

INSIGHTS

Sci-tech Cooperation Leads to Development

Voice of the World

By TANG Zhexiao

Focusing on technology cooperation, an innovation resource matchmaking event held on November 8, gathered science and technology diplomats in Beijing to enable more exchanges and cooperation and discuss how to create an open novel cooperative mechanism.

Beijing is in a stage of high-quality development, and the event will enhance sci-tech cooperation in wider areas and at a higher level, Zang Yan, deputy director of international cooperation division, Beijing Municipal Science and Technology Commission, said in her address.

Seventeen science and technology diplomats, and experts, scholars and executives exchanged ideas and views.

"New Zealand and China has had almost 50 years of science and innovation cooperation, and we have seen growing signs of it," said Dr. Ron Xavier, science and innovation counsellor of the New Zealand Embassy in China.

He illustrated the main areas where the two countries promoted science innovation cooperation, such as resuming the New Zealand-China Scientists Exchange Programme, signing memorandum (MoU) of cooperation arrangements with the Chinese Academy of Sciences, fund-



The locals show seedlings at the China-aided Nigeria Agricultural Demonstration Center in Abuja, Nigeria. (PHOTO: XINHUA)

ing joint research centers and establishing a strategic research alliance.

The New Zealand government is pleased to provide support in fostering the research collaboration, which is still continuing, according to Xavier. He stressed the importance of collaboration to drive innovation, noting that "By aligning priorities, we can achieve shared goals."

Pakistan and China officially signed a sci-tech cooperation agreement in 1976. For decades, the number of MoUs and agreements of cooperation in sci-

ence and technology between the two countries has reached more than 50, according to Khan Muhammad Wazir, science counsellor from Pakistan Embassy in China.

Currently, the two countries have included science technology innovation in the China-Pakistan Economic Corridor (CPEC) for high quality and sustainable development. With direct Chinese investment of 25.4 billion USD, 192,000 jobs have been created in Pakistan, said Wazir.

As the first European country to sign the Belt and Road Initiative (BRI), Hungary is forging a strong sci-tech partnership with China.

According to Balogh Andras Zoltan, first secretary for science and technology in Embassy of Hungary in China, the bilateral cooperation covers various field such as car industry, battery production, neuroscience, physics, space technology and new materials.

Large sci-tech facilities and tools will be jointly used in the future, as well as large scientific research centers, said Zoltan, adding that Hungary is willing to provide more opportunities for Chinese researchers.

Participants also made observations about exploration of the new way of international cooperation in sci-tech innovation in the new era. Apart from a focus on specific areas, many of them said that trust is one of the most significant factors in global scientific development.

Collaboration with China was highlighted. Professor Joseph C. Kolars, senior associate dean of the Medical School and executive director of the Office of Global Public Health at the University of Michigan, spoke about the reasons why the world needs to work with China. "Our future depends on China," said Kolars. In his view, cooperation will promote interconnection, co-dependency and productivity.

Comment

No Global Solutions Without Sci-tech

By LIANG Yilian & FU Xiaobo

Good science anywhere is good for science everywhere is the core message of Saifur Rahman, president and CEO of Institute of Electrical and Electronics Engineers, in his video address at the 6th World Forum on Development and Governance for Science and Technology Societies in Xiamen, east China's Fujian province, on November 7.

As for sci-tech societies, the question arises: How can we harness the power of scientific advancements in one region for the betterment of all humanity? "We are facing significant challenges, for example, geopolitical issues. However, there are actions that can be taken by people's activities, and sci-tech societies can play a role that governments cannot fulfill. Events like today's forum provide excellent opportunities to establish connections and promote collaboration," Guo Huadong, academician of Chinese Academy of Sciences and honorary president of International Society for Digital Earth, told *Science and Technology Daily* at the forum.

