

ASCEND

Solution Packages capacity-building module

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Abstract

This deliverable presents the different modules delivered by WP5 partners (DKSR, R2M, UoL, USG) for the WP4 Capacity Building Program and their integration in the ASCEND Knowledge Platform (WP8). It defines the proposed technical specifications for the ASCEND Knowledge Platform as a central access layer connecting knowledge assets, decision-support tools, monitoring systems and learning resources developed across the project. The report positions the platform not as a static repository, but as a guided transformation environment that helps cities move from problem definition through design, deployment and scale-up of Positive Clean Energy Districts.

The Knowledge Platform can be found at the non-public URL: <https://www.ascend-project.eu/knowledge-platform>

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Project Partners

Partners	Country	Abbreviation
SPL LYON CONFLUENCE	FR	SPL
METROPLE DE LYON	FR	GLY
COMMUNE DE LYON	FR	LYS
HESPUL ASSOCIATION	FR	HES
URBAN PRACTICES	FR	UP
ENERTECH	FR	ETC
LANDESHAUPTSTADT MUNCHEN	DE	LHM
STADTWERKE MUENCHEN GMBH	DE	SWM
MUENCHNER GESELLSCHAFT FUER STADTERNEUERUNG MBH	DE	MGS
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TECHNISCHE UNIVERSITAET MUENCHEN	DE	TUM
ISARWATT EG	DE	IW
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Glossary

Acronym	Description
AI	Artificial Intelligence
API	Application Programming Interface
BMA	Business Model Assembler
CEA	City Energy Analyst
CMS	Content Management System
CoP	Community of Practice
GPT	Generative Pre-trained Transformer
KP	Knowledge Platform
KPI	Key Performance Indicator
LTLC	Local Transitions Learning Centre
MCDA	Multi Criteria Decision Analysis
PCED	Positive Clean Energy Districts
WP	Work Package

Executive summary

The main objective of the ASCEND project is to create relevant conditions for upscaling solutions at the level of each partner city and across Europe. Our core assumption is to "scale up by design" our solutions instead of waiting for the final technical loop to start the process. The process is organised within the WP5, providing cities with easy and intuitive tools that will help them correctly frame the problem of upscaling and raise questions that must be solved during the lifespan of the ASCEND project. Those tools should enable project owners and cities to make decisions and measure the "market or adoption maturity" of their solutions.

The ASCEND Knowledge Platform is conceived as a central digital environment that connects these tools, the knowledge assets and data streams developed across ASCEND into one coherent user-facing system. It is placed on the non-public URL <https://www.ascend-project.eu/knowledge-platform>.

The starting point for this report is the practical reality shown in the project material: ASCEND does not have a single monolithic platform, but rather a growing ecosystem of repositories, planning tools, monitoring engines, Communities of Practice resources and services. The role of the Knowledge Platform is therefore to orchestrate access, impose structure and guide users through that ecosystem so that the outputs become usable in real city workflows.

The report translates that logic into a technical specification. It positions the platform as a system of systems with six core layers: user guidance, user interface, experience and navigation, knowledge and content, tool integration and data. A new user guide layer is introduced as a deliberate design response to a common failure in many platforms: tools exist, but users do not know when to use them, in which sequence, or how they connect to concrete decisions.

The proposed model is built around city transformation journeys. Users should be able to enter with a goal (for example, plan a district, monitor performance, assess financing options, or learn from other cities), via their role (city representative, technical expert, decision maker, investor) or via the project lifecycle phase. Internally, the platform aligns these pathways with DEFINE, DESIGN, DEVELOP, DEPLOY and SCALE. This logic ensures that the platform supports replication and exploitation in practice rather than simply publishing outputs.

1 Introduction

1.1 Purpose of the deliverable

This deliverable presents the different tools developed within ASCEND to support the upscaling efforts of cities, projects or solutions owners, and defines the proposed technical specifications, system architecture and user guidance logic for the ASCEND Knowledge Platform as a central node for capacity-building modules. Its purpose is to provide a shared design reference that can be used for development decisions, coordination between work packages, internal review and later external communication. The document is not intended as a software build manual; rather, it is the architecture and functional framing that should sit above implementation.

ASCEND generates knowledge in multiple forms: static content such as deliverables, city descriptions and case studies; structured databases such as the State of the Art Repository; decision-support tools such as the PCED Business Model Assembler and MCDA CEA (Multi Criteria Decision Analysis City Energy Analysts); monitoring systems and KPI calculation engines; and external learning environments such as the Local Transitions Learning Centre (used to host the Community Of Practices meetings). Because these outputs sit in different work packages and maturity stages, the central challenge is not only dissemination, but structured access and interoperability.

1.2 Methodology

WP5 partners have developed the tools under the coordination of BLS, WP5 leader, following a common methodology.

Starting from the initial proposal, the partners in charge have detailed and adapted the proposal to the context and the capacities of the end-users (in terms of availability, data, etc.). Then, USG and R2M have conducted a testing phase with the end users (cities, solution owners) to adapt, refine and tailor the approach to their needs. They assessed the feasibility of the Solution Package level and concluded that developing tools at this level would be too complicated and time-consuming. Instead, we decided to focus on a portfolio of well-identified solutions selected with the support of each city. It has been the case for the PCED Business Model Assembler card game and the CBA.

WP5 partners delivered specific training to solution package owners, cities and solutions owners during the first Capacity Building Program expert training, which took place in October 2024 in Stockholm. The training sessions have been designed to teach the basics on how to use all the tools and to trigger interaction and relevance with use cases.

The created content has been made available and usable on the ASCEND Knowledge Platform.

1.3 Scope

The scope of the Knowledge Platform includes public-facing knowledge access, tool navigation, integrated or linked tool entry points, content governance, taxonomy, user journeys, analytics and a scalable system architecture. It does not replace existing specialist tools where separate operation remains sensible. Instead, it provides the common access, framing and guidance layer through which those tools can be found, understood and used.

2 Platform concept and positioning

The ASCEND Knowledge Platform should be understood as an orchestration layer rather than a conventional project website. A standard project website is largely linear: users browse pages, download files and read news. ASCEND requires more. Cities need to move from inspiration to planning, from planning to deployment, and from implementation to replication. To support that, the platform must connect content, tools and data through a logic that reflects real work rather than internal project structure.

Strategically, the platform supports four objectives. First, it **packages ASCEND outputs** so they can be reused by other cities and stakeholders. Second, it **translates technical complexity into usable decision support**. Third, it **increases the exploitation value** of the project by making tools visible and navigable. Fourth, it **creates a digital asset that would be able to – under the right circumstances - continue evolving beyond the project lifetime** instead of ending as an archive of PDFs.

Operationally, the platform serves three simultaneous functions. It is a **content system**, because it houses structured knowledge. It is an **access system**, because it provides entry to multiple tools and resources. And it is a **guidance system**, because it tells users what is relevant for them and what should happen next. That third function is crucial; without it, the platform remains a list of assets rather than a usable environment.

3 Proposed system architecture

3.1 Architectural logic

The proposed architecture follows a layered model so that the platform remains modular, readable and easier to evolve over time. Each layer has a distinct purpose. The user guide layer sits on top and translates user intent into pathways. The user interface layer presents the web frontend. The experience and navigation layer manages journeys, search and tool access. The knowledge layer stores and structures content. The tool integration layer connects project tools and external systems. The data layer underpins KPI calculation, monitoring, metadata and analytics. The data layer underpins KPI calculation, monitoring, metadata and analytics.

This structure matters because ASCEND is not building everything from scratch in one technical stack. Some components are already operational, some are planned, some are better linked externally, and some may only become mature later in the project. A layered architecture allows the consortium to integrate what exists today while preserving flexibility for future modules such as a natural language-based search across PCED topics (PCED GPT) or expanded AI-supported search.

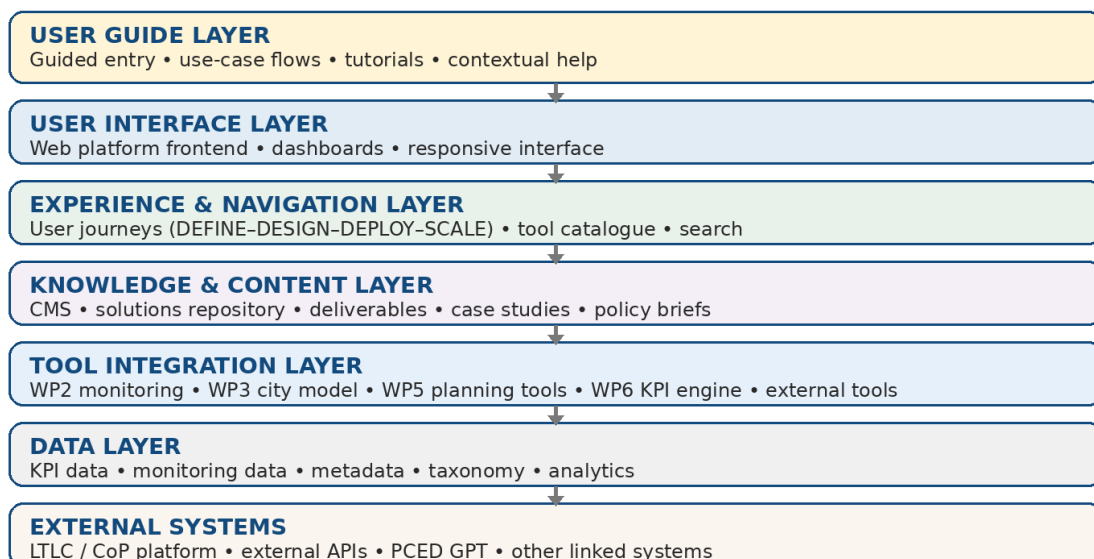


Figure 1: ASCEND Knowledge Platform system architecture

The user guide layer introduces guided entry, use-case flows, tool explanations, onboarding prompts and contextual support. In practice, this layer answers the question that most users will actually have: what do I need to do, and where do I start? It prevents the platform from becoming a technically impressive but user-hostile collection of links and modules.

