Empowering H2-ready regions in Central Europe

H2CE

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H2CE Lead Partner: Joint Spatial Planning Department Berlin-Brandenburg.

LAND BRANDENBURG

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Gemeinsame Landesplanungsabteilung

Introduction

This document presents the **key outcomes of the H2CE project**, focused on **supporting public authorities** in integrating hydrogen into **regional energy and spatial planning**. Through joint activities across **Central Europe**, project partners developed **practical tools**, tested **governance approaches**, and built **institutional capacities** needed for the transition towards **hydrogen-ready regions**.

Pilot activities carried out within the project examined how regions can **plan hydrogen ecosystems**, **coordinate stakeholders**, and connect **energy transition strategies with economic development**. These pilots allowed partners to **validate methods in real administrative environments** and identify **barriers, opportunities, and effective cooperation models**.

Based on these experiences, the project introduces a set of **transferable solutions**, including **planning guidelines, analytical tools, competence-building measures, and cooperation mechanisms**. Each solution has been **tested, adapted, and refined** to ensure applicability across **different regional contexts**.

By combining **strategic planning, capacity building, and transnational collaboration**, H2CE provides authorities with **clear steps to initiate hydrogen integration**. The project contributes to a **coordinated and resilient energy transition in Central Europe**, enabling regions to **actively shape emerging hydrogen value chains rather than react to them**.

Project duration: 04/2023 - 03/2026 (36 months)

The full reports and related brochures, along with other H2CE project outputs, can be found here:

Website https**://www.interreg-central.eu/projects/h2ce/**

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GIS-based Hydrogen Planning Tool: implemented within H2CE project

Introduction

The **GIS-based Hydrogen Planning Tool** helps public authorities understand where hydrogen can **realistically be produced, transported, and used** within their territory. Many regions currently evaluate hydrogen projects individually without a **shared spatial overview**, which can lead to **inefficient investments, missing infrastructure links, or unused capacity**.

The tool combines **spatial planning data** with **energy system information** in a single visual environment. It integrates datasets such as **energy demand, renewable energy potential, industrial consumption sites, transport corridors, and spatial restrictions**. This enables authorities to identify **suitable locations for hydrogen production, storage, distribution, and use**.

Instead of reacting to isolated initiatives, decision-makers can analyse **hydrogen value chains across the entire region**. The tool therefore supports **strategic coordination** between municipalities, infrastructure operators, and industry stakeholders.

By translating **complex modelling outputs into clear maps and indicators**, the GIS Tool strengthens **evidence-based planning**. It helps regions **prioritise investments, avoid infrastructure gaps, and build a coherent hydrogen ecosystem** aligned with regional development and climate objectives.

Development & implementation

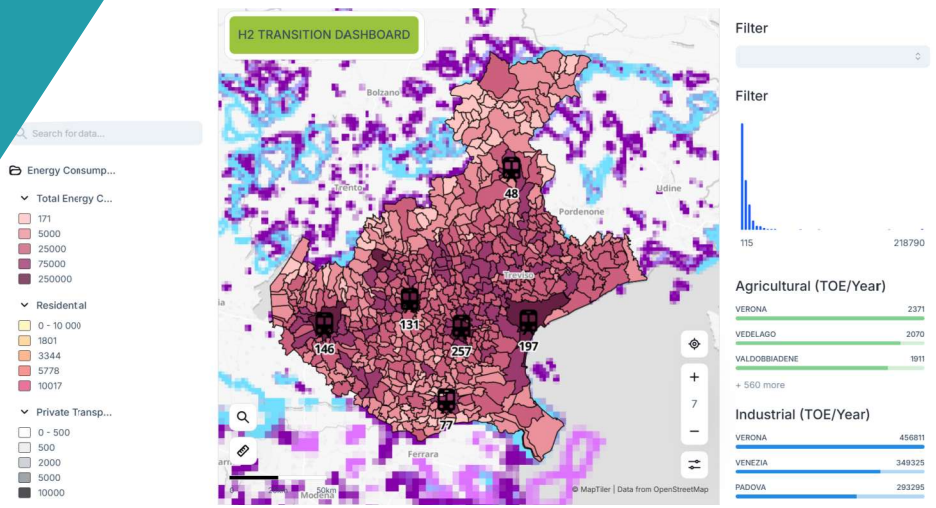
The **GIS Tool** was developed within **H2CE** by Regional Union **of Chambers of Commerce of Veneto Region and Energy Agency of Styria as part of an integrated modelling and planning methodology**. The process started with the **collection and harmonisation of regional datasets**, including energy consumption, renewable generation potential, transport infrastructure, industrial demand, and spatial planning constraints. These spatial datasets were connected to an **energy system model** capable of identifying **cost-efficient hydrogen infrastructure configurations** and detecting **gaps or overcapacities**.

