Strategic Policy Agenda and Recommendations

Connecting and Strengthening European Experimentation for Cleantech and Deeptech

REPORT
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PART I: Introduction

Europe's ability to achieve its' strategic goals of becoming a leader in deeptech and cleantech for a green transition (European Commission, 2019), will depend not only on scientific breakthroughs but also on the ability of innovation ecosystems to support new technologies as they are tested, scaled and brought to market.

Deeptech refers to technologies that are born from scientific and engineering breakthroughs, in sectors such as computing, biotechnology, aerospace, climate and more (Ruiz de Apodaca et al., 2023). Cleantech orients these breakthroughs towards finding solutions for reducing the environmental impact of industry, technology, energy, transportation, and other sectors, to address the global climate crisis (Caprotti, 2011). Both cleantech and deeptech have the potential to deeply transform systems and societies, by breaking away from embedded norms, in an effort to solve current large-scale problems (Ruiz de Apodaca et al., 2023).
This report looks at the role of experimentation spaces for cleantech development, within wider enabling environments, in the FINEX project countries: Bulgaria, Cyprus, Estonia, Finland, Latvia, Lithuania and France[1].

Experimentation infrastructure, such as testbeds, living labs and sandboxes, allow for novel ventures to go from the lab (testbeds) to real-world testing (living labs and sandboxes), a particularly important step for technologies that have the potential for systems change (D4.3 Stimulating and Connecting the FINEST Experimentation Practices and Spaces). This report shows that the different phases of innovation – from testing, to support services (accelerators, incubators, tech parks), to funding – are present and supported in all the FINEX countries. However, the individual parts of the ecosystem are often not well connected, slowing the uptake of cleantech ventures.
The policy recommendations in this report therefore provide pathways for further embedding and institutionalising the use of experimentation and strengthening ecosystem connectivity, at national and cross-European levels.

While experimentation spaces such as regulatory sandboxes, testbeds, and living labs are increasingly present across Europe, and are getting increased attention in legislation for strategic planning, certain cleantech and deeptech innovation ecosystems are more functional and interconnected than others. The FINEX project seeks to create resources and connect experimentation spaces across ecosystems at varying levels of maturity in Bulgaria, Lithuania, Latvia, Cyprus, Estonia, Finland and France. World-class experimentation and deep/cleantech venture-support exist across all the FINEX countries, but the innovation ecosystems in which they operate need further connecting. This, to facilitate and strengthen European deep/cleantech markets and achieve climate leadership targets.

A coherent policy roadmap is therefore needed to align regulatory frameworks, continue to expand market incentives, strengthen coordination across governance levels, and ensure that experimentation outcomes systematically inform long-term policy reform, enabling cleantech solutions to move from isolated trials to system-wide deployment.

Section 2 of this report outlines the methodologies used to collect data across the different work packages (WP). Each of these have been used to inform the policy roadmap.
Section 3 consolidates and triangulates the data with an added literature review to present the priority areas of cleantech development outlined in this report; innovation ecosystem functionality and maturity; and the main barriers and levers present today across the FINEX countries in policy and regulation. This last part uses examples from the FINEX cleantech use cases, to showcase some solutions being invented, and the barriers and opportunities they face in scaling and market integration.
Section 4 proposes a policy roadmap and recommendations, based on the project's research, for moving forward in connecting and institutionalising experimentation spaces, and

[1] France was not intended as an original ecosystem of the FINEX project. However, HEC Paris was added to the FINEX project consortium in 2025, and though data has not been as widely collected for France in the FINEX project, it is used throughout this report as an additional cleantech innovation "ecosystem leader" for context and to add to the discussion.

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strengthening innovation ecosystems, for cleantech innovation in Europe and cross-nationally.

PART II: Methodology

The development of this policy roadmap followed the approach outlined by Miedzinski et al. (2019), applying a structured methodology to translate diverse inputs into a coherent and actionable policy roadmap. The analysis was based on triangulation of multiple data sources, including project reports (outlined below and available via the FINEX website) and key findings from project workshops and policy labs, which were synthesised and organised into this report. For further detail on data collection methods across related deliverables, please refer to the reports linked below. Any identified gaps were addressed through a targeted literature review.

This report consolidates the research and outputs from the previous deliverables and activities that inform policymaking for experimentation and ecosystem support across the FINEX countries.

The tasks include:

- T3.3 Policy Labs:

3 Policy Labs were held in September 2025 with the participation of policy, industry and research actors. Each Lab took place over a 2-hour period using Zoom and a Miro board and followed a structured systems thinking approach using foresight and participatory tools. This consisted of "context mapping", identifying key barriers and levers, and "scenario explorations" to create pathways for change. More information on these methods can be found in D3.1 Cleantech Priority Areas Selection.

- T4.1 Survey with ecosystem actors:

The survey was conducted in the context of creating the FINEX resource catalogue and D4.1 FINEX Support Resources Mapping. 15 ecosystem actors (including all project partners) from the FINEX countries were surveyed in 2025 to develop a better understanding of existing experimentation spaces and their maturity in different locations.

- T6.1 Survey with use cases/ pilots:

In the context of WP6 matchmaking events for innovators for each FINEX innovation ecosystem, the use cases filled out a survey in 2025, to be matched with experimentation spaces based on their needs.

- T7.2 Three workshops/webinars on:

  - Accelerating Experimentation with Sandbox Initiatives (16.12.2026; 87 participants)
  - Accelerating Experimentation for Sustainable Transport (19.02.2026; 55 participants)
  - Policy Workshop Accelerating Experimentation for Sustainable Energy (23.04.2026; 41 participants)

Each workshop was held online and included three speakers at national or regional levels and one speaker presenting an international initiative. Speakers shared their experiences on implementing initiatives in the focus sectors with key perspectives on each subject. Participants included policy institutions and agencies, local public authorities, higher education and research institutions, businesses, associations, and cluster representatives. The events mobilised a total of approximately 183 participants and all took place from December 2025 to April 2026.

The results from the deliverables included in this report are:

- D3.1 Cleantech Priority Areas Selection
- D4.1 FINEX Support Resources Mapping (the basis of research that created the resource catalogue now available on the 28Digital website).
- D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces
- D6.1 Experimentation spaces and pilots: Action Plan Development & Deployment

PART III: Policy evidence from the FINEX research

3.1 Cleantech context and common challenges

Across Europe, key sectors identified by the FINEX project, for the drafting of the *Clean Tech Priority Areas Selection* report, have been

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identified as priorities for the development, scaling and uptake of cleantech to solve societal challenges faced by public authorities, cities, and consumers. **Cleantech priorities across the FINEX countries concentrate on four closely linked domains: energy systems, mobility and transport, the built environment, and governance and data. The first three are sectors that represent some of the largest sources of GHG emissions and are in urgent need of innovation for greener alternatives and solutions** (Climate Watch, 2026).

Energy security and clean mobility are critical to reducing fossil fuel dependence and ensuring affordable, locally resilient systems, while transforming buildings and infrastructure is essential to addressing inefficiencies, public health and growing climate adaptation pressures (Shakeel, 2021).

Across these three sectors, effective governance, reliable data, and public engagement are central instruments for change on socio-economic and cultural levels. This priority is a key enabler for regulatory coherence, trust, and targeted incentives that determine whether technological solutions can scale from pilots into durable, system-level change (Carayannis et al., 2012; Coenen & Díaz López, 2010). These sectors are shaped by systemic and interlinked challenges rather than isolated technological gaps (Policy Lab result report, 2025).

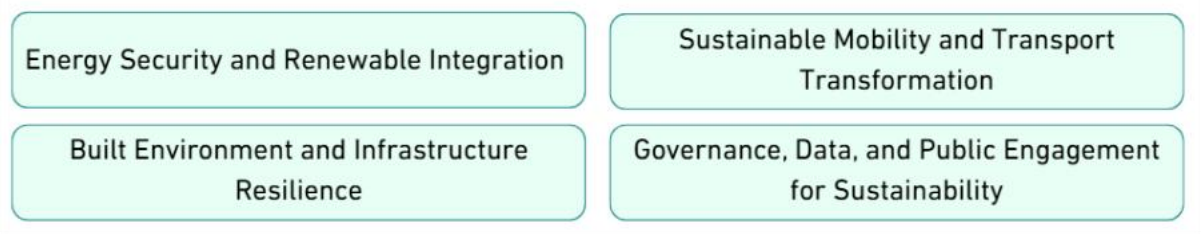

Figure 1: Common Cleantech priority areas

3.2 Innovation ecosystem functionality

Innovation doesn't happen in isolation but in interconnected multi-actor systems combining innovators, infrastructure, institutions, knowledge, markets, capital, and policy. A well-functioning innovation ecosystem is one where the system boundaries are clearly defined (technological fields, products or activities); actors, networks and institutions are connected and supportive; knowledge is produced and shared; the system dynamics are cohesive and maintain momentum; and where governments and policies (and their implementing bodies) intervene to correct market and systemic failures (Coenen & Díaz López, 2010; Edquist, 2013; Hekkert et al., 2007).

Figure 2 illustrates different actors and networks in a cleantech innovation ecosystem. **Intermediaries, services and support delivery help innovators, entrepreneurs and new ventures navigate complex markets, connect them with needed experimentation infrastructure and networks, translate regulation, and mobilise resources** (IDIA and the Ecosystem Strengthening Working Group, 2021). **Experimentation spaces allow for large-scale innovative solutions to be tested in the lab and in real-world settings, often streamlining time-to-market** (Fauth et al., 2024). **Finance, governance, market systems, and policy frameworks allow for science-based ventures to be tested, to scale, to become available to customers, and to interact with the local or global economy** (IDIA and the Ecosystem Strengthening Working Group, 2021).

From a systems perspective, it is the virtuous interaction between these parts that enables innovations to emerge and diffuse across the market, or not (Suurs & Hekkert, 2012). These dynamics also take place within **larger socio-political and natural contexts** (Carayannis et al., 2012; Ye et al., 2025). When scientific innovation takes place, if public acceptance or readiness for change is not present, new technologies can be abandoned. Similarly, access, or lack thereof, to natural resources, or the need to adapt socio-technical processes to a changing climate can shape innovation trajectories (Carayannis et al., 2012). Understanding the interactions between actors and their enabling environments can help innovation ecosystems grow and adapt to change.

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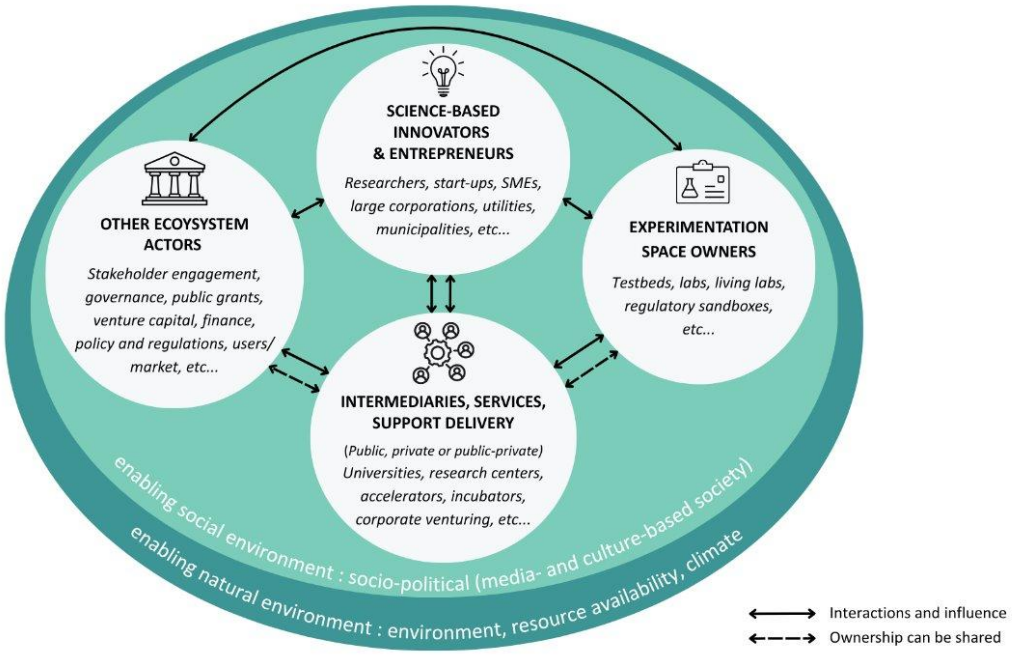

Figure 2: Innovation Ecosystems. Adapted by authors from Carayannis et al. (2012); Ye et al. (2025).

Each innovation actor plays a vital role in the overall functioning of an ecosystem, and in shaping and navigating their enabling environments. Figure 3 shows the functions and roles of each group of actors in innovation ecosystems for clean tech, based on the work of Edquist (2013) and Hekkert et al. (2007).

By mapping the functions that each actor plays, better support mechanisms can be created and adapted based on the roles they play within the overall system.

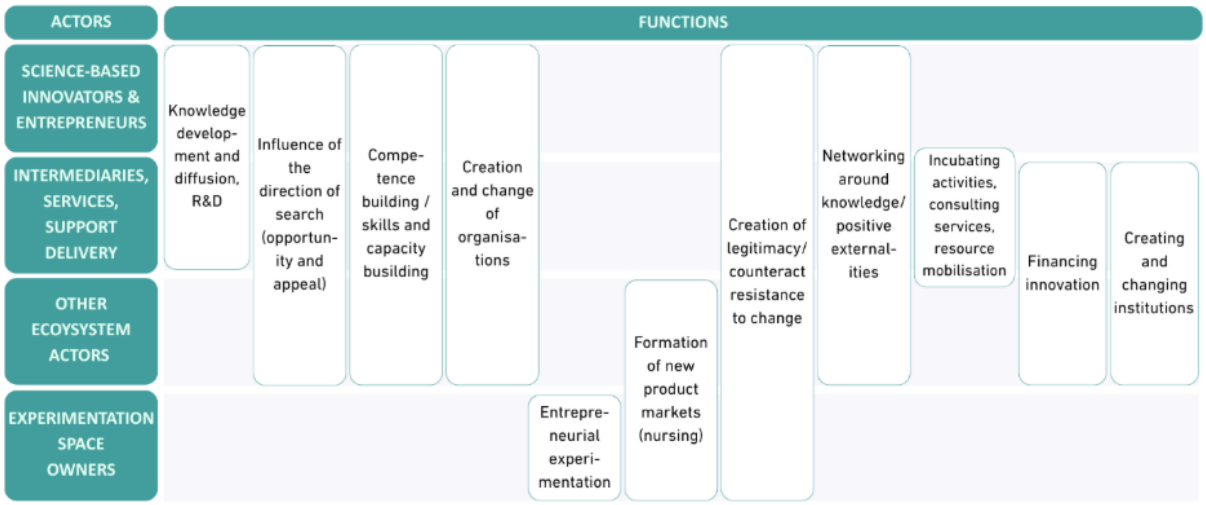

Figure 3: Roles and functions of IE actors, adapted from (Edquist, 2013; Hekkert et al., 2007).

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3.3 Experimentation spaces in Cleantech domains

Experimentation spaces such as testbeds, living labs, and regulatory sandboxes are increasingly recognised as core infrastructures within deep/cleantech innovation ecosystems. Definitions of the key experimentation spaces addressed in this report are outlined below (Fig 4), along with the Technological Readiness Levels (TRL) they are used for at the various stages of development and testing (Fig 5).

TESTBEDS & DIGITAL TWINS	Early-stage access to maker spaces, wet/dry labs, and testbeds to build and validate prototypes. These facilities accommodate hardware experimentation. Specifically, digital twins are virtual representations of a physical system (e.g. a city, grid, or building) that uses data to simulate, monitor, and predict behaviour and changes to a system.
LIVING LABS	Late-stage testing for at scale and real-world conditions (e.g., a smart grid controller in a live electrical network, or a new building material in an actual building).
REGULATORY SANDBOXES	Clean and Deep Tech often push the boundaries of existing regulations (e.g., testing autonomous vehicles on public roads). This involves late-stage testing that allows innovators to conduct live experiments under a regulator's supervision, with temporary relaxations of certain rules on facilities to accommodate hardware experimentation.

