

## REAJ: Energy Everywhere

### PURPOSE/OBJECTIVES OF THE PROJECT ACTIVITY

- To reduce our carbon trace through the avoid emissions.
- To give the started program continuity where the hostel promote its spirit about to produce its own energy.
- To minimize the dependency and the costs of the hostel against the electrical system.
- Improve energy efficiency of our system by minimizing consumption and avoiding losses due to the transport of part of the consumed energy.
- Awareness of energy saving from different points of view in which we can all participate and its direct involvement with climate change.

### THE SUSTAINABLE DEVELOPMENT GOALS THAT THE PROJECT ADDRESSES AND HOW

The main objective in which our project can be framed would be:



Guarantee access to affordable, safe, sustainable and modern energy for all

*We produce energy that is generated through renewable sources (see M1 and M2)*

*We improve the efficiency to reduce the global electricity consumption (see M1).*

*We minimize greenhouse gas emissions (see M1, M2 and M3)*

In addition, the same project also meets the following objectives:



To make cities and human settlements inclusive, safe, resilient and sustainable (see M1, M2 and M3)



Ensure sustainable consumption and production patterns (see M1, M2 and M3)



Adopt urgent measures to combat climate change and its effects (see M1, M2 and M3)



Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all (see M4)



Protect, restore and promote the sustainable use of terrestrial ecosystems and stop the loss of biodiversity (see M3)

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## METHODOLOGY

### M1 - Installation of 3 hot water storage tanks with aérothermal heating system

*What is Aérothermy?*

*It's a clean technology that extracts up to 77% of the energy of the air.*

*The aérothermal heating systems are a last generation heating pumps designed to provide cooling in summer, heating in winter and, if desired, hot water throughout the year.*

*How does it work? It extracts energy contained in the air, even with outside temperatures below zero and transfers it to the room or to running water.*

*This is achieved by the thermodynamic cycle that uses a refrigerant gas to extract heat from outside air and what aérothermy achieves is to produce more energy than it consumes. It does not produce combustion (there is no boiler), there is no smoke or waste and it is safer.*

We chose to use Aérothermy because it is a renewable energy that adapts perfectly to our geographical area, with a temperate climate close to the coast, where its performance is maximum.

We also put it in the hot water storage tanks as they are used daily and throughout the year at the hostel, both in the bathrooms and in the kitchen, so that their performance throughout their life will be much higher. And we will put 3 accumulators with aérothermal heating system because they are currently available (without aérothermal system) to cover our installation.

The objective is not only to reduce the consumption of hot water consumed, but to get the reflection of the users of the hostel, where as the energy consumption and the CO<sub>2</sub> reduction is not only found in the lights, but as in this case in the reduction of the consumption of hot water or in the reduction of the energy to heat it.

With an approximate consumption of:

- 25 l of hot water per guest per day
- 6 l of hot water for breakfast
- 12 l of hot water for lunch or dinner

in Hostel Albergue Paradiso we can estimate, at least one consumption throughout the year of approximately 579,600 liters of hot water.

On the other hand we have to raise the temperature of the water to at least 28° (on average, say 4° in winter and 20° in summer, and although in winter we consume a little less, losses are greater).

*We know that to increase the temperature of 1 g of water 1°C, 1 calorie of energy is needed, therefore, to increase 1 l of water 1°C will require 1,000 calories (since 1 g of water corresponds to 1 ml). If the difference is 28°C, what we need is 28,000 calories or what is the same, 28 kcalories.*

*Using the conversion between energy units, knowing that 1kWh are 859 kcal, the amount of kWh that we will need will be 0.0326 kWh for each liter of hot water consumed<sup>1</sup>.*

<sup>1</sup> Approximate theoretical numbers since the reality will depend on many factors such as the purity of the water, its hardness, the dissipation of the environment, etc.

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Therefore, the current total energy consumption for the hot water in the hostel is:

$$579.6000 \times 0.0326 = 18,894.96 \text{ kWh}$$

As with the accumulators of hot water by aerothermal heating system we will get 4kWh of heat for each kWh used, it means that our reduction in consumption will be 75%, so that the 18,894.96 kWh obtained before will only be 4,723.74 kWh.

