



ECOCHILECTRA ELECTRICITY THROUGH WASTE

THE EXTENSION OF A SUCCESSFUL MODEL



ROOTS FOR
SUSTAINABILITY



IRR Regional Initiative
for Inclusive Recycling



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Ecochiletra. Electricity Through Waste. The Extension of a Successful Model .

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PRESENTATION

The Regional Initiative for Inclusive Recycling (IRR) began operations in 2011 with the aim of contributing to the improvement of recycler's access to recycled materials markets in Latin America and the Caribbean. The program is supported by the Multilateral Investment Fund (MIF) and the Water and Sanitation Division of the Inter-American Development Bank (IDB), Avina, the Latin American Network of Recyclers (Red-LACRE in Spanish), PepsiCo Latin America and Coca Cola Latin America. The IRR has built a platform for strategic and multisectoral partnerships between different actors in the recycling sector which serves as a space for dialogue and action, in order to gain scale and impact with specific initiatives to disseminate best practices and effective models for economic and social inclusion of recyclers.

In 2007, the power operator company Coelce, in the state of Ceara in Brazil, created the "Ecoelce" program to promote access to energy services through the introduction of a model that offered customers a discount in their electricity bill for participating in their community recycling scheme.

This document is part of a series of two case studies which analyze the pioneer model "Ecoelce" and how it has been adapted and adopted to two new contexts; in the Metropolitan Area of Santiago in Chile as "Ecochilectra"; and in the State of Rio de Janeiro in Brazil as "Ecoampla". The impact of model application is analysed looking at two key issues: (1) Formal and affordable access to energy; and (2) Inclusion of recyclers in the recycling value chain. Key lessons for strengthening these schemes and their replication in other contexts are identified.

The IRR presents these case studies hoping that they will serve a reference for other companies that are considering the introduction of bonus systems for the recovery of recyclable solid waste, in order to offer discounts on their services and in this way facilitate access to these services for low income populations. Also, it can help the exchange of goods and services between the partners of the bonus scheme.



1

REPLICATING ECOELCE AND ADAPTING IT TO CHILE

Pablo Sánchez-R4S

In 2009, the Innovation and Environment Division at Chilectra, a subsidiary of Endesa, started designing Ecochilectra, a replica of the experience of the Ecoelce project conducted in the State of Ceará in Brazil by Coelce, another subsidiary of Endesa. The aim of the Ecochilectra programme is to promote waste recycling among the company's clients by offering a discount on their electricity bill equivalent to the value of the waste contributed to the scheme.

The Innovation and Environment Division believed that Ecochilectra could be an innovative project with a clear environmental and social impact, that could positively reinforce the company image in the eyes of its clients. It intended to implement the programme in all of the municipalities of the Santiago Metropolitan Region, where the company was licensed.

However, the socio-demographic situation in Santiago and the country's regulatory framework were substantially different to the Brazilian context. So the project was implemented gradually. The first stage involved a pilot project in the municipality of Peñalolén. After two years of trial and error, Ecochilectra extended its presence to five more municipalities in the city. Adapting, adjusting and defining the model in accordance with the Chilean reality has been one of the biggest challenges faced by the Ecochilectra programme since it began in September 2010.

Chilectra is the biggest supplier of electricity in the Chilean market. Its licence area corresponds to the 33 municipalities of the Santiago Metropolitan Region, with physical energy sales of 14,445 GWh¹ in 2012. Chilectra is owned by Enersis, which controls 99.09% of the shares in the company. The majority shareholders in Enersis are Endesa Latinoamérica and Enel Iberoamérica, companies controlled by the Enel Group, which owns 60.62%. Enersis manages a group of companies that operate in the electricity markets of five countries in South America².

¹ One GWh (Giga Watts-hora) corresponds to 10⁹ watts-hour and is a measure of electrical energy equivalent to that produced by one gigawatt in one hour. It is used to measure the consumption and/or production by large countries or industrial conglomerates. As a reference, in Chile, the monthly demand for energy in 2013 was about 4,000 GWh in the Inter-Connected Central System, according to the Centro de Despacho Económico de Carga del Sistema Interconectado Central.

² Argentina, Brazil, Chile, Colombia and Peru.



In 2007, Coelce set up the Ecoelce programme, a pioneer project for fostering access to regulated energy services through a system of credits in return for the promotion of recycling. The state of Ceará, in the northeast of Brazil, has one of the highest poverty rates in the country, 49.11%³, and has the highest number of people without access to electricity. The communities in the most vulnerable areas also had the highest rates of insolvency out of Coelce's customers and clandestine electrical connections were widespread. The Ecoelce programme specifically sought to provide a response to these problems by taking a very simple approach: customers separate recyclable waste in their homes and take it to collection points located around the city. There, the waste is assessed and part of its value is transferred to the client in the form of a discount in their electricity bill.

Since its creation, Ecoelce has saved the equivalent of 50 GWh of energy through the recycling of waste. Almost 430,000 registered clients have benefitted, more than 18,200 tons (t) have been recycled and more than US\$ 798,000 has been distributed in discounts in customers' electricity bills⁴. Moreover, the company has managed to reduce the default rate by 57% and non-technical losses by 30%, i.e. losses due primarily to clandestine use of the electricity company's service⁵. The success and widespread recognition of Ecoelce⁶ led to its expansion to new areas of the country, such as Rio de Janeiro through the Ampla distribution company, and also to other countries, such as Chile, through Chilectra.

However, social, regulatory and market differences in Chile meant substantial changes were made to Ecochilectra with respect to Ecoelce. While in Brazil, the context was already supportive of recycling, which meant that the Ecoelce model could be integrated in recycler cooperatives and waste management companies that already existed, Chilectra had to create and organise its own system for waste collection. Initially, a door-to-door waste collection system was set up using individual recyclers, with the logistics supported by Recupac, a waste management company. However, there were several difficulties with this system and the participation of individual recyclers was discontinued and a new collection system was devised.

In the second phase, it was decided that mobile collection points should be set up, to which the company's clients could deliver their waste. After this period of trial and error, Chilectra seemed to have found the solution to making the Ecochilectra project viable and sustainable. The key idea behind the model was the establishment of public-private collaboration with local councils, whereby these financed the waste sorting service offered by Ecochilectra.

The managing company, in this case Recupac, thus guaranteed that it would be able to cover the operational costs associated with the service provided by Ecochilectra. However, a method still had to be found to integrate recyclers in the model, which had been one of the initial aims. The absence of any regulations to promote the inclusion of this group in municipal waste management systems and inadequacies in the design for their participation in Ecochilectra had made it difficult to get them involved.

³ Santos, A., C.A. Manso, C.E. Marino & J.M. França. 2011. Uma Caracterização da Extrema Pobreza no Brasil. Nº 08, Relatório da Pesquisa, Laboratório de Estudos da Pobreza – LEP, Universidad Federal do Ceará.

⁴ Corporate information provided by the Ecoelce project.
Web accessed: 15/04/2015

⁵ Corporate information provided by Endesa and presented at the III Jornada Anual del Foro Proclima
Website: http://www.madrid.es/UnidadesDescentralizadas/Sostenibilidad/ContenidosBasicos/Ficheros/Endesa%20-%20ECOELCE%20IIIJORNADA_foroProClima.pdf Accessed: 30/12/2013

⁶ Ecoelce has obtained, among others, UN recognition in 2008 at the World Business and Development Awards.

1.1. Socio-demographic context of Santiago

The Metropolitan Region of Santiago is the main region of Chile, home to 40.19% of the country's population⁷. Of this number, 96.24% live in urban areas and just 3.76% in rural areas. Because of its high population density (434.04 people/km²) the region is extremely heterogeneous in terms of socioeconomics and the distribution of wealth.

Santiago has the highest concentration of people belonging to socioeconomic level ABC1 (high and medium-high income) in Chile. In the Metropolitan Region, this percentage is 10.6%, while 45.1% belong to socioeconomic levels D and E, which represent poverty and extreme poverty (average monthly family income of US\$750 and US\$200 respectively). In the city of Santiago, the north-eastern municipalities concentrate the highest percentages of socioeconomic level ABC1, while the western municipalities and some of those in the south-eastern sector have the highest percentages of the population classed in socioeconomic levels D and E.

Ecochilectra has been implemented in six municipalities and is present in those with high spending power (Providencia), in mainly medium-income municipalities (Santiago Centro, La Florida, Quilicura), and in municipalities with high percentages of poor population (Peñalolén, Recoleta); see **Table 1**.