Figure 4: Experimentation spaces, definitions (based on D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces).

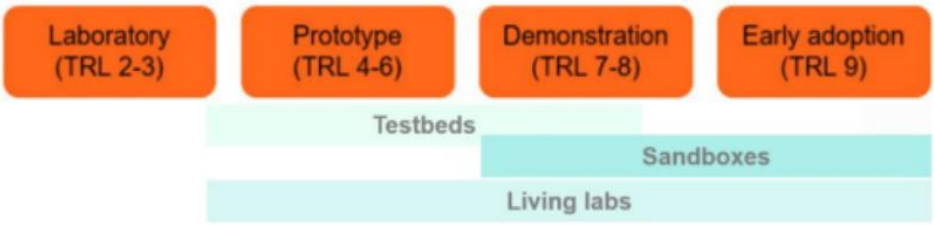

Figure 5: Experimentation spaces across development stages (D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces)

These spaces play central roles in addressing uncertainty and risk inherent in early-stage technologies, allowing iterative **"learning-by-doing"** that cannot occur in laboratory settings alone (Fauth et al., 2024). Living labs, for example, are user-centred, real-world environments that integrate research, innovation, and societal actors, enabling co-creation and validation of solutions under real conditions (ENoLL, 2026; Fauth et al., 2024). These environments facilitate collaboration, proof-of-concept development, and stakeholder alignment across industry, government, academia, and users.

Our research, *Stimulating and Connecting the FINEST Experimentation Practices and Spaces*, emphasises that testbeds, living labs, and sandboxes enable validation, reduce market-entry barriers, and accelerate deployment by providing structured environments across different stages of TRLs. These spaces also support a **"test-before-invest"** logic, producing evidence on performance, usability, and regulatory compliance, which reduces uncertainty for investors and policymakers (Muñoz Ferrandis & Perset, 2023). **They also allow governments and innovators to co-develop rules and**

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standards while technologies are still emerging (Kert et al., 2022).

Today, experimentation spaces and their connection to innovation ecosystems are still an emerging topic both scientifically and at the EU level. In doing a search in the Web of Science database and online more generally, using the keywords “experimentation spaces” “cleantech” and “policy” “deeptech”, few documents emerge.

Three important documents from the European Commission have been published that: call for experimentation best practices to be developed and researched (European Commission, 2020); give definitions and guidance on experimentation spaces for energy in the EU (European Commission, 2023); and call to strengthen knowledge dissemination from experimentation, and other sources, for innovation in Europe (European Commission, 2024b). The second gives extensive definitions of experimentation facilities and all state their importance in scaling innovation but remain disconnected from innovation ecosystem strategies as a whole.

For example, they have not yet been integrated as key strategies within deeptech or cleantech innovation trajectories at EU level, as seen in the European Commission’s Impact Report on Scaling Deep Tech in Europe. The document covers six key strategies: Accelerating deep tech innovation; Investing in start-ups and SMEs; Business acceleration; Priming the next generation of start-ups; Supporting technology breakthroughs; and Supporting women innovators. Experimentation is only mentioned in section 3.4 on supporting technology breakthroughs but only covers early TRLs.

The FINEX project seeks to address some of these gaps by placing experimentation at the heart of scaling innovation for deep and clean tech and proposing policy recommendations for their use and integration within innovation ecosystems.

3.4 Experimentation in the FINEX context

Based on the findings from the project’s research that maps the existing experimentation spaces in each FINEX country (D4.1 FINEX Support Resources Mapping, 2025), all countries have multiple types of infrastructure for deep/cleantech testing and development.

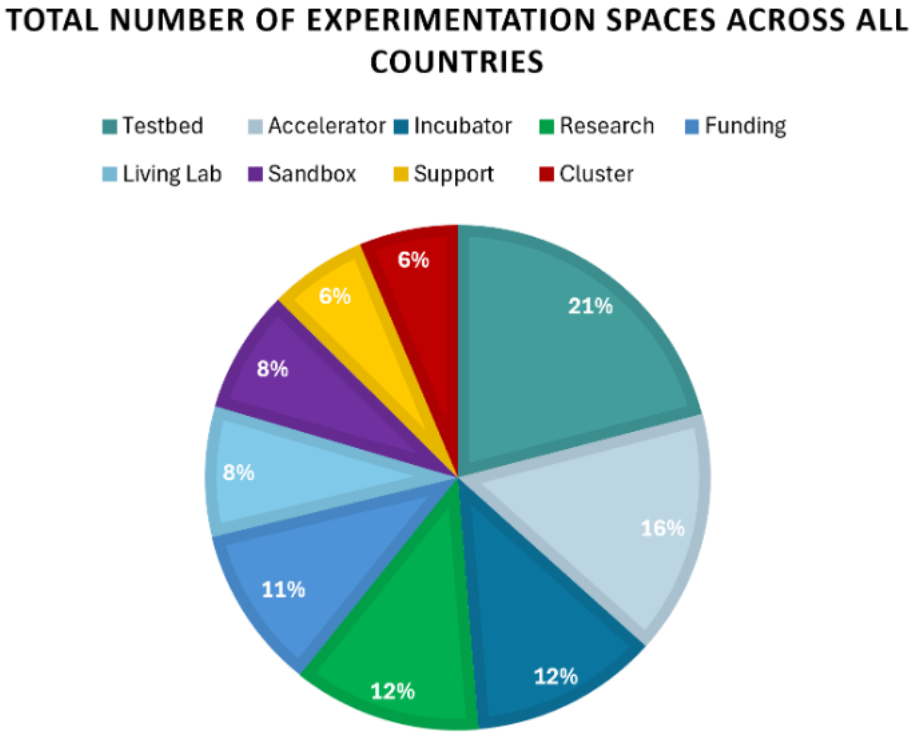

Figure 6: Data collected from FINEX resource catalogue and additional desk research.

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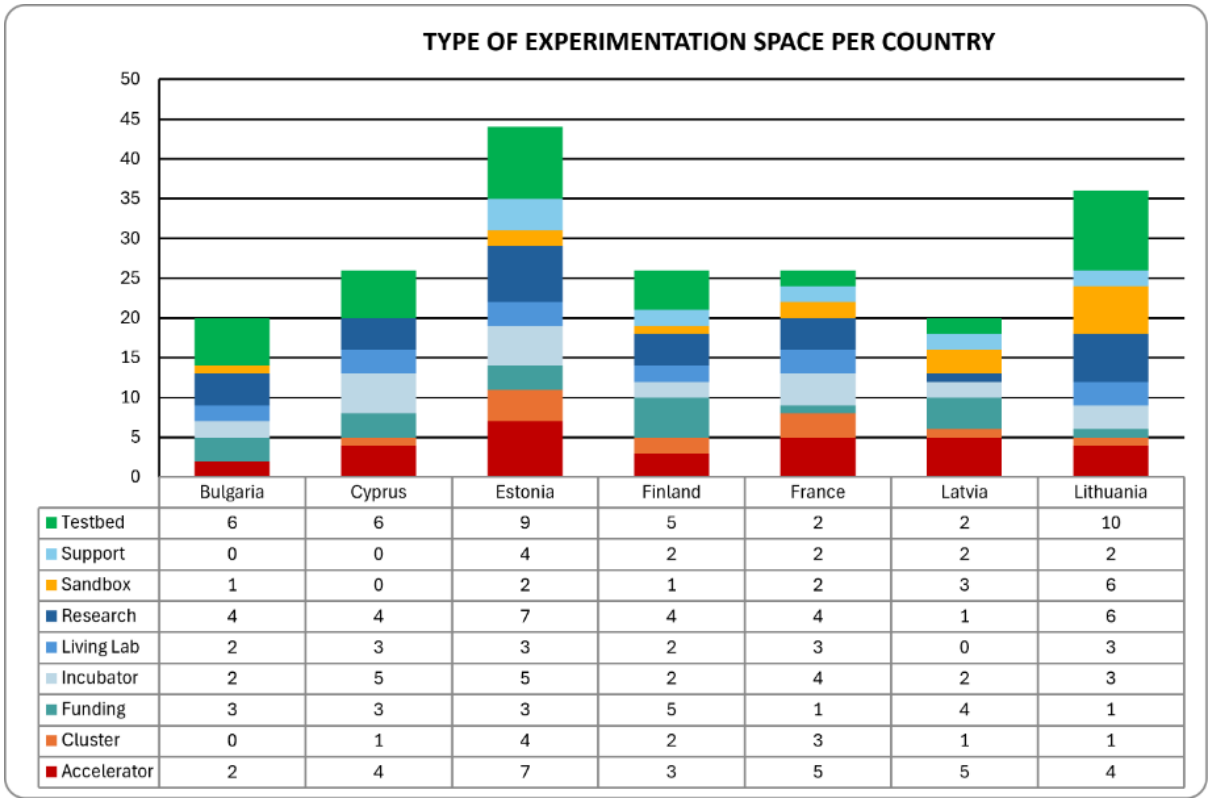

	Bulgaria	Cyprus	Estonia	Finland	France	Latvia	Lithuania
Testbed	6	6	9	5	2	2	10
Support	0	0	4	2	2	2	2
Sandbox	1	0	2	1	2	3	6
Research	4	4	7	4	4	1	6
Living Lab	2	3	3	2	3	0	3
Incubator	2	5	5	2	4	2	3
Funding	3	3	3	5	1	4	1
Cluster	0	1	4	2	3	1	1
Accelerator	2	4	7	3	5	5	4

Figure 7: Data collected from the FINEX resource catalogue and additional desk research.

Across all FINEX countries[2], **our data shows that accelerator and incubator services are most widely available, and testbeds the most present experimentation facility.** On the other hand, living labs and sandboxes represent a smaller share of the European ecosystem specialised in developing and scaling cleantech. Where testbeds are often spaces for early-stage development and prototyping, living labs and sandboxes are what facilitate new technologies' uptake into the market by testing real-world implementation at later test stages and are therefore key in the innovation process (D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces).

3.5 Innovation ecosystems for cleantech in the FINEX context: Maturity, functionality, challenges

Our research on the innovation ecosystems in the FINEX countries shows that experimentation spaces are at different levels of maturity or availability for use between "innovation leaders" (France, Finland) and "emerging ecosystems" (Estonia, Latvia, Bulgaria, Cyprus, Lithuania). Despite there being comparable assets across these countries, coordination and visibility differ.

Many of the "emerging" regions in the FINEX project have world-class niche experimentation facilities (e.g. smart grids, AI labs, hydrogen testbeds) but remain locally bound and underused by national or European ecosystems. For example, a country such as Lithuania can have as many as 27 ecosystem services (testbeds, sandboxes, clusters, accelerators, incubators, research…) (Fig 7) at different levels of development and integration, and if they are not connected to each other, cleantech ventures can face difficulties scaling and entering the market.

Figure 8 bellow, shows a method for assessing innovation uptake through an Eco-innovation score, as defined by the European Commission (2024a). Eco-innovation focuses on developing sustainable products, processes, and business

[2] As stated previously, the data collected for France was conducted in less depth than the other FINEX project countries and therefore cannot be considered exhaustive.

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models that reduce environmental impacts, while cleantech represents the practical application of these innovations through technologies and solutions that drive low-carbon and resource-efficient systems (European Commission, 2024a). The performance score of each country is calculated based on 12 indicators capturing variation across five themes: Eco-innovation inputs, Eco-innovation activities, Eco-innovation outputs, Resource efficiency outcomes, and Socio-economic outcomes.

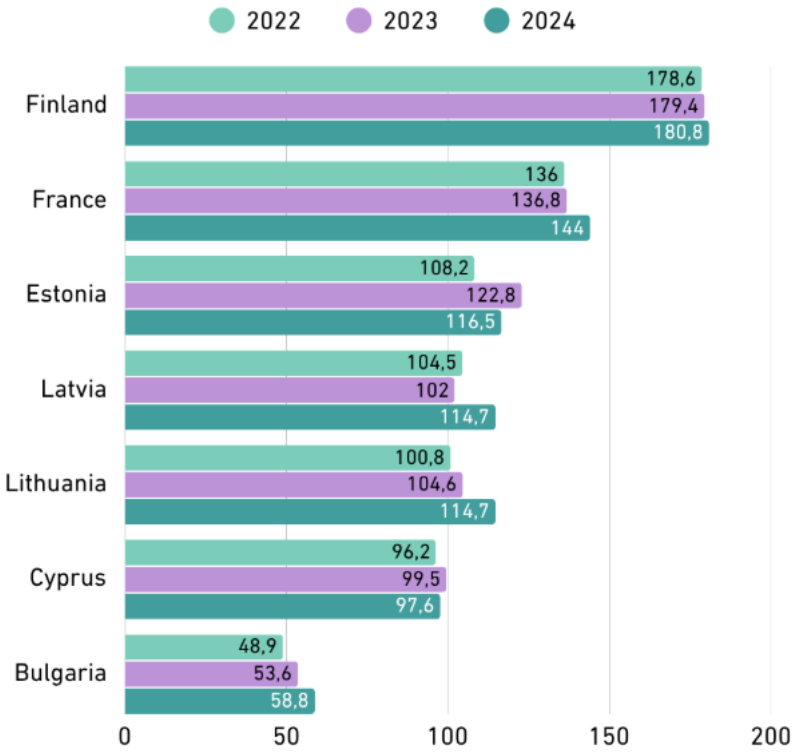

Figure 8: Eco Innovation score as set by the European Commission (European Commission, 2024a).

On a micro-scale, through our own survey[3], this report asked ecosystem actors across the partner organisations of the FINEX project, and some external to the project, to self-assess the maturity-levels of their own experimentation spaces, portrayed in figure 9 below.

[3] The survey was conducted in the scope of Task 4.1 FINEX Support Resources Mapping, in 2025. It collected data from 15 respondents from Cyprus, Latvia, Lithuania, Estonia, and Bulgaria, and represented project partners (including research institutions, cluster representatives and support services) as well as a small pool of municipality and city council actors, and innovation businesses. The results represent an average of 1 to 5 answers per country.

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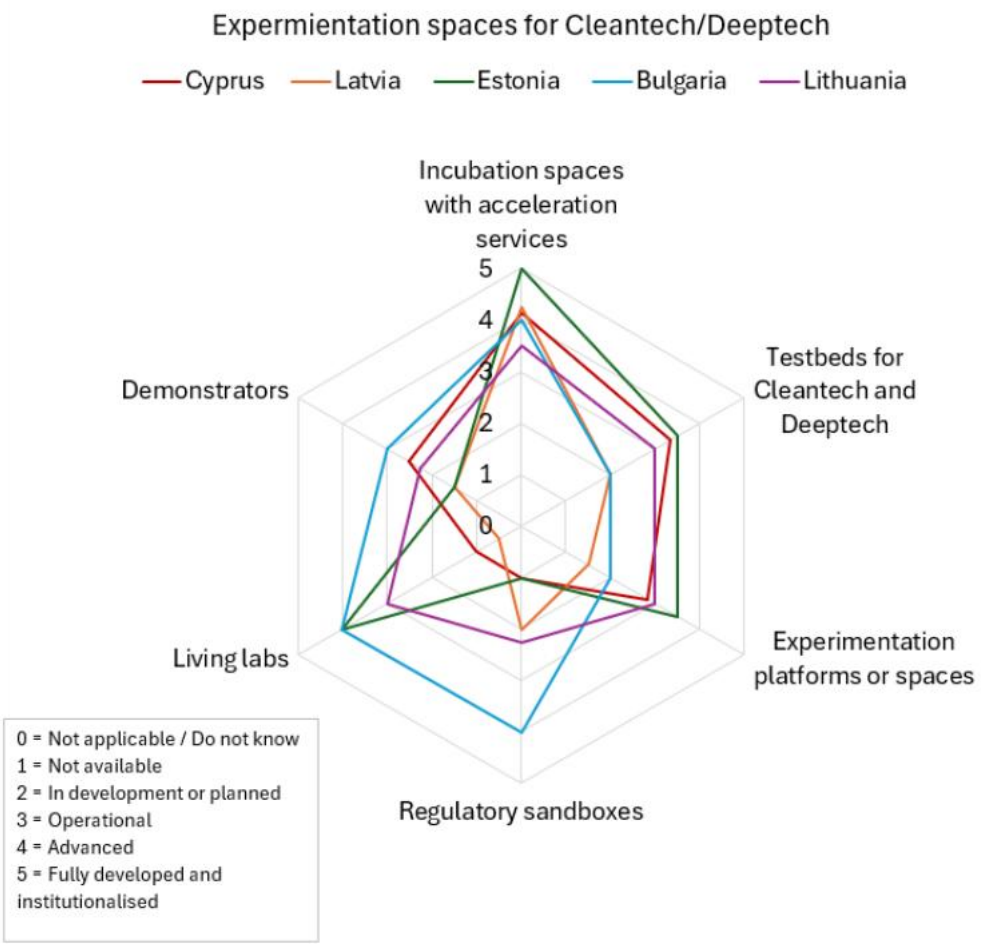

Figure 9: Based on data from a FINEX survey to ecosystem actors, results based on the average of 1-5 answers per country

This data does not represent the full scale of national maturity across the FINEX countries or availability of experimentation spaces within countries and is an average of the responses per country. The participating organisations specialise in different types of experimentation spaces; therefore, Figure 9 should be understood as illustrating the average of the surveyed organisations rather than providing a comparative assessment of the overall maturity of experimentation spaces within each country. For example, the Sunrise Tech Park has fully institutionalised and advanced incubation services, that the average does not reveal. More details on respondents' maturity self-assessments can be found in Annex IV.

