



Penafiel, Portugal

Urban Waste and Circular Economy Actions

NET ZERO CITIES

■ Built Environment ■ Energy Systems ■ Mobility ■ Circular Economy ■ Industry ■ Adaptation ■ Others

City values in a nutshell

Country: Portugal

Population: 69.629 (2021)

Role within the country: Penafiel is a regional city supporting surrounding rural areas.

Geographical context: Penafiel is located in northern Portugal, within the Tâmega e Sousa region, close to the Porto Metropolitan Area, in a transition zone between urban and rural environments.

Penafiel is a historic city located between the Douro and Tamega rivers, which is characterised by a mix of urban areas, agricultural land and ecological structures, where land use is carefully managed to balance development, environmental protection and landscape preservation.

Agriculture remains a key component of the territory, supported by protected agricultural areas and rural landscapes, while designated urban and industrial zones support local economic activity. This spatial organisation reinforces Penafiel's role as a transition area between urban centres and rural environments, shaping its identity and sustainable development.



[Municipal Web-site](#)

Penafiel plays a key role in regional development, with a growing focus on circular economy strategies and sustainable waste management, aiming to strengthen resilient infrastructure and resource-efficient industries.

The objective is to provide a portfolio of circular economy and waste actions, supported by a systemic methodology aligned with the Circular Cities and Regions Initiative (CCRI), focusing on developing Circular Systemic Solutions (CSS).

One-to-One Meeting

Session Scoping with Penafiel

On **25 February 2026**, a one-to-one meeting was held to discuss the technical request submitted by **Penafiel**. The main topics addressed included **clarification of the request scope**, focusing on circular economy and waste reduction actions, stakeholder engagement and sustainable urban development, **key data requirements** to support the analysis, the **methodological approach based on the Circular Cities and Regions Initiative (CCRI) plans** and the **local implementation context** within the NetZeroCities Mission framework.

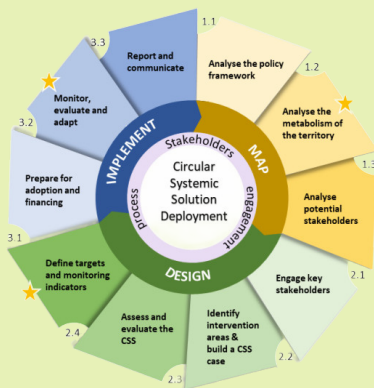
As a result of the discussion, the **main conclusions** included:

- Alignment on scope and priorities
- Identification of key data gaps
- Definition of next steps for applying the CCRI methodology.





CCRI Methodology



Phase 3: IMPLEMENT

Identify funding and get the Circular Systemic Solution under monitoring

P3 Apply

Milestone

Definition of the Circular Systemic Solutions Action Plan

- 3.1.- Define the business plan for the Circular Systemic Solution and identify the necessary funding
- 3.2.- Monitor the progress of the Circular Systemic Solution and take corrective action if needed
- 3.3.- Make key stakeholders aware of how the Circular Systemic Solution is progressing and communicate lessons learned to promote Circular Systemic Solution replicability

KPIs and Data Resources

Data Eurostat
Circular economy
[Website Link](#)

KPIs EEA
Indicators
[Website Link](#)

KPIs UNSD
SDG Indicators
I-8.4.1
I-11.6.1
I-9.4.1
I-13.2.2
[Website Link](#)

Phase 1: MAP

Understand the local context and stakeholders

Milestone

Identification of priorities and objectives, problems and leverages for change

1.1- Mapping and defining a list of existing policies, directives and local strategies currently approved in the urban context.

1.2- Map material flows and stocks, waste generation and management systems, and analyse the associated drivers and major industrial sectors.

Resource: **Key product value chain**

1.3- Map Stakeholders and begin defining a stakeholders engagement plan

Resource: **Stakeholders map**

Key product value chain		Industry breakdowns (NACE activities category)									
		Agroforestry, forestry and fishing (A)	Mining and quarrying (B)	Manufacturing (C)	Electricity, energy (D)	Water and waste management (E)	Construction (F)	Wholesale and retail trade (G)	Transport, storage and information (H)	Accommodation and food service (I)	Other support services (J)
Key product value chain	Food, drink & tobacco										
	Construction and building										
	Plastics										
	Textiles										
	Automotive & vehicles										
	Chemicals & ICT										
Other											
Cross-cutting enabling conditions											
		Government and public administration									
		Funding & financing									
		Other									

Phase 2: DESIGN

Prioritise intervention areas, define and evaluate a Circular Systemic Solution case

Milestone

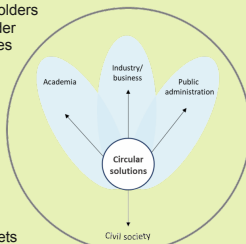
Definition of CSS Action Plan

2.1- Start engaging key stakeholders and define a regional stakeholder group to lead upcoming activities

2.2- Define intervention areas, prioritise Circular Economy actions and build a Circular Systemic Solution case

2.3- Define the CSS ambitions, analyse CSS drivers and barriers and evaluate CSS impacts

2.4- Agree on measurable targets & define a KPIs scoreboard



"The information presented in this section is a synthesis of the document "Circular Cities and Regions Initiative", summarised and adapted to support this work, including relevant key performance indicators and data sources. The original document can be accessed at: [Link](#)



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NET ZERO CITIES

NZC Portal tools



NZC Portal
Tools

The NetZeroCities platform offers a set of practical tools to support cities in achieving climate neutrality. It includes a progress tracking dashboard, tools to strengthen citizen and stakeholder engagement, guidance to identify suitable funding sources, and technical instruments. It also promotes systemic transformation through interactive resources on social innovation and sectoral solution bundles, helping cities design coherent, financeable and inclusive strategies.



