The website platform has received more than 136,000 visits, almost 50,000 of them during the first semester of FY2015. During the same period, 45 companies started to work directly in the AChEE's programs for Industry and Mining, reaching a total of 90 companies in the project lifetime.

- **<u>Technical Assistance on EE</u>**

The AChEE now also provides specialized workshops and seminars for staff members, Energy Service Companies (ESCOs) and end-users on: EE program design and evaluation, benchmarking, case studies and lessons learned, risk perception of EE projects, as well as Measurement and Verification (M&V) techniques for energy savings.

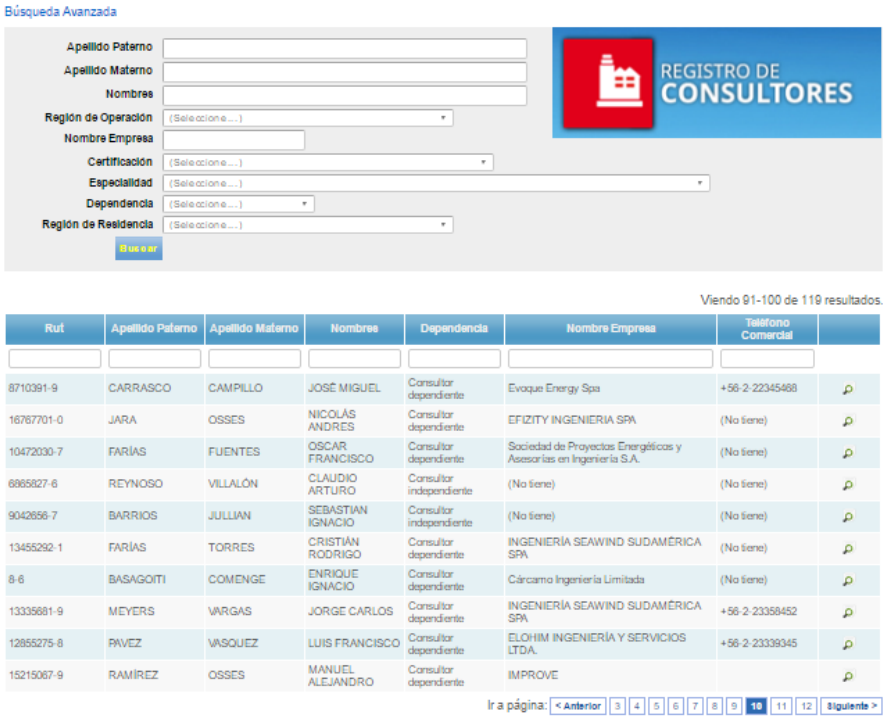
- **Course and Certification of the Measurement and Verification Protocol**

The AChEE developed the "Certified Measurement and Verification Professional (CMVP)" certification, with the aim of creating a market of specialists in the Measurement and Verification (M&V) of EE projects. Given the lack of market knowledge on EE M&V techniques, the AChEE provided, for the fourth consecutive year, the course "Using the Measurement and Verification Protocol IPMVP", leading to the CMVP certification. In Chile, to date there are a total of 77 professionals with the CMVP, of which 20 achieved certifications in 2014.

- **Registry of EE Consultants**

The AChEE has also developed a one-stop-shop or registry for the identification of EE professionals. The aim of the Register of Consultants is to have information on qualified consultants to conduct energy quality assessments, to identify energy efficiency measures, properly quantify potential energy savings and economically evaluate the company´s convenience. There are 119 registered consultants, as of today. (Click here to access the online Consultants Registry).

Table 8 Registry of EE Consultants



Source: www.acee.cl

<u>Outcome Indicator 2</u>: AChEE designs, monitors and evaluates EE programs following standards continuously adapting to market changes and systematically incorporating lessons learned:

- **<u>Design, Implementation and Certification for the Management of Energy Systems</u>**

This line of action was first implemented in 2013, in order to collaborate with the different public buildings in the adoption of an energy management system, whereby each building manager is able to track the energy consumption and EE indicators. The system implies the systematization of energy information, collaboration in the detection and implementation of optimization measures, detection and evaluation of optimization measures that require investment, development of action plans and finally, development of EE indicators. Some beneficiaries that have participated in the program include:

  - Energy Diagnostics in Northern Military Hospital, Hospital of Talca
  - Municipality of Villarrica- Hall Building, Municipal Building commune of Sagrada Familia and the Hospital de Cauquenes.
  - Technical assistance to projects in the Santiago Military Hospital and the Health Magallanes - former building geriatrics; energy efficiency diagnostics Horwitz Psychiatric Institute, the Hospital of Lota and the Hospital of Coquimbo.
  - Collaboration to the following Institutes of Higher Education: Catholic University of Valparaiso, Curauma Headquarters, the Faculty of Architecture of the University of Chile, the University of Bio-Bio and the University of La Frontera.

- **<u>Evaluation Capabilities: Measurement & Verification (M&V)</u>**

The AChEE has become a leader and benchmark for the Measurement and Verification of results of energy projects nationwide, as it provides technical assistance to both, implementers of these methodologies, as well as organizations or institutions that require their implementation and application.

In this context, the AChEE has acquired extensive experience in the development and implementation of M&V Plans for energy savings, in the selection and use of M&V equipment, in the collection and analysis of energy information, and in the measurement of EE savings as a result of selecting the most cost-effective energy saving initiatives, considering different types of EE projects.

Outcome Indicator 3: Improve energy performance indicators by developing the following studies:

- **5 Baselines for subsectors of the industrial and commercial sector**
- **5 Benchmarking Studies established for the baseline above**
- **5 Energy surveys**

The AChEE concluded the development of the study "Benchmarking Development on Energy Management for the Processed Food Industry and Design of an Implementation Plan for ISO 50001", the benchmarking study provides the following content:

- Initial characterization of energy management in companies from gathering information during the visits made through the questionnaire and sustainability indicators.
- Gaps with respect to the requirements of ISO 50001 based on the information gathered.
- Assessment of the technical-economic implementation of a Management System of Energy (SGE) in enterprises.
- Sectorial benchmarking on energy management per plant.
- Implementation plan for the installation of minimum energy management elements for processed foods industry.

32 plants of 21 companies from the processed food sector, classified into 5 different sub-sectors (canned, frozen, dehydrated, juices and bakery), participated in the "Benchmarking Development on Energy Management for the Processed Food Industry and Design of an Implementation Plan for ISO 50001" project.

The analysis of benchmarking data allowed the identification of gaps and the development of an Energy Management System Implementation Plan for the processed food industry. The plan provides the minimum elements that are considered essential for proper energy management in an organization, and to assist them to achieve the Energy Management Standard ISO 50001, using AChEE´s Implementation Guide. (Click here to download AChEE´s ISO 50001 Implementation Guide)

Outcome Indicator 4: The energy management good practices index increases from 18% to 25% according to the industrial EE survey.

This Indicator was eliminated from the Results Matrix.

Outcome Indicator 5: Direct CO2eq emissions reductions of the pilot projects:

Outcome Indicator 6: Direct CO2eq emissions reductions of pilot programs:

Outcome Indicator 7: Direct GHG emissions reductions in ton CO2eq of financial mechanisms learned:

Of the seven companies participating in the pilot project only three companies have experienced savings as a result of to the implementation of the EE enhancements, using the M&V plans. Those companies were:

- INVERTEC had savings of 172 MWh per year, which represents an energy saving of 46% over the reference period.
- FRIOFORT had savings of 127,011 kWh for the months of April and May, representing a saving of 12% over the reference period.
- ALIFRUT had savings of 22,652 liters of diesel oil in 126 days, which is equivalent to energy savings of 242,376 kWh, representing a saving of 7.4% over the reference period.

3.4. Completion of Project Outputs

Project Strategy	Expected Outcomes	Indicator	Baseline Level	End of Project Target	Achievement Rating	Comments (Victoria Galeano) Assessment based on last ISP provided (2nd Semester 2014.)
Component I. Institutional strengthening and capacity building	I. Institutional Strengthening					
	One-stop shop provides efficiently highquality information and technical assistance on EE to the market	1. Plan for the transition of the ACHEE to a one-stop shop providing technical assistance, information and training in energy efficiency	Technical assistance is scattered and very few training providers	Completed	Completed	
		2. ACHEE transformed to a one-stop-shop (including one phone number, one email address with follow-up tracking features, one web address serving as entrance point for EE information, and staff trained in customer service.)	One-stop shop not existing	One-stop-shop operating	Completed	
	ACHEE designs, monitors and evaluates EE programs following standards, continuously adapting to market changes and systematically incorporating lessons learned	3. # of trained ACHEE officers in EE program design, monitoring and evaluation, and M&V (monitoring and verification of savings.	ACHEE officers lack know-how on the management of EE programs	8	Completed	12 were trained.
Component I. Institutional strengthening and capacity building	II. Dissemination, seminars and workshops					
	Improve energy performance indicators	4. # of round-table established with the following characteristics: one public communication plan and a minimum of 10 representatives from companies attending each meeting.	No round-tables.	5	Partially Completed	3 round-tables were established.
		5. # of sectors with energy benchmarking based on energy indexes collected in the sector in Chile.	There is currently none	5	Partially Completed	1 sector with energy benchmarking was developed.
		6. # of sector-wise good practice handbooks on EE based on consolidated EE reports, pilot experience generated in component 2, and energy benchmarking.	There is currently none	5	Partially Completed	AChEE contracted a dissemination strategy to promote EE. However, this document does not reveal a good practice and benchmark handbook.