Yet, amongst project partners and the additional participants surveyed, the averaged data underlines that maturity and functionality are predominantly developed for incubator and accelerator services, whereas sandboxes, testbeds and living labs are generally less advanced or institutionalised. This tells us that, among these partner organisations, more support exists for business development rather than for later stage testing that gets solutions to market and gains user feedback. Nonetheless, they are connected to the wider ecosystem, as the survey also shows that 7 respondents have access to experimentation spaces through their ecosystems, 3 have their own experimentation spaces, 2 have both ownership and access through their ecosystem, (and 2 reported unknown). This indicates that **even if experimentation spaces are at different levels of maturity among the surveyed participants, the gap is filled by ecosystem partners, underlining the importance of these connections and collaborations.**

Additional spaces (not surveyed in the research) that have been successfully embedded into innovation ecosystems at the national scale of FINEX countries, include (for the full list, visit the FINEX Resource Catalogue):

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Table 1: Examples of experimentation spaces across the FINEX countries, based on the FINEX Resource Catalogue and the FINEX Workshop Reports

Cyprus	*KIOS Testbed for intelligent transportation systems*
	DiGiNN (Digital Innovation Hub Cyprus) (living lab and testbed)
	KIOS - Digital Twin / Simulation Platform (Living lab and testbed)
Estonia	*Test in Tallin (testbed and sandbox)*
	Estonian Metrosert Testbed initiative
	Ülemiste City – Test City (Living lab and testbed)
Latvia	*Latvian Public Utilities Commission Sandbox*
	Testbed in Riga and Riga Technical University (testbed)
	Public Utility Commission (energy regulatory sandbox)
Lithuania	*Lithuanian National AI Sandbox*
	Sunrise Valley Digital Innovation Hub/ EDIH Vilnius (testbed and living lab)
	Ignitis Group Open Infrastructure Sandbox
Bulgaria	*GATE Experimental Regulation and Policy Lab (sandbox)*
	Resonator Living Lab
	Cleantech Bulgaria (testbed)
Finland	*Regulatory Energy Sandbox in Ostrobotnia*
	EnergyVaasa Sandbox
	Tampere Smart City Testbed
France	*Commission de Régulation de l'Energie (CRE) (sandbox)*
	Autorité de Régulation des Transports (ART) (sandbox)
	Greentech EcoLab (testbed and living lab)

3.6 EU and MS policy context (FINEX countries)

Over the past two decades, the EU has developed and passed many regulations, strategies, and funding programmes to support the development and deployment of cleantech for a green transition. Below, figure 10, outlines the sectors represented in the EU legislative landscape that are relevant to cleantech.

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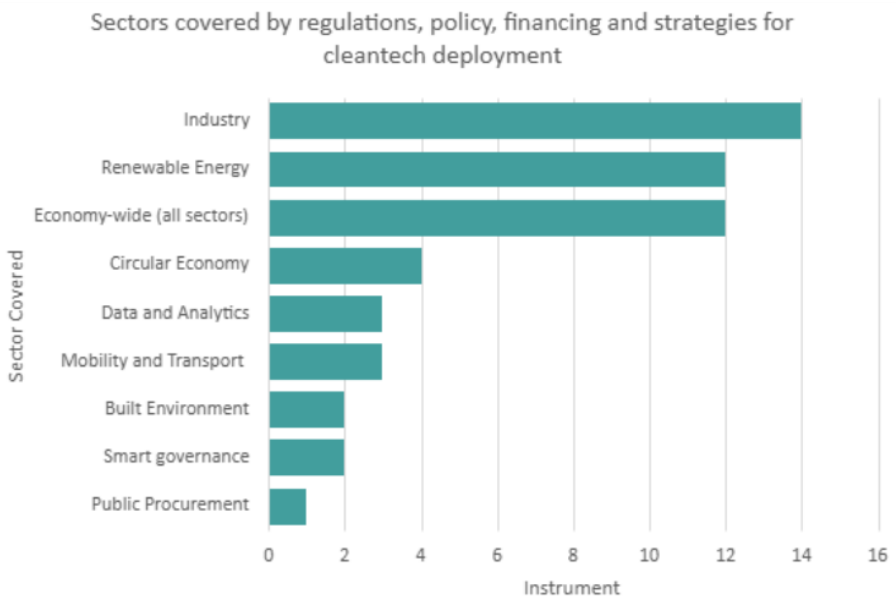

Figure 10: Data collected from D3.1, D4.2 and additional search by authors (CleanTech for Europe, 2026). Data in Appendix I.

The data shows that there are sectors that have taken priority in the policy context in Europe, namely industry (production and supply chain management), renewable energy, and overarching economy-wide policies, and fewer specific policies for mobility, built environment, and data and governance. Circular economy policies often include all sectors mentioned above.

This section identifies key policies in place that contribute to supporting and embedding experimentation into innovation ecosystems at the EU level. It outlines specific EU policies that contribute to supporting, scaling and connecting experimentation spaces to wider cleantech innovation ecosystems; then those that work to connect and support existing ecosystem actors (intermediaries, incubators, finance); and lastly, policies that aim to foster cross-national governance structures and collaboration that can inspire clean tech ecosystem connectivity throughout Europe.

Then, the section outlines existing national policies within the FINEX countries, along with some examples from other countries for wider context. All of these policies have the aim of embedding experimentation into innovation ecosystems for faster and more successful uptake of cleantech into European and global markets.

3.6.1 EU-level policy context

This section outlines key regulations that address cleantech experimentation, scaling and development at the EU level. Specifically at regulations that directly or indirectly support experimentation infrastructure deployment, innovation ecosystem scaling and connectivity, and cross-border infrastructure and collaboration.

Experimentation connectivity and scaling

The following policies, regulations, funding mechanisms and strategies have been developed and enforced at the EU level to scale the use of experimentation for cleantech in Europe, to ultimately scale clean tech ventures.

Industrial Accelerator Act (IAA) Introduces 'Made in EU' and low-carbon requirements in public procurement and public support schemes; FDI screening for strategic cleantech; Permitting simplification; Sandbox provisions for industrial pilots; Target: 20% of EU GDP from manufacturing by 2035.

Net-Zero Industry Act (NZIA) Strategic project status with accelerated permitting (18-month target); Regulatory flexibility provisions; 40% domestic production target by 2030 for strategic tech; 47 CRMA strategic projects announced Mar 2025.

AI Act — Regulatory Sandbox Provisions (Art. 57) Mandates at least one national AI

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regulatory sandbox per Member State by Aug 2026: Sandboxes allow controlled real-world testing with regulatory supervision, personal data processing for public interest, free access for SMEs/startups. The implementing act was published late 2025.

Renewables Permitting Omnibus Simplifies permitting for renewable energy projects; Designated renewables go-to areas with streamlined assessments; Implements time limits on permit decision-making/granting.

EU Startup and Scaleup Strategy Comprehensive strategy to reduce regulatory barriers for startups/scaleups. Scaleup Europe Fund €5bn AUM (Oct 2025). Access to finance improvements, IP frameworks and talent mobility.

Ecosystem connectivity

Strategies and regulations that encourage ecosystem connectivity at national and European level are detailed below through R&D support, reducing barriers to access to finance and reconsidering IP and employment frameworks.

European Institute of Innovation and Technology (EIT) - InnoEnergy and Climate-KIC R&D support and funding within Horizon Europe, with the aim of strengthening sustainable innovation ecosystems across Europe, entrepreneurial and innovation skills, creating synergies between stakeholders.

Savings & Investment Union Aims to deepen EU capital markets and channel household savings into productive investment. Reduces barriers for cross-border VC investment. Supports EIC fund-of-funds and cleantech scaleup financing.

EU Startup and Scaleup Strategy This is detailed in the section above and can also be considered a regulation for connecting innovation ecosystems.

The legal tools identified so far, offer an array of pathways for ecosystem connectivity, but still largely focuses on accelerating innovation, financing and uptake, taking less of a systemic approach to strengthening entire ecosystems.

Cross-border connectivity regulations

Both regulations outlined below are mechanisms that can be used to inspire the construction of transnational cleantech ecosystems for experimentation and scaling as they lay groundwork for cross-border collaboration and harmonisation between European countries.

Connecting Europe Facility Aims to facilitate the construction of cross-border and transnational transportation, energy and digital infrastructure that must adhere to Green Deal strategic objectives. 60% of the budget must be allocated to climate goals (decarbonisation through alternative fuels, rail and clean tech).

European Grids Package Reforms grid planning governance, permitting for grid projects, cross-border interconnection. Energy highways concept. Includes locational pricing reform discussion (EMD). Critical for Baltic synchronisation with continental Europe (BRELL exit) and for hydrogen grid overlay.

Additionally, the **European Innovation Act** is being proposed in 2026 which aims to increase collaboration between industry and academia, access to markets, finance, talent and infrastructures for innovative solutions in Europe. This regulation would support innovation through the implementation of regulatory sandboxes and connecting research with testing facilities, while addressing regulatory fragmentation and excessive red tape (European Commission, 2026b).

3.6.2 National-level policy context

This section highlights key national strategies, regulations, financial mechanisms and other instruments (R&D, agencies, labs, etc…) that are particularly relevant for cleantech experimentation (sandboxes, testbeds, living labs), scaling (markets, infrastructure, investment) and ecosystem development (connectivity and collaboration of cleantech innovation actors). For a more comprehensive

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list of policies, regulations and financing mechanisms per country, please refer to Annex II.

Smart Specialisation Strategy (S3CY) 2023–2030 (Cyprus) This national strategy provides a structured framework for directing R&I investment into cleantech priority areas (e.g. renewable energy, digital), enabling and supporting targeted experimentation ecosystems and pilot development.

Accelerate Estonia (Innovation Lab) One of the strongest examples of a policy-driven experimentation mechanism, explicitly identifying and working to remove regulatory barriers to allow real-world testing of innovative cleantech solutions.

Energy Law amendment (2020) – regulatory sandbox (Lithuania) This regulation provides a direct legal basis for energy experimentation spaces, enabling controlled real-world testing and regulatory learning. It is aligned with best-practice sandbox design.

ALTUM financing programmes (€101M VC) (Latvia) It provides venture capital and blended finance, supporting cleantech companies in moving from pilots to commercialisation and addresses the scaling gap.

RESTORE Programme (€602M storage funding) (Bulgaria) Large-scale investment in energy storage and grid integration, enabling system-level experimentation with renewables and addressing infrastructure bottlenecks.

Smart Otaniemi Living Lab (Finland) A flagship real-world experimentation environment integrating energy, mobility, and buildings and is a strong example of cross-sector cleantech testing and scaling.

Additional examples of experimentation spaces that have been embedded into regulatory innovation

Lithuanian National AI Sandbox provides supervised real-world testing of AI systems with regulatory guidance, and explicitly includes a policy learning loop where results inform national AI governance and implementation of the EU AI Act. For example, Insights from SME testing are used to improve conformity assessment procedures and national AI policy design, reducing regulatory uncertainty (Interrg Europe, 2026).

Estonian AI sandbox, (AIRE / experimentation framework) provides developers with structured feedback from regulators and compliance authorities, helping shape how EU AI Act requirements are interpreted in practice. For example, sandbox participation generates clear documented feedback that reduces risk and informs regulatory authorities, contributing to more practical and innovation-friendly AI regulation (AIRE Estonia, 2026).

GATE Experimental Regulation and Policy Lab (Bulgaria) Offers tools and infrastructure for interdisciplinary development and testing for technologies, prototypes and modelling of new legal, ethical and policy solutions to meet contemporary technical, regulatory and market concerns (FINEX Resource Catalogue).

KIOS Testbed for intelligent transportation systems (Cyprus) Provides real-world experimentation for smart mobility, IoT, and infrastructure resilience systems. Data from pilot deployments (e.g. mobility optimisation, traffic systems) feeds into evidence-based transport planning and infrastructure policy adjustments for ITS deployment.

Regulatory Energy Sandbox in Ostrobothnia (Finland) Aims to test regulatory exemptions and market models (e.g. hydrogen, microgrids, tariffs) to identify policy bottlenecks. The sandbox integrates a “regulatory policy platform” and “market accelerator”, ensuring experimentation results are translated into innovation-friendly regulation and future energy policy reforms (4Front, 2026).

Latvian Public Utilities Commission Sandbox (Latvia) The new energy regulatory sandbox was launched in 2025, with projects approved and running, demonstrating practical application. For example, Early pilot projects provide evidence for regulatory adaptation in energy markets, contributing to improvements in clean energy deployment frameworks and regulatory procedures (Labs of Latvia, 2025).

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These examples are some of the key strategies and implementation methods to develop experimentation and ecosystem connectivity in use today (Annex II).

3.6.3 Examples of other successful policy support mechanisms throughout Europe for experimentation

France's Energy-Climate Law of 2019 is a prominent example of a policy that effectively enabled an experimentation space in the EU. It established a regulatory sandbox for energy innovations, empowering the French Energy Regulatory Commission (CRE) to grant temporary regulatory exemptions for testing solutions that enhance the energy transition and smart grid development.

It did this by 1) creating a clear legal framework that allowed the CRE to provide exemptions to standard grid access and drafted rules for experimentation projects to abide by; 2) outlining an application and evaluation process for projects to be monitored and evaluated; 3) creating pathways for experimentation to be reviewed and translated into regulatory changes (Commision de Régulation de l'Engerie, 2025).

Similar initiatives were rolled out in Germany with "Reallabore der Energiewende" (Energy Transition Living Labs), Italy with EMOTOR-VTB testbed and the UK with Catapults and Ofgem (more information on these programs can be found in D3.1 Cleantech Priority Areas Selection).

3.7 Policy barriers and levers for experimentation within the ecosystem

3.7.1 Barriers in scaling and connecting experimentation spaces at policy level

Cleantech innovation often pushes the boundaries of the status-quo, usually impacting entire systems (i.e. transport, electricity grids, neighbourhoods...) that sometimes require major regulatory shifts. As cleantech innovations go from early- to late-stage testing, these technologies require real-world experimentation that can only be achieved through processes facilitated by living labs and regulatory sandboxes (figure 5). This section outlines the key barriers that still need to be overcome on the pan-European scale for experimentation spaces to become assets to flexible policy for cleantech innovation scaling in high-functioning ecosystems.

The FINEX project identified 7 cleantech use cases that address key system challenges in the national priority areas compiled in D3.1 Cleantech Priority Areas Selection (Annex III). They offer solutions and experimentation pilots for the acceleration of scalable cleantech across energy, transport and mobility, built environment and data and governance.