Table 1: Socioeconomic distribution in municipalities in which Ecochilectra operates

Commune	ABC1	C2	C3	D	E
Providencia	35.9 %	38.3	18.2	7.0	0.6
La Florida	11.7	25	26.5	30.5	6.2
Peñalolén	11.1	14	21.3	41.1	12.5
Santiago Centro	9.7	31.7	29.3	24.4	4.9
Quilicura	4.5	19.9	31.9	36.6	7.0
Recoleta	3.0	15.5	26.8	43.2	11.5

Source: Informe Mapa Socioeconómico de Chile, Investigaciones de Mercado y Opinión Pública ADIMARK, Chile, 2013. Municipalities ordered by % of ABC1

Although the Ecochilectra programme reflects the experience of Ecoelce, clandestine connections and default are not relevant issues in Chile. Clandestine connection and default rates are 3–4%⁸ and 7–8%⁹ respectively. Access to electricity is practically universal; only 0.5% of the population don't have access.¹⁰ Chile has a tariff system that consists of a single tariff bracket, with no allowance for cross-subsidies. **Expenditure on energy as a percentage of average income in the lowest income quintile is 16%, one of the highest rates in Latin America¹¹.** This is because the

⁷ Chile has a population of 16,634,603 inhabitants, of which 6,685,685 reside in the Metropolitan Region. Resumen CENSO 2012, Instituto Nacional de Estadísticas (INE), Chile, 2012.

⁸ History of Law N° 20.040, according to the President of the Comisión Nacional de Energía.

⁹ Chilectra estimate without official data.

¹⁰ CAF (2013). Energy: An Overview of Challenges and Opportunities in Latin America and the Caribbean.

¹¹ CEPAL. 2009. Contribution of energy services to the Millennium Development Goals and poverty alleviation.



<https://www.flickr.com/photos/penalolen>

price of electricity in Chile is one of the highest in Latin America, with the average family being billed US\$ 430 a year¹². So, the lowest income population receives, if properly registered and given certain conditions, public subsidies specifically for energy consumption¹³.

1.2. Waste Management in Santiago de Chile

Chilectra identified the opportunity to focus the project on the environment, by promoting a system to improve municipal solid waste (MSW) recycling. Estimated municipal solid waste (MSW) generation in Chile is 6.5 million tons, a figure corresponding to 38.5% of the total solid waste generated in the country. 43% of the MSW is generated in the Metropolitan Region. Santiago is estimated to generate 462 kg/person of MSW a year or 1.26 kg/day, one of the highest figures for any Latin American city¹⁴. Collection coverage is 95%, but the percentage of waste that is correctly treated is 60% and only 14% is recycled, including informal recycling¹⁵.

In 2014, only 17% of Chileans declared that they recycle any material and this percentage has decreased significantly in recent years¹⁶. The main cause for this manifest disinterest among Chileans is the lack of formal recycling systems. In 2009, more than 6.1 million tons of MSW was eliminated, mainly by disposal in landfills or dumps, while only 55,732 t were subject to material or energy recovery. These figures clearly reveal the major opportunities and challenges in this sector.

On a local level, it is the municipal governments who are responsible for the collection, transport and disposal of household waste within their municipal boundary, as stipulated by the 2005 National Policy for Integral Waste Management. This Policy mentions informal recyclers as stakeholders in the recycling chain, the first step towards recognition of their employment. In this respect, Mayling Yuen, Project Director for Fundación Casa de la Paz and an expert in participative environmental management, described the current difficulties: *“the lack of strategic planning that considers and contemplates the inclusion of informal recyclers and of measures to encourage recycling, make it harder to reduce the costs of the service. On the other hand, many local councils manage their waste by contracting companies, which implies a payment from the annual budget of between 10% and 15%”*¹⁷. Moreover, the organisational structure of the Metropolitan Region, made up of 33 municipalities with their respective mayors and their own waste management policies, hinders the coordination and execution of a joint strategy.

Similarly, the Law on Municipal Income II, which exempts properties valued at up to 225 UTM¹⁸ from having to pay fees for street cleaning and waste collection, reduces

¹² OLADE. 2013. La tarifa social de la energía en América Latina y El Caribe.

¹³ CAF. 2013. *Op. Cit.* Chile This measurement is contemplated in law 20.040, which establishes that “if in a period equal to or less than 6 months, the electricity fees for residential, urban and rural users register a real accumulated increase that is equal to or greater than 5%, a transitory subsidy on payment for the consumption of electrical energy may be established to benefit residential users with low resources that are up to date with their payments for said consumption.

¹⁴ UN-Habitat. 2012. State of Latin American and Caribbean cities. UN-Habitat, Nairobi.

¹⁵ CONAMA. 2010. Primer Reporte del Manejo de Residuos Sólidos en Chile.

¹⁶ GfK Adimark. 2015. Reciclaje, ¿Qué tanto nos interesa? Market study conducted by GfK Adimark.

¹⁷ Mayling Yuen. 2012. La urgencia de avanzar en alternativas integrales para la gestión de residuos: Escenarios y propuestas. In Veo Verde. Website: <http://www.veoverde.com/2012/10/la-urgencia-de-avanzar-en-alternativas-integrales-para-la-gestion-de-residuos-escenarios-y-propuestas/>. Access: 9/12/2013

¹⁸ UTM is the Monthly Tax Unit. In April 2014 it was 41,469 Chilean pesos (US\$ 83,7). Therefore, properties valued at approx. less than US\$ 19,000 are exempt from the *derecho de aseo*.



<https://www.flickr.com/photos/penalolen>

the funding that local councils have to spend on waste management, and to date there is nothing in the budget to offset those losses. This situation is even more serious in communes with higher percentages of low income population, where a greater percentage of the population is exempt from that payment and, therefore, there is less funding to spend on separate waste collection and recycling programmes. Logically, this situation has an influence on the quality of the service provided in low income municipalities, which have less human and technical means to undertake MSW management.

The creation of the Regional “Santiago Recicla” Plan in 2009 led to the constitution of a board formed by almost one hundred representatives of public, private and civil society institutions. This produced the Regional Action Plan, whose targets included an increase in the Metropolitan Region’s waste recycling rate from 14% to 25% by 2020.

Of particular importance in this context is the existence of around 60,000 recyclers in Chile, who are responsible for 60% of the recycling¹⁹. Through the National Movement of Chilean Recyclers (MNRCh in Spanish), work is being carried out to integrate recyclers in the recycling value chain. An Inclusion Policy Board has been set up, whose initial achievements include the creation of a policy on the inclusion of informal recyclers.

This policy is aimed at protection, training and promotion of their social and professional development, in order to promote their formalization and association and to benefit waste materials recovery and recycling²⁰.

However, this policy has yet to materialise in the new General Law on Waste, the Law on the Extended Producer Responsibility (EPR), which is currently passing through parliament, and which seeks to reduce the waste that ends up in landfill and, at the same time, increase the recovery rates of the same. This law requires companies of products of mass consumption to take charge of waste by means of a management system designed to prevent, reduce, recycle, and recover energy and only as a last resort dispose of waste material in landfill²¹. In the framework of this law, the MNRCh has managed to include waste pickers as operators in the recycling sector provided they certify their labour skills²². This could imply a stimulus for the organization and training of recycling associations, as the REP Law will provide the mechanism for additional funding to develop waste collection and treatment systems from which they could benefit.

¹⁹ Movimiento Nacional de Recicladores de Chile.

Website: <http://movimientorecicladoreschile.blogspot.com.es/2010/10/legislar-sobre-reciclaje-el-desafio-de.html>. Access: 26/11/2013

²⁰ Propuesta de políticas públicas para la inclusión de los recicladores de base al sistema de gestión de residuos municipales en Chile, page 49. January 2013.

²¹ REP, Containers and Packaging Center of Chile, CENEM, 2013.

²² Participation of informal recyclers is included in Article 2 and Article 6 of the REP law current proposal.



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1.3. Ecochilectra: Strategic Objectives and Stakeholders

Ecochilectra sought to implement an inclusive model to integrate the main stakeholders that were already involved in the recycling sector, including waste pickers²³, in order to satisfactorily achieve the strategic objectives of the programme, which can be summarised as:

- A social objective of environmental awareness and the generation of recycling habits among communities.
- An environmental objective of improving MSW rates through the offer of a waste sorting service.
- A business objective of improving the visibility and reputation of the company through a platform that allows the company to maintain a positive bond with customers.

The objectives are substantially different from those of Ecoelce, as Daniela Bravo, the manager of Ecochilectra, explains: *“in the design phase of the programme, before its implementation, the form and objectives of the project were changed, as it was observed that clandestine connections and default are not major elements of the Chilean reality. The strategic objectives are mainly about positioning and strengthening the bond with the client”*.

To achieve these objectives and be able to set up a separate waste collection system based on an incentive scheme, Chilectra made agreements and alliances with the following interest groups:

- **Local councils.** These act as regulators of the project and support it by helping to promote it to the general public. The *Municipality of Penalolen* was the first to support the project and after that a further five communes adopted Ecochilectra.
- **Waste management company.** *Recupac* was the company responsible for Ecochilectra's operations and logistics. As Chilectra has said, it was not easy at first to find an operator to manage the waste collection process, as there was no similar initiative for the separate collection of household waste and the main companies did not want to take on the risk of assuming the costs associated with this activity.
- **Fundación Casa de la Paz and waste pickers.** The first phase of the project involved working with waste pickers and the *Fundación Casa de la Paz*. This foundation, with a long history of formalization training work in the recycling sector, participated in the process of selecting and training the recyclers that joined Ecochilectra. The waste pickers were responsible for door-to-door waste collection.
- **Charity institutions.** Ecochilectra users had the option of donating the value of the waste provided to the charity organizations involved in the programme: *Coaniquem*, *Cenfa* and the *Fundación San José*.
- **Other private companies.** Companies that manage and produce packaging such as *Cristalerías Chile*, *Integrity* and *Tetra Pak* purchased the materials collected by Ecochilectra.

