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# Cleantech Innovation Capacity Building Framework

UNIDO Global Cleantech  
Innovation Programme (GCIP)



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# Introduction

## Purpose of this document

**The United Nations Industrial Development Organization (UNIDO)** is a specialized agency of the United Nations with a unique mandate to promote, dynamize and accelerate industrial development. The guiding principle of UNIDO's activities is low-emission, climate-resilient development. This means promoting policies, technologies and practices so that countries can take climate action and create millions of new, decent jobs. UNIDO sees innovation as key to mitigating and adapting to climate change.

Micro, small and medium-sized enterprises (MSMEs) form the backbone of the economy and generate a large share of economic value. Given the scale of climate mitigation and adaptation action needed, it is critical that MSMEs are supported to be part of the solutions, be it as entrepreneurs, in the context of small-scale industries and clusters or through their participation in regional and global value chains.

The **Global Cleantech Innovation Programme (GCIP)** of UNIDO, supported by the Global Environment Facility (GEF), aims to address the growing global demand for environmental sustainability and climate action by harnessing the potential of cleantech innovation and entrepreneurship. Through GCIP's theory of change, the programme seeks to empower innovative cleantech startups and MSMEs to make substantial contributions to climate mitigation. The goal is to achieve low-carbon development and stimulate job creation in priority sectors and systems.

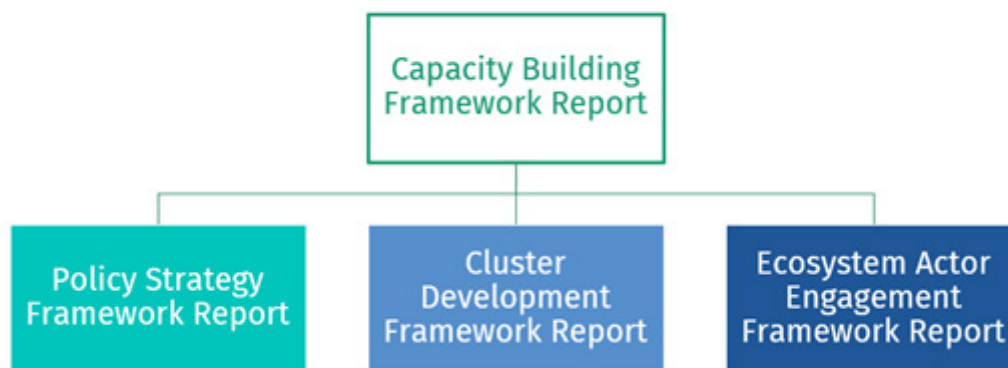
**Cleantech Group** provides research, consulting, and events to catalyse opportunities for sustainable growth powered by innovation. Cleantech Group's Cleantech Ecosystem Building practice works with cities, regional administrations, national governments, NGOs and multilateral organizations to create the macro conditions for cleantech innovation to thrive. Cleantech startups face specific challenges as they scale, from long times to market, needs for testing equipment and demonstration opportunities, access to finance, talent, and the need to compete with lower-priced, higher polluting incumbent technologies. Effective cleantech ecosystems support startups to overcome these challenges, creating the conditions to bring more cleantech innovation to market and to scale it faster. The result is economic growth as well as climate impact.

This framework is a key component of the GCIP's activities focused on enhancing and connecting **Cleantech Innovation and Entrepreneurship Ecosystems (CIEEs)**, implemented in partnership with the Cleantech Group. GCIP helps strengthen the capacity of national cleantech innovation and entrepreneurship ecosystems in GCIP partner countries, identifies synergies across these national ecosystems and facilitates knowledge exchange

and partnership building among different CIEEs.

This Cleantech Innovation Capacity Building Framework serves as the reference document for these activities. It should be read in conjunction with other ecosystem strengthening outputs of GCIP, including the **Cleantech Innovation Policy Strategy Framework**, the **Cleantech Innovation Cluster Development Framework**, and the **Cleantech Ecosystem Actor Engagement Framework**. Figure 1 illustrates the relationship between these documents.

The Capacity Building Framework includes an evaluation questionnaire that countries can use to evaluate the maturity of key drivers of ecosystem effectiveness. As ecosystems evolve continuously, the evaluation system supports countries to identify ecosystem strengthening interventions which will have the highest impact given the current state of the ecosystem. The other related frameworks provide ideas and guidelines for planning and implementing these high-priority interventions.



**Figure 1: Relationship between this report and the three detailed framework reports for cleantech ecosystem strengthening**

### **CLEANTECH INNOVATION POLICY IMPLEMENTATION**

Countries that are globally successful in cleantech innovation share common strategies that have contributed to their success. Similarly, countries that have achieved high levels of participation from women and youth in cleantech entrepreneurship also follow common strategies. GCIP partner countries can adopt these policy strategies to enhance their internal capacity for cleantech innovation and increase the involvement of women and youth in domestic cleantech startups and MSMEs.

[See the Cleantech Innovation Policy Framework.](#)

### **CLEANTECH INNOVATION CLUSTER DEVELOPMENT**

The **Cleantech Innovation Cluster Development Framework** employs a tiered approach, beginning with local and regional actions, expanding to national initiatives, and ultimately leveraging international networks. Leading clusters integrate into international networks early on, connecting their startups to global opportunities from the outset.

[\*See the Cleantech Innovation Cluster Development Framework.\*](#)

### **ECOSYSTEM ACTOR ENGAGEMENT AND ECOSYSTEM EVALUATION**

The **Cleantech Ecosystem Actor Engagement Framework** explores the roles and relationships between actors within a CIEE. It provides a four-step process to guide the strengthening of these relationships, aiming to enhance internal ecosystem connectedness.

[\*See the Cleantech Ecosystem Actor Engagement Framework.\*](#)

# Methodology

## General Approach

This Capacity Building Framework consolidates insights from various aspects of CIEE development, drawing on the three global best practice frameworks established during the first phase of the GCIP ecosystem building activities.

The insights in these frameworks are based on interviews with over 85 experts from leading cleantech ecosystems worldwide. They encompass cleantech innovation policy, strategies for gender and youth inclusion, cluster development and stakeholder engagement.

### Cleantech Ecosystem Evaluation System

The evaluation system aims to provide an objective method for assessing ecosystem progress, enabling comparisons across different ecosystems. It evaluates key drivers of ecosystem success, distilled from global best practice frameworks.

### Tracking and Measurement

Key performance indicators (KPIs) suggested for each ecosystem driver are metrics commonly used by cleantech ecosystems worldwide, and they are measurable without requiring sophisticated tracking tools.

### Opportunities for Ecosystem Strengthening in GCIP Countries

**Ecosystem Drivers:** GCIP partner countries assessed their cleantech innovation and entrepreneurship ecosystems through online workshops hosted by UNIDO and organized by the Cleantech Group. These workshops brought together selected policymakers, universities, research organizations, entrepreneurial support organizations and venture capital providers. The discussions were moderated by the Project Management Units (PMUs) of GCIP partner countries and documented by the Cleantech Group.

**Sectors with Potential for Mitigation:** these sectors are identified by GCIP partner countries in their Nationally Determined Contribution (NDC) documents.

**Sectors at Risk from Climate Change:** these sectors represent future demand for cleantech



innovation and are identified using the Notre Dame Global Adaptation Initiative (ND-GAIN).

## **Trends in Ecosystem Building and Measurement**

Leading countries in cleantech were identified based on the metrics for measuring cleantech ecosystems listed in Section 2, supplemented by two additional metrics:

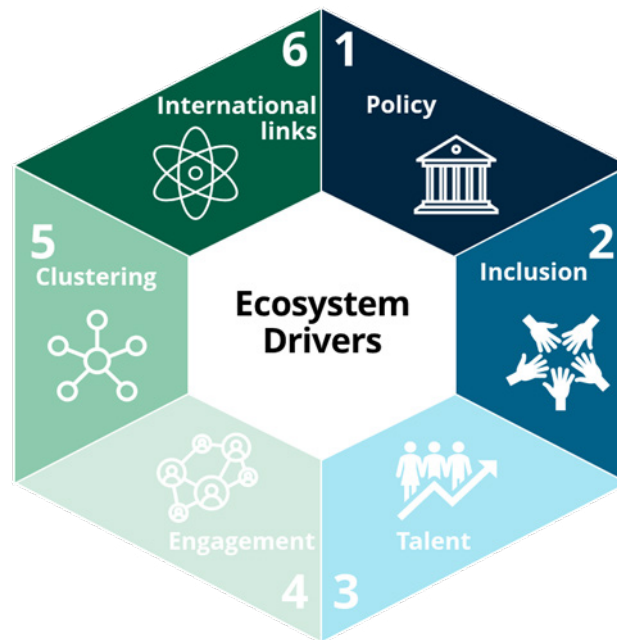
- Venture capital (VC) investment per capita;
- USD invested as a percentage of gross domestic product (GDP).

The selected countries rank within the top ten countries globally for at least one of the identified metrics.

# Section 1

## Drivers of CIEE Effectiveness

The evaluation framework assesses ecosystem activity in the key drivers of ecosystem effectiveness.



**Figure 2: Drivers of cleantech innovation and entrepreneurship ecosystem success**

**Policy** plays a crucial role in creating an enabling environment for ecosystem growth. This includes prioritizing cleantech at the national level and establishing a comprehensive policy and support framework that facilitates innovation across all stages, from research and development (R&D) to commercial scale.

