

# A Global Innovation Blueprint to make Clean Energy Affordable, Available and Accessible for All

## Announcements at the 7th Mission Innovation Ministerial

23rd September 2022, Pittsburgh

At the Global Clean Energy Action Forum, convening the [7th Mission Innovation Ministerial](#), members set out National Innovation Pathways and launched MI Mission Action Plans to deliver 221 demonstration projects globally this decade, accelerating clean energy technologies in the hardest to abate sectors. Together, the announcements set a global innovation blueprint for the action needed this decade to make clean energy solutions affordable, attractive and available for all.

This responds to the IEA assessment that at least USD\$ 90 billion of public funding is needed by 2026 to demonstrate the technologies necessary to decarbonise global energy systems by 2050, contingent on international cooperation to prove solutions quickly at scale in multiple configurations and in various regional contexts, with learning transferred across projects to build confidence. The seven MI 'Missions' provide the mechanism to drive this international collaboration and coordination, allowing governments to work together and with the private sector to target investment and action.

Members recognised the need for strengthened engagement between the public and private sectors, across a range of hard-to-abate sectors and cross-cutting technologies, announcing a collaboration agreement with the Mission Possible Partnership. Members also committed to improving the tracking and transparency of global energy innovation progress, including demonstrations, announcing enhanced collaboration agreements with the IEA and IRENA.

The meeting emphasised the importance of strengthening coordination from innovation to deployment, with the announcement that the Breakthrough Agenda will come under the joint stewardship of Mission Innovation and the Clean Energy Ministerial, initially for a year. This further cements MI and CEM as key centres of gravity for international clean energy collaboration within a strengthened and better organised global architecture.

Members emphasized that they cannot deliver this blueprint alone, calling on other governments, businesses, investors, philanthropies and innovators to work with them to step up innovation efforts to achieve these goals.

## Launch of the Net-Zero Industries Mission

The first global innovation coalition was launched with the goal of catalyzing the development and demonstration of cost competitive solutions for the efficient decarbonization of energy intensive and hard-to-abate industries worldwide by 2030. Led by Austria and Australia, in collaboration with Canada, China, the European Commission, Finland, Germany, the Republic of Korea and the UK, the

Net-Zero Industries Mission members are responsible for 50% of global industrial emissions and US\$13.5 annual RD&D investments (2021<sup>1</sup>).

The coalition released its innovation roadmap “Towards Net-Zero Industries” for the period up to 2030 focusing on industries such as steel, cement, and chemicals that require extremely high temperatures and use massive amounts of energy. This Mission will deliver at least 50 large-scale demonstration projects globally by 2030. This could unlock emissions reductions at the end of next refurbishment cycle of industrial plants, preventing nearly 60Gt CO<sub>2</sub> and put industrial sectors on to a pathway to net zero emissions by 2050.

## Zero-Emissions Shipping Mission launches Blueprint for Future Ports program

The **Zero-Emission Shipping Mission Action Plan** outlines the activities needed to reach the Mission’s goal for commercially viable, zero-emission ocean-going vessels making up at least 5% of the global fleet by 2030. The Action Plan identifies 43 prioritized actions (out of 158 in total) across the maritime value chain, and calls on governments and industry to take the necessary actions to successfully demonstrate, deploy, and adopt new innovations for ships, fuels, and ports.

The Shipping Mission and its members will lead on 18 actions and will work with partners and stakeholders in public-private partnerships on a further 25. The Mission has included Mission-led projects as part of the Action Plan, created by combining high-priority and high-impact actions with input from industry and Mission members. These projects are clustered into the foundation of the Blueprint for Future Ports Program, led by the Mission, to accelerate innovation and promote public-private collaboration.

### A Blueprint for Future Ports

The Zero-Emission Shipping Mission launched its first program, the **Blueprint for Future Ports**, to accelerate innovation and deployment of zero emission technology and kick-start Mission-led activities between 2022-2025. The program aims to demonstrate what a fully operational and commercially-ready Zero Emission refuelling port along a Green Corridor would look like in the 2030s. The *Blueprint for Future Ports* works to promote global public-private partnerships with an inclusive and holistic approach, accelerating progress towards the Mission goals of 10 large trade ports covering at least three continents supplying zero-emission fuel (ZEF), these fuels making up 5% of international shipping fuels and thereby enabling ships to primarily use the zero-emission fuels across the main deep sea shipping routes.

