

# Bilateral Mapping of Solar, Green Tech and Innovation Ecosystems in Romania and Morocco

(Preparatory Phase – Activity A1)



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## Summary

The mapping presented in this report was carried out during Months 1–2 of the project, corresponding to the Preparatory Phase, with the objective of establishing a comprehensive understanding of the innovation ecosystems in Romania and Morocco in the fields of solar energy, green technologies, industrial decarbonisation, and digitalisation, including AI-based solutions. The analysis provides a structured overview of key actors, value chains, and complementarities, and lays the analytical groundwork for subsequent project activities focused on targeted engagement, matchmaking, and joint initiative development.

The development of green technologies, renewable energy solutions, and digital innovation in both Romania and Morocco takes place within dynamic and rapidly evolving markets shaped by strong policy commitments to decarbonisation and industrial modernisation. Romania operates within the EU regulatory and financial framework, which accelerates investments in solar, energy efficiency, digitalisation, industrial decarbonisation, and energy system modernisation. Its mature renewable energy sector, combined with one of Europe's strongest ICT industries, creates favourable conditions for deploying AI-enabled optimisation tools and cleantech solutions at scale. Morocco, by contrast, is experiencing accelerated growth in solar and wind energy, supported by national flagship programmes such as the Moroccan Solar Plan and emerging strategies for green hydrogen. The country's industrial sectors are increasingly seeking modernisation pathways, which expands demand for cleantech, energy-efficiency technologies, storage solutions, and digital tools. Together, these two markets offer complementary strengths—Romania's digital and research capabilities and Morocco's large-scale renewable deployment and strategic green-energy ambitions—creating a solid foundation for joint value chain development and cross-border innovation.

The ecosystem mapping undertaken in Activity A1 provides a structured overview of organisations active in solar energy, green technologies, cleantech solutions, industrial decarbonisation, and AI-driven digitalisation in Romania and Morocco. The mapping combines desk research, sectoral databases, national innovation registries, cluster directories, and expert validation carried out by the project partners, ICONIC Cluster and Cluster EnR.

As a result of this process, a bilateral database of more than 130 organisations was developed, including 106 actors identified in Romania and a complementary set of actors within the Moroccan Cluster EnR ecosystem. In parallel, a targeted stakeholder survey involving 32 organisations was conducted to identify technological priorities, innovation barriers, and collaboration interests across both ecosystems.

Using this combined dataset and a structured classification framework, actors were positioned across the entire value chain—from upstream suppliers and integrators to solution providers,



industrial end-users, research institutions, innovation support organisations, investors, and regulatory bodies—creating key inputs for the stakeholder matrix to be developed under Activity A3.

The mapping highlights that Romania and Morocco form a highly complementary ecosystem with distinct but mutually reinforcing strengths. Romania’s landscape is characterised by experienced renewable-energy integrators, large-scale operators, and a strong ICT sector that enables advanced AI-based optimisation and digital industrial solutions. The Romanian ecosystem mapping identified 106 organisations operating across renewable energy, digital technologies, industrial sectors, finance, and research, illustrating the presence of a diversified and mature innovation ecosystem. Its diverse industrial base—automotive, steel, construction materials, FMCG, and logistics — creates substantial demand for decarbonisation technologies and large-scale deployment of cleantech and storage solutions. Research institutions such as UPB, UTCN, TUIASI, INCDTIM, ICPE-CA, and ICSI provide strong scientific capacity, particularly in hydrogen, materials science, and digital modelling.

Morocco complements these capabilities through its large-scale solar infrastructure, emerging hydrogen strategies, and coordinated green-energy ecosystem anchored by Cluster EnR. Moroccan EPC firms, solution providers, and industrial actors exhibit strong adoption potential for solar, storage, and energy-efficiency technologies. Supportive national strategies, investment programmes, and innovation agencies further strengthen Morocco’s readiness for technology transfer and cross-border cooperation, especially in areas such as green hydrogen, solar manufacturing, and industrial decarbonisation. The Moroccan ecosystem is strongly structured around Cluster EnR and national renewable energy initiatives, creating an organised environment for collaboration between industry, research institutions, and innovation intermediaries.