**Inclusive ecosystems** provide opportunities for women, youth and other minority groups to actively participate in cleantech entrepreneurship.

**Talent** encompasses developing local expertise, upskilling workers from different industries and attracting or facilitating the movement of skilled workers from other regions.

**Engagement** refers to the level of interconnectedness within an ecosystem. Startups and MSMEs thrive in highly connected ecosystems.<sup>1</sup>

<sup>1</sup> <https://startupgenome.com/articles/can-culture-be-counted-why-local-connectedness-matters-for-your-startup>

**Clustering** denotes thematic, geographically concentrated innovation activity. Clusters accelerate technology pathways to market by harnessing network effects that bolster startup growth and link innovation with demand stakeholders.

**International links** enable startups to access additional resources for growth and create opportunities for them to commercialize in export markets beyond their region.

# Section 2

## How to Use the Evaluation Framework

### Steps for Evaluating Ecosystem Drivers

**Complete the evaluation** by answering the questions in Appendix A to obtain scores for each aspect of the ecosystem across policy strategy, cluster development and ecosystem actor engagement.

**Identify priority areas for ecosystem strengthening;** focus on areas scored as ‘emerging’ or ‘developing’ as likely priority areas.

**Consult the checklists** in Section 3 to identify actions for strengthening priority areas.

**Refer to the relevant framework document** for examples and detailed guidance on designing and implementing these actions. Links to the documents are provided in the Introduction section.



**Figure 3: Steps for using the Capacity Building Framework**

## Suggested KPIs to Measure Ecosystem Results

The ecosystem drivers outlined in Section 1 are expected to result in increased numbers of innovative MSMEs and startups within the ecosystem. The table below details metrics that countries can use to evaluate these outputs and recommends data collection methods for tracking cleantech activities nationwide.

The KPIs in this section provide an initial overview of the country’s cleantech innovation activity. Globally, leading clusters and ecosystems are increasingly adopting sophisticated metrics to track ecosystem activity, as outlined in Section 5.

METRIC	KPI	DATA TO TRACK
<b>Evidence of early-stage innovation</b>	Early-stage cleantech companies Funds raised by early-stage cleantech companies	Number of active early-stage companies  Early-stage venture capital investment: stage, deal amount, date, investors  Grant awards to cleantech companies: company name, grant amount, date, funder
<b>Evidence of growth-stage cleantech innovation</b>	Cleantech scale-ups Growth funding raised by cleantech companies	Number of active growth-stage companies  Growth capital investment: stage, date, deal amount, investors
<b>Exits</b>	Cleantech IPOs  Cleantech acquisitions  Funds raised by cleantech companies	Number of cleantech IPOs  Company valuation at listing  Number of cleantech acquisitions  Acquisition value, name and location of acquiring company  Date of IPO/acquisition
<b>Inclusivity</b>	Companies with female, youth or minority leadership	Name, age, gender and ethnic origin (where appropriate) of founding team/C-suite

# Section 3

## Activities for Strengthening Cleantech Innovation and Entrepreneurship Ecosystems

### Checklist 1: Key Steps for Strengthening Cleantech Innovation Policy

<b>EARLY-STAGE INNOVATION</b>	<ul style="list-style-type: none"><li><input type="checkbox"/> Establish a national body dedicated to advancing innovation</li><li><input type="checkbox"/> Set long-term, consistent policy signals</li><li><input type="checkbox"/> Publish clear, national R&amp;D priorities and align R&amp;D funding with these priorities</li><li><input type="checkbox"/> Maximize the impact of R&amp;D investment through international collaboration</li><li><input type="checkbox"/> Focus early-stage support on developing novel industries &amp; high-growth ventures</li><li><input type="checkbox"/> Incentivize private sector investment through R&amp;D tax credits</li><li><input type="checkbox"/> Implement mechanisms to ensure cross-departmental collaboration on innovation</li><li><input type="checkbox"/> Develop appropriate programmes to educate the next generation of innovators</li><li><input type="checkbox"/> Implement measures to retain talent and attract an international workforce</li><li><input type="checkbox"/> Support regional development across the country to promote balanced economic growth, reduce regional disparities, and reach untapped potential</li><li><input type="checkbox"/> Collaborate with all key actors across the innovation ecosystem</li></ul>
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<p><b>DEMONSTRATION AND COMMERCIALIZATION</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Encourage the private sector to take ownership of the innovation agenda</li> <li><input type="checkbox"/> Implement targeted financing mechanisms to de-risk first commercialization</li> <li><input type="checkbox"/> Develop enabling infrastructure</li> <li><input type="checkbox"/> Boost demand for green products and services through public procurement</li> <li><input type="checkbox"/> Ensure that regulation responds to the pace and ambition of innovation</li> </ul>
<p><b>SCALING AND INTERNATIONALIZATION</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Learn from and share best practices with other countries</li> <li><input type="checkbox"/> Partner directly with global innovation leaders to enhance economic activity through added value and innovation</li> <li><input type="checkbox"/> Collaborate with the global community on exports, foreign investment and research</li> <li><input type="checkbox"/> Create level playing field with incumbents</li> </ul>
<p><b>INCLUSIVE POLICY FOR WOMEN AND YOUTH</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Coordinate action in data tracking, policy building, and monitoring and evaluation across ministries with a business, innovation, and gender and youth focus</li> <li><input type="checkbox"/> Promote access to high-quality science, technology, engineering and mathematics (STEM) education and green jobs</li> <li><input type="checkbox"/> Strengthen pathways to decision-making positions in government, financial institutions and corporations through leadership training, mentoring and networking</li> <li><input type="checkbox"/> Create ring-fenced funding sources for priority groups</li> <li><input type="checkbox"/> Establish platforms to recognize achievements through awards and publicity</li> <li><input type="checkbox"/> Allow for flexible working arrangements and establish a public social security system to cover personnel costs for parental leave and childcare, and address biases</li> </ul>

## Checklist 2: Key Steps for Strengthening Cleantech Cluster Development

<p><b>LOCAL AND REGIONAL ACTIONS</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Choose locations in proximity to technical universities and research organizations</li> <li><input type="checkbox"/> Develop a clear strategy for cluster development</li> <li><input type="checkbox"/> Help founders understand support opportunities</li> <li><input type="checkbox"/> Facilitate connections between actors within the cluster</li> <li><input type="checkbox"/> Create specific initiatives to involve women, youth and other under-represented groups</li> <li><input type="checkbox"/> Involve mayors and CEOs of local companies to match demand with solutions</li> <li><input type="checkbox"/> Collaborate with the local administration for smarter regulation</li> <li><input type="checkbox"/> Collaborate with the local administration to enhance liveability, making the region more attractive to talent</li> <li><input type="checkbox"/> Facilitate regular cluster meetings</li> </ul>
<p><b>NATIONAL ACTIONS AND CONDITIONS</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Create a culture of innovation and favourable attitudes towards cleantech</li> <li><input type="checkbox"/> Provide stable market signals</li> <li><input type="checkbox"/> Enable close collaboration between government and innovators</li> <li><input type="checkbox"/> Champion the global push for cleantech innovation</li> </ul>
<p><b>LEVERAGING INTERNATIONAL NETWORKS</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Join international cluster networks</li> <li><input type="checkbox"/> Expand talent search globally to overcome shortage of skilled labour</li> <li><input type="checkbox"/> Align with internationally-agreed targets for climate impact</li> <li><input type="checkbox"/> Advertise international events and networks</li> <li><input type="checkbox"/> Promote international funding opportunities</li> </ul>

## Checklist 3: Key Steps for Strengthening Cleantech Cluster Development

<p><b>ECOSYSTEM ACTOR MAPPING AND PRIORITIZATION</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Map and categorize the different actors engaged in the ecosystem</li> <li><input type="checkbox"/> Identify gaps in the ecosystem actor landscape</li> <li><input type="checkbox"/> Evaluate the most relevant ecosystem actors to fill the gaps</li> <li><input type="checkbox"/> Align with national objectives</li> <li><input type="checkbox"/> Involve a wide group of actors to design interventions (start small, expand later)</li> <li><input type="checkbox"/> Create thematic working groups</li> <li><input type="checkbox"/> Select participants for individual events and workshops according to topic</li> </ul>
<p><b>CREATE BUY-IN AND A SHARED VISION</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Explain benefits in a way that motivates each ecosystem actor</li> <li><input type="checkbox"/> Set objectives at a level that resonates with all ecosystem actors</li> <li><input type="checkbox"/> Establish a convincing thesis about what the initiative will achieve</li> <li><input type="checkbox"/> Create a mission statement or manifesto</li> <li><input type="checkbox"/> Use flagship research to create a shared vision of change</li> </ul>
<p><b>IMPLEMENT AND MAINTAIN ENGAGEMENT</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Policymakers and civic organizations that lead engagement initiatives</li> <li><input type="checkbox"/> Assess signals from ecosystem actors during the implementation phase</li> <li><input type="checkbox"/> Recruit champions to drive engagement</li> <li><input type="checkbox"/> Deploy a local organization team</li> <li><input type="checkbox"/> Use data to make a case for change</li> <li><input type="checkbox"/> Use success stories to inspire change</li> <li><input type="checkbox"/> Follow-up communication after events</li> <li><input type="checkbox"/> Present results in public</li> <li><input type="checkbox"/> Cultivate media relationships</li> </ul>



**EVALUATE AND DEFINE  
SUCCESS**

- Maintain flexibility around outcomes
- Circle back to the beginning of the process for continuous feedback
- Include evaluation and feedback loops into every process step

# Section 4

## Identified Opportunities in GCIP Partner Countries

In 2023, GCIP partner countries engaged in capacity development workshops, convening key representatives from their cleantech innovation and entrepreneurship ecosystems to assess ecosystem maturity using the questionnaire provided in this framework. The diagrams below illustrate the workshop outputs: a score of 1 indicates 'emerging', 2 indicates 'developing' and 3 indicates 'mature'. Moreover, each country has identified sectors with potential for mitigation and sectors vulnerable to climate change. Policymakers can prioritize these sectors when developing sector-specific targets and strategies.

