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WEEKLY EDITION

Sci-tech Powers China's Winter Sports Surge

Edited by Staff Reporters

President Xi Jinping and other Chinese leaders conferred awards to representatives of those who have made outstanding contributions to the Beijing 2022 Olympic Winter Games and the Beijing 2022 Paralympic Winter Games on April 8.

China has presented the world with a streamlined, safe and splendid Games, honoring its promise to the international community, said President Xi. He added that China's anti-COVID policy has once again withstood the test, contributing useful experience for the world to fight against the virus and host major international events. He called for faster steps in building China into a country strong on sports.

Technological innovations are playing vital roles in supporting sports devel-

opment. To build a country strong on sports, it is necessary to integrate multidisciplinary and interdisciplinary strengths, as well as coordinate the promotion of technological research and development and the transformation of scientific achievements.

More than 200 sci-tech achievements were used to support the Winter Olympics, making the light of sci-tech shining during the Winter Olympics. A series of sci-tech achievements such as a 5G studio in high-speed train, zero-gravity beds, and smart restaurants with robot chefs were impressive highlights.

Multiple advanced technological training facilities also helped athletes achieve breakthroughs at Beijing 2022. Wind tunnel design, a technique widely used in designing missiles, rockets, and aircraft, has now been used in sports like ski jumping. See page 4



The Sanshiliuqu River wetland park in Qiongzhan district of Haikou city, south China's Hainan province. (PHOTO: XINHUA)

Taikonauts Answer Questions from U.S. Students

By Staff Reporters

Nearly 500 school students, teachers and parents attended the event of "My Question to Taikonauts" hosted by the Chinese embassy in the U.S. on April 9, during which recordings of answers by Chinese astronauts Zhai Zhigang, Wang Yaping and Ye Guangfu to the questions asked by U.S. students were broadcast.

More than 180 questions of students from 13 states were sent to the Chinese embassy before the event. The taikonauts answered 12 of them, including whether they have enough water to drink, how high they can jump and how to become an astronaut.

Former NASA astronauts Don Thomas and Barbara Morgan also attended the event either onsite or online. They shared their experiences and inspired the students to explore the space.

Elon Musk, CEO of SpaceX, also delivered a message via video.

Qin Gang, Chinese ambassador to the U.S. said, "Scientific research in space exploration is endless and requires concerted efforts and cooperation of mankind." See page 2

International Cooperation

China, Europe Close Cooperation on Earth Observation Science

By TANG Zhexiong

The National Remote Sensing Center of China (NRSCC), together with the European Space Agency (ESA), signed Dragon 5 online on April 1, promoting closer cooperation in the field of Earth Observation (EO) application development.

As a flagship of China-Europe sci-tech cooperation in EO, the Dragon Programme is a cooperation between ESA and the Ministry of Science and Technology of China (MOST).

It is the country's largest international cooperation project in remote sensing technology currently, with the objective to stimulate scientific exchanges in EO science and technology, and research application development in thematic application projects related to land, ocean and atmospheric monitoring.

Beginning in 2004, four phases of Dragon cooperation have been completed, each lasting four years. It has explored a new cooperation mechanism, and jointly carried out more than 200 research projects and trained nearly 1,200 young scientists.

The Dragon 5, which was initial in

June 2020, focuses on the exploitation of Copernicus Sentinels, Chinese, ESA and ESA Third Party missions EO data for geo-science. There are 55 joint China-EU teams carrying out geo-science and application development in 10 topics, including newly added climate change and big data analysis.

Wang Qi'an, director of NRSCC, said with the joint efforts of China and Europe, the cooperation of the Dragon Programme has continued to expand its influence. It has not only been strongly supported by MOST and ESA, but also widely recognized by EO scientists.

It has also achieved fruitful results including sharing a large amount of China-EU EO data, training a group of outstanding young scientists, and winning high praise from the member states of ESA, according to Maurice Borgeaud, head of Science, Applications, and Climate Activities in the Earth Observation Directorate of ESA.

Both China and the EU agreed that the exchange between the two sides has become one of integrated scientific and cultural cooperation. They will continue to support the programme and regard it as an important part of future China-EU space sci-tech cooperation.



Multi-band image of Jiaozhou Bay, Shandong province returned by the remote sensing satellite SDGSAT-1. (PHOTO: XINHUA)

Editor's Pick

Wetland Protection in China Benefits All Life

By LU Zijian

This year marks the 30th anniversary of China's joining the Convention on Wetlands of International Importance adopted in 1971 in the Iranian city of Ramsar. After the efforts of three decades, China appointed 64 Wetlands of International Importance, and established 602 wetland natural reserves and more than 1,600 wetland parks.

Why wetlands matter
Regarded as the "kidneys of the Earth," wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters, according to the Convention.

Environmental protection is a vital advantage brought by wetlands. Salinization of soil can be eased or prevented by

wetlands, especially for land near a lake, a river or the sea. They can also purify the soil by decomposing the pollutants.

Wetlands can adjust the balance of a water system as well. When there is heavy rain or floods, wetlands can store the excessive water, and release the water when severe drought occurs.

In addition, many invaluable wild animals and plants choose wetlands as their habitat. For example, around half of rare birds under first class protection in China live in wetlands.

Offering numerous benefits to both nature and human beings, wetlands need to be protected in an all-round way.

What China has achieved
The improved situation of wetlands along the Yangtze River is a prime example of China's efforts in wetland conservation. The Hualong port at Dongting Lake in Yueyang city, Hunan province was cleared and restored in 2017, restoring the wetland to its former glory with

the return of the endangered Yangtze finless porpoises and rare birds.

More than 75,000 mu (1 mu is about 666.7 square meters) of wetlands at Poyang Lake, Jiangxi province was renovated from 2016 to 2020. Now millions of waterfowls have returned to Poyang Lake to spend winter each year, along with more than 95 percent of the world's white crane species.

Apart from restoring nature, the protection projects of wetlands also bring economic benefits. Haizhu wetland in Guangzhou city, south China's Guangdong province is surrounded by 26 Fortune Top 500 enterprises, attracting investment of 86.7 billion RMB in total.