Despite these strengths, the mapping also identified several systemic gaps that currently limit the emergence of robust cross-border value chains. Digitalisation remains insufficiently embedded in industrial decarbonisation efforts in both countries, with AI-based optimisation and predictive analytics not yet widely applied to energy management or emissions reduction. The two ecosystems also lack a mature base of energy-storage integrators capable of supporting large-scale solar deployment, which constrains grid flexibility and renewable energy penetration. Hydrogen technologies remain at an early stage in both ecosystems, with limited integrators, testing facilities, or demonstration platforms, despite Morocco’s strong policy ambitions and Romania’s scientific expertise. Access to innovation finance—particularly for SMEs and startups—also remains fragmented, slowing the pace of cleantech adoption and pilot deployment. Finally, the absence of shared testing, prototyping, and validation infrastructures in both regions restricts technology transfer and limits opportunities for joint experimentation and real-environment demonstration. These findings are consistent with the results of the stakeholder survey conducted within the project, where respondents frequently highlighted



limited access to advanced technologies, insufficient pilot infrastructure, regulatory complexity, and difficulties accessing innovation funding as key barriers to innovation and international collaboration.

The value chain analysis identified eight interconnected layers: (1) upstream suppliers, (2) integrators and EPC firms, (3) cleantech and renewable solution providers, (4) digital and AI actors, (5) industrial end-users, (6) R&D institutions, (7) innovation support organisations, and (8) finance and policy actors. The presence of actors across all these layers demonstrates that the combined Romania–Morocco ecosystem has the structural capacity to support the development of complete cross-border innovation value chains. This structure clarifies where complementarities arise and where bilateral cooperation can have the greatest impact—for example, Romania’s digital and AI strengths can reinforce Morocco’s renewable-energy and hydrogen ambitions, while Morocco’s large-scale solar and industrial modernisation efforts create opportunities for Romanian integrators, solution providers, and R&D partners.

These complementarities translate into clear synergies for future collaboration: joint EPC and renewable deployment projects; AI-enhanced energy management and optimisation systems; industrial decarbonisation pilots; cleantech and circular-economy solutions; green hydrogen research and feasibility studies; and coordinated cluster-to-cluster initiatives that strengthen innovation ecosystems on both sides. Survey responses confirm strong interest from organisations in joint R&D projects, pilot demonstrations, technology transfer, and commercial partnerships aimed at accessing EU and MENA markets. Together, these findings confirm that Activity A1 has successfully delivered its expected outcomes: a bilateral database, a comprehensive mapping of the ecosystem and value chains, and the identification of cooperation opportunities. This analytical foundation will guide the prioritisation of stakeholders for further engagement, inform the stakeholder matrix and matchmaking agenda (Activity A3), and support the development of concrete joint innovation initiatives and pilot collaborations in the next phases of the project.

## **Market context: Romania and Morocco in the green technology and digitalisation landscape**

The development of sustainable energy systems, green technologies, and AI-enabled industrial solutions in Romania and Morocco takes place within two rapidly evolving national markets that share several structural drivers but also reflect distinct development trajectories. Understanding the economic, technological, and policy contexts of the two countries is essential for situating the results of Activity A1 and for identifying where complementarities and cross-border value chains can emerge. The ecosystem mapping conducted within the project confirms that both



markets host a growing number of actors across renewable energy, digitalisation, and cleantech value chains, creating favourable conditions for bilateral cooperation and the development of cross-border innovation partnerships.

Romania has undergone a significant transformation of its energy and industrial sectors over the past decade, driven by EU climate objectives, the European Green Deal, and large-scale investment programmes such as the Recovery and Resilience Facility. The country has established itself as a regional player in renewable energy, particularly wind and solar, supported by an ecosystem of mature EPC integrators, technology solution providers, and digital innovation firms. The ecosystem mapping conducted within Activity A1 identified 106 organisations operating across renewable energy, digital technologies, industrial sectors, research institutions, and financial actors, illustrating the breadth of Romania’s green technology innovation landscape.

Romania’s ICT sector—one of the strongest in Eastern Europe—plays an increasingly central role in energy digitalisation through AI-based optimisation, predictive maintenance, and data-driven energy management. The Romanian industrial base remains energy-intensive, with major clusters in automotive, steel, cement, construction materials, FMCG, and logistics. This creates strong market demand for decarbonisation technologies, energy-efficiency solutions, storage systems, and digital integration. At the same time, Romania’s research and innovation ecosystem, including universities and national R&D institutes, provides robust scientific capabilities in hydrogen technologies, cleantech, materials science, and automation, which reinforce the country’s potential for applied research and pilot-scale experimentation.