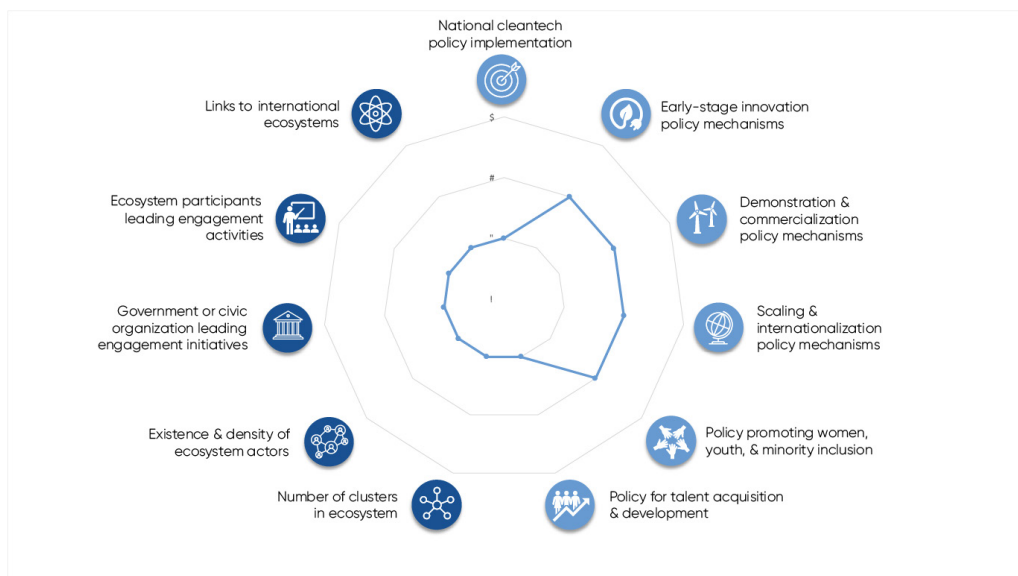
**GCIP partner countries can use these findings to plan and prioritize activities aimed at strengthening their ecosystems:**

- Areas scored as 'emerging' or 'developing' are likely to be areas that will yield best results.
- Prior to addressing scaling, it is crucial to establish a robust source of early-stage innovation. In policy areas scored as 'emerging', early-stage interventions are likely to yield better outcomes.

### Cambodia

**KEY SECTORS AT RISK:** Human habitat, agriculture, water resources, energy, human health.

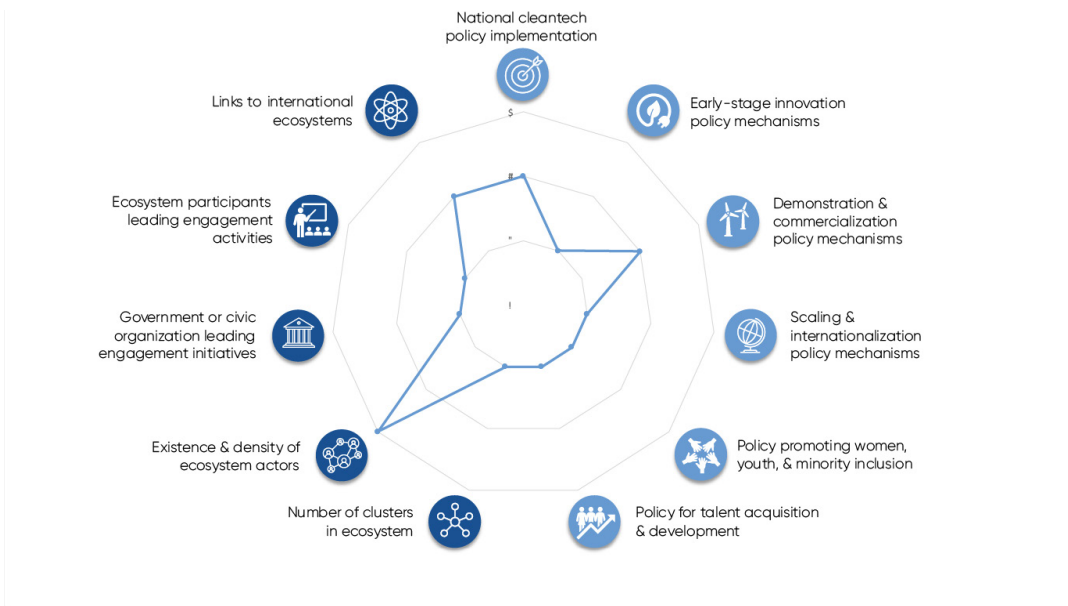
**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, agriculture, food and land use.



# Kazakhstan

**KEY SECTORS AT RISK:** Agriculture, water resources.

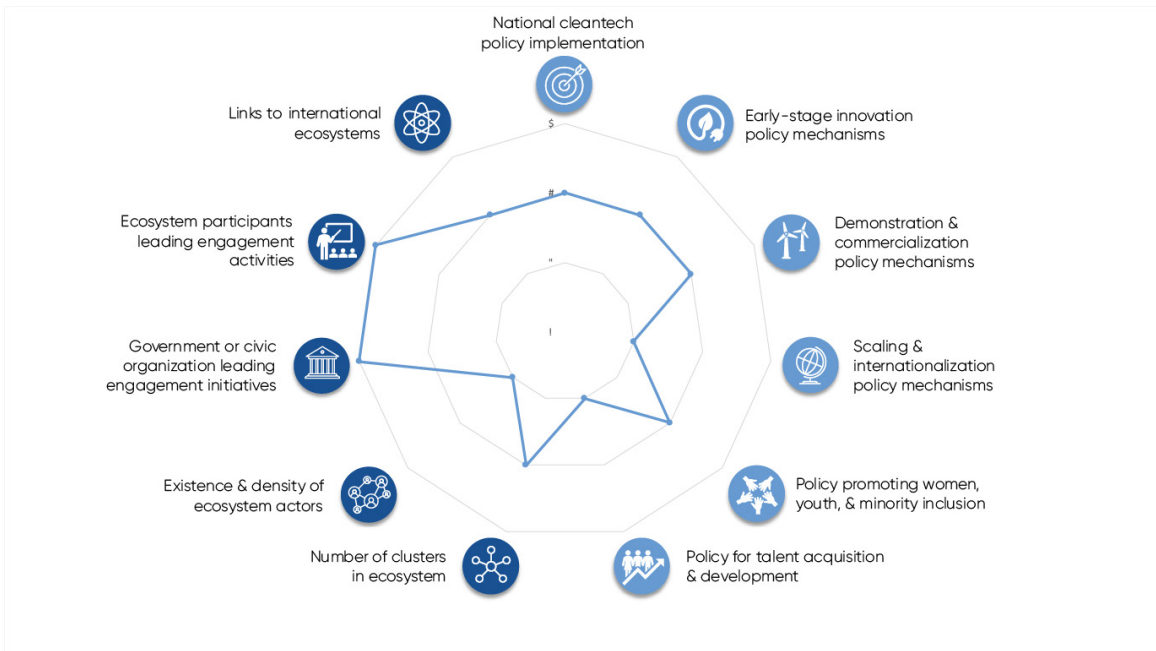
**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, agriculture, waste, land use, forestry.



# Republic of Moldova

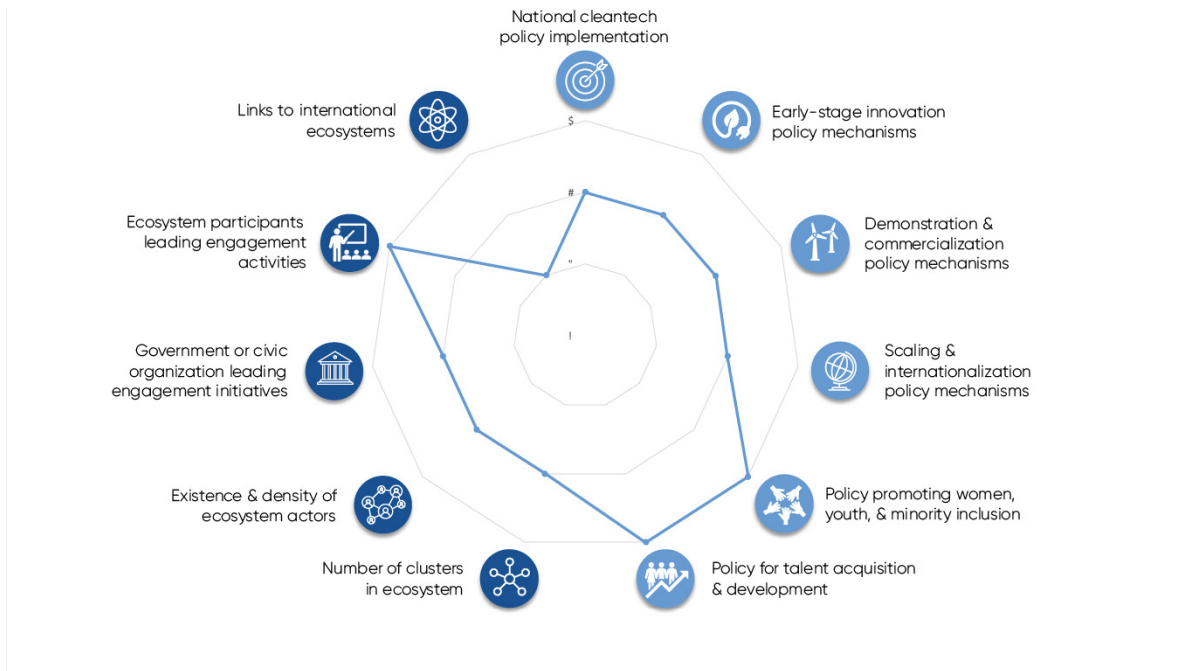
**KEY SECTORS AT RISK:** Human habitat, agriculture.