²³ The managers of the Ecochilectra programme initially contacted the MNRCh and the Fundación Casa de la Paz in order to assess the participation of waste pickers. They finally decided to sign an agreement with the Fundación Casa de la Paz to organise the participation of recyclers through this body. Ecochilectra's aim was to create a model for inclusive recycling and therefore sought their active involvement.



<http://www.recoleta.cl/>

- **Users.** Chilectra customers were the main beneficiaries of the programme, by being able to access a new separate waste collection system. Any client of the company could register for the programme. The only condition was to be a Chilectra client, and to select the nearest recycling point to one's home or workplace. In addition to the financial benefits, in the form of discounts on their electricity bills, users obtained environmental benefits thanks to better access to a separate waste collection service.



2 ECOCHILECTRA: IN SEARCH OF ITS OWN MODEL

<http://www.recupac.cl>

Ecochilectra pursued the promotion of waste recycling among its clients by offering a discount on electricity bills that was proportional to the recyclable material contributed to the scheme. This project imitated the Ecoelce experience, but unlike that scheme, the Ecochilectra case did not involve objectives regarding access to electricity, as this was not perceived as a relevant problem in the city of Santiago.

Ecochilectra was aimed equally at all Chilectra customers. In the municipalities where Ecochilectra operates there were both medium-high income users and users of medium-low and low income. The programme's mechanics worked in the same way for all of them, although the motivations varied: while **medium-high income groups mainly joined the scheme for environmental awareness and educational purposes (some families took their children to deposit waste); those on medium-low and low income also did so out of environmental awareness, but financial motivations were stronger** (section 2.3 shows the social results and looks in greater depth at this analysis).

Since the outset, Ecochilectra has been a constantly evolving project, which has sought to respond to its strategic objectives and achieve operational and financial sustainability. This has generated diverse changes, and two phases can be clearly differentiated: the door-to-door model; and the itinerant model with mobile collection points. The door-to-door collection model was only implemented in the municipality of Peñalolén, while in the second phase, Ecochilectra was extended to five other municipalities: Santiago Centro, Providencia, Recoleta, Quilicura and La Florida. The following is a description of the evolution of the Ecochilectra programme, detailing the operations and results in each of its two phases.

2.1. First phase: door-to-door collection system with waste pickers

In September 2010, Chilectra announced the start of the Ecochilectra programme in the municipality of Peñalolén of the city of Santiago. The involvement of the mayor, Claudio Orrego, played a decisive role, since as well as the collection centre, he supported the creation, in the same space that the municipality had provided to Chilectra, of an environmental education centre to offer training and awareness in schools. As Orrego emphasised: *"the possibility of making Peñalolén cleaner and less polluted, of the people in poorer districts being able to make savings thanks to this big change, and of pickers increasing their potential for work through this project, demonstrates that this is a green municipality"*. The municipality of Peñalolén, which includes people from all income groups, was also the perfect place to evaluate how the model works.



The start of the project was delayed by six months because the local people originally opposed the installation of the collection centre. Despite the advantages that this facility could offer, Daniela Bravo admitted that **it was a mistake not to consider the local residents' opinion and an important lesson for the company:** *"According to our criteria, the installation of the Ecochilectra environmental education centre was a clear improvement to the sector of the municipality where it was going to be built, but the community feared that it would turn the site into a rodent-infested rubbish tip, and they opposed it. The communications department stated that the project would not be implemented without the community's approval. The objective was a positive bond and it made no sense to set up a project that the people opposed. A negotiation in order process followed, and resident organizations were informed in detail about the plans to get them to agree to sign a document showing their approval of the project".* This process postponed the start of the project, but it did eventually get the go-ahead from resident organizations. Two years into the centre's operations, and the local community was satisfied with the environmental centre and the implementation of the Ecochilectra programme.

Operations of the door-to-door model

Initially, the programme contemplated a fortnightly door-to-door collection system for the people registered on the programme. There was also the option of taking material to the collection centre, but hardly anybody used it.

Chilectra wanted to implement as inclusive a model as possible and therefore decided to work with waste pickers in order to dignify and formalise their trade.

In Peñalolén, they were organised through the *Sindicato de Recolectores y Perceros*. However, as Daniela Bravo comments: *"they were highly distrustful and resentful of private companies"*. Therefore, Chilectra made an agreement with the Fundación Casa de la Paz, an organization with extensive experience of working with informal recyclers which allowed access to this group. The Fundación Casa de la Paz dealt with the initial selection and training. Some 100 recyclers from the syndicate undertook the training, which lasted for one month and was made up of four modules: introduction to recycling, customer service, use of the electronic terminal to apply discounts and operations of the Ecochilectra project. Of all these applicants, only 10 people attended regularly enough to complete the training. Seven of these were selected for participation in the Ecochilectra project.

The recyclers collected waste from homes and transported it to the environmental education centre. Each recycler had a set daily route, which was announced to the local residents. The recyclers did their rounds on a 1 m³ tricycle, on which waste was sorted into six recyclable categories (paper, cardboard, glass, aluminium cans, PET plastic and Tetrapak). When receiving the recyclable waste, the collector weighed the materials and performed the electronic transaction using a terminal, whereby the discount was immediately recorded in the client's account. Once the route was completed, the recycler took the waste to the environmental education centre, where it was classified and the recyclable materials were fine sorted, followed by the accounting process between the recycler and Recupac. This process involved Recupac providing the recycler with a receipt issued by the Ecochilectra software, indicating the total amount of material collected from customers and the total material delivered to the centre. Using the total amount of material delivered to the centre and the value of the recyclable materials, the software generated a receipt showing the amount to be paid for the day's route²⁴. At the end of the week, Recupac paid the recycler for the total sum of the receipts issued that week.

²⁴ The system was set up that way in response to the recyclers' requirements, as they were used to receiving daily payments for their work. Due to the high costs involved in making daily transfers, it was decided that the recyclers should be given a voucher that showed how much they had made each day.



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The distribution of income from the value of the waste was structured as follows: 25% was retained by the collection centre managed by Recupac; and of the remaining 75%, 60% went to the recycler and the other 40% to Chilectra customers in the form of a discount in their bill, i.e. the client's discount was equivalent to 30% of the value of the recycled waste (see **Table 2**). Hence in this system, **recyclers received a lower price for the waste than that which they could get on the open market, but in return they were guaranteed a set route, greater volume and, therefore, the chance to earn more income**. However, the reasons why they received less money for the materials than they could get on the open market was not easily comprehensible to the majority of participating recyclers.

Table 2. Price structure and distribution of income from waste

Price paid by recycling company to collection centre	\$/Kg. Weighted (Value of materials)	Distribution of the value of materials at Ecochilectra			
		Collection centre	Remainder to be shared	Recycler	Client
Factor		25%	75%	60%	40%
Glass	24.0	6	18	11	7
Paper	46.8	12	35	21	14
Metals	400.0	100	300	180	120
Plastics	180.0	45	135	81	54
Cardboard	29.4	7	22	13	9

Source: Ecochilectra. Monetary units in Chilean pesos.

Recupac was in charge of the accumulation, storage and sale of the recyclable materials, which basically consisted of its transport and baling. After that, Recupac paid Chilectra the value corresponding to customer discounts. This led to a cash flow problem for Chilectra, as it had to pay customer discounts each month, while the equivalent compensation was not received until later. In this first phase, Chilectra assumed the operational costs of the project (i.e. those associated with the management of the collection centre), which implied additional costs (section 2.3 evaluates the economic aspects of the project).

Evolution and results of the door-to-door model

At first, Chilectra decided to limit the promotion of the project out of the fear of a huge demand to which it would be unable to provide a response. However, the programme was well-received and in eight months almost 1,000 users registered, a number that eventually reached 2,500 users. The growth of Ecochilectra revealed certain difficulties: *“the process was inefficient at first and led to complaints from some residents who were unable to deliver their waste. This caused us problems with Sales Management, who noticed that the number of complaints was increasing”*, said Daniela Bravo.

These logistical and organisational shortcomings, derived from the operations model established with the waste pickers, hindered the expansion of Ecochilectra.