3.2 Knowledge and integration layers

The knowledge layer should include the solutions repository, case studies, policy briefs, deliverables, city profiles and reusable resources. The integration layer should classify tools according to their integration mode: native, embedded or external. Native tools share the platform interface and data model more closely. Embedded tools can remain on their own backend while appearing through dashboards or controlled entry points. External tools remain separate but are still framed, described and routed through the platform.

4 Target users

The ASCEND website and Knowledge Platform are designed to support a diverse ecosystem of stakeholders involved in the planning, implementation, financing, and scaling of Positive Clean Energy Districts. Users engage with the platform at different stages of project maturity and from different professional perspectives, ranging from early-stage concept development to investment readiness and replication.

In this document, we address only the **primary target users** for the Knowledge Platform (a full scope of target users is in detail presented in D8.1). In reality, the knowledge platform addresses both public and private actors, enabling them to design, evaluate, and upscale solutions through structured workflows and integrated decision-support tools and will be utilised more widely than presented below. It is however pertinent that its tool, user journeys and functionalities are optimised for a defined type of user(s) as presented below.

4.1 City planners

This group represents the core users of the platform, including:

- municipal departments (energy, urban planning, climate, innovation)
- public project developers
- in-house or affiliated development agencies

(e.g. Lyon Confluence, Munich, Prague, Charleroi, Budapest, Alba Iulia)

Role and Use:

Cities use the platform to:

- design and plan PCED solutions
- assess technical, economic, and environmental performance
- evaluate trade-offs between costs, emissions, and impacts
- structure business models and governance approaches
- prepare projects for implementation and scaling

A key objective for cities is to develop bankable and scalable solutions, understood as the ability to:

- present robust and evidence-based project concepts
- demonstrate costs, benefits, risks, and impacts
- identify viable financing structures and implementation pathways

4.2 Technical Experts

This group includes:

- energy system modellers
- urban data specialists
- engineering consultants
- research and innovation partners

Role and Use:

Technical experts support the analytical backbone of the platform by:

- running simulations and scenario analyses (e.g. MCDA / CEA)
- generating and validating input data
- interpreting outputs and supporting decision-making
- ensuring methodological robustness

4.3 Investors and Financial Stakeholders

This group includes:

- public and private investors
- financial institutions
- funding bodies

Role and Use:

Financial stakeholders engage with platform outputs to:

- assess project feasibility and risk
- evaluate return on investment
- identify suitable financing mechanisms
- support funding and scaling decisions

The platform supports their needs by structuring information relevant to investment readiness, including:

- economic performance indicators
- risk profiles
- non-monetary impacts
- financing options

5 User guidance and journey framework

5.1 User guidance principle

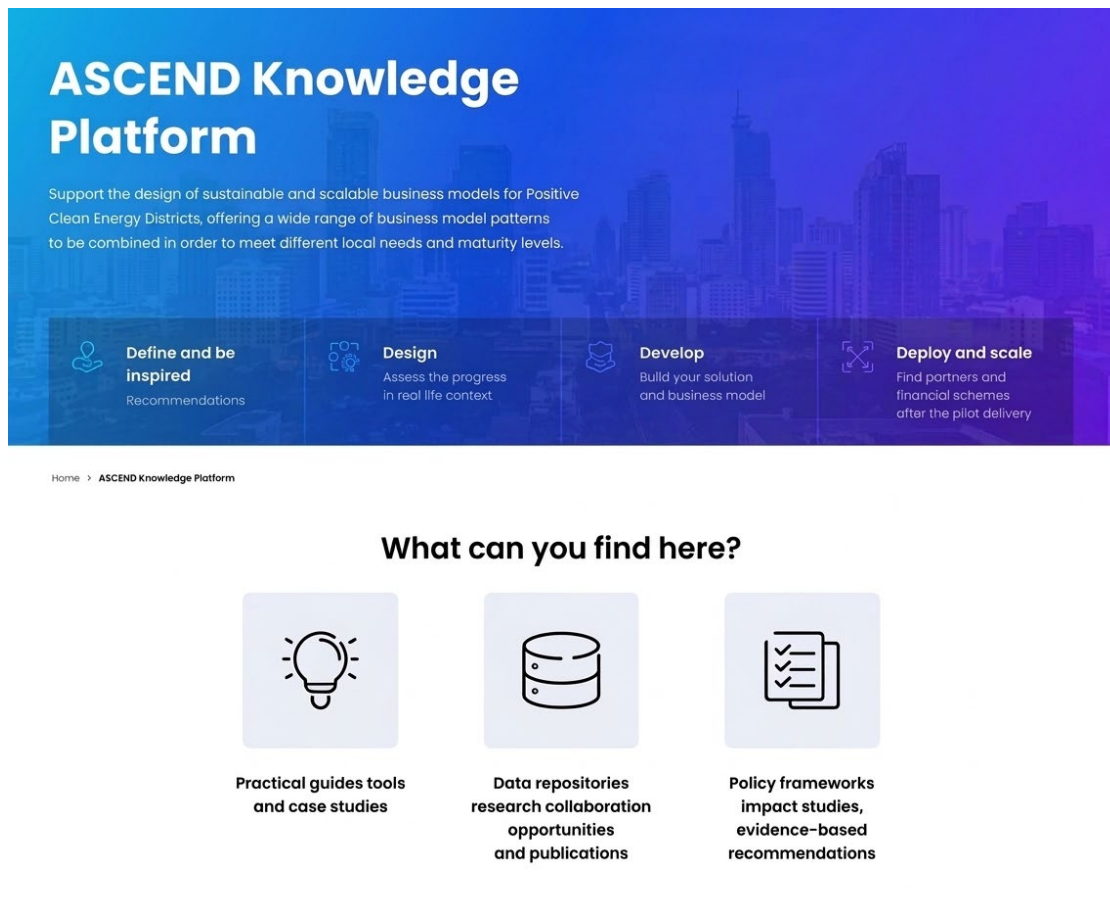
The platform does not begin with a technology menu. It begins with user intent. The recommended top-level question is therefore simple:

What do you want to do?

From there, the platform supports the varying needs through:

- goal-based entry points (e.g. “design a solution”, “assess financing”)
- tool-based route (e.g. practical guides and tools, data repositories, policy recommendations)
- role-based navigation (e.g. city, investor, expert)
- direct access to tools, data, and guidance

Depending on what kind of user they are and how much prior knowledge they already have about PCEDs, which stage of building a PCED they are on, or from which position they are approaching the topic of PCEDs, the user selects their own journey as needed.



ASCEND Knowledge Platform

Support the design of sustainable and scalable business models for Positive Clean Energy Districts, offering a wide range of business model patterns to be combined in order to meet different local needs and maturity levels.

Define and be inspired
Recommendations

Design
Assess the progress in real life context.

Develop
Build your solution and business model

Deploy and scale
Find partners and financial schemes after the pilot delivery

Home > ASCEND Knowledge Platform

What can you find here?

- Practical guides tools and case studies**
- Data repositories research collaboration opportunities and publications**
- Policy frameworks impact studies, evidence-based recommendations**

Figure 2: ASCEND Knowledge Platform Key questions and user journey

5.2 Journey phases

The lifecycle logic is organised around four phases.

- **DEFINE** supports problem framing, strategic alignment and inspiration.
- **DESIGN** supports concept development, scenario testing and business model logic.
- **DEVELOP** supports implementation, monitoring and operational decision-making.
- **DEPLOY & SCALE** supports peer learning, replication, Communities of Practice and wider promotion.

This sequence is intuitive for users and maps well to city transformation processes.