Morocco is recognised as one of Africa’s leaders in renewable energy development, with ambitious national strategies aimed at achieving energy diversification, increasing solar and wind capacity, and enabling long-term development of green hydrogen. The Moroccan innovation ecosystem is strongly supported by national agencies and cluster initiatives such as Cluster EnR, which facilitate collaboration between industry, research organisations, and innovation intermediaries. The Moroccan Solar Plan and associated investments have positioned the country at the forefront of large-scale solar deployment, creating a dynamic ecosystem of EPC contractors, technology providers, and industrial adopters. In parallel, the country’s emerging hydrogen roadmap reflects a strategic commitment to becoming a green hydrogen exporter, supported by strong governmental coordination and a favourable policy framework. Morocco’s industrial sectors—including phosphates, agri-food, automotive assembly, textiles, and logistics—are undergoing modernisation and increasingly seek energy-efficiency and cleantech solutions. Innovation agencies, clusters such as Cluster EnR, and government-backed initiatives play a central role in structuring collaboration between firms, research institutions, and investors, facilitating the uptake of cleantech and the development of green industrial solutions. While Morocco’s digitalisation in energy systems is progressing, the deployment of advanced digital tools such as AI-driven energy optimisation, smart-grid



analytics, and predictive maintenance solutions represents an important opportunity for collaboration with European technology providers.

The stakeholder survey conducted within the project further confirms these market dynamics. Respondents highlighted renewable energy technologies, energy storage, AI-based optimisation, and industrial energy efficiency solutions as priority areas for innovation and cross-border collaboration. At the same time, organisations identified barriers related to technology integration, regulatory complexity, and access to funding, reinforcing the need for structured cross-border cooperation mechanisms.

Taken together, Romania and Morocco represent two synergistic markets undergoing profound transitions toward decarbonisation, digital modernisation, and green industrial development. Romania's strengths in digital technologies, research, and industrial innovation complement Morocco's large-scale renewable deployment, hydrogen ambitions, and coordinated green-energy ecosystem. This complementarity creates favourable conditions for the emergence of Euro-Mediterranean value chains combining Romanian technological capabilities with Morocco's large-scale renewable energy deployment and industrial transformation needs.

The mapping results presented in the following sections build on this market foundation and illustrate how bilateral collaboration can generate meaningful technological, industrial and innovation impact.

## Cluster members' needs and relevance of the ecosystem mapping

The ecosystem mapping carried out under Activity A1 directly responds to the needs identified among cluster members and ecosystem stakeholders in both Romania and Morocco. These needs were identified through ecosystem analysis, consultations with cluster representatives, and the stakeholder survey conducted within the project. The mapping translates market context and structural gaps into actionable intelligence that supports collaboration, matchmaking, and the development of joint innovation initiatives.

For members of the **ICONIC Cluster**, the primary needs relate to expanding access to international markets, identifying opportunities for technology transfer and deployment in emerging renewable energy ecosystems, and participating in pilot and demonstration projects with international partners. In addition, many members express a strong need to scale digital and AI-enabled solutions beyond the domestic market, particularly in the context of energy optimisation, smart grids, and industrial decarbonisation. These needs reflect the strong



technological orientation of the Romanian ecosystem, particularly in digitalisation, AI-based optimisation, and industrial innovation.

For **Cluster EnR members**, the key needs include access to advanced digital and AI-based solutions that support renewable energy integration, grid optimisation, and industrial modernisation, collaboration with experienced European integrators and solution providers, and participation in applied research, pilot projects, and pre-commercial demonstrations. EnR members also seek structured pathways to facilitate technology transfer, build bankable project pipelines, and improve access to European innovation networks and financing instruments.

By identifying and classifying actors across the value chain, the mapping exercise enables the prioritisation of relevant stakeholders and supports the design of targeted matchmaking and collaboration activities. It also helps identify potential partners for joint pilot initiatives, technology transfer collaborations, and participation in European and Euro-Mediterranean innovation programmes in subsequent project phases.

These insights provide an important analytical input for the stakeholder matrix and matchmaking activities to be developed under Activity A3.

