National Road Network to Reach 461,000 km by 2035

By LI Linxu

Soon after its release, the new national road network plan began trending on social media, with netizens eagerly anticipating new roads to pass through their cities or hometowns.

By 2035, the total length of national roads is expected to reach 461,000 km, farther than the distance from Earth to the moon. The figure will be made up of 162,000 km national expressways and 299,000 km highways, according to the plan jointly released by the National Development and Reform Commission (NDRC) and the Ministry of Transport (MOT).

By then, most of the counties or cities can drive onto national expressways in half an hour and access national highways in 15 minutes.

Under the plan, national highways will continue to provide non-tolled basic public transportation services, while national expressways offer efficient and fast transport services, said Meng Wei, spokesperson of NDRC.

Leishan-Rongjiang Expressway in Guizhou. (PHOTO: VCG)

Since reform and opening-up, China has successively released four plans concerning the national arterial highway network. The last release was in 2013.

Since then, significant achievements have been made in the country's road network. By the end of 2021, the country had built 124,000 km national expressways and 258,000 km highways.

The new plan draws up a blueprint to build a modern high-quality national road network that is extensive, fully functional, efficient, green, intelligent, and safe.

Compared with last release in 2013, the total length of national roads increases about 60,000 km, including 26,000 km national expressways and 34,000 km national highways, said Zhou Xiaoqi, deputy director of NDRC's Department of Infrastructure Development.

The plan is a follow-up policy to the *Outline for National Comprehensive Transport Network* issued in 2021.

It attaches great importance to the principles of green and low carbon, as well as ecological protection in the design, construction, operation, management and maintenance of roads.

Sci-tech innovation is also highlighted in the plan, proposing to promote the application of frontier technologies, and continuously uplift the digital and networking level on national roads.

Frontier technologies such as a new generation of information technology and artificial intelligence will be deeply integrated into the national road network, said Wang Songbo, deputy director of MOT's Department of Comprehensive Planning, adding that engineering designs and construction schemes will also be optimized to use resources economically and intensively.

Renewable Energy Vital to Carbon Peaking in Construction Sector

By ZHONG Jianli

China will make efforts to cut carbon emissions in the urban and rural construction sector and achieve a systematic green and low-carbon transformation of the sector. That's according to a recent implementation plan released by China's Ministry of Housing and Urban-Rural Development and National Development and Reform Commission.

The policy system and institutional mechanism for green and low-carbon development of China's urban and rural construction sector should be basically established in a short term, while the level of building energy conservation and waste resource utilization will be greatly improved.

In a long run, the country will strive to fully achieve green and low-carbon transformation of urban and rural construction, to provide a better living environment for people, according to the plan.

The urban and rural construction sector is one of the major contributors to carbon emissions.

According to the *2021 China Building Energy Consumption and Carbon Emissions Report* issued by China Association of Building Energy Efficiency, carbon emissions from construction accounted for 50 percent of the country's total in 2019.

Promoting the application of clean renewable energy is an important part of achieving carbon emissions peak in the construction sector, according to the plan.

It proposes to optimize the energy structure of urban construction by promoting the use of solar photovoltaic power in buildings. The coverage of rooftop photovoltaic systems of newly-built public buildings and factory buildings should be increased to 50 percent by 2025, while the application of smart photovoltaic systems should be accelerated.

In rural areas, solar, geothermal, air thermal, biomass, and other renewable energy should be more widely used in cooking, heating, lighting and transportation.

Measures will also be taken to advance the development of prefabricated buildings, which will account for 40 percent of new urban buildings by 2030.

According to the plan, the country will promote urban ecological restoration and improve the urban ecosystem. The number of new super high-rise buildings will be controlled. Meanwhile, newly developed urban areas should control the ratio of commercial land and residential areas.

The plan calls for promoting intelligent construction, with the goal of setting up 100 intelligent construction industrial bases by 2030, creating a number of Internet platforms for the construction industry, and producing a series of typical construction robot products.

In addition, the processing and management of construction materials should be improved so as to reduce the loss rate of materials at the construction site.

Innovation Demo Zones to Boost Sustainable Development Approved

By LI Linxu

A number of cities have been approved recently by the State Council to set up national sustainable development innovation demonstration zones.

The newly approved cities include Ordos, Xuzhou, Huzhou, Zaozhuang and Hainan Tibetan autonomous prefecture.

Zaozhuang is among newly approved national sustainable development innovation demonstration zones. (PHOTO: VCG)

While establishing the demonstration zone, the local authorities are urged to follow an innovation driven strategy and sustainable development strategy.

Focusing on the United Nations 2030 Agenda for Sustainable Development, as well as China's national plan on implementation of the agenda, these cities are expected to pilot sustainable development paths driven by innovation and provide hands-on experiences for other cities and regions.

Ordos, located in North China's Inner Mongolia autonomous region, is asked to explore a green and low-carbon development road in desertification areas.

Xuzhou, located in East China's Jiangsu province, is tasked to find a high-quality development road for key cities in a resource-based region.

Huzhou, located in East China's Zhejiang province, is required to explore sustainable development in ecological resource-intensive areas.

Zaozhuang is a prefecture-level city in the south of Shandong province. Its mission is to find ways to sustainable development in rural areas.

Hainan Tibetan autonomous prefecture, located in Northeastern Qinghai province, is home to the Qinghai Lake and traversed by the Yellow River. It will endeavor to achieve high-quality development in headwater regions.