What has been achieved could not have been possible without the previous efforts. From 2016 to 2020, an accumulated investment of 9.87 billion RMB from the central government was made, facilitating over 2,000 wetland protection and restoration projects. See page 3

China's Marine Economy Booms in 2021

By Staff Reporters

China's marine economy maintained rapid growth in 2021, with innovation capacity strengthened according to official data, which showed that the country's gross ocean product increased by 8.3 percent to over nine trillion RMB.

The Ministry of Natural Resources (MNR) reports that the total output of the marine economy accounts for 15 percent of the coastal areas' GDP, and contributed to eight percent of the country's GDP growth.

Mechanisms were improved to trigger sci-tech innovation in marine industry and application of sci-tech achievements, said Cui Xiaojian, deputy director of National Marine Data and Information Service (NMDIS) subordinate to the MNR.

For example, Shandong province established a fund, focusing on supporting

original innovation, the application of sci-tech achievements and the cultivation of high-end marine sci-tech industrial projects.

Guangdong provides an annual special fund of 300 million RMB for marine economic development to support six industries, including engineering equipment, offshore wind power, marine electronic information, natural gas hydrate, marine biology, and public services.

Cui said that the industrial structure of the marine economy has been optimized. On one hand, emerging industries are enjoying strong growth. The added value of marine biomedicine, marine power and the seawater utilization industry climbed 18.7 percent, 30.5 percent and 16.4 percent year-on-year respectively.

On the other hand, traditional industries speed up transformation and upgrading. Progress has been made in

the green development of the shipbuilding industry and smart ports construction. Orders of ships powered by green energy made up 24.4 percent of all China's ship orders in 2021, and 33 automated container terminals were built in eight ports including Xiamen, Qingdao, and Shanghai.

In addition, marine resources have contributed to the stable supply of fresh water, energy, and seafood. Offshore oil and gas production increased by 6.2 percent and 6.9 percent year-on-year, with offshore crude oil accounting for 78.2 percent of China's crude oil production expansion.

The development of marine clean energy has maintained a strong momentum. China's grid-connected offshore wind power capacity increased by 16.9 million kW, up 4.5-fold year-on-year, ranking first in the world in cumulative capacity.

WEEKLY REVIEW

Key Gene to Increase Wheat Grain Yield

Spike architecture influences grain yield in wheat. Scientists from China and the U.S. found and cloned a gene named TaCOL-B5 that determines the number of spikelet nodes per spike in common wheat, thereby enhancing grain yield. The study was published in *Nature* on April 7.

Ground Station Receives Landsat-9 Data

The China Remote Sensing Satellite Ground Station has formally acquired the capability to receive, process and distribute the data product transmitted from the Landsat-9 satellite, according to the Aerospace Information Research Institute, the Chinese Academy of Sciences.

New Marine Reptile in Dinosaur's Age Identified

Chinese and Canadian paleontologists have reported a new large marine reptile species of the dinosaur's age, possibly a relative of ichthyosaurs in south China's Guangxi. The study was published in the journal *PeerJ* on April 7.

Bacteria Inside Tumors Influence Cancer Cells' Behavior

The microbes hiding inside tumors influence the cancer cell's behavior, including cancer's relocation, and promote cell survival during tumor progression, according to a new study led by Chinese scientists published in the journal *Cell* recently.

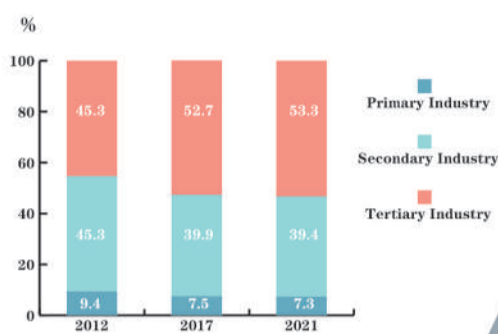
WECHAT ACCOUNT E-PAPER



Striding Towards the Second Centenary Goal——

Sci-tech Drives China's High-quality Development

Economic structure continuously optimized



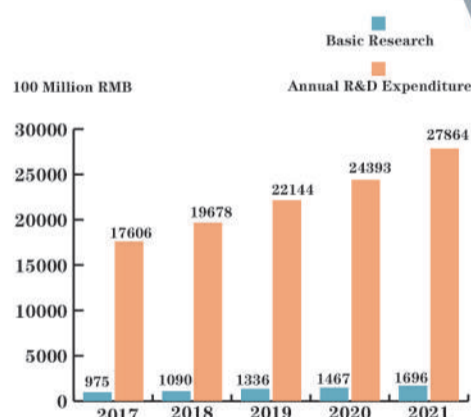
Shifts in China's economic structure
The proportion of the tertiary industry reached 53.3% of GDP in 2021.

Hi-tech industries leading the economic growth



In 2021, the output of high-tech industries jumped 18.2 percent year on year.

R&D expenditure continuously increasing



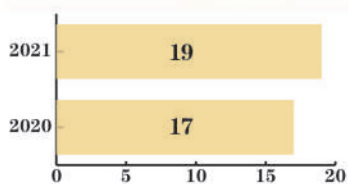
In 2021, the proportion of basic research spending in the total of R&D expenditure rose to 6.09%, surpassing six percent for the third year running since 2019.