## Value Chain Structure

The ecosystem mapping shows that the Romania–Morocco sustainable innovation ecosystem is structured around eight distinct and interconnected layers, each contributing to the development, deployment, and scaling of renewable energy and green technologies. The first layer consists of upstream suppliers, who provide essential components and technologies such as photovoltaic modules, power electronics, smart sensors, and automation systems. The second layer is formed by integrators and EPC companies responsible for designing, assembling, and implementing renewable energy installations and green industrial solutions. The third layer comprises solution providers, offering operational optimisation services, energy-efficiency improvements, cleantech deployment, and decarbonisation services tailored to industrial and commercial clients.

These activities are supported by the fourth layer, represented by digital and AI actors, who support grid optimisation, predictive maintenance, real-time monitoring, and energy analytics. The fifth layer includes industrial adopters, representing the major energy consumers in sectors such as automotive, steel, cement, construction materials, and logistics, where the demand for decarbonisation technologies is rapidly increasing. Supporting these technological and industrial layers, the sixth layer consists of research and development institutions, which generate



scientific knowledge, conduct experimental testing, and support technological innovation and upgrading.

To facilitate collaboration and the diffusion of innovation, the seventh layer consists of innovation support organisations, including clusters, accelerators, incubators, and technology-transfer structures that help scale emerging solutions. Completing the ecosystem, the eighth layer is formed by finance and policy actors, who shape the regulatory environment, provide incentives and enable investment and risk-mitigation mechanisms necessary for innovation and market deployment.

The actor database developed under Activity A1 confirms that organisations from both countries are present across all layers of the value chain, from technology suppliers and integrators to industrial adopters, research institutions, and innovation intermediaries.

Together, these eight layers demonstrate that Romania and Morocco possess complementary capabilities across the green innovation value chain. Romania demonstrates particular strengths in digitalisation and AI-driven optimisation technologies, supported by its advanced ICT sector and strong research institutions. Morocco offers significant advantages linked to large-scale solar deployment, abundant renewable energy resources, and emerging hydrogen strategies. These complementary characteristics create favourable conditions for developing robust cross-border value chains and joint innovation initiatives.



## **UPSTREAM SUPPLIERS**

PV panels • Inverters • Sensors • IoT devices • Power electronics

## **INTEGRATORS / EPC / SYSTEM DESIGN**

Project developers • Solar EPC • Automation firms • Grid integrators

## **SOLUTION PROVIDERS (ENERGY & CLEANTECH)**

PV operators • O&M • ESCOs • Cleantech systems

## **DIGITAL, AI & DATA ANALYTICS LAYER**

AI optimisation • Energy forecasting • IoT monitoring

## **INDUSTRIAL & COMMERCIAL END-USERS**

Manufacturing • Logistics • Retail • Ports • DSOs



## **R&D, LABORATORIES & TECHNOLOGY DEVELOPMENT**

Universities • National R&D Institutes • Hydrogen labs

## **INNOVATION SUPPORT, ACCELERATION & CLUSTERS**

Clusters • Accelerators • Tech transfer structures

## **FINANCE, FUNDING & INVESTMENT STRUCTURES**

Banks • VC funds • Impact finance • EU programmes

## **POLICY, REGULATION & GOVERNANCE**

Energy ministries • Environment agencies • Regulators

## **Existing collaborations and partnership landscape**

As part of the ecosystem mapping process, the project team also reviewed existing collaborations, partnerships, and international initiatives involving actors from Romania and Morocco in the fields of renewable energy, cleantech innovation, and digital technologies. The analysis indicates that while both ecosystems are actively involved in international research and innovation networks, structured bilateral cooperation between Romanian and Moroccan actors remains relatively limited.

Existing interactions typically occur through participation in European research programmes, international conferences, and thematic innovation networks rather than through sustained



industrial partnerships or joint pilot projects. This situation highlights a significant opportunity for the project to act as a catalyst for stronger cross-border cooperation. By connecting complementary capabilities—Romania’s digital and technological expertise and Morocco’s large-scale renewable energy deployment context—the project can help facilitate the emergence of new collaborative initiatives, pilot projects, and Euro–Mediterranean value chains in the fields of solar energy, industrial decarbonisation, and AI-enabled energy systems.

