EE Vila Real- Boosting Energy Efficiency in Vila Real through ... in Hydrogen and Other Solutions

Municipality of Vila Real

Portugal

EUCF
European City Facility

1 Executive Summary

1.1 Brief description of the investment concept

The “EE Vila Real – Boosting Energy through green hydrogen and other solutions” investment concept aims to boost energy efficiency and reduce carbon emissions through three key projects: (1) the production of green hydrogen using solar and wind energy, with an 18 MW electrolyser capacity; (2) the implementation of energy efficiency measures in private residential buildings, including thermal insulation and heat pump installations; and (3) the creation of Renewable Energy Communities (RECs) based on rooftop solar PV systems. These initiatives align with Vila Real’s goal of achieving carbon neutrality by 2045, while promoting social inclusion, energy independence, and local economic development.

1.2 Investment opportunities

Project 1	**Green Hydrogen in Vila Real- EE Vila Real**	
	Country	Portugal
	Municipality/local authority	VilaRealCityCouncil(CâmaraMunicipaldeVilaReal)
	Project sector	Innovative energy infrastructure
	Project start	01.2026
	Revenues and operating expenses start	12.2028
	Project lifetime (years)	30

Project 2	**Stimulating Energy Efficiency in the Private Residential Building Stock – EE Vila Real**	
	Country	Portugal
	Municipality/local authority	VilaRealCityCouncil(CâmaraMunicipaldeVilaReal)
	Project sector	Private residential buildings
	Project start	01.2026
	Revenues and operating expenses start	12.2027
	Project lifetime (years)	10
Project 3	**Renewable Energy Community Vila Real – EE Vila Real**	
	Country	Portugal
	Municipality/local authority	VilaRealCityCouncil(CâmaraMunicipaldeVilaReal)
	Project sector	Building integrated renewables
	Project start	01.2026
	Revenues and operating expenses start	12.2027
	Project lifetime (years)	30

2 Investment opportunities

2.1 Green Hydrogen in Vila Real- EE Vila Real

Project 1 – Green Hydrogen in Vila Real focuses on the production of green hydrogen using local renewable energy sources—solar and wind—to support the decarbonisation of the transport and energy sectors. The project will install 18 MW of electrolysis capacity in three 6 MW phases, powered by a 14 MWp solar PV park and a 10.8 MW wind farm. An integrated smart energy management system will optimise production, storage, and use. Hydrogen will be primarily used to fuel public transport buses. The project adopts a modular and scalable approach, allowing for future expansion and integration with the European H2med/CelZa corridor. Implementation will be led by private investors and ESCOs, with the municipality acting as strategic facilitator.

2.1.1 Problem to be addressed by the proposed project

The project addresses the high dependency on fossil fuels in Vila Real, especially in the transport sector, which is a major contributor to local CO_2 emissions. It also responds to the lack of local renewable hydrogen production and storage infrastructure, as well as the absence of a mature hydrogen market. By enabling large-scale green hydrogen generation, the project supports carbon neutrality targets, improves air quality, and fosters energy independence. Stakeholders—such as ESCOs, private investors, and public transport operators—benefit from new business opportunities, reduced environmental impact, and access to clean energy solutions.

2.1.2 Solution proposed with the project

The project proposes the development of an integrated green hydrogen production system powered by local solar (14 MWp) and wind (10.8 MW) energy sources. It includes phased installation of 18 MW of electrolysers, hydrogen storage infrastructure, and a smart energy management system to optimise production and use. The hydrogen will be primarily used in public transport, reducing fossil fuel reliance. The modular and scalable design allows adaptation to future demand and integration with the H2med/CelZa corridor. By involving ESCOs and private investors through energy performance contracts, the project ensures financial viability, technical expertise, and alignment with regional and EU decarbonisation goals.

2.1.3 Financial viability

A detailed cost-benefit analysis shows long-term financial viability, with projected annual revenues of €7.6M and annual OPEX of €3M. The project has a 10-year payback period and an IRR of 15.79%. The phased implementation reduces upfront risk, while energy performance contracts ensure stable income streams.

