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Science and Technology Daily

VOL.2-NO.36 THURSDAY, MARCH 17, 2022 WEEKLY EDITION

China Tops Manufacturing for 12 Straight Years

By WANG Xiaoxia

According to data from the Ministry of Industry and Information Technology, the added value of China's manufacturing industry reached 31.4 trillion RMB in 2021, accounting for 27.4 percent of its GDP. Since 2010, the added value of China's manufacturing industry has ranked No.1 in the world for 12 consecutive years.

From 2012 to 2021, the added value of China's industry increased from 20.9 trillion RMB to 37.3 trillion RMB, of which the added value of manufacturing increased from 16.98 trillion to 31.4 trillion RMB, according to the National Bureau of Statistics (NBS).

As a consequence, China's manufacturing industry is making headway in terms of its international competitiveness, innovation capacity, structural upgrade and digital transformation.

As the only country in the world to obtain all the industrial categories listed in the United Nations industrial classification, and the world's largest producer of over 220 types of industrial products, China's value-added industrial output, an important economic indicator, went up 9.6 percent year-on-year in 2021, and the figure brought the average growth rate in the past two years to 6.1 percent, the data from NBS showed on Jan 17.

The innovation capacity of the manufacturing sector has improved. The photovoltaic, wind power, shipbuilding and other industrial chains have further strengthened their international competitive advantages. NBS data shows that container output increased by 110.6 percent year-on-year, while chip output up 33.3 percent. Progress has also been made in tackling key problems in OLED displays, industrial motherboards and new materials.

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Fireworks illuminate the night sky during the closing ceremony of the Paralympic Winter Games Beijing 2022 at the National Stadium in Beijing. (PHOTO: XINHUA)

Innovation-driven Development Blueprint for 2022

By ZHONG Jianli

As this year's Two Sessions came to an end, the government work report provided a blueprint for China's development in 2022. The country will continue to implement the innovation-driven development strategy and strengthen the foundation of the real economy. To that end, a number of tasks are outlined in the report.

Basic research

China will implement a 10-year plan to provide stable and long-term support for basic research.

Speaking to the press during the Two Sessions, Wang Zhigang, minister of Science and Technology emphasized the importance of basic research. He said, basic research and frontier exploration are to expand people's cognition and provide a source for technological innovation. They are the fundamental, pioneering and key starting points of research and development, so the government has given priority to basic research.

Talent development

The country plans to speed up construction of major international talent centers and innovation hubs, improve systems and mechanisms for talent development, and increase support for young researchers, so that talented people across the board can focus on their research and give full play to their abilities. *See page 2*

Cambodia-China Friendship Hospital Inaugurated

By TANG Zhexiao

Constructed with a grant from China, a landmark modern hospital in Cambodia's eastern province of Tboung Khmum officially began operation on March 7.

The Cambodia-China Friendship Tboung Khmum Hospital started to build in 2019 by the China Railway Construction Group Co. Ltd. It has a construction area of 24,000 square meters and a capacity of 300 beds, being divided into different wards such as outpatient, emergency and imaging.

As the the largest modern general hospital with the highest level of medical care in Tboung Khmum, it serves as a central hospital for locals in the eastern and northeastern regions of Cambodia, providing more convenient medical care for people who previously had to travel to Phnom Penh for medical treatment.

Cambodian Prime Minister Samdech Techo Hun Sen said the hospital was another testament to the fruitful cooperation between Cambodia and China under the frameworks of the comprehensive strategic partnership and the community with a shared future.

Hun Sen thanked the Chinese government and people for their assistance to Cambodia. "Such a huge hospital had never been available in Cambodia's provinces before," said the Prime Minister. "It is the largest modern hospital in Cambodia's provinces, apart from in the capital Phnom Penh."

With the assistance of medical supplies and equipment, and technologies from China, people would enjoy quality medical care services, said Eng Kheang, director of the Cambodia-China Friendship Hospital.

Speaking during the hospital's inauguration ceremony, Chinese Ambassador to Cambodia, Wang Wentian said the hospital was emblematic of China-Cambodia friendship and would play an important role in safeguarding the lives and well-being of the people.

Wang said that China would be sending the world's first state-level medical team of traditional Chinese medicine to Cambodia, to share experience and provide assistance for COVID-19 prevention.

According to Wang, a new batch of vaccines will be donated to Cambodia as soon as possible to support the Cambodian government's efforts to vaccinate children. Cambodia has started COVID-19 vaccinations for three and four year olds using China's Sinovac vaccine in February.

China-aided hospital inaugurated in eastern Cambodia. (PHOTO: XINHUA)

Editor's Pick

Joint Efforts Support Africa's Green Development

By WANG Xiaoxia

China has always firmly supported Africa's sustainable development, and the two sides have collaborated on more than a hundred projects in the field of clean energy and green development.

As China and Africa embrace the new phase of development, their joint efforts on green energy cooperation, which is suitable for local conditions, will contribute to the "green recovery" of the post-pandemic African economy.

The world's first sisal biogas electricity plant

The tropical country of Tanzania is one of the world-renowned producers of sisal. As a hard fiber source, only between two and four percent of a sisal can be processed into usable fiber. Now, the sisal waste is used to produce biogas for electricity generation and organic fertilizer as well.

A biogas power plant is based in Hale town, Tanga region, northeast Tanzania. The plant, feeding on sisal waste, the first one of its kind in the world, is supported by the United Nations Industrial Development Organization (UNIDO) and jointly completed by the Chengdu Institute of Biology under the Chinese Academy of Sciences and its German partner.

With designed installed capacity of 30 megawatts, it has met the electricity demand of Tanga region since its inauguration in 2008.

To date, sisal biogas power plants have been built in Katani, Mazind and other places in Tanzania, generating between three and five percent of Tanzania's electricity.