	III. Market strengthening					
Component I. Institutional strengthening and capacity bu	**The energy management good practices index goes from 18% to regarding the energy management assessment matrix according to the industrial EE survey**	**7. # of trained trainers in Measurement and Verification.**	**None currently existing**	**20**	**Partially Completed**	**3 were trained.**
		8. # of professionals trained in energy consumption reduction Measurement and Verification	**None currently existing**	**50**	**Completed**	
		9. # of trained trainers in EE auditing and management	**Very few current EE consultants skilled enough to deliver such training**	**20**	**Partially Completed**	**5 were trained.**
		10. # of representatives from companies trained in EE management	**Few companies have in-house energy manager**	**100**	**Completed**	**147 were trained.**
		11. # of professionals trained in EE auditing	**Trained: none.**	**100**	**Completed**	**400 were trained**
		12. # of registered advanced EE consultants trained in system optimization (refrigeration, industrial compressed air, boiler and steam distribution) including visits to pilot project sites (component 2)	**EE consultants registered lack practical experiences and specialized knowledge on specific technologies and systems**	**40**	**Completed**	**45 were trained.**
		13. # of PIEE dissemination seminars	**Lack of knowledge about the PIEE program among possible beneficiaries**	**10**	**Not Completed**	**No evidence of complition on ISP.**
		14. # of performance contract models adapted to Chile	**None**	**3**	**Completed**	
		15. # of EE audits that receive the PIEE cofinancing package are carried out	**62 EE audits finished**	**300**	**Not Completed**	**No evidence of complition on ISP, due to the abs cofinancing.**

Component II. EE pilot projects in selected and prioritized areas	I. Pilot Projects					
	Direct CO2eq emissions reductions of the pilot projects	1. Number of pilot projects implemented with a M&V plan	None	4	Completed	6 were implemented.
		2. Verified results and lessons learned from pilot projects published and disseminated	None	4	Completed	
	II. Pilot Programs					
	Direct CO2eq emissions reductions of pilot programs	3. # brochures on energy efficient equipment and display counter	Not existing	2	Completed	
		4. # of co-financing grants (40 % subsidy each) provided for purchase of EE motors	0 motors subsidized	motor 9,000	Not Completed	Only a course on EE motors is cofinanced by Procobre.
Component III. Financial Mechanisms for EE Projects	I. Financial Mechanism for energy end-users					
	1. # of banks that develop a business line adapted to EE investments within its activities 2. Direct GHG emissions reductions in ton CO2eq of financial mechanisms	1. Standardized procedure/platform for project financial and technical assessment	Not existing	Completed	Completed	Standard procedures for a partial credit guarantee FOGAE were completed.
		2. # of bank professionals that attend to the information session on EE financing	None	6	Not Completed	No evidence of complition on ISP.
		3. # of commercial banks that sign an agreement with CORFO for the EE Credit Line	2	6	Partially Completed	The Credit Line and PCG were open, however, the market did not demand them.

3.4.1. Component 1. Institutional Strengthening and Capacity Building and Energy Efficiency

Outputs 1 and 2: **AChEE´s Transition and transformation plan to an open window for the delivery of information**. The platform for the management of energy and the efficient use of energy "**SIGUEE**", structured the transition plan for AChEE to become an open window in 2012, and became the basis for the development of a single open window. This output was fully implemented, as SIGUEE is now active and serves as an entry point for information. (To access the Platform click **here**).

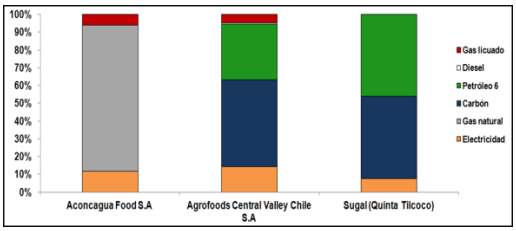
Output 3: Number of officials ACHEE trained in the design of energy efficiency programs, Monitoring and Evaluation and Monitoring and Verification of energy savings. Throughout 2012 and the first half of 2013, 12 staff members of the AChEE were certified, and conducted training courses on Measurement and Verification (M&V), on energy audits, and on energy management, exceeding the target set for this product of 4 people (with the same budget).

Output 4: **Number of round tables established with the following characteristics**. A plan of public communication and a minimum of 10 company representatives attended each meeting during 2011, the AChEE held three roundtables (Retail, Mining, Poultry, Milk Producers of Valdivia, and the Association of Food Companies). The Output is considered accomplished.

Output 5: **Number of sectors with energy benchmarking based on energy indices collected in each sector**. During the first half of 2012, different workshops were developed by the international company "CREARA" and presented to the AChEE's technical team and to 30 companies in the food industry, with the aim of developing an industry benchmark focused on the processed food industry sector, and designing an implementation plan of the ISO 50001 standard. The workshops were held in 3 regions to facilitate access to the maximum number of participating companies: Santiago (Metropolitan Region), Talca (Maule Region) and Temuco (Araucanía Region). Companies attended one or another depending on the proximity of their location to each of the workshops. The following are some of the benchmark results obtained in four (4) food industry subsectors: "Sources of energy use at the canned, dehydrated, frozen, and juice food sectors".

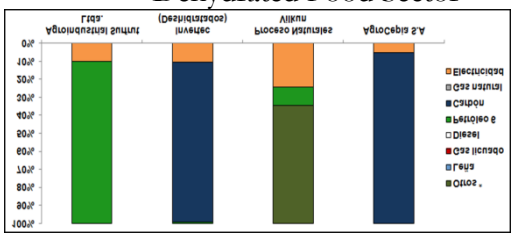
Table 9 Benchmark of Energy Sources used by Subsector Industry

Canned Food Sector



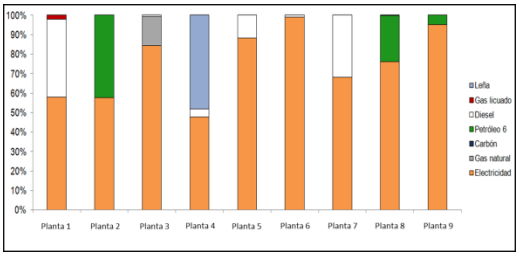
Thermic Energy Based (Coal and Oil)

Dehydrated Food Sector



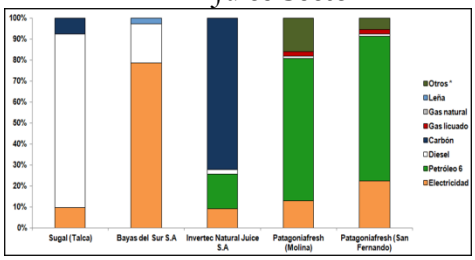
Thermic Energy Based (Coal and Oil)

Frozen Food Sector



Electric Based

Juice Sector



Thermic and Electric Based

<u>Output 6:</u> Number of manuals of good practice in the US, based on a consolidated energy efficiency report. AChEE developed and implemented a dissemination strategy for the Pilot Projects developed in collaboration with IADB and GEF for AChEEs industry and mining programs. The main objectives of the campaign were: a) Press Management for work developed by the Industry and Mining in the GEF/IDB projects under the World Day Efficiency energy (Macro Focus); b) Micro campaign approach to support lines and registration of consultants; and c) Promotion of Measurement and Verification (M&V).

Table 10 Crónica TVN Nacional. Diego Lizana presenting 3 success cases.

Source: AChEE, Final Report, Sistemas Sustentables.

Outputs 7 and 8: Number of coaches trained in measurement and verification (M & V) and number of coaches trained in auditing and management in energy efficiency. Program implementation reports account for the training of 3 trainers in M&V, however, the AChEE has developed the "Certified Measurement and Verification Professional (CMVP)" certification, with the aim of creating a market of specialists in the Measurement and Verification (M&V) of EE projects. Given the lack of market knowledge on EE M&V techniques, the AChEE provided, for the fourth consecutive year, the course "Using the Measurement and Verification Protocol IPMVP", leading to the CMVP certification. In Chile, to date there are a total of 77 professionals with the CMVP, of which 20 achieved certifications in 2014, according to public reports.