Returns

Equity Internal Rate of Return (IRR) in %	18,000
Project Internal Rate of Return (IRR) in %	16,000
Payback period in years	10
Net Present Value (NPV) in EUR	15 408 607

2.1.4 Financing approach

Total investment size	**46 255 758 EUR**	**100%**
Non-redeemable funding sources	**13 876 727 EUR**	**30,00 %**
Municipal/regional subsidies/grants	*0*	*%*
National subsidies/grants	*0*	*%*
European subsidies/grants	*13 876 727*	*100,00 %*
Municipal own resources	*0*	*%*
Other non-redeemable funding sources	*0*	*%*
Redeemable funding sources	**32 379 031 EUR**	**70,00 %**
Private redeemable funding	**32 379 031 EUR**	**100,00 %**
Commercial banks	*0*	*%*
Investment funds/ institutional investments	*0*	*%*
Private individual investors/ financiers (incl. citizens)	*32 379 031*	*100,00 %*
Other private redeemable funding sources	*0*	*%*
Public redeemable funding	**EUR**	**%**
National/regional development banks	*0*	*%*
Multilateral banks/ International financial institutions	*0*	*%*
Other public redeemable funding sources	*0*	*%*

Terms of investment opportunity

The project requires a total investment of €46.26M, with 30% from non-repayable EU grants and 70% from private equity. The investment spans 30 years, with a 10-year payback period and an IRR of 15.79%. Revenue is generated through hydrogen sales and infrastructure leasing, ensuring long-term returns.

Targeted investment schemes

 Dedicated funds (equity, (senior) debt, mezzanine, hybrid)
 Soft loans/ dedicated credit lines (backed by public and multilateral banks)

2.1.5 Environmental Impacts

The project will reduce CO_2 emissions by replacing fossil fuels with green hydrogen, significantly improving air quality. It promotes the circular use of resources by reusing treated wastewater for electrolysis, reducing pressure on freshwater sources. Additionally, it supports climate change adaptation by enhancing energy resilience through local renewable energy use.

Environmental impact metrics

Impact metric	Expected impacts
CO2 avoided	13 260 tCO2eq/y
Energy savings	0,000 GWh/y
Renewable energy production (Energy produced)	51,600 GWh/y
Energy savings/ Energy produced	0 EUR

2.1.6 Social Impacts

The project will create skilled local jobs, improve public health through better air quality, and promote cleaner public transport. It enhances energy accessibility by supporting renewable energy use and positions Vila Real as a hub for innovation. Community engagement and education initiatives will foster awareness and empower citizens in the energy transition.

Expected social impacts

Job creation	833 Jobs
Other quantitative social impact	
Other quantitative social impact	

2.1.7 Sustainable Development Goals

2.1.8 Legal feasibility and regulations applying to the project

The project is legally feasible and aligns with national and EU frameworks promoting renewable energy and green hydrogen. It complies with Decree-Law No. 15/2022 (updated by DL 69/2025), regulating the National Electricity System and decentralised renewable energy production. Key legal incentives include the renewable self-consumption regime, enabling lower operational costs, and eligibility for EU and national funding programmes that prioritise hydrogen. The project's modular and phased design ensures compliance with licensing procedures as regulations evolve. Environmental licensing and coordination with multiple authorities will be required, particularly for integrated systems (renewables + electrolysis + storage). The municipality's non-investor role avoids direct procurement or debt constraints, with private partners assuming legal and operational responsibilities.

2.1.9 About the project sponsor

The Municipality of Vila Real is the project sponsor, acting as institutional coordinator and strategic facilitator. Associated organisations include CIM-Douro, as the territorial coordinator, and private partners such as Energy Service Companies (ESCOs) and investors, responsible for financing, implementation, and operation through energy performance contracts.

Ownership of assets and management structure

Project assets—solar park, wind farm, electrolysers, and storage—will be owned by private investors and ESCOs. The Municipality of Vila Real will not own the infrastructure but will act as institutional facilitator. Management and decision-making will be led by private partners under energy performance contracts, with municipal oversight ensuring strategic alignment.

Roles in the project

The Municipality of Vila Real acts as project sponsor and institutional facilitator, coordinating stakeholders, ensuring regulatory and territorial alignment, and promoting the project's strategic integration into local and regional decarbonisation plans. It does not directly invest but creates favourable conditions for private implementation.

Team members

Eng. Américo Pires and Eng. Paulo Noronha, from the Department of Strategy and Coordination – Special Projects Division, lead project coordination, stakeholder engagement, and strategic planning. Technical teams support regulatory, legal, and environmental aspects.