This gives us a saving of 14,171.22 kWh, which transformed into CO<sub>2</sub> not emitted<sup>2</sup> is 4,350.56 kg or in other words **4.35 tons of CO<sub>2</sub>**.

## M2 - Installation of 20 m<sup>2</sup> of solar panels with direct connection to our network

Continuing with the generation of own electric power started in 2018 with the installation of a wind turbine and a Smartflower (domotized solar panels) that directly discharges the energy produced to our network, we propose to expand this local generation of clean energy with the installation of more solar panels due to our consumption still admits this.

The idea is to install ~ 20 m<sup>2</sup> of solar panels on the roof of one of the buildings and to dump the energy produced to our electrical network together with the energy produced by the wind turbine and the Smartflower.

We do not have batteries since we are still connected to the network for the extra energy need and we are not, nor do we consider, connect to the network for the sale of surplus energy.

We will put a total of 13 solar panels of 1,650 x 990 mm and with an individual power of 270 W and an annual average of 1,350 W of daily production.

With these data the installation of the 13 solar panels will produce 17,55 kWh/day on average that will give a total of 6,405.75 kWh/year.

Therefore, these 6,405.75 kWh give us a saving in non-emitted<sup>3</sup> CO<sub>2</sub> of 1,966.57 kg or, in other words, **1.96 Tn of CO<sub>2</sub> reduced**.

## M3 - Install a Can-Press with container and signage

In this section of the project what we intend is to install a manual press for cans of soda (aluminum cans) next to a container decorated for this purpose and in line with the explanatory signage that will accompany them.

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<sup>2</sup> Each kWh consumed emits an average of 0.307 kg of CO<sub>2</sub> - see the annex at the end with the data from the REE.

<sup>3</sup> Each kWh consumed emits an average of 0.307 kg of CO<sub>2</sub> - see the annex at the end with the data from the REE.

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The objective is not only to collect the aluminum cans, 100% recyclable material, but to get the reflection of the users of the hostel, by discovering the energy and CO<sub>2</sub> that they can save when recycling, but also what they can achieve by previously applying the 3R (Reduce – Reuse - Recycle).

In the hostel, the consumption of soda cans can be in two ways:

- Soft drinks sold in the cafeteria or vending machine.
- Refreshments that the clients bring themselves since sometimes they bring their food and / or snack (we also make birthdays parties for children in which the parents bring the snack and drinks).

Taking into account these two routes and the seasons of the hostel, the consumption of cans of soft drinks throughout the year we could distribute in 3 large blocks:

- 12 weeks of great affluence where consumption reaches 600 cans per week.
- 12 weeks of average affluence where consumption reaches 400 cans per week.
- 28 weeks of low affluence where consumption reaches 80 cans per week.
- 

This gives us a total of 14,240 cans per year, of which we hope to be able to include in the selective collection process at least 75%, that is, 10,680 cans.

As each can recycled, according to data from ECOEBES, reduces emissions by 0.218 kg of CO<sub>2</sub>, we would get 2,328.24 kg, or what is the same, **2,328 tons less CO<sub>2</sub>**.

## 2. REDUCTION IN EMISSIONS DUE TO RECYCLING

According to the data provided by ECOEMBES, there is a saving in the emissions of CO<sub>2</sub> to the atmosphere in the manufacture of different containers from recycled raw materials against the use of primary raw materials. In concrete, the data provided are the following:

Table: CO<sub>2</sub> savings data (ECOEMBES)

Container	Saving (in kg CO <sub>2</sub> / ud)
aluminum tin	0.218
PET bottle (soda)	0.141
pet bottle (water)	0.098

These data are the starting data for estimating or calculating the equivalent operating times reached by the different vehicles. The calculations will be made using CO<sub>2</sub> savings as input, this implies that the data obtained will be based on the amount of CO<sub>2</sub> that is not emitted to the atmosphere by the replacement of the primary raw material with material from recycling.

