# Piloting to scale

## Bridging the deployment gap of climate-deep tech in the UAE

# Introduction and strategic rationale

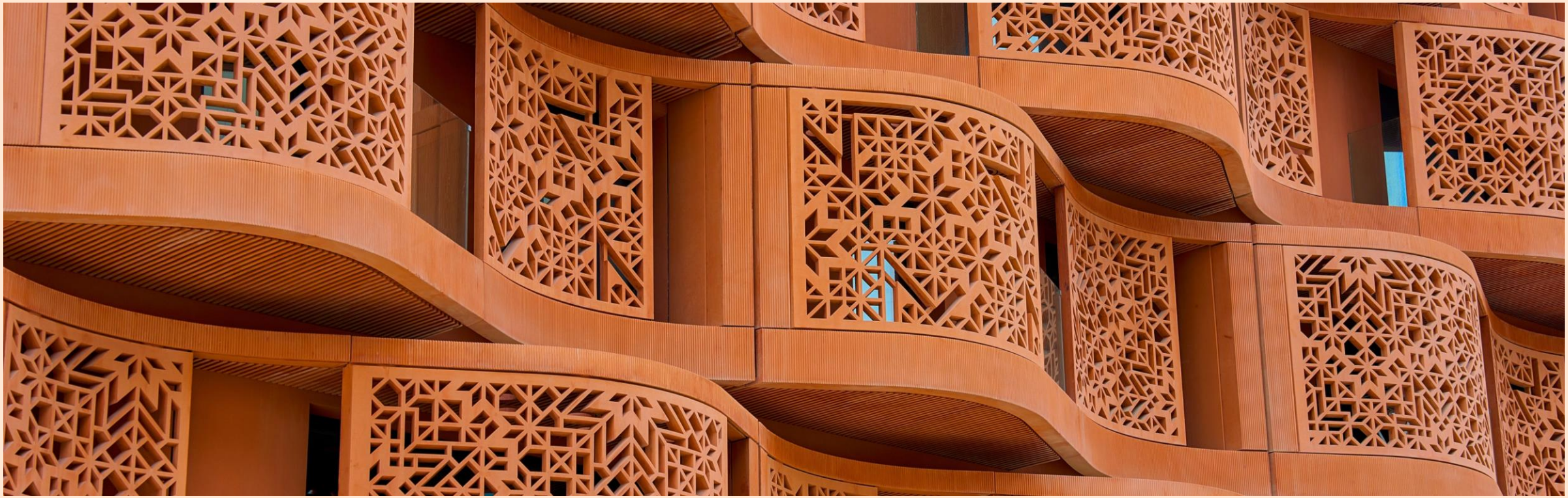
Abu Dhabi is well placed to lead the UAE's next wave of climate innovation, particularly in scaling hardware-intensive technologies at the intersection of climate, infrastructure and manufacturing. While the UAE has made global progress in clean energy and sustainability, a critical gap remains: the absence of infrastructure and mechanisms to pilot and scale climate-deep tech solutions. These include innovations such as green construction materials, energy storage systems, low-carbon industrial processes and other technologies vital to the future of infrastructure.

**On 21 May 2025, a closed-door roundtable was held under Chatham House Rules during Make it in the Emirates (MIITE) Week to explore how Abu Dhabi could lead the development of a national piloting programme.** The session brought together key stakeholders from government, industry, academia and finance. **Participants reached a clear consensus: the UAE must create real-world testing environments, align regulatory pathways and de-risk capital-intensive innovation.** These steps are essential to bridge the "valley of death" that many startups face as they move from prototype to deployment.

**This brief presents the outcomes of that roundtable discussion and has been created in collaboration with Abu Dhabi Sustainability Week (ADSW), Global Climate Financial Centre (GCFC), UAE Independent Climate Change Accelerators (UICCA), Hub71 and PwC Middle East.** It identifies the infrastructure, capital and policy gaps that currently constrain scale-up and offers a three-pillar action framework for Abu Dhabi to lead this transformation, building on existing programmes by Hub71, Masdar City and ADIO and aligning with national industrial and climate goals such as the Ministry of Industry and Advanced Technology's (MOIAT) Operation 300bn.

# Defining the focus

**“Climate-deep tech”** refers to hardware- and systems-intensive technologies that address climate mitigation or adaptation and are relevant to the future of infrastructure, including energy storage, green construction materials, carbon capture and industrial process decarbonisation. This brief does not cover general software-based climate solutions or consumer apps.



# Key findings and gaps

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## 1.1 Piloting infrastructure: What's missing?

Abu Dhabi provides strong support for incubation and now has the opportunity to enhance its infrastructure for real-world piloting and light manufacturing.