Apart from electricity, it is estimated that sisal waste from two processing machine can produce 350 cubic meters of liquid fertilizer and 40 tons of solid fertilizer per day. With sisal factories and biogas power plants, local villagers' living conditions have been improved.

Salum Shamte, former adviser to Tanzania's president, said that China's biomass energy technology has made huge contribution to Africa's energy development and more cooperation is expected to boost Africa's green development.

Biogas technology, which can generate electricity and control pollution, is suitable for promotion and application in developing countries. From Madagascar to Lesotho, from Benin to Cote d'Ivoire, Chinese biogas technology is taking root in Africa.

Water conservancy development project

About four hours' drive from Nairobi, the capital of Kenya, the Thwake dam is under construction at the intersection of the Thwake and Athi rivers.

Being built by the China Gezhouba Group Corporation (CGGC), it is a strategic water supply project for the large semi-arid area of Makueni county and surrounding regions, and comprises a multi-purpose dam for water supply, hydropower generation and irrigation development. Construction of the first phase of the project is expected to be completed by the end of 2022.

Kenyan President Uhuru Kenyatta hailed the project saying that when completed it will boost the local economy through an irrigation plan, mitigate drought and be an answer to the perennial flood problems in the lowlands.

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Chinese Satellite Acquires Global Gravity Field Data

By WANG Xiaoxia

China's satellite TianQin-1 has for the first time independently acquired global gravity field data, making China the third country in the world with the ability after the U.S. and Germany, said NPC delegate Luo Jun during this year's Two Sessions.

The earth's gravity field reflects the distribution of the earth's matter and its changes with time and space. The observation of a global gravity field can serve geodesy, geophysics, oil and gas exploration and other fields, while also contributing to global climate change and disaster prevention and reduction.

According to Luo, an academician of the Chinese Academy of Sciences, TianQin-1 is not specially designed for collecting gravity data, but rather to test the key technologies for future space-based gravitational wave (GW) detection. During this process, gravity field detection is one of the breakthroughs made in many frontier fields by the TianQin project.

On August 7, 2020, Tianqin-1 carried out an application test of the earth's gravity field for about 30 hours. During this period, the Global Navigation Satellite System (GNSS) receiver and inertial sensor, the key payload of Tianqin-1, were switched on at the same time, and the satellite's flight track basically covered the globe, said Luo.

After data was collected, the project team from Sun Yat-sen University and Huazhong University of Science and Technology carefully analyzed the data, verified the calculation, and obtained the global gravity anomaly distribution map and the global geoid height distribution map. Recently, they completed the global gravity field data scientific report and the on-orbit test summary evaluation.

However, the gravity field detected by TianQin-1 was not of high accuracy, said Luo, saying it is rather more significant to help pave the way for China's future gravity satellite programs.

WEEKLY REVIEW

China's First Commercial Maglev 3.0 Train on the Way

The commercial maglev 3.0 train had completed a series of tests in Shanghai till March 10. There are multiple tech breakthroughs achieved in the development process, such as unmanned driving and non-contact power supply.

Top 10 Paleontological Breakthroughs of 2021 Released

The Paleontological Society of China has announced its top 10 paleontological breakthroughs of 2021 on March 10, including vertebrate paleontology, paleoanthropology, geochemistry and paleobotany, among others.

Evidence of Wind and Water Erosion Found on Mars

A new study published in the journal *Nature Geoscience* on March 8 has revealed that the site where China's Mars rover Zhurong landed must have experienced wind and possibly water erosion, providing more evidence on the surface features of the red planet.

Chinese Researchers Developed Inhalable COVID-19 Treatment

Researchers at the Chinese Academy of Sciences said that they have developed an inhalable neutralizing antibody that can effectively neutralize the virus strain and variants like Beta, Delta and Omicron.

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Promoting Sci-tech Cooperation between Eastern and Western Regions

By LI Linxu

To balance and coordinate development among regions once again was one of the strategies prioritized at China's annual Two Sessions.

The strategy for balanced and coordinated regional development will be fully implemented, according to this year's government work report.

To further implement this strategy, as well as the innovation-driven strategy, the sci-tech cooperation between the eastern and western regions is essential.

Such cooperation is of great significance to improve the innovation capability of western regions and solve the issue of unbalanced and inadequate development there, noted a document recently released by the Ministry of Science and Technology in conjunction with eight other ministries and departments.

The document, titled the *Implementation Scheme of Sci-tech Cooperation between the Eastern and Western Regions During the 14th Five-Year Plan Period*, details the goals and tasks of promoting such cooperation in the following years.

Focusing on national sci-tech strategies and major regional development needs, the mechanism of sci-tech cooperation between the eastern and western regions will be improved, and the orderly flow of innovation elements across regions will be promoted.

By 2025, the sci-tech innovation capability of western regions will be significantly boosted, with the spillover effects of eastern regions' sci-tech innovation being more noticeable, and the innovation and industrial chain more closely intertwined between eastern and western regions, as per the goals.

To achieve these goals, the scheme laid out a series of key tasks, such as the sci-tech assistance to Xinjiang, Xizang, Qinghai, Yunnan, Ningxia, Inner Mongolia, Guizhou, and Gansu.

Xinjiang will receive support in the joint R&D efforts on carbon peaking and carbon neutrality technologies in key fields, as well as their demonstration applications, said the scheme, adding that Silk Road Economic Belt Innovation-driven Development Pilot Zone, and Urumqi-Changji-Shihezi National Innovation Demonstration Zone will play a leading role in building a regional sci-tech innovation hub.

Xizang will be supported in developing a systematic technological solution to the ecological protection of the Qinghai-Tibet Plateau, according to the scheme, calling for accelerating the transformation of sci-tech achievements in its specialized agricultural and animal husbandry industries.