User Journey and Guidance Flow

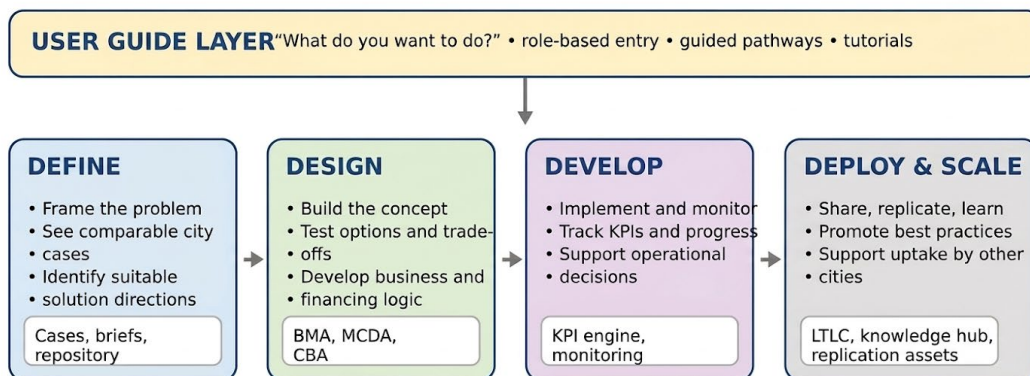


Figure 3: User journey and guidance flow

Each of these phases also directly corresponds to a different tool category (see Chapter 6 below)

DEFINE: Knowledge and Repository Tools (State of the Art)

DESIGN: Planning and Decision Tools (PCED Business Model Assembler, MCDA, CBA etc.)

DEVELOP: Monitoring and Data Tools (KPI Engine)

DEPLOY & SCALE: Learning Tools (CoP Learning Platform)

In practice, this means that every resource should ideally be tagged not only by topic and city but also by its lifecycle relevance. A city planner entering at DESIGN should be able to see the business model assembler, relevant case studies, scenario-comparison tools and financing guidance. A technical expert entering at DEPLOY should immediately see KPI and monitoring pathways. The journey logic is not a visual extra; it is a structural requirement.

6 Tool ecosystem and integration logic

6.1 Tool ecosystem overview

The ASCEND material shows a diverse and evolving tool ecosystem. Some tools are already incorporated into the platform or available with external links; others are currently planned for later deployment. The platform makes this complexity legible. Users should not need to know which work package owns which tool before they can find value in it. The role of the platform is to classify, describe and connect these assets around user needs.

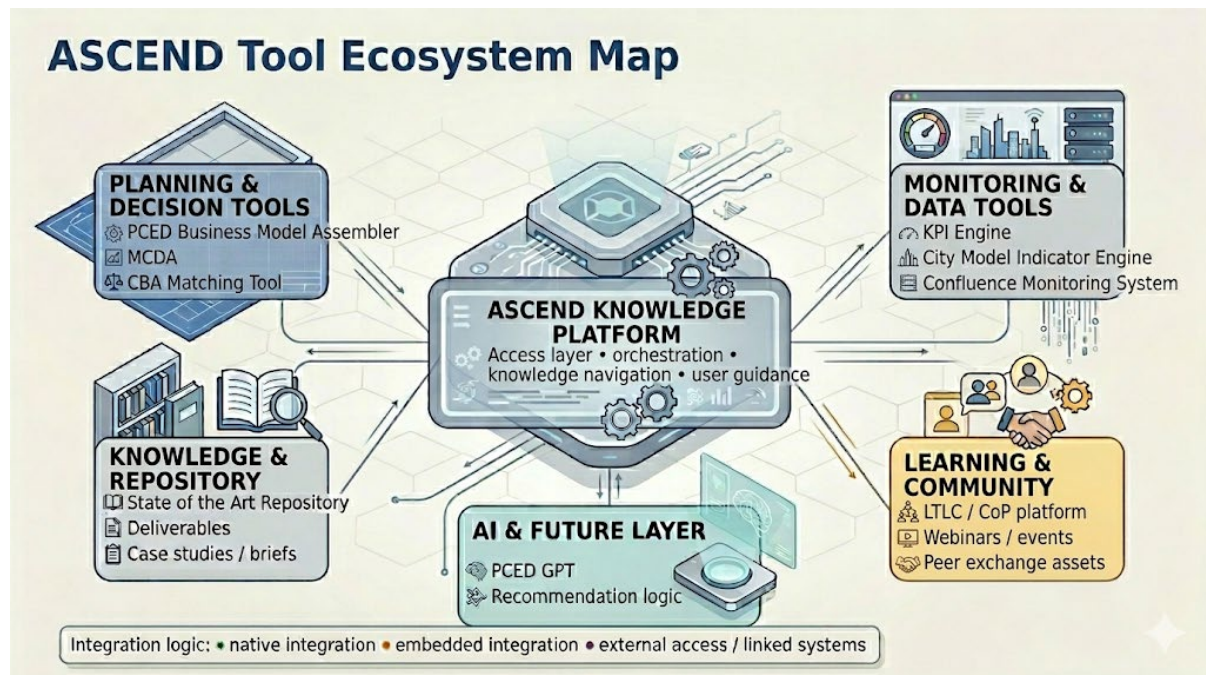


Figure 4: ASCEND tool ecosystem map (NanoBanana generated)

6.2 Tool categories

The current tool set can be grouped into four broad classes.

Planning and Decision Tools

- PCED Business Model Assembler
- MCDA Tool
- CBA Matching Tool

Monitoring and Data Tools

- KPI Engine
- City Model Indicator Engine (used by Munich)
- Confluence Monitoring System (used by Lyon)

Knowledge and Repository Tools

- State of the Art Repository

Learning Tools

- CoP Learning Platform (LTLC)
- PCED GPT (planned)

6.3 Integration approach

The platform uses natural language and **“lifecycle phase”** to help the user navigate where they need to go (**answering “WHY”**).

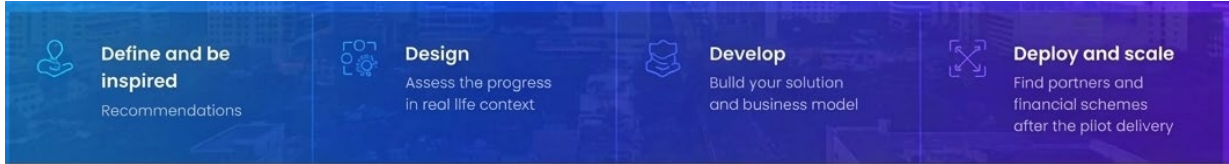


Figure 5: Natural language menu

Should the user be still unsure – and is there to browse, the lower menu helps with identifying the types of tools (**answering “WHAT”**).



Figure 6: Types of tools on the platform

Each tool is accompanied by clear metadata: what it is, who it is for, what it helps with, what the inputs are, what outputs the user can expect, and in which lifecycle phase it is most relevant. This metadata is as important as the technical connection itself, because it determines whether users understand why the tool matters.

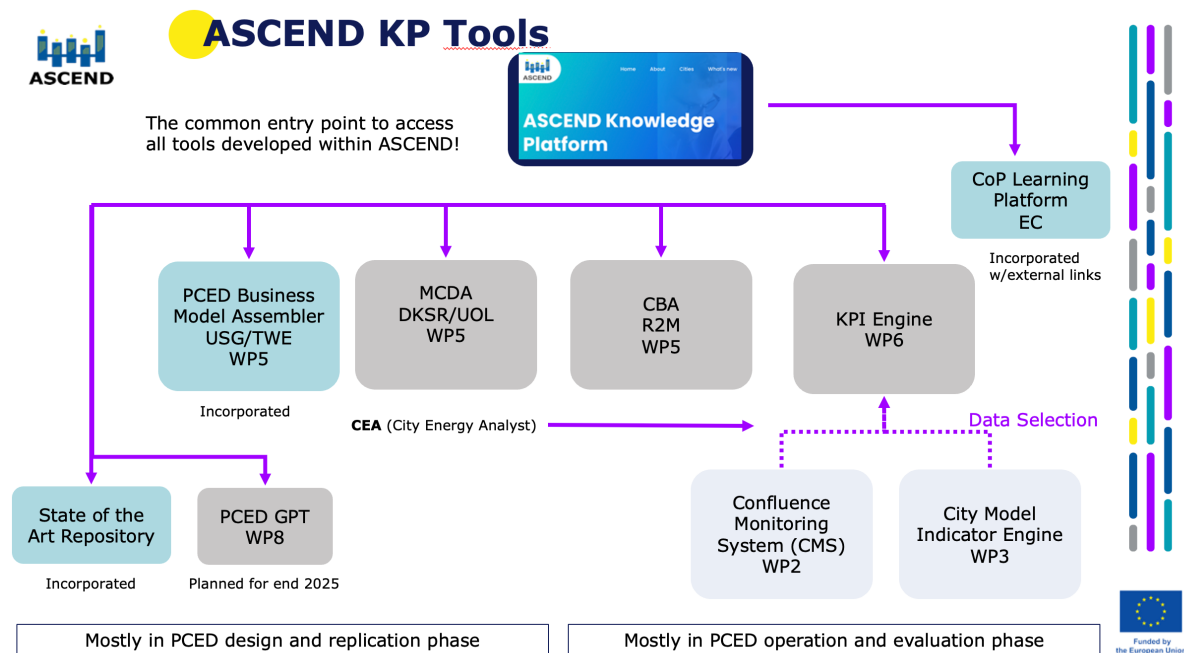


Figure 7: ASCEND Knowledge Platform Architecture

Table 1: Tool ecosystem and proposed integration logic

Tool / asset	Primary purpose	Main users	Integration mode	Lifecycle phase
State of the Art Repository	Searchable overview of ASCEND solutions and practices	Cities, experts, external initiatives	Native	DEFINE / SCALE
PCED Business Model Assembler	Structure stakeholder roles, value logic and business model options	Cross-department city teams, experts	Native embedded /	DESIGN
MCDA tool	Compare solution scenarios against weighted criteria	Urban planners, engineers, consultants	Embedded	DESIGN / DEPLOY
KPI Engine	Process monitoring data and calculate core KPIs	PCED administrators, city representatives	Embedded	DEPLOY
City Model Indicator Engine	Scenario testing and indicator modelling	Technical experts	Embedded	DEPLOY
Confluence Monitoring System	Collect and organise monitoring information	Consortium and city teams	Embedded / linked	DEPLOY
CBA Matching Tool	Suggest financing instruments and bankability pathway	Decision makers, project managers, finance users	Planned embedded	DESIGN
LTLC / CoP learning platform	Training, courses and Communities of Practice resources	Municipalities, agencies, consultants	External linked	SCALE
PCED GPT	Thematic AI guidance and future specialised agents	City representatives and non-expert users	Planned linked / embedded	DEFINE / DESIGN

6.4 Integration typology

From a technical perspective, the platform remains integration-neutral enough to accommodate different maturity levels. It is sensible to integrate some assets only through high-quality external linking if the cost of deeper integration is disproportionate. What matters is that the user journey still feels coherent. A consistent landing page, the navigation logic via several layers of different navigations and metadata model do a large part of that work.