The section below situates the use cases within the context they are trying to evolve and innovate into. By attempting to address particular societal and technological challenges, the use cases' ecosystems must also innovate – within this context there exist barriers and levers that can halt or support cleantech systems change. The use cases are used here as examples to illustrate how regulatory barriers need to be overcome by policy levers.

The key barriers identified during the policy labs and a literature review, are detailed below:

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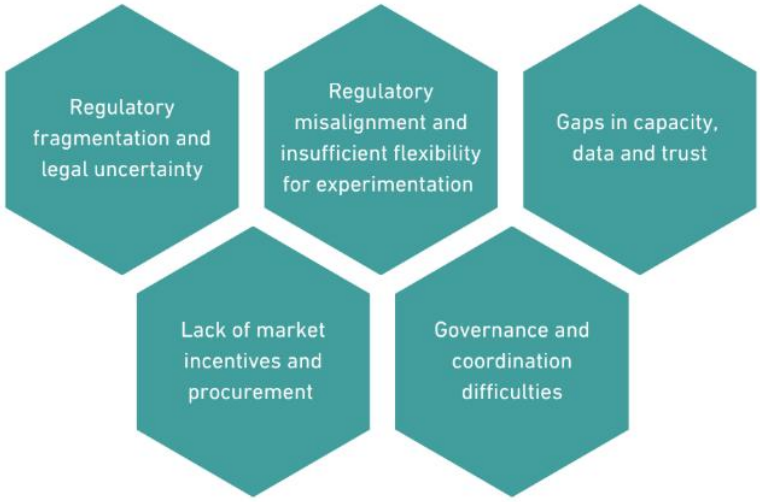

Figure 11: Key barriers in scaling and connecting experimentation spaces at policy level.

Regulatory fragmentation and legal uncertainty

Regulatory sandboxes and other experimentation tools are interpreted differently across Member States, this gap in standardisation leads to legal uncertainty, especially for connecting infrastructure cross-nationally. Although stakeholders recognise the potential for cross-border cooperation in launching joint regulatory sandboxes (an idea of Baltic AI cross-border pilot was raised in one of the workshops) in practice, where legislative competence remains largely national, transnational cooperation requires significant time and resources (FINEX Sandboxes and AI Workshop).

Additionally, different EU instruments use inconsistent definitions for experimentation which result in a lack of clarity and delays for national implementation. The AI Act (2024) aims to support cross-border sandboxes but has resulted in limited uptake due to complexity of application process and rules that vary across countries, this is a particularly important constraint for startups with limited resources.

This is also the case at the national level, where ventures innovating across multiple governance and policy frameworks can face challenges in navigating heavy administrative burdens and unclear or fragmented policy frameworks. Examples of this can be found in some of the challenges that the FINEX use cases face in scaling their ventures.

Example:

The **LAT-MaaS+ use case (Latvia)** is attempting to address a fragmented ticketing system and an outdated transportation fleet in Latvia. This type of change faces challenges with differing regulatory responsibilities across governance levels that create legal uncertainty and limits the scalability of integrated MaaS platforms beyond local pilots.

The **Urban Digital Twin use case (Bulgaria)** is innovating to offer real-time testing for grid stability for renewables. It faces unclear and inconsistent regulatory frameworks for data access and reuse that delays national uptake of city-scale experimentation tools.

Regulatory misalignment and insufficient flexibility for experimentation

Regulatory frameworks have a difficult time keeping pace with emerging technologies, creating structural barriers to experimentation and scaling (FINEX Energy Workshop; FINEX Sandboxes and AI

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Workshop). Often slow and complex permitting procedures delay renewable energy deployment, infrastructure development, and cleantech testing more broadly (Policy Lab Results Report).

Additionally, successful experimentation spaces in place today have been structured around strict rules, heavy application and compliance requirements, which often also lack flexibility (FINEX Energy Workshop). Additionally, as experimentation practices evolve, there will be a growing need to create pathways that allow inclusive experimentation for smaller actors (such as SMEs) with fewer resources and capacity.

Example:

The **Smart RE Systems (AI + Storage) use case (Lithuania)** is looking to optimise and address renewable energy grid inefficiencies using AI management tools. Experimentation for this often has rigid compliance requirements that are not yet adapted to AI-driven optimisation and storage integration. Increasingly tailored derogations are needed for startups to test grid-level innovations under real operational conditions.

The **Smart Energy Retrofit Kits use case (Bulgaria)** is innovating to produce modular energy efficient retrofitting for buildings, but current experimentation is constrained by standard building regulations that are not yet adapted to modular, incremental testing approaches. It also struggles with slow and complex permitting.

The **Grid Digital Twins use case (Cyprus),** (outlined above) also faces slow and complex permitting processes that delay the deployment of digital tools needed to manage high renewable penetration.

Capacity, data and trust

Cumbersome participation requirements, such as detailed applications, risk plans, and compliance procedures, combined with limited awareness of what sandboxes are and how to access them, significantly constrain uptake, particularly among firms and local authorities. There also exists capacity and skills gaps in regulators and operators, limited mandates and resources at local level, and low levels of public trust and citizen acceptance (notably in mobility and energy transitions), which slow reform momentum and delay policy action (Policy Lab Results Report).

Fragmented data governance and weak interoperability, combined with unresolved privacy, ethics, and ownership concerns, create data silos that limit the scaling of digital twins and data-driven innovation while simultaneously constraining data sharing for open data hubs and citizen-science initiatives (Policy Lab Results Report).

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Example:

The **Water Contamination Simulation (Cyprus)** is looking to create a digital twin for safe water testing within aging infrastructure. It faces barriers in creating and testing because of a lack of shared data standards that prevents integration into a unified simulation model.

The **Grid Digital Twins use case (Cyprus)** (outlined above) is faced with this challenge also, because limited institutional capacity and fragmented data availability prevent real-time testing and scaling of grid resilience solutions.

For the **LAT-MaaS+ use case (Latvia),** (outlined above) a barrier is also that low citizen trust and behavioural resistance to shared mobility reduces uptake, discouraging policymakers from advancing regulatory reform.

Lack of market incentives and public procurement

Weak demand-side incentives mean that sandboxes are often perceived as an additional regulatory burden rather than a business opportunity. The absence of incentives for circular construction and limited support for private grid investment further reduces market engagement (FINEX Energy Workshop; Policy Lab Results Report). Funding gaps for these technologies also slow uptake, for example mobility pilots typically end after 6–24 months without municipal budgets for scale-up, building renovations remain underfunded, and resources for replicating successful pilots (e.g. digital twins or resilience tools) are scarce (FINEX Sandboxes and AI Workshop; Policy Lab Results Report).

Example:

The **Circular Building Reuse use case (Estonia)** is creating a materials bank and digital twin to offer real-time data management on construction materials use. It faces difficulties with few incentives and/or mandatory reuse protocols that limit the market viability of circular construction solutions.

The **LAT-MaaS+ use case (Latvia)** (outlined above) illustrates how pilot mobility projects struggle to scale when municipal budgets and procurement frameworks do not support long-term deployment.

The digital twin use cases in Cyprus (outlined above) also face this barrier.

Governance and coordination difficulties

Fragmented governance structures such as conflicts between city, regional, and national transport planning, fragmented ministerial mandates and siloed data governance, significantly hinder the scaling of MaaS solutions or digital twins (Policy Lab Results Report). Frequent regulatory changes also discourage investment, and there is currently an absence of systematic mechanisms to translate experimentation outcomes (such as sandbox pilots and digital twins) into permanent regulatory reform (Policy Lab Results Report).

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Example:

Open Data Innovation Hubs use case (Bulgaria) that is working to enable local collaboration through shared data, and the **Urban Digital Twin use case (Bulgaria)** (outlined above) exist in a context where siloed mandates across ministries and agencies prevent experimentation results from feeding into regulatory or planning reforms. Innovation in policy is needed to incentivise and offer new protective models for data sharing.

The **Smart Flood Resilience Toolkit (Estonia)** seeks to address coordination shortcomings for responses to flooding through a decentralised response platform, again needing to breakthrough siloed governance and data sharing.

3.7.2 Levers to overcome barriers for experimentation

The table below outlines the ten most relevant policy levers identified during the four FINEX policy labs by policy, industry and research actors (2025). These levers can be used as signposting for pathways for action, as later introduced in section 4.2. Different types of levers can be used to address various barriers (Fig 12). “Equity, Inclusivity and Access” as well as “Monitoring, Metrics and Impact Assessment” are cross cutting levers that can, and should, be used throughout the policymaking process to address all barriers. These levers and barriers are then utilised to inform the strategic policy roadmap and recommendations presented in the following section.

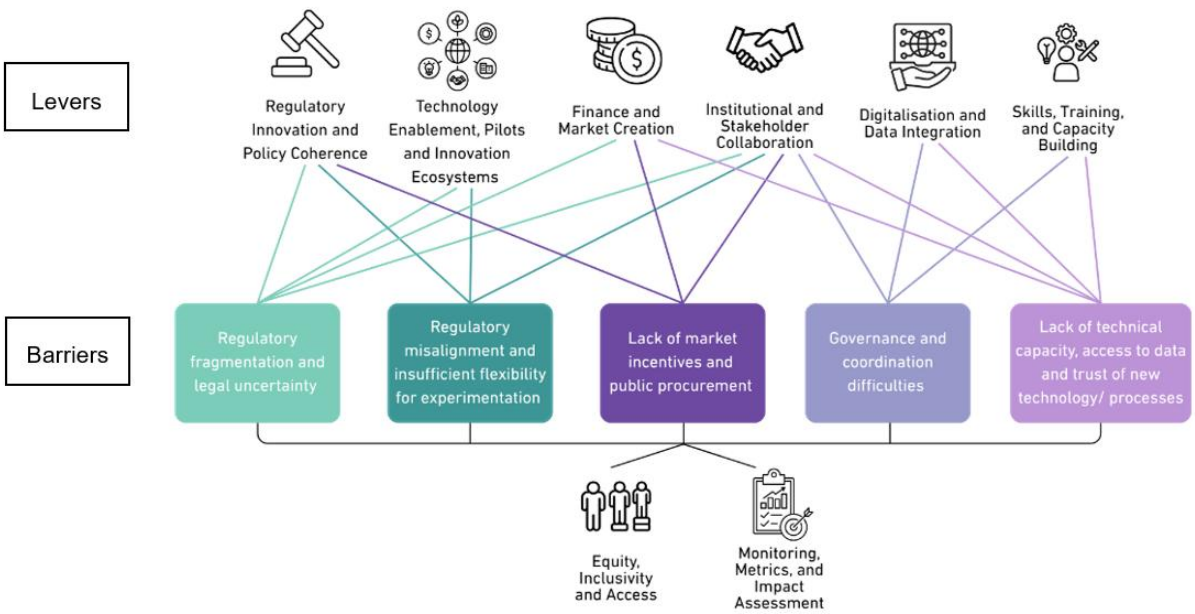

Figure 12: Key barriers identified during the FINEX policy labs, and the levers to address them.

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PART IV: Policy Roadmap

In the previous section, the research establishes that there are gaps in the planning and maturity of experimentation spaces (testbeds, regulatory sandboxes, and living labs) that are central to the uptake of deep/cleantech innovation in Europe. This roadmap seeks to address this gap by providing a vision and pathways for development at policy level.

This section is based on and was developed using the roadmap methodology as defined by Miedzinski et al. (2019). This methodology, utilised during policy labs that bring together perspectives from industry, research and policy actors, follows a three-step process:

1. Craft an overall vision for objective-setting, separated out into short-, medium- and long-term visions for innovation and systems change for a sector or innovative context, in this case for cleantech development and scaling in energy, mobility, built environment, and governance and data.

2. Based on these concrete visions, pathways to achieving the visions are established by identifying arriers and levers for each sector.

3. From there, policy instruments are identified to support the creation of a strategic action plan with policy recommendations.

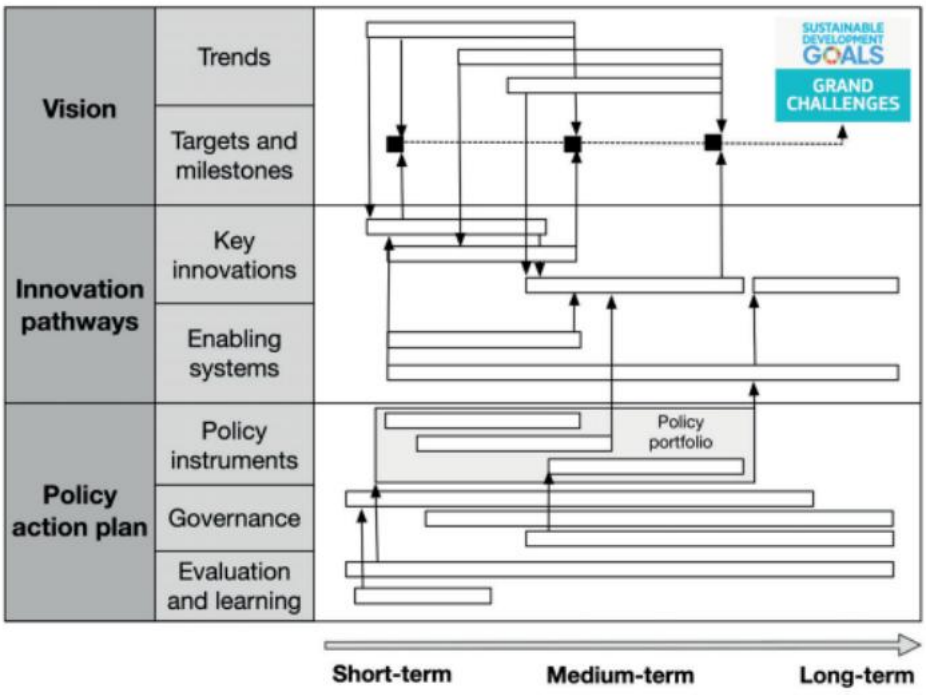

Figure 13: Policy roadmap methodology as outlined by Miedzinski et al. (2019).

The proposed FINEX policy roadmap gives a macro-European-level analysis of pathways for systemic change and integration of cleantech solutions across four core sectors: energy, mobility and transport, the built environment, and governance and data. This roadmap can then be utilised as a tool by national policymakers and actors for the creation of national and regional roadmaps, per sector.