<http://4.bp.blogspot.com>

- **Logistical difficulties.** Collection on tricycles proved insufficient to cope with the increasing demand among users. An innovation to the model occurred when Recupac²⁵, hired a van to increase the scope for collection, thanks to which the service could be expanded to 3,000 users. But the growth was unsustainable and another van was required. Chilectra decided to support one of the recyclers in their application for a microcredit so that he could buy a van. But the problems that this recycler had to face in order to be granted that credit merely served to discourage him, and the process failed.
- **Organisational aspects of working with waste pickers.** The recyclers' relationship with Chilectra and Recupac was one of major dependence. The routes, schedules and payment systems were all decided by Recupac. Many of the participant recyclers did not feel it was right for the discount offered to Chilectra customers to be deducted from their own income; especially when they were the people that constituted the image of Chilectra in the clients' eyes. The recyclers wore a Ecochilectra uniform, a jacket carrying the logos of all the participant companies, as they needed to be recognisable to the community that was providing materials. Being used to working independently and with a large degree of autonomy, the recyclers found it hard to adjust to this way of working, even though it did offer them a certain amount of flexibility. In Chilectra's opinion, their informal way of working caused some problems and generated complaints among customers. There were also tax issues to be dealt with, because it was difficult to audit their wages. One aspect that could not be resolved was that of insurance, as no company was willing to cover them. Also, some recyclers had trouble integrating the technology in their work.

There were also physical and legal matters that hindered the expansion and replication of the door-to-door model based on collection centres.

- **Availability of physical spaces.** In a high density city like Santiago where land is increasingly more expensive, the search for 350 m² spaces in other municipalities for the installation of collection centres presented a challenge to the expansion of the project to new municipalities.
- **Environmental legislation.** Chilean legislation does not include a definition of collection centres by size and volume; it only considers large industries, so the Environmental Education Centre was not included in any category. This led to an application for provisional permits, as a definitive one would have raised the costs of the centre, because the authorities would have demanded compliance as if it had been a large industry.

Several factors led to a reappraisal of the model and the waste pickers gradually left the project of their own free will due to the lack of incentives. The Fundación la Paz felt that the **dependent relationship and the fact that recyclers did not have a bigger say in its design and implementation had impeded a proper adaptation to the Ecochilectra model.** It was specifically argued that the recyclers, after being trained, could have managed the collection centre themselves, and thus been assigned greater decision-making powers regarding the centre's operations. Moreover, the fact that the discount received by customers was deducted from their income did not go down well at all. The average income of recyclers varied depending on the number of homes they visited: the greater the number of homes catered for, the more waste they recovered and hence the more income they made. During this phase, three waste pickers were working for Ecochilectra at the same time. On average, the income of

²⁵ In the final year of operation, the Peñalolén local council covered this cost.



<https://www.flickr.com/photos/lamuniquilicura>

each of these was between USD 250-350 per month, an amount that rose to USD 700-900 in the case of the last waste picker, who was in charge of collection from 2,500 homes per month. Nevertheless, in February 2012, the last recycler to participate in Ecochilectra left the project.

From that moment, Recupac took charge of the waste collection operation, continuing the door-to-door system. After that, in October 2013, the Ecochilectra pilot project was declared over and the environmental education centre at Peñalolén was closed. The new law on environmental impact required substantial investments in order to obtain the environmental impact statement and no agreement was reached with the new mayor of the municipality regarding continued funding.

In the three years that the collection centre was in operation in Peñalolén, a total of 396 t of recyclable waste was collected, an average of 10.5 t per month. During this period, US\$ 9,886²⁶ were distributed in discounts to customers' electricity bills. Each participant family provided, on average, almost 25 kg per month and obtained an average monthly discount on their bills of US\$ 0.58²⁷. The client with the biggest discount managed to save US\$ 13 a month on his bills, more than 40%. Most customers opted for the discount on their bill and 6% made donations.

To summarise, the first two years of the Ecochilectra programme in the municipality of Peñalolén revealed both the advantages of the project and its drawbacks. On the one hand, Ecochilectra seemed to go down well among most of the customers, and local media did a lot to cover the initiative. Both aspects had a positive effect on Chilectra's image. However, there were obvious difficulties with the organisation of a model for household waste collection using waste pickers. This system required complex and precise operations, which were not always in keeping with the more informal and independent methods that recyclers were used to. Likewise, the lack of financial incentives and the dependent relationship with respect to Ecochilectra made it hard to create a consolidated work group involving waste pickers. It is also important to point out that during this first phase, Ecochilectra lacked a model to make the project economically sustainable, as most of the funding came from Chilectra, without any support from external companies.

Only the local Peñalolén council provided funding, in the form of a one-off payment that was not enough to cover the programme's costs. This phase also demonstrated the value of the mediation and training offered by Fundación Casa de la Paz. Thanks to its efforts, the waste pickers' mistrust of a private company could be overcome and a joint work method could be established. However, the ultimate objective of efficiently integrating informal recyclers in the Ecochilectra scheme was not achieved.

²⁶ **Source:** Ecochilectra. The exchange rate used for this study to show figures in US dollars US\$ 1 = 495 CLP, corresponding to the annual US Dollar –Chilean Peso exchange rate published by the Banco Central de Chile.

²⁷ This figure includes all clients, including those that made donations.



2.2. Second phase: collection of waste from mobile collection points

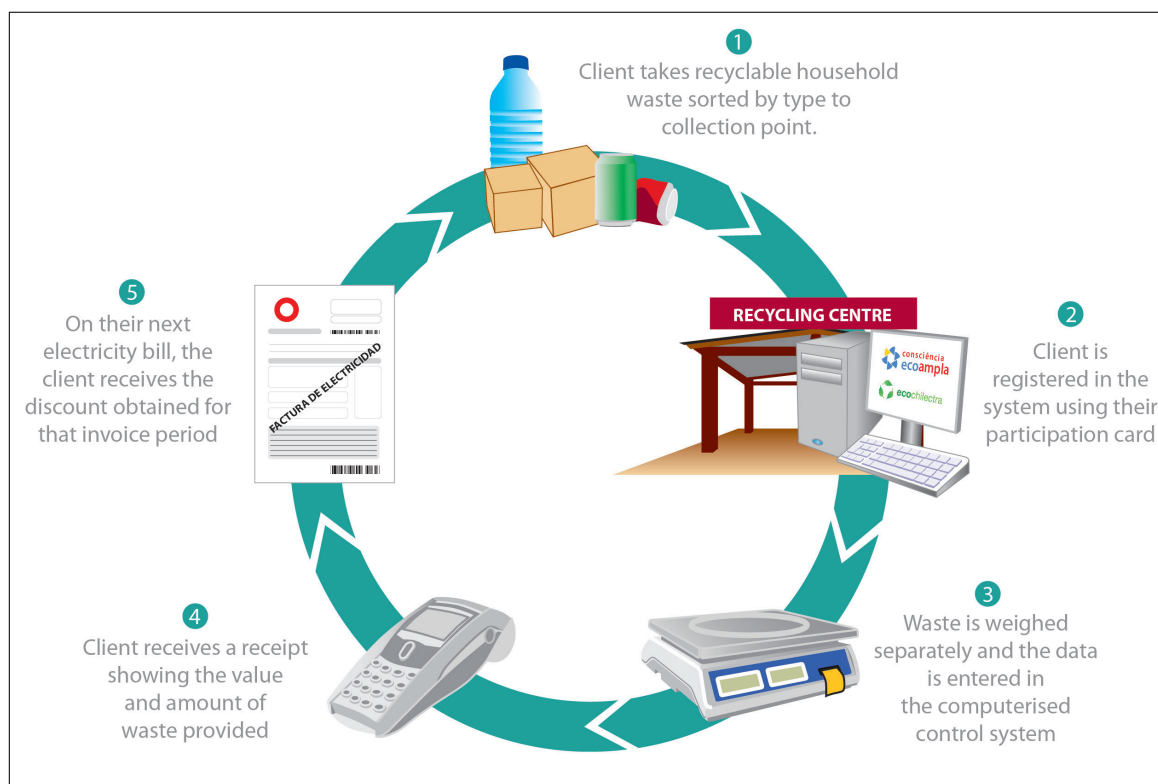
As a result of both the operative and financial drawbacks of the door-to-door model and the departure of the final waste picker, the Chilectra team in charge of the Ecochilectra operation reviewed its methods and in June 2012 set up a new operating model based on the collection of waste from mobile points positioned for 3 hours every fortnight in different strategic positions in the municipalities. Collection with this system is not door-to-door; instead it is Chilectra customers who go to mobile points to deposit their recyclable waste and, at that same time, it is weighed and the electronic transaction is performed whereby the client's discount (or donation) is recorded. This model **is designed to make it easier for customers to recycle by positioning the mobile points near to their homes**. In the municipality of Peñalolén, where customers were used to waste being collected from their homes, a lot of Ecochilectra users initially cancelled their membership due to the removal of the door-to-door service. New users gradually joined and, thanks to the expansion of Ecochilectra to new municipalities and new promotional measures, an increase was achieved in the number of registered clients to more than 6,000 by the end of 2014.