Contact persons for the project

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2.1 Stimulating Energy Efficiency in the Private Residential Building Stock – EE Vila Real

Project 2 aims to improve energy efficiency in Vila Real's private residential buildings by implementing targeted measures that reduce energy consumption and mitigate energy poverty. It will provide up to 14,000 "EE Vila Real Vouchers" to support 7,000 households per measure. Eligible interventions include replacing inefficient water heating systems with heat pumps and improving thermal insulation through ETICS and energy-efficient windows (A+ or higher). The project also includes awareness-raising actions and technical support through the Vila Real Energy Office. With an investment of €38.5M, co-financed by the Environmental Fund and a favourable loan scheme, the project is expected to reduce GHG emissions, improve thermal comfort, and strengthen the local market for energy-efficient technologies.

2.1.1 Problem to be addressed by the proposed project

The project addresses high energy consumption and poor thermal performance in Vila Real's private residential buildings, which contribute significantly to GHG emissions and energy poverty. Many homes lack efficient heating systems or adequate insulation, resulting in discomfort and high energy bills, particularly for vulnerable households. The project aims to improve energy efficiency, reduce emissions, and enhance living conditions. Benefits include lower energy costs for families, better indoor comfort, and increased demand for local renovation services, supporting economic development and social inclusion.

2.1.2 Solution proposed with the project

The project proposes a targeted voucher scheme—"EE Vila Real Vouchers"—to support private households in implementing energy efficiency measures. It focuses on two key interventions: (1) replacing inefficient water heating systems with high-efficiency heat pumps, and (2) improving the thermal envelope of buildings through ETICS and A+ rated windows. Technical support is provided via the Vila Real Energy Office to guide citizens through the application and implementation process. Awareness campaigns will increase energy literacy, while collaboration with local companies will ensure qualified installation and stimulate the regional market. The solution directly tackles energy poverty and emissions, improving comfort and reducing costs for residents.

2.1.3 Financial viability

A cost-benefit analysis confirms the project's financial viability, with a total investment of €38.5M and co-financing from the Environmental Fund and a soft loan scheme. Energy savings per household ensure long-term cost reductions. The IRR is 11.49%, with a 10-year payback period, indicating solid returns.

Returns

Equity Internal Rate of Return (IRR) in %	0,000
Project Internal Rate of Return (IRR) in %	23 834,000
Payback period in years	12
Net Present Value (NPV) in EUR	5 032 890

2.1.4 Financing approach

Total investment size	**38 500 000 EUR**	**100%**
Non-redeemable funding sources	**30 800 000 EUR**	**80,00 %**
Municipal/regional subsidies/grants	*0*	*%*
National subsidies/grants	*30 800 000*	*100,00 %*
European subsidies/grants	*0*	*%*
Municipal own resources	*0*	*%*
Other non-redeemable funding sources	*0*	*%*
Redeemable funding sources	**7 700 000 EUR**	**20,00 %**
Private redeemable funding	**7 700 000 EUR**	**100,00 %**
Commercial banks	*7 700 000*	*100,00 %*
Investment funds/ institutional investments	*0*	*%*
Private individual investors/ financiers (incl. citizens)	*0*	*%*
Other private redeemable funding sources	*0*	*%*
Public redeemable funding	**EUR**	**%**
National/regional development banks	*0*	*%*
Multilateral banks/ International financial institutions	*0*	*%*
Other public redeemable funding sources	*0*	*%*

Terms of investment opportunity

The project requires €38.5M, funded through a mix of Environmental Fund grants and soft loans to homeowners. It spans 10 years, with support for up to 14,000 interventions. The expected IRR is 11.49%, with a 10-year payback period. Returns come from energy cost savings and increased property value.

Targeted investment schemes

- EU and other grants
- Green mortgages/ Tailored renovation loans
- Local/ regional/ national grants
- Soft loans/ dedicated credit lines (backed by public and multilateral banks)
- Technical assistance/ Project Development Assistance (incl. ELENA)

2.1.5 Environmental Impacts

The project will reduce GHG emissions and primary energy consumption in the residential sector. Improved building insulation and efficient heating systems will lower fossil fuel use, contributing to better air quality and climate change mitigation. It also promotes sustainable resource use and supports national adaptation goals.