Qinghai will deepen cooperation with Tianjin, Shandong, Anhui and Chongqing to build a world-class salt lake industrial base, as per the scheme, highlighting that the upstream and downstream collaborative innovation mechanism will be improved.

The innovation capability of Yunnan, Ningxia, Inner Mongolia, Guizhou and Gansu will also be boosted through cross-regional sci-tech cooperation.

Resources will be shared, platforms will be co-built, R&D will be jointly conducted, and talent exchanges will be enhanced across these regions, proposed the scheme.

Caka Salt Lake, Haixi prefecture, Qinghai province. (PHOTO: VCG)

Policy Watch

Ushering in a Good Ecosystem for Basic Research

By CHEN Chunyou

Basic research is the foundation of the entire science system, the key to all technological challenges, and the precondition for achieving sci-tech self-reliance and self-strengthening at higher levels.

In the revised *Law on Progress of Science and Technology*, the articles concerning basic research are placed in the second chapter, only behind the General Provisions, which shows the importance of basic research and demonstrates China's determination to enhance original innovation capacity.

Urgency to reinforce basic research

According to Lyu Wei, researcher of Development Research Center of the State Council, China's investment in basic research had been hovering around five percent of the total national R&D spending for a long time until increasing to six percent in 2020. Compared with innovative developed countries, whose investment in basic research stood at about 15 to 20 percent, China still lagged behind.

The achievements in scientific theories and original ideas in China are limited, with only a few researchers engaged in basic theory, said Ding Minglei, researcher at the Chinese Academy of Science and Technology for Development.

With the development of science and technology, the boundary among basic research, applied research, technology development and industrialization has become increasingly blurred, said Ding, noting that a time, featuring a more flexible sci-tech innovation chain, a convenient technological update and commercialization of sci-tech achievements, and an increasingly accelerated industrial upgrading, has appeared.

It is required to break the bottleneck, and make breakthroughs in forward-looking basic research and leading original achievements, said Ding.

Legal protection for basic research

To achieve great development of basic research, fund investment is an important guarantee. In this regard, the country's legal obligation to finance basic research is legally specified. In article 20 of the revised law, it stipulates that China would gradually increase the proportion of basic research funding in total national R&D spending, which fits the requirement of making China an innovative sci-tech powerhouse.

Article 21 says the country would establish more natural science funds to finance basic research, and support personnel training and team building. In article 20, the country encourages local governments whose economic condition allows, to set up local natural science funds to support basic research.

In the past, research institutions and universities are thought to be the main players in basic research to make breakthroughs. In article 19 of the revised law, the role of enterprises is emphasized as an innovation agent for basic research, saying that the enterprises are expected to give full play to their advantages, strengthen basic research and promote original innovation. Article 20 also stipulates that China would guide the enterprises to enhance investment in basic research and provide them with fiscal, financial and tax policy support.

At the same time, article 20 highlights the involvement of social capital, saying that social forces are encouraged to support basic research by donating and setting up funds.

With regards to talent cultivation, article 25 says the country supports universities to strengthen the construction of basic disciplines and the training of talent, and promotes the high-quality development of basic research in institutions of higher learning.

In order to solve the problem of talent shortage in basic research, article 23 also says the country encourages and attracts quality sci-tech personnel to devote themselves to basic research.

East Data West Computing

Photo shows the National (Zhongwei) New Internet Exchange Center, Ningxia. Zhongwei has sufficient energy, suitable climate and few natural disasters. The construction of an Internet exchange center here will provide a large cloud computing data center with complete network infrastructure conditions.

Currently, data centers are mainly distributed in eastern China, facing land and resource shortages.

The computing resource in western China will support computing in the east, thus empowering the development of the country's digital economy.

(PHOTO: XINHUA)

Case Study

Green Development in Western China Takes Off

By CHEN Chunyou

When walking on the coal mine subsidence area in Wulanmulun town, Ordos city, Inner Mongolia Autonomous Region (Inner Mongolia), what used to be vast empty swathes of sand blown by relentless winds, is now an orderly layout of endless photovoltaic panels.

In recent years, Inner Mongolia has accelerated the development and utilization of clean energy, such as photovoltaic power and wind power, which offers a new reference for the development of China's new energy industry.

During the 14th Five-Year Plan period, the issue on how to promote the high-quality development of clean energy aroused the concerns of western China's delegates, who put forward their proposals during the Two Sessions that ended on March 11.

Wulanmulun town is busy with the ecological restoration of the coal mine subsidence area, which covers a land of about 42,000 mu (2,814 hectares). Once the restoration is finished, the mining subsidence area will be transformed into an intelligent photovoltaic pastoral complex. The theory is as follows: photovoltaic modules will be arranged above the ground on supporting structures. The upper layer is used for solar power generation, and the lower layer is used for agricultural and forestry planting and aquaculture, along with additional opportunities for supporting tourism industries, such as agricultural sightseeing.

To develop new energy in the context of carbon peaking and carbon neutrality, it is necessary to promote the orderly replacement of the old energy sources with new ones, to ensure a secure and stable energy supply, said Shi Taifeng, chairman of the Standing Committee of the People's Congress of Inner Mongolia.

From this year, Inner Mongolia will further accelerate the development and utilization of new energy sources, and take the lead in building an energy supply system and a new power system using new energy, so as to transform itself from a fossil energy consumption region into a clean energy consumption region.

Located in the hinterland of northwest China, Ningxia Hui Autonomous Region is rich in wind and solar energy resources. In 2012, it was designated as China's first comprehensive demonstration area of new energy by the National Energy Administration. As one of the most important clean energy resources, photovoltaic energy still accounts for a small percentage in its energy structure.

