

LIVING LABS FOR DECARBONIZATION AND CLIMATE CHANGE MITIGATION



WHAT ARE LIVING LABS?

They are testing spaces for innovative solutions, where multiple stakeholders collaborate in the development, prototyping, validation, and testing of new technologies, services, and their applications in real-world contexts, in defined areas with local identity, recognizable by citizens.

Public Policy Instruments

MODERN URBAN SPACES FACE SEVERAL CHALLENGES, IN THE SHORT TERM THEY REPRESENT (*):

- 60% to 80% of energy consumption
- 70% of carbon emissions
- 60% of the global GDP in 2025
- High population growth

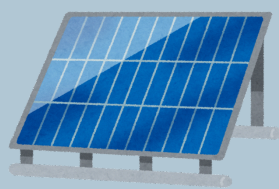
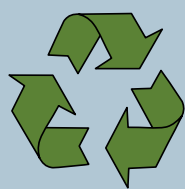
(*) Source: United Nations Environment Programme (UNEP)

THUS, WE NEED TO FIND SOLUTIONS THAT:

Create more innovative, sustainable, inclusive, and resilient cities for their citizens.

Replicate and scale technological solutions, in real-life contexts, that have proven benefits for the urban population.

Raise awareness and educate the population to adopt more sustainable behaviors by changing consumption habits.



KEY INDICATORS



Number of projects



Average duration



Total investment



EEA Grants funding



Jobs created



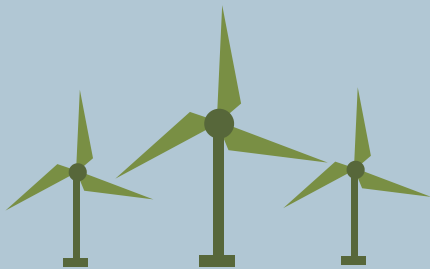
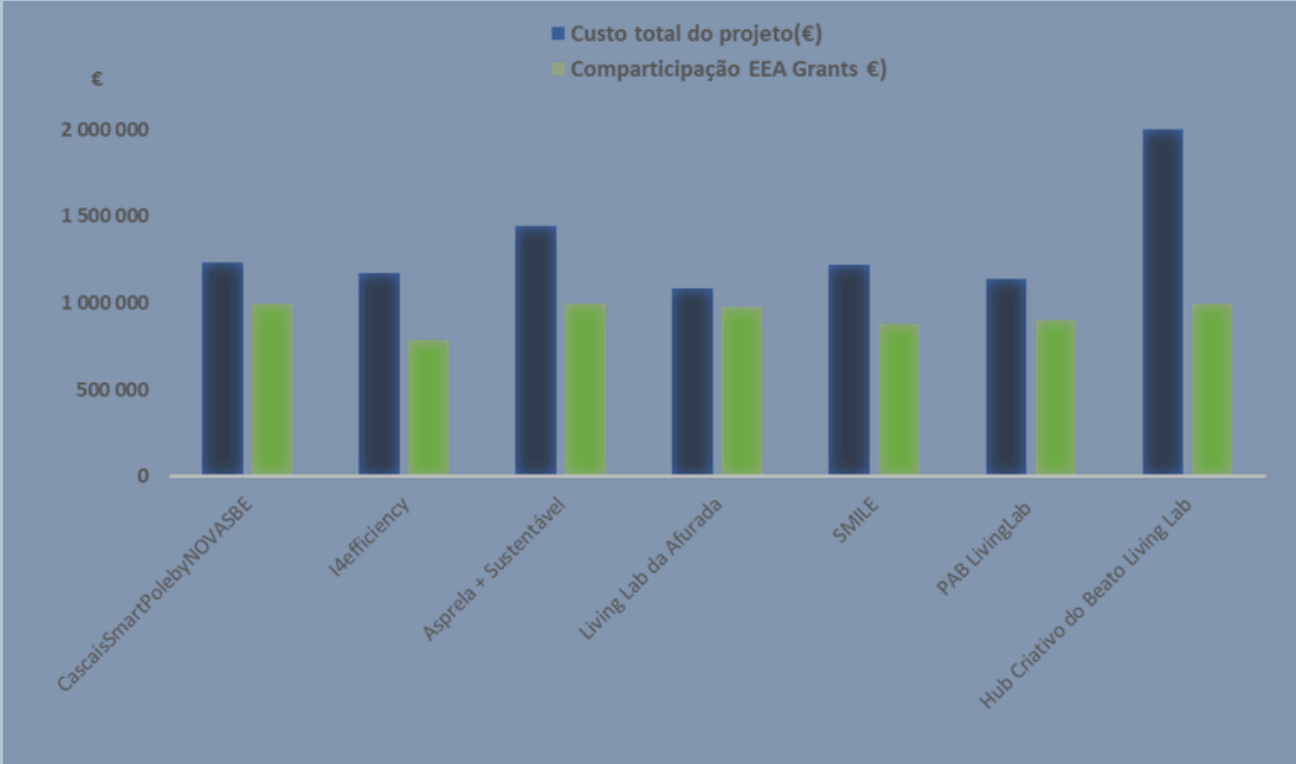
People benefiting from
decarbonization measures



