

INTRODUCTION

Chile has an extensive school system with more than 12,000 schools, which educates more than 3.5 million pupils per year. The schools are mostly lit with inefficient lighting systems. Lighting count for 80% of the schools' entire electricity consumption, and thus represent a significant operational cost. Moreover, Chile has high solar radiation in the centre and north of the country, which is a large untapped potential for solar photovoltaic (PV) power generation, using panels on the empty roofs of schools. However, the public system does not, by itself, have the sufficient funds to finance nor technical capacity to bring about such facility upgrades.

EBP Chile, a private consultancy and engineering company specialised in the project development and implementation of energy strategies and sustainable energy solutions, applied to ADMIRE with the idea to develop an investment case for public schools to finance a shift to more energy efficient technologies. This would allow the public sector to realise cost savings of 21.5m USD/year, create a better learning environment for the pupils, increase pupils' awareness of sustainable energy, and significantly reduce greenhouse gas emissions.

PROJECT OBJECTIVE

The objective was to create an investment framework, which enables private capital to finance the implementation of energy efficiency measures and renewable energy generation in public and private schools. This was done by assessing the current electricity and heating consumption, identifying best suited technologies, designing an ESCO investment framework, and by engaging with the necessary public, private and financial stakeholders to bring this project to life.

RESULTS & NEXT STEPS

A successful pilot project has been implemented, and the process of scaling it to a national level has been initiated. Enel X, the leading utility in Chile, has partnered with the Municipality of Peñalolén to invest in and implement a pilot project on six schools. The total investment is around 180,000 USD, and Enel X's investment has a payback time of 6 years.

The good experiences lead to a formulated implementation strategy to scale the project up, which has been initiated. EBP and Enel X have signed a Memorandum of Understanding (MOU) for implementing the model in 150 schools. A contract has been signed with the Municipality of Providencia to invest in 12 schools, and there are other municipalities in the pipeline, spurred by the experiences from the pilot.

The investment model, and its accompanying business model, has a replicability potential in other areas of the public sector, such as hospitals and other public buildings. Furthermore, it represents a model for the local financial sector to finance sustainable energy solutions in public sector on commercial grounds. Also, as the public sector buildings are in a similar condition in many other countries in the rest of Latin America, the replicability potential increases further, especially considering the leading position of Chile on this matters.

IMPACT HIGHLIGHTS

	GHG mitigation	Investment	Actors
Currently	1,870 tCO ₂ e/year	USD 568,000	5 integral partners, 17 total actors engaged
Total potential if up-scaled and replicated nationally	66,000 tCO ₂ e/year	USD 120,000,000	

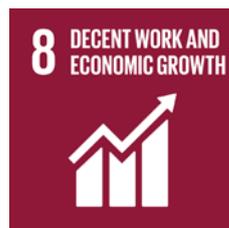
SUSTAINABLE DEVELOPMENT GOALS



By improving the lighting conditions, better learning environments are created.



LED lights improve energy efficiency and solar energy is used for electricity generation.



Improving the physical conditions of schools also improve the working environment of teachers and other supporting staff.



Creating public private partnerships and mobilising private finance for public benefit.

THE TECHNOLOGY - LED LIGHTING AND PV SOLAR CELLS

The technologies in this project are well-known: it is shifting from conventional to LED lighting, improving the lighting level and significantly decreasing electricity consumption, and placing electricity generating solar PV cells on the schools' roofs. The PV cells are scaled to maximize self-consumption, leading to 50% of the annual electricity use can be covered by the PV cells. At the times when the schools generate more electricity than they can use, it is sold to the grid, creating another revenue stream.

The reduced need of grid electricity through improved energy efficiency and renewable energy generation decreases GHG emissions. Moreover, the diversification of energy sources and the reduced future reliance on the climate sensitive hydropower increases the resilience of the Chilean energy systems as well.

THE BUSINESS CASE FOR CLIMATE ACTION

Changing the lighting system and installing PV cells requires an average investment of 22,700 USD per school. As it lowers the electricity bill considerably, and creates a revenue stream by selling electricity to the grid, the investment pays off after just 6-8 years; this is helped by the fact that Chile has one of the highest electricity costs in Latin America. Including interests, and administrative costs, the payback is around 10 years.