Fang Min, a delegate from Ningxia Electric Power Investment Group, proposed that a different technical route of solar thermal power generation should be supported, and a solar thermal power generation demonstration project should be built.

Fang noted that a diversified use of photovoltaic energy, facilitating agriculture, animal husbandry, aquaculture development, sand prevention and control, and ecological tourism, should be encouraged.

An aerial view of the solar photovoltaic power station at the mining subsidence area in Wulanmulun town, Ordos city. (PHOTO: XINHUA)

Innovation-driven Development Blueprint for 2022

From page 1

Regarding talent policies, Wang said it is necessary to further optimize and implement relevant policies to stimulate the enthusiasm and creativity of scientists, adding that young scientists are vital to the future development of science and technology and should be offered more opportunities.

Enterprise innovation

Enterprises play a leading role in the country's innovation, and that role will be further strengthened. China expects to make more efforts in promoting breakthroughs in key core technologies, and deepen the cooperation among enterprises, universities and research institutes.

According to Wang, 79 percent of key national R&D programs are led or participated in by enterprises. In such fields as high-speed rail, 5G, nuclear power and new energy vehicles, enterprises are playing a leading or main role in advancing their development.

"Whether it is a large, medium-sized or small enterprise, state or private-owned, the country will provide opportunities for them as long as the enterprises are capable of being innovative," Wang said.

Tax incentives

China will further implement the R&D expense deduction policy. The additional deduction for small and medium-sized high-tech enterprises is to be increased from 75 percent to 100 percent. Tax preferential policies are to also be given to enterprises investing in basic research, and to high-tech enterprises in terms of their corporate income tax.

Other tasks for boosting innovation-driven development are also high on the agenda of the government work report, including advancing international sci-tech cooperation, supporting different regions to invest more in innovation according to their distinctive features, strengthening the protection and application of intellectual property rights, and producing more innovative sci-tech financial products and services.

China Tops Manufacturing for 12 Straight Years

From page 1

The industrial structure continued to improve last year, with the output in high-tech manufacturing and equipment manufacturing industries expanding by 18.2 percent and 12.9 percent respectively. Meanwhile, productivity improved and energy consumption per unit of added value of industrial enterprises above designated size declined by 5.6 percent year-on-year.

The digital and green transformation of the manufacturing sector has also been accelerated. With more than 1.4 million 5G base stations and 520 million 5G mobile terminals connected, China has built the world's largest optical fiber and mobile communication network.

An impressive 55.3 percent of technological processes in key areas have been digitally controlled, and 74.7 percent of R&D and design tools are digitalized, creating a strong driver for sustainable and healthy economic and social development.

Cutting Carbon Emissions Rationally

Voice of the World

Edited by QI Liming

During this year's Two Sessions, President Xi Jinping pointed out that the carbon emissions reduction work must be based on the country's actual situation, and must be carried out progressively to maintain stability.

One-size-fits-all is not rational

According to China's National Development and Reform Commission (NDRC), some local governments adopted a one-size-fits-all approach to shut down all high-energy-consuming projects overnight, which exposes the negative consequences of such emissions reduction campaigns.

In view of this, China's top economic planning authority and two ministries delayed the target year for the steel industry to reach peak carbon emissions by five years to 2030.

According to Moody's analysts, the extra five years can reduce the burden on steelmakers by allowing them to spread out investments in decarbonization and avoid large capital expenditure in the short term.

The analysts don't expect the change to affect the nation's goal of reaching peak carbon emissions by 2030. "The government will continue to implement strict control over steel capacity and production, while encouraging environmentally-friendly projects," the analysts said, adding that, "Such efforts, along with the extension, will also help support stability in steel supply and prices."

It is not only China that needs to take a rational approach to reducing carbon emissions. Other major emitters in the world also need to make rational plans and arrangements.

India: clean, but affordable energy for the poor

India is the third largest emitter of carbon dioxide (CO_2). Prime Minister Narendra Modi has set his country a target of net zero greenhouse gas emissions by 2070, a significantly later deadline than many other countries.

According to DowntoEarth.org, a media platform of environment and science from India and south Asia, the big issue that must concern India as they move ahead, and this will remain the discussion for the future, will be to ensure that growth is equitable and the poor in the country are not denied their right to development in this new energy future.

The per capita emissions of India remain low, because they have massive numbers of people who still need fossil energy for their development. Now and in the future, as India has set the goal to grow without pollution, they must work on increasing clean, but affordable energy for the poor.

Germany: alternatives to grid-connected shore power systems

Reasonable carbon reduction is not only about onshore projects, but also about offshore operations.

Germany's new climate minister, Robert Habeck, said in January this year the country faces a "gigantic" task if it wants to achieve its goals of reducing greenhouse gas emissions, while ensuring sufficient energy for its energy-hungry industry.

According to Offshore-Energy.biz, a platform telling the story of the energy transition and sustainable solutions in the maritime and offshore world, Germany's nine largest seaports call for new ideas to cut ship emissions in February. The EU's proposal to expand shore power is not the right strategy to obtain a sustainable reduction in emissions by shipping, German seaports believe.

German seaports take the position that a European CO_2 emission limit should be introduced for all seagoing and inland waterway vessels at berth. However, across-the-board implementation of on-grid shoreside power facilities is not a necessary way to reach that goal, according to the ports.

If they operate with 100 percent renewable power, on-grid land-based power supply facilities can be an effective measure to reduce emissions from seagoing and inland waterway vessels docked in port, but not for every port, not for every berth, and not for every ship.

The German seaports believe that the solution focus needs to be open to all technologies and thus permit, for instance, the use of fuels from renewable energy sources.

