



United Nations Climate Change Global Innovation Hub

Eighth Systemic Innovation Workshop

Workshop Report

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United Nations Climate Change
Global Innovation Hub

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1 Executive Summary

The UN Climate Change Global Innovation Hub (UGIH) successfully conducted its Eighth Systemic Innovation Workshop at the Futian Shangri-La Hotel, Shenzhen, China on September 8th Monday, 2024. The objectives of the workshop were fourfold:

- To provide cities and counties (rural and urban) a physical space in the form of a workshop, where they can, with their solution providers, backcast and translate into directional goals, then challenges their long-term vision on how their citizens will satisfy their core human needs while aligning with climate and sustainability goals. These long-term visions of cities and counties (rural and urban) are referred to as the Future Outlook of Rural and Urban Counties.
- To discuss possible challenges that the solution providers participating in the workshop may face in reinventing their organization based on their current assets and their current and/or to be built distinctive competence, skills, and expertise, with a view to being relevant to the Future Outlook of Cities and Counties (rural and urban).
- To explore whether, for some of these challenges for Cities and Counties (rural and urban) and their solution providers, a cluster of climate and sustainability solutions is available for upscaled deployment.
- To identify the priority missing solutions that need to be developed or the existing solutions for which we need to accelerate and upscale the deployment and formulate the related critical Innovation Projects

UGIH's Systemic Innovation Workshops were launched in 2023 as part of a wider Systemic Innovation Framework that aims to accelerate the identification, development, and effective deployment of innovative technologies, policies, financial instruments, and business models, as well as cooperative approaches and products from culture and creative industries. This framework supports transformative climate and sustainability innovations to address the needs of the many people and the planet. Since its launch, UGIH has successfully organized eight workshops in the following cities that have resulted in the ideation of nineteen global innovation projects¹:

- Bonn, Germany (June 2023 and June 2024)
- New York, USA (September 2023)
- Riyadh, Saudi Arabia (October 2023)
- Dubai, UAE (December 2023)
- Bangalore, India (May 2024)
- Johannesburg, South Africa (July 2024)
- Shenzhen, China (September 2024)

UGIH's Eighth Systemic Innovation Workshop featured plenaries, breakout sessions, and presentations from innovators. Massamba Thioye, Project Executive of UGIH, delivered the opening remarks, focussed on the need and significance of climate and sustainability innovations. He further gave a comprehensive

¹ Urban Mobility, Fashion, Resilient Earth Settlement for Tomorrow (Shelter), Personalised Natural Living (Health), Waste2Wealth Catalytix, Framework For Measuring Alignment Of Businesses To Human Needs, Sustainable Innovative actions/practices for solving Water Crisis induced by Climate Change in Bengaluru City, Handprint campaign, City Solution Playground, eKasi Trade, Battery Passport, Mobility as a Service, Future of Mobility, Security of Energy Transition in Cities, Building industry chain for future energy, Net Zero Campus, Providing Energy And Food Support For Developing Countries, Greening of Smart Computing Infrastructure, Development and Implementation of a Green Building Skills Training Program for Enhancing Climate Resilience in the Construction Workforce of South Africa, Nigeria, Ghana, Zambia, and Rwanda

overview of UGIH, highlighting its vision, mission, core values, and operational framework, and concluded by introducing UGIH's City Challenge project, set to be launched at COP 29.

Mr. Stephan Minas, Vice-Chair of the UN Climate Technology Centre & Network (CTCN) Advisory Board and TEC member, introduced the UN Climate Change Technology Executive Committee and the Climate Technology Centre Network, collectively, the Technology Mechanism of the Climate Convention and the Paris Agreement. He also provided some examples of how the technology mechanism is helping countries with practical innovations. Further, he highlighted how various diverse institutions can partner with the climate technology mechanism to contribute to the climate and sustainability goals.

Mr. Karl Song, President of the Public Affairs Department, Huawei Digital Power started his keynote speech by highlighting the importance of ICT technology to empower the low-carbon industry. ICT, as an enabling technology, could help other industries transform and upgrade while enabling low-carbon development. He highlighted that Huawei is committed to supporting the low-carbon development of the world through digital technology innovation. He also highlighted the digital power business domain and mentioned that Huawei keeps integrating digital and power electronic technology to promote green and low-carbon transformations in the energy industry in their divisions.

Mr. Lee Kang-deok, Mayor of the city of Pohang, South Korea, and Ms. Chen Kaihong, Zhaoqing High Technology Industrial Development Zone, in their keynote speech, presented the vision and goals of their cities/regions, planned strategies, and ongoing projects and actions in achieving the vision.