Annual reduction in
emissions (tCO₂)



Location
Lisbon, Sintra,
Cascais, Loures, Vila
Nova de Gaia e Porto





OBJECTIVES

- Promote efficient resource management
- Contribute to the sustainable energy transition
- Decarbonization or mitigation of the effects of climate change
- Transition to sustainable food systems
- Create more innovative, inclusive, and sustainable cities for their citizens



ACTION AREAS

- Circular economy
- Sustainable mobility
- Energy efficiency
- Renewable energy communities
- Innovative low-carbon solutions
- Vertical farming or Roof farms
- Energy performance of buildings

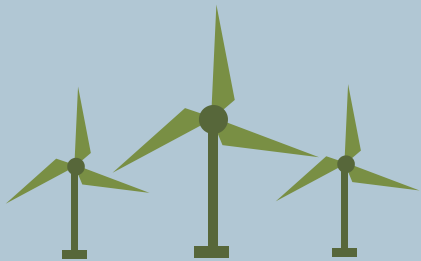


CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOAL (SDG) 11 – SUSTAINABLE CITIES AND COMMUNITIES:



Decarbonization of key activities in urban contexts:

- **Renewable Energy Communities** – affordable electricity based on renewable sources
- **Smart Lighting** – ensuring all urban citizens have access to smart lighting
- **Electric Charging** – sustainable electric mobility
- **Roof Farms** – healthier and more sustainable food system



Stakeholders

- Companies / Non-profit Organizations
- Municipalities
- Universities
- Local Community
- NGOs / INGOs



LIVING LAB – CASCAIS

Project Details



Designation Cascais Smart Pole

Promoter Foundation Alfredo dos Santos

Total Cost 1 235 025€

Financing 1 000 000€

Duration 36 months

EEA Grants website www.cascaissmartpole.pt



KEY RESULTS

- **Virtual Platform** – a key tool of the project that aggregates and makes available data generated and collected in the living lab, encouraging the participation of all stakeholders.
- **Energy Efficiency** – monitoring of the main indoor air pollutants through an app that provides real-time energy consumption data.
- **Circular Economy** – sustainable waste management through the implementation of a Pay as You Throw system, based on gamification, which incorporates various household waste streams.
- **Green Living** – integration of green spaces to promote climate change adaptation measures in urban areas.
- **Smart Pole Market** – generation and exchange of carbon credits aimed at holding stakeholders accountable for their CO₂ emissions or compensating them for avoided emissions resulting from sustainable behaviors.
- **Cascais Smart Pole World** – an activity that connects all others and promotes the broad involvement of all key actors.



LIVING LAB – SINTRA (MUNICIPALITY)

Project Details



Designation	I4Efficiency
Promoter	Zero - Associação Sustentável
Total Cost	1 175 846€
Financing	785 981€
Duration	31 months
EEA Grants website	www.i4efficiency.pt



KEY RESULTS

- **Develop an innovative smart urban logistics system** to improve postal distribution, technical assistance, utilities (electricity, gas, and water) maintenance, and urban waste management.