Global Innovation Index ranking steadily on the rise



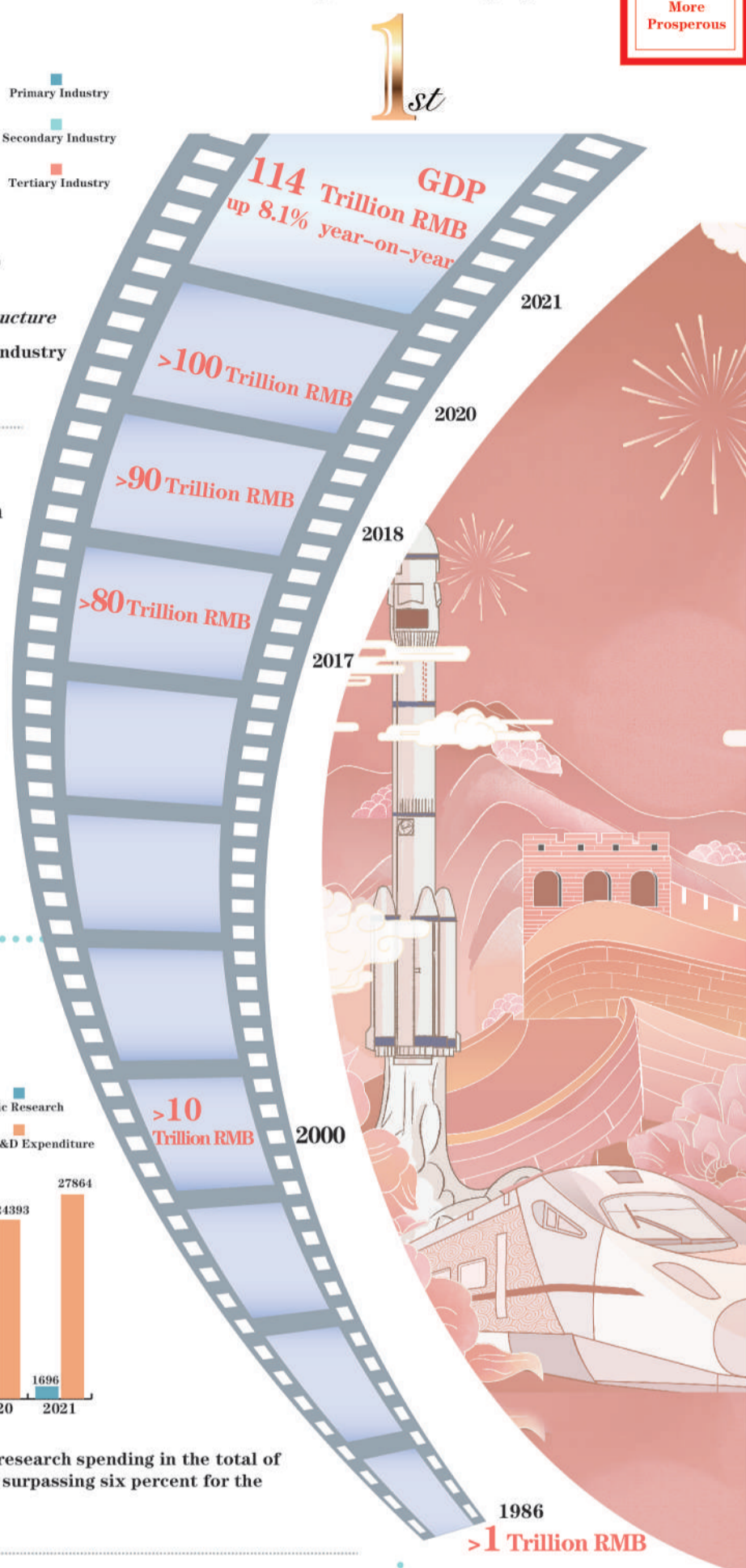
Since 2013, the country has moved up the GII ranks consistently and steadily, establishing itself as a global innovation leader.

Number of Chinese S&T clusters among global Top 100



In 2021, China hosted 19 of Top 100 Global S&T clusters.

Manufacturing output ranking 1st for 12 straight years

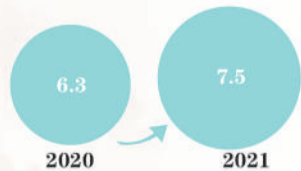


Economy More Prosperous

Global Innovation Index ranking steadily on the rise

Sci-tech More Advanced

Number of high-value patents per 10,000 people



By the end of 2021, there are

state-level enterprise technology centers: **1,636**

demonstration centers for business startups and innovation: **212**

state-level technology business incubators: **1,287**

national mass makerspaces: **2,551**

hi-tech enterprises: **330,000**

Cooperation More Substantial

By the end of 2021, China has

established diplomatic relationship with **181** countries;

built sci-tech cooperation relationship with more than **160** countries;

joined more than **200** international & multilateral mechanisms;

provided **2 billion** doses of Covid-19 vaccines to over **120** countries & international organizations.

Edited: Li Lin Xu; Source: NBS, MOST; Photo: VCG

Policy Watch

Regional Innovation, Cooperation Accelerate China's Prosperity

By CHEN Chunyou

When some people get rich first, others will be pulled up after them. Through this process, common prosperity of the entire population will be gradually achieved. This is a popular notion in China, and practice has proven that it works.

This year marks the fifth anniversary of the establishment of the Xiong'an New Area. As a key move to advance the coordinated development of the Beijing-Tianjin-Hebei region, Xiong'an's potential is stimulating the region's innovation vitality.

According to Liu Dongmei, researcher at the Chinese Academy of Science and Technology for Development, regional innovation is the key to building a national innovation system. With the expansion of a global innovation network, regional innovation needs to be more open and collaborative.

In the revised *Law on Progress of Science and Technology*, more targeted measures are put forward to encourage regional development.

For the projects that meet the needs of industrial development and have clear market application prospects, article 73 says the local government at or above county level should encourage enterprises to collaborate with research institutions and universities.

Article 74 stipulates that the country would support the construction and development of high-tech parks, such as high-tech industrial zones and national innovation demonstration zones, helping them form their characteristics and foster their advantages, so as to fully release their driving effects.

Central government should support local governments in building sci-tech innovation centers and comprehensive science centers, and allow them to give full play to their role in driving innovation, deepening reform and participating in global sci-tech cooperation, notes arti-



The sunrise scenery over Baiyangdian Lake, Xiong'an New Area, north China's Hebei province. (PHOTO: VCG)

cle 75.

This year, the building of sci-tech innovation centers is in full swing in China. Many cities have already formulated their plans. For example, Changsha, the capital city of central China's Hunan province, aims to establish more than three innovation platforms, including a technology innovation center and a manufacturing innovation center, before 2025.

