Advancing Bioeconomy Through Innovation

By ZHONG Jianli

Weiming Biomedical Industrial Park (Phase I) in Hefei city, east China's Anhui province. (PHOTO: VCG)

The first-ever five-year plan for the development of the bioeconomy has been unveiled by China's top economic planner, aiming to accelerate the development of biotechnology and industries, with focuses on healthcare, food supply and low-carbon growth.

According to the plan released by the National Development and Reform Commission (NDRC), China's bioeconomy industries are expected to grow to a new level before 2025, with the proportion of the bioeconomy's added value in GDP experiencing stable growth, and the number of bioeconomy enterprises with an annual revenue of over 10 billion RMB increasing greatly.

"We will strive to reach 22 trillion RMB in China's bioeconomy by 2025, so that bioeconomy will become a strong driving force for high-quality development of China's economy," said Bai Jingyu, director of NDRC's Center for Innovation-driven Development.

NDRC has identified four key areas to develop the bioeconomy, that is, biomedicine, bio-agriculture, bio-fuel and bio-information.

It points out that innovation plays a fundamental role in promoting bioeconomy development.

Thus, it is necessary for the country to strengthen original and pioneering basic research on bio-technologies, and carry out major national sci-tech projects in frontier areas such as clinical medicine and health management, new drug discovery, brain science, synthetic biology, biological breeding, and prevention and control of emerging infectious diseases.

Furthermore, the plan calls for speeding up the development of high-throughput gene sequencing technology, to improve the efficiency of gene sequencing and reduce costs. Gene diagnosis and treatment, stem and immune cell therapies, biocomputing, and DNA storage technologies will also be encouraged.

In such key fields as biomedicine, bio-agriculture and bio-manufacturing, enterprises should enhance their innovation capabilities in more specific areas, and cultivate themselves into industry leaders with global competitiveness. Large enterprises should be supported to take the lead in building innovation platforms including industrial innovation centers, technological innovation centers as well as manufacturing innovation centers.

NDRC says that China has good foundations for developing the bioeconomy, but challenges in innovation still exist. The original innovation capacity of the bioindustry is relatively weak, and the system for the protection, development and utilization of biological resources is not yet complete.

To further boost China's bioeconomy development, the plan stresses the importance of promoting international cooperation to bring together innovative biological resources from around the world.

In terms of deepening global cooperation in biomedicine innovation, Wang Xuegong, vice president of China Pharmaceutical Enterprises Association, suggested encouraging foreign enterprises to set up R&D centers and innovative drugs production bases in China, and supporting high-level Chinese talent abroad to come back to China to pursue their careers. Moreover, Chinese enterprises could establish their R&D centers, production bases and marketing networks overseas, so as to build up their operation ability in the international market.

Cultivating Talent for Green Development

By CHEN Chunyou

As a faithful advocate of the Paris Agreement, China is making concrete efforts to achieve the targets of carbon peaking and carbon neutrality.

To tackle key technological challenges on the low-carbon road, qualified professionals are needed to play a leading role.

This May, the *Action Plan for Strengthening the Construction of Higher Education Talent Training System in Carbon Sector* was released by the Ministry of Education, which lays out key tasks for training talented individuals in the new era.

According to the plan, China would promote the construction of a high-quality higher education system and improve the quality of training in the carbon field.

The plan proposed to incorporate the green and low-carbon concepts into the educational system, saying that the construction of courses and related teaching resources in universities requires strengthening in order to improve the quality of professional training.

The building of high-level platforms to generate technological breakthroughs is to be accelerated in China. The universities are encouraged to establish carbon-neutral laboratories and technological innovation centers, reinforcing the research on the causes and impacts of climate change, and the basic theory and methodology of carbon sink in the ecosystem, said the plan.

According to the plan, a number of colleges featuring future technology, modern industry, and demonstration energy in green and low-carbon fields would be established, which are expected to innovate the training modes, and produce experts who can lead the development of the low-carbon technologies in future.

Professionals in hydrogen energy, carbon capture, utilization and storage, carbon finance and trading are in urgent need, said the plan, adding that these will be the focus of talent cultivation.

Furthermore, the plan also noted that talent cultivation in the fields of wind power, photovoltaic power and nuclear power is to be accelerated, while it would be transformed and upgraded as early as possible in key traditional energy fields such as electrical engineering, transportation, and architecture.

In order to promote the integrated development between the industry and education, the establishment of alliances between universities and enterprises is supported, said the plan, noting that transnational alliances with relevant countries are also encouraged if possible, so as to promote the sharing of standards, technology and personnel.

Global talent exchange is also highlighted in this plan. The overseas experts specializing in hydrogen energy, carbon capture, utilization and storage, carbon economy and related policy research, clean utilization of fossil energy, and cutting-edge technologies of renewable energy are welcome to participate in course construction and related academic research in China.

In addition, Chinese universities are encouraged to launch a joint training program with world-renowned universities and institutes, to cultivate professionals who are actively engaged in global climate governance and the operation of the global carbon market. At the same time, the related cooperation projects on sci-tech innovation and think tank consultation in carbon-neutral fields are also encouraged to be carried out, as per the plan.

Sci-tech Management System Reform on Track

By LI Linxu

With an array of policies released and implemented in the past decade, reform of China's sci-tech management system has gone deeper.