Hi! Tech

Civilians to Visit Space Station Within a Decade

By QI Liming

This year, according to the plan, China's manned space station project will enter the station construction phase. Six major missions are expected to be completed, including the launch of Wentian and Mengtian, components of China Space Station (CSS).

In addition, three new records are planned, namely the first combined flight of six spacecraft, astronauts residing in space for six months and two crews of astronauts in orbit for the first time.

The selection of astronauts has always attracted much attention, as most of China's astronauts were previously from the Air Force. It is understood that some technical experts will also travel to the space station in the future. China also plans to foster space tourism during the 14th Five-Year Plan period (2021-2025), according to the white paper titled *China's Space Program: A 2021 Perspective.*

Yang Liwei, a member of the CPPCC and deputy chief designer of China's manned space program, said, "It is possible for non-astronauts to visit the space station during the 14th Five-Year Plan period, because commercial spaceflight is also a general trend of the whole progress of spaceflight. In terms of engineering, we also hope that more enterprises are able to participate in the project, which will give a strong boost to the whole industry," said Yang.

This indicates that there will be no problem for non-astronauts to enter the space station in the future.

"This is not a technical problem. As long as there is a demand and our resources allow it, this shouldn't be a long-term problem," said Yang, adding that it may be realized during the 15th Five-Year Plan or within a decade.

China's Anti-pandemic Efforts Benefit the World

Opinion

By Staff Reporters

Tunisia receives new batch of COVID-19 vaccines donated by China in February. (PHOTO: XINHUA)

China has made significant contributions to the fight against COVID-19. Over two years of round-the-clock R&D by top scientific teams, a lot of Chinese COVID-19 vaccines and medicines have been developed. After sending these products abroad with great feedback received, the Chinese anti-pandemic efforts have finally been recognized.

Before the vaccine was developed, China had already set up plans to help other countries. In September 2020, China announced that five countries in its neighborhood, including Cambodia, Vietnam, Myanmar, Laos and Thailand, would become the first to receive Chinese vaccines. Since then, China has officially started its COVID vaccine collaboration with many other countries.

In late 2020, due to the low number of its COVID patients, China approved to carry out phase III clinical trials in Brazil, Indonesia, the United Arab Emirates, Bahrain, Russia, Peru, Argentina, Bangladesh, Morocco and other countries. These collaborations not only accelerated the speed of vaccine development, but also ensured that these countries could get access to the COVID vaccine in the early stage of the pandemic. Since then, it has maintained cooperation with more than 40 countries around the world.

In late 2020 and early 2021, the first batch of China's COVID-19 vaccines, including Sinopharm BIBP (COVID-19 Sinopharm 0.5ml) and CoronaVac, were put into markets, making China the first tier to allow mass vaccination. The fast action of vaccination successfully contained the virus spread in China. Combined with the zero-COVID policy (ZCP), the action has saved millions of lives. According to a study by Peking University mathematicians, China could have faced more than 630,000 COVID-19 infections a day if it dropped its ZCP by lifting travel curbs.

According to the latest data released at China's Two Sessions, the country has provided more than 2.1 billion doses of finished vaccines to more than 120 countries and international organizations.

In addition to disease prevention, China has also worked hard on its treatment. In March 2021, three traditional Chinese medicines (TCM) — Qingfei Paidu Decoction (QFPDD), Huashi Baidu Granule (HSBD) and Xuanfei Baidu Granule (XFBD) — were officially approved for the market, playing a paramount role in fighting COVID-19.

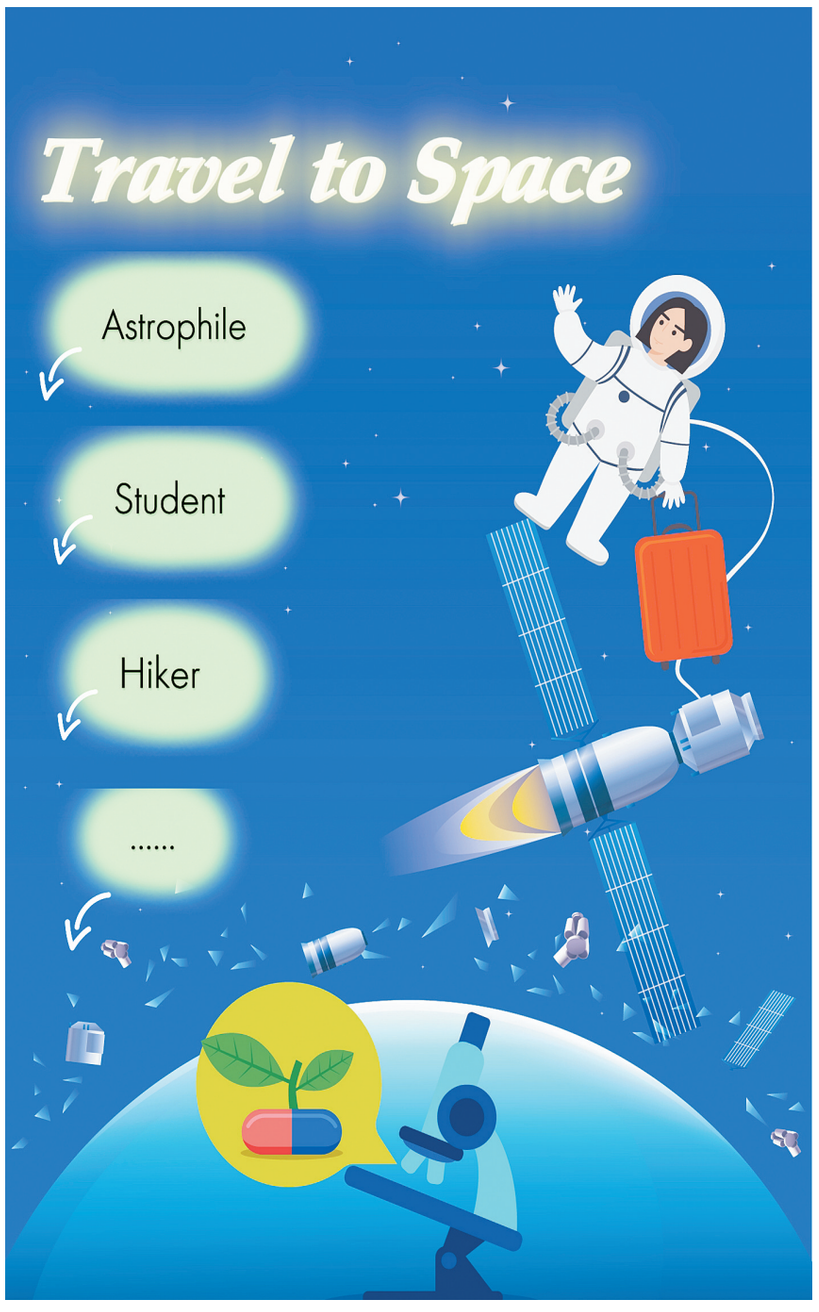
"These three prescriptions are developed through long term's attempt and exploration. They have been evaluated in use and proved to be effective in clinical trials," said Zhang Boli, a Chinese epidemiologist and academician with the Chinese Academy of Engineering.