To make the results usable for **non-technical users**, partners created a **visual interface** transforming modelling outputs into **interactive maps and simple indicators**. The aim was not to replace formal planning procedures but to **support decision preparation and inter-institutional coordination**.
The tool was **iteratively tested** with regional administrations and stakeholders. Authorities explored potential **hydrogen corridors**, evaluated **production locations**, and compared **alternative infrastructure concepts**. Feedback showed the importance of **transparency of assumptions** and compatibility with **existing planning workflows**. Based on this input, the interface was simplified and **explanatory layers were added** to improve understanding.

The tool was iteratively tested with regional administrations and stakeholders. Authorities explored potential hydrogen corridors, evaluated production locations, and compared alternative infrastructure concepts. Feedback showed the importance of transparency of assumptions and compatibility with existing planning workflows. Based on this input, the interface was simplified and explanatory layers were added to improve understanding.

Through these **testing phases**, the **GIS Tool evolved** from a purely analytical instrument into a **communication and coordination platform**. It enabled discussions between **planners, industry representatives, and energy experts** using a **shared territorial perspective**. This facilitated **consensus building** and helped align hydrogen projects with **broader regional development strategies**.

The final tool therefore supports both technical analysis and governance processes, allowing regions to **plan hydrogen infrastructure proactively** rather than reacting to **individual project proposals**.with regional development and climate objectives.



Feedback

Regional agencies from **Germany (Brandenburg), Croatia, and Poland** reviewed the **GIS Hydrogen Planning Tool** and confirmed it works as a **decision-support instrument** rather than only a map. Its strongest value lies in **early planning**, where it quickly identifies **suitable electrolysis locations, demand areas, and infrastructure gaps**, providing a **strategic overview within minutes**.

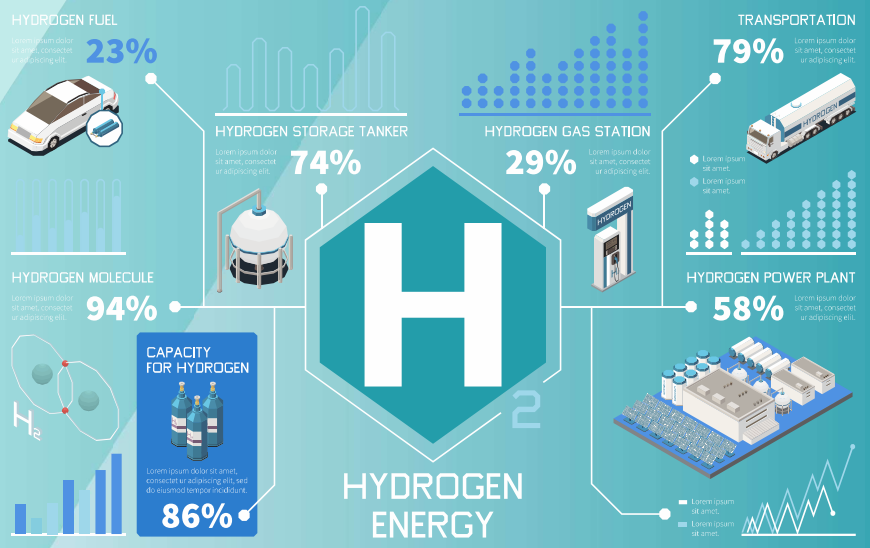
By linking **land use, industry demand, mobility, renewable production, and grid capacity**, the model enables **scenario testing instead of static mapping**. Authorities can evaluate the **impacts of new industrial zones or hydrogen transport projects** before investing public funds and align stakeholders using **shared spatial evidence**.