Environmental impact metrics

Impact metric	Expected impacts
CO2 avoided	12 515 tCO2eq/y
Energy savings	51,100 GWh/y
Renewable energy production (Energy produced)	0,000 GWh/y
Energy savings/ Energy produced	0 EUR

2.1.6 Social Impacts

The project will improve living conditions and thermal comfort, especially for vulnerable households, reducing energy poverty and health risks. It promotes energy affordability, community awareness, and citizen empowerment through training and support. Local job creation and market stimulation are also expected.

Expected social impacts

Job creation	693 Jobs
Other quantitative social impact	
Other quantitative social impact	

2.1.7 Sustainable Development Goals

2.1.8 Legal feasibility and regulations applying to the project

The project is legally feasible and aligned with national and EU regulations promoting energy efficiency in buildings. It complies with Decree-Law No. 101-D/2020, which governs energy performance and certification in residential buildings, transposing EU Directives (EU) 2018/844 and (EU) 2019/944. Eligible interventions—such as insulation and heat pump installation—follow established technical standards. Regulatory incentives include access to funding under the Environmental Fund and simplified application processes for energy renovation in private housing. The project also benefits from national programmes promoting energy transition and building decarbonisation. Legal complexity is minimised as installations are carried out by private homeowners with municipal technical support, avoiding public procurement procedures.

2.1.9 About the project sponsor

The Municipality of Vila Real is the project sponsor, leading the design and coordination of the initiative. The Espaço Energia provides technical support and citizen guidance. CIM-Douro and local installation companies may support implementation and outreach, enhancing regional alignment and market capacity.

Ownership of assets and management structure

The supported assets—heat pumps and insulation systems—will be owned by private homeowners. The Municipality of Vila Real manages the project through its technical departments and the Espaço Energia, coordinating implementation, voucher allocation, and stakeholder engagement to ensure strategic and social alignment.

Roles in the project

The Municipality of Vila Real acts as the project sponsor, responsible for overall coordination, strategic planning, and management of the voucher scheme. It oversees implementation, engages with stakeholders, and ensures alignment with energy and social policy goals, with technical support from the Espaço Energia.

Team members

Eng. Américo Pires and Eng. Paulo Noronha lead project coordination and strategic planning. The Espaço Energia team supports technical guidance, citizen engagement, and monitoring. Municipal staff handle voucher management, communication, and partner coordination.

Contact persons for the project

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2.1 Renewable Energy Community Vila Real – EE Vila Real

Project 3 aims to create a Renewable Energy Community (REC) in Vila Real by installing up to 6 MWp of solar PV systems on municipal and social housing rooftops. In its first phase, the project aggregates public buildings under self-consumption and energy sharing models. In a second phase, private producers and consumers will be integrated. The initiative targets lower electricity costs, energy poverty reduction, and community empowerment. It promotes local energy production and use, improves affordability, and supports the municipality's carbon neutrality goals. The estimated annual shared consumption is 8.9 GWh, contributing to greater energy independence and social equity. A total investment of €4.36 million is foreseen.

2.1.1 Problem to be addressed by the proposed project

The project addresses high energy costs, limited access to clean energy, and energy poverty among vulnerable households in Vila Real. Public buildings and social housing units often lack access to affordable renewable electricity. Additionally, there is low participation of citizens in the energy transition and underutilisation of rooftop space for solar generation. By establishing a Renewable Energy Community (REC), the project enables collective self-consumption, reduces electricity bills, and strengthens social inclusion. Stakeholders—including the municipality, low-income residents, and later private consumers—benefit from increased energy affordability, resilience, and participation in local clean energy systems.

2.1.2 Solution proposed with the project

The project proposes the creation of a Renewable Energy Community (REC) in Vila Real, initially aggregating municipal and social housing buildings under a collective self-consumption model. Rooftop solar PV systems with a total capacity of up to 6 MWp will be installed to generate clean electricity locally. Energy will be shared among public buildings and low-income households, directly reducing energy bills and improving access to renewable energy. In a second phase, private buildings and consumers will be integrated, creating a scalable and inclusive model. The municipality will define the governance and business model, combining EU funds, municipal resources, and private investment. The solution fosters citizen empowerment, combats energy poverty, and supports Vila Real's climate neutrality goals.

2.1.3 Financial viability

A cost-benefit analysis confirms the project's financial viability, with a total investment of €4.36M and projected savings through shared solar energy consumption. The estimated IRR is 8.37%, with a payback period of 12 years. Long-term returns stem from reduced energy costs for public and social buildings.