Outputs 9, 10, 11 and 12. Number of trainers, professionals and representatives of companies trained in energy management and energy auditing. EE consultants registered and trained in optimization systems (refrigeration, industrial compressed air, steam boilers and distribution); Professionals trained in measurement and verification (M&V) of reducing energy consumption; and professionals trained in auditing energy and management of EE. They were conducted jointly under the contract of the Institute of Public Affairs at the University of Chile in 2012, which was responsible for the realization of 7 workshops in and out of Santiago. As a result, 51 representatives of companies were trained in energy management, 56 media professionals were trained in verification (M&V) of reducing energy consumption and 119 professionals were trained in energy management audits and EE.

3.4.2. Component 2. Pilot Projects EE in priority industries and technologies.

Output 1: Number of pilot projects implemented with an M&V plan. In order to implement pilot demonstration projects on energy efficiency in the industrial and commercial sector of Chile, evaluation of 7 companies to which EE measures were implemented was made and energy conservation. The measures provided in this activity focused on the replacement, modernization and optimization of systems common high energy consumption in industry and commerce, such as cooling systems, Industrial compressed air, boilers and steam distribution, ventilation, heating and air conditioning (HVAC). A list of beneficiary companies and the name of the project is presented below:

Table 10 beneficiaries Companies

No.	company Benefited	Draft
1	Jaime Bosch B e Hijos CIA Ltda.	Heat exchangers drying ovens.
2	Invertec Foods SA	Lighting equipment parts.
3	Fruticola Dosal Ltda.	Controlled atmosphere One AC1.
4	Soc. Vinicola Miguel Torres SA	Biomass boiler.

No.	company Benefited	Draft
5	Minera Las Cenizas	Solar heating electrolyte concentration.
6	FRIOFORT SA	Frequency inverters and automation engine room.
7	Food and Fruits SA	thermal use compressors.

Activities to carry this product were:

- Information gathering and analysis of each of the Measures of Energy Efficiency Improvement (MEEIs) of companies.
- Development of the M & V plans for each MEEI.
- Track savings from the implementation of the MEEI.

Then MEEI of the seven pilot projects, its main characteristics, and challenges encountered and lessons learned are presented.

1. **HUERTOS MONTSERRAT (JAIME BOSCH E HIJOS CIA. LTDA.)**

Retrofit of Huertos Montserrat was implemented in Fundo San Antonio located in Talca. Such MEEI was to take advantage of the heat from the gases going into the atmosphere. For which it implied:

- Installing a heat exchanger in the fireplace;
- Installing fans (4 hp) for forcing the flow of fresh air through the heat exchanger, before being led into the combustion chamber;
- Installing an electric panel for fans.
- Retrofit was implemented in furnaces No. 1 and 2. While the oven No. 3 remained unchanged.

It was not possible to develop an ideal reference or baseline period, since at the time when the MEEI was proposed, it was already on an advanced implementation stage, added to the fact that the plum drying seasons are too short (February and March).

Given the existence of three drying ovens, and that the MEEI was implemented only in two of them, the third one was considered to establish a consumption reference model for comparison purposes, however, there was not gas meters, and instead meters at the ponds supplying the gas were used. Since the plum season is very short and the company lacked gas meters to provide daily measures, energy performance resulted almost equal between the furnaces with and without the MEEI. Therefore, it was not possible to obtain a conclusive result from the point of view of the IPMVP protocol. For future measurements, it is necessary to have gas meters for daily measures, preferably with automatic reading.

Table 11 Pictures of Huertos Montserrat

2. INVERTEC FOODS S.A.

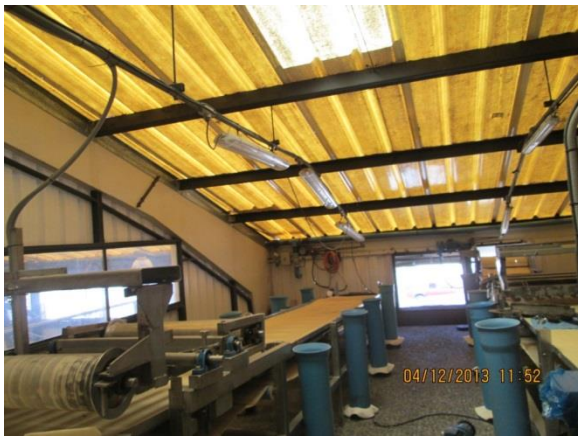
Invertec Foods Plant is located in Rengo, 114 km south of Santiago. This plant processes fruit and vegetables according to the specifications of different customers in the form of dehydrated and frozen (red, green and yellow peppers, tomato, jalapeno and apples) products.

MMEEs: consisted in the massive replacement of lighting installations. Replacements included the following parts of lamps and lighting fixtures:

- The first replacement (S1) consisted in the change of 173 metal halide lamps 173 (HM 400W) for magnetic induction (IM 200W) luminaires.
- The second replacement (S2) consisted in the change of 171 fluorescent tubes type (TF 2x36W) for LED tubes (LED 2x20W).

To carry the Measurement and Verification of energy savings, technicians estimated sample power measures, before and after the implementation of the measure to improve energy efficiency, as well as the hours of operation of the plants and the luminaires involved in the MMEE according to normal usage habits Invertec Foods; based on a 95% average use of lamps in operation.

Table 12 Invertec (Replacement of Luminaires)



Energy Efficiency Results

Table 13 Results of the MMEE

	Reference	Demonstrative	Savings	
	[MWh/Yr]	[MWh/Yr]	[MWh/Yr]	[%]
Salas de proceso	149	81	68	46%
Salas de envasado	146	78	68	46%
Zonas exteriores	20	11	9	45%
Oficinas	1	1	1	53%
Laboratorios	6	3	3	53%
Casino	9	4	5	53%
Otros	39	21	18	46%
Total	372	200	172	46%
Monetary Savings [MM$/Yr]			7,6	

According to the Measurement and Verification of savings made, replacement of lights (MMEE S1 and S2) provided energy savings equivalent to 172 MW/year, which is 46% less energy expenditure compared to the reference period. This translates into a monetary savings of approximately CLP $7,600,000 per year.

Estimated savings for energy efficiency study preliminary to this measurement was 269 MW/year, equivalent to a 47% decrease in energy expenditure compared to the reference period. However this represented an equivalent to about CLP $12,000,000 per year greater monetary savings. This has occurred because the preliminary study overestimated the number of hours of use of the luminaires, using 7060 hours/year of operation in all sectors. This was later rectified when measuring and verifying savings, where adjusted operating hours indicated by the Invertec.

3. FRUTÍCOLA DOSAL

Dosal fruit is a fruit company that has several cooling systems and controlled atmospheres (ACs) for maintenance of the fruit. The MMEE consisted in improving some of these systems, implementing changes in the automatic control system (PLC Computer), and installation of variable speed drives on fans at the evaporators and condensers, commanded by the PLC, which serve to maintain a discharge pressure within established parameters and thus prevent the compressors work at very high pressures, which is directly related to energy consumption.

According to POCH, the firm that performed the M&V of the implemented MMEE, it was not possible to obtain conclusive results in terms of energy savings. This happened because many of the MMEE were already implemented and this impeded the development of a reliable model to establish baseline references.

In order to establish a baseline consumption model (D option in the IPMVP), two cold environments (atmospheres controlled - AC) were used, one with and one without modifications. Although, it was not possible to obtained results based on the M&V protocol for technical reasons, estimates yielded savings of **73,512 kWh** per season.

Table 14 Pictures Frutícola Dosal




MMEE: Installed PLC Control Dashboard

4. VIÑA MIGUEL TORRES SA

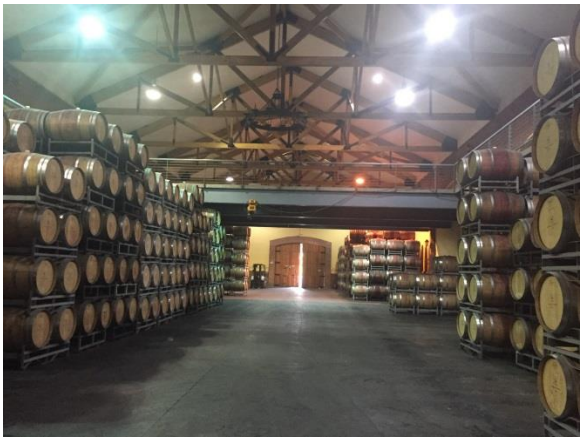
Miguel Torres is a winery that uses a hot water boiler for various uses, where a gas boiler was replaced by a pellet.

The MMEE consisted in the replacement of existing water boilers to connected to a GLP (509kW and 407kW), which remains in operation, by one that burns wood pellets.

According to the POCH report, it was not possible to measure pellet consumption because measurements require a larger intervention in the GLP and the company had no interest in investing more in the project. As a result, gas measurements to establish the baseline consumption were inconsistent.

Technicians developed an estimate of savings outside the IPMVP, which yielded energy savings of **42.176,24 kWh** per season, which corresponds to an energy saving of **22%** over the reference period. Meanwhile, the estimated monetary savings were CLP $17.8 million per season equivalent to a 70% of savings.