Article 76 rules that the country establishes regional cooperation mechanisms for sci-tech innovation, and encourages local governments and relevant departments to carry out trans-regional cooperation, so as to promote rational flow and efficient convergence of various innovation factors.

A typical example is the cooperation between Shanghai city and Gansu province. To understand the mutual development needs and provide precise services for respective enterprises, Shanghai and Gansu transfer public officials to each other. These officials worked in enterprises or sci-tech parks, which facilitates the exchanges and integration of development concepts of the two regions.

Moreover, in response to accelerat-

ing the development of Xiong'an, a lot of central state-owned enterprises located in Beijing have decided to move to Xiong'an, and many universities have also chosen to establish their branches there. Liu said the establishment of branches of universities and enterprises will help to optimize the region's conditions for innovation and promote its development.

In the era of the digital economy, it is an opportunity for the underdeveloped regions to enhance their innovation capacity by strengthening cooperation with the outside. Liu said the digital technologies offer more possibilities for regional development, noting that each region should be active to make forward-looking strategic planning to create new momentum for innovation, instead of making plans solely based on the region's existing economic layout.

"It is important to create a healthy innovation environment. Regional innovation should avoid industrial homogeneity," said Liu, adding that due attention should be paid to the coordination of industries and the balance between industrial development and industrial ecology, to prevent competition for resources.

Promising Outlook for New Energy Storage Solutions

By ZHONG Jianli

New energy storage solutions have been identified as a critical component to build a new power system and enable green and low-carbon energy transformation.

To promote large-scale, high-quality development of new energy storage ability, the National Development and Reform Commission and the National Energy Administration of China recently issued the *14th Five-Year (2021-2025) Plan for Development of New Types of Energy Storage*, aimed at providing more support for China's carbon emissions peaking and carbon neutrality goals.

According to the policy, by 2025, new types of energy storage should enter the stage of large-scale development for wider commercial use. This entails promoting innovation in new energy storage technologies, setting up a standard system, and completing the industrial system.

With the production of wind and solar energy on the rise, energy storage

solutions are becoming more significant, more especially, when there is a lack of wind or sunlight.

Energy storage can help integrate more solar, wind and other energy resources into the grid. It can also improve the flexibility of the power system through peak and frequency regulation.

Generally, new types of energy storage refer to those other than pumped storage hydropower, such as new lithium-ion batteries, flow batteries, flywheel, compressed air, hydrogen (ammonia), and thermal (cold) energy storage.

The construction period of pumped storage hydropower is usually six to eight years, while that of electrochemical energy storage projects is three to six months. In addition, new energy storage projects are more capable of regulating the grid with quicker response systems.

Regarding technological innovation of new energy storage solutions, the policy calls for strengthening the strategic and systematic planning for related technologies. It encourages development of diversified technologies, ensures whole-

process safety, and promotes innovative intelligent control systems. High-reliability, low-cost and sustainability are always the ultimate pursuit of all different technologies.

The industries, universities, research institutes, and end users should collaborate with each other to establish the new energy storage innovation platform and cultivate professionals in the field, says the policy.

Different from subsidized photovoltaics and wind power in their initial stage, the development of new energy storage will rely on the market mechanism. The policy clarifies that the establishment of the electricity market system should be accelerated, in order to create a favorable market environment for developing new energy storage solutions.

Meanwhile, the international cooperation on promoting technical and industrial development of new energy storage should be advanced, so as to enhance global competitiveness of local enterprises, noted the policy.

Taikonauts Answer Questions from U.S. Students

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"We hope the young generation of China and the U.S. can pursue their

dreams as boldly as the astronauts and make contributions to mankind," he said.

Thomas pointed out at the event that

despite the differences between Chinese and American cultural traditions, space exploration inspires the whole world.

Saving the Earth: It's Now or Never

Voice of the World

Edited by QI Liming

According to the report released by the Intergovernmental Panel on Climate Change (IPCC) on April 4, greenhouse gas emissions must peak by 2025, and need to be nearly halved this decade. This is the last chance for the world to limit future heating to 1.5°C above pre-industrial levels.

Voices from scientists

The world can still hope to stave off the worst ravages of climate breakdown, but only through a "now or never" push to a low-carbon economy and society. The world's leading climate scientists have in effect given a final warning to governments on the climate.

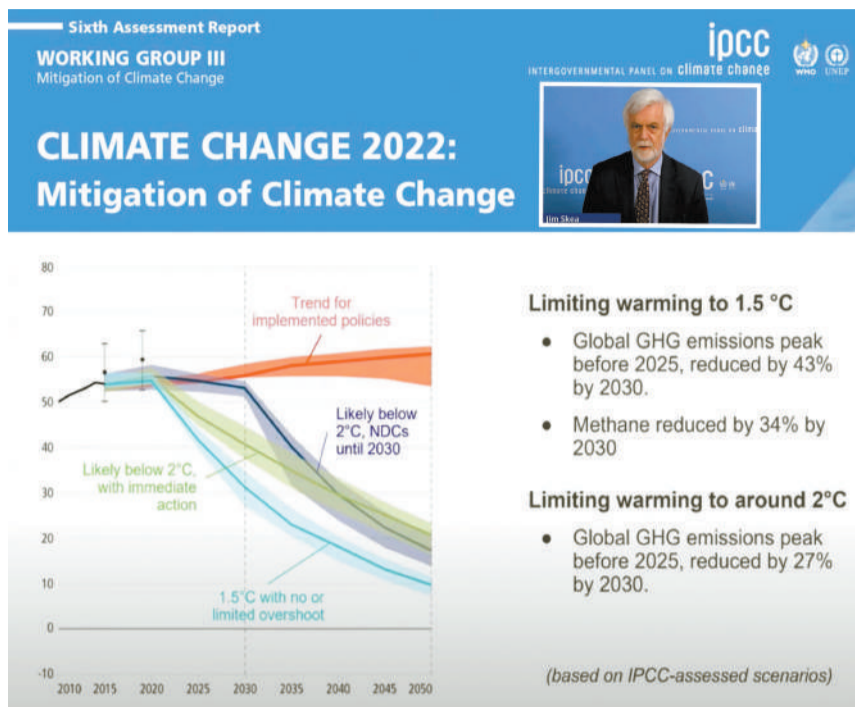
With the world failing to make the changes needed in the past, temperatures are predicted to soar by more than 3°C with catastrophic consequences, unless policies and actions are urgently strengthened.