Returns

Equity Internal Rate of Return (IRR) in %	29,000
Project Internal Rate of Return (IRR) in %	28,000
Payback period in years	7
Net Present Value (NPV) in EUR	8 955 088

2.1.4 Financing approach

Total investment size	**4 362 000 EUR**	**100%**
Non-redeemable funding sources	**872 400 EUR**	**20,00 %**
Municipal/regional subsidies/grants	*0*	*%*
National subsidies/grants	*0*	*%*
European subsidies/grants	*0*	*%*
Municipal own resources	*872 400*	*100,00 %*
Other non-redeemable funding sources	*0*	*%*
Redeemable funding sources	**3 489 600 EUR**	**80,00 %**

Private redeemable funding	3 489 600 EUR	100,00 %
Commercial banks	*348 960*	*10,00 %*
Investment funds/ institutional investments	*3 140 640*	*90,00 %*
Private individual investors/ financiers (incl. citizens)	*0*	*%*
Other private redeemable funding sources	*0*	*%*
Public redeemable funding	**EUR**	**%**
National/regional development banks	*0*	*%*
Multilateral banks/ International financial institutions	*0*	*%*
Other public redeemable funding sources	*0*	*%*

Terms of investment opportunity

The project requires €4.36M, financed through EU and national grants combined with municipal resources. It spans a 20-year period, with an expected IRR of 8.37% and a 12-year payback period. Returns come from energy cost savings and shared consumption revenues within the REC model.

Targeted investment schemes

 Crowdfunding/ Citizen finance/ Energy community
 EU and other grants
 Local/ regional/ national grants
 Soft loans/ dedicated credit lines (backed by public and multilateral banks)
 Technical assistance/ Project Development Assistance (incl. ELENA)

2.1.5 Environmental Impacts

The project promotes local renewable energy generation, reducing GHG emissions and dependence on fossil fuels. It contributes to improved air quality, supports climate change mitigation and adaptation goals, and encourages the sustainable use of urban rooftop space.

Environmental impact metrics

Impact metric	Expected impacts
CO2 avoided	2 078 tCO2eq/y
Energy savings	0,000 GWh/y
Renewable energy production (Energy produced)	8,900 GWh/y
Energy savings/ Energy produced	0 EUR

2.1.6 Social Impacts

The project enhances energy affordability by reducing electricity costs for public buildings and social housing residents. It empowers communities through participation in renewable energy generation, promotes education on sustainability, and directly contributes to reducing energy poverty and improving quality of life.

Expected social impacts

Job creation	79 Jobs
Other quantitative social impact	
Other quantitative social impact	

2.1.7 Sustainable Development Goals

2.1.8 Legal feasibility and regulations applying to the project

The project is legally feasible and aligned with national and EU frameworks supporting Renewable Energy Communities (RECs) and collective self-consumption. It complies with Decree-Law No. 15/2022 (as amended by DL 69/2025), which regulates self-consumption units (UPACs), energy sharing, and REC formation. Incentives include simplified licensing procedures, priority grid access, and eligibility for EU and national funding. The legal framework allows municipalities to act as aggregators and energy producers for community benefit. The project also benefits from the EU's "Clean Energy for All Europeans" package and national strategies promoting decentralised energy. Ownership and operation will follow current legal models for public-sector-led RECs, ensuring regulatory compliance and scalability.

2.1.9 About the project sponsor

The Municipality of Vila Real is the project sponsor, leading the coordination, planning, and implementation of the Renewable Energy Community. Associated organisations may include local energy agencies, social housing providers, and private installers, supporting technical execution, citizen engagement, and system maintenance.

Ownership of assets and management structure

The solar PV systems will be owned by the Municipality of Vila Real during the initial phase. The municipality will also lead the management of the REC, defining the governance model and coordinating implementation. Decision-making will involve municipal departments and, in later phases, community representatives.

Roles in the project

The Municipality of Vila Real acts as the project sponsor, responsible for coordinating the implementation of the Renewable Energy Community. It leads planning, oversees installation, defines the governance and business model, and ensures alignment with social and environmental goals.

Team members

Eng. Américo Pires and Eng. Paulo Noronha lead project coordination and strategic planning. Municipal technical staff support system design, procurement, and monitoring. The Espaço Energia team assists with citizen engagement, awareness, and energy literacy.

Contact persons for the project

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