The policy roadmap outlined in this section for the FINEX project is detailed as follows:

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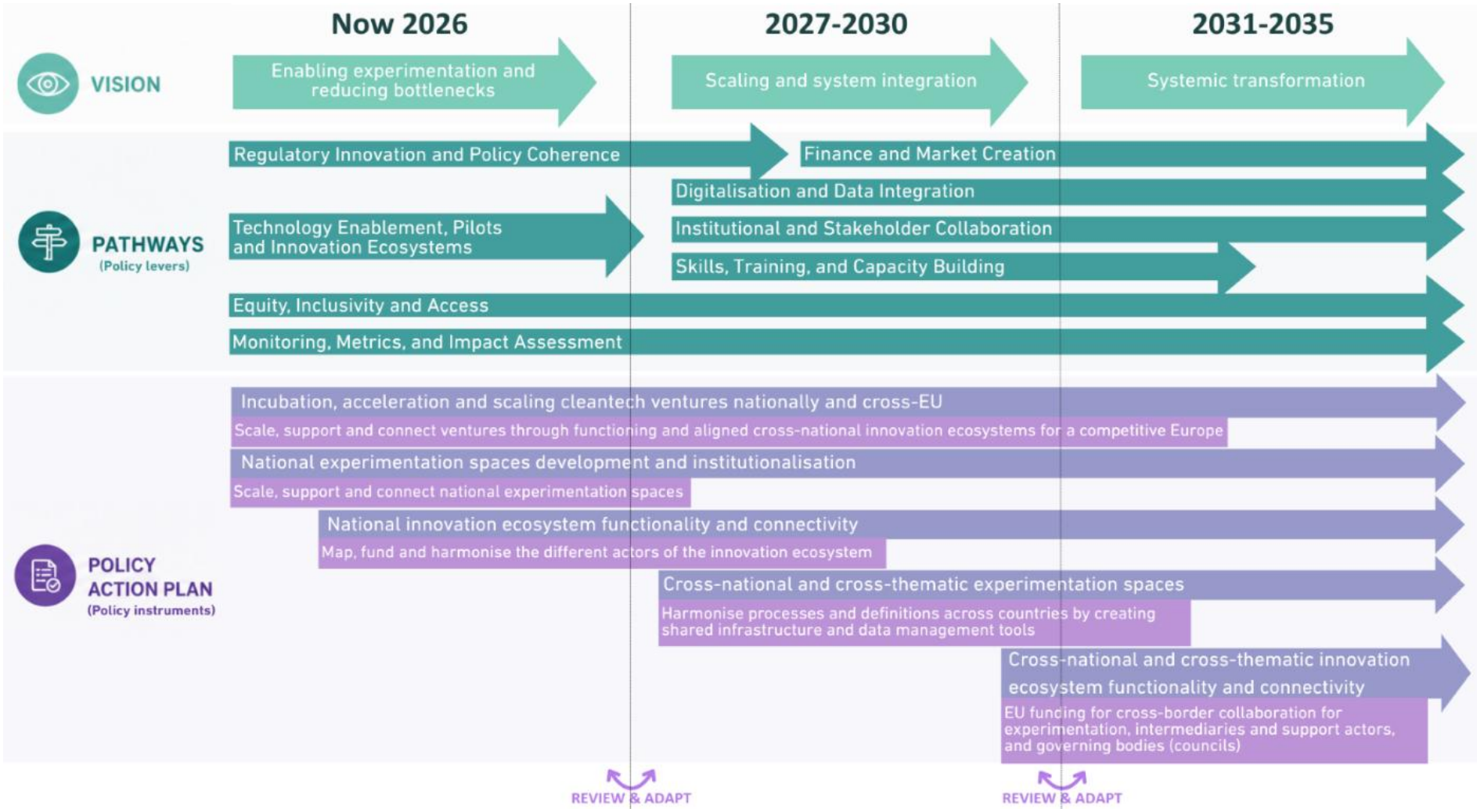

Figure 14: FINEX policy roadmap. Based on the Miedzinski et al. (2019) framework.

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THE VISION

By 2035, Europe will operate an increasingly integrated, data-driven, and citizen-centred cleantech ecosystem in which energy, mobility, buildings, and governance systems are digitally interconnected, low-carbon, and resilient. Cleantech ventures will be supported by adaptive policy frameworks that are enabled and informed by scaling platforms and spaces (living labs, sandboxes, testbeds) allowing continuous experimentation, learning, and widespread adoption of innovation and business models in well-functioning ecosystems across European regions.

4.1 The vision

The results from all four policy labs establish a clear vision for shaping the role of deep/cleantech in Europe – as outlined above.

This vision would:

- Deliver energy independence and decarbonisation
- Enable facilitated, inclusive, and sustainable mobility
- Ensure climate-resilient and circular built environments
- Be governed through interoperable data systems, participatory governance, and coordinated multi-level policymaking

In the short term, priorities focus on enabling experimentation by reducing regulatory and administrative barriers and strengthening pilot demonstration by embedding experimentation into digital governance systems, enabling continuous learning, adaptive and equitable regulation. In the medium term, the emphasis shifts to scaling solutions through market creation, integrated digital infrastructure, building capacity through skills and knowledge, and increasing collaboration across the ecosystem. In the long term, the objective is to create clear pathways for ventures to scale thanks to high-functioning and connected ecosystems with experimentation spaces as key enabling infrastructure.

***The short-term vision (Now–2026):* Experimentation spaces and alignment**

Europe can begin by establishing the foundations for systemic transformation by enabling experimentation, improving coordination, and reducing key regulatory and administrative bottlenecks. Embedding experimentation into regulations and digital governance systems allows for continuous learning, adaptive and equitable regulation. Early pilots, digital tools, and regulatory innovations begin to demonstrate the value of integrated cleantech systems.

The medium-term vision (2026-2030): Scaling and integration

Cleantech solutions are scaled and embedded into core systems through market creation, supported by aligned and adaptive policy frameworks, cross-sector integration, and stronger public-private collaboration. Digital infrastructure, particularly data platforms and digital twins, enables system-wide optimisation and real-time decision-making. Capacity is built through skills and knowledge uptake, and increasing collaboration across ecosystems.

The long-term vision (2031-2035): Systemic transformation and institutionalisation

Cleantech systems become mainstream, self-sustaining, and institutionalised, with integrated governance models, strong citizen participation, and resilient, low-carbon infrastructures across all sectors. European-wide innovation ecosystems are well-functioning and connected, and experimentation spaces are central facilities that connect ventures to policy, the market and other support actors.

These visions serve as directional milestones for systemic change across Europe.

4.2 Pathways for action (policy levers)

The following section highlights recommended pathways to achieving the vision set out for clean tech in Europe. This report argues that in order to have high functioning innovation ecosystems at national and European level,

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experimentation needs to be at the centre of policy and processes.
The four thematic policy labs highlight a range of policy levers to accelerate decarbonization, adaptation, and sustainability to craft concrete pathways forward. Though each domain operates under distinct technical and institutional conditions, several cross-cutting issues emerge:

- Fragmentation in governance structures inhibits systemic innovation.
- Regulatory environments are often rigid, slowing cleantech deployment.
- Public-private collaboration is essential but underdeveloped.
- Digital infrastructure remains uneven and underleveraged
- Capacity building needs are pervasive, especially at local levels.

Though each sector presents common challenges, the pathways diverge depending on sectoral specificities, technical maturity, and institutional readiness. The policy levers outlined below (1-8) attempt to showcase some of these specificities by sector.

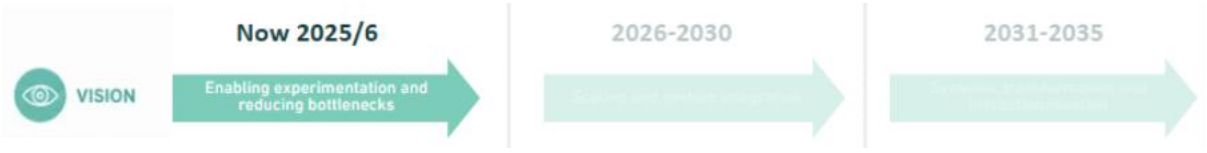

Figure 15: Pathway for action 1

Regulatory innovation and policy coherence

All sectors require regulatory innovation to integrate and scale the use of experimentation and increase access to the market for cleantech; this takes the form of regulatory harmonisation, simplification, restructuring permitting processes, or integrating novel axes for regulatory innovation that adapts to changing technologies and systems. Examples from the FINEX pilot cases are shown below:

- **Energy**: Need for stabilizing regulatory frameworks and enabling cleantech testing through pre-competitive procurement. Digitize regulations for better compliance and oversight.
- **Mobility**: Regulatory innovation for ecodesign, procurement incentives, and modernization mandates (e.g., fleet updates), with additional attention to business model transformation.
- **Built Environment**: Incentives and mandates for sustainable construction. Policy levers focus on retrofitting and regulatory dashboards to monitor impact.
- **Data & Governance**: Regulatory sandboxes and simplified permitting. Policy alignment between national and local levels and regulatory frameworks for AI.

→ *Convergence*: More adaptive, clear, and integrated regulations are needed to de-risk innovation and enable scale across all sectors.
→ *Divergence*: Need for digital regulatory environments for energy and data sectors; structural reforms and procurement as key levers for mobility and built environment sectors.

Technology Enablement, Pilots and Innovation Ecosystems

The use of technology for increased efficiency, data collection and connectivity is central to all cleantech sectors. Access to needed technology, testing and deployment can be found in functioning ecosystems, where experimentation can support pilot demonstration to derisk and increase attractiveness for investment.

- **Energy**: Cleantech testing, rapid permitting, and digital grid stabilization
- **Mobility**: Technology for tracking, interoperability, and clean vehicle transitions
- **Built Environment**: AI-enhanced retrofitting, BIM integration, and

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systemic innovation across fragmented actors
- **Data & Governance**: Innovation as a socio-technical system requiring ethical standards, sandboxes, and open platforms

→ *Convergence*: Technology as both a solution and a disruptor requiring safeguards and enablement.
→ *Divergence*: Only Data/Governance systematically addresses ethical, geopolitical, and rebound effects of technology.

Figure 16: Pathway for action 2

Finance and Market Creation

Finance acts as a key enabler of change, allocating resources and allowing for new markets to emerge. This can take the form of public and/or private investment, funding programmes, taxation amendments, incentives, and more. Different sectors require specific tools based on the challenges they face, outlined below:

- **Energy**: Private-public investment across development stages and targeted cleantech scaling.
- **Mobility**: Tax incentives for green transport and shared mobility, including infrastructure modernization.
- **Built Environment**: Market mechanisms for circular economy practices and energy-efficient retrofitting.
- **Data & Governance**: Public funding for climate services, resilient infrastructure, and trust-enabling datasets.

→ *Convergence*: Finance as both enabler and constraint, calling for better targeted public funds and private leverage.
→ *Divergence*: Data sector focuses on non-market value and public goods; energy/mobility sectors prioritize returns and scale.

Digitalisation and Data Integration

Digitalisation plays a key role in connectivity: increasing visibility, communication and functioning for all ecosystems actors. The green transition, and cleantech more specifically, needs data to enable testing, feedback loops, adaptation and monitoring of systems change.

- **Energy**: Digitalization is treated as both a goal and a tool—embedding law compliance into platforms and improving grid/ permitting systems.
- **Mobility**: Real-time tracking, predictive models, and a multimodal journey planner.
- **Built Environment**: BIM and AI use in retrofitting and materials selection. Integration with educational platforms.
- **Data & Governance**: Open data hubs, digital permitting, secure data environments, and policies for AI ethics and privacy.

→ *Convergence*: Digital infrastructure is seen as a critical enabler for resilience and efficiency.
→ *Divergence*: Energy and data sectors invest in system-level integration, while mobility and building sectors focus more on operational applications.

Institutional and Stakeholder Collaboration

Collaboration and connectivity across the entire ecosystem allow for higher functionality, knowledge sharing and co-creation and can be implemented in many ways depending on the sector or challenge faced. Some examples are through public private partnerships, clusters, councils, or cross-sector partnerships. Some are exemplified below based on the sector:

- **Energy**: Public-private partnerships for innovation deployment, including skills programs.
- **Mobility**: Institutional innovation to rethink KPIs, governance models, and

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intermodal planning, with emphasis on regional coordination.

- **Built Environment**: Cross-sector innovation ecosystems and better horizontal alignment between government levels.
- **Data & Governance**: Inclusive stakeholder models (e.g., advisory councils), cross-sector partnerships, and a Cleantech Task Force.

→ *Convergence*: Fragmented institutional arrangements and new governance formats to foster collaboration have been proposed across all sectors.
→ *Divergence*: Data & Governance has the most developed models for stakeholder diversity and equity; others focus more on inter-institutional coherence.

Skills, Training, and Capacity Building

As new markets emerge, training and the transmission of new skills are priorities for capacity building for a green economy to give consumers and employees the opportunities needed to adapt to change.

- **Energy**: National reskilling programs aligned with private sector and citizen needs.
- **Mobility**: Workforce needs evolution through fleet modernization and business model change.
- **Built Environment**: Focus on education—from vocational to in-company training in circular and cleantech practices.
- **Data & Governance**: Capacity building within public agencies and inclusion of community data agents.

→ *Convergence*: Skill gaps as a barrier to innovation uptake across all sectors.
→ *Divergence*: Built Environment is the most advanced in defining educational pathways and workforce strategies.

Figure 17: Pathway for action 3

Equity, Inclusivity and Access

This lever is cross-cutting and needs to be integrated and adapted throughout the scaling of cleantech ecosystems and new ventures. Examples of starting points for each sector are outlined below, and macro-level European action points are outlined in the next section.

- **Energy**: Support for state-owned companies and public workforce reskilling, aiming to avoid leaving behind traditional energy sector workers (inclusivity).
- **Mobility**: Disparities in transport access, particularly in rural areas or among lower-income users. Need for intramodality and smart pricing to expand equitable access.
- **Built Environment**: Incentives are needed for geographically and socioeconomically accessibility.
- **Data & Governance**: Advocating for ethical standards and accountability in data collection, gender-sensitive policy making, community ownership models, and participation of underrepresented groups.

→ *Convergence*: Equity challenges exist across all sectors, whether in terms of access to infrastructure, services, or participation in the transition.
→ *Divergence*: Only the Data & Governance domain offers a structured and intersectional inclusion strategy. The others, while acknowledging access gaps, tend to frame equity more in economic or geographic terms rather than institutional or structural terms.

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Monitoring, Metrics, and Impact Assessment

This lever is also highly cross-cutting as processes for impact assessments and monitoring are essential for systems level change in order to embed and correct as clean tech is tested and scaled.

Energy: Improved systems for measuring impact of clean tech rollouts and procurement policies.
Mobility: Real-time OD matrices and behavioural impact tracking.
Built Environment: Dashboards to track regulatory compliance and material reuse.
Data & Governance: Data gaps that need harmonized metrics across levels of governance.

→ *Convergence*: Question on how to measure systemic transformation.
→ *Divergence*: Built and mobility sectors focus on operational indicators; data sector emphasizes meta-governance and knowledge systems.

4.3 Policy action plan (policy recommendations)

This next section outlines system-level policy recommendations that embed experimentation spaces into cleantech innovation ecosystems to increase overall ecosystem functionality and development at national and EU-levels.

The figure below, taken from the policy roadmap (Fig 14) indicates that incubation, acceleration and scaling nationally and at EU-level, is already of high priority in the EU but needs continued support and strengthening alongside experimentation and ecosystem development strategies. **Countries with high maturity are those that have dedicated infrastructure (experimentation spaces), entrepreneurial support organisations (intermediaries), as well as finance and regulatory support that connect the ecosystem actors within an enabling environment.** Achieving this nationally then can allow for increased connectivity cross-thematically and cross-nationally to facilitate experimentation and bring innovations to the market on a European scale.

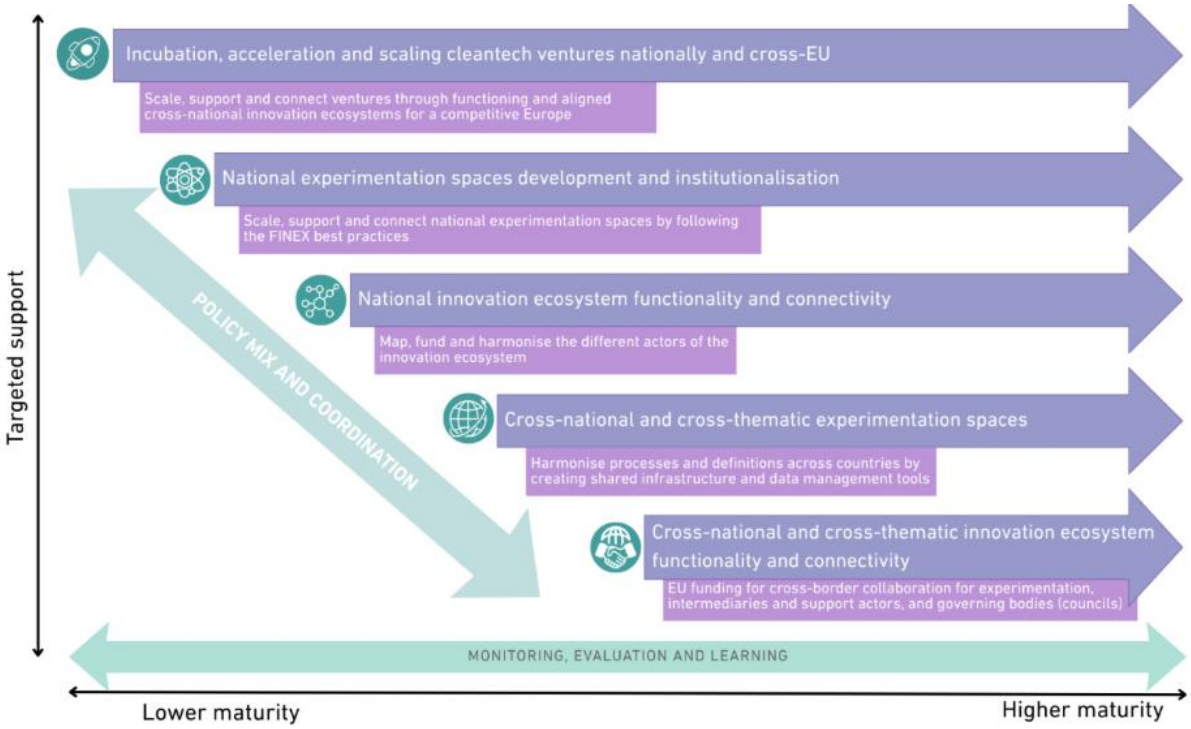

Figure 18: Policy action plan (recommendations).