Zhang and his team have done plenty of work on COVID medicines. By optimizing and combining the classic TCM prescriptions and adding experimentally effective Chinese medicine components, the new TCM for COVID was developed. According to the result of tests, the medicine can markedly improve symptoms, reduce the rate of weight conversion, promote nucleic acid conversion to negative and reduce sequelae. Therefore, the entire process is considered as a way to quickly screen and evaluate new drugs developed.

The role of TCM in the treatment of COVID-19 has also been recognized overseas. A paper published by Dove Press confirmed the effectiveness of COVID-19 TCM. It was suggested that SARS-CoV-2 and SARS-CoV are similar in gene, pathological process and epidemiology. Thus, they can be applied in TCM treatment. Evidence on the use of TCM for the treatment of SARS-CoV also clearly displays the advantages of utilizing TCM for the treatment of COVID-19.

Apart from TCM, China has also focused on other kinds of anti-COVID medicine developed through collaborations among institutions at home and abroad. At the end of 2021, China approved the country's first COVID-19 antibody drug, developed by the co-efforts of Tsinghua University, the Third People's Hospital of Shenzhen, and medical company Briibio.

According to the latest data released at the end of February 2022 by China's National Medical Products Administration, more than 50 COVID-19 medicines were being approved for clinical trials. As a result, more of China's anti-pandemic efforts will be seen in the field of medicine development.



Space tourism in the future.
(PHOTO: VCG)

Ready, 6G Needs Global Cooperation

By Staff Reporters

While 5G is still being rolled out for business use, 6G, with substantially higher capacity and much lower latency, is being discussed and researched worldwide. This technology shift seems far more rapid than the 4G to 5G, and the world should be well-prepared for the coming of 6G.

What is 6G

As the next generation of communication and one of the clusters of network technologies, 6G will provide a better service for cyber users.

IEEE fellow Chih-Lin I, who is also the Chief Scientist of China Mobile Research Institute and Chairman of the 5G/6G SIG of FuTURE FORUM, concluded the mainstream views from the research field. She pointed out that there are six major technical characteristics of 6G, which include wireless access with extreme capabilities, distributed intelligent network with a simplified yet flexible protocol stack, all spectrum three-dimensional global coverage, pervasive intelligence, native security, and digital twin network-enabled autonomous operation.

What should we expect from the network's improvement

Despite the current capability requirements for 6G and the underlying core technologies that are still being explored, future networks will basically make improvements on data rates, delays, and efficiencies. However, tech experts have different opinions on where the technology is heading.

Li Junyi, Vice President of Qualcomm and an IEEE fellow, said that he would prefer to bring AI and machine learning technology (AI/ML) into 6G. "I believe that AI/ML can potentially change the way that wireless communication and networking systems are designed and deployed in a fundamental manner," he said, adding that, "A significant amount of advance R&D has been devoted to AI/ML for wireless in 5G, either via standardization or via implementation. This path will continue to 6G."

Harish Viswanathan, Head of Radio System Group in Nokia Bell Labs and IEEE Fellow said, "We expect performance features such as centimeter-level accurate positioning for robotics, sensing metrics such as maximum range and Doppler, and object detection accuracies. Synchronization will be another major theme."

5G should be shifted smoothly towards 6G

Although 5G has just been commercialized on a large scale, the next generation networks development is on schedule. It is believed that the world transition from 5G to 6G might be faster than the previous transitions, which means more work should be done in this period.

Experts believe 6G is not just a digital revolution, but also a societal one.

"There should be a smooth transition from 5G to 6G, allowing for coexistence initially and gradually shifting to the latest technology," said Viswanathan.

"6G will probably open up new use cases, which require new technologies that have not been studied formally in 5G standards. Like the transitions in the previous generations, 6G will coexist with 5G for a certain period of time, and gradually supplement and substitute 5G in terms of use cases and features," said Li.

The world needs 6G collaborations

People from all over the world are gathering to discuss 6G use cases and requirements, and make unified standards. However, under the turbulent geographical environment, standard splitting is at risk.

Chih-Lin I noted that various regions and countries are accelerating their R&D initiatives of 6G technology. In particular, the U.S. attaches great importance to its success of 6G R&D. However, the U.S. clearly indicated that it is competing with China, and its "Next G Alliance" excludes Chinese companies from participating, which is rather unfortunate. It is of the utmost importance that we all continue pursuing jointly with the global ecosystem so that a unified 6G standard will be created, similar to what was accomplished globally for 5G.