The first step of the program will span 2022-2023, and will assess fuel readiness at ports, mapping existing refueling networks, as well as fuel demand at selected ports to identify the best matched ports for Green Corridor development globally. This includes a study on “Alternative Fuel Readiness at Ports” with the International Association of Ports and Harbors (IAPH), a Mission-hosted webpage for information on Green Corridors, and findings from a trans-Atlantic green ammonia bulk carrier pilot.

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<sup>1</sup> Source: [Public energy RD&D in IEA countries – Energy Technology RD&D Budgets: Overview – Analysis - IEA](#)

Step two focuses on the potential for ports to either become ZEF production hubs, or to connect to landside renewable energy infrastructure, and unlock clean energy deployment needed for industry-wide decarbonization. The third and final step presents the Blueprint as a framework for the ZEF refueling ports of the future. C40 Green Ports Forum has confirmed support for the program, and the Mission Secretariat is engaging with additional industry and government partners across the maritime value chain.

#### **New members**

Australia and the European Commission announced that they will join the Zero-Emissions Shipping Mission.

### **Green Powered Future Mission launches sprints to establish five continental demonstrators and to mobilise USD 100 million for multilateral research**

The **Green Powered Future Mission Action Plan 2022–2024** sets out a pathway to launch demonstrations and concrete actions to implement innovative solutions for power system transformation and decarbonization. The Action Plan calls on governments and industry to take the bold actions necessary to successfully demonstrate, by means of 20+ national pilots and a dedicated multilateral research programme, that power systems around the globe can be run with up to 100% VRE by 2030.

The Action Plan 2022–2024 focuses on the 50 most urgent Innovation Priorities that need to be tackled in the next 3 years and two ambitious flagship projects to achieve the Mission’s goal. To support the development of these flagship projects and facilitate the dissemination of the demonstration projects’ results, the GPFM is committed to develop an Internet-based Platform dedicated to the Green Powered Future Mission – the GPF Platform.

#### **5 Demos in Five Continents**

The Green Powered Future Mission announced a sprint to establish five continental demonstrators with up to 80% Variable Renewable Energy by 2024. This multi-million-dollar sprint will enable the implementation of 20+ national pilots by governments and the private sector, sharing progress and learning at a continental level, tackling urgent innovation priorities and validating innovative solutions through field testing in different grid environments. After 2024, the programme aims to demonstrate further innovation to increase VRE grid penetration from 80% to 100% in a reliable and cost-effective way. Proven innovative solutions will populate the GPFM “Toolbox” enabling all countries to customise technical, market and regulatory solutions suitable to their own geography, system conditions, and national strategies.

#### **Multilateral Research Programme**

The Green Powered Future Mission announced the development of a new multilateral research programme to tackle 20 of the identified innovation priorities to achieve the Mission goal as selected by a GPFM international task force. The programme aims to mobilise resources exceeding USD 100 million over the next three years by participating governments and private sector members to enable researchers and innovators to accelerate progress towards the clean energy transition. The first open calls will be launched in 2023, with further calls planned annually.

#### **Partnerships**

The Green Powered Future Mission and ISGAN signed a Memorandum of Understanding to strengthen their past and present collaboration. The MoU reports specific and tangible joint collaborative activities and the related expected outcomes to drive public-private sector engagement and shared commitment to innovation.

## Clean Hydrogen Mission announces sprint to identify 100 Clean Hydrogen Valley projects by 2024

The Clean Hydrogen Mission **Action Plan 2022–2024** was published to stimulate greater international cooperation on clean hydrogen technology and achieve cost reduction across the full value chain of clean hydrogen and to reach an end-to-end cost of \$2/kg H<sub>2</sub>.