Table 15 pictures 4. Viña Miguel Torres



Click here to see video

5. FRIOFORT SA

FRIOFORT is a company dedicated to freeze and store refrigerated products. The MMEE implemented consisted of cold systems, focusing on the five screw compressors responsible for maintaining the temperature of the storage chambers. In addition, the boards were modernized and an automation system was implemented through a centralized PLC system.

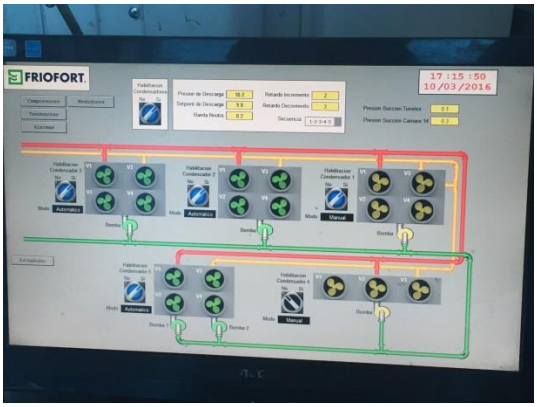
Notably FRIOFORT was a very participative company, providing monthly data and production of electrical energy continuously throughout the project.

For the M&V plan the correlation between electricity production and degree day, which was quite adequate, only with a CV a little high, but a standard error of savings expected near analyzed. According IMPVP, savings must be greater than twice the standard error to be different from the normal process variation. As no more measurements were available and failed to identify any other independent variable that could explain this variation, this model was adopted and savings calculated as expected.

From experience FRIOFORT also it understands the need for a good understanding of the process so that all independent variables can be identified and analyzed.

In the case of FRIOFORT has made an estimate of savings for a "typical year" with MMEE implemented, whereby consumption 6,610,200 kWh (reporting period) was estimated, the adjusted baseline consumption was 7,152,163 kWh, hence saving 541,963 kWh / year power corresponding to 8% was obtained.

Table 16 pictures FRIOFORT



6. ALIMENTOS Y FRUTOS, ALIFRUT S.A.

ALIFRUT is a food company processing frozen fruit and vegetables. It uses boiled steam, mainly from burning oil, for washing and processing fruit, melting cold tunnels, and sanitizing facilities. It also uses electricity to power the ammonia compressors to generate cold. The operation is seasonal, with higher activity from October to May.

The MEEI involved the installation of two plate heat exchangers to utilize the residual heat from the compressor system to preheat cold water before mixing with steam. Thus, less steam would be needed for preheating.

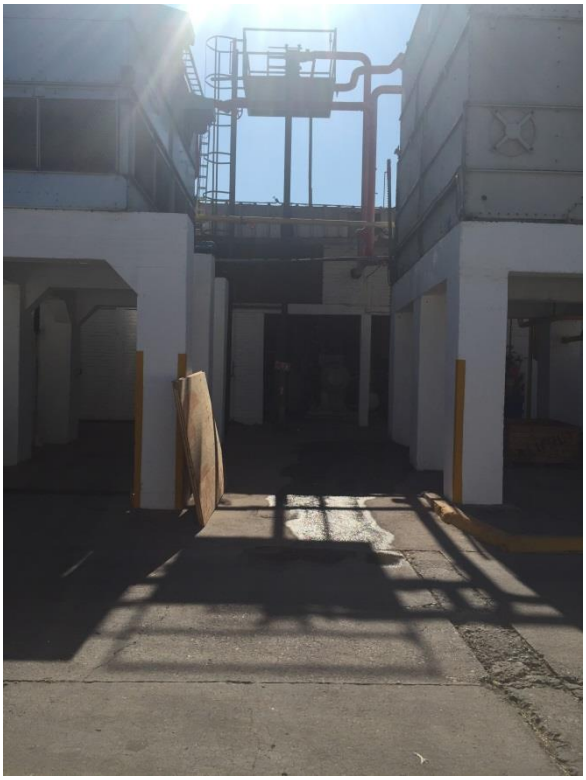
Prior to the implementation of the MEEI, ALIFRUT was already performing daily measurements of water, steam, oil and production. Oil measurement is done with a rod in the pond (what seemed an unreliable process). The M&V plan showed a good correlation between oil and steam, oil and water, but with many points outside the curve (outliers). It was determined that these points represent measurement errors (mainly from oil), so they were removed, and a lineal regression model between oil and water was considered, eliminating a lot of error points. In the reporting period these outliers remained and the relationship between oil and water remained practically unchanged, resulting in savings well below what it was expected.

Later another analysis was made for the measurements of the reference period, which pointed to a good correlation between oil and water production (and also degree-days, three independent variables) was performed. Under this model, energy savings approximate what is

expected. However, from the point of view of engineering, this latest model only makes sense if the boiler operates according to production (increasing pressure for example), which to date has not yet been confirmed. Two important lessons come from the ALIFRUT pilot project:

- Processes and forms of control need to be well known in order to develop a reference model
- Manual measuring processes with high probability of errors must be avoided.

Table 17 Pictures Alimentos y Frutos S.A.



7. MINERA LAS CENIZAS

Minera Las Cenizas is a copper production plant, that uses a boiler to heat the electrolyte. The MEEI consisted in the installation of a SWH system for preheating the boiler.

The measurements provide a good correlation between the oil and the volume of rich electrolyte processed. Note that in this project the MEEI was not fully implemented due to administrative problems between Minera Las Cenizas and the engineering company responsible for implementing the MEEI.

Output 2. Number of Brochures of Energy Efficiency Tools. AChEE developed two (2) brochures on EE, one for the Lines of Support on Industry and Mining, and one for the Implementation of Pilot Projects on EE.

CASO DE ÉXITO DOSAL

AHORROS EN ENERGÍA	73,512 MWH / (ANUAL)
BENEFICIOS ECONÓMICOS	AHORRO DE MM $3,6 (ANUAL)
REDUCCIÓN DE GEI	GEI ES DE 31,5 TONCO2EQ (ANUAL)

"Nosotros como trabajadores de esta empresa entendemos que hoy día la eficiencia energética tiene que pasar por usar bien el recurso, es decir, usar lo que tenemos que usar sin perder energía en instancias que no se requiera"
-Jorge Olivos Castro-
Jefe de Operaciones.

CASO DE ÉXITO MIGUEL TORRES

Miguel Torres Chile es una viña fundada en Curicó (Chile) en 1979, por la firma española Miguel Torres. En 230 hectáreas, la Viña Santa Digna cultiva Sauvignon blanc, Riesling, Gewürztraminer y Chardonnay (para los vinos blancos) y Cabernet sauvignon (para los tintos y rosados). En menor escala, se cultiva la Pinot noir, que contribuye a la Cuvée de un vino Espumoso Brut.
Además de los vinos Santa Digna, las condiciones del viñedo chileno han permitido desarrollar nuevas Viñas como Manso de Velasco, que produce un Cabernet Sauvignon, nacido en viñas centenarias y nunca injertadas.

MEDIDA DE EFICIENCIA ENERGÉTICA

El vínculo con la Agencia Chilena de Eficiencia Energética nace por la iniciativa de Miguel Torres de buscar alternativas para ser más eficientes energéticamente y de reducir el impacto de la huella de carbono de su proceso productivo con el objeto de ser más sustentables y amigables con el medio ambiente.

Con el apoyo de la AChEE se detectó que el sistema de agua caliente controlado por Caldera presentaba una oportunidad de reemplazo a una tecnologías más eficientes. Previo a la medida de Eficiencia Energética implementada, las calderas sólo utilizaban Gas Licuado de Petroleo (GLP) para calentar el agua del proceso de almacenamiento de vinos en cubas de 50 m3, y el lavado y sanitización de las mismas.

La medida de Eficiencia Energética implementada consiste en un recambio tecnológico, es decir, reemplaza las antiguas calderas que utilizan GLP, las que operaban con rendimientos de 75%, por calderas a Biomasa (pellets) con rendimiento de 88%.
Este cambio de tecnología y combustible significó una reducción de costos importante para la empresa, ya que el GLP es más caro que el combustible alternativo utilizado. Además, al ser una industria que regularmente realiza poda de sus plantaciones, generaría la oportunidad de autoabastecerse energéticamente.