Other scientists have also appealed to continually enhancing collaboration worldwide.

"Unified global standards are the foundation of the mobile communication industry. As we have witnessed the success of the mobile cellular industry in the last decades, a unified global standard is vital," said Li, adding that, "Dialog of a broad spectrum of topics by experts in academia, government and industry across the globe will help strengthen global industrial collaboration."

"The industry should drive towards a single global standard and increase engagement across the different regional consortiums," said Viswanathan.

Sustainability Shaping Great Collaboration

By LONG Yun

Dr. Narong Sirilertworakul is the President of Thailand's National Science and Technology Development Agency (NSTDA), an organization tasked with enhancing Thailand's global competitiveness in scientific research and technology, modernizing the country's industries, and enhancing Thais' quality of life.

"Thailand has maintained a positive relationship with China, both bilaterally and through multilateral frameworks such as China- ASEAN cooperation," he told *Science and Technology Daily* recently, believing that the two countries' relationships have grown steadily in a variety of areas, including corporate values, trade, culture, education, and innovation. Sirilertworakul received the 2021 Chinese Government Friendship Award in recognition of his significant contributions to China-Thailand cooperation, particularly in the field of sci-tech cooperation and people-to-people exchanges.

Dr. Narong Sirilertworakul. (COURTESY PHOTO)

Cooperation generating benefits

Sirilertworakul was instrumental in establishing the "Thailand-China Technology Transfer Center Working Group" in collaboration with the China - ASEAN Technology Transfer Center (CATTC). He considered himself fortunate to have led NSTDA in numerous initiatives to enhance Thailand- China cooperation under the CATTC.

Various programs are established to promote knowledge and technology transfer, thereby accelerating scientific and commercial advancement in both countries, he said.

In 2015, the Thailand- China Technology Transfer Center, established at NSTDA, facilitated technology transfer and dialogue between Thai and Chinese businesses. The Center holds regular events to foster collaboration between Thai and Chinese businesses in diverse fields.

In the business sector, more opportunities were generated for Thai businesses to collaborate with their Chinese counterparts at Thailand- China technology matchmaking session in China Intelligent Equipment Industry Exposition during 2017 - 2019 organized by CATTC. "The activities have expanded as more companies from both countries joined forces to facilitate technology transfer and equipment trading," said Sirilertworakul.

Additionally, he exemplified people- to- people exchanges by naming the China-ASEAN Technology Manager International Training and the Talent Young Scientist program. Both programs present professional training in a variety of sectors, providing excellent opportunities to gain knowledge and experience essential for common development.

In 2022, the Forum on China-ASEAN Technology Transfer and Collaborative Innovation will celebrate its tenth anniversary. The Forum's mission is to facilitate precise matchmaking in scientific information between China and ASEAN across various sectors and institutes.

Concerning the platform's future role, Sirilertworakul expressed hope that "through the CATTC network, we can develop joint activities and products to consolidate the framework and promote the long- term development of bilateral ties."

Sustainability shaping future cooperation

Sirilertworakul's extensive experience in his work has made him keen to pursue concerted efforts to address global issues. He emphasized the importance of "sustainability" in future international collaboration in scientific communities.

According to him, ASEAN members are now actively involved in achieving the UN's Sustainable Development Goals and mitigating environmental issues.

He provided a detailed overview of the various measures implemented by various ASEAN countries. Regarding his country, he said that Thailand is attaching great importance to the Bio- Circular- Green (BCG) economic model in pursuit of the circular economy, green economy, and ASEAN cooperation, noting that it also aligns with the national plans of some ASEAN members, such as Singapore and Malaysia.

He understands how critical it is to conduct international cooperation for sustainable development. In the face of potential threats, Sirilertworakul believes China could collaborate with Thailand and other ASEAN countries to combat climate change. "China is one of the leading countries addressing this issue, which is beneficial to all people on the planet," he said, as demonstrated by the concepts of the "Green Games" and "sustainability" integrated into all aspects of Beijing 2022.

Sirilertworakul suggested ways to strengthen collaboration, including technology and infrastructure support and joint capacity building programs, while emphasizing the importance of promoting BCG products and services.

Having traveled extensively across China, he quoted two lines from Chinese poetry praising the beauty of Guilin's Li River, his favorite part of China: "He who travels through the Guilin hills finds himself in a fairyland," and "He who sails along the Li River finds himself boating in a sweet dream."

Letter to the Editor

Two Sessions Boost Prospects for High-tech Industry

By Musundali Bhuiyan

Alongside increasing its global economic share, China continues to lead the world in many spheres, including science, technology and innovation. Through constructing the space station, supercomputer, and its unparalleled feats in artificial intelligence, new medicines, and low- carbon technologies, China has already ushered in a new era of these fields.

Against such a backdrop, the Two Sessions, the most important annual political meetings in China, once again attracted wide spread attention this year. Premier Li Keqiang delivered his government work report highlighting a slew of key economic targets including science, technology, and innovation.

In the report, Li reiterated his government's commitment to implement a 10- year action plan on basic research, to ensure stable support for scientific and technological innovation over the long term. China will continue its innovation- driven development strategy and strengthen the foundation of the real economy. The country plans to promote scientific and technological innovation to upgrade its industries, eliminate supply bottlenecks, and realize high- quality development through innovation.

This part of Li's report has widely been hailed by scientists, researchers, IT experts, and inventors across the world. Those working in the specific fields have seen the statements as a boost for the development of the industry. They think, as a result of initiatives and incentives to be offered by the Chinese government, that the industry will see a huge boom in the coming years.

Many are optimistic about getting new cutting- edge technologies, assisting with innovations in the field of science, which can make human life more convenient and less expensive. The world is looking forward to getting good news about new inventions and the development of state-of-the-art technologies, especially in the field of 5G and artificial intelligence.