**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, agriculture, waste.



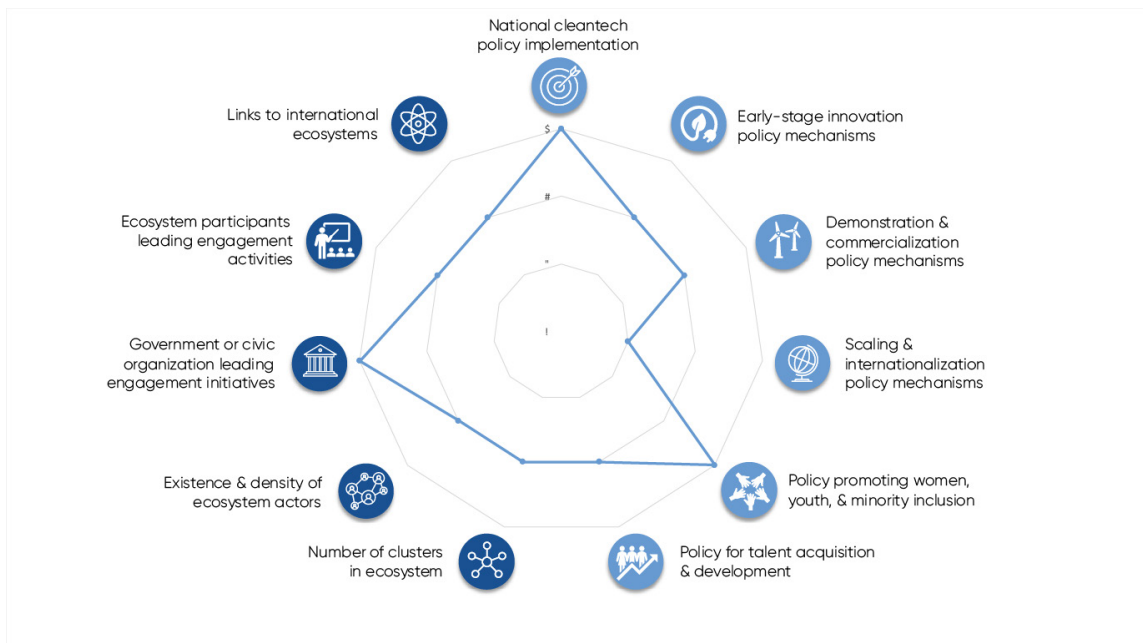
## Morocco

**KEY SECTORS AT RISK:** Forestry, agriculture, water resources, energy, human health.  
**KEY SECTORS WITH MITIGATION POTENTIAL:** Agriculture, industry, housing, energy.



## Nigeria

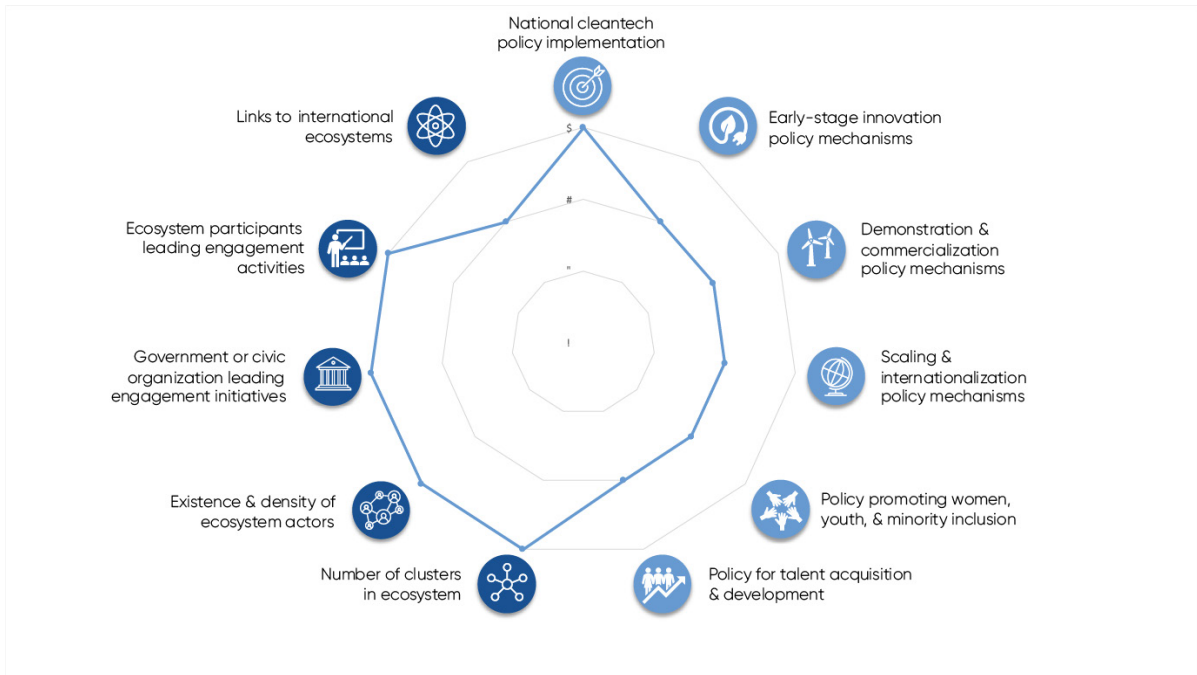
**KEY SECTORS AT RISK:** Human habitat, agriculture, water resources, human health.  
**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, agriculture, forestry and other land use, waste.



# South Africa

**KEY SECTORS AT RISK:** Forestry, agriculture, water resources, human health.

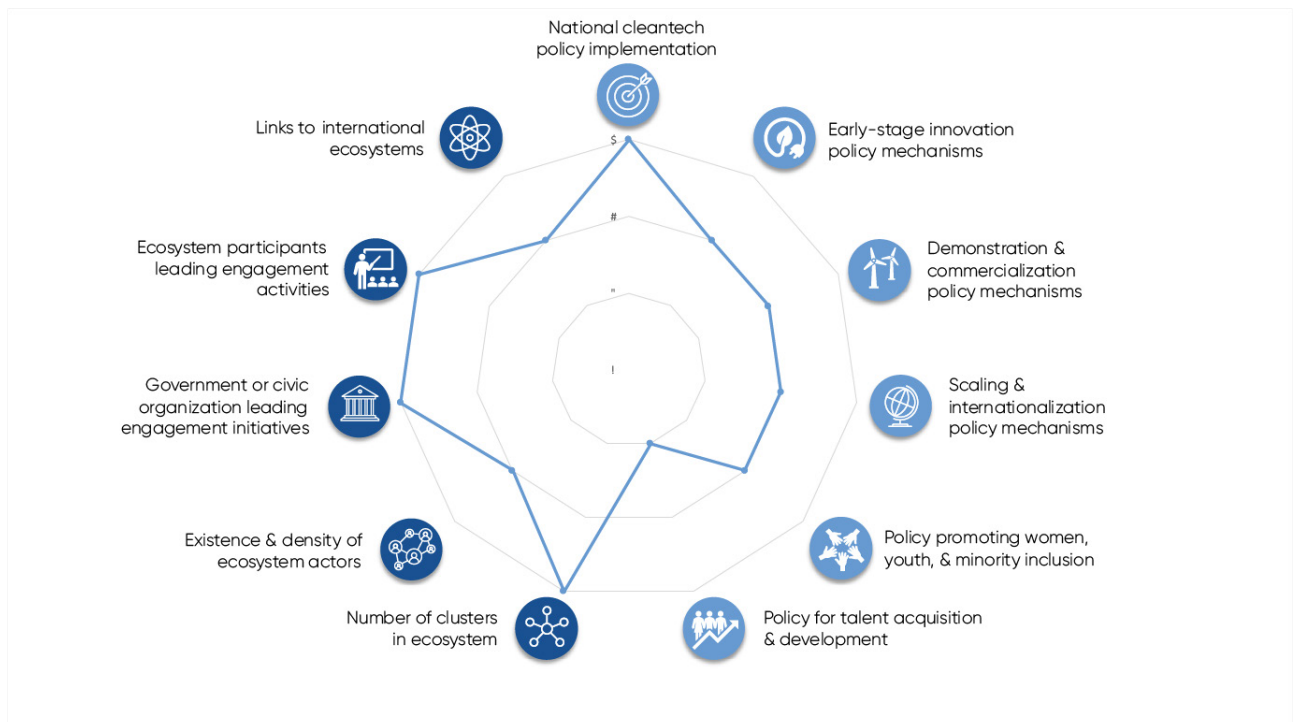
**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, industrial processes and product use, agriculture, forestry and other land use, waste.



