LIFE ZEROENERGYMOD

Zero energy habitable mobile modules in Europe

FUNDACIÓN PARA EL DESARROLLO DE LAS NUEVAS TECNOLOGÍAS DEL HIDRÓGENO EN ARAGÓN

ARPA
EQUIPOS MÓVILES DE CAMPAÑA

B + HAUS

CUD Zaragoza

LIFE19 CCM/ES/001327

General context

Currently, the **habitable solutions** installed in campsites are not designed considering the energy efficiency or the environmental criteria. They are portable and easy-to-install solutions based on usual 20-feet modules, highly dependent on HVAC technologies to be comfortable.

The **energy consumption** in army bases, including the electricity, is produced **using diesel generators**, creating the necessity of being externally supplied of the energy source, and producing a huge amount of GHG and pollution.

Source: Hts-tentiq

Apart from it, Europe is highly dependent on the external energy supply and currently engaged in a huge **European strategy of climate change mitigation and adaptation**.

Source: eu2019.fi

- Directive (EU) 2018/844
- Directive (EU) 2019/944
- Directive (EU) 2018/2002

Project information

LIFE ZEROENERGYMOD

Coordinator	Fundación Hidrógeno de Aragón (FHA)
Partners	Centro Universitario de la Defensa de Zaragoza (CUDZ) Equipos Móviles de Campaña ARPA S.A.U. (ARPA) B-Haus Arquitectura Eficiente (B-Haus)
Programme	LIFE19 CCM (Climate Change Mitigation)
Budget	1,178,265 € (55% UE contribution)
Duration	4 years: from June, 2020 to May, 2024

Project partners

The **Aragon Hydrogen Foundation** is a private non-profit R&D&I centre whose main mission is the support the development of **strategic projects**, in the short medium and long term in the field of hydrogen and fuel cell technologies in order to create employment, generate wealth and improve the competitiveness of the industrial sector in the Aragon region.

ARPA is an Aragonese company specialised in the design, manufacture, installation, training, and management of **mobile solutions** for different sectors such as Defence, Civil, Health, Emergencies, and Telecommunications. Our mission is to design and manufacture sustainable solutions that change, or at least improve, the lives of those who use them anywhere in the world. Comprehensive, innovative and rapidly deployable solutions to support any activity of any operator anywhere.

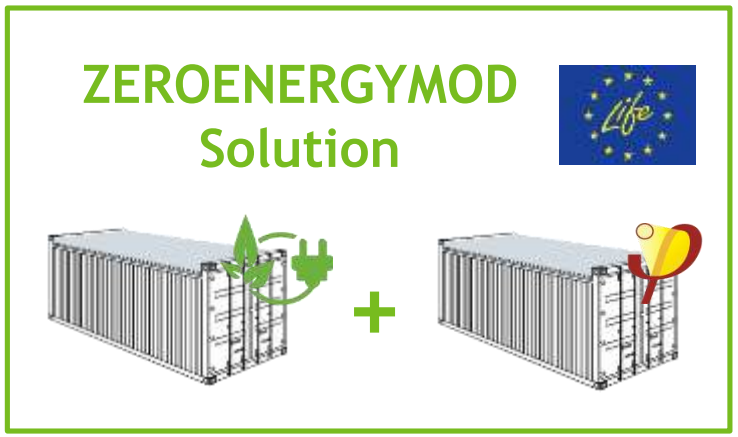
Bhaus Arquitectura Eficiente is an architectural firm specialized in low-consumption, sustainable and self-sufficient architecture. Pioneers in Aragon in the design of buildings with **Passivhaus standard (PS)**, performing both new construction and rehabilitation projects, energy advisory services, urban planning and building training programs under the PS, being an accredited company as trainers of the *Passivhaus Institut*.

The **Centro Universitario de la Defensa** de Zaragoza is a training and research centre attached to the University of Zaragoza under the ownership of the **Ministry of Defence**. The purpose of the CUD is to teach courses leading to the award of the official undergraduate degrees. CUDZ researchers have led 4 **R&D projects** in the Armed Forces related to optimization of energy consumption of the General Militar Academy, the development of the Strategic Plan for Energy Refurbishment, and the Monitoring and Energy Characterization of the Gabriel de Castilla Antarctic base, among other.