First it starts with the

WHY (Why are you here? What would you like to do?)

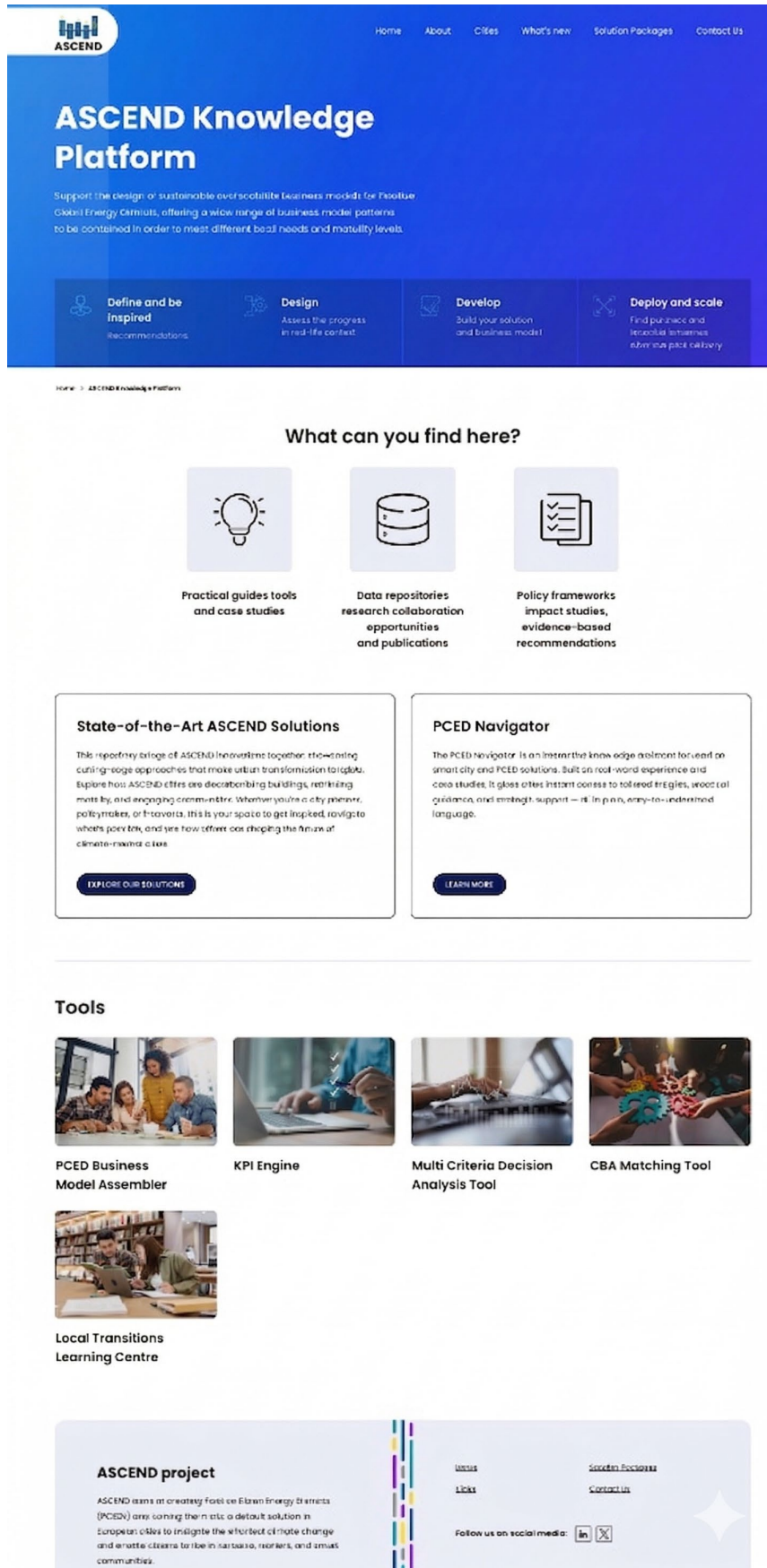
then **WHAT (What is all available? What type of content can I find here?)**

and then gives a **detailed overview** of all that is currently available (**What specific tools does the Platform offer and what are they good for?**)

Tools are integrated through three approaches:

- **Native integration:** fully embedded
- **Embedded integration:** connected via APIs or dashboards
- **External access:** linked systems

This ensures flexibility while maintaining coherence.



The screenshot shows the ASCEND Knowledge Platform landing page. At the top left is the ASCEND logo. A navigation menu includes Home, About, Cities, What's new, Solution Packages, and Contact Us. The main heading is "ASCEND Knowledge Platform" with a subtext: "Support the design of sustainable over-scalable business models for Flexible Green Energy Districts, offering a wide range of business model patterns to be contained in order to meet different local needs and maturity levels." Below this are four process steps: "Define and be inspired" (Recommendations), "Design" (Assess the progress in real-life context), "Develop" (Build your solution and business model), and "Deploy and scale" (Find partners and successful business administration delivery). A section titled "What can you find here?" features three icons: a lightbulb for "Practical guides tools and case studies", a database cylinder for "Data repositories research collaboration opportunities and publications", and a checklist for "Policy frameworks impact studies, evidence-based recommendations". Two featured content boxes are present: "State-of-the-Art ASCEND Solutions" (with an "EXPLORE OUR SOLUTIONS" button) and "PCED Navigator" (with a "LEARN MORE" button). A "Tools" section lists five items with corresponding images: "PCED Business Model Assembler", "KPI Engine", "Multi Criteria Decision Analysis Tool", "CBA Matching Tool", and "Local Transitions Learning Centre". At the bottom, the "ASCEND project" description is provided, along with "Useful Links" (Website, LinkedIn, Facebook, Twitter) and "Contact Us" (Email, Phone, Address). Social media icons for LinkedIn and Facebook are also shown.

Figure 8: ASCEND Knowledge Platform landing page

7 Representative user scenarios

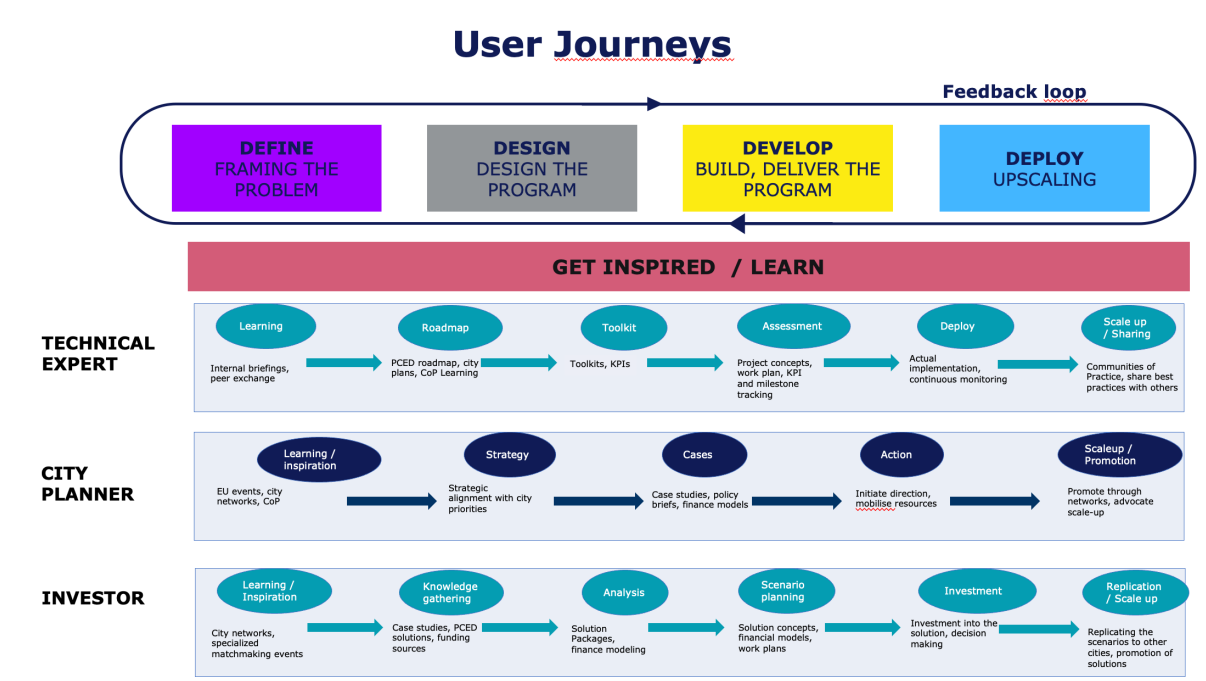


Figure 9: User journeys of ASCEND KP target users

To test whether the proposed architecture is meaningful, it is useful to view it through practical scenarios. The following examples show how different user groups would move through the platform and what value the guidance layer adds.