Ecochilectra progressively extended its presence to five new municipalities (Santiago Centro, Providencia, Recoleta, Quilicura and La Florida), in addition to Peñalolén. This expansion was much simpler since the identification of a physical space was not necessary nor were licences or authorizations required to begin the activity. In this case, the mobile point is positioned for three hours on a site agreed with the respective local council and the waste that is collected is then deposited directly at Recupac's plants. In this new phase of the project, the role of some partners was changed in order to create a self-sufficient model. Recupac was the new director of operations and the waste pickers were no longer involved, so there was also no longer any support from the Fundación Casa de la Paz. Recupac, Tetra Pak, Cristalerías de Chile and Integrity also assumed the operational costs instead of Chilectra. The distribution of the value of the waste was still 30% for Chilectra customers and the remaining 70% was used to cover the costs of the operation. Tetra Pak, Cristalerías de Chile and Integrity²⁸, in addition to buying the recyclable materials, also made a financial contribution to support the programme's investment, management and maintenance costs. In return, their support was made visible at the Ecochilectra mobile point and in all communications associated with the project. These companies were also guaranteed exclusive purchasing rights to the recovered materials. Investment per mobile point (or '*tolva*', as they were known locally) was just over US\$ 18,000, while the operational costs were approximately US\$ 8,000 a month.

Apart from the municipality of La Florida, the local councils did not pay for the placing of mobile points in their municipality. The main function of the local councils was to regulate the process for obtaining permits for the establishment of points, to support the project's operations and to publicise it among the community. **In La Florida, however, a new relationship was initiated with the local council that was intended to lay the foundations for the renewed growth of Ecochilectra.** As Daniela Bravo explains, this was the future of Ecochilectra: "*we have turned Ecochilectra into an offer of recycling management services for companies and local councils*". In this case, the local council contracted Ecochilectra's service in the form of exclusive use of a mobile point to cover 14 points of the commune. This contribution was used to fund the model's operational costs and thus achieved its complete financial sustainability.

²⁸ In late 2013, the Integrity ceased operations and its contribution was compensated by Chilectra.

Image 1. Operation of Ecochiletra with mobile points



In December 2014, Ecochiletra had two mobile points for separate waste collection.

Table 3 shows the differences between these two *to/vas*. “Mobile Point 1” was used in five municipalities and was only financed through contributions from the participant private companies²⁹; while “Mobile Point 2” received municipal funding from the municipality of La Florida and could therefore provide a more frequent collection service.

Table 3. Ecochiletra Mobile Points

	Mobile Point 1	Mobile Point 2
Municipalities	Peñalolén, Recoleta, Quilicura, Santiago Centro, Providencia	La Florida
Collection points	11	14
Frequency of collection	Fortnightly	Weekly
Monthly collections	20	60
Funding model	Private funding by companies	Municipal funding
Start of activity	June 2012	May 2013

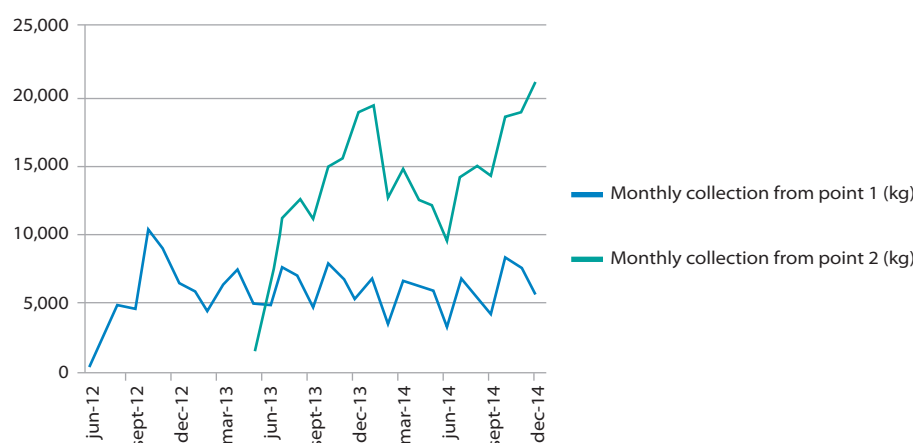
Source: Developed by the authors based on Chiletra data

²⁹ Although the Integrity company originally participated in Ecochiletra, at the time of writing the company had been declared bankrupt and its participation had therefore been interrupted.



The average monthly collection from Ecochiletra mobile points as a whole was 19.59 t per month. In La Florida the average monthly collection was 13.6 t, with an average collection per point per month of 970 kg., and in the other municipalities it was 6.06 t on average per month and 606 kg per point. The amount of waste collection in La Florida was on the rise, although a significant decrease is noted in the first half of 2014. In the other municipalities, the behaviour is more stable, as shown in **Graph 1**. This graph shows that visiting more frequently slightly improves collection rates.

Graph 1. Evolution of waste collected by Ecochiletra



Source: Developed by the authors based upon Ecochiletra data

A successful point received some 70-80 people and collected 1 t per visit. The awareness and promotional activities implemented from the second half of 2014 were a great help and in some places visits increased from 40 to 70-80, and La Florida sometimes even reached as many as 120 visits.

The decisive factors when it comes to collecting higher volumes can be summarised as:

- **Good positioning of mobile points.** Better results are achieved at places where large crowds gather, like fairs and markets, or places that are easy to access with a vehicle, like shopping malls and department stores.
- **The prior existence of demand for recycling.** The best results are achieved in municipalities in which the people have made demands for separate waste collection. In these cases, greater public awareness has a favourable effect on the operation of the mobile point.
- **Clear municipal support.** In some local councils, there are staff available that support the collection operation at mobile points. In principle, the local councils with the most resources are the ones that can offer the most resources, but if there is desire and political commitment, as in the case of La Florida, the results are better.
- **Running promotions and awareness activities.** Good awareness and communication work, along with promotional activities, such as free gifts (bags, balloons, etc.) and rewards for the most frequent customers or prize draws can increase the number of visits to mobile points.

2.3. Ecochilectra's socioeconomic results

Chilectra's aim is to run Ecochilectra as a company in itself and therefore seeks its financial sustainability, as well as positive social and environmental impact. The following is an economic, social and environmental analysis of the Ecochilectra model.

Financial results

There is a separate analysis of financial results for the mobile point models implemented in the five communes (hereinafter, "mobile 1"), and the model in La Florida (hereinafter, "mobile 2"), because the costs and income of each are different (see **Table 4**). As shown, while mobile model 1 made a financial loss, mobile model 2 achieved a small profit. The latter model is precisely the one on which the growth of Ecochilectra is to be based.

Table 4. Ecochilectra Monthly Financial Results (US Dollars)

MONTHLY INCOME MOBILE 1 \$3,880.00		B. MONTHLY INCOME MOBILE 2 \$ 25,708.00	
Sales of waste	\$849.30	Sales of waste	\$1,465.36
Funding by private companies	\$3,030.30	Funding by council (La Florida)	\$24,242.42
ECOCHILECTRA MONTHLY COSTS	\$10,239.60	ECOCHILECTRA MONTHLY COSTS	\$23,028.00
Chilectra general costs ³⁰	\$2,217.13	Chilectra general costs	\$2,217.13
Operational costs	\$7,767.68	Operational costs	\$20,371.79
Client discounts	\$254.80	Client discounts	\$439.60
MONTHLY BALANCE	-\$6,360.00	MONTHLY BALANCE	\$2,680.00

Source: Developed by the authors based upon data provided by Chilectra and Recupac.

Ecochilectra has three sources of income: income from sale of waste³¹; contributions to quotas by associated private companies for mobile model 1; and municipal funding for mobile model 2.

As for the sale of waste, Recupac sells it to different clients depending on the type of material: paper and cardboard are sold to COIPSA, a commercial group that manufactures paper and packaging that belongs to Recupac itself; glass is sold to Cristalerías de Chile, plastic bottles are sold to Integrity, Tetra Pak cartons are sold to Recicladados Industriales, and aluminium drink cans are sold to external waste managers.

³⁰ 50% of the general costs have been attributed to each of the two models.

³¹ The income from sales of waste were estimated by multiplying the monthly average of different types of waste collected from mobile points by their market price at the time of the study. Prices of materials (cardboard, glass, aluminium, PET, etc.) are subject to changes in the market, so there may be small fluctuations in this estimated income.