Jim Skea, professor at the Imperial College London, said, "It's now or never, if we want to limit global warming to 1.5°C. Without immediate and deep emissions reductions across all sectors, it will be impossible."

Pete Smith, a professor of soils and global change at Aberdeen University, said, "The time of reckoning is now. We have one decade to get on track. We use fossil fuels in all these things that we need to change."

Meanwhile, less developed countries warned they were ill-equipped to make the changes needed. They require financial assistance from richer nations to cut emissions and help them adapt to the impact of the climate crisis.

Madeleine Diouf Sarr, the chair of



Jim Skea, co-chair of the working group behind the IPCC report, speaking at the press conference on April 4 GMT. (PHOTO: SCREENSHOT FROM IPCC)

the least developed countries group at the UN climate talks, said, "There can be no new fossil fuel infrastructure. The emissions from existing and planned infrastructure alone are higher than scenarios consistent with limiting warming to 1.5°C, with no or limited overshoot. We cannot afford to lock in the use of fossil fuels."

Ways to save our planet

Accordingly, UN scientists laid out a plan that they believe could help people avoid the worst impacts of rising temperatures.

In their view, to avoid very dangerous warming, carbon emissions need to peak within three years, and fall rapidly after that. Even then, technology to pull CO₂ from the air will still be needed to keep temperatures down.

One key component of reducing

emissions is to limit demand, which the IPCC has divided into three types of change. First, "Socio-cultural factors" are behavioral choices individuals make. Second, "Infrastructure use" refers to changes in the design of infrastructure that makes it possible for individuals to make different choices. Third, "End-use technology adoption" refers to changes in the uptake of technologies by end users.

"Having the right policies, infrastructure and technology in place to enable changes to our lifestyles and behavior can result in a 40-70 percent reduction in greenhouse gas emissions by 2050. This offers significant untapped potential," said IPCC Working Group III Co-Chair Priyadarshi Shukla, in a written statement, adding that, "The evidence also shows that these lifestyle changes can improve our health and

well-being."

The immediate goal is to accelerate those efforts and ramp up climate finance to ensure that it's a truly global effort, said Nathaniel Keohane, president of the Center For Climate and Energy Solutions in Virginia, and a White House adviser for former U.S. president Barack Obama.

In the longer term, governments need to invest in research and development activities to explore the feasibility of carbon-removal technologies that could help to bend the curve in decades to come. "It's a Herculean effort, and so we better get started," said Keohane.

Powering China's net-zero energy goal

As a member of the international community, China proposed its emission reduction target by 2060, and energy researchers are helping China achieve this goal. Research teams at Chinese universities and research institutes presented their solutions in *Nature* magazine.

Baoshan Zhu, a hydraulic engineer at Tsinghua University, believed that development of storing clean energy technology is very important. Pumped hydro-power is the most common type of energy storage in use globally, often supporting electricity grids that rely on solar or wind power.

Additionally, new energy technologies, such as harnessing offshore green energy and turning air into electricity, are being studied by researchers at Tsinghua University and Institutes at the Chinese Academy of Sciences.

As demand for wind and solar power increases, systems for accurately forecasting their availability are becoming more important to power companies in China, said Fei Wang, a researcher at North China Electric Power University, adding that it is indispensable to forecast future needs.

Opinion

How to Prevent the Next Pandemic

By YU Haoyuan

Over the past two years, the COVID-19 pandemic has had a massive negative global impact and unfortunately it continues to cause suffering to many daily. No matter when and how the pandemic will end, what is of vital importance is that humanity learns from the lessons of the current pandemic, in order to be better prepared for the next one.

Apart from viruses leaking from labs, a pandemic could also occur in the future for a variety of reasons. What we are doing now may be totally inappropriate when the next one comes around. Therefore, four aspects must be put in place in order to handle whatever virus outbreak follows.

Firstly, before the outbreak of any disease, mental preparation is necessary. We need to conquer our fear of unknown diseases, and with motivation from awareness, human response to the virus could be accelerated, and an increased number of people could be protected.

"For many of us during this pandemic, the motivation was at the fear of illness and even death. Our motivation should be maintaining public health ... if the motivation is right, we can protect a lot of people," said Ahmed E. Ogwell Ourma, Deputy Director of Africa CDC.

Meanwhile, mental preparation will help people pay more attention to the task at hand, resulting in increased efficiency in combating the virus. The government and local medical facilities could also respond to the outbreak immediately and lower the risk of massive virus transmission.

Secondly, local medical capabilities must be enhanced. When COVID-19 broke out, the greatest pressure in response came from the lack of medical infrastructure and medical staff. Even countries with advanced medical facilities, let alone those countries with poor health systems.

As one of the solutions, countries could create more jobs, particularly in the fields related to public health, or hire those people who have trained in medicine, such as retired doctors or medical students on the verge of graduating to help out. Perhaps this could provide a backup platoon of medical personnel to help take up the strain when the next pandemic arrives.

Therefore, for the lower and lower-middle income countries, governments could implement policies to encourage anti-pandemic behavior. "[In these countries, we could] create those national vaccination plans that prioritize vaccinating fully at risk populations, ensure

that there's implementation of a test and treat strategy at the community and primary care level, expand support for frontline and community health workers and ensure that they use this crisis as an opportunity to invest in long term capacity for preventing the next pandemic," said Dr. Raj Panjabi, special assistant at White House National Security Council.

Thirdly, in the event of another pandemic, the public should take action immediately. Over the past two years, the WHO has recommended, on several occasions, the need for people to take various actions to combat the pandemic, but many refused to follow such recommendations.

"It is becoming tiring to continue to wear masks, keep social distance, and stay away from friends and family. But these things have to be done," said Ogwell Ourma. Such behavior recommendations were mentioned often by medical experts and it is considered the only way to try and buy time so that people can deploy better tools to control the pandemic.