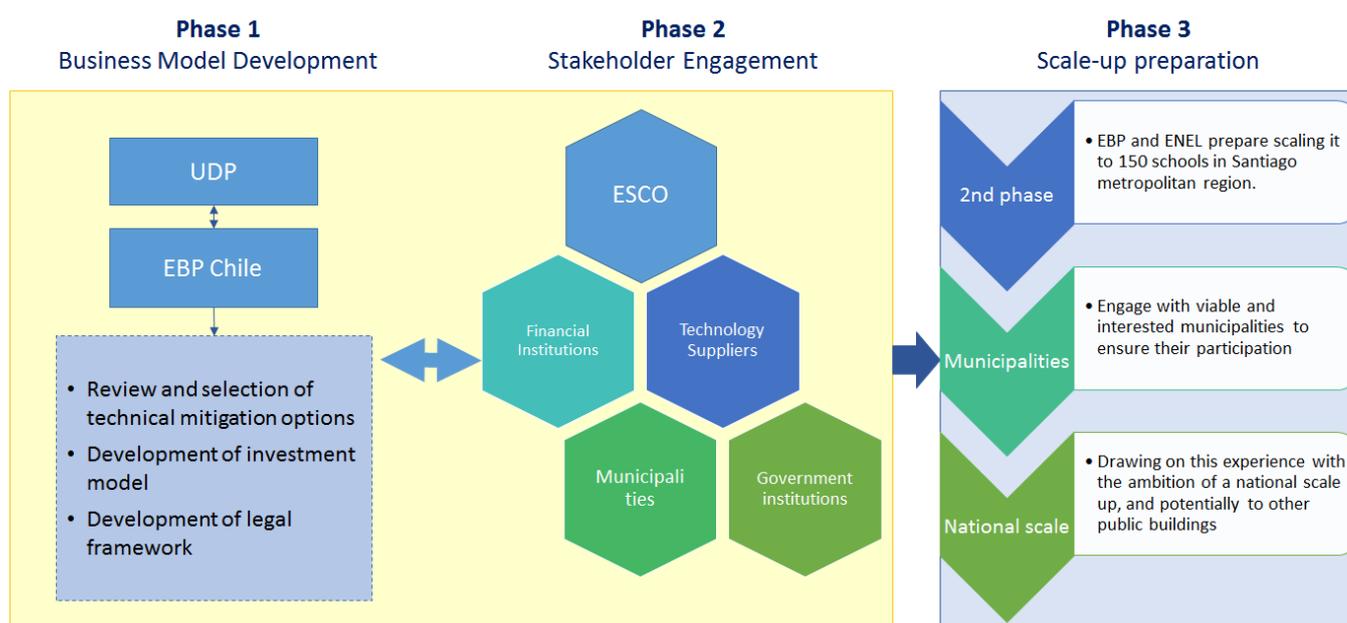
It is the organisation of how to implement and finance the investment which sets this project apart in a Latin American context. EBP Chile designed, in collaboration with key stakeholders, an investment model akin to an Energy Service Company Organisation (ESCO). The ESCO invests in the project purchasing and installing the new technologies in the schools (the beneficiaries). The ESCO signs a 10 year contract with

the schools, represented by a 'Corporación Municipal' (CORMUP), which is responsible for administration of schools.

In return, the ESCO receives a monthly fee from the CORMUPs. For the beneficiaries, the reduced electricity costs and the monthly fee is equal to or less than the previous electricity costs. After the 10 years pass, the ownership of the technologies is transferred to the CORMUPs, after which they benefit from the substantial lower operating costs.

It was critical for the success of the project to find a reputable company with sufficient financial, technical, as well as legal and administrative capabilities to act as a solid and long-term partner for the public sector, which can bundle many relatively small investments together. Facilitation of this stakeholder engagement process was therefore key in the project intervention, which is further described below.

PROJECT INTERVENTION



Phase 1 & 2 - The first phase focused on analysing the investment opportunity in the public schools. First, EBP Chile collected the necessary data from all schools in the country, to test the feasibility of different technical solutions. 17 different technologies were tested, and LED lighting and PV cells came out as the two that had the best profitability, but also GHG reduction potential.

Consecutively, EBP together with UDP developed an investment model with the identified technologies. The model extrapolated cost savings, investment volume and GHG emission reductions to a national level. Moreover, the organisational form of how this could be implemented started to take shape. An ESCO model was identified as most suitable, as it spared municipalities of a need to seek funding to implement the improvements, administrative and technical work at the same time as it was commercially viable.

The legal framework was studied through a legal assessment. Important legal questions regarded the contractual relation between the schools, represented by CORMUPs and the ESCO, and *inter alia*, how changes in the electricity consumption could be accounted for.

The reports above were developed through discussion with the different stakeholders. Moreover, as the ESCO model is new in Chile, it could not be implemented without having strong and reputable actors on-

board. The ADMIRE project thus included a substantial stakeholder engagement part, where EBP met with numerous stakeholders to gauge their interest and engage them in the project.

Phase 3 - Ministry of Energy Chile co-financed the third phase, which includes the pilot of six schools, and the preparation to scale up to 150 schools in Santiago. EBP and Enel focused on identifying interested and viable municipalities, and getting them interested in participating in the model. On the basis of this experience, an expansion of the project to all national schools is planned.

RESOURCES

[Calculations](#) - Costs, savings, payback period, greenhouse gas emission calculations per measure, region and aggregated - Excel Model

[Legal report](#) on the model, identifying and suggesting solutions to legal challenges - PDF Document.

Short **technical briefs** of the different measures - PV cells, [PDF](#) and LED, [PDF](#)

TEAM

Name	Organisation	Email
Mauricio Villaseñor	Project Manager, EBP Chile	Mauricio (dot) Villasenor (at) ebpchile (dot) cl
Marco Henriquez	Consultant, EBP Chile	Marco (dot) Henriquez (at) ebpchile (dot) cl
Per Harry Wretlind	Climate and Development Expert, UNEP DTU Partnership	perwre(at) dtu (dot) dk

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