Acceleration and incubation are beyond the focus on this report and will not be included in the policy recommendations. This section gives European-level policy recommendations for scaling experimentation, and for increasing

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functionality of innovation ecosystems, at national and cross-national levels.

National experimentation spaces development and institutionalisation

Experimentation spaces and their role in scaling cleantech have only just recently begun to be included at policy level across all FINEX countries (Annex II). Although some regulations and strategies exist, the recommendations below offer next steps for countries to use in integrating experimentation for innovation regulation adapted for cleantech scaling.

- Embed adaptive regulation mechanisms (e.g. sandbox frameworks, iterative regulation), by including experimentation exemptions in legislation to allow controlled and monitored real-world testing for new technologies.
- Improve regulatory learning mechanisms using data from sandboxes and living labs.
- Create a dedicated council to monitor and relay experimentation results to regulatory authorities.
- Create pathways for SMEs and ventures with fewer resources or capacity to access experimentation spaces and be included in cleantech innovation ecosystems.
    - A new *Charter of access for industrial users to research and technology infrastructures*, is being drafted to help better include and give access to research infrastructure for SMEs (stems from the EU Startup and Scaleup Strategy) (European Commission, 2025).

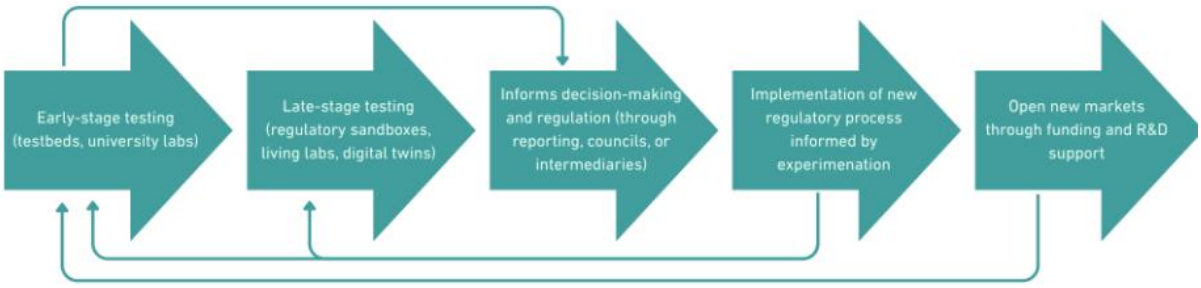

Figure 19: Connecting national experimentation spaces to policy and innovation ecosystems

National innovation ecosystem functionality and connectivity

As experimentation spaces take on larger roles in, and are connected to, innovation ecosystems for cleantech, visibility and collaboration between all actors are essential for building maturity at the national level, creating a base off which to connect cross-thematically and cross-nationally. Recommendations for this stage include:

- Fund and connect intermediary bodies to map and support ecosystem coordination and development. Examples of current ones are: Cleantech for Europe has regional chapters for the Baltics, France, Nordics, Iberia, and the UK that connect ecosystem actors, translate policy and support cleantech venture scaling, amongst other functions.
- Alleviate smaller ventures' challenges with capacity and access by funding intermediaries for administrative and reporting services, directly connected to experimentation space infrastructure, accelerator or incubator programs.
- Integrate digital tools for real-time governance, citizen and ecosystem actor engagement.
- Expand reskilling and vocational training linked to green jobs across the entire ecosystem to increase knowledge sharing for cleantech sectors.

Additional recommendations on developing and strengthening innovation ecosystems at the national level can be found in the figure below,

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developed by IDIA and the Ecosystem Strengthening Working Group (2021):

Table 2: Guiding principles for designing/developing ecosystem strengthening initiatives (IDIA and the Ecosystem Strengthening Working Group, 2021).

Guiding Principles For Designing / Implementing Ecosystem Strengthening Initiatives			
Recognise the diversity of actors who play a role in the innovation and scaling process, and ensure any intervention is contributing to strengthening the connectivity and trust among these actors.	Utilise political economy analysis tools to **understand inequities within the ecosystem** to do with power, resources, norms and values, and integrate ways to redress these inequalities within ecosystem strengthening initiatives.	**Engage governments at all levels from the very beginning** to maximise the depth, breadth and sustainability of any impact brought about through ecosystem-strengthening initiatives.	Consider how to **engage, learn from and help influence smaller, local level players and processes alongside the larger actors** and institutions, particularly where they have potential to deliver greater impact through collective organisation.
Ensure that interventions **prioritise local ownership of innovation processes** in order to support sustainability, and be cognisant that it may be more appropriate to help ready local actors in that system to drive change rather than going in to try and 'fix' problems that have been identified.	**Focus on one (or a subset of) ecosystem challenges**, rather than trying to tackle too many issues at once.	Recognise that while ecosystem-strengthening interventions are typically designed to promote incremental improvements, they can also **potentially be vehicles for driving larger systems innovation**.	**Embed feedback loops and agile monitoring and evaluation mechanisms** into any collaborative approach to capture learning and iterate models accordingly to ensure the benefits of the intervention are distributed in an inclusive manner.

Cross-national and cross-thematic experimentation spaces

One of the main objectives of the FINEX project is to map and connect experimentation spaces across countries to strengthen access to worldclass testing facilities for all European ventures. Today, challenges remain as legal frameworks remain fragmented and complex. Recommendations to overcome some of these challenges include:

- Harmonise cross-border testing procedures and standards to enable scaling across EU markets: A new European communication *Towards a 28th* regime for EU companies, seeks to harmonise taxation and regulatory structures across the Union in order to streamline processes for innovative companies and startups. Though not specifically for cleantech, this model could be applied to experimentation for the sector (European Commission, 2026a).
- Create a unified application, funding, and monitoring processes: The Connecting Europe Facility (CEF), managed by Commission work programmes and CINEA with Member State involvement, creates a single regulatory interface that aligns national project standards, legal frameworks, and permit requirements, actively reducing fragmented national regulations and enabling coordinated deployment of strategic cleantech across energy, mobility and digital infrastructure (European Commission, 2021).
- Develop EU-wide experimentation access platforms for knowledge sharing, visibility/mapping of testing facilities (sandboxes, testbeds, living labs), and cross-national collaboration: The FINEX resource catalogue is a start that could be built on (D4.1 FINEX Support Resources Mapping).
- Strengthen connections between experimentation spaces and market deployment pathways through public-private partnerships.

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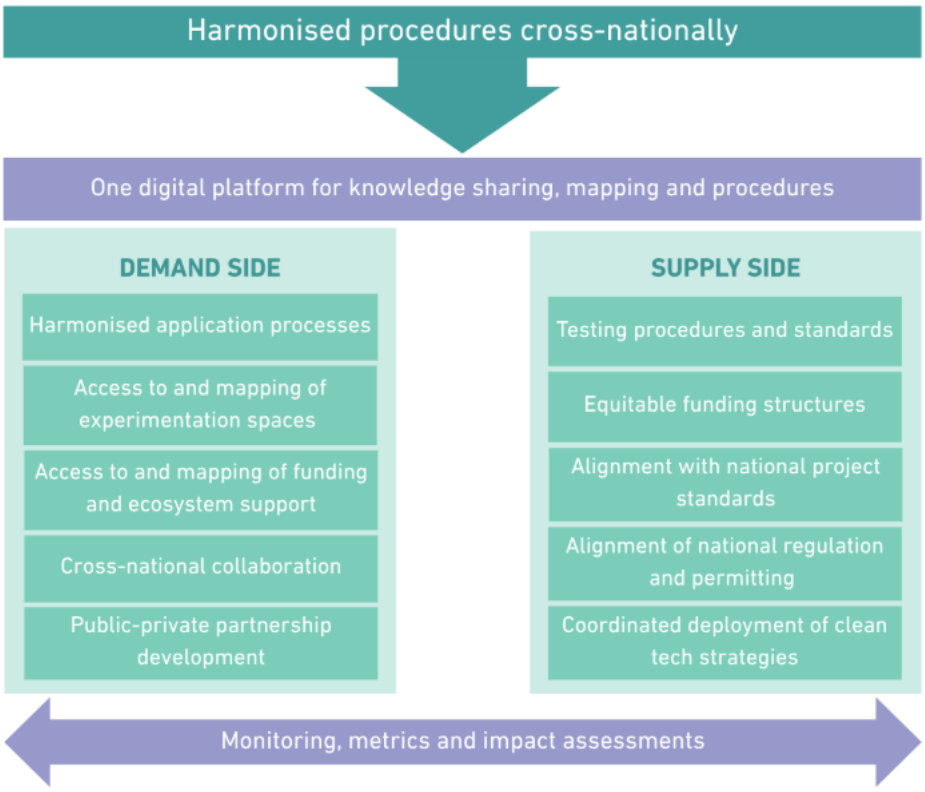

Figure 20: Harmonised procedures for cross-national experimentation in the EU.

Cross-national and cross-thematic innovation ecosystem functionality and connectivity

When experimentation spaces are connected within a functioning ecosystem at the national level and are visible and accessible cross-nationally, European innovation can be tested, supported and scaled through multiple channels cross-nationally, allowing for facilitated and increased uptake. This needs to be supported by an enabling environment:

- Establish and support multi-level coordination bodies linking EU, national, regional, and local actors. Current examples include: The Cleantech Friendship Group (32 MEPs, co-chaired Pereira & Pellerin-Carlin); monthly briefings with Commissioners; and Cleantech for Europe, including its national chapters: Cleantech for Iberia, for UK, for Baltics, etc...
- Support and connect intermediary bodies for ecosystem coordination and development at EU level (ex: Cleantech for Europe or national clusters).
- Support and liaise with coalitions of industry leaders in the shaping of policy for new technologies: Electrolysers for Europe (E4E) secretariat is a coalition of EU electrolyser producers who have come together to inform and strengthen policy for hydrogen production in Europe.
- Create cleantech investment and coordination platforms to align public and private actors: Through programs such as Emissions Trading Systems, as called for by industry in March 2026 through an open letter with over 100 signatories. The open letter argues that maintaining a strong, predictable, and stable EU Emissions Trading System (ETS) is essential for ensuring investment certainty, supporting industrial competitiveness, and scaling cleantech solutions in Europe, while warning that weakening the ETS would undermine both decarbonisation efforts and long-term economic resilience.

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Another proposed pathway is through a Clean Industrial State Aid Framework (CISAF) to support the objectives of EU Clean Industrial Deal. This open letter argues that the EU should redesign the Clean Industrial State Aid Framework (CISAF) to provide faster, more predictable, and production-based public support mechanisms, enabling large-scale cleantech manufacturing investment (CleanTech for Europe, 2025).

The Industrial Accelerator Act (IAA) proposes a regulatory framework to expand manufacturing capacity in strategic cleantech sectors by simplifying permitting, strengthening investment conditions, and supporting the scaling of net-zero technologies across Europe (Directorate-General for Internal Market Industry Entrepreneurship and SMEs, 2026).

Overarching steps to implement the recommendations were summarised in the FINEX Best Practices report (D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces) and are outlined again below:

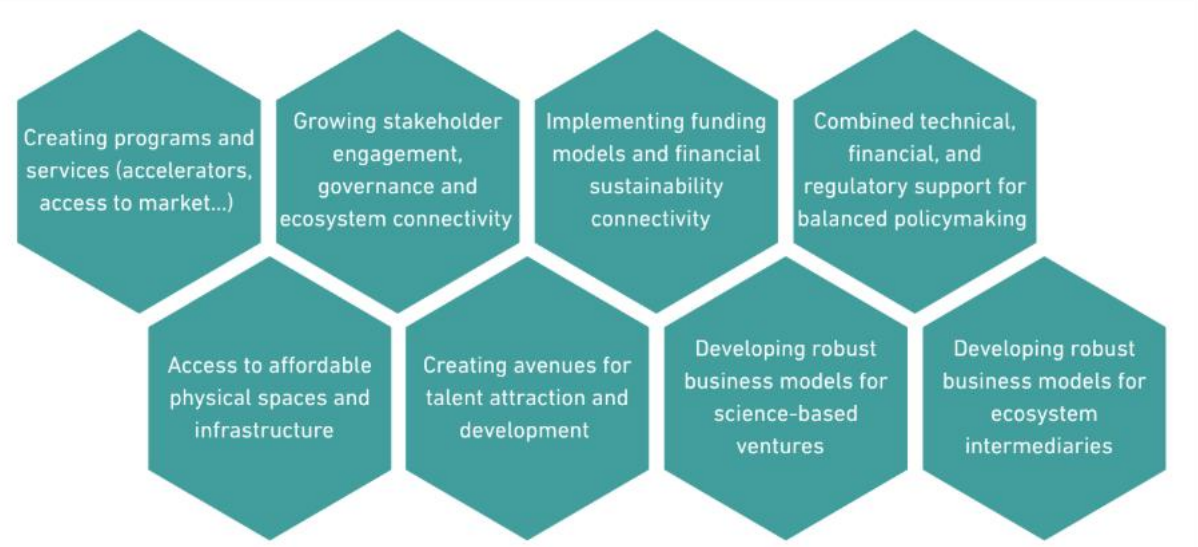

Figure 21: FINEX Best Practices for embedding experimentation spaces into cleantech ecosystems and increasing overall functionality (D4.2 Stimulating and Connecting the FINEST Experimentation Practices and Spaces).

Each thematic policy lab produced a rich set of recommendations tailored to their specific context (see Cleantech Priority Areas Selection for more details) the key ones are outlined below:

- Energy: Regulatory stability, cleantech procurement, and public-private R&D partnerships (parts of this are being addressed in the Innovation Fund Heat Auction, €400M, May 2026).
- Mobility & Transportation system: Governance reform, smart taxation, business model innovation.
- Built Environment: Retrofitting incentives, digital construction tools, circularity.
- Data & Governance: AI policy development and refinement, open data hubs, inclusive participation models.

Overall, a combination of measures, regulations, and funding are needed to enable and develop systemic change, it is the measured implementation of all of these axes that will allow for cross-national ecosystem functionality, with monitoring and feedback loops guiding and correction pathways for change.

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PART V: Key insights and next steps

The objective of this report has been to develop a research-based, strategic policy agenda and recommendations for scaling cleantech experimentation spaces across the FINEX countries, situating these facilities as central to broader innovation ecosystem functionality and development. The roadmap situates national dynamics within the broader European policy context and synthesises evidence from policy labs, workshops, and policy analysis. It has presented a structured assessment of key barriers, enabling conditions, and priority policy areas across energy, mobility, the built environment, and governance/data sectors, with practical pathways for systemic transformation.

This report showcases that experimentation spaces already exist and have some national and EU level support across the FINEX countries, but remain fragmented and underutilised, slowing the uptake of clean tech innovation. This challenge requires stronger alignment and collaboration between ecosystem actors, clearer regulatory frameworks and funding mechanisms, and digitalised governance structures at both national and EU level. The policy recommendations and agenda detailed in this report have the aim of connecting experimentation spaces to their national and EU-level innovation ecosystems through strategic policy recommendations and a roadmap.