*Report justifying the production of CO<sub>2</sub> - CIDAUT Foundation*

This section has the extra that we not only eliminate the CO<sub>2</sub> linked to the recycling of aluminum:

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- Locally, garbage is minimized in the dump, thus contributing its longer existence and therefore to the environmental protection of the next area that will be degraded to build the next dump in Cantabria.
- In a global way, it also contributes by limiting the amount of mineral needed (4 kg of bauxite in origin per kg of final aluminum), thus:
  - The degradation of ecosystems by the extraction of bauxite in open pit mines is minimized.
  - Limits the emission of other greenhouse gases linked to the extraction and treatment of bauxite until aluminum is obtained.

## M4 - Design and implement games of renewable energies and energy efficiency

We will design school Games (“Gynkhana”) of renewable energies, sustainable mobility and energy efficiency based on all the different elements available in the hostel as a living example, together with other tests and simple experiments.

The goal of these Games will be the approach of basic knowledge, to help the reflection and try to achieve a change of attitude in the users, being an activity energized by professionals of free time and leisure.

The reason for this “Gynkhana” is that a high percentage of our clients, are schoolchildren.

In addition, these students and many of the rest of clients (families or other groups) ask us to do activities, giving them the opportunity to do something fun as well as educational, getting a greater depth of the message we intend to convey transversally.

At Paradiso hostel we work transversally in the environmental field and what we want is:

- BE,
- SEEM
- And also TRANSMIT.

This "Game of renewable energies and energy efficiency" will be specifically promoted among the educational community of Cantabria, so that schoolchildren can attend the hostel with an environmental education program in which they will learn about this topic dynamically and with real examples while discovering the spirit of sustainable hostelling.

This “Gynkhana” will also be offered as an alternative to schoolchildren from the rest of Spain.

## MONITORING PLAN

We have different indicators to evaluate the success of the implementation of the different activities of the program:

- Fulfillment with the scheduled deadlines.
- kWh saved annually in the production of hot water.
- kWh produced with solar panels annually.
- Kg of aluminum collected annually (and its equivalence in cans)

$$\text{No. of cans} = \frac{\text{kg of aluminium}}{0.013 \text{ kg/lcan}}$$

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- Number of employees who have received the training linked to the functions (maintenance staff in M1, cleaning staff in M3 and monitors (leisure and free time staff) in M4).
- Number of educational centers interested in the environmental education program linked to the "Ginkhana of renewable energies and energy efficiency".
- Number of schoolchildren who enjoy the "Ginkhana of renewable energies and energy efficiency".

## CONTRIBUTION OF THE PROJECT ACTIVITY TO THE TEN AREAS

### Direct categories of the project presented:



The hostel will contribute to the annual elimination of 8,638 tons of CO<sub>2</sub> into the atmosphere.



We have an impact on the recycling of waste, we are aware of water consumption (in this case hot water) and the reduction of energy or its cleaner production.



The "Ginkhana of renewable energy and energy efficiency" goes directly to our customers. In addition all the informative signage is also for them.

### Categories involved in the project within the global program to which it belongs:



The project is not an isolated initiative. It is part of the continuation of a broader program initiated by the hostel years ago and of which there will be continuity.



Since its beginning, the hostel owners have invested a large part of its profits in the company. The return on investment makes the company more economically sustainable and this returns will allow us to continue more broadly with continuous improvement in the field of sustainability

### Categories involved tangential:



Despite not directly implementing this element, the "Gynkhana" will work on the issue of mobility and encourage the use of electric vehicles.

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When working on the issue of waste, the importance of recycling their packaging, as well as the importance of applying the 3R will help our customers to reflect on the consumption of their food and beverages.



In addition to achieving a beneficial local return for the community, the educational part will be closely linked to the educational community that can use the “Gynkhana” within the environmental education program and which also uses our school farm. We are also an example in our council since it is the first accommodation company that places charging points for electric vehicles.



Although it is not the objective of the project, it will act on the staff of the hostel: the monitors will receive training to be able to impart the “Gynkhana”, the cleaning team will receive training on the importance of the selection of waste and the maintenance staff on the new renewable energy implemented and its benefits (aerothermia).