Meanwhile, Robin Peter Tensen, CEO of GlobalTech IP, pointed out the resistance to the trend of globalization in various countries. "In many countries, such as the U.S. and many European nations, individuals, especially workers, feel apprehensive about the process of opening up and the blurring of national boundaries." He said this sentiment is partly related to attitudes towards immigration and a concern that, for example, in the U.S., there may be a loss of dominance. "It is my belief that the 'genie' is out of the bottle, and a reversal seems unlikely due to the efficiency and benefits it brings," said Tensen.

Sudip Parikh, CEO of the American Association for the Advancement of Sci-

ence told the forum about the significance of "data sharing and transparency" in addressing global challenges that transcend borders, such as climate change.

"We generate a large amount of data and then share it to improve monitoring and evaluation of sustainable development goals (SDGs). Chinese Foreign Minister Wang Yi on behalf of the Chinese government made a commitment to the United Nations, ensuring that the data collected by Sustainable Development Science Satellite 1 (SDGSAT-1) would be available for free use by all 193 UN member states," Guo told the forum.

And according to Bob Cryan, emeritus president of Institution of Engineering and Technology, sci-tech societies are becoming more and more recognized as being extremely important. He told *S&T Daily* that the general public are starting to understand that without science, technology and engineers, global problems can't be solved.

"What we need to do is to look at the whole of our international community, to take the best minds from around the world, and get them to tackle the problems. That's the only way that humanity can continue to develop and drive," said Cryan.

And the cooperation is built on trust, which is gained incrementally. Events like this forum help to increase communication among scientists. The collective efforts of sci-tech societies, in conjunction with collaborative data sharing and transparent practices, will play an indispensable role in addressing pressing global issues. The recognition of this critical role is steadily growing, underscoring the essential nature of scientific advancements in finding solutions to the challenges that transcend borders.

Energy Storage, Great Potential Technology

Edited by QI Liming

In the transformation of traditional fossil fuels to renewables, the issue of new energy storage is one of major concern—where do we get our energy from when the wind is not blowing and the sun is not shining?

A dive into the current situation and future development of new energy storage reveals understanding, innovation and new technology going forward.

Why does renewable energy need to be stored?

According to UK magazine *Impakter* and UK National Grid, as the world moves towards a more renewable and decentralized energy system, energy storage is becoming increasingly important.

Energy storage technologies allow us to store energy when it's available and release it when it's needed, providing a range of benefits for the grid, businesses, and households.

Efficient energy storage is crucial for the green transition. One of the pri-

mary reasons is the need to manage variable energy supply. Renewable energy sources like wind and solar are intermittent and don't provide a consistent energy supply. Energy storage can help smooth out these fluctuations by storing excess energy when it's available and releasing it when needed.

As many renewable energy sources are becoming cheaper, storing them and using them later can be very cost-efficient for society.

Energy storage can also provide backup power during emergencies and help reduce peak demand, which occurs when many people use electricity simultaneously.

By storing excess energy during off-peak hours and releasing it during peak hours, energy storage can help prevent blackouts and reduce the need for expensive infrastructure upgrades or reliance on fossil fuels.

Improving energy storage infrastructure and overcoming the issues posed by the intermittent renewable energy supply is essential to achieve decarbonization targets and drastically help eliminate our fossil fuel dependence.

How is renewable energy stored?

When asking how to store renewable energy efficiently, one concept needs particular attention, this is long duration energy stor-

age (LDES).

According to *Financial Times*, LDES generally refers to any form of technology that can store energy for multiple hours, days, even weeks or months, and then provide that energy when and if needed. It is an essential technology if the world is to increase the proportion of renewable energy.

Various technologies are being worked on, with varying degrees of success, but the benchmark is pumped hydro storage, partly because of its high round-trip efficiency: the proportion of the energy stored in this way that can later be extracted is around 80 percent.