The Central Commission for Comprehensively Deepening Reform has reviewed more than 20 major reform initiatives regarding science and technology, said Li Meng, vice minister of science and technology, during a press conference on May 12.

Up to now, 143 tasks in the *Implementation Plan for Deepening Reform of Science and Technology System* have been completed, according to Li.

Thanks to these efforts, substantial progress has been made in reforms of the key areas and links in the sci-tech management system.

For example, R&D funds management has long been a difficult issue. To well serve creative activities, a series of reforms have been carried out, such as adopting profit distribution policies oriented toward increasing the value of knowledge, building up a trust-based management system for sci-tech programs and funds, establishing a quality, performance, contribution-oriented evaluation approach, and providing stronger incentives for researchers.

In addition, systematic steps have been taken to reform mechanisms of program assessment, personnel assessment and institution evaluation. Many local governments and organizations have explored roadmaps for category-based assessment.

Application of sci-tech achievements is another key issue. In the past 10 years, one of the major goals of sci-tech system reform is to accelerate the establishment of a system for the transfer and commercialization of sci-tech achievements.

To this end, rewards have been increased substantially to researchers for the transfer and commercialization of advances in science and technology. And the right to use, transfer, and profit from sci-tech achievements has been fully delegated. Trials have also been carried out to give researchers the ownership and long-term right to use their achievements, said Li.

The additional tax deductions for R&D expenses increased from 50 percent in 2012 to 75 percent in 2018, and now cover 100 percent of small and medium sci-tech enterprises and manufacturing enterprises.

At present, more than three-quarters of the total R&D spending comes from enterprises and 79 percent of National Key R&D Programs are initiated or participated in by enterprises, according to Li.

Statistics show that the market for technology trade has been continuously expanded in recent years. In 2021, the technology contract turnover reached 3.7 trillion RMB, 5.8 times of that in 2012.

Technology, industry, and finance are shaping each other and forming a virtuous circle, said Li, adding that a synergy has been formed between technology and economy.

Hubei to Support R&D of Innovative Medicines

By LI Linxu

A specialized fund of 10 billion RMB for the life and health industry has been set up to support pharmaceutical companies to be listed at home or abroad, according to a series of measures recently unveiled by East Lake Science City in Wuhan, Hubei province.

Focusing on cultivating major new drug discoveries, improving innovation capabilities, promoting investment, and optimizing industrial ecology, a total of about 20 measures have been introduced to support the industrial development of new medicines.

Of note is that to support new drug innovation and development, a partner model has been created.

Under this model, the funding support will move forward and the risk of developing new drugs will be shared. For the clinical research of a Class I new drug, the funding support can amount to a maximum of 20 million RMB annually and the accumulative amount of funding support can reach a maximum of 100 million RMB.

In addition, a maximum of 100 million RMB will be allocated to attract top scientists and high-end talent through a talent exchange program.

By the end of 2030, the industrial output value of related pharmaceutical companies is expected to exceed 100 billion RMB, 30 top academicians and experts in the field will be introduced, 20 listed companies to be fostered and 30 Class I new drugs to go public, according to East Lake Science City.

New drug R&D enterprises will gather in East Lake Science City. (PHOTO: Wuhan East Lake High-tech Development Zone)

Urbanization via County Reform

By CHEN Chunyou

There are about 2,846 county-level administrative regions in Chinese mainland currently. County towns are an important part of China's urban system and a key support base for the integrated development of urban and rural areas. The development of counties is vital to promoting new-type urbanization and building new-type urban-rural relations.

China's urbanization rate of permanent residence hit 64.7 percent in 2021, up from 53.1 percent in 2012, and the urban-rural income ratio narrowed by 0.38 to 2.5 in 2021 in the past decade, according to the National Development and Reform Commission.

In order to further boost the development of the counties, China released the *Guideline on Promoting the Urbanization with the County Towns as the Focus* on May 6.

According to the guideline, China will devise differentiated paths of development for five types of counties, including those close to metropolises, having industrial advantages, located in the agricultural producing areas, having ecological significance, and those suffering from population outflows.

The guideline clarified the measures for promoting the development of the counties, including developing competitive industries, creating more jobs in counties, and strengthening ecological conservation.

Governments should coordinate the development of local industries and the inflow of industries from other regions, and promote industrial transformation and upgrading, said the guideline, noting the counties should make use of local resources to develop cultural and leisure industries, and the health care industries.

The vocational skills training for rural migrant workers will be carried out on a large scale to improve their competitiveness in the employment market. It encourages the enterprises, vocational schools and technical schools to offer more training opportunities for the emerging positions or positions in short supply, so as to make job candidates better match market demand.

A low-carbon style of production and life is to be upheld in counties, said the guideline, advocating clean, low-carbon, safe and efficient use of energy, and promoting the use of green building materials in construction.

In addition, it supports the installation of photovoltaic power generation facilities on house roofs in counties where natural conditions permit.

By 2025, China's counties are expected to see a notable improvement in all respects. The industries will have a robust potential for growth, and the public services will witness an all-round improvement. More and more rural residents like to work and settle in their hometowns, enjoying a better quality of life, as per the plan.

The water diversion project in Taihe county, Jiangxi province, improves the local ecological environment and makes the county more livable. (PHOTO: VCG)