# Türkiye

**KEY SECTORS AT RISK:** Agriculture, energy.

**KEY SECTORS WITH MITIGATION POTENTIAL:** Energy, waste, agriculture.



# Section 5

## Global Trends in Ecosystem Building and Measurement

### Cleantech Innovation Ecosystem Success Cases

The countries featured in this section exemplify successful cleantech innovation ecosystems characterized by active stakeholder engagement, corporate participation, substantial investment in cleantech, creation of green jobs, and sufficient capital for scaling cleantech startups to achieve significant climate impact. These profiles highlight each country's measurable strengths and achievements in these areas.<sup>2</sup>

While these countries benefit from historical and economic advantages in the global market, they also offer universal lessons and success factors. The following section outlines these factors as identified by startup founders and investors, demonstrating how supportive ecosystems have fostered their company's growth. Other countries can use these insights to replicate similar success in their national cleantech ecosystems.

#### **France**

France ranked among the top ten countries globally in terms of cleantech deals in 2022. Bpifrance, a public sector investment bank and financial advisor, emerged as the leading cleantech investor in France, participating in 10 deals in the final quarter of 2022. Additionally, France was among the top five countries for early-stage investment deals in cleantech between 2017 and 2022.

#### **Germany**

Germany ranked among the top five countries globally in terms of deal volume in 2022, holding the fourth position. Additionally, Germany secured the fourth highest volume of early-stage deals and the fifth highest volume of late-stage deal deals worldwide. In total, Germany was also among the top countries in terms of total dollars invested in cleantech innovation in 2022.

#### **Sweden**

As of 2022, Sweden ranks among the top five countries globally in terms of per capita investment in cleantech innovation. The country demonstrates a strong commitment to achieving climate goals and prioritizing cleantech as a key economic priority.

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<sup>2</sup> Data in this section were collected from Cleantech Group's i3 database.

## Switzerland

Switzerland leads the world with USD 1,657 invested in cleantech per capita, the highest amount globally. Switzerland ranked among the top ten countries for the highest number of cleantech innovation deals in 2022.

## United Kingdom

The United Kingdom (UK) ranks third globally for total dollars invested in cleantech between 2017–2022 at USD 14.2 billion. As of 2022, the UK is also among the top five countries with the highest cleantech deal volume. The country ranks second highest for both early and late-stage deals in cleantech, despite more early-stage deals being concluded.

## United States

The United States (U.S.) recorded the highest number of cleantech investment deals globally in the last quarter of 2022, with a total of 202 deals. The top states were California with 89 deals, Massachusetts with 27 deals, and New York with 26 deals. Between 2017 and 2022, U.S. companies secured the highest number of both early-stage (seed and Series A) and late-stage (Series B to growth equity) deals, totalling 6,809 cleantech deals. A notable trend in the U.S. is the prevalence of serial entrepreneurs leveraging their experience, capital and success to launch new ventures, further driving innovation and growth in the cleantech sector.

## Factors That Define Innovation Ecosystem Success

The following insights from entrepreneurs and key stakeholders in the successful ecosystems mentioned in the previous section highlight elements and actions that can be replicated to develop cleantech ecosystems.

### **Develop a well-defined strategy and set national priorities for the cleantech sector**

Innovation will struggle to scale in ecosystems lacking market buy-in. Establishing national priorities for the cleantech sector enhances market readiness to adopt new technologies and solutions. Startups may relocate abroad in search of better financing and market opportunities. Conversely, countries that create favourable conditions can attract innovation and talent to their national markets.

## COMPANY PROFILE: Electrochaea



Over the past decade, European countries have outpaced the U.S. in committing to net-zero targets, attracting startups to establish headquarters within European ecosystems that are well-equipped for piloting cleantech and incentivizing manufacturing.

The German scaleup, Electrochaea, which produces a power-to-gas energy storage technology that converts excess electricity from wind and solar into renewable gas (SNG), illustrates this trend. Originally a spinout from the University of Chicago, Electrochaea quickly recognized the impact of varied policy agendas and corporate commitments to climate adaptation targets across different cleantech innovation ecosystems. Despite its U.S. origins, the German and Danish markets proved more receptive to their technology. Before the Inflation Reduction Act (IRA) was passed in the U.S. in 2022, the company sought market readiness outside the U.S. A decade ago, fossil fuels were cheap in the U.S., and renewable natural gas (RNG) development was not prioritized in the U.S. energy market. Meanwhile, RNG already accounted for a significant percentage of electricity demand in Germany and Denmark. Germany offered Electrochaea strategic partnerships, investors, pilot opportunities, and proximity to regional ecosystems focused on renewable energy storage and fossil fuel displacement with RNG.

## **Pursue opportunities for dialogue between innovators and regulators**

Regulation often lags behind the pace of innovation. Granting innovators direct access to regulators facilitates responsive regulation that can expedite innovation. This approach helps regulators understand the needs and potential of innovative solutions while helping innovators effectively navigate regulation.

Innovators from the UK and European Union (EU) capitalized on net-zero targets and policies that created a market for cleantech. The U.S. was slower to commit to these targets, but the IRA of 2022 has accelerated regulatory efforts, resulting in increased investments, incentives for reducing corporate emissions, and promoting career paths in clean energy from university to the job market.



## COMPANY PROFILE: Oxford PV



The Oxford University spinout, Oxford PV, develops perovskite-on-silicone tandem solar cells, driving down the cost of solar energy. Established in 2010, the company has emerged as a leading scaleup in the solar energy industry. To advance the renewable energy market in the UK, the company's Chief Technology Officer (CTO) actively engaged in political events to influence the policy agenda. By integrating into a large network of ecosystem actors that included policymakers and world-renowned serial entrepreneurs, Oxford PV gained visibility and a powerful platform. This engagement facilitated direct communication channels with policymakers, enabling Oxford PV's CTO to meet with the Minister of Energy and provide testimony to the Environmental Audit Committee, advocating for increased investments in renewable energy.

### **Attract more VCs into climate investing**

Winning over risk-averse investors hinges on increasing visibility by participating in national and regional events, targeting suitable VCs, and securing a first customer. Over the past decade, cleantech startups have often been perceived as high-risk ventures with a difficult path to profitability. However, evolving government incentives and global climate targets are reshaping this mindset.

## COMPANY PROFILE: Verdane



Swedish investor Verdane highlighted the significance of cluster facilitator-run conferences as pivotal platforms to bring together ecosystem actors, foster partnerships, and draw attention to the impact of cleantech. Norrskan, a non-profit based in Stockholm is a notable cluster facilitator in Sweden that hosts 300 events annually. These events play a crucial role in driving momentum within the national cleantech industry, providing opportunities for startups to forge the essential connections for scaling their businesses and attracting attention from international markets. In Sweden, the cleantech ecosystem is characterized by companies saturating the domestic market early and needing support to grow by entering international markets. Despite Sweden's small size, its enabling environment facilitates easy entry for cleantech innovations into the national market. Startups benefit from a high number of investors per capita and progressive demand for cleantech solutions. However, the limited size of the national market restricts internal growth opportunities, prompting startups in the Swedish ecosystem to adopt an international orientation from their inception stages.

## Clusters connect startups to market demand and support early-stage innovation

Cleantech innovation clusters help university spinouts access resources, robust investor networks, and fast tracks to accelerators during the early stages. While many spinouts initially remain in clusters that provide sufficient ecosystem support for local market growth, scaling startups may eventually seek out more mature ecosystems with greater market readiness to expand their operations if necessary.

### COMPANY PROFILE: Packetized Energy



The University of Vermont spinout, Packetized Energy, faced challenges in gaining commercial traction in a region with generally fewer ecosystem actors. Packetized Energy's software systems, designed to enable flexible grid services from distributed energy resources, initially relied on a U.S. Department of Energy grant intended for university R&D in cleantech startup development. Despite receiving an initial federal grant of over US\$ 2 million, a significant share of the funding was allocated to the university's R&D department rather than directly to the startup that had originally requested it.

Generally, federal and state funding in the U.S. sufficiently supports software startups to develop their first prototype, while hardware startups often require additional investments. Once a prototype is developed, startups can demonstrate reduced risk to attract local investors, including those affiliated with universities or based in the same state, for seed funding. Packetized Energy founders sought out more established cleantech innovation clusters with higher volumes of VC funds, accelerator programmes, and access to corporate investors to scale their operations. This strategy ultimately led to the startup's acquisition by EnergyHub, a leading company specializing in distributed energy resource management solutions.

## Events and publicity amplify startup success

Startups in various countries cited events and publicity as important contributors to company growth and success. Startups utilize events and innovator showcases to increase visibility. This facilitates widespread recognition among cleantech ecosystem actors, increased credibility, and opportunities to engage with investors, corporates and offtake customers.