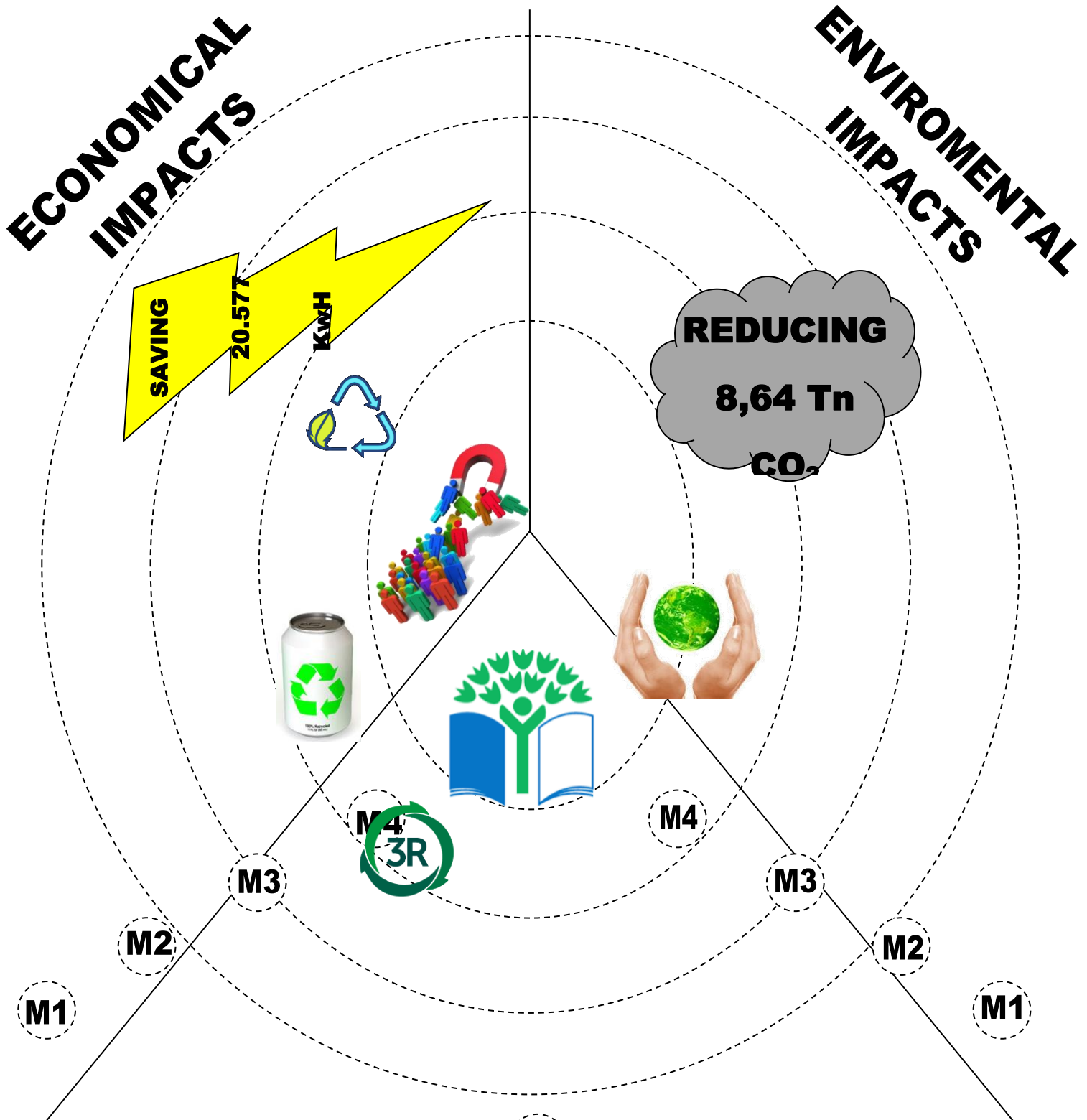
## ENVIRONMENT, SOCIAL AND ECONOMIC IMPACTS

The project "Energy everywhere" has 4 independent activities:

- M1 - Install 3 hot water accumulators with aerothermal heating system
- M2 - Install 20 m<sup>2</sup> of solar panels with direct connection to our network
- M3 - Install a canpress with container and signage
- M4 - Design and implement a “Gynkhana of renewable energies and energy efficiency”