Table 2: Representative user scenarios supported by the platform

User	Objective	Typical pathway	Expected output
City planner	Design a viable PCED concept	Repository → business model assembler → MCDA → CBA tool	Prioritised concept, stakeholder logic and preliminary financing route
Technical expert	Monitor and optimise implementation	Monitoring system → KPI engine → city model / MCDA → knowledge feedback loop	Performance insight, scenario comparison and recommended actions
Investor / financial advisor	Assess project maturity and financing fit	City page → solution evidence → KPI view → CBA logic	Structured view of risk, performance and investment readiness

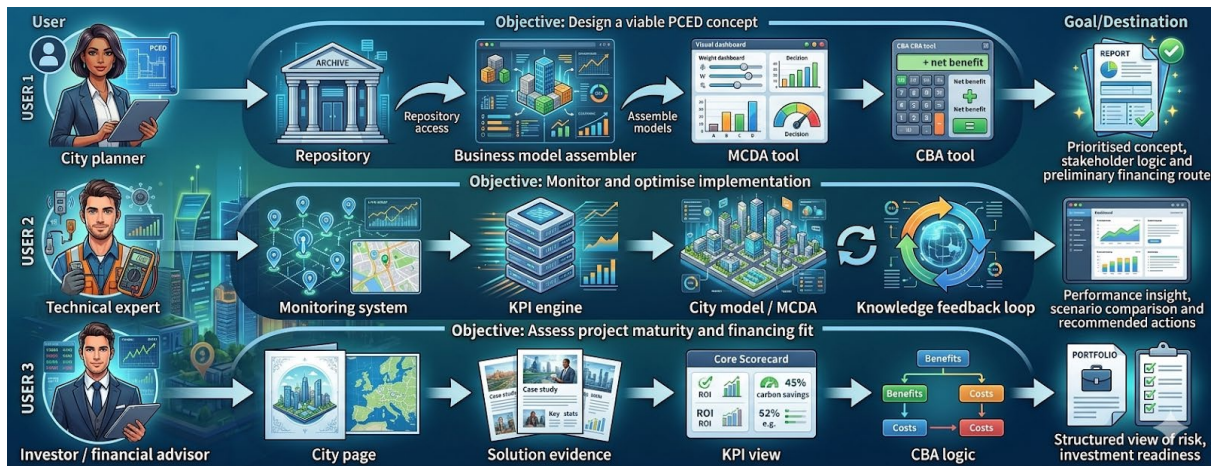


Figure 10: Illustrative user journeys (Nano Banana generated)

7.1 Scenario 1: City planner designing a PCED

A city planner / municipal project manager **enters through the goal 'plan a district'**. At **DEFINE** or **GET INSPIRED**, the platform first presents relevant case studies, repository entries and policy context to help frame the problem. It then routes the user to the PCED Business Model Assembler to structure stakeholders, value logic and responsibilities. From there, MCDA supports scenario comparison, while the planned CBA Matching Tool helps the user think through financing options and project maturity. The result is not only inspiration but a more structured concept pathway.

7.2 Scenario 2: Technical expert supporting deployment of a PCED

A project manager /technical expert working in implementation **needs access to monitoring data, KPI calculations and scenario logic**. Entering at **DEPLOY**, the user should see monitoring systems, KPI views and links to model-based analysis. The expert can then feed insights back into knowledge assets such as case studies or lessons learned, strengthening the platform's feedback loop between implementation and replication.

7.3 Scenario 3: Investor assessing maturity of a PCED

A finance-oriented user (investor or a financial director) **needs clear evidence, ideally financial data**. The platform allows this user to review the project context, see solution evidence, inspect KPIs where available and understand how financing logic is being approached. The value of the platform in this scenario is comparability and structure: instead of receiving fragmented project information, the user sees a standardised path from technical concept to performance indicators and financing fit.

8 Individual tools description

8.1 State of the Art Repository

8.1.1 Description

The State-of-the-Art Repository / Six Solution Packages is built on the results of the deliverable D5.1 (State of the Art Assessment) and serves as a centralized hub for collecting, organizing, and disseminating the state of the art solutions, technologies, and methodologies relevant to the ASCEND project. It is designed to facilitate easy access to up-to-date information, fostering collaboration and knowledge sharing between Lighthouse and Multipliers cities and enabling deeper learning.

The following **functionalities** are built into it:

- **Individual Solution view:** You can view in-depth information about each of the solutions in the six analysed Solutions Packages of ASCEND.
- **Extended View:** Each of the solutions is directly linked to the city where it was implemented for extended information about the whole PCED built. Equally, each solution is linked to its taxonomy topic, therefore providing an extended view of all solutions under a given topic.
- **Modular Architecture:** Each component operates independently but is seamlessly integrated and re-linked with the website, allowing for scalability and easy updates.
- **Categorization and Tagging:** Solutions are organized according to the city in which they are implemented or according to thematic categories with descriptive tags for intuitive navigation.
- **Resource Download and Export:** Users can download the Solution Packages or the full report in the PDF format.

Who is it primarily for?

- **Cities, technical experts, external initiatives**
- **ASCEND partners**

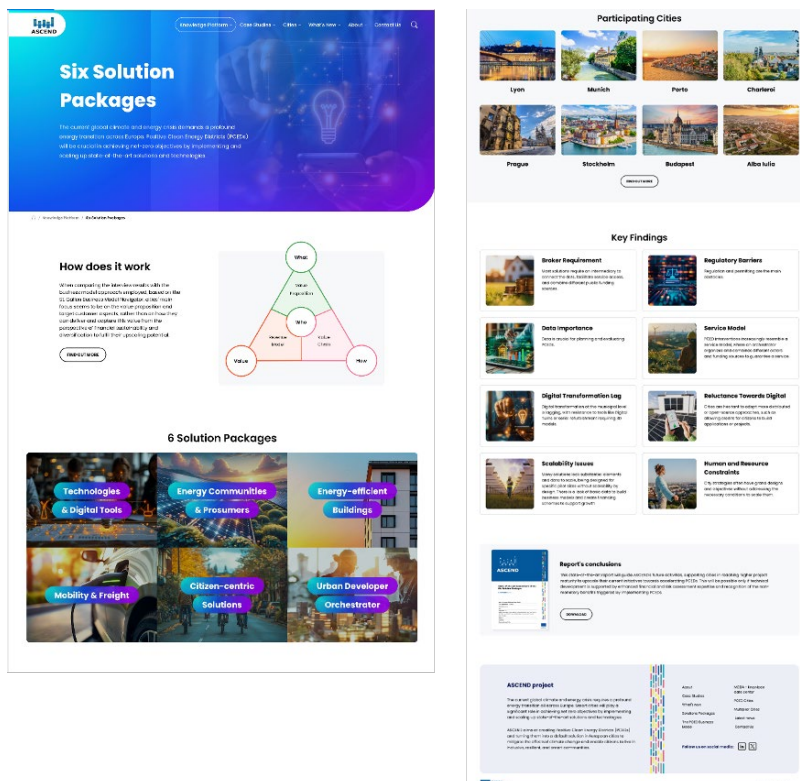


Figure 11: State of the Art Repository

8.1.2 State of the Art Repository user journey

- **Accessing the Repository:** Upon logging into the ASCEND platform, the user selects the State-of-the-Art Repository from the main Knowledge Platform menu or from the top menu.
- **Searching for Knowledge:** The user selects a solution package or a city, such as "Lyon Confluence" and applies relevant filters.
- **Reviewing Search Results:** A list of matching solution packages appears, each with a brief summary.
- **Viewing a Resource:** Clicking on a solution package brings us to a more detailed page listing all the details of the solution.
- **Downloading:** The user downloads individual solution package or the full report.

