

LIFE SustainHuts

Spanish huts





Lizara (1540 m)



Ibones de Bachimaña (2200 m)



Estós (1890 m)



Cap de Llauset (2450 m)



Montfalcó (790 m)



Góriz (2200 m)

Evaluation of initial status of huts

Initial data recovering in the huts. Evaluation of weather, renewable resources, technologies installed, consumption profiles, accessibilities, and other.

Assessment of technologies

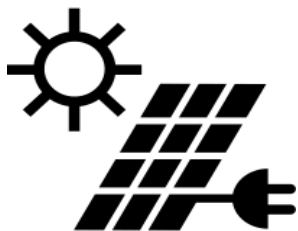
Microgrid is analysed and improvements proposed. A wide study of technologies, consumption, cost, etc. is assessed and the best microgrid configuration finally proposed.

Implementation

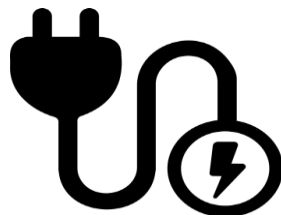
7 technologies were selected to be installed in 18 different actions in all the huts. Finally, 16 are executed.

Demo

Between 1 and 3 years of monitoring period is analysed of each action executed.



PV



Electrification



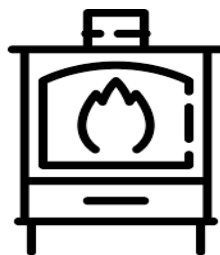
Electric efficiency



Novel insulation



Thermo-chimney



Pellet stove



Hydrogen



4 kWp of PV



Automatic control of
batteries and genset
operation



Installation of a
thermo-chimney with
high efficiency

Results as expected:

- Good operation of the new automatic control.
- 3,000 litres of diesel saved since 2018.



Electrification.
Higher leverage of
the hydro-turbine
installed

Initial status

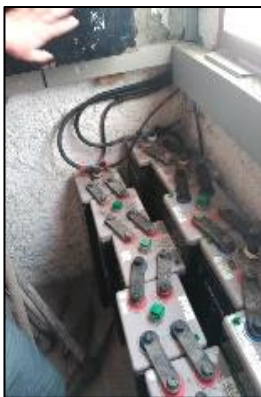


30 kW of hydro-turbine.
Excess of electricity.
Only operating during
10 months/year

- Fantastic results of electrification. Longer operation than expected. 7,500 litres of diesel reduced.
- Hydrogen technology installed. Demonstration phase.



Seasonal
storage using
hydrogen



1. Automatic control of batteries and genset operation
2. To charge of batteries from the hydro-turbine



2.5 kWp of PV



Pellet stove with
air recirculation



Innovative
insulation

Results as expected:

- Good operation of the new automatic control.
- 5,000 litres of diesel saved since 2018.
- It would be interesting to improve the hydro-turbine to increase the renewable production.



4 kWp of PV



2 pellet stoves



Innovative insulation

Results as expected:

- The hut is new and efficient, so the energy consumption is lower than in others.
- 4,000 litres of diesel saved since 2017.
- Lower PV production than expected. New lessons learnt.



5.7 kWp of PV



Automatic pumping of water
from the natural spring

Positive results:

- Good operation of the PV.
- Excellent results of the improvement in the water pumping. No water purchased since the installation.
- 2,778 litres of diesel saved since 2020.



21.1 kWp of PV

Results as expected:

- Hut with highest number of visitors (13,403 guests in 2019).
- The largest PV installation.
- 10.6 tonnes of CO₂ avoided since the installation.

		2017					2018					2019					2020					2021																			
		VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X
Lizara	AAI	Not installed																																							
	PV	Not installed					Monitored					Monitored					Monitored					Monitored					Monitored														
Bachimaña	Thermo-chimney	Not installed																																							
	Electrification	Not installed																																							
Estós	Insulation	Not installed					Monitored					Monitored					Monitored					Monitored					Monitored														
	H2 storage	Not installed																																							
Llauset	AAI	Not installed																																							
	PV	Not installed					Monitored					Monitored					Monitored					Monitored					Monitored														
Montfalcó	Pellet stove	Not installed																																							
	Insulation	Not installed					Monitored					Monitored					Monitored					Monitored					Monitored														
Góriz	PV	Not installed																																							
	Insulation	Not installed																																							

Not installed
 Monitored
 Installed but not monitored

Monitoring protocol:

- Monitoring protocol started after the installations.
- One methodology developed. It was applied considering the data recorded in each hut.
- The protocol has been deeply affected by the Covid pandemic.
- Highly difficult to analyse if the objectives are targeted.
- Not only quantifiable results. Improvement of the comfort and the management.

Hut	Renewable production	Litres of fuel saved	CO ₂ Avoided	Reduction on the l/person night in the hut
	kWh	Litres (die.) Kilograms (PG)	Tonnes	Litres/person
Lizara	15,209	2,939 (die.)	35.68	0.25 (die.)
Bachimaña	62,744	9,207 (PG)	18.82	0.25 (NG)
Estós	14,598	7,502	12.41	0.11
Llauset	20,525	4,945	10.46	0.04
Montfalcó	7,696	4,973	6.97	0.20
Góriz	12,536	2,778	10.65	0.02
Spanish huts	133,308	27,383 (die.) 9,207 (NG)	94.99	-

Results keep coherence with expected ones!

Thank you
very much!



See you in
the huts!