The analysis is subject to certain limitations, notably the relatively small sample of intermediary stakeholders in the FINEX partner survey, which limits the generalisability of findings and would benefit from expansion in future research. Similarly, experimentation spaces owners were not interviewed further, they were invited to the policy labs, but the research could be taken further by gathering more in-depth data from specific stakeholder perspectives. Additional limitations include uneven data availability across countries and reliance on workshop-based qualitative inputs, which means information could have been missed, suggesting that further work could incorporate more systematic quantitative analysis and longitudinal tracking of experimentation outcomes.

Looking ahead, additional research should focus on mapping and strengthening intermediary actors, better understanding how to measure and support maturity as well as effectiveness of policy in scaling ecosystems and experimentation.

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List of Terms and Definitions

Abbreviation	Definition
CAD	Computer-aided design
CE	Conformité Européenne
Deep tech	"Deep tech is technology that is based on cutting-edge scientific advances and discoveries and is characterised by the need to stay at the technological forefront by constant interaction with new ideas and results from the lab. Deep tech is distinct from 'high tech' which tends to refer only to Research & Development intensity." - European Innovation Council standard definition
DEI	Diversity, Equity and Inclusion
EC	European Commission
ESO	Entrepreneurial Support Organization
EU	European Union
GA	Grant Agreement
HVAC	Heating, ventilation, and air conditioning
IE	Innovation Ecosystem[4]
IP	Intellectual Property
KPI	Key Performance Indicator
MSMEs	Micro, Small and Medium Enterprises
RCC	Resources, Competences and Capabilities
R&D	Research and Development
TRL	Technology Readiness Level
UL	Underwriters Laboratories
WP	Work Package

[4]European Commission (2023). Retrieved from:https://eismea.ec.europa.eu/programmes/european-innovation-ecosystems_en#european-innovation-ecosystems

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Annexes

Annex I: Current policy landscape at EU-level for cleantech

Instrument	Status / Timeline	Type	Sectors Covered	Sector specifics	Key Elements for Cleantech Ecosystems
Electrification Action Plan	Announced in Clean Industrial Deal; expected 2026; consultation closed Nov 2025	Action Plan	Industry, Transport, Built Environment, Renewable Energy	Industry, transport, buildings, grids	KPI: 32% electrification share of final energy by 2030 (from ~21%). Supports industrial heat electrification, fleet electrification, grid-industry integration. Removes barriers to direct electrification in industry.
ReSourceEU Action Plan	Adopted Dec 2025	Action Plan	Industry, Circular Economy	Critical materials, circular economy, supply chain resilience	Strategic raw material security through recycling, substitution, and supply diversification. Links to CRMA and Circular Economy Act.
Hydrogen Policy — RFNBO Rules & Low-Carbon Hydrogen Framework	RFNBO rules simplification under review (2026); low-carbon hydrogen framework in development	Delegated Acts / Policy	Renewable Energy, Industry	Hydrogen production, electrolysers, industrial fuel switching	Additionality, temporal, and geographical correlation rules for renewable hydrogen (RFNBO). Revisions to simplify/clarify eligibility. Low-carbon hydrogen framework to cover blue/natural hydrogen.
Industrial Decarbonisation Bank (proposed)	Announced / under development 2026	Financing Instrument (under development)	Industry, Renewable Energy	Heavy industry, hydrogen, industrial process heat, CCUS	Proposed dedicated financing facility for industrial decarbonisation — supplements EHB and Innovation Fund. Would provide long-term low-cost loans and guarantees for industrial scale-up.
European Hydrogen Bank (EHB)	2nd auction closed May 2025; €992M awarded; further auctions planned	Funding Mechanism / Auction	Industry, Renewable Energy	Green hydrogen production (RFNBO), electrolyser manufacturing	Competitive auctions for green hydrogen; premium paid per kg over 10 years. RFNBO compliance required. Connects to cross-border hydrogen corridor ambitions. Industrial process heat auction also in development.

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Innovation Fund	2025 calls: €5.2bn total; reform discussions linked to ETS review; Battery Call €852M (Jul 2025)	Funding Programme	Industry, Renewable Energy	Low-carbon tech, renewables, energy storage, industrial decarbonisation, CCUS	Large-scale demonstration grants for innovative clean tech; ETS-funded. €2.9bn awards Nov 2025. Battery manufacturing call €852M Jul 2025. Reform discussions on simplification and alignment with Clean Industrial Deal.
NextGenerationEU (includes the Recovery and Resilience Facility)	In force - 2021	Funding Programme	Economy-wide (all sectors)	Economy-wide (all sectors)	€600+ billion temporary recovery instrument launched in 2021 to help rebuild after the COVID-19 pandemic. Each national strategy must include ~42% green spending per plan as of 2024.
Horizon Europe (2021-2027)	In force - 2021	Funding Programme	Economy-wide (all sectors)	Economy-wide (all sectors)	Funding and R&D support - 93.5 billion. Tackles climate change, helps to achieve the UN's Sustainable Development Goals and boosts the EU's competitiveness and growth.
European Institute of Innovation and Technology (EIT) - InnoEnergy and Climate-KIC	In force - 2021	Funding programme and support	Economy-wide (all sectors)	Economy-wide (all sectors)	R&D support and funding within Horizon Europe, with the aim of strengthening sustainable innovation ecosystems across Europe, entrepreneurial and innovation skills, creating synergies between stakeholders
EU 2040 Climate Target — 90% Net Reduction	Political agreement Nov 2025; legislation (Climate Law amendment) pending	Policy Decision / Forthcoming Legislation	Economy-wide (all sectors)	Economy-wide (all sectors)	Sets binding 2040 target of 90% net GHG reduction vs 1990. Shapes long-term investment signals, sectoral carbon budgets, and National Energy and Climate Plans (NECPs) revisions.
Berlin Declaration on Industrial Decarbonisation	Signed Nov 2025	Political Declaration (17 MS)	Industry	Industry, clean steel, batteries, industrial processes	17 Member States committed to demand-side measures for clean industrial products (clean steel, batteries). Creates political coalition for lead markets.
Industrial Accelerator Act (IAA)	Proposed 4 Mar 2026; rapporteur Christophe Grudler (Renew, ITRE); EP procedure	Proposed Regulation	Industry	Energy-intensive industries, net-zero tech, automotive	Introduces 'Made in EU' and low-carbon requirements in public procurement and public support schemes. FDI screening for strategic cleantech. Permitting simplification. Sandbox provisions for industrial pilots. Target: 20% of EU GDP from manufacturing by 2035.

	underway (joint ITRE/IMCO/INTA)				
Circular Economy Act	Expected 2026 (Commission Work Programme)	Proposed Regulation	Circular Economy, Industry, Built Environement, Renewable Energy	Circular economy, manufacturing, construction, textiles, electronics	To ensure scarce materials used efficiently. Will introduce circular design standards, secondary materials markets, repair rights. Complements CBAM and Innovation Fund. Policy Labs Built Environment takeaways (circular construction) map to this directly.
Public Procurement Act (Directives Revision)	Commission Work Programme Q2 2026; consultation closed Jan 2026; no rapporteur assigned yet	Proposed Regulation / Directive	Circular Economy, Public Procurement	Public sector procurement, all strategic sectors	Revision of 2014/23/EU, 2014/24/EU, 2014/25/EU directives. Will introduce sustainability, resilience and 'Made in Europe' criteria. Enable preference for EU products. Simplify rules for SMEs. Key demand-side lever for cleantech. CfE 'Scale or Fail' report anchors.
Net-Zero Industry Act (NZIA)	In force; implementing acts ongoing (3 acts adopted Jun 2025)	Regulation	Industry, Renewable Energy	Net-zero tech manufacturing (solar, wind, heat pumps, electrolysers, batteries, CCUS, grid)	Strategic project status with accelerated permitting (18-month target). Regulatory flexibility provisions. 40% domestic production target by 2030 for strategic tech. 47 CRMA strategic projects announced Mar 2025.
CBAM — Carbon Border Adjustment Mechanism	Financial obligations from Jan 2026; expansion (indirect emissions, downstream products, anti-circumvention) under discussion	Regulation	Industry	Steel, aluminium, cement, chemicals, fertilizers, hydrogen, electricity	Carbon price equivalence on imports. Scope expansion being debated (indirect emissions, downstream). Anti-circumvention measures. CBAM Omnibus deal reached Jun 2025 (50-tonne threshold, exemptions for SMEs, offshore wind EEZ).

Critical Raw Materials Act (CRMA) — Implementation	In force; 47 strategic projects designated Mar 2025; implementation ongoing	Regulation	Circular Economy, Industry, Data and Analytics	Mining, processing, refining, recycling of strategic/critical materials	Accelerated permitting for strategic projects (24-month target). Benchmarks: 10% extraction, 40% processing, 25% recycling of annual EU consumption by 2030. Strategic stockpiling.
AI Act — Regulatory Sandbox Provisions (Art. 57)	In force Aug 2024; national sandboxes operational by Aug 2026	Regulation	Smart governance, Data and Analytics, Economy-wide (all sectors)	AI systems across all sectors	Mandates at least one national AI regulatory sandbox per Member State by Aug 2026. Sandboxes allow controlled real-world testing with regulatory supervision, personal data processing for public interest, free access for SMEs/startups. Implementing act published late 2025.
Sustainable Products Initiative and Ecodesign Revision	In force - 2022	Regulation	Economy-wide (all sectors)	Economy-wide (all sectors)	Push to make sustainable products "the norm" in the EU. Aims to broaden Ecodesign requirements beyond energy-related products.
European Climate Law	In force - 2021	Regulation	Economy-wide (all sectors)	Economy-wide (all sectors)	From the EU Green Deal – sets targets to reduce carbon emissions by 55% by 2030, and by 90% by 2040, compared to 1990 levels.
Renewables Permitting Omnibus	In force / clarifications May 2025	Regulation (Omnibus Package)	Renewable Energy	Renewable energy (wind, solar, hydrogen)	Simplifies permitting for renewable energy projects. Designated renewables go-to areas with streamlined assessments. Time limits on permit decisions.
Renewable Energy Directives I, II & III	In force - May 2025	Regulation	Economy-wide (all sectors)	Renewable energy (wind, solar, hydrogen), buildings, transport, industry	Sets the EU's binding 42.5% renewables target for 2030 and requires 42% of industrial hydrogen demand to come from renewable sources.

Connecting Europe Facility (CEF)	In force - July 2021	Regulation	Mobility and Transport, Renewable Energy, Circular Economy	Connecting Europe's transport (rail, alternative fuels) transnational collaboration	Establishes a EUR 33.7 billion EU fund for cross-border transport, energy and digital infrastructure projects for 2021-2027, with 60% of the transport budget reserved for climate objectives.
EU ETS Review	Review due Jul 2026 (waste management, aviation scope); ETS2 operational 2027	Regulation / Directive Amendment	Industry, Mobility and Transport	Industry, aviation, maritime, buildings & transport (ETS2)	ETS review examines inclusion of municipal waste (2028), international aviation (2027). ETS2 covers buildings and road transport. Innovation Fund linked to ETS revenue. Carbon price signal essential for cleantech investment certainty. Complements CBAM.
European Grids Package	Proposed Dec 2025; ITRE rapporteurs Penkova (ECR) and Fuglsang (S&D) presented draft reports 6 May 2026	Regulation + Directive	Renewable Energy, Smart governance	Electricity infrastructure, interconnectors, grid planning	Reforms grid planning governance, permitting for grid projects, cross-border interconnection. Energy highways concept. Includes locational pricing reform discussion (EMD). Critical for Baltic synchronisation with continental Europe (BRELL exit) and for hydrogen grid overlay.
Corporate Sustainability Reporting Directive (CSRD)	In force - 2023 and amended in 2026	Directive	Economy-wide (all sectors), Data and analytics	All sectors, cross-cutting	Reporting on environmental impact of corporate processes and products. Value chain reporting obligations mean large in-scope companies will continue requesting sustainability data from their suppliers — so the indirect burden remains for many smaller businesses.
Clean Industrial State Aid Framework (CISAF)	In force — Jun 2025; valid until 31 Dec 2030	State Aid Rules	Industry, Renewable Energy	Clean manufacturing, industrial decarbonisation, clean energy	Replaces TCTF; enables Member States to grant state aid for clean tech manufacturing, industrial decarbonisation and clean energy projects. France approved €11bn offshore wind aid under CISAF (Sep 2025).
EU Startup and Scaleup Strategy	Published May 2025	Strategy	Economy-wide (all sectors)	Startups, deeptech, cleantech, scaleups	Comprehensive strategy to reduce regulatory barriers for startups/scaleups. Scaleup Europe Fund €5bn AUM (Oct 2025). Access to finance improvements. IP framework. Talent mobility.

Clean Energy Investment Strategy	Published Mar 2026; targets €660bn/yr to 2030	Strategy	Renewable Energy	Energy (renewables, grids, storage, hydrogen)	Public and private investment roadmap to 2030. EIB TechEU and CleantechEU Guarantee (Jun 2025) as de-risking tools. Complements Innovation Fund and EHB.
Savings & Investment Union	Announced Mar 2025; implementation ongoing	Strategy / Regulatory Reform	Economy-wide (all sectors)	Capital markets, venture capital, long-term investment	Aims to deepen EU capital markets and channel household savings into productive investment. Reduces barriers for cross-border VC investment. Supports EIC fund-of-funds and cleantech scaleup financing.
European Green Deal	Adopted 2019	Strategy Package	Economy-wide (all sectors)	All sectors, cross-cutting	EU's flagship strategy to achieve climate neutrality by 2050, modern, resource-efficient and competitive economy.
Clean Industrial Deal (CID) & The Clean Industrial Deal State Aid Framework (CISAF)	In force — Feb 2025	Strategy Package and funding programme	Economy-wide (all sectors)	All sectors, cross-cutting	Overarching industrial decarbonisation strategy; support for clean energy, industrial decarbonisation, and cleantech manufacturing until 2030; anchor for IAA, CISAF, procurement reform, hydrogen bank, ETS reform. Sets framework for lead markets, 'Made in EU' criteria, €660bn/yr investment target to 2030.

Source: FINEX D3.1, D4.2, D6.1, and Cleantech Group 2026.

Annex II: Current policy landscape at national-level for the FINEX countries (excluding France)

Cyprus	*Name*	*Description*
Strategy	**Research and Innovation Strategy Framework 2024–2026** (built on strategy 2019–2023)	Aims to strengthen innovation ecosystems, support technological development, and align with the country's green and digital transitions.
	National Energy and Climate Plan (NECP) 2021–2030	Promotes research and innovation in clean energy, climate technologies, and sustainable infrastructure
	Smart Specialisation Strategy for Cyprus (S3CY) 2023–2030	Sets national research and innovation (R&I) priorities across four categories: Technological (e.g. Digital Technologies, Advanced Materials), Ecosystems (e.g. Agrifood, Renewable Energy, Maritime and Shipping), Emerging Ecosystems (e.g. Space Technologies), and Enablers (e.g. Health and Environment). Guides funding support by creating categories.
	National Action Plan for the Circular Economy 2021-2027	€90 million budget. Supports circular practices for businesses and citizens, incentivizes green investments, and improves waste management. Collaboration between the Ministry

		of Agriculture, Rural Development and Environment, the Deputy Ministry for Research, Innovation and Digital Policy, and the Ministry of Energy, Commerce and Industry.
Regulations	***Law 130(I)/2021 for the Regulation of the Electricity Market***	Includes a definition for CECs and RECs and lays down the responsibilities of the Cyprus Energy Regulatory Authority (CERA).
	Law 107(I)/2022 on the Promotion and Encouragement of the Use of Renewable Energy Sources	Precursor for the Law 130(I)/2021.
Financing	**RESTART 2016–2020 Programme**	€215.5 million, co-funded by national and EU sources, Supported activities including collaborative research, SME innovation, infrastructure development, and international partnerships.
	Cyprus Smart Specialisation Strategy 2030	New funding opportunities have been drafted under the S3CY 2023-2030 strategy.
	Green Recovery and Climate Action Initiatives (2023)	Funding under the EU Recovery and Resilience Plan (€1.2 billion funds), to achieve sustainable mobility, cities, and increased and cleaner energy supply, as well as skill mismatch (skilling, reskilling and upskilling) and innovation funding programmes for start-ups and SMEs.
Other (R&D, clusters, etc...)	**Cyprus Research and Innovation Foundation (RIF)**	Outlines national priorities to strengthen the innovation ecosystem, support technological development, and align with the country's green and digital transitions.
	Cyprus Energy Agency	Information point for local society, providing education and vocational training. It participates in projects in with local, European, and international organisations, contributing to innovation, research, and sustainable development.
	Business Support Center (BSC)	Serves as a point of contact for foreign and Cypriot investors for developing businesses and funding opportunities.
	KIOS Testbed for intelligent transportation systems	Offers spaces for the testing of advanced solutions in real-time and real conditions for innovation and research for intelligent transport and mobility systems.