<https://www.flickr.com/photos/penalolen/>

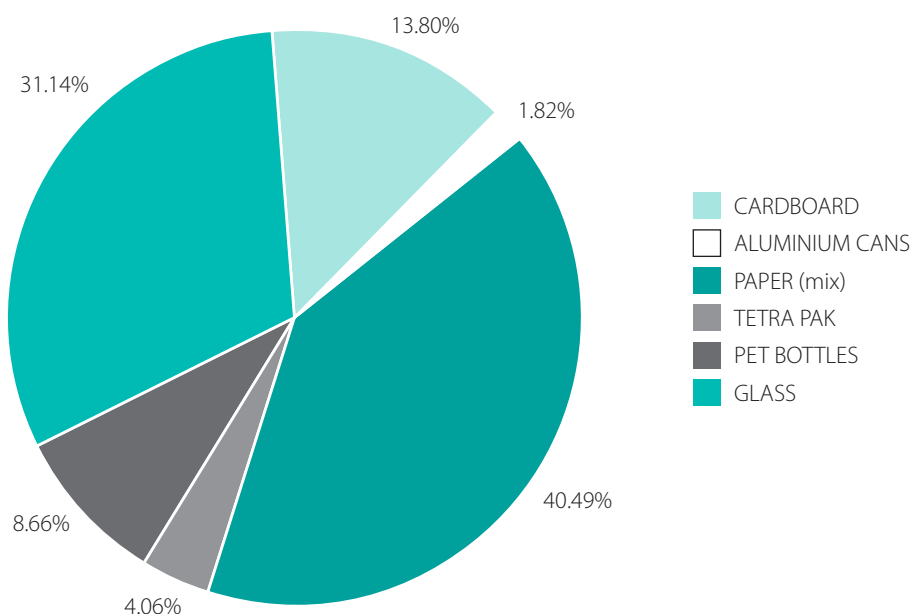
Recupac pays 30% of the value of the waste to Chilectra, corresponding to the discount that it offers on its clients' electricity bills. For customers, this is a set value and is determined according to the initial valuation for each type of material, which stays stable throughout the year. According to Isidro Pereda, the owner of Recupac: *"the La Florida model produces some 15 pesos (USD 3 cents) of net income per kg; with the other model we make losses, as the volume and value of waste collected does not compensate for the costs"*.

Ecochilectra costs are distributed between Chilectra and the other companies that finance the operation. Chilectra assumes the general costs corresponding to the contracted administration and management services, claims and requests from clients, the software, website and hardware management system corresponding to the terminals at collection points and promotional costs (section B.1 of table 3). Chilectra costs are practically all fixed and independent of the number of mobile points managed. The operational costs for the other companies, however, are variable and to a large extent depend on the number of mobile points managed, because the hours of work and, especially, freight costs are determined on that basis, which is one of the aspects that most effects the cost structure. So, the operational costs of mobile model point 2 are practically three times more than those of mobile point 1; a result that corresponds with the fact that point 2 made 60 monthly collections compared to just over 20 made by point 1.

Note that **the sale of waste only covers between 5-7% of the overall costs of the project**. So, the income obtained from the sale of materials by Recupac must be complemented with additional contributions, either from other private companies or from local councils, in order to make the project economically sustainable. The funding from Chilectra to maintain the project should not necessarily be viewed as a loss, because the company receives an intangible return in the form of a better image. From 2015, Chilectra is planning to evaluate the benefits that Ecochilectra supposes for the company.

Environmental results

Since it was set up in September 2010 and until December 2014, **Ecochilectra has collected a total of 842 t of recyclable waste**. The composition of the waste is shown in **Graph 2**, where it is revealed that paper, glass and cardboard are the main kinds of waste collected. The most economically valuable waste (aluminium and PET) represent a smaller portion.

Graph 2. Types of Waste (t) Collected by Ecochilectra

Source: Developed by the authors based on data provided by Chilectra

Although it is hard to compare the data due to the successive changes made to Ecochilectra, **the evolution of the scheme over the first four years of operations shows a clear growth of 250% in the volume of waste collected³²**, which indicates a good reception and acceptance of the project among Chilectra customers and an increase in environmental awareness regarding the importance of recycling, as shall be seen later in the social results. Specifically, from collecting 71,744 kg of waste in the first year, this figure had increased to 252,282 kg in the fourth year.

Recupac's waste management process is simple. At the mobile points, materials are sorted into different containers and are taken from there to one of Recupac's three treatment plants in Santiago. That is where the materials are compacted and baled for posterior sale to the different clients. Recupac does not mechanically or chemically transform any of its waste.

As for Ecochilectra's impact on energy consumption by families, the company has yet to undertake an evaluation of this aspect of the scheme.

Social results

In December 2014, the Ecochilectra programme had 6,462 registered clients, which represented an increase of 38% on the previous year. Since Ecochilectra started, and also including the collection centre period, discounts have been distributed with a value of more than US\$ 24,500. The average monthly discount per family is around US\$ 0.70. Although there is considerable variation, in most cases this does not have a significant impact on families' energy savings. In fact, the average discount substantially varies between mobile points. For example, in the municipality of Peñalolén, the average

³² Source: Chilectra.



discount is US\$ 1.22, the highest for any of Ecochilectra's points; while one of the points in La Florida has the lowest average, just US\$ 0.36. 21% of users opt to donate their discount to the charities associated with the programme.

The following results were obtained from questionnaires³³, interviews and observations at the mobile points:

- Most users are women (80.8%) with an average age of 57.6 years. These women are mainly housewives (52.7%), and this percentage is higher in the lower income segments. The average number of members of a household is just over 3.
- 85% say that they participate for environmental reasons and 23.4% are also motivated by the financial benefit³⁴.
- 90% consider that Ecochilectra provides benefits to the community, the most relevant of these being environmental (hygiene, cleaning and recycling).
- 83% consider that Ecochilectra is either 'highly' or 'fairly' effective at raising awareness about the importance of recycling. 17% do not consider it to be as effective in this respect.
- 74% of customers have recommended Ecochilectra to a relative, friend or neighbour.
- The average rating of Ecochilectra among interviewees was 6.47 out of 7.

The qualitative evaluation of Ecochilectra shows that, among higher income users, the main motivation is environmental and educational, it being a common practice for families to take their children to deposit waste at the collection points. Medium-low and low income users are also motivated by environmental awareness, but they also consider financial motivations to be important. The words of one user express well the feelings of this income group: *"any help is good for your pocket"*. However, there are no significant differences between geographic regions in relation to the percentage of clients that donate their discounts to charity.

Some low income users group the waste of several neighbours or families in order to obtain bigger discounts. There are even some people who come to the collection point four or five times the same morning to deliver waste collected over the week. In these cases, the monthly discount can amount to between US\$ 3 and US\$ 5; i.e. a discount of 10-20% of the overall electricity bill. Chilectra has identified that the programme has had an impact on customers that default on their payments, who have started to recycle in order to obtain the discount, which helps them to pay their debts and get reconnected. To date, there has not been any monitoring of this indicator, but it is due to be studied shortly in order to gain more accurate information about this impact.

In general, according to the users themselves, the discount has no significant impact on health or education indicators. However, improvements are perceived in terms of a cleaner municipality and evident improvements in relation to the level of awareness regarding the need for and importance of recycling.

Ecochilectra has approximately 50% active users; i.e. those that deliver waste to a mobile recycling point at least once every three months. That is because many clients are registered that never actually visit any points.

³³ This study involved questionnaires asked to 47 users in 4 communes. Of these, 36% were from the low income bracket (monthly family income below US\$ 400), 41% were in the medium income bracket (between US\$ 400 and US\$ 800) and 23% in the medium-high income bracket (more than US\$ 800).

³⁴ The percentages do not add up to 100 because the answers were not exclusive.



<http://www.recupac.cl>

As for job creation, Ecochiletra had generated economic activity for four waste pickers in its first phase. In the second phase, four jobs have been created in the management of operations and logistics of the two mobile points³⁵.



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Ecochiletra use delivering recyclable waste

Integration of Ecochiletra in municipal waste management systems

The Ecochiletra system is complementary to and compatible with municipal solid waste management (MSWM) systems. Both operate side-by-side and there is no need for coordination between the established garbage collection routes and the location of the Ecochiletra mobile point. People can choose which of the two systems to use to deposit their waste. The MSWM systems do not apply any incentives for people to recycle; although several municipalities do have other recycling programmes that work in parallel, such as, for example the *Reciclaje Inclusivo* (Inclusive Recycling) programme in Peñalolén in which waste pickers deliver a door-to-door collection system.

The model implemented in La Florida involves a substantial variation. In this case, **Ecochiletra is offered as a separate waste collection service to the local council**, and the latter should have initiated a public tender process. However, the mayor's political support allowed Ecochiletra to be contracted directly because it was deemed that there was no competition, as the provision of electricity discounts makes it a unique system.

Ecochiletra is even offering its system to waste management companies to be integrated into MSWM system tenders as an element that generates added value. Ecochiletra can also be implemented in condominiums or schools (in these cases offering group discounts), or even in already established door-to-door collection systems. So, Ecochiletra can be integrated in MSWM systems and with its sustainability ensured by being able to incorporate the costs in the framework of MSWM systems and, at the same time, could encourage separate waste collection.

³⁵ Of these four jobs, two were newly created, corresponding to the needs to conduct the operations of the two mobile points, and two were re-assignments of workers from RECUPAC, who performed supervision and support duties.



Along these lines, in 2014 the Ecochilectra service was integrated in ecopoints in the municipality of Providencia. This municipality has 20 selective collection points and it is the local council itself that collects MSW. The Ecochilectra service has been integrated in five of these points, with weighing done on certain days and times of the week, and the value of the materials being paid into the accounts of registered customers. In this case, Ecochilectra only provides the technological infrastructure and the value of the discount is paid by the intermediary to which the local council supplies the waste.