AHORROS EN ENERGÍA	22,581 MWH (ANUAL)
BENEFICIOS ECONÓMICOS	MM $9,7 (ANUAL)
REDUCCIÓN DE GEI	9,75 TONCOEQ (ANUAL)

3.4.3. Component 3. Funding Mechanisms for EE

Component was part of a co-financing mechanism contributed by CORFO for the following programs:

a) The CORFO instrument known as Pre-investment in Energy Efficiency (Pre-Inversión en Eficiencia Energética, or PIEE), a direct subsidy to finance EE consulting services including i) assessment to quantify potential energy savings, ii) implementation plan and/or iii) financial analysis of energy efficiency measures. These technical assistance activities must be carried out by a consultant accredited by the National Normalization Institute (Instituto Nacional de Normalización, or INN). This financial mechanism allows companies with annual net sales up to US$ 33 million to hire EE consulting services to quantify their energy savings potential and develop an improvement plan. CORFO covers up to 70% of the total cost of the consultancy, to a maximum of US$ 10,000. From the launch of this program through December 2009, 154 contracts have been approved, of which 110 have already presented their final report.
b) The EE credit line to finance investments of up to US$ 1 million for optimizing energy use in businesses. This credit line allows companies to finance investments in energy optimization projects. Companies, production cooperatives and associations with annual sales up to US$ 33 million, excluding VAT, can apply for this credit line. This financial instrument is available to different sectors such as industry, agriculture, mining, fisheries, tourism and health. This credit is facilitated through banks with a preferential interest rate, grace periods of up to 18 months and payment terms from 2 to 12 years.
c) The CORFO Guarantee for EE projects was approved by the General Accounting Office in December 2009.

The execution of this component was as follows:

- The resources allocated by CORFO under the Pre-Investment Program in Energy Efficiency during the period between June 2009 and November 2010 amounted a total of $ 377,217,172.
- 17 lending operations, whose resources were allocated to CORFO to finance the Non-Conventional Renewable Energy Credit Program in the amount of US $133,133,959, of which 20% were funded by CORFO with a corresponding amount of US $26,626,791.
- The EE credit line was suspended by CORFO´s Executive Credit Committee on December of 2010, resources were depleted, due to budgetary constraints associated to the KfW-CORFO cooperation.

While credit resources from CORFO were used to finance only Non-Conventional Renewable Energy projects, the GoCh complied its commitments by making the credit line available for Energy Efficiency programs. The GoCh argued in a letter (No. 672 jointly signed by the AChEE and CORFO) that the lack of financing to EE projects was due to market externalities.

In addition, GEF funds were used in the preparation of a number of studies to evaluate the financial barriers and other specific conditions affecting the development of EE projects in the market. The study "Formulation and Structuring of a Financial Instrument for the Energy Services Market in Chile", elaborated by GERENS in April of 2012, provides recommendations for the operation of an EE Credit Line, and a Partial Credit Guarantee (PCG), later named FOGAEE; and the necessary measures to implement the recommendations of the study, including marketing initiatives, sessions to commercial banks and the development, testing, and dissemination of a standardized process for assessing loan applications for EE investments. A second study was also developed to adapt the financial instrument (FOGAEE) to the current and future conditions of the EE market. The main stakeholders of this market (financial institutions, guarantee companies, ESCOs, end users, etc.) were involved in the execution of such study.

4. FINDINGS

4.1. Implementation Strategy and Project Design

The strategy and design of the project is analyzed on the basis of the major changes that have been identified during project implementation. For this analysis, the findings have been divided into three key points: i) project implementation performance; ii) outputs and results achieved; and iii) co-financing.

4.1.1. Project Implementation Performance

4.1.1.1. Approved Budget and Budget Execution

The Project was approved on October 2010 and obtained eligibility on November 2011. The first disbursement occurred in February 2013. Monitoring the budget execution was carried out by the IDB semiannually, using the Semi-Annual Progress Report (ISP) prepared by the executing agency. This report was updated based on the financial activity developed and allows to track individual goals of physical and financial progress for the following years. The following table compares the current financial budget of the project with the costs incurred.

Table 5. Budget Execution by Funding Source

Component	Planned Budget	Planned Budget	Total Planned Budget	Total Execution	% Of total Budget Execution
	GEF	Co-Financing	GEF+ CoFinancing	GEF+ CoFinancing	
	(US$)	(US$)	(US$)	(US$)	
C1. Institutional strengthening and capacity building on EE	$978,780.00	$4,318,000.00	$5,296,780.00	$24,813,927.00	468.47%
C2. EE pilot projects in priority industries and technologies	$1,242,683.00	$5,117,000.00	$6,359,683.00	$28,412,888.00	446.77%
C3. Funding Mechanisms for EE projects	$225,916.00	$29,860,000.00	$30,085,916.00	$905,091.00	3.01%
Project Management	$188,985.00	$395,000.00	$583,985.00	$74,700.00	12.79%
TOTAL AChEE	**$2,636,364.00**	**$39,690,000.00**	**$42,326,364.00**	**$54,206,606.00**	128.07%
FOMIN (Fundación Chile)		**$975,000.00**	**$975,000.00**	**$927,348.00**	95.11%
TOTAL PROJECT				**$55,133,954.00**	

As of July 2016, AChEE executed a total of **US$54.206.606,00** million, 128% of the total budget Project. If analyzed separately, the implementation of GEF funding resources and co-financing, the AChEE executed 4,7% of GEF resources and 95,3% of co-financing resources.

Fundación Chile also executed project resources in the amount of US$ 927,348.00.

4.1.1.2. Audit Opinion of Crowe Horwath Auditors

Crowe Horwarth, the auditing firm that audited the project financial statements submitted the following opinion:

"Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with International Standards on Auditing issued by the International Federation of Accountants (IFAC) and according to the Guidelines of External Audit of operations financed by the Inter-American Development Bank. Those standards require that we plan and perform the audit to obtain reasonable assurance that the financial statements of the Project are free of material misstatement. In our opinion, such financial statements present fairly, in all material respects, the cash received, disbursements made and retained for the year ended in December, 31 of 2015 for the project "Development and Strengthening of Market Efficiency Industrial Sector energy in Chile "- Technical Cooperation agreement nonrefundable GRT / FM-12414-CH, in accordance with the accounting principles referred to in Note 2 to the financial statements".

4.1.2. Outputs and Results Achieved by Component

The project consisted of three main components.

Component I – Institutional strengthening and capacity building

Results of this component were achieved satisfactorily. The project was able to strengthen the technical capacities and knowledge of AChEE in EE, to develop a registry of EE engineering firms and M&V certified technicians, as well as to consolidate AChEE as a "one-stop shop" and information platform to inform the industry.

Component II – EE pilot projects in selected and prioritized areas

Although most of the pilot projects were successfully implemented from a physical standpoint, many of them provided inconclusive results in terms of energy savings, from a strict technical standpoint following the IPMVP. In several cases, alternative measuring models provided positive results in terms of EE. Two conclusions are derived from this situation: a) the pilots were either not selected or conducted appropriately in order to make EE measurements according to the IPMVP possible, or b) AChEE and the industry is not prepared to use the IPMVP, and other more relaxed measures should be developed.

At a higher level, based on the field visits, interviews and other indirect results collected from the pilot projects, the FE concludes that there is appetite for EE projects in the food industry, and therefore, a continuing support to the industry is relevant and important for the development of such industry in Chile.

Component III – Financial Mechanisms to promote EE Projects:

The main output financed with GEF funds was successfully delivered, as it provided the technical knowledge necessary for the design and implementation of previously unknown financial instruments for the EE market in Chile (an EE Credit Line and Partial Credit Guarantee to finance EE projects under ESCO models and EPC contracts). However, from an outcome perspective, CORFO was not able to finance EE projects due to market externalities associated to reductions in the energy prices and difficulties to introduce such financial mechanisms on a relatively unattractive and insipient market.

4.2. Project Management

Although initial project implementation was delayed after the original executing agency, PPEE, was dissolved and AChEE was created and assumed responsibility for the project's implementation, efforts made by the AChEE in terms of management and coordination for the completion of the project components have been satisfactory. AChEE has been strengthened since its creation and continues to promote energy efficiency within the industry. Seven energy efficiency projects have been implemented or are under implementation in the selected prioritized areas of this program. AChEE has taken the necessary measures to overcome the obstacles faced by the projects, which proves its technical and management capacities.

AChEE demonstrated high capacity in the implementation of capacity building activities in EE to private sector companies, which was reflected in the satisfaction surveys provided by course

assistants. However, with regards to the selection and implementation of the pilot projects, we consider that there is room for improvement. This consideration emanates from analyzing the final technical evaluations, where many of the results are inconclusive from the IPMV. The challenge to obtained conclusive results are due to several differing reasons, including, a) the company had already started the MEEI, b) the company didn´t want to make further investments in meter equipment, c) the company uses unreliable measuring and control processes, most of which impeded the development of a reference model to compare energy savings. Although, in most cases, alternative methods, outside of the IPMV provided positive energy savings, these results are only useful in the realm of a pilot, but they turn shaky when translated into final conclusions to help spur development in the industry. It is important that AChEE provides a higher degree of scrutiny when selecting pilot project candidates/beneficiaries, and a to exercise more detailed technical due diligence in order to invest grants into private sector companies, so that the M&V process is implemented with a higher rigor.

Management and coordination of the pilot projects was satisfactory, along with a fluid communication between the AChEE and beneficiaries of the projects for its implementation, monitoring and maintenance. Coordination skills from AChEE staff have been instrumental in all processes of development of EE measures in the six projects that were carried out.