In the second part of the workshop, participants were divided into six breakout groups for focused discussions centered around three themes: Future of Energy, Future of Mobility, and Future of Education. The insightful discussions led to the formation of nine innovative projects, which were then discussed in a subsequent plenary session.

The workshop also provided a platform for innovative solution providers to feature their innovative works to promote transformative innovation. Organizations such as BYD, International Telecommunication Union (ITU), Tsinghua Institute for Carbon Neutrality (ICON), China Mobile, China Telecom, Tongji University, GESI, China Academy of Information and Communication Technology (CAICT), Panzhihua Iron and Steel Group Mining Co., China National Institute of Standardization, and the AIOTI ICM working group presented their work at the workshop.

The workshop saw a diverse mix of 113 participants with 90% attending in person and the remaining attending virtually. The participants included cities, UN organizations, incubators and accelerators tech companies, foundations, VC firms, research centers, publishers, start-ups, and companies from the culture and creative industries.

2 Understanding the future of cities and their challenges

City representatives from Pohang, South Korea, and Zhaoqing High-Technology Industry Development Zone, China, shared their visions for their city/region during their keynote speeches. Several innovative solutions, already implemented by some solution providers, were also presented. In the subsequent plenary sessions, participants reacted to the proposed future scenarios. The key discussion points are summarized below.

City of Pohang, South Korea

Pohang, a major industrial city in South Korea known for steel production, has faced significant environmental challenges due to high carbon emissions. These emissions contribute to over 30% of the country's industrial greenhouse gas output, leading to rising temperatures and climate-related disasters. Recognizing the need for carbon neutrality, Pohang has committed to Green Growth and sustainable development. In 2021, the city announced its vision to become a carbon-neutral, 'environmental dream city' by 2050 and developed concrete plans for transformation. The strategy focuses on shifting its industrial base toward low-carbon industries like secondary batteries, biotechnology, and hydrogen. By 2030, Pohang aims to generate 20% of its electricity from renewable sources, including offshore wind and hydrogen energy. The Pohang Greenway project, initiated in 2016, marks a key step in transitioning the city from a gray steel industry city to a green ecological city.

Zhaoqing High Technology Industrial Development Zone, China

Zhaoqing is a national historical city recognized for its foreign trade, advanced manufacturing, and investment environment. It ranks first in the water quality index, is among the first batch of outstanding tourist cities in China, and is an integral part of the economic circle in the Guangzhou region. The city's high-tech zone, located near Foshan, Guangdong, houses 260,000 residents and 850 high-tech companies, including 125 international firms. Well-connected to the Greater Bay Area, the zone is a destination for foreign companies. It has been approved to pilot carbon peaking, utilizing renewable energy, optimizing power generation, and implementing multiple Energy Storage Systems (ESS) for industrial and household use. The zone has established green financial services, with 316 companies opening carbon accounts and 21 financial institutions participating in the system, generating various financial products. The city also serves as a dual carbon demonstration zone, promoting projects that reduce energy consumption, wind and PV power, and expanded ESS.

2.1 Open plenary: Reactions to the Cities' Envisioned Future

In the reaction session, participants highlighted several key challenges in scaling the green technologies and solutions presented during the session. For example, replicating successful initiatives from countries like China and Saudi Arabia—such as microgrid deployments in the Red Sea region and fast-charging infrastructure in roads in China—will face challenges when implemented in developing countries. These challenges are multi-faceted, involving technological constraints, environmental factors at potential deployment sites, and issues with business models and financial backing.

Participants further pointed out political barriers as a challenge in implementing innovative solutions. Cities with strong political will and engaged citizens are more likely to adopt and scale green solutions, but ensuring this commitment often requires citizens to actively support their leaders.

Another specific challenge raised was the commercialization of green transportation technologies, such as hydrogen-powered trucks. A solution provider expressed concern about the higher costs of green energy compared to fossil fuels, particularly subsidized diesel. Participants agreed that without subsidies for green fuels like hydrogen, it will be difficult for these alternatives to compete in the market. The need

for policy intervention, including subsidies and incentives, was highlighted as a crucial factor in fostering wider adoption of green transportation solutions.

Despite the challenges, participants also highlighted significant opportunities in the green energy sector. A key opportunity lies in leveraging China's decade-long experience in decarbonization, especially in microgrid technology. For instance, microgrid solutions from China's Southern Power Grid, with an 8-digit reliability rate, could be adapted for Africa's mining industry. Africa, with immense renewable energy potential but only 3% developed, could benefit greatly. However, participants stressed that successful implementation would require collaboration between governments, technology providers, local businesses, and financial institutions to maximize value and ensure effective global transfer of these technologies.