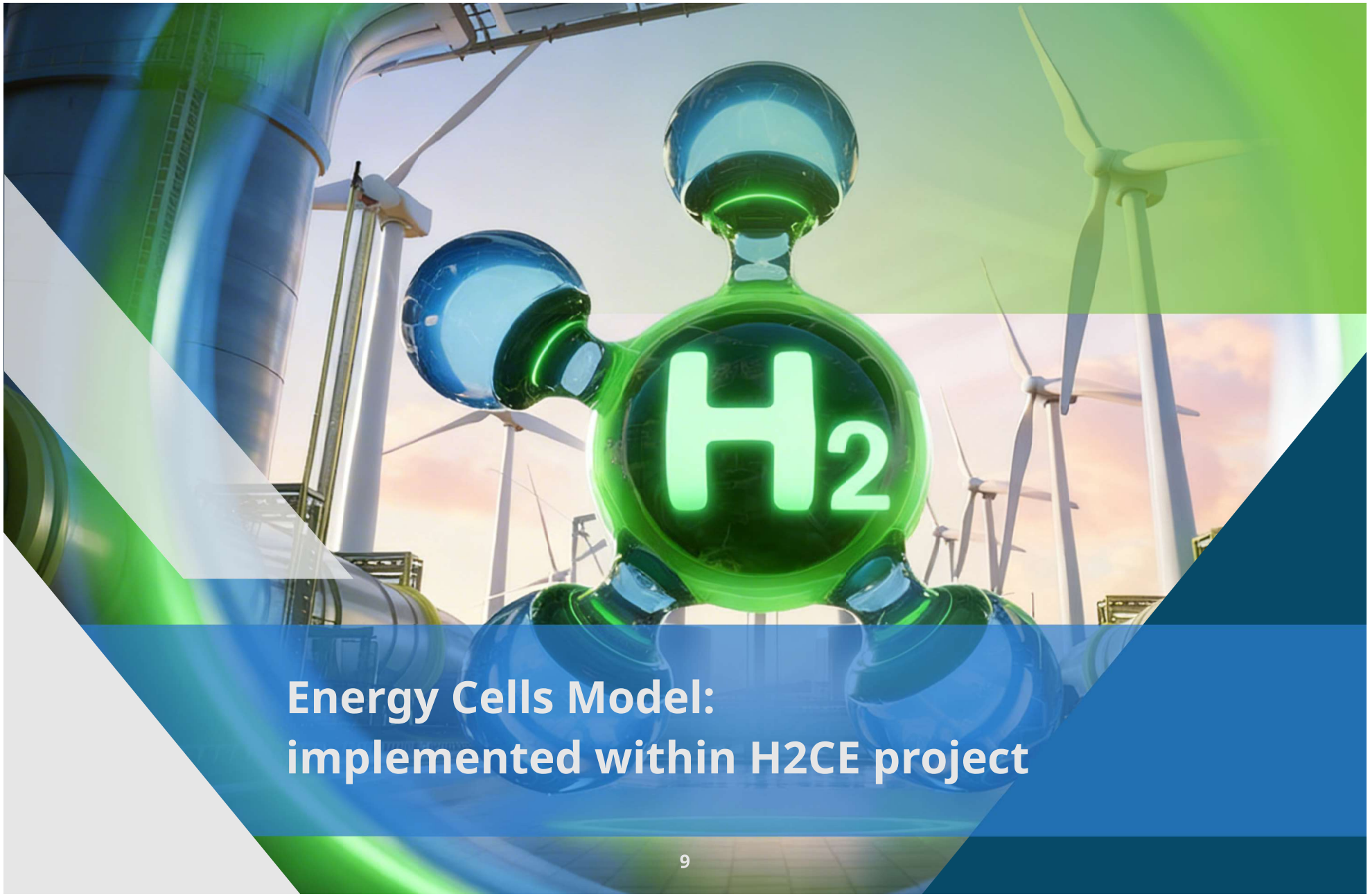
Transferability

The tool is transferable because it uses **standard administrative datasets** such as industrial registries, renewable cadastres, transport statistics, and spatial plans. **Dedicated hydrogen data are not required to start.**

The main barrier is organisational coordination of data owners rather than technology. Successful use requires a **regional authority operating the platform**, **regular data updates**, and **cooperation with utilities and statistical offices**.

With this governance in place, regions can use the **GIS Tool as a permanent planning instrument**, supporting **hydrogen strategies, climate plans, and infrastructure investment decisions**.





Energy Cells Model: implemented within H2CE project

Introduction

The **Energy Cells Model** supports regional authorities in planning **future energy systems under decarbonisation targets**. Instead of analysing **electricity, heat, and hydrogen separately**, the model represents a territory as a **network of local energy cells** that generate, store, and distribute energy based on **regional resources and demand**.

Each cell combines **renewable production, storage technologies, and demand sectors** such as households, industry, and heating networks. This allows planners to understand how **different energy carriers interact** and how **local conditions influence infrastructure requirements**. The concept reflects the transition from **centralised supply** towards **decentralised and resilient energy systems**.

Through a **user-friendly modelling environment**, authorities can **test scenarios, compare technology combinations, and evaluate impacts of policy targets**. The model translates **climate ambitions into concrete technical and spatial decisions**, helping regions **prepare strategies, prioritise investments, and coordinate stakeholders** when developing future energy and hydrogen ecosystems.