State-of-the-Art

Based on the systematic literature review and the empirical data collected, this section presents an overview of state-of-the-art business models that could be identified for SPI. Different technologies and digital tools, funding mechanisms, procurement procedures and governance models are allocated to each of these models identified to show how they could be combined in the context of the different business models. Moreover, highlights from concrete state-of-the-art examples from ASCEND's lighthouse and multiplier cities are presented including a short description and analysis of the elements that make them state-of-the-art solutions

- Business Models Overview
- Subscription-Based Platforms
- Facility Management
- Traffic Management & Optimization
- Real Estate Development
- Predictive Maintenance
- Tourism Models
- Public Information
- Virtual Power Plant (VPP)
- State-of-the-Art Implementation Examples
- Baseline Assessment of Cost-Effectiveness
- Scaling Drivers & Barriers

Subscription-Based Platforms

Description

- Platforms offering cloud-based services for managing digital twins or data-based models provide clients with sophisticated tools for urban planning and management.
- The primary revenue models for these platforms are subscription-based, significantly reducing initial investment costs for users while ensuring steady income for service providers.
- Additional monetization strategies include leveraging collected datasets for analytics purposes (with user consent) and introducing targeted advertising visible to platform users.

Benefits

- The subscription-based approach simplifies the process of finding and comparing service providers, enhancing market transparency and competition.
- By creating digital replicas of urban districts, these platforms enable planners and decision-makers to simulate various scenarios, such as traffic flow and energy consumption, to optimize processes for greater efficiency.

Governance and Procurement

- These platforms can be managed internally by a city's IT department, a public company, or procured from private companies and subsequently hosted by the city.
- Typical procurement procedures for these platforms include Request for Proposals (RFP), Request for Information (RFI), Competitive Contracting Procedure (CCPU), and Competitive Procurement Requests (CCPR).

Conclusion

This comprehensive overview demonstrates how various digital tools and technologies can be integrated into different business models, each offering unique benefits and monetization strategies while optimizing urban management and services.

Figure 12: State of the Art Repository details

8.2 PCED Business Model Assembler

8.2.1 Description

The PCED Business Model Assembler / PCED Card Game is an interactive tool that assists users in creating and visualizing customized business models for the selection solution in their city. Inspired by the **Business Model Canvas**, it uses the **adjusted City Business Model Canvas**, that enables cities to map out business strategies effectively.

Functionalities

- **Board Game-Like:** Offers a playing “board” as well as a Business Model Canvas, providing a variety of guidance questions and card templates to kickstart the modeling process.
- **Card Selection:** Offers a step-by-step workflow of selecting cards, including examples and guidance questions to help create and describe the prototype to kickstart the modeling process.
- **Tick-box Interface:** Users can easily click (select or remove) cards they wish to use for their business model.
- **Custom Component Creation:** Allows users to define new prototypes / solutions tailored to their unique business needs.
- **Export Options:** Models can be downloaded in multiple formats (e.g. PDF) for presentations or offline use.

Who is it primarily for?

- **City cross-department teams, municipality workers and technical experts**
- **Academia**

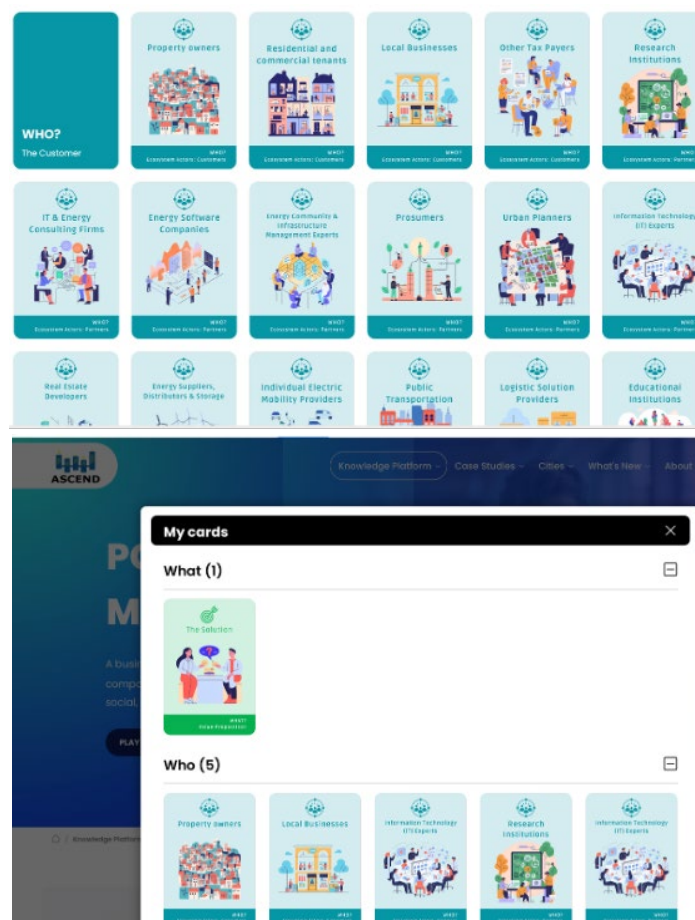


Figure 13: PCED Business Assembler

8.2.2 PCED Business Assembler user journey

- **Launching the Assembler:** The user navigates to the Business Model Assembler via the Knowledge Platform dashboard or the website's top menu.
- **Following the Workflow:** The user is answering the questions of the business model building sequence, while navigating through the platform.

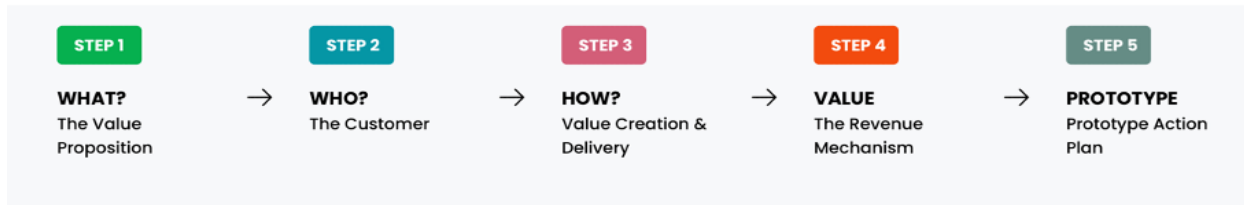


Figure 14: PCED Business Model Assembler online user journey

- **Selecting a Card:** The user chooses a card that best fits the solution/ prototype scope that the user has in mind.
- **Building the Model:** Uses the selection interface to populate the model with predefined or custom cards.
- **Customising the Model:** The user has a text box for further input, details and clarifications.
- **Finalizing the Model:** Reviews the model for completeness and saves it or sends to his or others' email.
- **Exporting:** Exports the finalized model for sharing with colleagues, partners, stakeholders.

8.3 MCDA analysis tool

8.3.1 Description

The Multicriteria Decision Analysis (MCDA) Tool is an interactive decision-support tool that enables cities to evaluate and prioritise different PCED design options based on multiple criteria, including cost, emissions, and energy performance.

Integrated with the City Energy Analyst (CEA), it supports data-driven decision-making by structuring trade-offs between competing objectives and identifying optimal energy system configurations.

Functionalities

- **Scenario-Based Analysis:** Enables the comparison of multiple district design scenarios with different technology combinations and system configurations.
- **Multi-Criteria Evaluation:** Supports the assessment of options based on key criteria such as capital costs, operational costs, and emissions.
- **Weighting Mechanism:** Allows users to assign weights to different criteria to reflect strategic priorities and policy objectives.
- **Optimisation Engine:** Identifies optimal solutions using simulation and optimisation (e.g. Pareto front analysis of cost vs. emissions).
- **Integrated Simulation (CEA):** Generates required input data (energy demand, renewable potential, costs, emissions) through embedded modelling capabilities.
- **Results Visualisation and Export:** Provides dashboards and downloadable outputs for comparison, reporting, and further analysis.

Who is it primarily for?

- **Cities stakeholders** (Urban planners, energy consultants, municipalities, researchers, and engineers involved in sustainable urban energy planning and design) **involved in evaluating and assessing different design options for PCEDs**

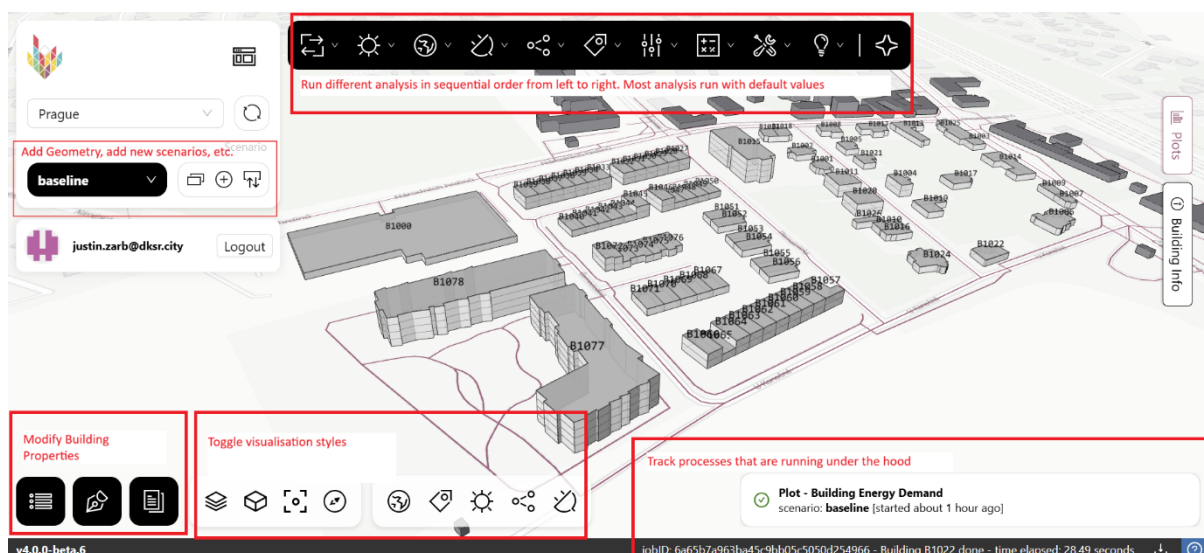


Figure 15: The main CEA interface

8.3.2 MCDA user journey

- **Accessing the Tool:** The user accesses the MCDA tool via the KPI Engine environment and would be able to access it also via the Knowledge Platform.
- **Defining the Scenario:** The user inputs or selects district parameters, including building data, technologies, and system configurations.
- **Running Simulations:** The tool generates performance data (energy demand, costs, emissions) for multiple design scenarios.
- **Applying Criteria and Weights:** The user defines evaluation criteria and assigns weights based on priorities.
- **Comparing Options:** The tool visualises trade-offs (e.g. cost vs. emissions) and presents optimised solution sets.
- **Selecting the Preferred Solution:** The user selects the most suitable option based on weighted outcomes.
- **Exporting Results:** Results are exported or shared for decision-making, reporting, or integration with other tools (e.g. CBA).