## COMPANY PROFILE: Circulor



To scale their company, Circulor's founders capitalized on the many events at which startups can showcase their progress and network with other ecosystem actors. This approach proved beneficial for gaining exposure, recognition and legitimacy, and for attracting relevant audiences. The founders invested time in educating policymakers, investor communities and customers about their innovation, thereby cultivating advocates and building a market for their solutions. Their active participation and speaking engagements at events increased Circulor's visibility among the target audience.

The founders strategically engaged dozens of journalists and media outlets to disseminate information about the benefits of their technology, effectively amplifying awareness and driving market demand. Securing coverage in highly acclaimed media outlets with large audiences amplified their success, sparking significant inbound investor interest. Exposure at events led to a partnership between Circulor and the Swedish car manufacturer Volvo. This collaboration spurred market demand for a software product that provides traceability of global supply chains. Securing Volvo as a major customer during the early stages of commercialization allowed Circulor to showcase the benefit of using their technology in understanding global supply chains at a time when the UK market lacked clear use cases or demand for the product. Volvo wanted to trace human rights abuses within the cobalt mining supply chain and ensure socially responsible sourcing for import to Sweden. By establishing itself as a first mover in this field, the company gained traction in external markets while maintaining operations and influencing market demand in the UK.

## Facilitate corporate partnerships

Corporate partnerships are essential for piloting and scaling innovative climate solutions. Despite efforts in some ecosystems to facilitate such partnerships, significant hurdles remain. Entrepreneurs often face resistance from large corporates in adopting new technologies or updating existing infrastructure. Corporates across ecosystems may lobby to maintain the status quo and to preserve their influence over market dynamics and supply and demand. Change is slow unless incentives are in place to encourage the adoption of innovative solutions.

Scale-ups that have forged partnerships with corporates across several countries observe notable differences among different ecosystems in terms of the level of policy support to stimulate demand for innovation.

## Incentivize utilities to engage external innovation

Utility companies often exhibit strong risk aversion and are slow to adopt new technologies. Such resistance to speed and adaptation may seem incompatible with the very nature of startup operations. However, in countries where utilities are incentivized to improve operational efficiency, there has been a shift in mindset from risk aversion towards advantages of investing in innovation. In these ecosystems, startups can scale while addressing bottlenecks and upgrading inefficient infrastructure, creating a win-win solution for the utility company, startup and the general public.

### COMPANY PROFILE: NewGrid



Utility companies play a crucial role in adopting NewGrid's technology. NewGrid initially experienced resistance from utility companies to changing their traditional infrastructure. For example, grid operators in the U.S. have historically not been incentivized to improve operational efficiency, although many startups have emerged that have developed grid connectivity solutions. This resulted in U.S.-based NewGrid to commercialize abroad. NewGrid was successful in the UK, where the market is designed to incentivize utility companies, such as National Grid ESO, to reduce the cost of congestion while enhancing electricity grid efficiency. The UK recognizes renewable energy providers as well as transmission companies as a key customer for startups. However, the industry's very slow sales cycle and the value of improving energy transmission mostly accrues to society.

NewGrid, originating from Massachusetts, benefits from its proximity to top tier R&D universities. Within this ecosystem, a project from one university can supplement funding, resources and equipment constraints by accessing labs and resources at other nearby universities. As a spinout from Boston University, NewGrid was able to collaborate with Tufts University and Northeastern University to access the necessary equipment and expertise to build and test products prior to commercialization. Universities in the U.S. cleantech innovation clusters such as Boston provide extensive access to prototyping resources, talent, investor networks and incubators which qualify startups for acclaimed accelerator programmes. By sharing resources with affiliated universities, NewGrid was able to cut R&D costs and expedite product testing. NewGrid's access to an abundance of key ecosystem actors in the Boston cleantech innovation cluster sustained the company's growth in an industry with a slow sales cycle.

## Choosing the right accelerator maximizes value for startups

Cleantech accelerators provide STEM research professionals with valuable business skills, expanded networks, peer-to-peer mentoring, legal support and increased visibility to investors. While accelerators offer expertise in commercialization and unite innovators to develop cleantech solutions, founders emphasize that some programmes may be a better fit than others. Accelerators require significant time commitment, anywhere from 3 to 16 months. Additionally, funding from an accelerator is often insufficient in the early stages of operation, and accelerators do not always lead to follow-on investments. Therefore, startups need to be selective about the accelerators they participate in and determine which one has the strongest investor networks in their sector. Ultimately, the accelerators' main value is not the funds to cover startup costs, but rather the business development, network gained, mentoring, legal support and increased visibility to investors, corporates and new markets.

### **ACCELERATOR PROFILE:** European Institute of Innovation and Technology (EIT)



Highly acclaimed international accelerator programmes facilitate collaboration among ecosystem actors across borders. One such community is the European Institute of Innovation and Technology (EIT), which provides government-backed accelerator programmes aimed at fostering cleantech innovation across various sectors in Europe, bridging the funding gap between research and commercialization. This accelerator operates as a public-private partnership including the EU, leading universities and research institutions and industry partners. Key benefits of participating in EIT's accelerator include funding support, business development resources, market analysis, and access to a network of industry experts.

EIT Climate KIC has demonstrated its impact through Resourcify, a circular economy startup based in Berlin, Germany, growing to a team of 70 staff within four years. Moreover, completing EIT accelerator programmes provides entrepreneurs with substantial funding opportunities and meaningful partnerships with ecosystem actors throughout Europe. The German startup, Electrochaea, secured US\$ 2.5 million in funding directly from the accelerator and subsequently raised an additional US\$ 15 million in venture capital.

## Ensuring ongoing support for accelerator alumni: benefiting the entire ecosystem

While many accelerators lack robust post-programme support systems, those that provide

continued assistance significantly contribute to the growth and success of alumni ventures. Sustaining long-term viability within the ecosystem cultivates a sense of community, trust and resilience to more effectively address challenges. Supporting programme alumni not only benefits individual startups, but also enriches the entrepreneurial landscape by fostering innovation, collaboration and sustainable growth. Successful accelerators provide alumni with resources such as open office hours, engaging events and sector-specific insights on market trends.

## **Dedicated programmes increase inclusivity**

Dedicated programmes promoting intersectional inclusion of genders, youth and minorities increase equitable representation in cleantech innovation. Attracting more young people to cleantech innovation must be underpinned by increased resources and opportunities for spinouts incubated in university innovation centres. When Entrepreneurial Support Organizations (ESO) such as incubators and accelerators offer programmes targeted specifically at women, youth and minority groups, biases and exclusion risks within the ecosystem are reduced.

**ENTREPRENEURIAL SUPPORT ORGANIZATION (ESO) PROFILE:** Sustainable Women's Network



It is important to include women, youth and minorities in the climate transition. In the UK, the Sustainable Women's Network is raising awareness on why women, youth and minorities are typically left out of the cleantech sector. Data indicate that among startups in the early stages, 40 per cent of founders are women, however, of the 20 per cent that make it to Series A, only 1 per cent are women, with less than 1 per cent of these women being women of colour.

The ESO adopts an intersectional approach that encompasses gender, age and diversity to enhance their representation in institutions with the greatest influence in cleantech. These include risk capital providers, government ministries and corporate ventures. Additionally, the ESO urges risk capital providers, government ministries and corporates to prioritize capacity development and establish dedicated funding schemes aimed at supporting diverse founders.

## **Trends in Ecosystem Measurement**

Historically, ecosystems and clusters in cleantech and other sectors have primarily been assessed based on metrics such as the number of startups established, flows of VC

investment and the creation of unicorns. Additionally, cluster activity can be gauged by indicators such as the number of investor events, the number of connections created, or new regulations unlocked.

However, leading cleantech ecosystem and cluster managers are now exploring more sophisticated metrics based on outcomes for startups, MSMEs and other ecosystem actors to assess the success and impact of their ecosystems. While these indicators provide a clearer picture of how much value an ecosystem delivers to the companies that grow in them, it is also important to note that only the most advanced ecosystems and clusters are currently tracking and measuring these indicators.

Countries aiming to strengthen their national or regional ecosystems should incorporate these factors into their intervention designs, and where possible, include mechanisms to track and measure one or more of these indicators. This will lead to a more sophisticated understanding of ecosystem evolution over time.

**Leading clusters and ecosystems consider the following outcomes as key indicators of success:**

- Speed of growth for startups in the ecosystem compared to the market average
- Gross value added (GVA) growth for the ecosystem compared to other ecosystems
- Tangible results from connections facilitated by the ecosystem:
  - Collaboration between corporates and startups
  - Cooperation between universities and corporates
  - Investment in startups and scale-ups
  - Collaboration between business and government
  - Number of regulatory or policy proposals
- Participation of serial entrepreneurs in the ecosystem
- Number of jobs created by cleantech companies in the ecosystem
- Emergence of new VC funds in the ecosystem
- Foreign direct investment (FDI) attracted by the ecosystem
- Number of educated/skilled workers attracted to the region
- Media impact: number of press articles on topics critical for innovation growth in the relevant sector
- Greenhouse gas emissions reduced by companies in the ecosystem
- Waste management (prevented, reduced, recycled) by companies in the ecosystem

# Conclusion

The Cleantech Innovation Capacity Building Framework, alongside the other GCIP frameworks for ecosystem strengthening and capacity building, including the Cleantech Innovation Policy Strategy Framework, the Cleantech Innovation Cluster Development Framework and the Cleantech Ecosystem Actor Engagement Framework, offers a comprehensive toolkit for countries to plan targeted interventions for strengthening their CIEEs. By leveraging these resources and adopting a data-driven approach to ecosystem strengthening, countries can unleash the potential of national cleantech innovation and entrepreneurship, contributing to climate mitigation, low carbon development, job creation and economic growth.