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Each of the activities has different impacts:



## SOCIAL IMPACTS

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*Council = village example*



## ESTIMATION OF EMISSION REDUCTIONS (CO<sup>2</sup> tonnes)

### ANNUALLY NOT GENERATED CO<sub>2</sub> THANKS TO THE IMPLEMENTATION OF THE PROJECT:

Project sections	Units year	Kg CO <sub>2</sub> /units	Tn CO <sub>2</sub> saved year
M1 - 3 hot water accumulators with aérothermal heating system	14.171,22 kWh saved	0,307 kg	4,350 Tn
M2 - 20 m <sup>2</sup> of solar panels with direct connection to our network	6.405,75 kWh produced	0,307 kg	1,960 Tn
M3 – Canpress with container	10.680 recycled cans	0,218 kg	2,328 Tn
M4 - Gyinkhana of renewable energies and energy efficiency	<i>This section does not have a direct impact on CO<sub>2</sub></i>		
<b>ANNUAL TOTAL CO<sub>2</sub> THAT WE WILL SAVE</b>			<b>8,638 Tn</b>

In the before table, we can see the data of CO<sub>2</sub> eliminated or not generated with our project.

However, for a better explanation of the data, we can see each of the sections in "Methodology" and the Annex at the end.

## SAVED FUNDS AND RETURN OF INVESTMENT (ROI)

### DIRECT INVESTMENT RETURN

Project sections	kWhyear	Actual Price kWh <sup>4</sup>	Annual return
M1 - 3 hot water accumulators with aérothermal heating system	14.171,22 kWhyear produced	0,095 €/kWh	1.346,27€
M2 - 20 m <sup>2</sup> of solar panels with direct connection to our network	6.405,75 kWhyear saved	0,095 €/kWh	608,55€
<b>TOTAL DIRECT RETURN PER YEAR</b>			<b>1.954,81€</b>

### INDIRECT INVESTMENT RETURN:

We consider this indirect return, since we will not be the ones who obtain the economic return directly, but society in general, since aluminum is a high-value metal in the scrap sector for recycling and will be the local selective collection system which will be the one who will take advantage of the return of a material of these characteristics.

Project sections	Und. año	Peso por lata	Precio por kg aluminio	Retorno anual
M3 - Canpress with container	14.240 cans	13 gr	1,50€/kg	277,68€

<sup>4</sup> It must also be keep in mind that this value is with the current price, fixed by a one-year contract, about to expire, and with the rising price of energy the return in the coming years will actually be higher than this figure.

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<b>TOTAL INDIRECT RETURN PER YEAR</b>	<b>277,68€</b>
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To this direct return to society we must add that it has an indirect extra return but linked by kg of garbage that does not end up in the dump.

We can also assess an indirect return on investment with the possible acquisition of customers thanks to schoolchildren who come to the hostel to do the “Ginkhana of renewable energy and energy efficiency”.

## **SOCIAL INVESTMENT RETURN:**

Along with the two previous economic returns of the investment, must be added the social return of the investment, that is, each person who passes through the hostel and sees, reads, is interested in the subject, as well as all schoolchildren who make the “Ginkhana of renewable energy and energy efficiency”, we can talk about several thousand students, who are sensitized, that when they get home they transfer part of what they have learned, that they make a change in their daily habits thanks to the change of attitude, which will have a multiplying effect far beyond the euros Returned.

## **WHY SHOULD THE PROJECT BE FUNDED AHEAD OF OTHERS?**

- Because it is an important impulse to continue with a line started years ago and that we hope to continue for many more years (see below our background).
- Because being a private company, we are an example of how without institutional support things can be done well.
- Because we believe that education for sustainability is important and must be transversal and for that reason it is not just the event itself, but we seek to disseminate the environmental message.
- Because we put a lot of love in everything we do.

## **BACKGROUND**

During the 22 years of life of Albergue Paradiso hostel we always tried to offer to our customers different alternatives in experiences and services.