Finally, the world should collaborate on virus research as well as vaccines.

Many viruses come from animal and natural mutation, thus we should abandon the idea of "If we don't look for the viruses, they cannot hurt me," and find viruses through active surveillance instead. However, since the pandemic is a disease affecting the entire world, rather than one country, virus research and analysis should be worked on together under global supervision. This will help reduce the possibility of deadly virus mutation and accelerate vaccine production.

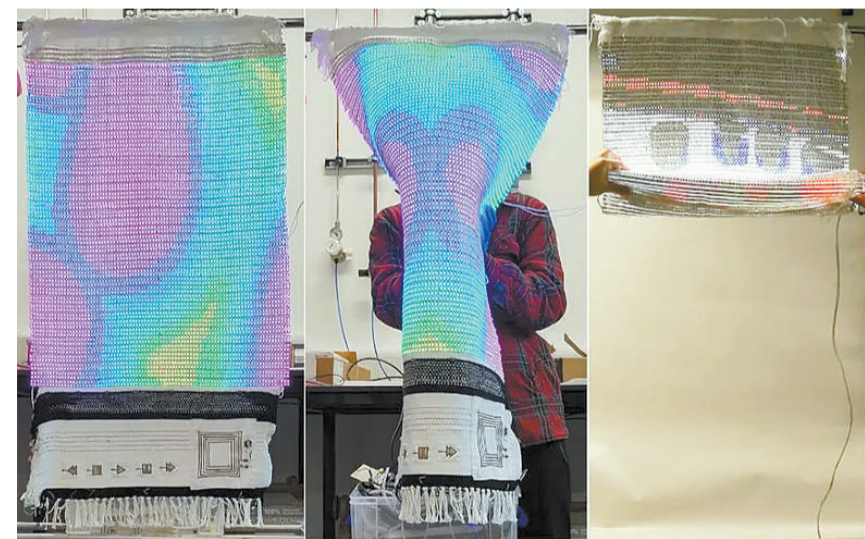
Moreover, according to WHO official Ann Lindstrand, the world should work on a collective vaccine roll out. Taking the current COVID-19 pandemic as an example, she cited that so far, a third of the world's population still remains unvaccinated because of the insufficient supply and unequal distribution of COVID-19 vaccines that we witnessed in 2021. This must be improved, said Lindstrand.



The way need to be found to prevent the next pandemic. (PHOTO: VCG)

Hi! Tech

Wearable Smart Sensor Monitors Your Health



A prototype smart display, fully reproducible using industry-standard looms, is shown here being folded and rolled while retaining its performance. (SCREENSHOT FROM VIDEO)

Edited by QI Liming

A smart sensor is a device that monitors and is fed input from the physical environment. It uses built-in resources to perform predefined functions upon detection of specific input, and then processes data before passing it on.

Smart sensors are able to collect more accurate and automated data from the environment with less noise among the accurately recorded information.

There are five main types of smart sensors used in industrial environments:

- Level sensors that could monitor the level of fuel in a tank.
- Temperature sensors that can be used to make sure machinery is not overheating.
- Pressure sensor that could indicate a leak or a flow control issue.

- Infrared sensors that are used in medical equipment, such as pulse oximetry devices.

- Proximity sensors used to detect the location of a person or object with relation to the sensor.

In addition to the industrial environment, combining temperature and infrared sensors could be woven into our everyday life in the near future.

Recently, a paper released in *Nature* reported an innovative approach to fabricate hybrid piezoelectric fibers that can act as flexible, robust acoustic sensors, pushing audible sensing to a new high.

The hybrid design combines sensitivity and flexibility to create an acoustic single-fibre sensor that can be knitted into fabric. The future of tracking our health and fitness looks wearable, and perhaps even implantable.

Brain-computer Interface A Reality

By Staff Reporters

During a craniotomy, surgeons can precisely recognize the nerve nuclei and cortical functional areas in the brain by using a new flexible electrode. The new tool is composed of 2 μm size electrode points placed on the brain to maximize the protection of brain function and minimize the probability of disability and death from surgery. It can be applied to fields like brain-computer interface for rehabilitation of paralyzed patients.

A China-U.S. research team has recently proposed this new tool solution named "a flexible microarray electrode

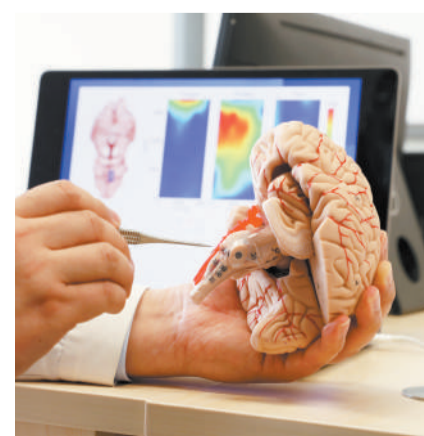
that fits tightly to irregular areas of the brain" and developed a novel conductive polymer material. As a major breakthrough in the field of stretchable organic electronic devices, the material remains conductive after being stretched several times, and stretchable and highly conductive even after being processed to 2 μm.

The flexible and stretchable electrode may be safely used in a variety of irregular or vulnerable areas of the brain, such as the brain stem and neurosurgical cavity. This means it will not be damaged by pulling or twisting of surgical instruments.

In addition, with high electrical con-

ductivity and high density, the electrode can locate individual cells precisely, thus helping surgeons to "observe" the nerve nuclei in the brain directly in the form of a "heat map," which is conducive to the protection of brain function.

According to relevant reports, this is the most precise flexible stretchable microarray electrode in the world. Such flexible electrodes and electronic devices are expected to play an important role in brain science research and relevant clinical transformation, for they can not only promote the precision of neurosurgery, but also serve as a core technology for the brain-computer interface.



A researcher is demonstrating the use of the new flexible electrode on a brain model. (PHOTO: XINHUA)

Wetland Protection in China Benefits All Life

From page 1

More than seven million mu of degraded wetlands were repaired.