Estonia	Name	Short description
Strategy	**ENMAK 2030**	Set targets for renewable energy production and consumption locally, targets to increase energy efficiency and restrictions on gas markets.
	Transport and Mobility Plan 2021–2035	Modernize energy and transport systems by promoting renewable energy, energy efficiency, and low-carbon mobility
	Climate Resilient Economy Act	Promote renewable electricity, innovation in clean technologies, and preferential treatment for sustainable solutions in public procurement.
	Hydrogen Roadmap	Increase national hydrogen production, use, and infrastructure, with the aim of reaching regional leadership in renewable hydrogen exports. Allocated budget of €50 million.
Regulations	**Building Code Amendments**	Streamlines permitting processes for renewable energy projects by consolidating requirements into a single process.

Financing mechanisms	**SmartCap Green Fund**	€100 million from the Recovery and Resilience Facility (RRF). Aims to increase venture capital for cleantech companies.
	National funding plans	Resource-efficient cleantech applications: €53 million.Security of supply: €20 million. Biogas and biomethane projects: €20 million. Development services to support cleantech startups: €8 million.
	Just Transition Fund	Reskilling and training for fossil fuel-dependent regions (e.g. Ida-Virumaa). Modernization of district heating systems with cleaner, low-carbon alternatives. Restoration of abandoned and polluted areas and investments in solar, wind and hydrogen power.
Other (R&D, clusters, agencies...)	**Accelerate Estonia**	innovation lab that identifies and removes regulatory barriers for emerging cleantech firms
	Startup Estonia and Invest in Estonia	Startup community that is building a startup ecosystem, including for clean tech and Deep Tech.
	Estonian Business and Innovation Agency	Supports the development of projects of companies by providing financial resources, tools, and knowledge/technology transfers, as well as collaboration with universities.
	Tehnopol Science and Business Park	Largest tech park in Estonia (and the Baltics), supports over 200 companies and 35+ startups. Provides mentorship, experimentation spaces, financing support and collaboration with stakeholders across industry and research. GreenTech Cluster branch focuses on CleanTech.
	Estonian AI sandbox (AIRE / experimentation framework)	Launched by the Ministry of Justice and Digital Affairs. The AI & Robotics Estonia centre (AIRE), based at TalTech, conducts initial risk assessment and classification of projects for testing and insuring safe AI development.

Lithuania	Name	Short description
Strategy	**National Energy Vision (2024–2050)**	Long-term strategy positioning Lithuania as a cleantech and next-generation industry hub, promoting collaboration across public, private, and international actors.
	Roadmap for Transition to a Circular Economy by 2035 (2019)	Framework guiding circular economy development and resource efficiency across sectors.
	National Hydrogen Development Vision	Strategic direction for hydrogen development as part of energy transition and industrial decarbonisation.
	Green Finance Action Plan (2023–2026)	Sets priorities to mobilise finance for green transition, highlighting the role of public authorities in enabling investment.
	AI Regulatory Sandbox Policy	To implement the EU AI Act and accelerate safe AI innovation, the sandbox will be operated by the Innovation Agency and the Communications Regulatory Authority (RRT) as the market surveillance authority. Targets SME access, HPC resources, supervised testing of high-risk systems.

Regulations	**Transport decarbonisation legislative framework**	Includes energy efficiency requirements for public vehicle procurement to reduce emissions in transport.
	Net billing scheme for RES	Regulatory support for solar and wind park development through improved remuneration mechanisms.
	Simplified RES permitting and administrative reforms	Streamlined permitting processes and reduced administrative burdens to accelerate renewable energy deployment in line with EU Green Deal objectives.
	Energy Law amendment (2020) – regulatory sandbox framework	Introduces legal basis for experimentation in energy innovation under controlled regulatory conditions.
Financial mechanisms	**Modernisation Fund**	€50M hydrogen funding. Supports development of green hydrogen projects.
	Circular economy funding	€100M Investment envelope to accelerate circular business models and infrastructure.
	Biogas and biomethane support	€30M funding for deployment of sustainable biogas and biomethane technologies.
	Solar support schemes	€40M for residential and €32M for solar parks. Financial incentives for household solar adoption and participation in solar parks.
	EV charging infrastructure	€19M to support the rollout of electric vehicle charging stations.
	Cohesion Policy & RRF funding	€6.3M + €3.8B EU-level funding supporting green transition and recovery, with 37% allocated to climate.
	Cleantech investment programme	€376M for 2021–2024 in funding for PV, alternative fuels, grids, materials, biogas, storage.
	Industrial decarbonisation package	€42M in 2025 to support industrial modernisation, energy efficiency, and emissions reduction Sets targets of saving 2,607 GWh, and reducing 489 kt CO_2 by 2035.
Other (R&D, institutions, agencies, etc.)	**Innovation Agency (est. 2022)**	Centralised one-stop-shop for business support (innovation, exports, entrepreneurship), managing €500M in funding and aiming to boost R&D and high-value exports.
	GreenTech Hub (2024)	Competence centre providing consulting, funding guidance, and regulatory support for green technologies; supports international cooperation and major EU projects (e.g. Circular Innovation Valley).
	Regulatory sandbox for energy innovation	Allows real-world testing of innovative energy solutions under supervision by the National Energy Regulatory Council, helping identify regulatory barriers and accelerate innovation uptake.
	Lithuanian National AI Sandbox	Run and monitored by the Innovation Agency and the Communications Regulatory Authority (RRT)
	Sandbox for 5G based mobility innovations	Run by the Ministry of Transport and Communications, to promote the creation, testing and development of digital technology solutions that require 5G connectivity.

Latvia	Name	Short description

Strategy	**National Energy and Climate Plan (NECP) 2021–2030**	Core strategic framework setting binding targets (−65% GHG vs. 1990; 50–57% RES share by 2030) and promoting electrification, transport decarbonisation, and renewable energy expansion.
	EU Smart Specialisation Strategy (RIS3) – clean tech focus	Strategic prioritisation of smart energy, mobility, energy efficiency, and smart grids through targeted public R&I investment.
	National Industrial Policy Guidelines 2021–2027	Supports innovation, productivity, industrial transformation and creation of pilot territories / innovation zones.
	Digital Transformation Guidelines 2021–2027	National strategy promoting digitalisation across the economy and public sector, supporting data-driven innovation, digital infrastructure, and adoption of advanced technologies that enable the development, scaling, and deployment of cleantech solutions, including smart energy systems, resource efficiency, and digital environmental services.
Regulations	**Wind energy regulatory framework reforms**	Measures to improve permitting for onshore wind and reduce legal uncertainty for investors.
	Building energy efficiency reforms	Regulatory efforts to improve energy performance of buildings as part of the green transition.
	Transport system reform (Riga green transition)	Policy and regulatory adjustments to support decarbonisation of urban transport systems.
	Renewable energy deployment framework improvements	Regulatory enhancements to accelerate RES deployment and facilitate investment conditions.
Financial mechanisms	**ALTUM financing programmes**	€101M via VC funds - State-backed financial support (with ERDF/EIF) providing venture capital to over 300 companies, supporting cleantech innovation, job creation, and energy transition.
	RIS3 funding	€34M, 2014–2018. Public investment in R&I for clean transport, energy efficiency, and smart grid innovation.
	General support from the Recovery and Resilience Facility and Cohesion Policy funds	Major EU funding instruments supporting green transition reforms and investments. RRF: €1.97B and CPF: €4.4B
Other (R&D, institutions, agencies...)	**Investment and Development Agency of Latvia (LIAA)**	Supports cleantech innovation via export promotion, investment attraction, and business incubation services.
	Venture Catalysts programme	Training initiative helping researchers and entrepreneurs commercialise innovations, particularly in cleantech sectors.
	ALTUM (State Development Finance Institution)	Key financial institution implementing innovation and cleantech funding programmes in cooperation with EU instruments.
	Ministry of Climate and Energy (est. 2023)	Central authority coordinating climate and energy policy, consolidating responsibilities to streamline governance of the green transition.
	Latvian Public Utilities Commission Sandbox	Run by the Public Utilities Commission (PUC) to create further opportunities for innovation under supervision.

	1. **Latvian IT Competence Centre** 2. **Latvian Food Competence Centre** 3. **Forest Industry Competence Centre (MNKC)** 4. **Smart Materials and Technologies Competence Centre (VMTKC)** 5. **Energy and Transport Competence Centre (ETKC)** 6. **Mechanical Engineering Competence Centre**	1. Focuses on digitalisation, green technology, and ICT research for enterprises and knowledge disseminators 2. Specialises in the knowledge-intensive bioeconomy, including packaging innovations and extending product shelf life 3. Drives research into new bioeconomy products and forestry technologies. 4. Focuses on photonics, smart materials, and advanced engineering systems 5. Drives innovation in smart energy, mobility, and green products. 6. Supports advanced engineering and manufacturing research.

Bulgaria	Name	Short description
Strategy	Integrated National Energy and Climate Plan (NECP) 2021–2030	Sets targets of 34% renewable energy share and coal phase-out by 2038, guiding national decarbonisation and energy transition.
Regulations	Energy from Renewable Sources Act	Provides support for small-scale renewables, including feed-in tariffs and incentives, particularly for solar and biomass.
Financial mechanisms	RESTORE Programme	€602M from RRF 2021–2026, supporting battery energy storage systems with up to 50% co-financing; €587M allocated to 82 projects to enhance grid stability and RES integration.
	EU Recovery and Resilience Facility	Supports national green transition investments, including energy infrastructure and clean technologies, 57% green allocation.
	EU Cohesion Funds & Interreg programmes	Provides financing for circular economy initiatives and cleantech SME development.
Other (R&D, institutions, agencies, etc.)	Ministry of Energy (with Ministry of Environment & Water; Ministry of Innovation and Growth)	Core institutional framework coordinating cleantech policy implementation and green transition governance across sectors.
	Cleantech Bulgaria	National cleantech network supporting startups and SMEs through incubation, acceleration, pilot projects, and access to EU innovation ecosystems (e.g., EIT Climate-KIC, EIT Manufacturing).

Finland	Name	Short description
Strategy	Climate Change Act (2022)	Legally binding framework setting the objective of carbon neutrality by 2035, providing the overarching direction for climate policy.
	National Climate and Energy Strategy (NCES)	Core strategic roadmap outlining measures for decarbonising energy, industry, transport, and buildings through electrification, efficiency, and renewable energy deployment.
	National Battery Strategy (2025)	Aims to position Finland as a global leader in the battery value chain, leveraging strengths in minerals, recycling, and industrial innovation.

Regulations	Biofuel blending mandate (34% by 2030)	Regulatory requirement to increase the share of biofuels in transport, supporting decarbonisation of mobility.
	Energy efficiency agreements (industry-wide)	Voluntary/regulatory hybrid framework promoting energy savings across industries through coordinated agreements.
	EV incentives and transport decarbonisation measures	Policy and regulatory support enabling transition toward fossil fuel-free transport by 2045.
Financial mechanisms	Public R&D and innovation funding (high OECD/IEA ranking)	Public investment in innovation (high share of GDP), supporting cleantech development and deployment.
	Business Finland funding instruments	National funding body providing grants, loans, and innovation support for cleantech companies and export-oriented solutions.
	EU funding instruments (various)	Complementary funding from EU programmes supporting cleantech innovation, deployment, and industrial scaling.
Other (R&D, institutions, agencies, etc.)	Business Finland	Key national agency supporting innovation, internationalisation, and commercialisation of clean technologies.
	VTT Technical Research Centre of Finland	Major public R&D organisation leading cleantech research and innovation ecosystems (e.g. smart energy systems).
	Smart Otaniemi (living lab, est. 2019)	Real-world innovation ecosystem connecting companies, startups, and public actors to pilot integrated smart energy solutions (smart grids, buildings, mobility).
	Industrial and export-oriented cleantech ecosystem	Strong institutional focus on commercialising cleantech solutions globally and supporting hard-to-abate sectors.

Sources: FINEX D3.1, D4.2, D6.1, and Cleantech Group 2026.

Annex III: Use Cases Presentation

Case Title	Country	Thematic Area	Key Challenge	Lead Actor	Notes
Grid Digital Twins	Cyprus	Energy	Grid instability, lack of real time testing for renewables	KIOS CoE	Hardware in the loop for power systems
Smart RE Systems (AI + Storage)	Lithuania	Energy	Intermittent renewables, grid inefficiency	Cleantech Startups	AI-based grid management + EVs
LAT-MaaS+	Latvia	Mobility	Outdated diesel fleet, poor rural access, fragmented ticketing	Public Transport Authority / Gov	Scalable MaaS platform; strong rural inclusion
Smart Energy Retrofit Kits	Bulgaria	Built Environment	Inefficient Buildings, retrofit cost, slow uptake	Tech providers / Property Owners	Modular retrofitting with smart sensors
Circular Building Reuse	Estonia	Built Environment	High CDW, lack of reuse protocols	Urban planners / Builders	Material banks and digital twins
Urban Digital Twin	Bulgaria	Governance & Data	Lack of integrated urban data for planning	City Governments	Interactive 3D planning tools with IoT

Water Contamination Simulation	Cyprus	Governance & Data	Aging infrastructure, cyber-physical threats	KIOS CoE	Safe innovation testing in water networks
Open Data Innovation Hubs	Bulgaria	Governance & Data	Data silos between public and private sectors	Innovation Hubs / Public-Private	Enabling local collaboration via shared data
Smart Flood Resilience Toolkit	Estonia	Governance & Data	Lack of early warning, poor coordination	City Resilience teams	Decentralized response platforms

Source: FINEX D3.1

Annex IV: Responses to the self-assessment survey on experimentation spaces maturity per project partner and country

Location	Name of entity	General facilities: - Maturity - Incubation spaces with acceleration services	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Experimentation spaces (living labs, sandboxes, testbeds).	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Testbeds	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Experimentation platforms or spaces	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Regulatory sandboxes	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Living labs	Experimentation spaces for Cleantech/ Deeptech: - Maturity - Demonstrators
Nicosia, Cyprus	PHOEBE Research and Innovation Ltd	3	2	3	3	0	1	2
Lefkosia, Cyprus	KIOS CoE	5	5	5	4	1	2	5
Nicosia, Cyprus	KIOS University of Cyprus	5	5	5	4	1	2	5
Cyprus	DiGiNN	3	2	3	3	0	0	0
Riga, Latvia	HONICS	5	3	3	3	2	1	3
Riga, Latvia	Kipsala Pilot Territory	3	3	1	0	2	0	0
Estonia	Startup Estonia / Estonian Business and Innovation Agency	5	2	3	3	2	3	3
Tallinn, Estonia	Tallinn Science Park Tehnopol	5	4	4	4	0	5	0

Sofia. Bulgaria	Sofia Municipality	4	4	2	2	4	4	3
Vilnius, Lithuania	FTMC	3	1	0	0	0	0	0
Vilnius, Lithuania	Cleantech Lithuania	3	4	4	3	3	3	3
Vilnius Lithuania	Vilnius Gediminas Technical University	3	2	2	2	1	2	1
Vilnius, Lithuania	Sunrise Tech Park	5	3	4	3	3	3	3
Vilnius, Lithuania	Vilnius Gediminas Technical University	1	2	2	2	2	2	2

0 = Not applicable / Do not know
1 = Not available
2 = In development or planned
3 = Operational
4 = Advanced
5 = Fully developed and institutionalised

Source: FINEX survey, 2025.


FINEX