Coordination and management with the IDB was also satisfactory. Coordination has allowed formal requests, reports, requested meetings are carried in a good way.

4.3. Project Effectiveness

With respect to capacity building under component I, a breakthrough occurs in the degree of effectiveness of the actions taken. Beneficiaries of the academic workshops, in both the metropolitan area and outside, expressed a high degree of satisfaction and indicated their willingness to continue participating in similar courses. The training targeted to AChEE officials, private sector businesses and to the general public was also very effective in ensuring the quality of technical knowledge provided.

There was a mixture of results obtained from the pilot projects. Implementation was successful but energy saving measurements provided inconsistent results from the IPMV standpoint, but positive results from alternative models. It is assumed that the alternative models are accepted and therefore that companies were able to achieve energy savings. The pilots did provide several lessons learned and institutional strengthening for the AChEE, the private sector and the EE industry in general.

The benchmarking studies and interaction between the selected companies and AChEE were been instrumental in ensuring the effectiveness of interventions.

4.4. Project Sustainability

The experience gained in the development of the different workshops by the AChEE through the implementation of the actions of component I, has been critical to strengthening capabilities of the AChEE in the EE areas. This experience and commitment will be a key factor to the sustainability of the AChEE in supporting the EE industry.

Pilot projects implemented under component II have shown that the measures undertaken by the AChEE throughout the implementation of the MEE measures are viable and sustainable over time, and have demonstrated energy savings in the food industry as well as appetite for EE projects. However, a careful revision of the application of the IPMV and its implementation in the industry is necessary so that EE projects can demonstrate their viability and consequently become bankable by the financial industry and the private sector.

The interviews held with representatives of the beneficiary companies indicate that the installed equipment will be reviewed in light of preventive maintenance in order to guarantee the life of the machinery.

5. CONCLUSIONS AND RECOMMENDATIONS

The GoCh has shown its commitment to make a quantum leap in the development of EE, transitioning from a demonstration model towards the creation of a legal framework, turning EE into a long-term policy. A series of critical events since 2005, where the Bank along with GEF funds has played a critical role, have been instrumental in such transition. From launching the first public initiative in 2005, called "the National Energy Efficiency Program", to the development of new and more focused public policies on energy and EE in 2008, to the creation of the Chilean Energy Efficiency Agency (AChEE) in 2010, the GoCh has been able to advance and put EE in the government agenda, achieving international standard recognition and high leveled commitments.

This program in particular supported the GoCh in the development and consolidation of the AChEE. Although, only created in 2010, today the agency has become a "one-stop shop" and industrial reference for EE technical expertise to the private and the public sector alike by making available sector-specific information and knowledge across different industries, by providing technical assistance and capacity building to industry stakeholders on project development and M&V techniques, by providing an updated registry of EE consultants, and by supporting the policy development through market adaptation and incorporation of lessons learned.

The EE pilot programs were an innovative initiative to spur positive externalities in an infant market, even under difficult conditions for EE investments. It provided demonstrative examples for companies across different food industry sectors, to identify EE improvements and possible investments. By participating in the pilots, and having access to technical experts who accompanied their implementation, companies learned along the process about the benefits of changes to the current processes and retrofitting of equipment that would translate into energy savings and better use of the company resources. The companies visited expressed tangible economic benefits derived from energy savings and from a reduction of productions costs. They also learned about better practices in energy management, and how small adjustments could translate into larger saving impacts. In some case, the EE pilots helped the company to identify enhancements to utilize water resources more efficiently as well. Based on the companies visited, there is appetite for EE projects in, and therefore a continuous support to EE projects the industry is relevant and important for the development of such market in Chile.

From an implementation perspective, AChEE demonstrated high capacity in the implementation of capacity building activities in EE to private sector companies however, with regards to the selection and implementation of the pilot projects, the evaluation considers that there is room for improvement where AChEE should exercise a more detailed technical due diligence in order to invest grants into private sector companies, so that the IPMV protocol can be implemented to measure energy savings accurately.

This FE concludes that this program was effective in terms of strengthening the institutional capacities of AChEE, creating industry awareness among different groups of beneficiaries and stakeholders, including private sector companies, banking sector, engineering firms, and public officials, among others. It was also effective providing demonstrative projects, tangible data and business cases to promote EE investments across different production sectors.

Annex 1. MTR Ratings

Measure	MTR Rating		Achievement Description
Project Strategy			This FE considers that the development hypothesis of the project was properly addressed, that is, there was a proper anlysis of the sector problems and their root causes preventing the development of an EE market including lack of regulation on EE applicable to productive companies, lack of information and application of EE strategies and technologies and no adequate baseline for calculating the EE potential. The FE considers that the project strategy was well conceived and properly implemented through the execution of the project outputs.
Progress Towards Results	Objective:		to promote and strengthen Energy Efficiency (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 sector, reducing energy consumption, increasing productivity and at the same time contributing to reduce carbon emissions
	Outcome 1:	HS	One-stop shop provides efficiently high-quality information and technical assistance on EE to the market.
	Outcome 2:	HS	AChEE designs, monitors and evaluates EE programs following standards, continuously adapting to market changes and systematically incorporating lessons learned.
	Outcome 3:	HS	Improve energy performance indicators
	Outcome 4:	N/A	The energy management good practices index increases from 18% to 25% according to the industrial EE survey
	Outcome 5:	TBD	Direct CO2eq emissions reductions of the pilot projects
	Outcome 6:	TBD	Direct CO2eq emissions reductions of pilot programs
	Outcome 7:	TBD	Direct GHG emissions reductions in ton CO2eq of financial mechanisms
Project Implementation & Adaptive Management	Satisfactory		ACHEE demonstrated high capacity in the implementation of capacity building activities in EE to private sector companies, which was reflected in the satisfaction surveys provided by course assistants. However, with regards to the selection and implementation of the pilot projects, we consider that there is room for improvement.
Sustainability	Satisfactory		Pilot projects implemented under component II have shown that the measures undertaken by the ACHEE throughout the implementation of the MEE measures are viable and sustainable over time, and have demonstrated energy savings in the food industry as well as appetite for EE projects. However, a careful revision of the application of the IPMV and its implementation in the industry is necessary so that EE projects can demonstrate their viability and consequently become bankable by the financial industry and the private sector.

Annex 2. MTR Mission Itinerary and Persons Interviewed

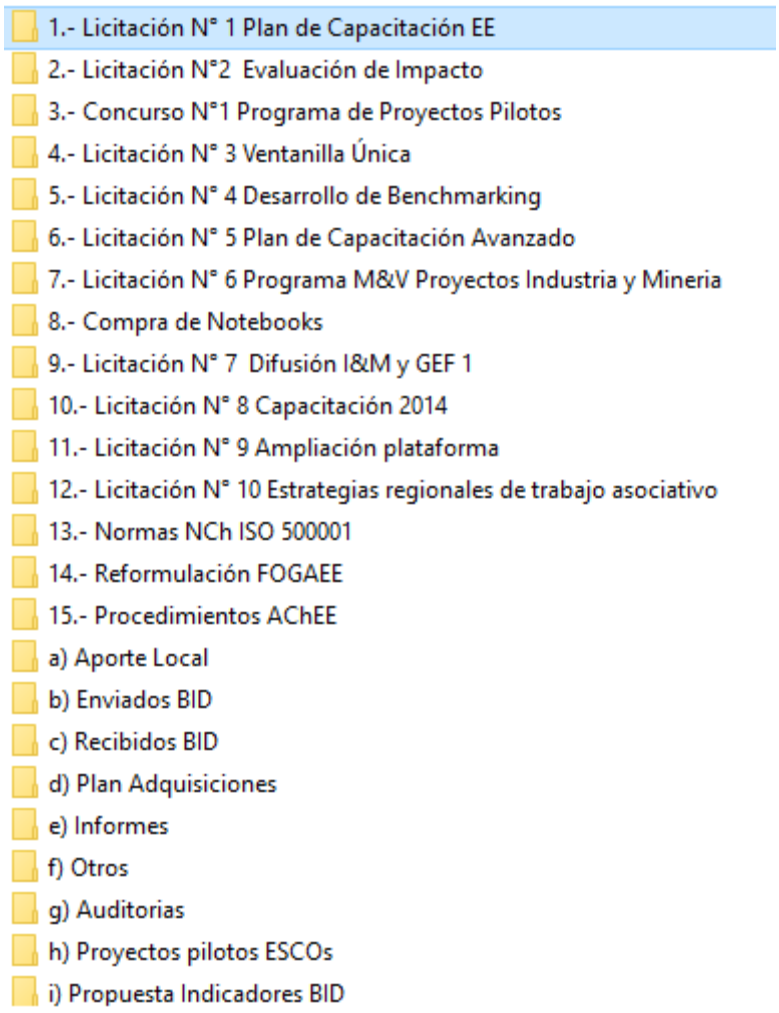
Mission 2: From March 9th through 15th

Project Meetings and Interviews:

- Ximena George and Miguel Stutzin (GEF Focal Point -Environmental Ministry of GoCh)
- Diego Lizana (Executive Director -AChEE-)
- Sebastian Jure (Operations Manager -AChEE-)
- Roxana Cid (Administration and Financial Manager -AChEE-)
- Juan Pablo Payero (Interim Project Manager)
- Alvaro Soto (Chief of Measurement and Verification Area -AChEE-)
- Alejandro Silva (EE Division -Energy Ministry of GoCh-)
- Romina Grancelli Monsalves (Ingeniero de Proyectos, Alimentos y Frutos S.A.)
- Sociedad Vinícola Miguel Torres S.A.
- Nelson Arenas (Fruticola Dosal)
- Andrés Barton (Invertec Foods S.A)

Annex 3. List of Documents Reviewed

The AChEE provided 21 GB (6,302 files) of information related to the project. All the information related to the project execution and technical evaluations of the pilots was reviewed and incorporated in this report. Information related to the financial management, procurement and financial disbursements was also assessed.