### **100 Hydrogen Valleys by 2024**

The Clean Hydrogen Mission announced the goal of identifying 100 Clean Hydrogen Valley projects by 2024, that can be implemented by 2030. These multi-million-dollar projects in regions around the world will demonstrate innovative hydrogen value chains and build scale for different end-use sectors, driving down the cost of clean hydrogen. Together, these 100 Hydrogen Valleys could stimulate USD \$90 bn investment and significant new clean hydrogen capacity.

The Mission will issue a call for hydrogen valley proposals in 2022, with successful regions receiving a new MI Hydrogen Valley Label, support to develop a pipeline of investable projects and will become part of an exclusive group of world-leading projects sharing learnings and best practices.

### **Hydrogen Exchange**

The Clean Hydrogen Mission announced the Hydrogen Exchange, a new peer-learning network to enable policymakers to rapidly access insights to start and accelerate the development of their hydrogen economy. Initially, the project will work with five countries who are at an early-stage of developing a hydrogen economy, providing a bespoke programme to tap into Mission Innovation's network of policymakers, developers, investors and technical experts. The Hydrogen Exchange will open expertise to a wide number of countries and contribute to the delivery of 100 Hydrogen Valleys as well as driving down the cost of clean hydrogen.

The Mission will work with collaborating organisations include the World Bank, IRENA, World Economic Forum, the CEM Hydrogen Initiative the UN Development Programme to deliver this project The first wave of countries that the Mission will work with will be announced at COP27.

### **Hydrogen RD&D Collaboration Opportunities Report**

A new report published by CSIRO and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for the Mission Innovation Clean Hydrogen Mission analyses global RD&D activity at each stage of the innovation cycle, with an in-depth analysis of the clean hydrogen activities in ten selected countries. The report provides a framework for increasing international engagement, collaboration and knowledge sharing to accelerate clean hydrogen industry development. The report identifies RD&D opportunities of mutual interest, based on the complementarity of strategies and research activities of different countries, and highlights key research organisations, helping to lay the foundation for new bilateral or multilateral research collaborations.

## Carbon Dioxide Removal Mission launches global push for pilot-scale tests and demonstrations

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### Roadmap and Action Plan

The CDR Mission released its Innovation Roadmap, which summarizes the status of CDR technologies and highlights 12 innovation priorities for member governments. Building on the findings in the roadmap, the CDR Mission's Action Plan sets out a vision for how to drive progress toward the Mission's objectives, identifies potential actions that can advance CDR pathways, and outlines the initial projects that members and partners will deliver, beginning in September 2022.

### Carbon Dioxide Removal Launchpad

The CDR Mission announced **the Carbon Dioxide Removal Launchpad**, a global push for CDR pilot-scale tests and demonstrations projects. The United States, Canada, Norway, the United Kingdom, Saudi Arabia, and Japan, commit to funding at least one CDR project that removes 1,000+ metric tons of CO<sub>2</sub>/year by 2025. Participating countries will also contribute to a collective goal of USD \$100 million for CDR pilots and demonstrations globally by 2025.

The Launchpad is a call to action: the CDR Mission will recruit additional countries and stakeholders to sign on to the Launchpad initiative in the lead up to COP27.

In convening a coalition of countries, the Mission seeks to increase the number of early, pilot-scale tests and demonstrations on CDR tenfold by 2025 and stimulate further investments in full-scale, commercial CDR demonstrations, from zero projects today to over a dozen by 2028.

### Membership Updates

The United Kingdom announced that it will join the Carbon Dioxide Removal Mission as a support member. Japan and Australia also announce that they will raise their increase the level of their participation in the Mission, from support member to core member.

## Integrated Biorefineries Mission announces eight collaboration priorities

The Integrated Biorefineries Mission Innovation achieved its first milestone by launching a roadmap for the Mission. The roadmap identifies gaps and challenges in current biorefining value chains. Based on innovation needs, Mission members have identified eight collaborative actions to accelerate the research, development, and demonstration of sustainable, bio-based fuels, chemicals, and materials and advance enabling policy and regulatory environments. As a next step, the Mission is working with governments and stakeholders to launch its first flagship actions in 2023 to develop new products and improve processes.