## Identified synergies between Romania and Morocco

The ecosystem mapping highlights several areas where Romania and Morocco exhibit strong complementarities that can be leveraged to create new cross-border value chains. One of the most immediate opportunities lies in solar energy development and EPC integration. Romania hosts several experienced renewable energy integrators—including companies such as Simtel, Monsson, and Photon Energy—whose expertise aligns closely with Morocco’s rapidly expanding solar ambitions. This creates favourable conditions for joint EPC projects, shared technology demonstration platforms, and collaborative development models that combine Romanian technical expertise with Morocco’s large-scale renewable investment context. A second area of synergy relates to digitalisation and AI for energy systems, where Romania’s advanced ICT and AI ecosystem can strengthen Morocco’s efforts in forecasting, optimisation, and intelligent grid management. Co-developing AI-powered energy management platforms tailored to the needs of Moroccan industrial clients represents a concrete pathway for bilateral innovation.

Additional complementarities emerge in the field of industrial decarbonisation, as both countries share similar industrial structures—particularly in sectors such as steel, cement, construction materials, and agri-food—resulting in parallel needs for energy efficiency, electrification, and low-carbon process innovations. This paves the way for bilateral pilot projects on industrial electrification, low-carbon fuels, and energy-efficiency upgrades. The analysis also reveals strong potential for cooperation in cleantech and the circular economy, where Romanian cleantech SMEs can support Morocco’s growing interest in waste valorisation, resource efficiency, and sustainable materials management. Joint initiatives could focus on thermal efficiency technologies, biomass valorisation, and circular production models adapted to local industrial needs.

In addition, green hydrogen and energy storage technologies constitute promising areas for deeper collaboration. Morocco’s strategic ambitions in green hydrogen production align closely with Romania’s strong research capabilities in hydrogen chemistry, materials science, and



system design. This creates opportunities for joint feasibility studies, shared research projects, and pre-commercial demonstration pilots that can accelerate hydrogen readiness in both ecosystems. Finally, a cross-cutting synergy arises from cluster-to-cluster cooperation, with ICONIC and EnR acting as ecosystem orchestrators capable of mobilising companies, research organisations, investors, and public actors. Through coordinated strategic initiatives, the two clusters can establish a long-term Euro-Mediterranean innovation corridor linking digital and energy transition capabilities and fostering sustained collaboration across industries and technologies.

## Conclusion of the mapping phase

The results presented in this report represent the core preparatory outputs produced during Months 1–2 of the project under Activity A1. The bilateral database, ecosystem and value chain mapping, and the identification of complementarities between Romania and Morocco collectively provide the analytical foundation for the transition to the next implementation stages of the project. In particular, these outputs constitute the primary input for Activity A2, informing the design of targeted surveys and needs assessments. They also provide the basis for developing the stakeholder matrix and preliminary matchmaking agenda under Activity A3, as well as for prioritising collaboration themes. The completion of this preparatory phase ensures continuity, coherence, and operational readiness for the subsequent project activities.

The analysis demonstrates that Romania and Morocco form a well-structured and highly complementary innovation ecosystem, aligned with the objectives of sustainable industrial transitions, renewable energy development, and AI-driven digitalisation. The combined results of the bilateral database, the ecosystem and value chain mapping, and the narrative synthesis, and the narrative synthesis provide a comprehensive and evidence-based understanding of the actors active in both regions and the roles they play across the green technology landscape. Together, these components fulfil all expected outcomes of Activity A1. They deliver detailed databases of relevant organisations in each region, provide a comprehensive mapping of the ecosystem and associated value chains, and identify areas where synergies, complementarities, and collaboration opportunities can be developed. This integrated foundation not only validates the robustness of the preparatory phase but also establishes the analytical basis required for designing the targeted survey in Activity A2 and the matchmaking agenda under Activity A3.



## Use of Activity A1 outputs in subsequent project activities (A2 and A3)

The outputs generated under Activity A1 will be directly used in subsequent project activities, ensuring continuity between the preparatory and implementation phases of the project:

- **Bilateral actor database → Activity A2 (targeted surveys):**  
The validated database of actors will be used to define the target groups for Activity A2, enabling the distribution of surveys to prioritised organisations based on sector, value chain role, and capability level, and ensuring relevant and representative input from cluster members and ecosystem stakeholders.
- **Actor prioritisation and capability assessment → Activity A3 (matchmaking agenda):**  
Actor prioritisation and capability assessment → Activity A3 (matchmaking agenda). The prioritisation framework developed under Activity A1 will inform the selection of participants and the structuring of matchmaking sessions under Activity A3, focusing on high-potential actors with complementary technical, digital, and decarbonisation capabilities.
- **Value chain mapping → thematic focus of collaboration sessions**  
The value chain analysis will inform the definition of thematic sessions and collaboration tracks under Activity A3, including solar EPC cooperation, AI-enabled energy optimisation, industrial decarbonisation pilots, energy storage, and hydrogen-related initiatives.
- **Identified synergies → preparation of joint initiatives:**  
The synergies identified during Activity A1 will guide the formulation of concrete cooperation pathways, including pilot projects, joint feasibility studies, and cluster-to-cluster initiatives, to be further developed through Activities A2 and A3.

Together, these linkages ensure that the analytical outputs of Activity A1 are directly translated into operational collaboration mechanisms in Activities A2 and A3.



## Methodology for developing the actor database and value chain matrix

The methodology applied in this report was implemented during Months 1–2 of the project, corresponding to the Preparatory Phase. All activities related to data collection, actor identification and classification, value chain analysis, capability assessment, and expert validation were conducted within this timeframe. The methodological approach was designed to ensure that the outputs generated under Activity A1 are directly operational and can be effectively used to support the design of targeted surveys and stakeholder engagement mechanisms in the following project phases.

The development of the bilateral actor database and the value chain matrix aims to provide a comprehensive and evidence-based mapping of the Romanian and Moroccan ecosystems in the fields of solar energy, green technologies, cleantech solutions, sustainable industrial practices, digitalisation, and AI. The methodology ensures that the mapping responds directly to the expected outcomes under Activity A1, including the identification and classification of relevant ecosystem actors, the mapping of sectoral and value chain structures, and the identification of complementarities and collaboration opportunities. The process followed a standardised, replicable, and transparent framework suitable for EU-funded cross-border cluster collaboration projects.

To ensure completeness, accuracy, and representativeness, data was collected from multiple validated sources. Official public sources included company websites, corporate publications, Romanian and Moroccan government databases, national regulatory authorities such as ANRE, registers of research institutes and universities, and public policy documents related to renewable energy and digitalisation. Sectoral and industry databases were also used, including Romanian business registries and energy sector catalogues, European renewable and cleantech associations, Cluster EnR and ICONIC member directories, European Enterprise Network (EEN) partner databases, and national innovation ecosystem directories. Project-relevant secondary data included Horizon Europe documentation, European Commission guidance, national energy transition strategies, hydrogen roadmaps, circular economy plans, and reports on industrial decarbonisation. Expert consultation with cluster staff and ecosystem representatives contributed additional validation.

The construction of the bilateral database followed a structured five-step process. First, preliminary identification of actors was carried out by scanning organisations active in the project's thematic domains, including solar energy, energy storage, hydrogen, smart grids, cleantech, AI and data-driven energy systems, industrial decarbonisation, innovation support, research, investment, and policymaking. Second, each actor was categorised by organisational type, including SMEs, large enterprises, startups, research and innovation organisations,



universities, innovation agencies, accelerators, investors, and government bodies. This ensured clear segmentation of the ecosystem and supports effective matchmaking in subsequent project phases.

Third, a detailed sectoral classification was conducted. Each actor was assigned a main sector and a sub-sector or specialisation, reflecting its technological orientation, operational focus, or functional role, such as EPC contractor, component supplier, AI optimisation provider, cleantech integrator, industrial end-user, or hydrogen research laboratory. This step directly addresses the Activity A1 requirement to classify actors by expertise, capabilities, and activity areas.

Fourth, each actor was assigned a value chain role. The roles included supplier, integrator, solution provider, end-user, R&D actor, innovation support organisation, and policy or regulatory body. These roles were determined based on objective analysis of products, services, sector behaviours, and publicly available documentation. Where relevant, actors could be assigned multiple value chain roles.

Fifth, capability assessments were added to capture technological and innovation maturity. Three capability indicators were defined: Technical Capabilities (Low/Medium/High), AI Capability (None/Emerging/Moderate/Advanced), and Decarbonisation Capability (Low/Medium/High). These were based on evidence from technical portfolios, R&D activities, digitalisation practices, and sectoral involvement in emissions reduction or clean energy adoption.