Participants also explored the importance of focusing on the needs of less-developed regions. Many of the world's most advanced solutions may not be feasible in countries or cities that lack the necessary infrastructure or capacity. Instead, the focus should be on developing simple, affordable solutions that address the core human needs. Businesses and governments should prioritize scalable and financially accessible solutions for these regions, where delivering basic infrastructure may be more effective than deploying high-tech innovations.

Another key theme that emerged from the discussion was the need to build internal capacity to drive innovation and overcome challenges associated with new technologies. Participants stressed the importance of adopting a multi-perspective approach, understanding the diverse needs and capabilities of different regions, and fostering collaboration across sectors. Learning from both successes and failures was seen as essential for advancing green innovation. The ability to acknowledge and learn from failures is often more valuable than success, as it helps avoid repeating mistakes and enables stakeholders to fine-tune their strategies moving forward.

The opportunities to collaborate with the Climate Technology Centre and Network (CTCN) on AI-driven solutions for climate action were also highlighted in the discussion. The Technology Mechanism has developed a four-year work program, which is publicly available and offers multiple partnership opportunities. The program focuses on capacity building for developing countries, developing technical papers and recommendations to the Conference of the Parties, and developing a program to help prepare projects and connect projects, to finance and to practitioners in developing countries. Participants were encouraged to explore collaboration with the Technology mechanism of the UN.

One participant highlighted the concept of compressed sensing as a method to cut down data production and improve efficiency in how data is handled before it reaches clients. While some companies are beginning to explore this concept, the participants noted that compressed sensing has not yet fully materialized into commercial products. The discussion emphasized the need for new business models that prioritize data efficiency rather than the sheer volume of data, particularly in sectors that are data-intensive but resource-constrained.

Overall, the discussions underscored the need for a holistic, collaborative approach to scaling green solutions, with a strong focus on political will, financial innovation, capacity building, and cross-sector partnerships.

3 Summary of the Breakout Groups Discussions

The workshop participants were divided into six breakout groups to discuss challenges and develop solutions on the topics of the Future of Mobility, the Future of Energy, and the Future of Education. These productive discussions led to the creation of seven innovative projects. Key points from each group are summarized below:

3.1 Future of Mobility

The first breakout group initiated their discussion on the necessity of mobility and considered circularity principles—"Avoid, Minimize, and Replace"—in future mobility solutions. They explored ideas such as integrating nature-based solutions alongside advanced technologies like sensors, telecommunications, and energy storage. The second group focused on defining the future of mobility, questioning whether it involves merely transporting people from A to B, enhancing social mobility, or introducing entirely new concepts. They stressed the importance of minimizing environmental impacts while ensuring efficient transportation systems. One key proposal was a "passport" system to track vehicle components' emissions from production through recycling, improving transparency and accountability. The group also discussed how to incentivize automobile manufacturers to produce fewer vehicles while increasing revenue, as well as the policy interventions necessary to support these ideas.

3.2 Future of Energy

The group discussions focused on the security of the energy transition and building an industry chain for future energy. Key challenges highlighted include technological barriers, particularly in large-scale green energy deployment and energy storage. The phased transition from fossil fuels was noted as critical, given its current role as a backup for green energy. Participants emphasized the importance of energy-saving technologies on the user side and the role of digitization in supporting this transition. There was also a focus on balancing carbon emissions in green energy projects. The discussion on building the future energy industry chain addressed information gaps in supply and demand, investment challenges, lack of evaluation systems for identifying investment needs, establishing a circular economy, inadequate policies, and the incubation of new technologies. The group also discussed the shortage and misallocation of talent, which is critical for innovation and growth in the sector.

3.3 Future of Education

The discussion began by exploring the future of education and the priorities for its development. Participants emphasized the importance of prospective thinking and open-minded preparation, along with early research to anticipate future educational needs. They stressed that preparation should start as early as possible, from early childhood education to graduate programs. Early education on sustainability was deemed essential, with a focus on integrating these concepts from kindergarten through higher education. The need for collaboration between educational institutions, private sectors, and governments was emphasized to ensure that curricula align with market demands and technological advancements. The discussion also focused on the critical need for education systems to adapt to the rapidly changing societal landscape. Participants also highlighted the necessity of bridging the gap between academic theory and real-world applications, advocating for a holistic approach to education that supports continuous development throughout one's career.