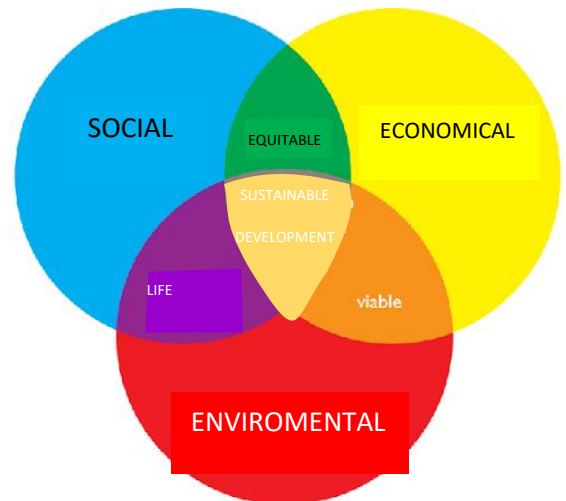
As a way to attract clients, especially schoolchildren (although not limited to them alone) the hostel implemented a school farm years ago with an environmental education classroom, in which through the tools that the non-formal education of leisure It allows Discovering, Knowing, Enjoying different environmental themes, not as "something that must", but as an activity, an experience that we like, it entertains us ...

With this spirit of giving options to learn and have fun with our clients, to find something different at the same time educational, within the line of local sustainability for a global sustainability, we have continued year after year with diverse investments around different areas and areas of the hostel, but always, not only looking for the environmental improvement in itself, but also giving it the educational, diffusion, the example on which they can meet and then move...

In that continuity of adapting ourselves to the times, the hostel has had different punctual and permanent lines of action:

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- Transforming our area in a farm with lot of trees and a botanic garden with more than orchard with a "botanical garden" with more than 100 different species of trees and shrubs
- Installed solar showers in the swimming pool.
- WCs with double discharge system
- Installed mono-controls with push button in the showers to favor the saving of water and power.
- Installation of thermostatic valves in all heat radiators.
- We are replacing the old lighting to LED lighting.
- Start-up of an apicultural workshop to sensitize about the importance of bees.
- Etc.



And in recent years we have bet with stronger investments to continue working towards sustainable development:

- Acquire a fully electric vehicle, which produces 0 emissions and minimal noise pollution.
- Install 2 charging points for electric vehicles (each with a semi-fast charging plug and a slow charging plug) to facilitate the mobility of passengers with electric vehicles.
- Install a wind turbine and a smartflower (domotized solar panel as a "solar sunflower").
- Acquire 2 electric bicycles, for loan to the clients, covering a double function: at the same time that we are offering a local leisure alternative, clients can discover the benefits that this type of vehicle can offer (if they have never tried it before).
- Install an informative poster about clean energies and sustainable mobility so that all customers can learn freely.

All this framed in that we are adhered to the Cantabrian Strategy of Environmental Education.



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## Cantabrian Strategy of Environmental Education

### OUTLINE A SUSTAINABLE COMMUNICATION PLAN FOR GUESTS AND STAKEHOLDERS

#### **Provide examples.**

In all cases, explanatory signage and other graphic material will be available, which will show about the availability of the project thanks to the HI Sustainability Fund.

This signage will be permanently visible to all customers.

In addition, advertising will be done on our social networks, not only when it is granted and implemented, but also in recurring news in which it has to do with any of the initiatives.

In our blog we will generate several news, about what is the Fund for the Sustainability of HI and each of the different areas worked on the executed project, where it will be clearly expressed how it has been done thanks to the Fund for the Sustainability of HI, which also will link to the news of the social networks as an extension of the information.

We will also will make videos about it for our Youtube and IGTV channels.

<https://www.albergue-paradiso.com/es/>

<http://www.youtube.com/user/AlbergueCantabria>

<https://www.instagram.com/albergueparadiso/>

<https://www.facebook.com/albergueparadisocantabria>

<https://twitter.com/AlbergueINFO>

We will request support from local administrations (General Directorate of Youth, Suances City Council ...) for its dissemination both on its social networks and institutional portals and with press releases to newspapers and local radio stations.

In addition, when the clients and students carry out the “Ginkhana” guided by the hostel's free time and leisure staff, they will expressly refer to the HI Sustainability

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