Development & implementation

The **Energy Cells Model** was developed within **H2CE** by **City and Regional Utilities Luebben** as a practical **simulation tool** built on the **open-source open_plan platform**. The tool follows a **structured workflow**: defining a scenario, designing the energy system, applying constraints, and analysing simulation results.

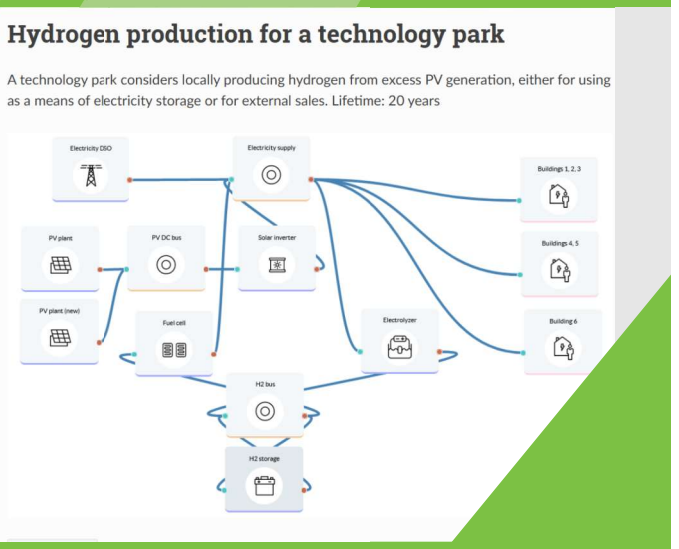
Structured Workflow

- **Define planning parameters** (timeframe, demand assumptions, cost limits)
- **Assemble modular energy components** (renewables, storage, hydrogen, grid interaction)
- **Apply policy and technical constraints** (renewable share, autonomy targets)
- **Run optimisation and analyse results** (cost efficiency, system configuration, indicators)

The model integrates **electricity, heat, and hydrogen in one system** and allows the use of **local time-series data**, such as consumption profiles or weather conditions. Authorities can set **policy-relevant constraints**, for example minimum renewable share or degree of energy autonomy. The optimisation then calculates the **most cost-efficient configuration** that fulfils these conditions.

The approach was tested in a **regional case study** to analyse **decarbonisation pathways** and compare **technology combinations**. The simulations produced indicators such as **renewable share, system costs, and level of independence from external energy sources**. These outputs support decision-making on **infrastructure development, sector coupling, and investment priorities**.

Through **iterative testing and stakeholder discussion**, the model evolved into a **practical planning instrument** enabling authorities to **explore alternatives**, **understand system interactions**, and prepare **long-term energy transition strategies**.

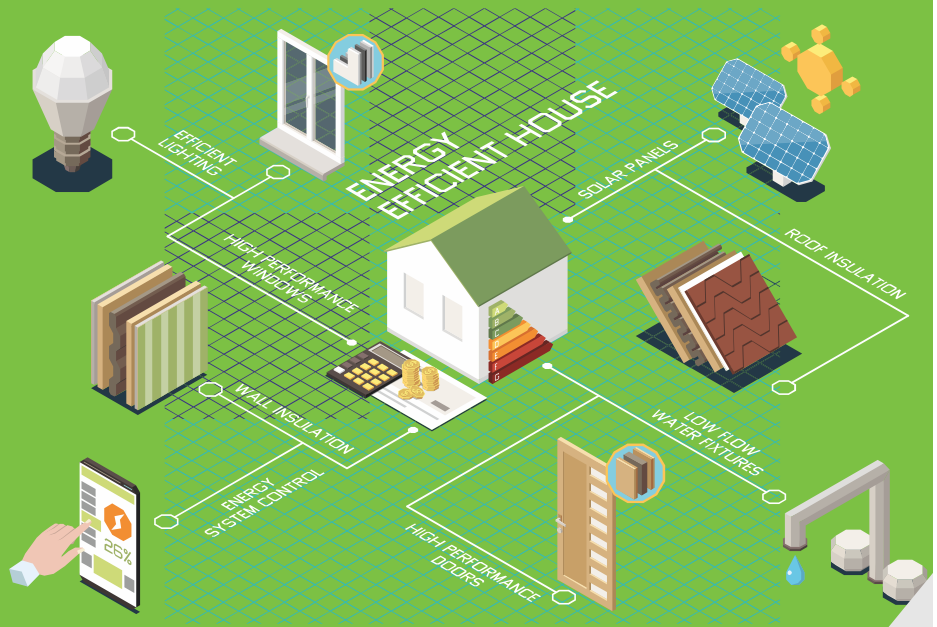


Feedback

Regional agencies from **several European regions** tested the **Energy Cells Model** and confirmed its main value lies in **early planning stages**. The model acts as a **pre-feasibility simulator**, allowing authorities to check whether an **energy concept is realistic before commissioning engineering studies**.