8.4 CBA analysis tool

8.4.1 Description

The Cost-Benefit Analysis (CBA) Tool is an interactive decision-support tool that enables cities to assess the economic, environmental, and social impacts of PCED solutions and determine their financial viability and investment readiness.

It supports informed decision-making by evaluating costs, benefits, and risks, and by identifying suitable financing strategies to enhance the bankability of projects.

Functionalities:

- **Economic Assessment:** Evaluates financial performance through key indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Time.
- **Non-Monetary Impact Analysis:** Assesses environmental, social, and governance impacts, including emissions reduction, stakeholder engagement, and societal benefits.
- **Risk Identification:** Identifies and evaluates potential risks that may affect project feasibility and success.
- **Financing Strategy Support:** Recommends suitable financing instruments and funding approaches based on project characteristics.
- **Project Maturity Assessment:** Determines the readiness and bankability of solutions for external investment.
- **Integration:** Aligns with the PCED Business Model Assembler to link financial analysis with governance and operational structures as well as with the MCDA Analysis Tool.

Who is it primarily for?

- **City representatives involved in the economic-financial planning of projects** (decision maker, project manager or technical expert) **who want to test the maturity vis-à-vis investors' readiness and receive suggestions for suitable financing instruments.**

8.4.2 CBA user journey

- **Accessing the Tool:** The user accesses the CBA tool via a dedicated interface (and would also be able to via the Knowledge Platform).
- **Defining the Project:** The user inputs project data, including technical, financial, and contextual parameters.
- **Calculating Economic Indicators:** The tool generates financial metrics (e.g. NPV, IRR, Payback Time) based on project assumptions.
- **Assessing Non-Monetary Impacts:** The user evaluates environmental, social, and governance benefits.
- **Identifying Risks:** The tool supports the identification and qualitative assessment of key risks.
- **Exploring Financing Options:** The tool suggests relevant financing instruments and funding structures.
- **Evaluating Project Maturity:** The user reviews the project's readiness for investment and replication.
- **Exporting Results:** Results are visualised for improved overview or downloaded for reporting, stakeholder communication, or integration with other tools.

8.5 KPI Engine

8.5.1 Description

The KPI Engine is an **ICT-based monitoring infrastructure** designed to gather, process, and analyse data from multiple sources in order to calculate predefined KPIs for PCEDs.

Within the ASCEND Knowledge Platform, it serves as a core performance monitoring and evaluation component, enabling cities and stakeholders to assess the effectiveness of implemented solutions, track progress over time, and generate evidence on the impact of interventions.

The tool is designed to support data-driven decision-making by transforming fragmented datasets into structured insights that can inform planning, implementation, and scaling of PCED strategies.

Functionalities:

The following functionalities are built into it:

- **Data Integration and Processing:** Aggregates data from multiple heterogeneous sources, ensuring consistent structuring and preparation of inputs for KPI calculation.
- **KPI Calculation Engine:** Computes predefined indicators related to energy performance, emissions, system efficiency, and other PCED-relevant metrics, enabling standardised evaluation across cities.
- **Dashboard Visualisation:** Translates complex datasets into interactive visual outputs (e.g. dashboards, charts), allowing users to easily interpret performance and trends.
- **Progress Tracking and Benchmarking:** Enables continuous monitoring of implementation progress and comparison of impacts across solutions, districts, or cities.
- **Reporting and Output Generation:** Produces visual and data outputs that can be used for reporting, communication, and stakeholder engagement.

Who is it primarily for?

- **PCED administrators, city representatives, ASCEND stakeholders**

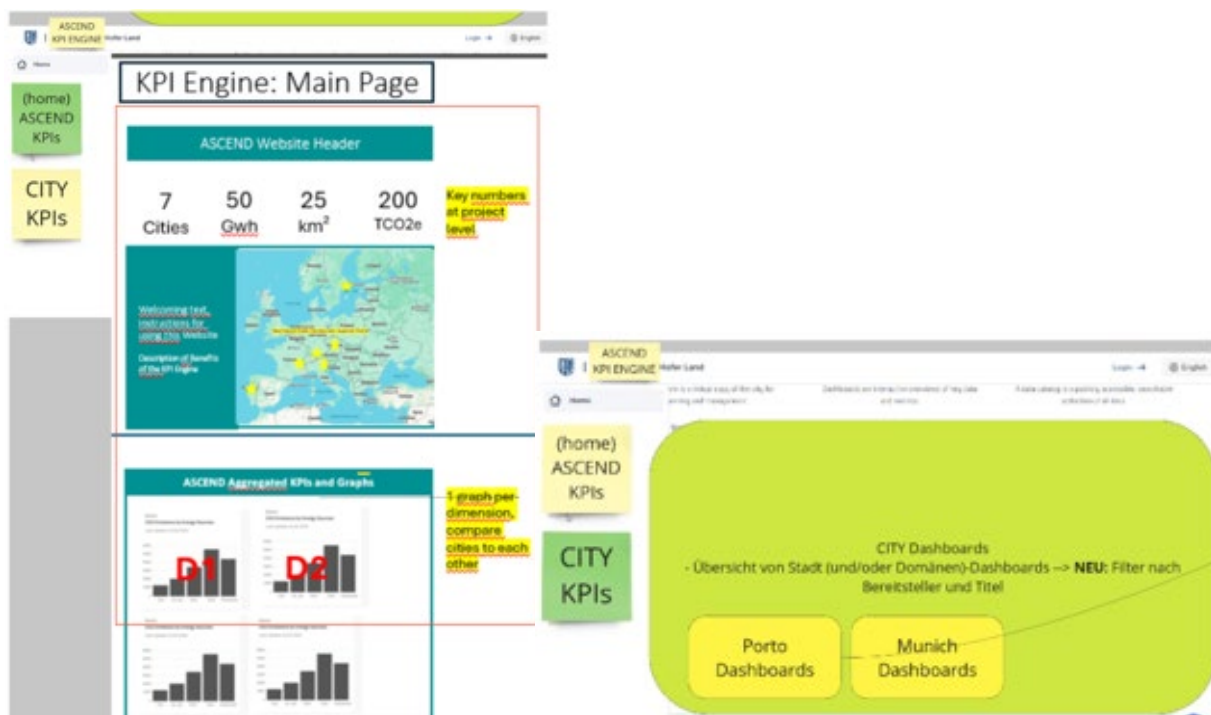


Figure 16:KPI Engine visualisation dashboard

8.5.2 KPI Engine User Journey

- **Accessing the Tool:** The user accesses the KPI Engine directly via its dedicated interface and would be able to also via the Knowledge Platform.
- **Integrating Data Sources:** The user connects or uploads relevant datasets from different systems or monitoring sources.
- **Processing and Calculation:** The system processes the data and automatically calculates predefined KPIs.
- **Exploring Results:** The user reviews results through dashboards and visualisations, analysing performance and trends.
- **Comparing and Interpreting Impact:** The user compares results across interventions or time periods to assess effectiveness.
- **Using Outputs for Decision-Making:** The user exports or applies insights to support reporting, strategic planning, and optimisation of PCED solutions.

8.6 Local Transitions Learning Centre

8.6.1 Description

The Local Transitions Learning Centre (LTLC) is an open-access learning platform providing structured courses and knowledge resources to support cities in addressing energy and climate challenges. Within the ASCEND Knowledge Platform, the LTLC serves as a capacity-building and knowledge transfer hub, enabling municipalities, practitioners, and project partners to access curated learning content, participate in Communities of Practice, and strengthen their ability to design, implement, and scale urban transition solutions.

The platform is designed to facilitate continuous learning, support peer exchange, and ensure that knowledge generated within ASCEND and beyond is accessible, actionable, and scalable.