The Cleantech Innovation Capacity Building Framework features a comprehensive evaluation questionnaire that allows countries to assess the maturity of key drivers of ecosystem effectiveness and identify high-priority interventions for maximum impact. Ecosystem builders can then refer to the other high-level frameworks for ideas and practical tips to design these interventions.



# Appendix A.

## Cleantech Innovation Ecosystem Evaluation System

This assessment is designed for ecosystem actors from government, risk capital providers, corporates, universities, incubators and accelerators, startups and MSMEs, and other key Entrepreneurial Support Organizations within a Cleantech Innovation and Entrepreneurship Ecosystem (CIEE). It serves as a collaborative tool for ecosystem actors to discuss the maturity of each indicator and provide rationale for their answers in a workshop setting.

### Instructions for Using the Assessment

- 1. Refer to the Cleantech Innovation Policy Strategy Framework Baseline report and Section 3 of this document.** Note national cleantech innovation priorities, ecosystem actors, engagement initiatives, and activities stated in the country profiles.
- 2. Record the current policy environment at the time of assessment.** One example from the United States is “as of December 2022 the 45V 10-year Production Tax Credit (PTC) for clean H2 from the Inflation Reduction Act is in effect but is scheduled to expire after January 1, 2033.”<sup>3</sup>
- 3. Assess the cleantech innovation ecosystem** based on each dimension of the rubric (Emerging, Developing, or Mature) and record the rationale notes.
- 4. Display the results** as a spider diagram illustrating each metric measured individually. The cleantech innovation ecosystem maturity level is based on innovation policy and ecosystem support, existence and engagement of ecosystem actors, and measurement of cleantech innovation clusters.
- 5. Use the results** to identify the ecosystem’s strengths as well as areas for improvement.

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<sup>3</sup> Lucia Tian, Jacob Mees, Vanessa Chan, William Dean. (2023). Commercial Adoption Readiness Assessment Tool (CARAT). Washington, D.C.: U.S. Department of Energy

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 1. NATIONAL CLEANTECH POLICY IMPLEMENTATION

National cleantech policy implementation hinges on three criteria:

1. A specific cleantech, climate and/or innovation policy that prioritizes cleantech on the national agenda.
2. Dedicated climate protection agency and/or innovation agency.
3. A roadmap to implement and enforce cleantech development.

<b>EMERGING</b>	<b>DEVELOPING</b>	<b>MATURE</b>
The country meets <b>at least 1</b> of the following criteria: <ul style="list-style-type: none"><li>• Cleantech, climate or innovation policies</li><li>• Climate or innovation agency</li><li>• Cleantech roadmap</li></ul>	The country meets <b>at least 2</b> of the following criteria: <ul style="list-style-type: none"><li>• Cleantech, climate or innovation policies</li><li>• Climate or innovation agency</li><li>• Cleantech roadmap</li></ul>	The country meets <b>all 3</b> of the following criteria: <ul style="list-style-type: none"><li>• Cleantech, climate and innovation policies</li><li>• Climate or innovation agency</li><li>• Cleantech roadmap</li></ul>



## RATIONALE & NOTES

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 2. EARLY-STAGE INNOVATION

Early-stage innovation hinges on three criteria:

1. Percentage of total government funding for R&D across all industries.
2. R&D mechanisms, which may include R&D grants, international R&D collaboration, public research priorities, and R&D tax incentives across all industries.
3. Early-stage business grants are available to cleantech innovators to pilot technologies that have been proven in a theoretical or laboratory setting

EMERGING	DEVELOPING	MATURE
The country meets <b>none</b> of the following criteria: <ul style="list-style-type: none"><li>• <math>\geq 1.5\%</math> government funding for R&amp;D</li><li>• R&amp;D mechanisms</li><li>• Early-stage business grants for cleantech innovation</li></ul>	The country meets <b>at least 1</b> of the following criteria: <ul style="list-style-type: none"><li>• <math>\geq 2\%</math> government funding for R&amp;D</li><li>• R&amp;D mechanisms</li><li>• Early-stage business grants for cleantech innovation</li></ul>	The country meets <b>all 3</b> of the following criteria: <ul style="list-style-type: none"><li>• <math>\geq 2.7\%</math> government funding for R&amp;D</li><li>• R&amp;D mechanisms</li><li>• Early-stage business grants for cleantech innovation</li></ul>



## RATIONALE & NOTES

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 3. DEMONSTRATION/COMMERCIALIZATION

Demonstration/commercialization policy tools can be analysed based on four categories:

1. **Catalytic capital tools:** to de-risk and incentivize cleantech investment/innovation – includes loan guarantees, performance guarantees, government loans, insurance, contract for differences and related tools.
2. **Infrastructure development:** cleantech solutions require upgrades and changes in infrastructure across the country, ranging from grid networks to airports and shipping ports. Support can be provided through grants, public cleantech infrastructure projects, etc.
3. **Public procurement to create lead markets:** green public procurement, especially as a first customer, can fuel demand, reduce green premiums and unblock investment in cleantech, as demonstrated by the Government of Germany, which purchased renewable electricity, thereby driving down photovoltaic prices.
4. **Responsive regulation:** a regulatory framework that promotes cleantech solutions (and at minimum, does not prevent its development) is crucial for ensuring widespread adoption. Countries must ensure that their regulatory framework is responsive to innovative and novel solutions that are not covered under existing regulatory regimes.

EMERGING	DEVELOPING	MATURE
<p>The country has adopted <b>none</b> of the following policies or programmes that support:</p> <ul style="list-style-type: none"> <li>• Catalytic capital tools</li> <li>• Cleantech infrastructure development</li> <li>• Public procurement/ market creation mechanisms</li> <li>• Cleantech regulation</li> </ul>	<p>The country has adopted <b>at least 1</b> of the following policies or programmes that support:</p> <ul style="list-style-type: none"> <li>• Catalytic capital tools</li> <li>• Cleantech infrastructure development</li> <li>• Public procurement/ market creation mechanisms</li> <li>• Cleantech regulation</li> </ul>	<p><b>The country meets all 4 criteria</b> through government policy/tools.</p>



### RATIONALE & NOTES

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 4. SCALE-UP ACCELERATION

Scale-up acceleration benefits from three criteria:

- 1. Demand stimulation:** after a cleantech innovator has proven its technology and acquired its first customers / lead market, policies and tools should be implemented to further stimulate demand both domestically and internationally. Tools such as tax incentives to attract both local and foreign companies, along with export promotion, can be used to scale domestic success stories to the international market and attract successful cleantech innovators from other countries to the local market.
- 2. Transition existing assets:** existing assets can be transitioned and utilized by cleantech innovators to achieve a country's climate and innovation objectives. Examples include transitioning former oil and gas storage, pipelines and infrastructure to utilize low-carbon hydrogen / carbon capture, as is the case in the UK.
- 3. Level-playing activities:** Cleantech acceleration is a global endeavour and requires initiatives to ensure a level-playing field internationally. For example, China learned how to develop a successful Emissions Trading System (ETS) from the European Union, which has the world's oldest ETS. This put a price on carbon and creates a more level playing field for companies to compete in the global market.

<b>EMERGING</b>	<b>DEVELOPING</b>	<b>MATURE</b>
<p>The country has adopted <b>none</b> of the following:</p> <ul style="list-style-type: none"> <li>• Policies/programmes that support demand stimulation</li> <li>• Transitioning of existing assets</li> <li>• Tools/programmes to support a level playing field internationally</li> </ul>	<p>The country has adopted <b>at least 1</b> of the following:</p> <ul style="list-style-type: none"> <li>• Policies/programmes that support demand stimulation</li> <li>• Transitioning of existing assets</li> <li>• Tools/programmes to support a level playing field internationally</li> </ul>	<p><b>The country meets all 3 criteria</b> through government policy/tools.</p>
□	□	□

### RATIONALE & NOTES

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 5. WOMEN, YOUTH AND MINORITY INCLUSION IN CLEANTECH INNOVATION

1. Percentage of students in tertiary STEM education.
2. Female to male total entrepreneurship ratio.
3. Cleantech programmes within universities, accelerators and incubators specifically designed for women, youth or minorities.
4. Law mandating non-discrimination based on gender

EMERGING	DEVELOPING	MATURE
<p>The country meets <b>none</b> of the following criteria:</p> <ul style="list-style-type: none"><li>• <b>Less than 18%</b> of students in tertiary STEM education</li><li>• <b>&lt;10:90 female to male entrepreneurship ratio</b></li><li>• Cleantech programmes for women and/or youth inclusion in cleantech</li><li>• Law against gender discrimination</li></ul>	<p>The country meets <b>at least 1</b> of the following:</p> <ul style="list-style-type: none"><li>• <b>Between 18% and 27%</b> of students in tertiary STEM education</li><li>• <b>≥10:90 female to male entrepreneurship ratio</b></li><li>• Cleantech programmes for women and/or youth inclusion in cleantech</li><li>• Law against gender discrimination</li></ul>	<p><b>The country meets all criteria</b>, with many programmes and a high level of female and youth participation in cleantech entrepreneurship and:</p> <ul style="list-style-type: none"><li>• <b>&gt;27% of students</b> in tertiary STEM education</li><li>• <b>&gt;10:90 female to male entrepreneurship ratio</b></li></ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### RATIONALE & NOTES

## A. INNOVATION POLICY AND ECOSYSTEM SUPPORT

### 6. TALENT ACQUISITION AND DEVELOPMENT

National policy creates incentives to attract international cleantech researchers and/or entrepreneurs and establishes government-run or funded cleantech incubator(s) and accelerator(s).