Users explored combinations of **renewable generation, hydrogen production, heating technologies, and local microgrids**. By visualising **interactions inside the system** — such as **surplus solar enabling hydrogen production** or **storage affecting grid independence** — planners could assess **technical plausibility, level of autonomy, and approximate costs**.

The tool therefore **reduces uncertainty** and supports **informed decision-making** on whether a project should proceed to **detailed technical analysis**.



Transferability

Regions confirmed the model is **transferable** because it can operate with **commonly available data**, such as annual consumption figures, renewable potential maps, or basic spatial statistics. **Detailed hourly datasets are not mandatory**; simplified profiles can be used for **initial assessment**.

The main challenge is **organisational rather than technical** — preparing inputs and interpreting results — rather than running the software itself. Successful implementation works best when a **regional energy agency operates the tool**, municipalities **provide data**, and **shared templates standardise assumptions**.

In this setup, the model becomes a **shared analytical service** that helps regions **screen project ideas, prioritise feasible concepts, and prepare funding applications**.

H2CE Voucher Scheme: implemented within H2CE project

Introduction

The **H2CE Voucher Scheme** is a **support instrument** designed to help organisations prepare **hydrogen projects in their earliest stages**. Many municipalities, SMEs, and public bodies recognise hydrogen opportunities but **lack the resources to verify feasibility, prepare documentation, or access funding**. The voucher mechanism lowers this **entry barrier** by providing **targeted financial support for project preparation and validation**.

Instead of funding infrastructure directly, the scheme focuses on the **critical phase where ideas become viable projects**. Beneficiaries can use vouchers for **feasibility studies, cost-benefit analyses, pilot solution design, or preparation of funding applications**. This allows project promoters to assess **technical, economic, and environmental viability** before committing major investments.

By supporting **early development steps**, the scheme **reduces financial risk** and encourages **innovation in hydrogen applications** across industry, transport, and energy systems. It also strengthens **cooperation between public authorities, research institutions, and businesses**, helping regions build **project pipelines aligned with decarbonisation strategies**.

The mechanism therefore acts as a **bridge between strategic ambitions and implementation**, enabling regions to move from **initial ideas toward bankable hydrogen projects and future investment opportunities.stments, and coordinate stakeholders** when developing future energy and hydrogen ecosystems.

Development & implementation

The **H2CE Voucher Scheme** was designed by **Economic and Social Council of the Ústí region** as a **structured project preparation instrument** enabling organisations to develop **hydrogen project concepts into complete project documentation**. The methodology builds on **proven regional support schemes** but adapts them specifically to **hydrogen technologies and decarbonisation objectives**. The focus was to create a **clear and manageable process** that public authorities can operate while remaining accessible to **municipalities, SMEs, and research organisations**.

Implementation Workflow

- **Submission of short project concept**
- **Eligibility assessment by regional authority**
- **Grant for preparatory activities (non-investment)**
- **Preparation of complete project documentation**
- **Readiness for national/EU funding or alternative financing**

The scheme was **piloted in the Ústí Region** to define **administrative procedures, documentation structure, and evaluation criteria**. During this phase, **standardised templates** for project fiches, required annexes, and assessment steps were prepared to ensure consistency in project preparation. The process also defined **eligible costs, reporting requirements, and payment procedures** to ensure compatibility with **public funding rules**.

Regions implementing the scheme may **adapt funding intensity, thematic priorities, and eligibility conditions** according to their regional strategies while maintaining the same **methodological framework**. The recommended **governance model** assigns programme management to a **regional authority or agency** responsible for **application evaluation, contracting, and monitoring**.
The final output of each supported activity is a **complete project plan** ready for submission to **national or European funding programmes** or for implementation through **alternative financing sources**. The scheme therefore serves as a **preparatory stage within the broader hydrogen project development cycle**.

Feedback

Regional authorities and business organisations confirmed the **Hydrogen Voucher** works best at the **very first stage of project development**. It allows companies and municipalities to **explore hydrogen opportunities without committing investment**, using **technical consultations, pre-assessments, and cost analysis**.

This support helps organisations understand **technical feasibility, emissions impact, and suitable technology options** before starting detailed studies. Authorities reported that the mechanism transforms **general interest into concrete project concepts** and prepares applicants for **national or EU funding programmes**.