General definition

LIFE ZEROENERGYMOD project aims to develop a robust, easy-to-install, easy-to-transport, **low consumption and zero emissions solution** for habitable modules which will be able to be used under **extreme weather**.

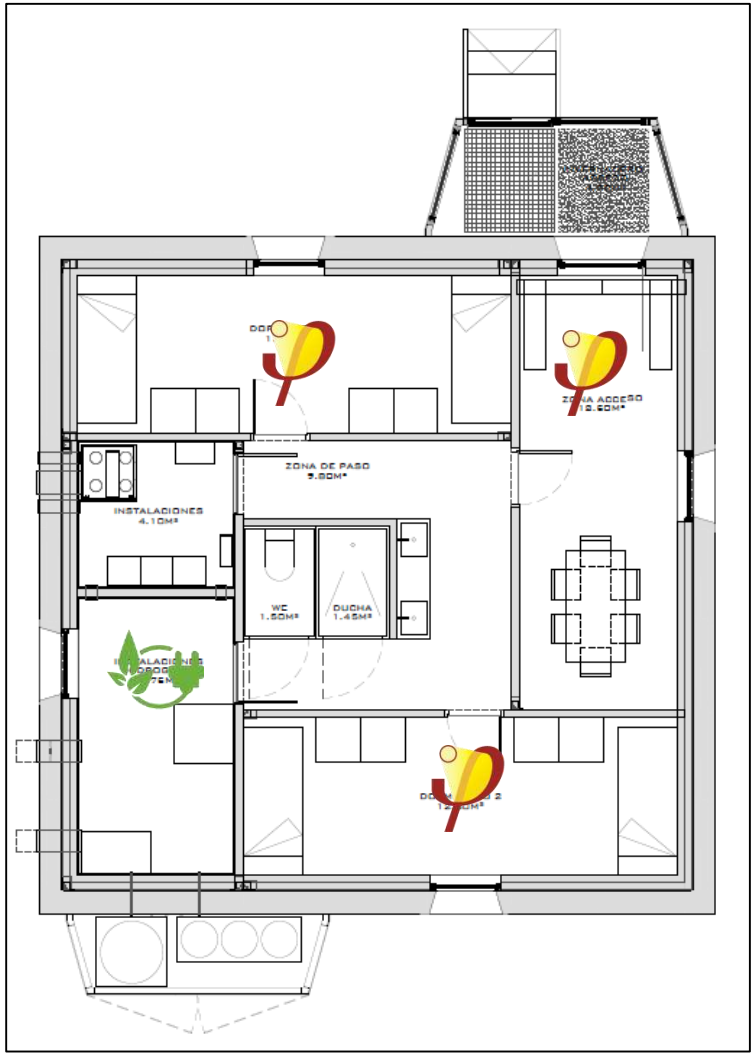
The zero emissions solution will be formed by **two connected solutions**, the **PASSIVMOD**, a low-consumption habitable module designed under Passivhaus standard, and the **ENERMOD**, which will provide renewable energy and energy storage to the habitable module.