The local councils are clearly aware of the need to adopt new measures to encourage recycling, as a lot can be done to improve on the current results. As Dominique Cataldo, Head of the Environmental Department of La Florida, says: *"Official data shows that not even 1% of waste is recycled in the municipality; the figure is 0.6%, not counting waste pickers and other sources. So the system has to be more sophisticated, because what we have at the moment doesn't achieve much, hardly anything really"*. La Florida is looking to develop a future policy to improve recycling rates, in awareness of the need for better integration of waste pickers in MSWM systems and the fostering of door-to-door separate waste collection. This would mean two waste sorting models existing side-by-side in the municipality, offering different alternatives to the local population. On the one hand, the Ecochilectra model, based on the installation of mobile points in strategic places around the municipality; and on the other a system managed by waste pickers, who undertake door-to-door collection and have a collection centre where waste is sorted, accumulated and sold. The big challenge is to successfully integrate Ecochilectra's discount system in a waste collection and treatment system managed by waste pickers.

2.4. New challenges for Ecochilectra

Ecochilectra's immediate objective is to operate as company in its own right as part of Chilectra, and to do so while achieving viable and sustainable social impact. To achieve this, it is planning to introduce a series of objectives and improvements to foster growth and expansion.

Growth and sustainability of Ecochilectra

- **Expansion of Ecochilectra to the Santiago Metropolitan Region.** Ecochilectra is aiming to become present in the 33 municipalities of the Metropolitan Region in which the company holds a license and thus reach 10,000 active clients. The main barriers to this growth are economic (funding the expansion of the model) and administrative (tender procedures with local councils). In this regard, Ecochilectra is considering the introduction of a smaller stand than the current one, which would mean an initial investment of some US\$ 14,000, and would reduce transport costs and therefore make it more competitive in public tenders.
- **Diversification of Ecochilectra services.** In parallel to the growth of Ecochilectra, Chilectra is evaluating different options to achieve full economic sustainability. First, it plans to replicate the model that has been used in La Florida, and to take part in public tenders, along with authorised waste managers³⁷, in order to enter new municipalities. Second, the Chilectra team that is in charge of Ecochilectra plans to

³⁶ Although there is no available data on the volumes collected by waste pickers in La Florida, MNRCh estimates that waste pickers are responsible for 60% of recycling in Chile.

³⁷ Should waste pickers be certified as authorised collectors (a matter that is currently in the process of being legislated) the Ecochilectra model could be integrated in MSWM systems managed by waste pickers.



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offer its service to private companies through the installation of separate collection eco-points. In 2014, one such eco-point was installed at the Bimbo company. It is also hoped that the introduction of the future Law on Extended Producer Responsibility (EPR) will also help to improve the participation of the private sector in Ecochilectra.

Establishment of New Strategic Alliances

- **Commercial alliances.** Chilectra plans to generate a winning commercial product aimed at consumer companies in order to attract private funding to help expand the model. Ideas that it is investigating include sharing the image of companies providing additional finance at the mobile points, creating promotional and educational modules and including advertisements for the company on the electricity bills of clients living in areas where recycling rates are low.
- **Operational alliances.** Another area that the company is looking into to accelerate the expansion of the model is by making deals with companies that have established waste collection contracts with local councils. Ecochilectra could, in such cases, be integrated into domestic waste collection tenders by providing additional value to the company's offer. On the one hand, this system would help with the administrative process and access to new municipalities; and on the other, would make it possible to offer local councils a more efficient and competitive separate waste collection system.
- **Alliances with informal recyclers.** The integration of informal recyclers has not been discounted in the future, although this would require municipal collaboration in order to ensure the previous training and education of organised recycler groups so that they can operate the system reliably. It would also be advisable to integrate a supervisory body (public or NGO) to monitor and evaluate the work. Likewise, the integration of recyclers should be done through organizations, cooperatives or associations that are working in a formal manner and not with independent recyclers. This would ensure that the recyclers work in association. However, current limitations and the difficulties of the first experience mean that the inclusion of waste pickers is not a priority for Chilectra at the moment.

Better adaptation of the programme to low income customers

- **Analysis of the incidence of the programme on low income customers.** Although Ecochilectra is aimed at all of its clients, it is planning to analyse ways of getting the programme to have an effect on low income clients and those with a history of non-payment. It also plans to introduce indicators to assess the impact on access to energy. This analysis should also help to adapt the project to lower income customers.

Introduction of operational improvements

- **Incorporation of new actions.** A set of improvements has been identified for implementation, in particular: a new industrial design for mobile points to make the collection system more efficient and economic; better pedagogic dissemination and promotion of the programme; better user experiences; and the introduction of the programme to groups such as schools and condominiums.



2.5. Analysis of the replicability and scalability of Ecochilectra

With an annual growth of 2.5% in the generation of MSW and a recycling rate of 14%, Chile faces a challenge with regard to waste management. The Ecochilectra programme has a positive impact on its users by generating clear awareness of the importance of recycling, but this knowledge is still limited, as the programme does not exist in many municipalities. It is crucial for the project to be replicated in new municipalities, but there is also a need for public and legislative policies to regulate and support the development of this economic sector.

Given that Ecochilectra was created in order to replicate the successful Ecoelce model in Brazil, this study is especially relevant for understanding the factors that influence the project replication process and its subsequent scalability. The following is a list of those factors, differentiating external and contextual elements from those that are strictly internal and organisational.

External and contextual elements

- **The replication of projects in different socio-demographic contexts requires a prolonged preliminary process of adaptation.** The Ecochilectra experience shows that there is a variety of contextual factors that hinder replication processes. Different social needs cause the project's strategic objectives to vary. Cultural and legislative aspects also play a part in the design and implementation of its operations, as shown by the case of waste pickers. In Chile, the absence of any law to oversee their integration in municipal solid waste management systems made it hard for them to continue to be part of Ecochilectra. This all led to the Ecochilectra model ending up with a very different identity to that of the original Ecoelce model.
- **The structure of public administration is a conditioning factor of the scalability of the model.** The model defined for the municipality of La Florida, involving a public-private alliance, laid the groundwork for the growth of Ecochilectra, as it ensured its economic sustainability. However, when the implementation of a business model depends on the public sector, the scalability process is slower and may be delayed if there are political changes. This dynamic is accentuated if the structure of public administration also requires the process to be managed by different interlocutors. The fact that Ecochilectra has to make agreements with the 33 communes in the Santiago Metropolitan Region has a negative impact on this scalability process.

Internal and organisational elements

- **The commitment of company management is essential.** The replication and scalability process tends to be long and costly, so it requires clear commitment from senior management and the substantial dedication of the company's employees. In this regard, Chilectra was clearly committed to undertaking its Ecochilectra project. However, as the inclusion of waste pickers was not one of the strategic objectives of the programme, it shifted away from its original plans and failed to have a relevant impact in this area.



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- **Inadequate funding conditions scalability.** The expansion of Ecochilectra was limited by the lack of funding. The absence of any regulation that obliged the company to invest a percentage of its income in energy saving projects (as was the case with Ecoelce and Ecoampla in Brazil), or of any direct incidence of the programme on the company's financial results (such as reducing default rates or energy theft), meant that the sources of finance for expansion were mainly external, an aspect that hindered the process.
- **The efficiency of the service determines the scope for replication.** The scope for the replication of Ecochilectra mainly depends on the adoption of this model by new municipalities. To do so, Ecochilectra should make its operations as efficient as possible and ensure that the cost/tons collected ratio is as low as can be. With this in mind, work is being done, on the one hand, to design modular and lighter collection systems to reduce operational costs and therefore make them cheaper for local councils; and on the other to increase the number of promotion and awareness campaigns to boost participation in Ecochilectra.
- **Partners' skills influence the replication and scalability process.** It is important to analyse the capacities of the ecosystem of partners in order to facilitate the replication and scalability process. In Ecochilectra's case, the formation of alliances was hindered at first by the difficulty of finding operative partners that were willing to participate in a project that might have been highly innovative, but that also involved a high degree of uncertainty. Recupac, the company with which a partnership was finally formed, had experience of the management, transformation and sale of waste, but had to acquire the knowledge and skills required for waste collection. This fact conditioned the scalability of Ecochilectra.

Finally, it should be noted that the replication process is more iterative than linear. Although there is an original model on which the project is based (Ecoelce), the implementation of the same requires a series of pilot projects to be set up in order to acquire the knowledge required to adapt that model to the local reality and create the most convenient organisational structure.

3

CONCLUSIONS

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This study, based on the Ecochilectra experience after four years of operation, has led to a series of relevant conclusions regarding how separate waste collection systems based on incentive schemes can work in Chile. The following is a list of the main conclusions in the business, social and public sector areas, and finally in relation to the integration of waste pickers.

Business area

Ecochilectra was created without there being a previous reference or model in Chile and the inexistence of a 'market' resulted in early difficulties that have to be taken into account: high perception of risk among potential partners; unfamiliarity among users; and even reticence among the local community. In relation to this latter aspect, there is a basic need to integrate local resident organizations and trade organizations from the outset, even when the programme presents clear improvements, in order to respond to their needs and concerns. In short, the study demonstrates that **'market creation processes' are a complex affair** there are no yardsticks that consumers, partners or local government administrations can use as a guideline to the benefits and risks involved in undertaking a new activity.