The project was based on three core elements:

1. **Digital solution** – that allows to orchestrate and manage all urban logistics processes in an optimized manner, including various service routes (waste collection, goods delivery).
2. **Development of the IUE (Unique Address Identifier).**
3. **Implementation of a combination of complementary initiatives** – a pilot urban consolidation hub that limits the number of delivery vehicles required in the city, centralizing deliveries from multiple operators before entering the urban area it serves; use of RFID technology for tracking deposited volumes (biowaste and unsorted waste bags); biomass reduction/compaction containers and biodegradable bags to be distributed to selected households for this purpose; electrified fleet for last-mile distribution processes; smart lockers and locks to be installed in residential buildings.



- **Reduction in traveled kilometers** – with the implementation of the logistics hubs, it was possible to achieve a reduction of approximately 7.38% (18,914.53 km).



LIVING LAB- ASPRELA

Project Details



Designation

Asprela + Sustentável

Promoter

Coopérnico

Total Cost

1 446 355,73€

Financing

1 000 000€

Duration

34 months

EEA Grants website

<https://asprelamaissustentavel.pt/>



KEY RESULTS

- **Installation of an integrated real-time monitoring system** based on artificial intelligence and machine learning for monitoring the flow of streams in the Asprela Central Park.
- **Reusing lithium-ion batteries from electric vehicles (2nd life)** to implement an energy storage system sourced from the photovoltaic power plant.
- **ReBOOT Project** - promoting the reuse of computer and electronic equipment through repair or upcycling, and facilitating access for families in socioeconomically vulnerable situations.
- **Creation of a Renewable Energy Community (CER)** with microproduction and storage in Agra do Amial, through the installation of photovoltaic panels.
- Energy efficiency **management system** to combat energy poverty in social housing.
- Implementation of the **Good Food Hubs** task to promote healthy and sustainable eating, with the Asprela area as the pilot territory.
- **Creation of a Virtual Hub (urban platform)** for the management, control, and monitoring of the "Asprela+ Sustainable" project.



LIVING LAB - VILA NOVA DE GAIA

Project Details



Designation Afurada Living Lab

Promoter CEDES

Total Cost 1 084 301€

Financing 975 871€

Duration 36 months

EEA Grants website <https://afuradalivinglab.pt/>



KEY RESULTS

- *Smart Parking* - Smart digitalization of the parking system.
- *Electric mobility hotspot* - Implementation of an electric mobility system.
- *Connected mobility ecosystem* - Development of a sustainable urban mobility platform (MUS), promoting the concept of "Mobility as a Service."
- *Afurada “sai prá rua”* - Creation of a "green territory," a healthy meeting point where people of all ages have the opportunity to experience and develop safe, healthy habits such as "cycling," "walking," and "playing."
- *Afurada Smart RAYT* - Installation of smart equipment in strategically distributed "deposit islands."
- *Afurada Upcycle* - Reuse of waste in two "territorial anchors" strongly linked to fishing activities: the Fishing Dock and the Market.
- *Roadmap for urban circularity* - Promoting operations leading to the circularity of the intervention area, particularly in terms of consumption and behavioral habits.



LIVING LAB – SINTRA 2 (TABAQUEIRA)

Project Details



Designation	SMILE
Promoter	Foundation Aga Khan
Total Cost	1 219 786€
Financing	878 929€
Duration	36 months
EEA Grants website	https://www.smile-sintra.com/#/home



KEY RESULTS

A set of innovative measures and actions was implemented in the Tabaqueira neighborhood:

- Community garden, school composting, repair café-workshop, bicycle workshop, automatic irrigation system, and microforest.
- Electric passenger vehicle, electric delivery vehicle, secure bicycle parking, and shared bicycles.
- Self-consumption of energy.
- Energy Efficiency Program, including energy audits, virtual energy manager, and Energy Efficiency Support Office.
- Swap Market (coin exchange) and SintraSMILE App with integrated widgets.

The project addresses the climate vulnerabilities identified for the municipality as outlined in the Strategic Plan of the Municipality of Sintra on Climate Change (PECSAC), particularly through measures focused on information, environmental awareness, and sectoral adaptation with active stakeholder participation. The project’s impact was enhanced by Sintra's active involvement in national initiatives.