This structured approach ensured consistency in actor classification, transparency in capability assessment, and comparability across the Romanian and Moroccan ecosystems.

The value chain matrix was then built by integrating all actor attributes—sectoral classification, value chain roles, capabilities, and collaboration areas—into a coherent analytical structure. A priority level (High/Medium/Low) was assigned to each actor based on relevance to project domains, capability strength, value chain importance, and potential for cross-border collaboration. This prioritisation supports targeted engagement under Activities A2 and A3.

Quality assurance included internal consistency checks, cross-referencing classifications, verifying data completeness, and reviewing capability scoring. Additional validation was provided by ICONIC and EnR cluster representatives. The methodology aligns with European Cluster Collaboration Platform (ECCP) mapping practices, Euroclusters guidelines, and Horizon Europe ecosystem characterisation practices.

The result is a validated, structured ecosystem map providing a comprehensive bilateral database, a complete value chain map across eight functional layers, and a clear identification of complementarities between Romania and Morocco, which together constitute the analytical



input for the development of the stakeholder matrix and targeted matchmaking activities under Activity A3. These outputs provide a strong foundation for subsequent project phases, including the implementation of surveys (Activity A2), the preparation of the stakeholder matrix and matchmaking agenda (Activity A3), and the development of joint innovation initiatives.

## **Human and administrative resources mobilised under Activity A1**

Activity A1 was implemented through the coordinated involvement of the Project Manager, the dedicated project teams of ICONIC Cluster and Cluster EnR, and selected experts supporting validation and quality assurance. The Project Manager was responsible for the overall coordination of the mapping process, methodological consistency, supervision of data collection and analysis, and alignment of outputs with the project objectives and timeline. Cluster staff from both organisations contributed to the identification and classification of relevant actors, collection of sectoral and organisational data, and facilitation of bilateral coordination between the two ecosystems. In addition, expert validation was ensured through consultations with knowledgeable ecosystem representatives and technical experts, who reviewed the completeness, accuracy, and relevance of the mapped actors, value chain roles, and identified synergies. Administrative and technical resources provided by both clusters—such as office infrastructure, IT equipment, communication tools, online meeting platforms, and data processing software—supported the effective implementation of Activity A1 during the Preparatory Phase.

## **Location and implementation format of Activity A1**

Activity A1 was implemented through a combination of bilateral online coordination and national-level investigations conducted in Romania and Morocco. The common analytical framework and ecosystem mapping methodology were established and coordinated through two bilateral online meetings between ICONIC Cluster and Cluster EnR. The first meeting took place at the beginning of the activity and focused on aligning the methodological approach, defining the actor identification criteria, and establishing the classification framework for the bilateral database. The second meeting was organised at the conclusion of the mapping process to review the collected data, consolidate analytical findings, and validate the overall conclusions of the ecosystem mapping exercise.



In parallel, national-level investigations were carried out in each country by the respective cluster teams. These investigations combined desk research, analysis of national databases and sectoral registries, consultation of publicly available sources, and engagement with cluster members and ecosystem actors active in the fields of renewable energy, green technologies, industrial decarbonisation, and digitalisation. The investigations were conducted primarily at the clusters' offices and through direct interaction with relevant organisations and stakeholders within each national ecosystem.

The implementation process also included expert validation steps consisting of internal reviews and consultations with experienced ecosystem representatives and technical experts from both countries. These validation activities contributed to verifying the accuracy, completeness, and relevance of the mapped actors, confirming the consistency of value chain classifications, and ensuring that the identified complementarities and collaboration opportunities provide a reliable basis for the subsequent project activities, including the targeted survey (Activity A2) and the development of the stakeholder matrix and matchmaking agenda (Activity A3).



# Annex 1 Actors Classification Role Definitions

## Supplier

An organisation that produces components, equipment, materials, or enabling technologies used by integrators, solution providers, or end-users. Examples include PV panel manufacturers, mounting system producers, inverter suppliers, sensors, IoT devices, and industrial components. Suppliers contribute by offering technology building blocks, supporting pilot implementation, and supplying hardware or software for testing.

## Integrator

A company that assembles, installs, configures, or combines technologies into functional systems, being responsible for engineering, deployment, and system interoperability. Examples include EPC contractors, grid automation firms, industrial integrators, and digital platform integrators. Integrators design and deploy turnkey systems, ensure compatibility among technologies, and act as a bridge between suppliers and end-users.