## Mission accelerates Urban Transitions with €60 million research programme and global cohort of Cities

The **Urban Transitions Mission Action Plan 2022–2030** presents an initial set of actions, flagship activities and sprints defined by the Mission team to reach its goal and vision. The mission calls on decision makers across all levels of government to prioritize net-zero pathways enabled by clean energy and systemic innovation across all sectors.

The Mission activities will contribute to the demonstration, validation and replication of integrated pathways towards holistic, people-centred urban transitions built around clean energy and innovative net-zero carbon solutions. The Mission activities will enable and foster collaboration,

increase the capacity of urban stakeholder and close the gap between research, development and deployment of innovative solutions.

### **UTM City Cohort Call**

The Mission launched an open call for cities to join the Urban Transitions Mission City cohort. A first cohort of 50 cities will be identified by the end of 2022, while a second cohort of 250 cities will follow by 2024. A robust methodology in the selection process will ensure the readiness and commitment of cities to engage as frontrunners in innovation to support and accelerate the Mission goals.

Cities are invited to apply online by 22<sup>nd</sup> October through a brief questionnaire reflecting the assessment criteria on the Global Covenant of Mayors, MI Urban Transition Mission and partner websites. This provides further information on the value proposition for cities and their expected commitment, an info pack on the selection process and FAQs.

### **Global Knowledge Exchange Centre**

The Urban Transitions Mission (UTM) announced the setup of a global knowledge exchange centre on emissions reduction pathways for urban environments, funded by a EUR 2 million call under the Horizon Europe programme. Building on the expertise of the Global Innovation Alliance and the UTM partnership anchored in the European Mission on Climate-Neutral and Smart Cities, the centre will link European and international climate initiatives and stakeholders to ensure two-way learning and exchanges in support of the Urban Transition Mission activities and their implementation.

The centre aims to facilitate the mainstreaming and scaling-up of knowledge on urban climate action, steering the international outreach for both the EU Cities Mission and the MI Urban Transitions Mission. It will enable cities to build their capacity in a networking environment with access to knowledge and tools on urban systems integration, technology developments, successful policies, investment and funding opportunities.

### **MI Call 22**

In support of the Urban Transition Mission, the MICall 22 is funded by 27 countries, allocating more than Euro 60 million funding was launched by the Driving Urban Transitions Partnership, the new programme of the Joint Programming Initiative (JPI) Urban Europe, to support transnational research and innovation projects addressing urban challenges to help cities in their transition towards a climate neutral and sustainable future.

Research organisations, companies, municipalities and other stakeholders located in one of the participating countries and fulfilling the eligibility criteria are invited to engage in transnational consortia and submit their first stage applications until 21 November 2022, 13:00 CET. Detailed national eligibility criteria and conditions are provided at <https://dutpartnership.eu/>

### **Mayoral Statement of Needs**

The world's cities and local governments underscored their role as an effective driving force in implementing the Paris Agreement and called for stronger collaboration between levels of governments, private sectors, academia and local leaders to support the urban net-zero transition.

Recognising critical knowledge, funding and support gaps that hold back urban climate action, Global Covenant of Mayors board members called for accelerated and coordinated interventions to address the scale and urgency of the challenge faced by local leaders. The members fully recognised the priorities set out in the City Research and Innovation Agenda and welcomed the Urban Transitions Mission of Mission Innovation as a contribution to filling the identified research and innovation gaps.

## Members welcomes Spain as the 24th member of Mission Innovation

The Minister for Science and Innovation of Spain, Diana Morant, announced Spain's membership of Mission Innovation, including the Green Powered Future and Clean Hydrogen Missions. The Spanish Science, Technology and Innovation Strategy and National Energy and Climate Plan, lay the foundations for the modernization of the Spanish economy, the creation of employment and the leadership of Spain in clean energy technologies and demonstrate how Spain's interests align with the vision of Mission Innovation.

