



## Third G20 Sustainable Finance Working Group Meeting Mahabalipuram, 19-21 March 2023

### *G20 Workshop on Policy measures and financial instruments for catalysing the rapid development and deployment of green and low-carbon technologies*

#### *Overview*

The G20 Presidency organised a workshop to provide an overview of the early-stage climate technology market and discuss the barriers to - and potential solutions for - scaling up private finance to support the development, demonstration, and deployment of the critical early-stage climate technologies<sup>1</sup> that are necessary for keeping the goals of the Paris Agreement within reach.

Two input papers were circulated to members prior to the workshop: ‘Barriers and enablers of investment in climate technology’ by PricewaterhouseCoopers (PwC) and ‘Policy measures and financial instruments for catalyzing the rapid development and deployment of green and low-carbon technologies’ by the Asian Development Bank (ADB).

The workshop was organised around the following two sessions preceded by a keynote:

- Session I: Scaling-up capital for early-stage climate technologies: barriers, opportunities, and way forward
- Session II: Building an enabling environment for financing early-stage climate technologies

The workshop gathered participants to share country experiences, lessons and discuss diverse perspectives on various sector and jurisdiction level enablers for spurring actions on climate tech investments. The workshop provided a space for jurisdictions, academia and international organisations to discuss the different mechanisms countries are exploring in different stages of technology, the policies and the sequencing they have adopted, and share their experiences.

This note captures key messages and summarizes the main outputs from the workshop; the workshop’s agenda, including further details on speakers, is provided in Annex below.

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<sup>1</sup> Technology readiness levels 1-9, referred to as “early-stage” in this workshop, occur prior to market scaling and include activities such as proof of concept, prototyping, technology scaling, and early commercial sales. Climate technologies are explicitly focused on mitigating emissions, removing emissions, or addressing the impacts of climate change. See PwC’s State of Climate Tech 2022 report. See, for example, the UNFCCC report, Emerging Climate Technologies in the Energy Supply Sector.

## *Key Takeaways from the Workshop*

Speakers expressed a diverse set of views during the workshop, including but not limited to:

- Some of the best **technologies** available today are not necessarily being operated at a **commercial scale**; more innovations are needed to create better and cheaper solutions.
- There are a number of pathways by which a new idea can reach the market. For instance, in addition to the work of startups, the involvement of **large corporations** can also play a significant role as they have extensive **research and development labs** and budgets that arguably outweigh both government spending and venture capital investment flowing into the sector.
- There is a catalytic role for governments in spurring innovation and expanding technology deployment, including through non-dilutive or concessional government finance, like grants, which can help lower the costs of capital.
- The role of **universities and ecosystems**, which provide a supporting and enabling environment is crucial in the ideation and development phase for startups.
- Data shows that the share of funding received by sectors does not necessarily correspond with their emissions reduction potential. This **capital allocation – emission reduction potential mismatch** needs to be addressed in order to reduce overall GHG emissions more efficiently.
- **Policy certainty**, for instance as experienced in mobility and renewable energy segments in many geographies, is instrumental to the development of necessary supply chains and supporting tertiary services, leading to economies of scale. Policy enablers should appropriately develop and incentivise markets. In the current phase of green transition, **decisive and bold policy actions** would create opportunities for the stakeholders.
- The development and deployment of technologies require a **convergence of factors and coordination across stakeholders**, including those in both emerging and advanced countries.
- The importance of following a **demand-driven approach** in technology development is a paramount, as it incentivises an organic push for products and services in the long run. Governments can play critical roles in creating such demand, through for example, direct subsidies, public procurement, or the development of carbon markets, among other measures.
- Developing **technological solutions** in emerging economies will build a feedback cycle as home-grown technologies can benefit from supportive climate policies, including access to markets.
- The **climate technologies** that have reached **comparative maturity** and have been receiving the bulk share of funding are those that were supported early by governments, which to a large extent has also led to reduced cost of those technologies. Policymakers and governments can draw important lessons from this as several technologies that are mature from a R&D perspective but not from a learning curve perspective.
- The **climate ambitions of multinational companies** will affect the environmental performance of the countries that they operate in while obstructive activities such as lobbying against positive change may equally hold back any progress on reducing countries emissions.
- **Adaptation needs further attention.** While mitigation-related technologies have received growing interest, the market for adaptation-related technologies also requires further development and improvement.

## *Keynote Address*

The first keynote was delivered by Emma Cox, Global Climate Leader from PwC United Kingdom, who was interviewed by Tarik Moussa, Senior Manager, Sustainability and Climate Change, PwC United Kingdom. The keynote highlighted key trends within the climate technologies investment market<sup>2</sup> and how enablers, such as net zero commitments as well as favourable government policies, are pushing corporates to view this market with new-found opportunity and back solutions to decarbonise their businesses. As some climate technologies, such as solar and other renewables energies, become more mature, the investor community is gaining more confidence in how to assess and mitigate technology risks. However, compared to the scale of climate solutions required, the current level of investment is still lagging. The keynote also touched upon two market inefficiencies. First, the current sectoral capital allocation is not optimal in reducing carbon emissions. Secondly there is a mismatch between where capital is currently allocated and the stage of maturity where it is needed most. The barriers to the market were also discussed, including the lack of understanding of the technologies and business models, long timescales to recoup returns, and particularities of different geographies where investment is needed, especially for nature-related solutions. On the projects side, the keynote further discussed the difficulty in matching investors' needs in terms of due-diligence with startups' ability to provide such information. The role of policy in creating a sense of certainty for the investor communities was mentioned as a crucial enabler.

## *Session I: Scaling-up capital for early-stage climate technologies: barriers, opportunities, and way forward*

The roundtable was moderated by Hiran Vedam, Business Fellow at Breakthrough Energy. The discussion was structured around three stages of early-stage climate technologies - development, demonstration, and deployment.

### **Development Phase**

Panellists highlighted several different key insights from the development phase, such as a) the demand side push is driving an organic momentum in the early-stage technology space as the business case for decarbonisation is getting stronger, b) an increasing number of high quality talent is transitioning into the space, driven by both mission-oriented and opportunistic reasons, but many of these people still need technical assistance and upskilling support, especially under-represented founders such as women, and c) the emergence of late stage capital allocators is sending positive signals to the early-stage market.

Panellists also emphasised the importance of incremental technology innovation. For instance, one speaker highlighted that in some sectors the current available technology is not sufficient to lead to a market learning curve that can result in increased performance and lower costs. The panellist also noted that small, consistent improvements in technology, which may not look radical in standalone terms, could have a large cumulative effect over decades is important to achieve that learning curve. One panellist cited solar as an example of how coordination, policy support, supply side push and enabling environment together helped to bring down costs rapidly.

Some panellists agreed that there is a strong case for countries to collaborate on technology transfer and incentives for both ethical and practical reasons. Another speaker mentioned that many innovators are focusing on the problems and challenges that their local communities are facing. For instance, a slew of startups in Africa and Asia focus on access to electricity, which is still a barrier for millions of people in these regions. A panellist also pointed out that most of the energy investment that is collectively

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<sup>2</sup> <https://www.pwc.com/gx/en/news-room/press-releases/2022/state-of-climate-tech-report-2022.html>

needed by 2050 is projected to happen in emerging market and developing economies and there is a significant economic opportunity for all to participate in those value chains.

### **Pilot or Demonstration Phase**

One panellist discussed a successful model in China where public and private funding are together used to support the development of innovative startups. Citing an example, the panellist mentioned that the Ministry of Finance acted as the anchor investor in a fund of funds investing into China VCs. The concept of risk-sharing was also discussed through the lens of instruments used by startups at different stages of their growth cycle from demonstration through deployment. Another panellist noted that startups can be inventive in the way they structure their funding, including by using incubation programs or philanthropic capital, which can help lower risk. They added that startups can also explore funding that best matches with the risk-return profile of different capital providers. For example, a commercial investor may make larger-sized investments, while an impact-focused investor may pool smaller-sized investments to catalyze different programs.

While commenting on technology risk and high costs associated with demonstration, one panellist proposed that a suitable way to frame demonstration projects is by focusing on the public goods aspect of the solution and pilot a relatively small number of demonstration projects carefully localized around the world to reflect the technology risk. Some speakers also emphasised the role of the state in providing non-dilutive or concessional finance during technology development, demonstration and commercialization, complementing private sector funding. The panellists further recognised the institutional role of the state as a common denominator in providing an enabling environment.

### **Deployment Phase**

During the deployment phase, various forms and sources of capital are available to startups as projects are appraised and due-diligence has already been done. Panellists underscored the importance of market understanding and demand generation through various means, including direct subsidies by government, public procurement, and carbon markets. At this stage, a panellist noted, innovation is driven to a large extent by market signals. For instance, the market signals are very strong for certain sectors like solar PV, electric vehicles and wind energy. One panellist highlighted the role of cost of capital and how policies can incentivize banks to provide funds at lower costs of capital.

## **Session II: Building an enabling environment for financing early-stage climate technologies**

The roundtable was moderated by Mark Daly, Head of Technology & Innovation from BloombergNEF and continued the discussion on contribution of various stakeholders in creating an enabling environment for financing early-stage climate technologies. One panellist pointed to the inefficient capital allocation across sectors and across countries and the need for de-risking through first loss capital from MDBs and philanthropic sources. Panellists discussed the US Inflation Reduction Act as well as carbon taxes. Another panellist encouraged the group to focus on foundational policy that can positively affect firm behavior and examine what kind of market failures and distortions are preventing the adoption of climate technologies in higher numbers by the private sector.

The panel highlighted the critical role of multinationals in financing early-stage climate technologies as well as correlation between their climate ambition and its effect on emissions. A panel member provided a summary of their publication ‘The Effect of Multinational Enterprises on Climate Change<sup>3</sup>’, that dealt with the role of multinationals in climate tech innovation. The U.S. Department of Energy also provided

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<sup>3</sup> <https://openknowledge.worldbank.org/entities/publication/6f95644d-92cc-4e75-87c7-43f866355833>

a brief overview of the US Loan Programs Office in supporting startups. One panellist described the necessity of well-functioning sustainable finance markets as another technology enabler, as it shows where the opportunities are. The panellist also argued on the advantages of issuing sovereign green debt in local currencies in emerging economies in the midst of monetary tightening and rising interest rates, pointing to the non-monetizable nature of many adaptation-related investments. The critical role that the insurance sector can play in adaptation finance was also highlighted.

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## Annex

Date and Time: Monday 19 June 2023, 14.00-18.00 IST (UTC+5.30)

Venue: Radisson Blu, Mahabalipuram

Workshop Agenda
14.00 – 14.10/ Welcome and Introduction
14.10 – 14.30/ Keynote: Assessing the state of early-stage climate technology <ul style="list-style-type: none"><li>• <b>Emma Cox</b>, Global Climate Leader, PwC</li><li>• <b>Tarik Moussa</b>, Senior Manager, Sustainability and Climate Change, PwC UK</li></ul>
14.30 – 16.00/ Session I: Scaling-up capital for early-stage climate technologies: Barriers, opportunities, and way forward. <u>Moderator:</u> <b>Hiran Vedam</b> , Breakthrough Energy Business Fellow <u>Panellists:</u> <ul style="list-style-type: none"><li>• <b>Anjana Seshadri</b>, Vice President, SBICAP Ventures Limited Neev Fund</li><li>• <b>Nalin Agarwal</b>, India Program Director, New Energy Nexus</li><li>• <b>Simon Bennett</b>, Energy Technology Analyst, International Energy Agency</li><li>• <b>Wang Yuxi</b>, Executive Director of CICC Capital Management and the executive director of Shandong Green Development Fund Qingdao Fund</li></ul>
16.20 – 17.50/ Session II: Building an enabling environment for financing early-stage climate technologies <u>Moderator:</u> <b>Mark Daly</b> , Head of Technology & Innovation, BloombergNEF <u>Panellists:</u> <ul style="list-style-type: none"><li>• <b>Jigar Shah</b>, Director, Loan Programs Office, U.S. Department of Energy</li><li>• <b>Elias El Mrabet</b>, Finance and Technology Partnerships, COP28</li><li>• <b>Prof. Amit Garg</b>, Indian Institute of Management Ahmedabad</li><li>• <b>Abhishek Saurav</b>, Senior Economist, World Bank</li><li>• <b>Neha Kumar</b>, Head the South Asia Programme, Climate Bonds Initiative</li></ul>
17.50 – 18.00/ Closing session

Contact information: [sfwg.secretariat@undp.org](mailto:sfwg.secretariat@undp.org)

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