## Solution Provider

An organisation offering complete technological, digital, cleantech, or energy-efficiency solutions, including services, software, and operational optimisation. Examples include EMS providers, solar asset operators, ESCOs, digital optimisation platforms, and cleantech system providers. Their contribution includes delivering ready-to-use solutions, ensuring performance, and supporting scaling and replication.

## End-User

A company or institution that uses or adopts the technologies, typically benefiting from improved efficiency, lower emissions, or new capabilities. Examples include industrial companies, DSOs, manufacturing plants, logistics hubs, retail chains, and public utilities. End-users host pilot projects, validate real-world impact, and provide operational data and context.

## R&D Actor

A research organisation, institute, or university involved in scientific research, technology development, prototyping, testing, and experimentation. Examples include national R&D institutes, university labs, hydrogen research centres, and materials science labs. Their contribution includes providing scientific expertise, developing prototypes, conducting tests, and co-authoring pilot projects and R&D proposals.

## Innovation Support

An intermediary organisation that supports startups, SMEs, technology development, or market access through acceleration, mentoring, incubation, or innovation services. Examples include



accelerators, innovation agencies, technology transfer centres, and cluster organisations. They contribute by building innovation ecosystems, supporting cross-border collaboration, matching supply with demand, and offering training, coaching, or business support.

### **Policy / Regulator**

A public authority responsible for policy-making, regulation, permitting, standards, funding instruments, or oversight related to energy, environment, technology, or economic development. Examples include the Ministry of Energy, ANRE, the Ministry of Environment, UEFISCDI, and MCID. Their contribution includes providing regulatory context, enabling pilot-scale implementation, aligning national policies with project objectives, and facilitating access to funding instruments.

### **Sub-Sector / Specialisation**

This field describes the actor's specific technological or operational field within the broader sector, such as solar EPC, inverter manufacturing, grid automation, battery storage integration, hydrogen R&D, cleantech solutions, or AI optimisation. It identifies what the organisation actually does at a technical and functional level.

### **Expertise Category**

This field groups the organisation into a higher-level domain aligned with the project's targeted sectors, including Solar Energy, Energy Storage, Smart Grids, Cleantech, AI for Energy, Industrial Decarbonisation, or Circular Economy. It provides a taxonomy for clustering actors during ecosystem mapping and matchmaking.

### **Technical Capabilities (Low/Medium/High)**

This field assesses the organisation's technical maturity, infrastructure, and capacity to develop, deploy, or scale technologies. "High" indicates advanced capabilities, strong infrastructure, and experience in deployment or R&D; "Medium" reflects solid technical capacity typical of SMEs; "Low" is associated with limited infrastructure or early-stage development.

### **AI Capability (None/Emerging/Moderate/Advanced)**

This field evaluates the organisation's ability to use, integrate, or develop AI and digital solutions relevant to green technologies, smart grids, or industrial optimisation. "None" reflects no AI-related activity; "Emerging" indicates initial data-driven tools; "Moderate" signals active use of AI or predictive analytics; "Advanced" means AI is central to the organisation's offering.

### **Decarbonisation Capability (Low/Medium/High)**

This field reflects the organisation's capacity to contribute to emissions reduction, energy efficiency, or industrial decarbonisation through technology, services, or operational



improvements. “High” applies to actors whose core activity supports decarbonisation; “Medium” to organisations that can adopt or support it; “Low” to those with minimal relevance.

### **Targeted Collaboration Areas**

This field indicates thematic domains in which the organisation can contribute or seeks partnerships, such as Solar Energy, Energy Storage/Hydrogen, Smart Grids, Cleantech/Circular Economy, AI/digitalisation, Industrial Decarbonisation, Finance/Investment, or Cross-cutting Innovation. It directly supports structured matchmaking and thematic session planning.

### **Priority Level (High/Medium/Low)**

This field provides a composite assessment of the actor’s strategic relevance to the project based on sector alignment, technical and digital capabilities, decarbonisation potential, and value chain role. “High” identifies key actors for pilot projects and bilateral collaboration; “Medium” includes relevant but less central participants; “Low” reflects peripheral relevance.



## Annex 2 References and Data Sources

### 1. European Union and International Sources

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Project methodology documentation prepared during Activity A1 (ICONIC–EnR Project Team).