Meanwhile, when it comes to implementing models like Ecochilectra there are two options: the development of one's own, exclusive waste collection model; or the integration of the model by means of a licence to already existing collection points or separate waste collection systems. The former, which Chilectra initially adopted, requires the inclusion of additional sources of municipal or private income to the sale of materials in order to guarantee sustainability, while the latter may require improvements to the profitability of existing systems. In both cases, it is difficult for a greater percentage of the value of the waste to be attributed to the client due to the implicit management costs of the collection system.

In relation to operations, there are also two possibilities: collection via mobile collection points or door-to-door collection with collection centres to store the waste. The installation of mobile points makes the system more flexible than the use of collection centres. Mobile points involve more variable costs (transport) and therefore require a very good location to ensure good performance (tons collected) and thus optimise the system. Door-to-door collection requires more complex collection logistics, as route schedules need to be established for when residents can hand over their waste, have it weighed and perform the electronic transaction corresponding to the discount. Moreover, the need to have a collection centre in the vicinity for depositing and storing waste also requires a greater initial investment, especially taking into consideration environmental laws in Chile. Both systems require a great deal of public communication and awareness work in order to maximise adhesion to the programme.



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Ecochilectra's economic sustainability depends on improving its income model and optimising its operational costs. Regarding its income model, **Ecochilectra has already started to be offered as a value added service to municipal waste separate collection systems, both to local councils and to private companies.** In this regard, models like Ecochilectra may be an attractive complement for waste management companies when bidding in public tenders. Ecochilectra, and similar models, could have an even greater social impact if they were to be integrated in municipal waste collection systems managed by recycler cooperatives. To do so, in addition to the need for more favourable regulations, the system and design for the participation of recyclers in Ecochilectra would need to be reviewed, whereby they should be offered greater autonomy and better financial incentives in order to ensure their successful participation. As for costs, lighter and more modular mobile points are now being designed that will reduce transport costs and make it possible to offer a more competitive service to local councils and companies.

The sustainability of Ecochilectra could be improved through association of the programme with Chilectra's main business activity: access to electricity. This would require adaptation of the programme to people in payment arrears or that have no formal access to electricity.

Social Area

The impact **of the Ecochilectra programme on savings on families' electricity bills is around 2-3%.** However, this benefit can have a greater effect on lower income families. Some users group the waste of other residents or relatives in order to get bigger discounts, which can be as much as 10% of the electricity bill. A significant impact is also observed on levels of environmental awareness among users.

In general terms, **Ecochilectra works better in the highest income and lowest income brackets,** for educational reasons in the former and because of the discount in the latter. In medium income brackets, the amount of money that can be saved is considered so irrelevant that people are discouraged from bothering with the system.

In this respect, some people involved in Ecochilectra, both inside and outside of the company, comment that the **act of recycling should not be associated with making money,** but should instead be viewed as part of everyone's environmental responsibility as good citizens, and hence should be a reward enough in itself.

The role of administration and the regulatory framework

Activities in relation to waste management **depend on decisions by government administrations,** an aspect that tends to slow down the implementation process, although it can also make it faster when there is solid political will. The involvement of the local council has been shown to have a positive influence on how the programme works, as more tons of waste are recycled in the municipalities where the councils are most supportive and does the most to raise awareness.

The **regulatory framework also has a decisive influence,** for it determines both the funding scheme for the model (for example, the future EPR Law will make it easier to receive private funding) and the logistical operations (depending on the requirements for obtaining environmental permits). It also affects the kinds of relationship adopted with waste pickers.



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Integration of waste pickers

Although the inclusion of waste pickers was not one of Ecochilectra's strategic objectives, an initial attempt was made to get them involved and thus create an inclusive model. However, Ecochilectra was unsuccessful in its bid to involve the waste pickers in its first phase despite initial activities to identify, select and train them undertaken by Fundación Casa de la Paz. It can therefore be said that Ecochilectra did not have a positive impact on the inclusion of recyclers in its waste management system.

Ecochilectra was certainly a pioneering project in Chile with a high degree of initial uncertainty. The company therefore sought to control the model's operations as much as possible in order to offer a good service to the client. This conditioned the relationship that was established with the recyclers, who were the visible 'face' of the company in the clients' eyes, but who didn't receive the benefits of being company employees.

The main item that hindered their inclusion was **the establishment of major dependence of the waste pickers** with respect to the company. The recyclers had to accept the rules, schedules and prices set by Chilectra. Neither was their participation encouraged by the fact that **the discount obtained by customers was deducted from their own income**, making them the weakest and most vulnerable part of the value chain. Likewise, the establishment of relations with individual recyclers, rather than with associations, failed to generate a positive impact on a certain group, but rather on certain recyclers in particular. Note, however, that the practical inexistence of organised recycler associations in the places where Ecochilectra operated made it difficult for such relations to be established.

The Ecochilectra experience shows that in order to carry out this process and form relationships it is essential to work with an experienced local entity and develop a trusting relationship with waste pickers. The initial barriers and mistrust can only be overcome through the mediation of an organisation that both parties recognise.

Likewise, it is useful to analyse waste promotion and discount systems that do not generate the perception that recyclers are going to be paid less for their work.

Therefore, schemes that offer greater autonomy and a more central role to waste pickers are preferable to encourage their participation. Increased autonomy means developing their own management structures to facilitate organised work in waste collection, treatment and sale processes; and these should be duly recognised by the municipal authorities. Such actions **have a positive effect on recycling rates and the reduction of municipal waste management costs**³⁷.

³⁷ Public policies for informal recyclers inclusion at the Chile municipal waste management system (2013). Working document for the Bureau for the inclusion of informal recyclers. Published by Avina Foundation, International Labour Organization and the Chilean National Movement of Recyclers, Santiago de Chile.



4

RECOMMENDATIONS

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- **Analyse the conduct and behaviour of customers with respect to recycling on the basis of their participation in Ecochilectra.** This analysis could especially focus on lower income users and users at risk of default on their payments in order to adapt the programme to this segment of the population and favour access to such a basic service as energy.
- **New strategies for the integration of waste pickers.** It would be possible to recover the inclusive nature of the model by incorporating Ecochilectra in green points managed by formalised waste pickers. This would be a long process, which could be implemented in municipalities where there is an interest in developing such policies, as in the cases of La Florida and Peñalolén.
- **Promote the economic sustainability of Ecochilectra.** The development of partnerships with waste management companies in order to participate in public tenders would make the Ecochilectra model totally viable. Additionally, such alliances could promote other sources of income, such as the offer of mobile waste collection points to shopping malls, supermarkets and private companies, or the development of commercial products for brands that want to run promotions or advertise at mobile points.
- **Accept a wider range of materials.** The collection of other small waste materials at the current mobile points (batteries, household oil, waste textiles, etc.) would improve the viability of mobile points by making more income per collection point. This would also offer customers a more complete service.
- **Develop more alternatives to the discount.** One option is to demonetise the incentive and create a loyalty system based on collecting points that can be exchanged for products and promotions. The introduction of other elements, such as competitions, announcing the recycler of the month, etc. would also be ways of encouraging people to take part in the programme.
- **Foster energy saving.** A points system as described in the previous point could encourage the acquisition of products that improve domestic energy saving (bulbs, small and more efficient household appliances, etc.) and thus promote savings on electricity consumption.
- **Reinforce the pedagogic side of the Ecochilectra programme.** Given the direct access that Ecochilectra has to its customers, informative and educational activities could be organised to explain recycling better and teach people about the social and environmental benefits of including such habits in everyday life.



METHODOLOGY

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The first phase of the study, which started in November 2013, involved a compilation of bibliographic information and document analysis. This was followed by the development of the fieldwork in the city of Santiago. The first visit was from 26 November to 10 January 2014 and the second was from 18 to 26 November 2014. In between these visits, work was done to update the bibliographic information and the results of the Ecochilectra programme.

On both visits, various interviews were conducted with the manager of the Ecochilectra programme and the different partners involved in the programme, including the environmental managers of the 6 municipalities where Ecochilectra is present, and the managers and employees of Recupac, the Fundación Casa la Paz, Tetra Pak, Cristalerías Chile and the Fundación San José. Interviews were also held with the waste pickers that participated in Ecochilectra, and the presidents of the MNRCh and of the Peñalolén Waste Pickers Association. A total of 28 personal interviews were held. Additionally, a work committee was formed in order to identify potential problems and misjudgements regarding the Ecochilectra model, along with possible solutions and constructive contributions to help improve things. This committee included members of Ecochilectra, Tetra Pak, Recupac, the Fundación San José, the municipality of La Florida and the municipality of Providencia.

Physical visits were made to five mobile points in four municipalities (La Florida, Providencia, Quilicura and Recoleta). On these visits, 47 questionnaires were issued to clients that had come to deposit their waste.

The final phase involved analysis and drafting of the case studies, and concluded in July 2015.



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