The Voucher therefore acts as a **bridge between policy goals and real projects**, by **reducing uncertainty and encouraging early action** in hydrogen development.

Transferability

The mechanism proved **easy to replicate** because it relies on **simple and standardised elements**: **assessment modules, advisory support, and connection to existing funding programmes**. It can be operated by **regional administrations, development agencies, competence centres, or chambers of commerce**.

The main requirement is a **coordinating body** providing guidance and managing applications. The **small-scale structure keeps administrative burden low** while creating a **steady pipeline of well-prepared projects**.

H2CE Competence Centres: implemented within H2CE project

Introduction

The **Hydrogen Competence Centre** is a **regional support structure** designed to help public authorities, companies, and organisations **understand, plan, and implement hydrogen solutions in practice**. It acts as a **one-stop hub**, combining **knowledge, advisory services, and stakeholder cooperation** in a single accessible place.

The concept responds to a **key barrier in the energy transition**: hydrogen is strategically important, but most actors lack the **expertise, coordination channels, and practical guidance** needed to move from **policy ambition to real projects**. The centre therefore does not focus on research alone — it **translates complex hydrogen topics into actionable steps for decision-makers**.

Core Functions of the Competence Centre

- **Advisory desk for municipalities and companies**
- **Training and awareness programmes**
- **Technical consultation and feasibility orientation**
- **Stakeholder coordination and networking platform**
- **Connection to experts and research partners**

The model connects **public authorities, research institutions, industry, and citizens**. By concentrating knowledge and guidance in one place, it **reduces fragmentation of information** and **shortens the learning curve** for organisations entering hydrogen projects. Instead of each stakeholder starting from zero, they receive **structured support tailored to regional needs.**

In practice, the **Hydrogen Competence Centre** functions as an **operational interface between strategy and implementation** — enabling regions to **turn hydrogen from a policy objective into coordinated local action.**

Development & implementation

The **Hydrogen Competence Centre support mechanism** was co-created by **City of Zagreb, Energy Agency of Styria, North-West Croatia Regional Energy and Climate Agency,** and **Regional Union of Chambers of Commerce of Veneto Region** as an **operational support structure embedded in the regional governance framework**. Its development focused on defining **clear functions, responsibilities, and service formats** rather than creating a purely informational platform. The objective was to provide **continuous assistance to organisations preparing hydrogen activities**.

Implementation began with **mapping regional stakeholders and identifying their needs**: municipalities required guidance for **climate planning**, companies needed orientation in **technology choices**, and administrations required **coordinated information for policy preparation**. Based on this analysis, a **structured service portfolio** was defined, including **consultations, technical guidance, awareness activities, and training sessions**.

The Physical Competence Centre, also known as the "One-Stop Shop" for Hydrogen and Sustainable Energy, was established at Maksimirska 5 in the heart of **Zagreb**, ensuring easy accessibility for all citizens, including individuals with special needs.

Operational procedures were structured to ensure **continuity and reliability**: defined contact points, **standardised consultation steps**, and prepared materials for **frequently asked topics**. Activities include **workshops, thematic seminars, and individual advisory meetings** adapted to different levels of expertise. The centre also gathers **regional knowledge** and maintains a **structured information base** supporting repeated and long-term use.

The **governance model** assigns management to a **regional authority or agency** responsible for **coordination, communication, and service organisation**. Cooperation with **external experts** allows the centre to operate without extensive in-house technical departments while still providing **qualified and specialised guidance**.

Through this setup, the competence centre functions as a **permanent regional support service**, assisting stakeholders throughout the **preparation phase of hydrogen initiatives** and ensuring that **knowledge, information, and expertise remain accessible within the region**.

Feedback

Regional authorities confirmed the **Hydrogen Competence Centre** fills a **critical gap between strategy and implementation**. It provides a **single entry point** where municipalities and companies can obtain guidance on **technologies, regulations, funding opportunities, and project preparation**.

The centre increases the **confidence of public administrations lacking hydrogen expertise** and supports **staff training, consultations, and feasibility checks**. It also serves as a **neutral coordination platform**, connecting **municipalities, industry, utilities, and research actors**, helping to **avoid fragmented initiatives**.