#### EMERGING

There are **no** policy incentives to attract international talent or establish government-run or funded cleantech incubators and accelerators.



#### DEVELOPING

There are **either** national policy incentives to attract international talent, OR government-run or funded cleantech incubators and accelerators.



#### MATURE

There are **both** policy incentives to attract international talent **AND** government-run or funded cleantech incubators and accelerators.



## RATIONALE & NOTES

## B. MEASURING CLEANTECH INNOVATION CLUSTERS

### 1. EXISTENCE OF REGIONAL CLUSTERS

Clusters of cleantech innovation have startups and MSMEs, key ecosystem actors and ecosystem participants collaborating to develop cleantech solutions within a city. A cluster is defined as ‘a concentration of cleantech innovation activity in a geographic area, for example one or more adjacent zip codes.’

#### EMERGING

The country only has a **maximum 1** cleantech innovation cluster



#### DEVELOPING

**The country has maximum 2** clusters cultivating cleantech innovation



#### MATURE

**The country has more than 2** clusters cultivating cleantech innovation



## RATIONALE & NOTES



## B. MEASURING CLEANTECH INNOVATION CLUSTERS

### 2. SCALING STARTUPS PRODUCED BY THE NATIONAL ECOSYSTEM

An early-stage startup is a company that has only raised funds during pre-seed, seed & Series A rounds, or has not yet raised funds.

A growth stage scale-up is a company that has reached Series B onward funding rounds.

EMERGING	DEVELOPING	MATURE
The national ecosystem has <b>only</b> early-stage startups	The national ecosystem has produced <b>many</b> early-stage startups and <b>at least 1</b> growth stage scale-up	The national ecosystem has produced <b>many growth stage scale-ups</b>



### RATIONALE & NOTES

## B. MEASURING CLEANTECH INNOVATION CLUSTERS

### 3. LINKS TO INTERNATIONAL ECOSYSTEMS

This can include increasing cleantech imports and exports, attracting FDI to the ecosystem, fostering close collaboration between government and innovators, joining international cluster networks, championing the global push for cleantech innovation, and expanding the search for talent globally to address local and national shortages of skilled labour. Additionally, it includes adhering to internationally aligned targets for climate impact, advertising international events online and through networks, and promoting international funding opportunities.

EMERGING	DEVELOPING	MATURE
There are <b>no</b> links to international ecosystems	<b>Links exist</b> with nearby <b>countries in the same region</b>  Ecosystem actors collaborate with nearby countries and startups can access resources for growth within the region	<b>Trans-continental links</b> are facilitating national ecosystem startup growth and creating opportunities for startups to commercialize in export markets beyond the region



## RATIONALE & NOTES

## C. EXISTENCE AND ENGAGEMENT OF ECOSYSTEM ACTORS

### 1. EXISTENCE AND DENSITY OF ECOSYSTEM ACTORS<sup>4</sup>

Actors in a Cleantech Innovation and Entrepreneurship Ecosystem (CIEE) can be categorized as 1) corporates, 2) incubators and accelerators, 3) government, 4) universities, and 5) risk capital providers, with 6) startups and MSMEs at the centre of the ecosystem.

EMERGING	DEVELOPING	MATURE
<b>1 or more</b> ecosystem actor categories active in cleantech innovation	<b>All 6 ecosystem actor categories</b> have <b>at least 1</b> representative active in cleantech innovation	<b>At least 5</b> representatives of each category <b>are active</b> in cleantech innovation
□	□	□

### RATIONALE & NOTES

### 2. EXISTENCE OF ENGAGEMENT INITIATIVES LED BY GOVERNMENTS OR CIVIL SOCIETY ORGANIZATIONS

Government includes ministries or entities established or controlled by the government, such as innovation agencies and economic development agencies. Civil society organizations facilitate the transfer of knowledge and skills for ecosystem actor engagement to public officials who will conduct such initiatives in subsequent iterations.

EMERGING	DEVELOPING	MATURE
The country has <b>no</b> government or civil society organizations engagement initiatives	The country has <b>at least 1</b> government or civil society organizations engagement initiative	The country's government or civil society organizations have introduced <b>several</b> engagement initiatives
□	□	□

<sup>4</sup> Reference the Global Framework for Cleantech Ecosystem Actor Engagement for full definitions which distinguish ecosystem actors from participants.

## RATIONALE & NOTES

## C. EXISTENCE AND ENGAGEMENT OF ECOSYSTEM ACTORS

### 3. EXISTENCE OF ECOSYSTEM PARTICIPANTS LEADING ENGAGEMENT ACTIVITIES

This question refers to engagement activities led by ecosystem participants that are not government or civil society. These activities could include networking events for VCs, curated events from cluster facilitators or accelerators, or startup competitions among others.

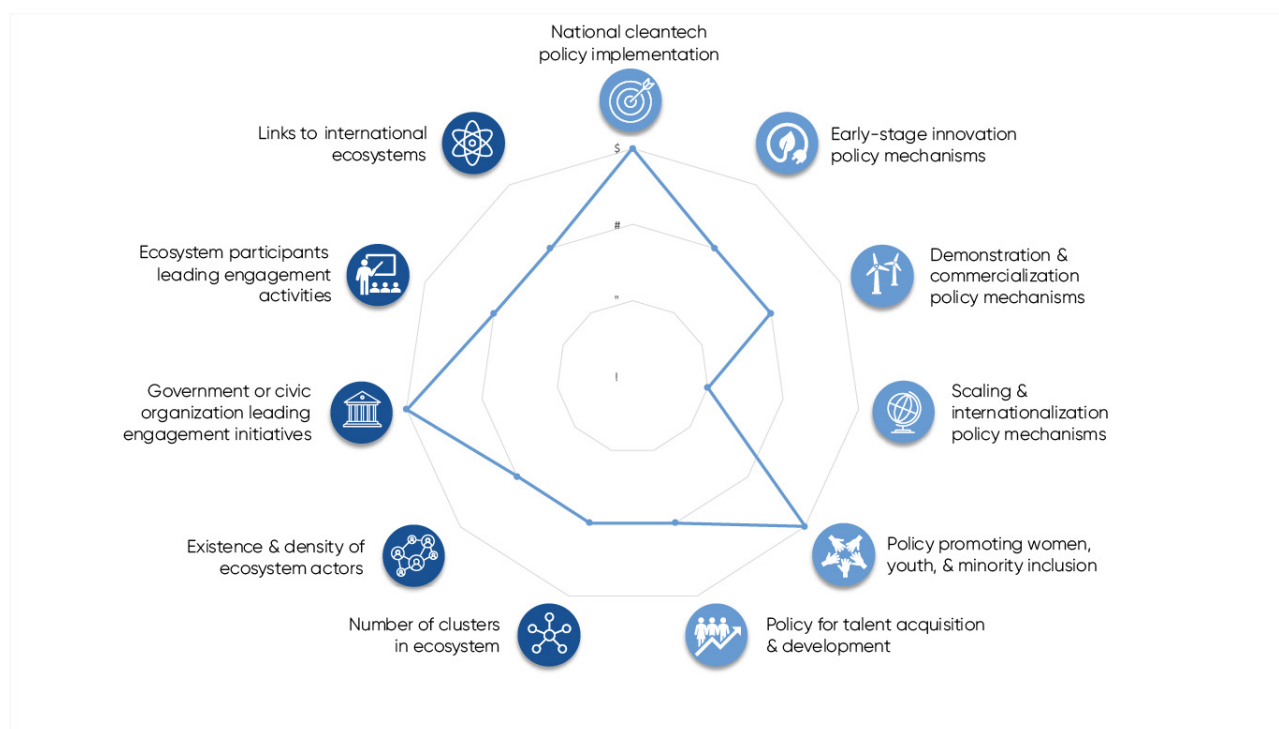
<b>EMERGING</b>	<b>DEVELOPING</b>	<b>MATURE</b>
The country has <b>no</b> ecosystem participants leading engagement activities	The country has <b>at least 1 other</b> ecosystem participants running engagement activities	The country has <b>various</b> ecosystem participants involved in running engagement activities
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## RATIONALE & NOTES

# Appendix B.

## Spider Diagram Scoring

The results of the Cleantech Innovation Ecosystem Evaluation System aim to identify which ecosystem drivers require additional support and resources. An effective way to display the results of a Cleantech Innovation and Entrepreneurship Ecosystem is through a spider diagram based on the metrics measured in the evaluation system. This diagram offers a holistic approach to analysing an ecosystem based on each component relative to the others. The evaluation survey does not produce a cumulative score to maintain focus on individual drivers. Figure 7 exemplifies a spider diagram displaying hypothetical results of the Cleantech Innovation Ecosystem Evaluation System, with maturity levels denoted as **1** – Emerging, **2** – Developing, and **3** – Mature.



**Figure 7. Spider diagram example for displaying and analysing evaluation system results**

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# Notes









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