LIVING LAB – LOURES

Project Details



Designation PAB Living Lab

Promoter AIDGLOBAL

Total Cost 1 140 783€

Financing 903 855€

Duration 36 months

EEA Grants website https://aidglobal.org/project/pab_livinglab/



PRINCIPAIS RESULTADOS

Reducing the carbon intensity of activities and services at Parque Adão Barata (PAB), located in the municipality of Loures. The PAB includes measures across **five key areas**:

- **Circular Economy and Environment** - Installation of a smart irrigation system; waste management through a sustainable waste management plan, waste valorization promotion, and a sensor system for green space management.
- **Sustainable Mobility** - Implementation of smart parking with electromagnetic sensors detecting vehicle presence in parking spaces.
- **Energy** - Renewable energy community supported by a photovoltaic production plant and a management platform.
- **Buildings** - Integration of "Building Information Modeling" (BIM) with IoT, enhancing an advanced management model for the "Palácio Marqueses Praia e Monforte" building.

The **local community** and its visitors experienced an interactive and dynamic decarbonization laboratory while simultaneously enjoying a green space.



LIVING LAB - HUB CRIATIVO DO BEATO

Project Details



Designation	Hub Criativo do Beato
Promoter	AIEL
Total Cost	2 000 000€
Financing	1 000 000€
Duration	36 months
EEA Grants website	https://hubcriativobeato.com/



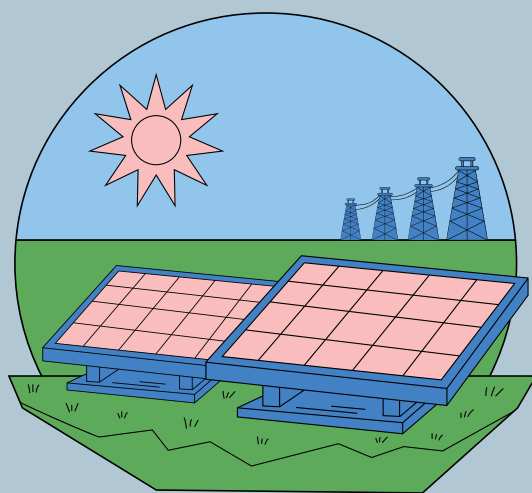
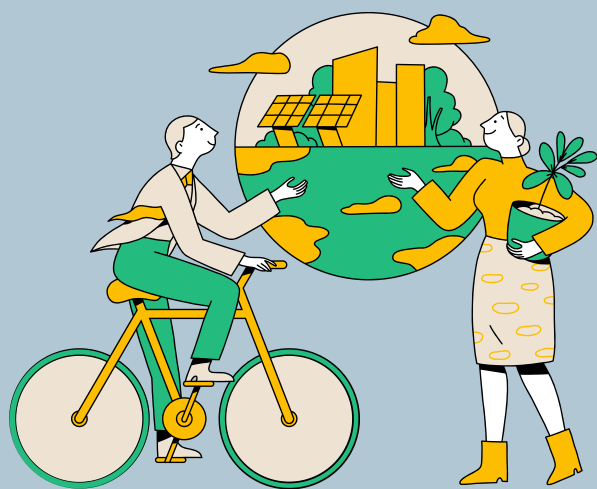
KEY RESULTS

The Hub Criativo do Beato (HCB) served as a space for prototyping, validating, and testing new technologies, services, and innovative and sustainable lifestyles, based on **five thematic areas**:

- **Circular Economy** - some activities were carried out in this context, such as the planting of urban gardens on existing building rooftops (roof farms) and the reuse of cooking oils, transforming them into biodiesel.
- **Energy** - development of technologies that enable efficient and intelligent public lighting and advanced energy communities.
- **Buildings** - promotion of energy efficiency and the building integration of agriculture and renewable energy technologies.
- **Environment** - testing a set of advanced environmental detection and sensing solutions, exploring their relevance to model different urban variables and parameters.
- **Sustainable urban mobility** - installation of columns equipped with environmental sensors stands out, two of which have sockets for micro-mobility, allowing the charging of electric vehicles (bicycles, scooters, etc.), and one includes a sensor module for people counting.



LIVING LABS ARE A PUBLIC POLICY INITIATIVE FOR THE DECARBONIZATION OF MODERN CITIES.



**Working together for a green
competitive and inclusive Europe!**



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