**Specific gaps include:**

- High OPEX for pilot sites, including real estate and utilities. One startup reported annual costs of Dhs150m for a modest pilot site
- Insufficient number of climate-tech tailored zones (e.g. Hub71 + ClimateTech that was launched during COP28 to accelerate startups developing climate solutions), especially for industrial decarbonisation and grid-related innovation
- Insufficient number of testing environments or regulatory sandboxes for first-of-a-kind (FOAK) technologies

These additions would help startups move beyond lab-scale validation. Without purpose-built zones and environments that support experimentation, Abu Dhabi risks losing commercially promising innovations to other markets.

### Insight 1:

Building first-of-a-kind (FOAK) commercial scale production plant for technologies like sustainable aviation fuel (SAF) or green hydrogen can require between US$100m and over US$1bn in capital expenditure.[1]

[1] https://www.weforum.org/publications/financing-sustainable-aviation-fuels-case-studies-and-implications-for-investment

# Key findings and gaps

## 1.2 Capital and de-risking barriers

Deployment-stage climate-deep tech startups often require significant investments (>US$100m) with long timelines and technology risks. This profile does not align with the expectations of most traditional venture capital in the region.

**Key challenges include:**

- Pilots are often perceived as cost centres rather than value-generating assets
- Limited investor appetite for hardware innovation in MENA markets
- Absence of predictable demand signals, such as offtake agreements or strategic procurement, reducing the attractiveness of early-stage investments

A financing model tailored to hardware-intensive, climate-relevant technologies remains underdeveloped.

### Insight 2:

Sharjah-based BEEAH has pioneered the region's first large-scale waste-to-hydrogen (W2H) project, working with UK firm Chinook Sciences to turn municipal solid waste into green hydrogen via gasification and refinement processes. The initial pilot phase was positioned more as a proof-of-concept than a revenue-generating asset.[2]

[2] https://www.beeahgroup.com/beeah-and-chinook-hydrogen-set-to-build-middle-easts-first-commercial-scale-hydrogen-from-waste-plant

# Key findings and gaps

## 1.3 Regulatory enablement

Despite national ambition on climate, regulatory frameworks to support piloting and deployment remain fragmented or underdeveloped.

**Observed gaps include:**

- No formal regulatory sandboxes or conditional approvals for climate-tech pilots
- Uncoordinated or immature carbon credit schemes, lacking interoperability or market traction
- Weak alignment between innovation priorities and public sector procurement practices

This regulatory ambiguity creates uncertainty and slows down deployment, particularly in sectors like green hydrogen, carbon capture and low-carbon construction.

### Insight 3:

The United Arab Emirates stands at the frontier of climate innovation with the introduction of Cabinet Resolution No.67 of 2024, establishing the National Register for Carbon Credits (NRCC). Businesses aligning early can gain compliance and tap into emerging revenue from carbon trading.[3]

[3] https://www.middleeastbriefing.com/news/uaes-carbon-credit-market-i-sustainability-business-compliance/

# Key findings and gaps

## 1.4 Governance and integration

The ecosystem remains fragmented. Startups must navigate multiple and often siloed entry points across regulators, accelerators and investors. There is no single window for accessing the infrastructure, capital and partners needed to pilot deep-tech solutions.

- Stakeholders lack a coordinated mechanism for identifying, supporting and scaling high-potential pilot technologies
- Public-private collaboration mechanisms for scale-up are nascent
- While there are strong efforts by ADIO, Hub71 and others, there remains an opportunity to create a more unified approach and scope

A more integrated national approach could reduce friction, improve resource alignment and accelerate time to deployment.

### Insight 4

The UAE's regulatory landscape is central to sustainability innovation but remains fragmented across emirates. Inconsistent rules hinder the scalability of climate tech startups, deter international players, and struggle to keep pace with fast-evolving sectors like hydrogen and renewables. A more unified framework is essential to accelerate progress and support innovation.[4]

[4] https://www.pwc.com/m1/en/publications/scaling-climate-tech-deployment-in-the-uae-with-abu-dhabi-sustainability-week.html

# What Abu Dhabi could do next

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Abu Dhabi can play a catalytic role in closing the piloting gap by initiating a scalable, nationally replicable model to deploy climate-deep tech solutions. Building on existing platforms like Hub71, ADIO and Masdar City, this three-pillar action plan outlines how Abu Dhabi can lead the UAE in converting innovation into infrastructure.

## Pillar 1:

### Enable piloting infrastructure

To accelerate real-world testing and iteration, Abu Dhabi could establish dedicated zones and enable flexible deployment environments:

- **Designate climate-deep tech zones** in locations such as KEZAD or Masdar City, offering subsidised utilities, tailored permitting and regulatory flexibility
- **Develop a UAE innovation readiness map,** beginning with Abu Dhabi, to clearly outline pilot pathways, contact points and support mechanisms across the ecosystem
- Expand Hub71 + ClimateTech to serve as **a centralised access point for climate-deep tech pilot support**
- **Foster lab-to-pilot partnerships** by linking Hub71 academic partners (MBZUAI, NYUAD, Khalifa University) with industrial stakeholders to co-develop and test FOAK technologies

## Pillar 2:

### Mobilise capital and de-risk innovation

To address capital intensity and long deployment cycles, Abu Dhabi could anchor a financial framework that improves investor confidence:

- **Launch a de-risking facility** in Abu Dhabi to offer guarantees, first-loss capital, or concessional finance, potentially expandable to a national model
- **Introduce R&D tax credits and corporate VC incentives** to encourage private-sector investment in high-risk, hardware-based climate innovation
- **Integrate pilot-stage startups into in-country value (ICV) schemes,** providing procurement advantages and enhanced visibility in industrial supply chains

## Pillar 3:

### Drive collaboration and governance

To overcome fragmentation, a clear governance structure is needed to coordinate stakeholders and ensure accountability:

- **Establish a national piloting mechanism** anchored in Abu Dhabi, with clearly defined roles for public and private sector entities
- **Create a multi-stakeholder steering committee** to oversee implementation, monitor progress and adjust the model based on pilot outcomes
- **Set up centres of excellence** in partnership with corporates such as ADNOC, TAQA and Etihad to lead vertical-specific innovation agendas
- Embed challenge-driven procurement models into government and SOE purchasing strategies to **create demand for locally piloted solutions**

# This thought leadership piece has been developed through the collaboration of the following organisations:

**PwC**
About PwC At PwC, we help clients build trust and reinvent so they can turn complexity into competitive advantage. We're a tech-forward, people-empowered network with more than 370,000 people in 149 countries. Across audit and assurance, tax and legal, deals and consulting we help build, accelerate and sustain momentum. Find out more at www.pwc.com.

With over 12,000 people across 12 countries in 30 offices, PwC Middle East combines deep regional insight with global expertise to help clients solve complex problems, drive transformation, and achieve sustained outcomes. Learn more at www.pwc.com/me.

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**Abu Dhabi Sustainability Week (ADSW)**
Abu Dhabi Sustainability Week (ADSW) is a global platform supported by the UAE and its clean energy leader, Masdar, to address the world's most pressing sustainability challenges through crucial conversations accelerating responsible development and fostering inclusive economic, social and environmental progress.

For more than 15 years, ADSW has convened decision-makers from governments, the private sector and civil society to advance the global sustainability agenda through dialogue, cross-sector collaboration and impactful solutions. Throughout the year, ADSW conversations and initiatives facilitate knowledge sharing and collective action that will ensure a sustainable world for future generations.

**The Global Climate Finance Centre (GCFC)**
The Global Climate Finance Centre (GCFC) is a COP28 legacy initiative focused on catalysing climate investments and solutions globally, head-quartered in Abu Dhabi Global Market (ADGM). As a registered independent entity, it operates at the intersection of the public and private sectors, with the ambition to scale and accelerate the pace of climate finance transactions.

GCFC is dedicated to work with a broad spectrum of local, regional, and global partners to facilitate the creation of a comprehensive ecosystem for climate investing in the UAE, from supporting the design of regulatory frameworks to back-office support, with capacity to develop new partnerships and business strategies. It will develop in house capacity to address specific gaps in the ecosystem and serve as a single window for climate business and investors, prioritizing the Global South and driving forward COP28's legacy, while shaping the global climate finance dialogue.

**The UAE Independent Climate Change Accelerators (UICCA)**
The UAE Independent Climate Change Accelerators (UICCA) is a nonprofit climate action organisation, with a vision to transform our climate trajectory, and a mission to accelerate climate action by driving the UAE's transition to a green economy through effective innovation, collaboration, and policy advocacy in support of the UAE Net Zero by 2050 Strategic Initiative.

UICCA empowers organisations to fulfil their sustainability commitments and advance climate progress across sectors through three interconnected pillars: Advisory services, including data-driven research and policy development; Accelerators for climate technologies through the Launchpad Programme; and building durable Alliances that unite and connect diverse stakeholders. Across these pillars, UICCA also offers bespoke Capacity Building and Education programmes to enhance climate awareness in communities and integrate sustainability values and goals within organisations.

**Hub71**
Hub71 is Abu Dhabi's global tech ecosystem that enables founders to build globally enduring homegrown tech companies in any sector by providing access to global markets, a capital ecosystem, a global network of partners, and a vibrant community filled with highly skilled talent governed by forward-thinking regulation.

Backed by the Government of Abu Dhabi and Mubadala Investment Company, Hub71 is growing its vibrant community of tech startups, investors, government, and corporate partners to ensure the availability of investment, commercial activities, and incentives from the public and private sectors. Through Hub71's entrepreneurial infrastructure, value-add programmes, enabling services and support packages, founders can build, and scale widely adopted technologies with purpose and impact. Hub71 is on a mission to introduce new minds and technologies to Abu Dhabi, finding new ways to build globally enduring technology companies and sustain the nation's continuous economic development.

Visit https://www.hub71.com/ for more information.