Annex 4. Field Mission (Photographic Registry)

To see all pictures from visited pilot projects, click here:

https://www.flickr.com/gp/47510054@N02/03c4z0

Annex 5. Co-Financing Table

Sources of Co-financing	Name of Co-financer	Type of Co-financing	Amount Confirmed at CEO endorsement (US$)	Actual Amount Contributed as of September 30, 2015 Review (US$)	Actual % of Expected Amount
GEF Funds	GEF	Grant	$2,636,364.00	$2,578,878.00	98%
IADB	IADB	Grant	$975,000.00	$927,348.00	95%
Co-financing			$3,611,364.00	$3,506,226.00	97%
AChEE	AChEE	In Kind	$3,694,927.00	$23,495,483.00	636%
CORFO	National Government	Credit Line	$31,885,400.00	$26,607,212.81	83%
Private Sector			$3,134,673.00	$1,525,032.19	49%
Local Financing			$38,715,000.00	$51,627,728.00	133%
		Total	**$42,326,364.00**	**$55,133,954.00**	**130%**

Annex 6. Signed Code of Conduct

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.

2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.

3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source.

Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.

4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.

5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.

6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings and recommendations.

7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

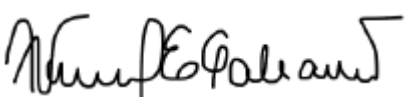
MTR Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Consultant: Victoria Galeano

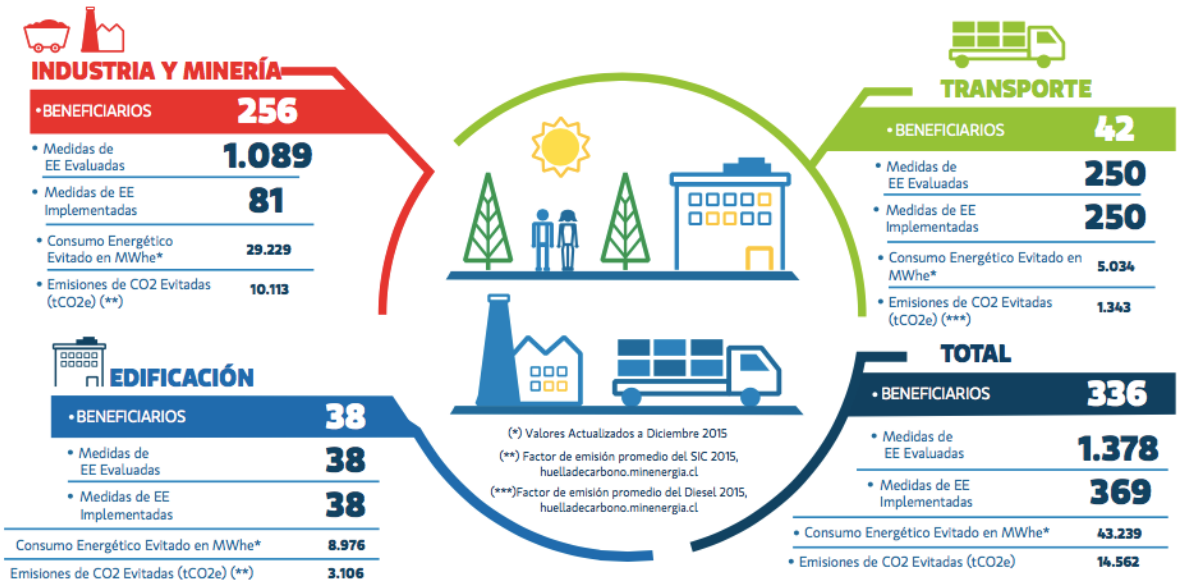
I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at __Washington D.C. _____ (Place) on _June 26, 2016_____ (Date)

Signature: _  _____

Annex 7. GCh Interventions in EE, CO2 Avoided Emissions and Other Results Achieved by Sector

A. Measured and Verified Results: AChEE 2011-2015



B. Government of Chile´s Investments in EE between 2011-2014

Sector Económico	Sum of Inversión AChEE ($)	Sum of Ahorro Energético Efectivo Anual (kWh/año)	Sum of Ahorro Energético Efectivo Acumulado (kWh)
Industria y Minería	824,823,131.00	24,795,059.00	16,428,878.00
Fomento a la Cogeneración	160,359,440.00	-	-
Fomento al Desarrollo de Anteproyectos de Eficiencia Energética	385,457,697.00	15,704,092.00	7,324,100.00
Incorporación de la EE en el Diseño de Procesos y Proyectos	39,194,250.00	27,000.00	40,612.00
Promoción de la Medición y Verificación de Proyectos de Eficiencia Energética	39,573,908.00	2,791,330.00	2,791,392.00
Promoción Sistemas de Gestión de la Energía	200,237,836.00	6,272,637.00	6,272,774.00
Edificación	897,083,433.00	9,390,816.00	13,376,295.00
Financiamiento Especial para Reacondicionamiento a Edificaciones de Interés Público	774,068,498.00	8,936,371.00	12,926,233.00
Fomento al Desarrollo de Anteproyectos de Eficiencia Energética	21,108,000.00	27,175.00	22,783.00
Promoción de la Medición y Verificación de Proyectos de Eficiencia Energética	8,000,000.00	427,270.00	427,279.00
Promoción Sistemas de Gestión de la Energía	93,906,935.00	-	-
Transporte	170,832,072.00	-	4,525,229.00
Apoyo Técnico en Iimplem. de Planes de EE en Empresas de Transporte Camionero	-	-	374,662.00
Apoyo Técnico en Iimplem. de Planes de EE en Empresas de Transp. Camionero Pasajeros	-	-	-
Apoyo Técnico en Iimplem. de Planes de EE en Empresas de Transporte de Pasajeros	-	-	3,545,538.00
Fomento al Desarrollo de Anteproyectos de Eficiencia Energética	4,430,000.00	-	-
Incentivar la intro. de mejoras aerodinámicas en de carga del transp. caminero	140,300,000.00	-	605,029.00
Promoción de la Medición y Verificación de Proyectos de Eficiencia Energética	5,000,000.00	-	-
Promoción Sistemas de Gestión de la Energía	21,102,072.00	-	-
Grand Total	**1,892,738,636.00**	**34,185,875.00**	**34,330,402.00**

C. CO2 Avoided Emissions and Other Results Achieved by Sector between 2011-2015

Sector Económico	Reducción CO2 (tCO2)	Beneficios Adicionales
Industria y Minería	**10,113**	
Programa de Fomento a los Sistemas de Gestión de la Energía		Implementación de SEGs basados en ISO 50001
Programa de Fomento a la Cogeneración		1 Decreto sobre Cogeneración aprobado 40 Estudios cofinanciados 3 Proyectos Pilotos de Cogeneración
Preinversión en EE y EE en fase de diseño		8 Empresas capacitadas en metodología de EE en fase de diseño
Edificación	**3,106**	
Programa de Eficiencia Energética en Edificios Públicos (PEEEP)		
PEEEP en Hospitales de Alta Complejidad		14 Hospitales 450 Personas capacitadas 3.671.821 Beneficiarios Ch$1.290.004.228 ahorros
Diagnósticos Energéticos en Hospitales Regionales		25 Hospitales (Lineas de Base, indicadores y balances energéticos)
Eficiencia Energética en Edificios Públicos		21 Edificios Públicos beneficiados
Programa de Alumbrado Público		57,723 luminarias recambiadas (of a target of 200,000 in 4 yrs) 14 municipalidades beneficiadas
Diseño Integrado de Arquitectura		36 proyectos implementados bajo esta modalidad
Transporte	**1,343**	
Conducción Eficiente		**354 Instructores entrenados (30 + 324)** **694 alumnos beneficiados (467 + 227)** **5 unidades educativas de conducción eficiente**