A law on wetland protection was passed in China in 2021 and will take effect on June 1 this year. However, well before this date there were already regulations on wetland conservation at national and provincial levels.

China is also the world's first country to complete national investigation of wetland resources for three times. Monitoring stations have been built all over the country for wetland investigation, real-time monitoring and information management with the help of high-tech.

China's international involvement
In addition to domestic responsibility, China has also been actively engaging with the international community regarding wetland conservation, since the country joined the Convention in 1992.

The monitoring data of 2021 showed that Wetlands of International Importance in China retained a stable

status. The area of those wetlands increased compared with that of 2020, and most of them enjoyed stable or increased water supply. The water quality has become better in general and the biodiversity has been enriched.

With only four percent of the world's wetlands, China managed to meet the production, living, ecological and cultural needs of 20 percent of global population for wetlands, contributing to the protection and reasonable utilization of global wetlands.

From November 11 to 29 this year, the 14th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP14) will take place in Wuhan, central China's Hubei province, which is also the first time the country will host the conference.

Together with the international community, China is ready to exert more efforts to strengthen wetland protection, monitoring and management in the future.

A Colorful China in the Eye of A Geologist

By LONG Yun & ZHONG Jianli

Dr. Marie-Luce Chevalier, a Belgian/French geologist, has been working as a research professor at the Chinese Academy of Geological Sciences in Beijing since 2010.

For the past 12 years, she has been studying active faults in the Qinghai-Tibet Plateau (such as the Karakorum fault in western Tibet or the Xianshuihe fault in eastern Tibet) and how they move. In 2021, Chevalier was presented with the Chinese Government Friendship Award in appreciation of her contributions to the development of China's seismic disaster assessment system and the promotion of cooperation and exchanges between China and other countries.

Her fascination with nature from childhood sparked her endless passion for science and research. "Science was my favorite subject in high school, largely due to the inspiration provided by my teachers. As a result, I attended college to study physics, which led to further studies in geophysics, tectonic - geomorphology, and geosciences. Now, I spend a lot of time outdoors in my studies, hiking on the Qinghai-Tibet Plateau to collect my rocks," she told *Science and Technology Daily* recently.

China, a choice she has never regretted

Chevalier's choice of China as a research destination was not made by chance. Her research has primarily focused on the Qinghai-Tibet Plateau. She had also collaborated with Chinese scientists from the beginning of her master's program. "When they asked if I wanted to join their team after my postdoctorate, I gladly accepted and have no regrets. My almost twelve years in China



Dr. Marie-Luce Chevalier. (COURTESY PHOTO)

have provided me with a constant source of fresh personal and professional experiences," she said, adding that her mother's interest in Chinese culture contributed to her decision to work in the country.

Commenting on China's present research and innovation environment, she said that the generous research funding and the state-of-the-art facilities are impressive. In addition, the dynamic working environment is good for improving efficiency. Frequent academic exchanges at national and international levels in China also foster new collaboration opportunities.

According to Chevalier, China has made numerous significant advances in

science and technology over the last decade or so, and many of her international counterparts are willing to carry on the cooperative programs with their Chinese counterparts.

As far as communicating while living in the country, she advised her expat peers working in China that learning Chinese is the first step to integrate into the scientific community. "And I believe that once you speak and understand enough Chinese, it can open up many doors for academic research and build up more connections in China," she said.

Her life as a female scientist

As a female scientist, Chevalier often gives special attention to gender

equality in the scientific community. She applauds China's active efforts in promoting female researchers for talent recruitment and research funding grants. "I think the Chinese government is now pushing females into higher positions and [offering females] higher-level grants," she said.

Chevalier is good at striking a balance between her academic research and daily life. Twice a year, she usually spends a few weeks in remote places on the Qinghai-Tibet Plateau, hiking at high altitude to collect rocks, surveying the sites using special equipment, and completing other fieldwork. However, these operations have been suspended temporarily due to COVID-19. "[For] the rest of the year, it is more like office work, such as reading scientific papers, writing papers, preparing and giving talks, and supervising students," she said, adding that having family time with her husband and her four-year-old daughter is also essential in her daily life. In terms of her future academic plan, she hopes to continue her studies, discover new things, expand her knowledge, and test existing theories. Additionally, she is excited about partnering with other institutions in China and internationally. Chevalier values diversity in a team to generate new ideas and resolve scientific problems on a larger scale.

And if she had to choose three words to describe reasons why she continues to remain in China, what would they be? "Convenience" and "fast pace," which she explained were due to China's high-tech and rapid development, while the third would be "safety." "My daughter goes out and plays in the Hutong (small alleyways) where we live. We never worry, even at night," she said.

Letter to the Editor

China-MENA Relations: An Example of Win-win Cooperation

By Rami Khalil

The Silk Road was China's first economic expansion toward the West, connecting China through Central Asia and the Indian subcontinent to Europe. It wasn't only a route to connect markets and creating wealth, but was also a bridge to link people and exchange culture and knowledge.

With the reform and opening-up policies in the late 70s, China recorded an impressive economic development that over 40 years lifted 900 million out of poverty, developed an expanded and modern infrastructure, and created stunning metropolitan and prosperous megacities. The policies also included improving people's well-being and living standards, such as health, education, and welfare. The successful economic development has given China a prosperous economy with surplus capital, capacity and skilled manpower.

Historically, the states of the Middle East and North Africa (MENA) have featured on China's foreign policy compass. Starting in the early 2000s, China's relations with the MENA states continued to expand when China adopted the strategy of "going out" (zou chu qu), and as a result of this, economic and diplomatic relations between two sides witnessed a new dawn, especially after China joining the World Trade Organization in 2001.

With the acceleration of China's energy consumption growth, the MENA region is becoming vital to China's energy security, as this region contains the world's largest energy resources, including 52 percent of the world's oil and 42 percent of the natural gas. According to a report published by the Middle East Institute, more than 45 percent of Chinese crude oil and 19 percent of Chinese liquefied natural gas (LNG) imports are sourced from the MENA region.

Moreover, the MENA region is of specific importance to China as it offers vast opportunities for substantial infrastructure investments in ports, railways and highways, as well as in nuclear energy and high-tech development.