Functionalities:

- **Course Access and Learning Modules:** Provides open access to a range of structured courses addressing key urban challenges related to the energy transition and climate neutrality, enabling users to build relevant knowledge and skills.
- **Communities of Practice Integration:** Enables users to participate in CoP sessions, fostering peer-to-peer exchange, discussion, and collaborative learning across cities and stakeholders.
- **Resource Repository:** Offers continuous access to materials linked to CoPs and courses, including documents, recordings, and supporting resources, ensuring knowledge can be revisited and reused over time.
- **Centralised Learning Environment:** Aggregates courses, live sessions, and related materials within a single interface, reducing fragmentation and facilitating intuitive navigation across learning content.

Who is it primarily for?

- Municipalities / local and regional agencies / consultants working with cities / academics
- All ASCEND Solution Packages' members

Local governance

Setting up participatory processes to transform local ecosystems



Demand-side solutions to energy shortages

Demand-side instruments to reduce final energy consumption in the EU are key to securing the EU's energy supply, alongside the diversification of the energy supply and energy efficiency improvements.

15 min



EU City Facility's learning programme

This learning programme developed by the European City Facility is designed to provide you with the essential skills and knowledge needed to create a thorough plan for effectively implementing and funding your sustainable energy projects.

15 min



#1, Construire des scénarios basés sur des données pour la neutralité climatique des villes

Dans ce cours, vous apprendrez comment les villes conçoivent leurs voies vers la neutralité climatique en utilisant des outils d'élaboration de scénarios tels que le Calculateur de villes de l'UE, et quelles sont les compétences et aptitudes nécessaires pour tirer le meilleur parti de cet outil.

15 min



#1, Costruire scenari basati sui dati per la neutralità climatica delle città

In questo corso imparerete come le città progettano i loro percorsi verso la neutralità climatica utilizzando strumenti di creazione di scenari come l'EU City Calculator, e quali sono le competenze e le abilità necessarie per tirare il meglio da questo strumento.

15 min

Fossil free cities

Diversifying local renewable energy sources, strengthening public energy services and improving energy efficiency



SP1: Digital infrastructures and ICT tools to support flexible energy systems and PCED

With Solution Package 1, ASCEND cities will employ advanced digital tools, such as digital twins, to design and replicate PCEDs, as well as create a digital infrastructure and interface for energy communities.

15 min



SP2: Deployment of Energy Communities & Prosumers

Welcome to the ASCEND's Community of Practice on Deployment of Energy Communities and Prosumers! This course provides a dedicated platform for practitioners and implementers from the 8 ASCEND Cities, focusing on Solution Package 2.

15 min



SP3: Energy-efficient buildings integrating RES, storage and frugal solutions

With solution Package 3, ASCEND will target existing and new buildings, using advanced technologies and building solutions to reduce their energy needs, integrate RES to produce heat and electricity, implement heat and electricity storage systems, and collect rainwater for reuse.

15 min



SP4: Decarbonization of mobility and freight logistics, including frugal solutions

ASCEND's mobility approach not only leads to a decrease in carbon emissions, but it will improve living conditions, reduce cost, noise and pollution. In embracing clean mobility, ASCEND's vision extends beyond transportation to encompass the broader goal of enhancing the overall quality of life within Positive Clean Energy Districts.

15 min

Community energy

Increasing cities' locally-owned renewable energy production



Espresso Train-the-trainer

The EU Espresso course is successfully running since 2023. As community energy knowledge needs to spread across European municipalities, we appreciate you decided to learn how to translate and adapt.



Curs Espresso de Energie Comunitară

Îți dorești să fi o administrație locală proactivă și implicată, dar nu știi de unde să încep? Ținem că ai găsit timpul și că înțelegem așadar nevoia urgentă. De aceea, am conceput acest curs e-learning auto-didactic.



Espresso 2025 EU training

You wish you'd be one of those proactive and supportive local governments, but you don't know where to start? We know you have little time and always urgent things coming in.



Espresso 2025_Hrvatski

Maui, snadno koristit energije - to je poput espresso! Kroz naše materije, ali snadno dion energije koje vam daju energiju za djelovanje. Bilo kao što kulinarske kuhinje imaju, ovaj tečaj je e-learning tečaj potpuno će vam pomoći i naučiti sve o

Figure 17: Local Transition Learning Centre

8.6.2 LTLC user journey

- **Accessing the Knowledge and Learning Materials:** The user accesses the LTLC via the ASCEND Knowledge Platform or directly through the learning interface.
- **Exploring Learning Opportunities:** The user browses available courses or Communities of Practice, selecting topics aligned with their needs (e.g. energy communities, governance, financing).
- **Participating in Learning Activities:** The user attends live CoP sessions or follows self-paced courses, engaging with content and peer discussions.
- **Accessing Supporting Resources:** The user retrieves related materials, including documents and recordings, to deepen understanding or support implementation activities.
- **Applying Knowledge:** The user applies acquired insights to real-world projects, supporting decision-making, project development, and scaling of solutions.

8.7 PCED GPT

8.7.1 Description

The PCED GPT will be a PCED-themed, AI-powered knowledge assistant designed to provide on-demand access to expertise on smart city solutions and the development of Positive Clean Energy Districts.

Within the ASCEND Knowledge Platform, it will function as an **interactive decision-support and knowledge access layer**, enabling users to query knowledge about the project solutions, case studies, and methodologies in a conversational format. It supports users in understanding, analysing, and adapting solutions to their local context.

The tool will be designed to enhance accessibility of complex information, facilitate rapid knowledge retrieval, and support informed decision-making across planning, implementation, and scaling phases.

It is foreseen to have the following functionalities:

- **Conversational Knowledge Access:** Provides users with in-depth, context-specific answers to questions related to PCED design, implementation, and optimisation, based on curated project knowledge and case studies.
- **Solution Analysis and Contextualisation:** Supports users in assessing the relevance and applicability of specific solutions within their local context, including identification of constraints, opportunities, and key success factors.
- **Scenario Exploration and Comparison:** Enables users to explore alternative approaches, compare solutions, and assess potential benefits and trade-offs to support strategic decision-making.
- **Guidance on Implementation Considerations:** Highlights critical aspects to consider during planning and deployment, including risks, dependencies, and operational requirements.

8.7.2 PCED GPT user journey

- **Accessing the Tool:** The user will access the PCED GPT via the ASCEND Knowledge Platform.
- **Formulating a Query:** The user will submit a question related to a specific solution, challenge, or implementation context.
- **Receiving Contextualised Insights:** The GPT will provide a structured, evidence-informed response based on available knowledge and case studies.
- **Exploring Options:** The user will be able to refine queries to compare solutions, assess feasibility, and explore alternative approaches.
- **Applying Insights to Decision-Making:** The user will use the generated insights to support planning, strategy development, or implementation decisions.

Timeline: The PCED GPT will be developed throughout 2026 and fed with available data, use cases and solutions.

9 Functional and technical requirements

9.1 Core functional requirements

The platform provides a central tool catalogue, a structured knowledge repository, related-content logic, city and solution pages, guidance prompts, content management workflows and usage analytics. The Platform will provide a strong search and faceted filtering.

Content and taxonomy requirements

A controlled taxonomy is the backbone of the platform. Without it, the same solution could appear under different names, tools could not be cross-linked consistently, and search would become unreliable. At minimum, the taxonomy covers cities, solution packages categories, content types and technologies. In the extended search, it could also include stakeholder groups, lifecycle phases, work packages, and integration modes.

9.2 Technical requirements

The technical architecture remains modular and combines native incorporation, embedding, and API-enabled incorporate. Hosting is secure and EU-based. Performance matters because the platform should remain usable even when media-rich content, dashboards and data-driven pages are introduced. Based on the requirements of each tool and their users, a suitable hosting and integration are applied.

UX, accessibility and compliance

The platform is responsive across devices and aligned with accessibility good practice, WCAG 2.1 AA. GDPR compliance is required whenever personal data is processed through forms, newsletter sign-up or user registration. Consent, transparency and data minimisation are designed into the platform, especially when it comes to the built-in tools (PCED Business Model Assembler, State of the Art Repository).

10 Governance, analytics and sustainability

10.1 Content governance

The biggest operational risk for a platform of this kind is not only technical fragmentation but content chaos. Therefore, the WP8 and WP5 are jointly managing the integration of the tools into the platform, each partner being responsible for “their tool”. Decentralised content contribution is possible, but it only works if the metadata model and editorial workflow are centrally managed.

10.2 Analytics and monitoring

Analytics supports both reporting and product improvement. The platform should track page views, downloads, search queries, tool click-throughs, journey entry points and engagement with priority assets. These metrics help answer whether the platform is merely visited or whether it is actually used as an operational support environment.

10.3 Sustainability logic

Many EU platforms lose value after the end of the project because they are designed as dissemination shells rather than long-term systems. ASCEND is working explicitly to avoid that outcome. Sustainability depends on a portable content model, low lock-in architecture, clear maintenance ownership and a platform concept that can be reused or extended by future projects, city networks or external stakeholders.

11 Conclusions and next steps

The ASCEND Knowledge Platform is developed as a guided transformation environment rather than a simple repository or dissemination site. The project already has the ingredients of a strong ecosystem: useful planning tools, promising data and monitoring assets, knowledge resources and learning channels. The task now is to finalise the integration of the tools and to connect them through a coherent architecture and user logic.