Solution. PASSIVMOD

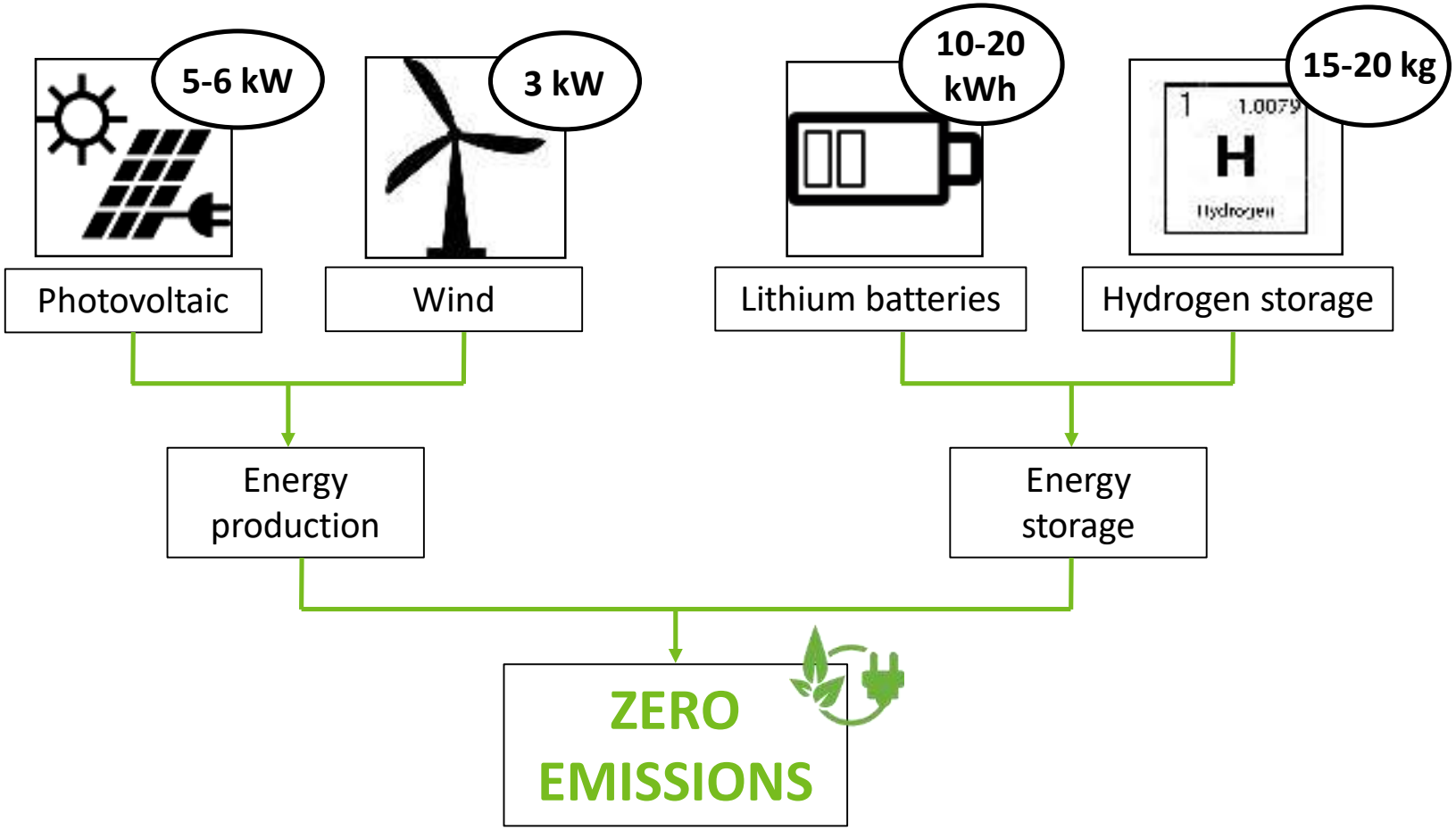
The **PASSIVMOD** is an usual construction of 4 (20ft) modules, one of them with the energy facilities and the others are habitable spaces. It is designed and built under **PassivHaus criteria**, to not exceed the 15 kWh/m^2 year in heating and cooling consumption. Considering the current solutions, this solution will **reduce the energy consumption in 85-90%**.

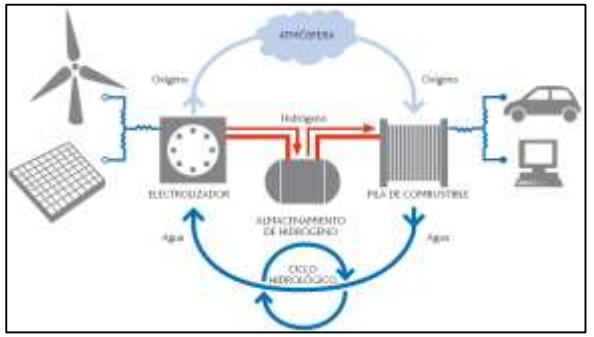
Designed for two purposes: offices or rooms. It counts with **all the facilities necessaries** to be installed in different locations and uses: HVAC system, hot water, bathrooms, lighting, and others.



Solution. ENERMOD

ENERMOD is integrated in the building and provides all the consumptions of the solution with **renewable energy**, which is completely electrified.



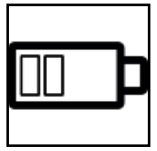


Solution. ENERMOD

ENERMOD has two energy storage systems.