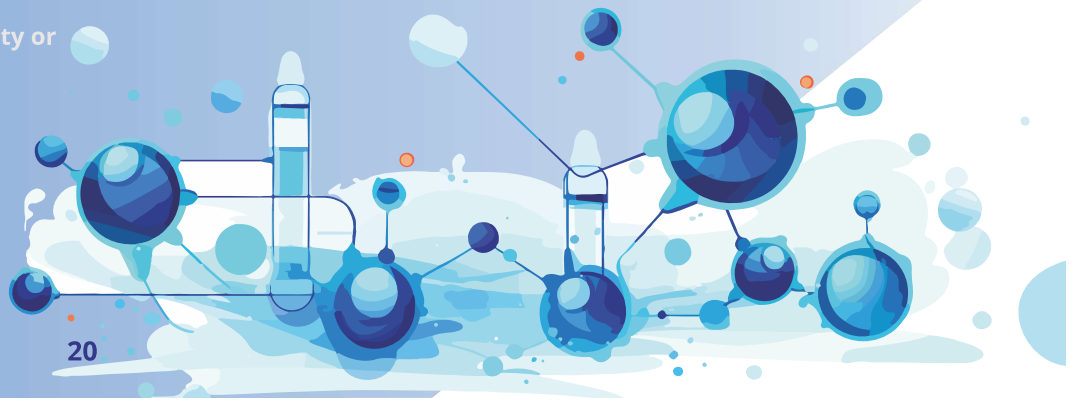
Regions reported **faster project preparation and clearer decision-making**, as stakeholders work with **shared information and structured support** rather than isolated knowledge.

Transferability

The concept is **transferable** because it relies on **replicable and modular services**: an **advisory desk**, **training modules**, an **expert network**, and **project preparation support**. It functions effectively both in **advanced regions coordinating innovation** and in **early-stage regions building capacity**.

The recommended model places the centre within a **regional authority or energy agency** and connects it with **universities and industry partners**. Combining **public funding with service-based activities** strengthens long-term sustainability.

With this structure, regions can establish a **permanent coordination hub** that supports **project pipelines, funding absorption, and long-term hydrogen ecosystem development**.



H2CE Capacity Building for Competence Centres: implemented within H2CE

The programme was developed through **pilot activities in Styria and Zagreb**, focusing on how **hydrogen knowledge should be communicated to different audiences**. Target groups were first identified, and **training content was tailored accordingly**.

Two complementary formats were created: **digital learning materials** and **on-site information activities**. Training modules were prepared at **multiple levels**, including a **basic introduction** and a **more advanced section**. This structure allows regions to **adapt training depth according to stakeholder interest and expertise**.

Workshops, seminars, and demonstration activities are organised through **competence centres** using a **one-stop-shop approach**. **Educational institutions, public authorities, and businesses** participate in expert-led sessions supported by **presentations, factsheets, and case examples**.
All materials are **shared digitally** and can be **reused and adapted by other regions** to reflect local regulations and funding conditions. The programme therefore functions as a **continuous training service embedded within competence centre operations**, rather than a standalone educational campaign.

Development & implementation

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Feedback

Regions confirmed that **training significantly increases confidence** among **public authorities, companies, and citizens** regarding hydrogen projects.

Workshops help stakeholders **understand regulatory frameworks**, **evaluate technical solutions**, and **communicate planned developments clearly**.

Improved knowledge reduces hesitation and enables administrations to **plan and initiate hydrogen projects more proactively and strategically**.

Transferability

The model is **highly adaptable**, as content can be **tailored to different target groups and regional maturity levels**.

Regions can **reuse and adapt training materials**, combine **online learning with in-person workshops**, and integrate hydrogen education into **existing training programmes or competence centre services**.

This flexibility allows each region to implement the programme in a way that fits its **institutional structure, knowledge base, and strategic priorities**.

Solution — Handbook for Strategic Decision-Making (H2CE Web Platform Overview)

Introduction

The **H2CE Handbook for Strategic Decision-Making** is implemented as an **online knowledge platform** available at **www.h2ce.eu**. Instead of a static publication, the handbook functions as a **continuously updated digital reference space** supporting regional and local authorities in **planning, evaluating, and implementing hydrogen activities**. It consolidates the **outputs of the H2CE project** into a **structured and accessible environment**, where decision-makers can find **guidance, data, and practical examples in one place**.

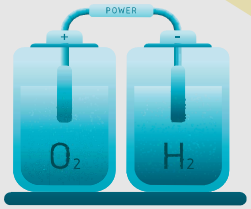
The platform is specifically designed for **public administrations** that require **strategic orientation rather than technical engineering detail**. Its purpose is to help authorities understand **how hydrogen integrates into regional development, spatial planning, and climate strategies**, and how to move from **general policy ambitions toward concrete implementation steps**.