Sector Económico	Reducción CO2 (tCO2)	Beneficios Adicionales
Laboratorio de Pruebas de Tecnologías Eficientes		**1 nueva norma (NCh 3331) para determinar consumo de combustible** **13 tecnologías aprobadas basadas en la nueva norma**
Educación y Formación de Capacidades		294 establecimientos educativos incorporan EE a nivel escolar 40,350 niños y jóvenes beneficiados 43,588 adultos beneficiados 8 cursos especializados para formar capacidades en EE
Medición y Verificación		3 Guías de Medición y Verificación 1 Registro consolidado de especialistas 150 personas capacitadas en CMVP 52 personas certificadas en CMVP
Total Reducción CO2 (tCO2)	**14,562**	

D. Results Achieved by the Government of Chile in EE By Sector between 2011-2015

Industry and Mining: during the length of the program the GCh was able to perform investments of over Ch$824 million in programs to reduce energy consumption and improve competitiveness of the industry. These programs achieved energy savings of 16.4 million (KWh), reducing over 10,113 tCO2. The following programs describe the specific interventions:

- **Program for the Promotion of Energy Management Systems:** incorporation of Energy Management Systems (SGE) based on the ISO 50001 standard, proved to be an effective tool for the development of energy science initiatives, achieving significant improvements in the energy performance of the organizations that implement them. Having a SGE allows a company to know the amount of energy used in their processes, reduce economic costs and CO2 emissions, and obtain international certification, among other benefits.
- **Program to Encourage Cogeneration:** since 2012, the AChEE has developed important initiatives within the framework of the "Cogeneration Promotion Program", co-financing pre-projects, pre-feasibility and feasibility studies, and developing technical skills through the execution of courses and dissemination activities. As of 2015, AChEE co-financed 40 studies that resulted in an important portfolio of projects with high implementation potential. During 2015, AChEE launched 3 tenders in the framework of cogeneration, which resulted in the execution of 3 prefeasibility studies, 1 feasibility study, and the implementation of 3 pilot projects for cogeneration, which received a financing of up to CL$100 million for its execution.
- **Incorporation of EE in the Design and Pre-investment Phase of projects:** the incorporation of EE in Design Phase aims to optimize the consumption and use of energy required, as well as the overall energy performance of the project or process in the stage of operation, through the incorporation and application of best practices and technologies at an early stage, from the genesis of the project.
- **The formation of new specific capabilities for industry:** AChEE dedicated efforts and resources to strengthen technical competencies in cogeneration, audits and energy science projects, and SGEs, and developed focused workshops to incorporate the concept of energy science in the design of processes and projects, and delivered the "EE Guide in Investment Processes", developed to attend engineering companies as well as the industrial sector. A total of eight (8) companies were trained in EE in Design and Pre-Investment Phase.

Public Building: GCh made investments of over Ch$897 million in the implementation of SGEs, retrofitting of buildings, promotion of EE projects, and promotion of Measurement and Verification Plans. Also, two main EE programs were developed by the GCh in public building during the project lifetime: 1) EE Program in Public Buildings (PEEEP) to retrofit EE equipment and implement EE Plans in 14 high complex hospitals; 2) Public Lighting Program, a massive replacement program to replace over 200,000 luminaires across the whole country, and 3) Integrated Design Architecture to incorporate EE criteria into new constructions.

The Public Building sector made CO2 reductions of 3,106 (tCO2), while the EE in Public Buildings Program benefitted over 3.6 million people and generated over Ch$1,290 million in savings. The following were the specific achievements of each program:

- **EE Program in Public Buildings (PEEEP):** the PEEEP entails three stages, first the development of energy diagnostics; second the implementation of projects for both technological change and process optimization, and third, the implementation of plans for the measurement and verification of savings; while AChEE carries out the monitoring of the savings for 12 months. A total of 14 Hospitals of High Complexity benefited from the program. These buildings reduced energy consumption through the optimization of different energy consuming systems, such as air conditioning systems, artificial lighting, water heating sanitary, boilers and thermal improvements of their façades, among others. Additional 25 regional hospitals also benefited from the program with the implementation of Early Diagnostics, which entailed the development of energy measurement baselines and energy balances. Also, another total of 21 public buildings incorporated EE features in their facilities.
- **Public Lighting Program:** at the end of 2014, the "Massive Replacement Program for Public Lighting" was developed by the Ministry of Energy and implemented by the Chilean Energy Efficiency Agency. The program that began execution during the first half of 2015, to replace 200,000 luminaires throughout the country, over a period of four years.
- **Integrated Design Architecture**: since 2011, AChEE has been managing and coordinating a program to incorporate EE criteria into new constructions from the beginning of the design stage; and as of to date, 36 projects have been developed under this modality.

Transportation: efforts, worth over Ch$ 170 million in investments, in the transport sector were focused in the dissemination of EE in the land transportation of freight and people. This was done mainly through the dissemination of technologies and know-how, the inclusion of good maintenance practices, and the promotion of efficient driving techniques. The whole sector was responsible for a reduction in CO2 of 1,343 (tCO2).

- **Efficient Driving:** during 2011, the AChEE conducted studies that demonstrated that thanks to the application of efficient driving techniques the performance of a vehicle can increase between 5% and 13%. As a consequence, in 2012 the AChEE developed the website www.conduccione ciente.cl, aimed at encouraging the adoption of driving concepts and awareness by drivers of vehicles for the transport of freight by road and people. As of today, AChEE has trained over 354 instructors and benefited over 694 students in efficient driving educational programs, and has implemented 5 educational units including general cargo transport, transport of mining cargo, transport of forest cargo, transport of urban people and transport of people interurban.

- **EE Testing Technologies Laboratory:** AChEE has funded several initiatives to identify and promote those technological advances that contribute to the reduction of both energy consumption and the emission of polluting gases, among of which are the creation of the Chilean Standard (NCh) 3331. From 2012 to 2015, the AChEE has been carrying out technology tests and load variations, based on the described Standard, in order to provide useful and accessible information to all actors in the industry of transport, including suppliers and transporters. Over 13 technologies have already been tested based on the standard, based on the interest of those who seek to certify their products.

Education: the GCh has made great strides in incorporating EE to educational programs at different scholar levels to create awareness and improve behavior over the use of energy resources. AChEE has developed three important programs ranging from nursery school to high school and vocational education. This is done through the training and accompaniment of the entire educational community, developing learning activities, delivering educational resources, implementing energy self-diagnostics and good practices of energy management in establishments. With 294 educational institutions that incorporated EE in curricula, AChEE´s program impacted over 40,350 kinds and youth, and over 43,588 adults with educational programs in EE. The specific programs entailed:

- **Integral Educational Program in EE:** the objective of the program is to transfer competences to teachers, administrative and managerial staff of educational establishments to incorporate contents and good practices of energy and energy science in the national curriculum, from the nursery to the fourth half with the aim of achieving training on this Thematic in all students.
- **Capacity Building Program at technical, higher and professional levels in EE**: AChEE has collaborated extensively with the training of new professionals in the field of EE, by providing training and advisory services to professional higher education and technical institutions.
- **Study of supply and demand gaps in EE job skills**: AChEE determined the need to collect up-to-date and reliable information on supply and demand gaps in relation to job competencies related to EE with the aim of incorporating EE and Energy Management skills and competencies in job profiles, and thus upgrading ChileValora's Catalog of Labor Competencies in order to strengthen the human capital of the diverse industries.

Capacity Building: a great amount of efforts have been made towards developing and providing the Certified Measurement and Verification Professional (CMVP). This accreditation certifies that the professionals are qualified to develop energy savings measurement and verification (M & V) plans, in addition to being able to verify the M & V plans developed by third parties. On its six consecutive cycle, AChEE has trained 150 people, and certified over 52. In addition to that, AChEE offers eight specialized courses to build capacities in EE:

- Course of Projects and Audits in Energy Science

- Course on Implementation of Energy Management Systems based on ISO 50001
- Course Energy Manager e-learning mode
- Measurement and Verification Course in Project Management of EE in Agroindustry, Mining and Metalworking and Manufacturing
- Course Energy Manager in Public and Hotel Sector
- Course on Introduction to cogeneration at commercial and industrial level
- Certified Energy Manager

Measurement and Verification: Measurement and verification is a fundamental tool for verifying the reduction of energy consumption and monetary savings associated with the implementation of an EE measure, whether in the field of energy management or in technological conversions. AChEE is working to demonstrate that investments in energy science are cost effective, to disseminate results and to replicate these measures at the national level. During the program this area has been gaining ground by certifying and training professionals so that they can implement these procedures in their projects. The methodologies used to measure and verify are in the IPMVP (International Performance Measurement and Verification Protocol). In addition to that, AChEE has developed three new guides focused on the Mining, Agroindustrial, and Metalworking and Manufacturing industries, with the aim of disseminating the measurement and verification theme in the management of energy science projects.