Day-night storage

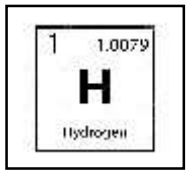
Lithium-ion batteries



10-20 kWh

Seasonal storage

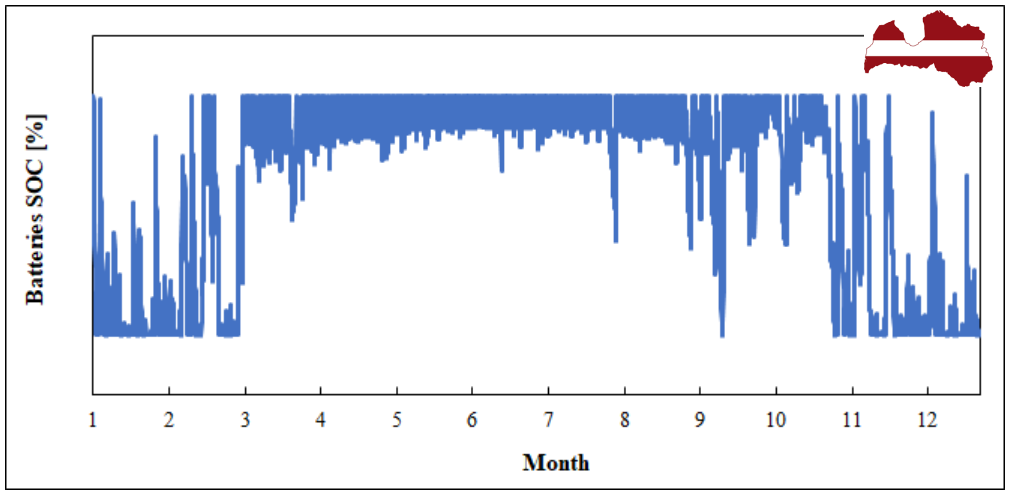
Hydrogen storage

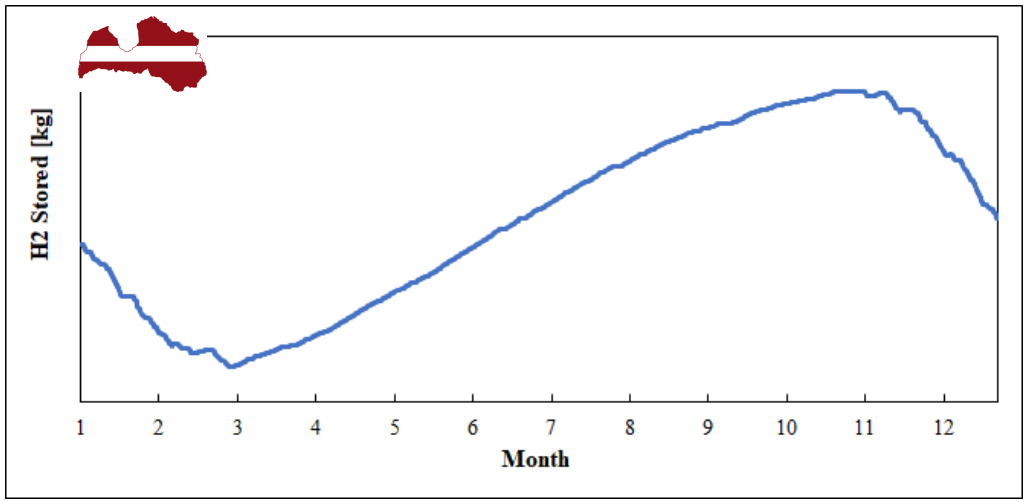


Electrolyser **2-4 kW**

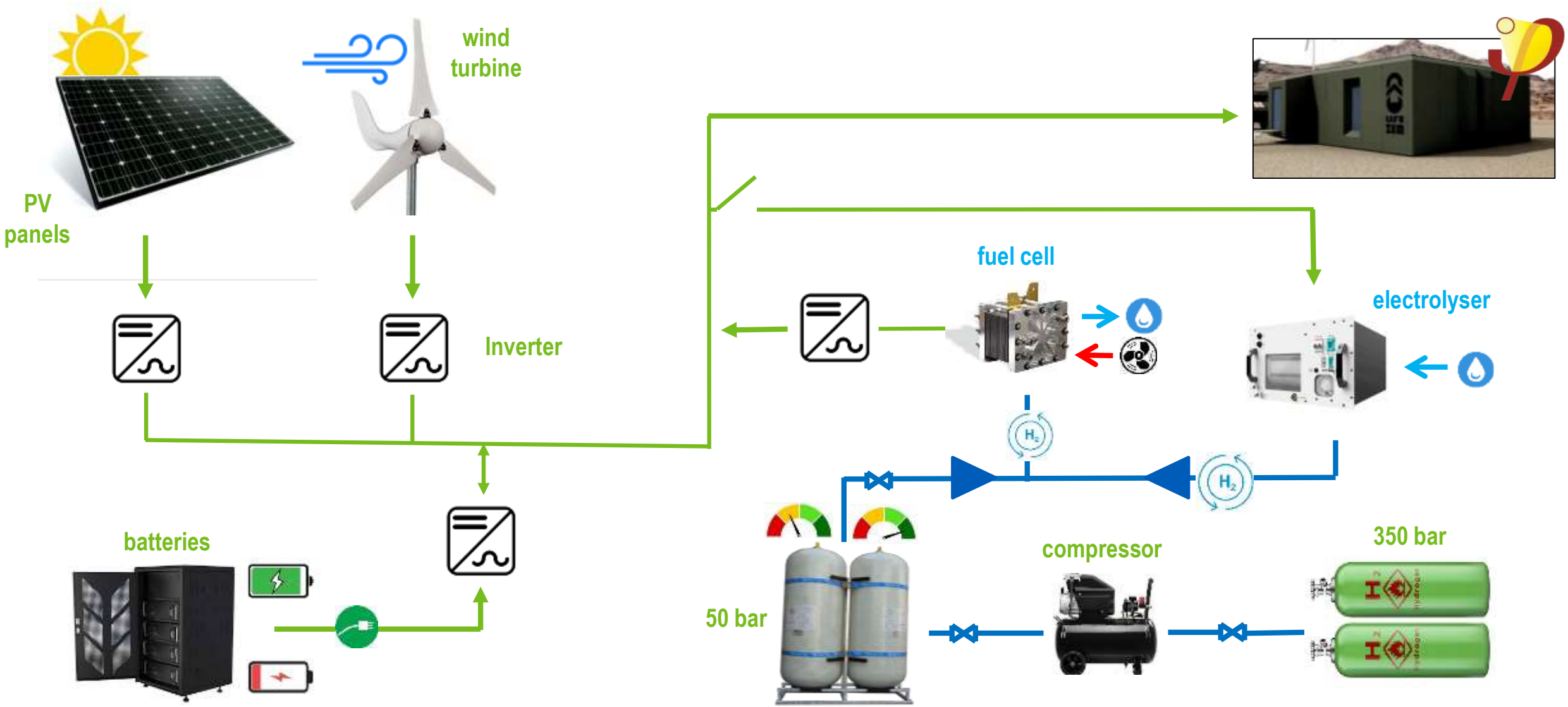
Tanks **10-20 kg**

Fuel cell **1-3 kW**

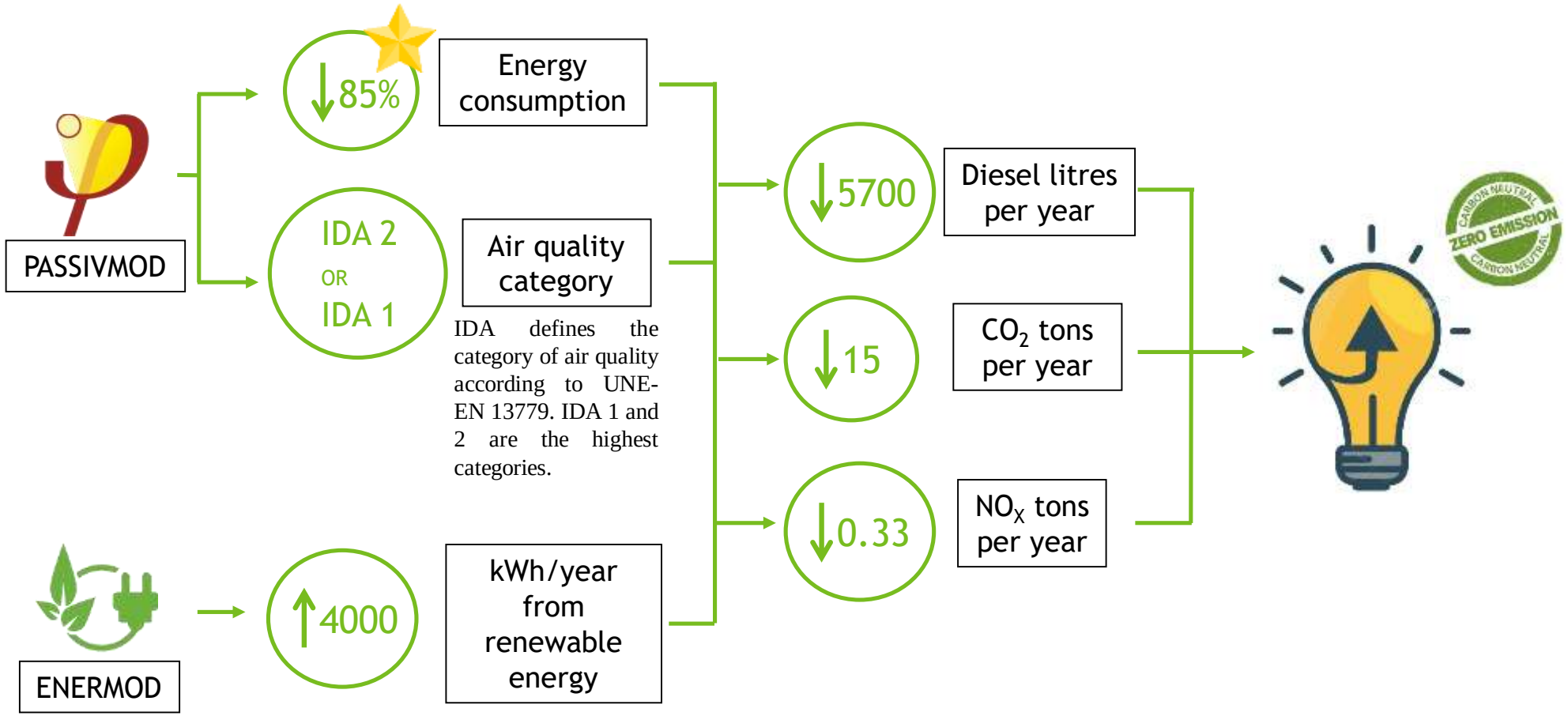




Solution. ENERMOD



Project impact



Demos-sites

The final solution will be installed and demonstrated in **three different demo sites** managed by the Spanish Army.

CENAD San Gregorio (Zaragoza, Spain)

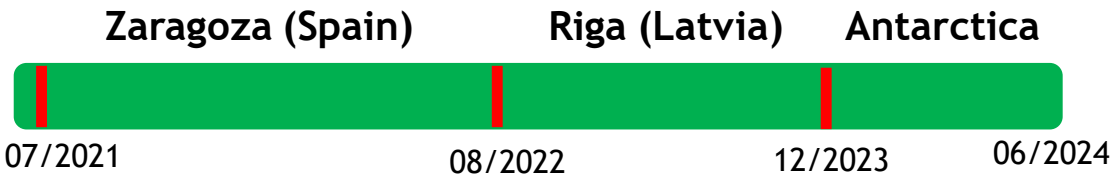
July'21-June'22

Adazi NATO Base (Riga, Latvia)

August'22-April'23

Gabriel de Castilla Base (Deception Island, Antarctica)

December'22-June'23



Replicability

The project solution is developed under a complete and adaptable design which makes it potential to be applied in **different sectors and situations**. The design is focused on be easy-to-transport, easy-to-install, low consumption and zero emissions, so many implementation can be developed in a **future industrial replication**.

Army campsites

Emergency facilities or field hospitals

Schools

Temporary habitable solutions

Current status

Currently, the project is optimally progressing with the modules (almost) finally designed and the final **assembly in progress**. During the next weeks the final solution will be integrated and testing using different protocols and, finally, in July'21, the ZEROENERGYMOD will be transported and installed in the **first demo-site**, CENAD proving ground (Spain).

http://lifezeroenergymod.eu/es/

ejercito.defensa.gob.es

Thank you very 😊 much! 😊

I will be happy to answer your questions

Contact: Manuel Gutiérrez (mgutierrez@hidrogenoaragon.org)

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