Li also reaffirmed to the world that China will take well - ordered steps to achieve peak carbon emissions and carbon neutrality. Under this assurance, China will start reducing its carbon emissions in 2030 and will become a carbon- neutral nation by 2060. The country's action plan in this regard will be put into effect in the near future.

The work report maintained that China will continue to improve its ecological environment by promoting green and low-carbon development. The development and application of green and low- carbon technologies are to be promoted, and projects with high energy consumption, high emissions, and low quality will be curbed. The world has confidence in China, as its successive leaders have already proved their trustworthiness by fulfilling their promises to the world in the past.

President Xi Jinping has previously announced that China will not build new coal-fired power plants abroad. After his announcement, China has not made any new coal investment overseas. What it has done is launching the world's largest carbon market, to contribute half the emission reductions the country needs to meet its 2060 net-zero goal.

China aims to gradually increase the share of non-fossil energy consumption to around 20 percent by 2025, around 25 percent by 2030, and more than 80 percent by 2060. China is also playing a significant role in carbon emission reduction around the world. The country is responsible for about 30 to 50 percent of the global contribution to improving energy efficiency, optimizing the energy mix, developing renewable energy and forest carbon sequestration, and adjusting industrial structure.

China has ranked first in the world with its investment in renewable energy for many years. Accordingly, it has built a large number of solar and wind farms in Inner Mongolia, Xinjiang, and several other locations and is also busy turning its deserts into green zones in Kubuqi and Gobi.

Musundali Bhuiyan is a Bangladeshi journalist now based in Beijing.

A wind power plant in Dingxi, Gansu province. (PHOTO: XINHUA)

Traditional Eastern Wisdom

Huangfu Mi: Ancestor of Acupuncture

By BI Weizi

Huangfu Mi (215- 282) was a Chinese physician, writer and historian during the Western Jin Dynasty of the Three Kingdoms. He occupies a high academic position in the history of acupuncture, which is an important invention of the Chinese nation.

As early as 2,000 years ago, the basic theories of acupuncture and moxibustion had already been established.

However, the earliest acupuncture books contained many errors, especially the locations and names of acupuncture points, which were not unified.

Built on earlier medical literature, Huangfu compiled *The Systematic Classic of Acupuncture and Moxibustion* in 256- 260, which is the earliest systemized book on acupuncture and moxibustion.

The 12 volume book stands as a monument in the field of Chinese medicine, for its scientific categorization of acupuncture points based on many classical medical works such as *Huangdi Neijing*, *Su Wen*, and *Zhen Jing*. It includes a total of 349 acupuncture point names, 189 more than *Huangdi Neijing*.

The book laid a solid theoretical foundation for the discipline of acupuncture and moxibustion, accelerating the development of acupuncture and moxibustion in leaps and bounds. Thus, Huangfu was hailed as the ancestor of acupuncture and moxibustion in Chinese medicine.

For more than 1,700 years, Huangfu's book has provided acupuncturists with concrete guidance and theoretical basis for clinical treatment. It also spread worldwide and was valued by various countries, especially Japan and Korea.

Huangfu Mi. (PHOTO: VCG)

Service Info

The Spring Equinox (4th Solar Term)

During the Western Han Dynasty, 24 Solar Terms were formally identified and integrated into the Chinese lunar calendar. And it continues to be used today. They depict the relationship between the universe, seasons, climate, and agriculture, all of which were created by Chinese ancestors. The Twenty-four Solar Terms have served as a comprehensive collection of weather calendars in China, guiding agricultural productivity. This year's Spring Equinox will be on March 20. As the weather warms up after this solar term, the number of daylight hours increases progressively. The picture on the left shows that Hanfu lovers enjoy flowers at Huangjiawan Scenic Area in Xiangyang city, Hubei province.

(PHOTO: XINHUA)

Joint Efforts Support Africa's Green Development

From page 1

During the construction, ecological conservation and wildlife protection are of great importance. According to the CGGC, regulations were carried out on waste gas and wastewater discharge, waste recycle, noise control, use of environmentally friendly materials and biodiversity protection.

The project worked with the local authorities to guide the migration of hippopotamus, crocodile and other large animals within the project scope in advance, and put in place professionals for continuous monitoring.

"Our project does not affect the survival of wild animals, rather, creates better conditions for their reproduction," said a local environmental expert.

According to her, local communities still rely on rainfall from the short rainy season, river water and unstable solar power supply. "We are all looking forward to the completion of the dam, bringing us sufficient hydropower resources," she said.

Breakthrough achieved in green industry

Nigeria is the world's largest cassava producer, with Benue state producing the most. In 2020, a China-invested biotech company was established in this state to produce medical, industrial and edible ethanol from cassava.

As the largest ethanol plant in Nigeria, it can produce 70,000 tons of ethanol per year and 140,000 tons per year in the second phase, which is expected to generate 10 million USD of annual tax revenue for the state.

In order to prevent environmental pollution from the plant's waste water, the Chinese enterprise invested 10 million USD to build a sewage treatment system. It was a breakthrough for Nigeria's pursuit of a green industry, said Dondo Ahire, Benue State Commissioner for Water Resources and Environment.

The waste from the ethanol plant can be processed into organic fertilizer or produce biogas, with an annual output of 23 million cubic meters, equivalent to more than 30,000 tons of high-quality raw coal.

"I could never imagine that even cassava residue can be processed into organic fertilizer!" said local farmer Joseph, who no longer worries about affording fertilizer.

The project has boosted the local economy by increasing farmers' incomes and promoting industrialization, said Benue Governor Samuel Ortom, and it offered 1,000 local jobs for its construction and trial operation alone.