3.4 Proposed Global Innovation Projects For Addressing The Challenges

Project 1: Battery Passport Theme: Mobility	Description: This project proposes a comprehensive system to track vehicle parts in terms of emissions throughout their entire lifecycle, similar to how the automotive industry tracks parts for safety across the supply chain. The system will include emission checks for all parts of electric vehicles, including batteries. A "passport" mechanism will be introduced to monitor each part from manufacturing through usage to recycling. It also aims to develop evaluation standards and a governance framework for this system. Additionally, an incentive program will be designed to enable emissions trading, contributing to the reduction of overall emissions.
Project 2: Mobility as a Service Theme: Mobility	Description: The objective of the project is to incentivize car manufacturers to produce fewer vehicles while generating higher revenue. Key components include promoting autonomous driving, shared vehicles, and other technologies to increase vehicle utilization, thereby reducing the overall number of vehicles that need to be manufactured. A tax system that redistributes the environmental impact from consumers to manufacturers is also needed. The project will also work on defining "carbon per unit productivity" and integrating it into the proposed tax system. A second-tier city will be identified to pilot the initiative.
Project 3: Future of Mobility Theme: Mobility	Description: The project aims to pilot innovative mobility solutions at the Zhaoqing High Technology Industrial Development Zone by minimizing or replacing traditional mobility methods while adhering to the circularity principles of "Avoid, Minimize, and Replace". It will explore new business models and co-funding opportunities through government and public procurement to drive innovation. The project plans to integrate advanced technologies, such as sensors, telecommunications, and energy storage, while also incorporating nature-based solutions, including vertical farming or hydroponics, to promote environmental sustainability. A significant aspect of the project is the development of a virtual reality-based curriculum for distant traineeships in advanced technologies, targeting developing countries and rural areas in China. This educational component aims to bridge knowledge gaps and provide practical skills, contributing to social impact. A feasibility study will assess the viability of these innovative solutions as the project's first step.
Project 4: Security of Energy Transition in Cities Theme: The Future of Energy	Description: The project aims to develop innovative solutions to enhance energy storage and security, supporting the global transition to renewable energy. It seeks to address the technical barriers to reliable renewable energy deployment, especially energy storage challenges. In addition to improving storage, the project will explore energy-saving technologies to reduce user-side consumption. Digitalization will play a key role in optimizing energy management and integrating these new technologies.
Project 5: Building industry chain for future energy Theme: The Future of Energy	Description: The project aims to build a comprehensive industry chain for the future energy sector, addressing the current lack of a well-established material supply chain. A key challenge is the information gap between supply and demand, which this project seeks to bridge by creating systems for better information flow. The project will also focus on overcoming investment challenges, establishing evaluation systems to identify investment needs, and promoting a circular economy. Inadequate policies and the incubation of emerging technologies will be addressed to support the sector's growth.

Project 6: Net Zero Campus Theme: The Future of Education	Description: The project aims to empower 5 million students across 150 universities to help their campuses transition to clean energy through the use of carbon credits and renewable energy certificates (RECs). The initiative intends to promote the use of carbon credits and RECs by university students to fund the campus microgrid. Universities will benefit by advancing their net-zero goals. Additionally, the project promotes vocational education in engineering, marketing, and finance, helping students gain relevant skills. The pilot is planned at Ajman University, UAE, in Q4 2024, with the goal of expanding the initiative to other institutions.
Project 7: Providing Energy and Food Support for Developing Countries Theme: Future of Energy	Description: The project aims to leverage decentralized microgrid solutions to support agricultural cultivation. This approach has been successfully implemented in several regions of China. The project intends to adopt a corporate strategy, integrating microgrid technology with agricultural production to create a sustainable and scalable food supply system. By combining renewable energy from microgrids with efficient farming practices, the initiative seeks to enhance food production while reducing environmental impact. This innovative model could offer a sustainable solution for food security and energy efficiency.
Project 8: Greening of Smart Computing Infrastructure Theme: The Future of Energy	Description: This project proposed by China Telecom Research Institute focuses on reducing the Power Usage Effectiveness (PUE) of smart computing centers, aiming to lower the PUE of the data center by 0.2 to 0.3 through technological innovation. For instance, in a smart computing center with an IT equipment load of 1000 kW, the implementation of green technologies can result in annual electricity savings of 2,190,000 kWh, which is equivalent to a reduction of 1,200 tons of carbon dioxide emissions.
Project 9: Development and Implementation of a Green Building Skills Training Program for Enhancing Climate Resilience in the Construction Workforce of South Africa, Nigeria, Ghana, Zambia, and Rwanda Theme: The Future of Education	Description: The project focuses on education by developing a comprehensive green-building skills training program aimed at TVET colleges and high schools in South Africa, Nigeria, Ghana, and Rwanda. The program will provide foundational education in sustainable construction practices, focusing on climate resilience through energy efficiency, water conservation, and the use of eco-friendly materials. Through interactive learning experiences, the program aims to equip young students with practical knowledge that can be applied in real-world construction scenarios. By fostering early engagement in green building principles, the program will prepare the next generation of construction professionals to address the growing need for sustainable development in their respective countries.

Photo Gallery