## Brazil announces it will host Ministerials in 2024

In 2024, the CEM, MI and the broader energy community has an appointment with Brazil. The country where close to half of all energy supply, and four-fifths of all electricity, is already clean and renewable announced that it will be the host for the 15<sup>th</sup> Clean Energy Ministerial and the 9<sup>th</sup> Mission Innovation Ministerial (CEM15/MI-9). In 2024, Brazil will also hold the G20 Presidency, and the CEM and MI Ministerials are to be held back-to-back with the G20 Energy Ministerial Meeting. These Ministerial meetings will all be hosted in Foz do Iguazu, next to the wondrous Iguazu Falls and in the campus of the Itaipu Binational hydropower plant, the world record holder plant for clean energy generation. In the home country of clean energy, it will be time for the international community to deliver on the commitments made in Pittsburgh and keep the momentum expected in India in 2023.

## MI and CEM become the future home for the Breakthrough Agenda

The Clean Energy Ministerial and Mission Innovation will bring the Breakthrough Agenda under their joint stewardship for an initial pilot phase of one year from COP27 onwards. The Breakthrough Agenda, launched at COP26 by 45 countries, is a commitment to work together this decade to scale and speed up the development and deployment of clean technologies in each emitting sector.

The Clean Energy Ministerial and Mission Innovation, as well-established collaboration platforms with broad country, organisational and private sector participation, are well placed to oversee this agenda, working together to strengthen global clean energy collaboration. This cements CEM and MI as key centres of gravity for international clean energy collaboration within a strengthened and better organised global architecture, and will elevate the importance of leading initiatives under CEM, MI and the wider BA community to this vital decade of delivery.

## Governments set out National Innovation Pathways and commit to enhancing tracking

Mission Innovation published the **MI Member Insights Report 2021–22** summarising clean energy research, development and demonstration (RD&D) activity over the past year and the **MI National Innovation Pathways Report** summarising priorities and plans for this decade. These provide a unique insight into the global clean energy innovation landscape.

Mission Innovation Ministers endorsed a **Track and Review Framework**, recognizing the importance of enhanced data, insights and learning to support countries to accelerate clean energy transitions and transparency to demonstrate progress towards the delivery of the commitments made at the launch of MI 2.0 in June 2021. The Framework will be implemented with partners including the

International Energy Agency (IEA), International Renewable Energy Agency (IRENA), and the European Commission Joint Research Centre (JRC).

## Mission Innovation steps up collaboration with leading international organisations

**Mission Innovation and the International Energy Agency (IEA) signed a new Memorandum of Understanding**, setting out actions to work together to support the delivery of Mission Innovation 2.0. This will include improving coordination of international activities on clean energy innovation, supporting the implementation of the new MI Track and Review Framework and enabling MI members to further benefit from the technical and analytical capability of the IEA.

Mission Innovation and the **International Renewable Energy Agency (IRENA) signed a new Memorandum of Understanding** setting out actions to work together to support the delivery of Mission Innovation 2.0. This will include improving the tracking of the progress of innovative energy-related technologies, providing input to the MI Missions and enabling MI members to further benefit from the technical and analytical capability of IRENA.

Mission Innovation and the **Mission Possible Partnership (MPP) signed a Statement of Intent** expanding their partnership and work more closely together to advance public and private sector collaboration to accelerate clean energy technologies from development to demonstration and commercialization. More broadly, the two organizations intend to work towards demonstrating and deploying breakthrough technologies to deliver significant decarbonization projects before 2030 while continuing to develop the next generation of breakthrough technologies ahead.

## Julie Cerqueira appointed as the Chair of the MI Steering Committee 2022-23

Julie Cerqueira is Principal Deputy Assistant Secretary for the US Department of Energy Office for International Affairs. Julie most recently served as the Executive Director of the U.S. Climate Alliance, a bipartisan coalition of governors working to advance an ambitious state climate agenda. Prior to that, she served as a Senior Advisor to the Special Envoy for Climate Change at the U.S. Department of State.





Mission Innovation – Catalysing Clean Energy Solutions For All