Over the past two decades, the Chinese vision of the MENA region has been greatly focused on cultural dialogue, trade, and economics, in line with what Chinese President Xi Jinping used



Professor Rami Khalil. (COURTESY PHOTO)

to refer to as "win-win cooperation, whereby China achieves its goal in peaceful coexistence and builds strong partnership ties with other nations.

Expanding the scope of MENA-China relations under the Belt and Road Initiative (BRI), is an example of China's active efforts to promote its economic development and management model at the global and multinational level. BRI has made it clear that a new era has begun with a greater focus on massive scale international development initiatives, involving huge infrastructure projects in 66 countries across Asia, Europe, and Africa. China has signed BRI agreements with 21 states in the MENA region, including 18 Arab states, which have a vital impact on China's economy due to their large and young population and substantial markets, with a population of 400 million. About one-third of this figure are aged between 15 and 30, and this population is expected to double by 2060.

We can classify China's relations with the MENA states into five types: (1) Strategic Partnerships; (2) Comprehensive Strategic Partnerships; (3) Comprehensive Cooperative Partnerships; (4) Cooperative Partnerships; and (5) Friendly Cooperative Partnerships.

China is making continuous efforts to strengthen the friendship ties with the MENA region, which is often considered one of the core objectives of its foreign policy. On the other hand, the MENA states are also eager to foster close ties with China as a trustworthy historical partner.

Rami Khalil has served as a professor in Sichuan International Studies University from 2012 to the present.

Traditional Eastern Wisdom

Traditional Chinese Woodcraft: Magical Joints

By QI Liming

In ancient China, there existed a kind of "magic technology" that could make solid wooden structures without the use of nails or glue. It's known as a mortise and tenon structure, which is a concave-convex joint used to connect two sections of wood. You can see this structure in a corbel bracket (dougong).

The convex part is called the tenon (mao), and the concave part is called the mortise (sun). Mortise and tenon together create the connection. This constitutes the main structure of ancient Chinese architecture, furniture and other

er wooden instruments.

If the mortise and tenon joints are properly used, the two wooden structures can be tightly connected and the structure itself would be seamless. Thus, mortise and tenon have also been called "the Lego of China."

Traditionally, mortise and tenon structures can be roughly divided into three types, namely surface to surface, point structure and component combination.

The technology of mortise and tenon structures is still used in numerous modern buildings. The China National Pavilion of the World Expo 2010 Shanghai is the most typical representative.



China National Pavilion of World Expo 2010 Shanghai, typical mortise and tenon structure "dougong (corbel bracket)." (PHOTO: VCG)

Asymptomatic COVID-19 Patients Treated Effectively in Mobile Cabin Hospitals

By Zhang Jiaxing & BI Weizi

The recent spread of COVID-19 in China has caused a rapid increase in the number of asymptomatic infections. On April 5 alone, as many as 16,766 asymptomatic cases were reported in Shanghai.

The following Q&A sheds some light on how to deal with issues brought about by asymptomatic infections.

Do asymptomatic infections need treatment?

"Since a portion of asymptomatic infected people are in the incubation period and may also develop the disease, the management of these people requires medical staff to observe changes in their condition, identify cases in a timely manner and make adjustments to their treatment," said Wang Guiqiang, director of the Infectious Disease

Department of Peking University First Hospital.

On March 22, the State Council's Joint Prevention and Control Mechanism issued a guideline for the management of mobile cabin hospitals, which clarifies their responsibility of admitting asymptomatic and mild cases. A certain proportion of medical personnel, medical testing equipment, resuscitation drugs and oxygen are required for these hospitals to ensure basic condition monitoring and treatment, as well as timely referral.

Do asymptomatic infections need medication?

"For asymptomatic key populations, such as the elderly, those suffering from underlying diseases, as well as the frail, the obese and heavy smokers, their conditions might take a sharp turn for the worse and thus need extra atten-

tion," said Zhang Boli, a famous Chinese epidemiologist, adding that for asymptomatic infections, early intervention with Traditional Chinese Medicine can, first, protect them from any symptom; and second, shorten the nucleic acid negative conversion time.

With the large number of asymptomatic infections, how can these patients be most effectively admitted and treated?

Centralized management of asymptomatic infections is, on the one hand, to avoid the further spread of the virus through isolation. On the other hand, it is convenient for medical observation, so that patients at high risk of progression could be promptly detected and referred to designated hospitals for further diagnosis and treatment.

Jiao Yahui, director of the bureau of medical administration at the National

Health Commission, said that the mobile cabin hospital model for the treatment of asymptomatic infected people around the country, is very effective and in line with the regulations and requirements.

It is reported that the State Council's Joint Prevention and Control Mechanism has requested all provinces to build or come up with a plan to build mobile cabin hospitals according to the pandemic situation, ensuring that each province has at least two to three of these structures, which can be built and put into operation within two days when required. The already built mobile cabin hospitals have played a constructive role in the response to the pandemic, such as the rapid treatment of asymptomatic and mild cases, effectively relieving the pressure on local medical resources.

Sci-tech Powers China's Winter Sports Surge

From page 1

It enables much greater efficiency in training by suspending athletes in mid-air and simulating airflows similar to the surrounding winds.

To honor the promise of hosting a green games, all venues for Beijing 2022 were supplied with 100 percent green power and used optimized construction materials that meet the three-star standard of green construction. The competition zones in Yanqing and Zhangjiakou were serviced by hydrogen-fueled buses,

available to connect high-speed railway stations and spectator parking lots.

The National Speed Skating Oval is one of the first venues in the world to use carbon dioxide transcritical direct cooling ice technology for ice-making.

These sci-tech achievements, which received increased exposure through the Beijing Winter Olympics, are also helping to boost sustainable development and create lasting benefits for the people in the host cities and the global community.

PHOTO NEWS



Expat Volunteer in Shanghai

Habib Ur Rehman, a Pakistani expat living in Shanghai, is doing the volunteer job during the nucleic acid test activity. (PHOTO: XINHUA)