It is technology that has been around for more than a century, involving the movement of water between lower and higher reservoirs to store and generate energy. However, it remains the most used storage method globally, with around 160GW of power capacity installed as of 2021. A further 130GW is planned or under construction, with China accounting for around 60 percent of the new plans.

According to *South China Morning Post*, compared with pumped hydro storage, electricity storage processes that use emerging technologies such as compressed air, flywheels and electrochemical are the trends to follow.

Electricity storage process is more flexible when it comes to site selection, and has other advantages, including short construction periods, faster and flexible response and more diverse functions.

What are the most promising energy storage technologies?

Frank Wouters, co-president of the

LDES Council, said that LDES remains a nascent market without an established business model.

Both regulators and industry players are still trying to figure out what the right business model is, he added.

According to research blog StartUs Insights, energy storage is undergoing a rapid transformation wherein research is underway to develop efficient long-lasting solutions.

Currently, the energy storage sector is focusing on improving energy consumption capacities to ensure stable and economic power system operations. Broadly, trends in energy storage solutions can be categorized into three concepts:

- Moving away from the traditional lithium-ion batteries toward innovative battery chemistries that offer greater stability, density, and shelf life.

- Developing storage solutions that store intermittent renewable energy efficiently and also scale it up to power large geographical areas.

- Transitioning from centralized energy storage to a more flexible and portable distributed form of energy storage.

Meanwhile, Greentech Media evaluated the five most promising long-duration storage technologies left standing: pumped hydro, stacked blocks, liquid air, underground compressed air, and flow batteries, while *Impakter's* list is a little bit different: thermal energy storage, pumped hydroelectric storage, green hydrogen, and gravity batteries.



The 6th World Forum on Development and Governance for Science and Technology Societies is held in Xiamen. (PHOTO: China Association for Science and Technology)

New Long-Ladder Fire Truck Boosts Fire-fighting Power

By Staff Reporters

China's first 40-meter straight-bend ladder fire truck, devised by Xuzhou Construction Machinery Group (XCMG), made its debut at an exhibition recently, showcasing China's progress in fire equipment development.

XCMG made a breakthrough in two core technologies: dual ladder expansion technology and multi-track asynchronous pipeline transmission technology. This enables the fire truck with stronger obstacle-crossing capability and larger operating range, as well as

the ability to reaching higher altitudes when carrying out rescues.

In addition, the fire truck has multiple intelligent protection functions for safer operation such as ladder intelligent vibration reduction.

The fire extinction power has also been boosted with a fire system configuration that can automatically issue fire-fighting foam in the required proportion.

The new fire truck helps speed up rescue as the ladder can be quickly extended, enabling the rescue workers to enter the platform operation zone on the ladder.



The 40-meter straight-bend ladder fire truck, invented by Chinese company XCMG. (PHOTO: XCMG)

Turning Garden Waste into Eco Treasure

Hi! Tech

By QI Liming

While some countries are still using incineration and landfills to dispose of garden waste, more and more countries are using new technology to avoid emitting greenhouse gases and wasting resources.

A research team from Chinese Academy of Sciences presented the latest research results of artificial humification of garden waste recently. Artificial humification technology, with aerobic fermentation as the core, is becoming an effective resource recovery scheme.

The researchers screened both high-efficient medium and high temperature lignin degrading bacteria, and applied them to bio-enhanced directed humus of garden waste.

For example, according to the thickness of the garden waste, small pieces of dry branches and fallen leaves are ground into powder and thick tree trunks and branches are sliced into pieces.

After both the small and thick ones are humified at the same time, the former can be made into organic fertilizer, and the latter can be made into organic mulch sheets by coloring. These organic mulch sheets can not only suppress dust and retain water and heat, but also has a

landscape effect with their colorful appearance, and can be used for urban park construction.

In the future, the directed humification technology of garden waste can bring ecological and economic comprehensive benefits.

As for the economy, more and more organic fertilizer and mulch made by this technology can be sold on the market, along with the benefit of soil carbon sink income.