Uppsala, Sweden: Scaling reuse through a pop-up recycling store

Strong governance, knowledge sharing, stakeholder engagement, and a clear strategy enabled the initiative, despite social, technical, and economic barriers to reuse, as well as challenges related to the pilot's potential for replication.

It proves that reuse can scale in construction and offers a replicable circular model for cities.



Drammen, Norway: Circular Business Model for the reuse of construction goods

Drammen is developing a circular approach to reuse construction materials and reduce emissions as part of its climate strategy. The model is based on strong cooperation between public and private actors and uses simple, iterative methods to improve how materials are reused. It also combines digital and physical markets to make it easier to access, store, and exchange reusable materials.



Prato, Italy: Circular economy in a textile city

Prato is a leading example of circular economy in a textile city.

It combines recycling, water reuse, and strong governance to support climate goals.



Pécs, Hungary: Circular Decarbonisation

Pécs reduced emissions by 20% through long-term climate planning.

Main sources are transport, electricity, and heating.



Glasgow, UK: Circular transition

Glasgow aims to become a net zero city by 2030 through a data-driven approach embedded in governance and supported by strong stakeholder engagement.

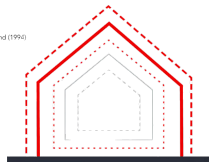


Amsterdam, The circular design of buildings



A guide to circular building design, focusing on reducing material use, enabling reuse, and extending building lifespan through adaptable, modular, and detachable solutions. It presents key principles, design strategies, and practical recommendations, supported by real case studies, to promote more sustainable, resource-efficient, and cost-effective construction over the full life cycle.

Figure 2: The G5-model van Brand (1990)



Stockholm, Sweden: Pop-up Aterbruk

Pop-up reuse stores in Uppsala and mobile or temporary recycling parks in Antwerp are simple ways to reuse materials and reduce waste at a local level.

They show how circular solutions can work in practice and be adapted to different cities.



Helsinki-Uusimaa, Finland: Climate Meals Ilmastoaanoks

The Climate Meal label helps small and medium restaurants become more climate-friendly, as they often have fewer resources than big chains.

It also led to new projects like Urban&Local, which support local businesses and promote sustainable food in cities.





Good Practices

National plan to tackle vacant housing

Type National plan
[Link](#)

Description

The French National Plan to reduce empty housing focuses on reusing homes that have been empty for a long time, mainly in the private sector. It uses rules, incentives, and simple tools to help local authorities find, understand, and reuse these homes.

The plan also supports the use of other empty spaces, like offices, and temporary uses. Its main goals are to create more affordable housing, improve cities, make buildings more energy efficient, and avoid building on new land by reusing existing buildings.



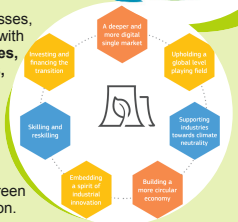
Industry and the Green Deal

Type Technical Standards
[Link](#)

Description

The EU Industrial Strategy aims to make industry more **green, digital, and competitive**, in line with the European Green Deal. Its main goal is to reach **climate neutrality by 2050** by reducing emissions and promoting a circular economy.

It supports businesses, especially SMEs, with **clean technologies, innovation, skills, and access to finance**, and strengthens the **single market** to improve competitiveness and support the green and digital transition.



Building Regulations Denmark

Type Guidance
[Link](#)

Description

The Danish Building Regulations provide a comprehensive legal and technical framework governing all aspects of construction in Denmark.

Structured into:

- Administrative
- Technical
- Supplementary provisions,

the regulation defines mandatory requirements that buildings must meet in terms of safety, health, energy performance, environmental impact and functionality.

The document is organised into thematic chapters covering key areas such as: accessibility, fire safety, structural integrity, energy consumption, ventilation, water systems, and indoor environmental quality.

In addition, it includes specific provisions related to construction processes, documentation, certification of professionals, and compliance verification.

Supporting appendices and national annexes further detail calculation methods, classification systems, and technical standards.



Overall, BR18 ensures that construction projects follow the Danish Building Act by setting clear rules to achieve safe, sustainable and high-quality buildings.

Building Regulations 2018 BR18
[Link](#)

It is the current building regulation in Denmark. It sets the mandatory rules that all buildings must follow during design, construction and renovation.

The regulation covers key aspects such as safety, health, energy efficiency, accessibility, and environmental impact.

Overall, it ensures that buildings are **SAFE, SUSTAINABLE** and of **GOOD QUALITY**.