Key Features of the H2CE Strategic Handbook Platform

1. **Strategic Guidance and Planning Support**
2. **Tools and Methodologies**
3. **Project Preparation and Implementation Knowledge**
4. **Case Examples and Practical Experience**
5. **Networking and Knowledge Exchange**
6. **Continuous Knowledge Infrastructure**

RENEWABLE ELECTRICITY

Using the excess energy produced by renewables like



ELECTROLYZER

Green electricity could produce hydrogen through

STORAGE

Hydrogen is stored safety for when needed.

USE

Once stored, the gas can be transported to anywhere in the world for domestic or

1. Strategic guidance and planning support

The platform supports authorities in understanding **where hydrogen fits within regional development**, rather than promoting the technology in general. It explains the **role of hydrogen in relation to electrification, renewable deployment, transport decarbonisation, and industrial transition**.
The handbook helps administrations answer **practical policy questions**: **when hydrogen is justified**, **which sectors should be prioritised**, and **how implementation should be phased over time**. It structures **key decision points** and clarifies implications so that regional strategies can be prepared based on **realistic pathways aligned with climate neutrality goals**.

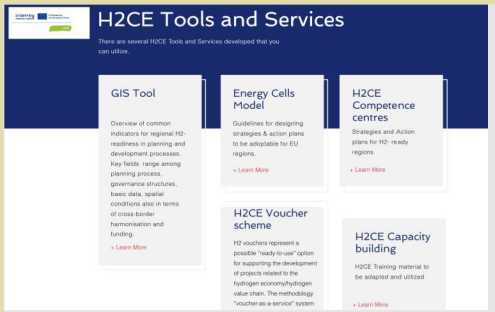
The handbook translates complex technical topics into **planning-level questions**, such as:

- **Where hydrogen makes sense within a regional energy mix**
- **When hydrogen should be prioritised over electrification**
- **How infrastructure should be coordinated across municipalities**
- **How regional strategies should be phased over time**

This approach ensures that hydrogen becomes a **strategic planning choice**, not just a technological option.

2. Tools and Methodologies

The platform integrates the **practical tools developed within the H2CE project**. These tools are presented as **operational methods rather than research outputs**, enabling authorities to **directly apply them in planning processes**. The platform clearly explains how to use **spatial analysis, modelling approaches, and project preparation mechanisms** to evaluate hydrogen initiatives.



Regional planners can navigate between:

- **Spatial planning support methods**
- **System modelling approaches**
- **Project preparation mechanisms**
- **Governance support instruments**

Each method is carefully **contextualised**: the platform explains **when it should be used**, **what inputs are required**, and **which types of decisions it supports**. This structured guidance helps administrations **select appropriate instruments** instead of applying generic or unsuitable approaches.

3. Project preparation and implementation knowledge

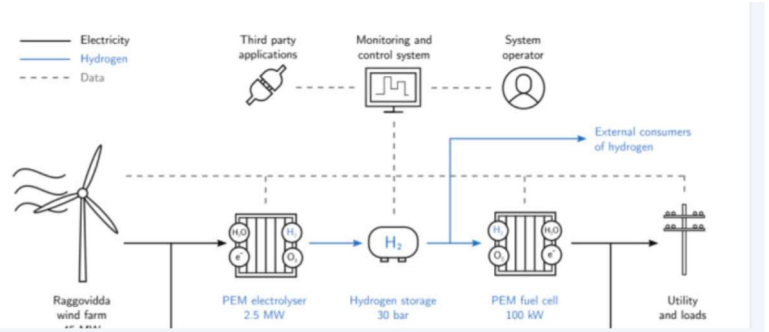
The platform supports the **transition from strategy to implementation** by explaining how to **structure projects, organise cooperation, and involve stakeholders** before investment decisions.
Authorities learn to **build project pipelines**, **coordinate with industry and utilities**, and **prepare funding applications**, strengthening **institutional readiness for concrete projects**.

4. Case examples and practical experience

The platform presents **tested regional approaches** showing how hydrogen initiatives were **prepared and managed in practice**.
Policy makers can **compare regional situations** and identify **models suited to their context**, providing **realistic implementation pathways** instead of theoretical concepts.

5. Networking and knowledge exchange

The platform at **www.h2ce.eu** functions as a **cooperation space**, connecting authorities with **peers, experts, and European initiatives**. Users can **exchange experience, find partners, and access expertise**, supporting **faster and better-informed project preparation**.



6. Continuous knowledge infrastructure

The handbook at **www.h2ce.eu** is a **living resource** maintained by **participating regions**. Through **continuous updates and shared contributions**, it becomes a **permanent knowledge infrastructure** supporting **learning, coordination, and interregional cooperation**.

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Go to the project website: