

**10th meeting of the Advisory Board to the
Climate Technology Centre and Network (CTCN)**

Summary report of the First-of-a-Kind Workshop on Climate Technologies

Procedural background

1. In order to strengthen the UNFCCC Technology Mechanism and support the implementation of the Paris Agreement, COP decision 1/CP.21, paragraph 66 requests the Technology Executive Committee and the Climate Technology Centre and Network to undertake further work relating to, inter alia: (a) Technology research, development and demonstration; (b) The development and enhancement of endogenous capacities and technologies.
2. The CTCN hosted a scoping workshop to address its potential to support First-of-a-Kind technologies in Copenhagen on 22-23 May 2017. The report from that workshop is attached as Annex I to this document. Outcomes from this meeting will inform the participation of the CTCN Advisory Board Chair at GCF B.18 in October 2017.
3. The CTCN Advisory Board will be invited to take note of the document, noting that it will be published on the CTCN website once it has been properly formatted and supplemented with photographs from the event.

Annex I

1. Introduction

1.1 Background of the Scoping Workshop

In order to strengthen the UNFCCC Technology Mechanism and support the implementation of the Paris Agreement, COP decision 1/CP.21, paragraph 66 requests the Technology Executive Committee and the Climate Technology Centre and Network to undertake further work relating to, inter alia: (a) Technology research, development and demonstration; (b) The development and enhancement of endogenous capacities and technologies.

The CTCN has over 120 Network Member organisations working with research, development and demonstration activities in a position to support developing country clients of the CTCN in their efforts to mitigate and adapt to the effects of climate change. The objectives of this CTCN Scoping Workshop were tailored to the scale of CTCN interventions and formulated based on the mandate given by UNFCCC Parties to the CTCN:

- 1) Define the status and potential for matchmaking support of First-of-a-Kind climate technologies to developing countries through the CTCN; and
- 2) Identify means of de-risking public and private sector investment in First-of-a-Kind climate technologies, adapting to local and regional contexts, enabling policies, fiscal instruments and markets.

1.2 Summary of the Scoping Workshop

An audience of 83 external participants met from 22-23 May 2017, at UN City in Copenhagen, Denmark to explore opportunities for CTCN to support First-of-a-Kind climate technology demonstration. Workshop participants included 13 National Designated Entities (NDEs) from Non-Annex I countries and 3 from Annex I countries, 13 CTC Network members working with First-of-a-Kind climate technologies from Non-Annex I countries and 23 from Annex I countries, 16 CTCN Consortium Partners and 15 other relevant stakeholders including TEC representatives, CTCN Advisory Board Members, UNFCCC Secretariat officials and other finance and research experts.

The workshop established a common basis for the discussion of climate technology piloting and demonstration, considering representative examples, and mapping the expertise of Climate Technology Network institutions related to innovative, First-of-a-Kind climate technologies. This included identifying needs of adapting technologies to local contexts that could be facilitated through the CTCN. Discussions addressed new business models and market conditions for demonstration and subsequent deployment.

Panel discussions and expert presentations identified local, national and regional needs in developing economies for First-of-a-Kind technology piloting and demonstration, as well as the adapting of climate technologies to local and national conditions. Group exercises and roundtable discussions involving CTCN Advisory Board members, NDEs, CTC Network members, TEC members, Consortium Partners, and other relevant stakeholders explored gaps and opportunities towards de-risking financial investment including policies, fiscal instruments, enabling markets and incentives.

2. Relevant parallel and supporting processes

2.1 Key issues identified by the CTCN RD&D task force in August 2016

Based on an assessment of RD&D needs of developing countries (including a review of CTCN requests, sampling of TNAs/TAPs, feedback from NDEs), there is a clear desire for innovation-related technical assistance that the CTCN can fulfil. These needs vary widely among countries.

According to the findings of the CTCN Advisory Board's RD&D task force the CTCN should address RD&D through five "lenses": (1) technology; (2) information; (3) policy and regulation; (4) behaviour; and (5) business models. Within these lenses, the activities of the CTCN should continue to promote collaboration, guide NDE focal points in the development of Technical Assistance requests, match network member expertise with developing country requests on RD&D and assist with the deployment of climate technologies. The task force also encouraged CTCN to continue to engage with the UNFCCC Technology Executive Committee (TEC)'s Task Force on RD&D.

2.2 CARISMA project on mitigation and innovation

"Coordination and Assessment of Research and Innovation in Support of climate Mitigation Actions", is an EU-funded project (Horizon 2020) running from 2015 to 2018. It is a joint effort to encourage innovative mitigation-related research and policy development in Europe. It is coordinated by Radboud University in Nijmegen, Netherlands, and promotes synergies with other institutions, including the CTCN.¹

CARISMA's approach is to support the accelerated development, diffusion and scaling-up of options for climate change mitigation. CARISMA works with synergies and engagement with the policymaking and business communities to resolve implementation issues, networking and information-sharing as well as support to climate change mitigation policy development in the EU and its member states. CARISMA researches institutional, political, economic, and social factors impact on climate action as well as the economic costs and environmental benefits of mitigation options that target substantial GHG reductions.²

The CARISMA project is structured along eight themes, with five that form the core focus: Research & Innovation; Assessment of Technologies; Policy effectiveness and Interaction; Governance and contextual factors; and International Collaboration on Innovation and Policy.³ Experts affiliated with

¹ <http://carisma-project.eu/>

² CARISMA First Synthesis Report, August 2016.

³ *ibid.*

CARISMA participated in the CTCN workshop and will help ensure its outputs appropriately inform that project's own deliberations.

2.3 Findings of the TEC Special event on Innovation

The CTCN Scoping workshop drew on findings from the special event organised by the Technology Executive Committee (TEC) on May 12th 2017, entitled "How innovation can support implementation of nationally determined contributions and mid-century strategies", as well as on proceedings of the 46th meeting of the Subsidiary Bodies to the UNFCCC. The TEC event built on its previous work on innovation in the lead-up to the adoption of the Paris Agreement.

The TEC Special event aimed to:

- a) Describe technological innovation and outline the capacities required to nurture an effective innovation process;
- (b) Analyze and highlight the key role that innovation policy and international cooperation on innovation can play in accelerating the implementation of NDCs and mid-century strategies in developing countries;
- (c) Showcase experiences, good practices and lessons learned from previous efforts relevant to developing countries;
- (d) Identify the following, to accelerate the implementation of NDCs and mid-century strategies:
 - (i) Innovations with high potential in developing countries;
 - (ii) Innovation policies and international cooperation on innovation that can be established, strengthened and/or implemented;
 - (iii) Possible financing models for innovation that can support developing countries.⁴

According to the TEC Vice-Chair, Ms. Duduzile Nhlengethwa, for countries to achieve their NDCs and mid-century strategies there is a need to embrace technological innovation to deliver transformational change based on respective countries' contexts, and to recognize that innovation cuts across approaches to deliver on all Sustainable Development Goals. Therefore the TEC emphasizes strengthening of the full innovation system according to stakeholders' roles in the innovation process, taking into account that innovation goes beyond finance and its principal role in ensuring effective diffusion. Ms. Nhlengethwa further mentioned policies, innovative communication, business models and technology demonstration activities as important elements for supporting innovation as well as transferring knowledge and technologies to and between developing countries.

It was identified that countries' short- and long-term innovation needs might not be mutually reinforcing as NDCs usually focus on a time frame linked to 2025 or 2030. The default approach for most countries is to focus mainly on rapid, wide-scale and near-term deployment of mature technologies or technologies that are close to market maturity, without necessarily considering those actions in the context of delivering on longer-term objectives. Participants discussed the barriers to the deployment of innovative technologies including the need to identify actions for supporting replication in different local, national and regional contexts, financing and business models, and smart regulations and policies that will provide incentives for public and private actors to engage.

⁴ Technology Executive Committee Special Event on Innovation and Climate Change: <http://unfccc.int/ttclear/tec/documents.html>

Mid-century strategies, however, aim to catalyse transformational change and therefore require a more long-term focus. Many factors are required to support transformational technological innovation: national innovation systems, targeted capacity building for actors and institutions to participate in national, regional and international processes, effective knowledge transfer, strong stakeholder engagement highlighting local and indigenous knowledge, and predictable access to financing to develop national ownership were all raised by participants. It was stated that there is a need for implementable innovation and for showcasing success stories to guide the process forward, recognizing that no one solution works in every circumstance.⁵

3. Findings of the CTCN Scoping workshop

3.1 Session 1 - Setting the stage

CTCN officials Jason Spensley and Federico Villatico noted that innovation is a basic need for developing countries to address climate change, and that first-of-a-kind approaches can be deployed to support and address that need by the CTCN through its Technical Assistance (TA) interventions. Heleen de Coninck (CARISMA) helped to set the stage for the day by drawing a distinction between Research and Development (R&D) activities as more cutting-edge and explorative whereas discussions of technological innovation would focus on those technologies that were market-ready. Ms. De Coninck's presentation also sought to highlight the key elements of successful collaboration, including an understanding of how collaboration takes place and in what shape (based on a mapping exercise of ongoing collaboration), considering the importance of political momentum, a sharper focus on impacts than on measurable outputs, not underestimating the value of mutual trust, and anchoring activities in the mutual interest of all parties at an early stage. The CARISMA project further noted that in the UNFCCC, there is only one place to talk about transformational change: the technology mechanism.

Libasse Ba (ENDA) underscored the importance of including indigenous technologies and approaches in the working definition of climate technology. Henry Neufeldt (ICRAF) looked to define first-of-a-kind (FOAK) technology, and suggested the consideration of "innovative technology" could be useful. The unintended impacts of innovation were discussed, including uncontrolled system change, which the TEC proposed could be addressed through an analysis of technologies to assess their risk of triggering such a change. It also noted that there is no innovation without participation (integration of technologies in our society through engagement and ownership).

3.2 Session 2 – Matching needs with solutions

Jonathan Lonsdale of ICF began the second session by highlighting that understanding capital markets and how they treat risk is key to unlocking investment for climate technology, and to creating the conditions that will allow so-called first-of-a-kind approaches to thrive. Matthew Kennedy of the International Energy Research Centre identified replicability, trust and understanding of local conditions as keys to the successful deployment of technology innovation. According to Mr. Kennedy, as industry will ultimately own the intellectual property being deployed, the potential to build markets for any

⁵ *ibid.*

proprietary technology is what will drive research and investment. Disruptive technologies take business from non-innovators - that is important to acknowledge as industry does not need help with engineering but with business models, analysis of local conditions and understanding of the needs of all partners. Nand Kishor Agrawal (ICIMOD) noted that innovation needs to be low-cost and not too dependent on government intervention.

The panel discussion emphasized the adaptation of new technologies to local contexts, and encouraged investment in RD&D with an emphasis on deployment. Technology 'know-how' and 'know-why' were highlighted, as was the need to link technology innovation with capacity building. The CTCN model of tailored technical assistance was identified as an approach that could enable solutions on the ground, while building local capacity as well.

3.3 Session 3 – Financing climate technology and adapting climate technologies to local contexts

Astrid Motta (EBRD) provided an overview of the role that FINTECC plays in funding innovative projects at the national level that reduce GHG emissions as well as crowding in additional sources of investment. Lars Pehrson, Global Alliance for Banking on Values (GABV), explains how banks such as Merkur Cooperative Bank fund innovative approaches to energy access by adopting a triple-bottom-line approach and taking a longer-term view allows for greater support to emerging low-carbon technologies often advanced by SME. This 'patient money' approach has spurred the development of robust clean technology portfolios as well as valuable joint ventures that have produced, inter alia, open source methodologies for financial institutions to measure the carbon footprints of their investment portfolios. He also noted the important role that local ownership can play in spurring the development of clean technology solutions as investors have more than a financial stake in the outputs.

Rabhi Abdessalem (Institute for Global Environmental Strategies) highlighted the importance of mapping of technologies based on their size, source of financing, scale and phase of deployment in a particular location and the role this work can play in supporting additional investment in similar projects. Nagaraja Rao (Private Finance Advisory Network) noted that the questions of technology ownership are particularly important, as technologies that do not pay for themselves will generally fail to gain any traction in a market. Daniel Buckley (GCF) elaborated the role that the GCF can play in supporting innovation by looking to de-risk mitigation and take on risk in adaptation investments. The GCF views investments in their potential contribution to a paradigm shift, and aims to figure out the most appropriate pathways to support collaborative RD&D together with CTCN including through the creation of markets with appropriate support for necessary enabling frameworks.

3.4 Session 4 – Climate Technology support: a CTCN country and partner perspective

During session 4 Shikha Bhasin, RINGO representative to CTCN Advisory Board, reflected on the purpose of CTCN supporting First-of-a-kind technologies. In her opinion data gaps affecting transparency and a strong governance structure are major issues. She urged to get the terminology right to attract interest and to adopt a more systematic approach: not just moving a technology along, but taking a more complete, holistic view. Zimbabwe's NDE Elisha N. Moyo pushed for a solution on how collaborative

RDD works in practice. In his opinion much on-going work can be integrated; appropriate information-sharing and lessons learned across communities can inform these investments. He encouraged the development of technology programmes that influence on different levels: country, community and family/household. He wished that the CTCN and GCF collaboration on capacity development would continue and that more resources would be earmarked for modelling impacts of climate change in Africa as this could inform the technology choices made by African governments as well as the applicability of First-of-a-Kind approaches implemented on the continent.

The Argentinian NDE Gabriel Blanco encouraged the CTCN not to concentrate on business but to recall its role within the Technology Mechanism and the work it can do across the full breadth of the technology cycle – including supporting research into innovative solutions. In Mr. Blanco’s opinion, cooperative RD&D is the right action for the CTCN in the future but it needs to be matched with predictable funding for CTCN, which has thus far not been forthcoming.

Participants repeatedly raised the role of the adaptation of technologies to a particular market, country or context. This is particularly important for technologies that exist but need to be adapted to a developing world context as well as technologies tailored to needs that exist predominantly in the developing, but not the industrialised, world. There was broad agreement that creating the right market conditions for these approaches would create the proper incentive for the private sector, and multilateral finance, to become more actively involved.

3.5 Sessions 5&6 – Mapping expertise.

Participants dispersed into working groups to discuss and map the solution space for the CTCN to support the deployment of first-of-a-kind technologies, then re-convened to present and discuss their findings. Groups were guided by the following discussion questions:

- How can the CTCN best leverage its matchmaking role between the needs of developing countries for emerging climate technologies and the providers of those technologies?
- What gaps are there for First-of-a-Kind climate technologies and subsequent deployment in developing countries that CTCN can address?
- What are the challenges for developing countries to access support for technology adaptation to local contexts? Where are the opportunities to deepen engagement? How can the CTCN assist?

A summary of insights that will be incorporated into the CTCN’s work includes:

- Sector needs and circumstances drive solutions at the national level. Strong country- and sector-level engagement will lead to greater market intelligence and a stronger matchmaking platform. A strong Network has an important role to play in this regard.
- CTCN could provide a library of best practice cases as a reference for dissemination and upscaling as part of its matchmaking service. The matchmaking role of the CTCN relies on its strong knowledge management focus and providing the success cases for up-scaling of innovative technology assistance. The effective up-scaling of CTCN interventions will be driven by matching development and capacity building needs and clearly indicating the co-benefits for local/national sectors.

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- CTCN can play an important convening role in ensuring appropriate stakeholders are engaged and may wish to consider clustering countries/requests along climate zones, regions, technical aspects, and establish a “typology” which enables peer to peer country exchange, i.e. fostering mutual learning among stakeholders.
 - The promotion of enabling environments for private sector engagement (incl. de-risking of investment, and extended tracking the impacts of TA interventions beyond their completion) can enable technical assistance for innovative technologies at full investment scale. CTCN should also focus on working with partners on including business models and transition pathways to bankable projects in its technical assistance.
 - CTCN should expand the focus as requested by the Parties to also embrace aspects of RD&D and deployment – which means to bring national private sector and innovators into an “in-country” ownership role of new solutions and thus providing long-term perspective for countries. This also extends to the promotion of RD&D-related technical assistance.
 - The CTCN could draw more strongly on its Regional Forums and leverage convened expertise to address regional specifics. Project bundling at the regional level may support the upscaling of solutions to deploy innovative and adapted deployment of climate technologies.
 - Promoting South-South collaboration, learning and information sharing can multiply the impact of CTCN interventions.
 - It is critical to foster not just the innovative technologies (to be brought in, adapted, demonstrated and deployed) in a traditional sense but to foster also the endogenous technologies, i.e. available in-country or on regional scale.
 - CTCN is seen to bridge the language barrier e.g. between the research and the business communities; the key is for CTCN and its work with the countries and the Financial Mechanism to have a transparent definition that is consistently applied and support to countries and stakeholders effectively communicated.

3.6 Session 7 - Reporting back and moving forward: Key findings of Day 1 and Introductory keynote on de-risking investment in climate technologies

During Session 7 Nagaraja Rao from CTI-PFAN presented on the de-risking of investments. He encouraged the sharing of risk among different stakeholders, and noted the key role that political will can play in incentivizing large investments. Mr. Rao presented different approaches for de-risking such as public-private partnerships, Foreign Direct Investment, technology transfer (if proper patent agreements are in place and the technology is scalable), impact investment (people who can help with small projects but with high social impact) and support for collaborative RD&D.

In Mr. Rao’s opinion, the CTCN should consider outreach to source technologies (mapping, getting right technology to right place), encourage adoption of proven technologies for developing markets, set up pilot projects that can be replicated and scaled up, catalyze needs based technology transfer assessments and assist in key technology assessment and project management.

3.7 Session 8 – Regional/national/subnational climate strategies and responses – how best to reduce investment gaps and risks?

Arthur Onyuka, the NDE of Kenya, talked about the need for good policies for supporting the Technical Assistance processes. He identified the lack of technical ability, trials to transfer non-adapted technologies to local contexts, limited knowledge of technologies, lack of access to information, facilities and finance, lack of policies on innovation and entrepreneurship, socio-economic factors, lack of regional linkages and weak linkages between concepts and commercialization (lack of roadmap towards commercialization), as gaps and challenges for climate technology transfer. Mr. Onyuka identified capacity building, understanding local context, collaboration, IP rights, joint ventures or licensing rights, ethical practises, transparency, public guarantees and investment incentives as solutions to address these gaps and challenges.

Ambuj Sagar (Indian Institute of Technology) identified the stages for a successful technology transition as 1) defining what are a desirable future and development aspirations for the country, 2) understanding the technological opportunities for meeting these aspirations, 3) selecting the technologies that make sense and 4) defining the technological pathway. Mr. Sagar defined First-of-a-Kind as the first step of getting the deployment cycle going. He identified two types of innovation: “new to the world” and “new to the market”. He supported collaborative RD&D and highlighted the importance to develop new technologies (new to the world) that do not have a place in the global market but are important for developing countries and to make sure that already available technologies are adapted to local contexts.

Mr. Sagar encouraged a heightened focus on the analysis of financial gaps and the development of innovative approaches ways to overcome financial constraints such as using alternative payment models (e.g. pay-as-you-go to support LED deployment). He recommended looking at knowledge gaps, e.g. consumers being unaware of the energy performance of household appliances, and developing strategies to address these gaps.

During the panel discussion Mukand Babel (AIT) encouraged to put more attention to market formation, and to create clear diffusion strategies for adaptation technologies. He highlighted that First-of-a-Kind technologies are more risky than established technologies and that this risk-taking needs to be balanced with cost-effectiveness in the context of limited financial resources. He suggested the CTCN identify the most suitable technologies during the Technical Assistance response planning phase, including information on market players, financing and piloting, and that this information be incorporated into the response.

3.8 Session 9 – Regional/national/subnational needs and responses – how best to reduce investment risk?

Workshop participants again split into breakout groups along regional lines to address specific strategies the CTCN could adopt to support First-of-a-Kind technologies and innovative approaches to address climate change. The discussion questions groups were asked to address were the following:

- What practical approaches (including financial instruments and market incentives) have worked in First-of-a-Kind technology demonstration and application to local contexts?
- What are the new business models needed to enable First-of-a-Kind technology piloting and upscaling and how can CTCN be a matchmaker to support those?

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- What partnerships, financial and market instruments are required towards de-risking of investment and can CTCN address those in the form of technical assistance and capacity building? In the context of support to First-of-a-Kind Technologies, what is the most efficient role for CTCN as climate technology broker?

Key themes that emerged from the working groups and the plenary discussion that followed include:

- The importance of support for the development of strong business models can't be overstated. To arrive at new business models First-of-a-Kind piloting will require priority and seed finding to support SMEs and investment in the value chain. Business models need to convene multiple actors, i.e. the business community itself including SMEs, new entrepreneurs with piloting technologies, government agencies (which may also request for targeted capacity building) and community-level engagement. In this context, First-of-a-kind may explicitly also encompass indigenous and endogenous technologies and their upscaling.
- Adaptation needs remain under-addressed. Technical assistance, with an RD&D focus, could begin to bridge this gap but needs to be supported by predictable funding. CTCN in its role as efficient climate broker is required to engage with the research community to develop robust responses to climate challenges and national strategies, particularly for adaptation and particularly in Africa.
- Responses need to be grounded in local contexts, match development needs, and lead to outputs that can be shared and built upon in other countries. Raising awareness of the role of CTCN including by empowering the NDEs could support this objective, and could be supported by enhanced access to lessons learned and proofs of concept.
- The feasibility and market potential of technologies needs to be tested and the risk assessed in pilot applications. A mapping of climate technologies and risk profiles could be a useful result; climate innovation incubator centres could contribute to effective regional mapping of needs and high-potential approaches.
- Technologies need to be contextualized to their larger deployment area to provide appropriate framing and selling points for targeted fund-raising from potential bilateral and multilateral sources.
- The impact of CTCN interventions may be increased by working on technology assessment across the region e.g. with Centres of Excellence and promote "twinning arrangements" that can support NDCs across countries and within regions.
- In Africa, it may be particularly important to consolidate resources to maximize the impact and co-benefits, and to concentrate more strongly on climate adaptation with a focus on agriculture, water and urbanisation.
- There is support for monitoring and evaluation (M&E) to be strengthened in CTCN interventions and enabling a life cycle approach and long-term follow up.
- The regional views exchanged support particularly one finding articulated by TEC which is that there is no one-size-fits-all set of solutions.

4. Conclusions

4.1 Conclusions from the CTCN director

CTCN Director Jukka Uosukainen concluded that there is no single solution for promoting First-of-a-Kind technologies: private sector involvement and funding is needed together with political and policy support. The process needs management throughout the whole Technology cycle. The approach needs

to be disruptive and transformational, and demands market and up-scaling of appropriate solutions be examined and appropriately addressed. Further, the role these interventions can play in job creation and economic growth need to be effectively communicated to stakeholders.

Mr. Uosukainen encouraged countries to think what kind of future they want for themselves and to seek assistance to help to build that vision. He highlighted the importance of mapping: to support the right technologies at the right time to the right people and to put emphasis on strengthening local capacities. It is also important to remember that collaborative RD&D is a long-term process and relies on trust and transparency.

He further concluded that:

- The seven key outcomes from the TEC Innovation workshop form a good basis for CTCN activities;
- The CTCN should focus on a First to Market approach, when a technology is applied in a new country or transferred to a new sector.
- Technology innovation only part of the successful technology transfer process: there must be a clear link to policies, management and finance;
- It is important to look for potential in markets, business cases and underlying risks;
- There is strong support for GCF financing for RD&D: the CTCN should seek to collaborate on streamlined modalities to support these activities, as both reliable financing and sound technical expertise are critical to success;
- Support for endogenous and adapted technologies needs to be strengthened and prioritized;
- the private sector usually does not fund FOAK technologies but is willing to step in when these approaches reach the bankable project level;
- The CTCN should continue to focus on interventions that balance demand for services and prudent use of resources, and be mindful of overlap in other established processes;
- The CTCN will continue to focus on areas where it can serve as facilitator and catalyst for larger-scale actions, and examine opportunities to deliver ‘best-fit’ mapping of transformational technology solutions with not just national but regional transformational potential as well;
- This includes the development of technology roadmaps in support of NDC implementation, supported by strong partnerships, including national RD&D commitments as appropriate;
- The CTCN has the potential to leverage its convening power – as it did at the FOAK workshop – to bring together the research, finance, government, industry, and intergovernmental bodies required to ensure a balanced approach to successful RD&D initiatives;
- NDE are an exceptional resource whose expertise should be leveraged to identify appropriate interventions aligned with NDC priorities, including upscaling supportive systems for institutional strengthening and capacity building;
- RD&D activities will play an important role in the elaboration of mid-century strategies and the realization of mid- to longer-term climate objectives;
- The CTCN needs the political support and guidance of the TEC, and to ensure their activities are aligned according to their respective strengths.