Supporting measures will be rolled out by relevant departments, including the Ministry of Science and Technology, and corresponding provincial government in the building of these demonstration zones.

Currently, a total of 11 such demonstration zones have been approved in China.

Case Study

Old Industrial Base of Heilongjiang Gets Digital Makeover

By LI Liyun & CHEN Chunyou

Digital technology is regarded as an important engine to transform the industrial development model. One prime example of this modernization is in Heilongjiang province, where the old industrial base of northeast China has embraced the digital economy as its "No. 1 project" in the province's development, impacting all walks of life. Digitech brings a smart edge to Heilongjiang's traditional industries, taking its industrial structures into the fast lane.

Advantages in developing digital technology

The optical network has basically covered the whole province, and Harbin, the capital city of Heilongjiang, has become a major national Internet direct connection point. A total of 30 big data centers have been established, with 40,000 standard racks available in the province.

Digital technology industries, such as artificial intelligence, cloud computing, Internet of Things and big data have continued to develop, and an electronic information manufacturing industry pattern, featuring automotive electronics, sensitive devices, semiconductor materials, information terminals and applied electronics has taken shape. Industrial parks for satellite manufacturing and application, BeiDou Navigation Satellite System and geographic information have also been established.

Most notably, Heilongjiang is home to 78 institutions of higher learning, and many other research institutions, which have strong research and innovation capabilities in the field of digital economy.

Prosperity in smart farming

In the past, Heilongjiang was characterized by a labor-intensive farming model, which has given way to smart farming. With the support of modern equipment and technologies, farmers have embraced a new era of farming.

"At present, we are carrying out the experiments and explorations of smart agriculture, with 34 university-industry partners providing technical support," said Jiang Hao, vice director of the rice office of Qixing Branch, Heilongjiang Agriculture Co., Ltd.

Qixing Branch is located in the Three River Plain, one of the important grain-producing areas in China. In recent years, this branch has vigorously promoted the application of digital agriculture and built China's earliest batch of smart farms, which include 20 small weather stations and 20 sets of groundwater monitoring devices, covering a total area of 1.26 million mu (about 84,420 hectares) of farmland.

Based on the Internet of Things, big data and other technologies, the research on seedling breeding and transplanting is accelerating. The entire process of management of land and the harvest is unmanned.

Deep integration with real economy

In the automatic stacking workshop of the generator punching sheet at Harbin Electric Machinery Factory Co., Ltd., the stacking process of the transformed production line doesn't need the involvement of workers, yet its working efficiency is three times as high as before.

"A long time ago, our company's researchers used information technology to design and develop large power generation equipment," said Qin Daqing, deputy chief engineer of the company.

"During the process of design, manufacturing, testing and other R&D stages, a lot of data was produced, but the data was scattered and like a separate 'island'. With the improvement of cloud computing capacity, the data on the 'island' is gradually linked to a large database. What used to take a week to compute now can be done in a morning," said Qin.

In addition to agriculture and industry, digital technology is also changing Heilongjiang's education, finance, medical care and many other industries. According to *Heilongjiang's Digital Economy Development Plan During the 14th Five-Year Plan Period*, by 2025, about 10 percent of the province's GDP will come from the added value of core industries in the digital economy, and the digital economy will achieve leapfrog development.

Researchers operate a hyperspectral drone at a smart agriculture demonstration zone in Heilongjiang province. The drone is like the CT examination in a hospital, which can take photos of farmland, and help spray fertilizer precisely. (PHOTO: VCG)

China's Space Station: New Home for Astronauts New Platform for Global Cooperation

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The two lab modules, Wentian and Mengtian, are also equipped with flexible solar wings, each pair twice as large as those on the core module. If fully unfolded, the wingspan of a pair of solar wings on Wentian is more than 55 meters, and the area of each solar wing is about 110 square meters, which is so far the largest in China.

The solar wings on Wentian are expected to generate an average of over 430 kWh of power daily, almost the consumption of an ordinary household in Beijing for one and a half months, and can provide sufficient energy for the operation of the space station, said Zhang Hao, designer of the space station system from China Aerospace Science and Technology Corporation.

During the operation of the space station, the manned spacecraft will transport crew members, while the cargo spacecraft will send supplies and experimental instruments and bring back waste to the earth.

Advanced physicochemical technologies for resource regeneration are also adopted, to facilitate recycling of resources and reduce the transportation costs of supplies.

Onboard environmental control and life support systems compromise functions including electrolytic oxygen generation, regenerative carbon dioxide removal, condensate collection and treatment, urine collection and treatment, therefore greatly reducing the supply of water resources and oxygen from Earth.

Space station for all

International collaboration has always been a significant part of the project.

The space station will be a port in space, capable of docking with multiple crewed and cargo spaceships, and will also be able to link with foreign spacecraft if they have a designated docking hatch.

The CMSA has signed agreements with the United Nations Office for Outer Space Affairs (UNOOSA) on space station cooperation and published an announcement of opportunity, inviting scientists from around the world to submit their research proposals for an opportunity to conduct their own experiments on board the Chinese station.

Nine international science experiments have been selected by CMSA for installation aboard Tiangong in the coming years.

It is an innovative and future-focused program to open up space exploration activities to all nations and to create a new paradigm in building capabilities in space science and technology, said UNOOSA.

The space station will also carry out technical cooperation in space debris monitoring, prevention and mitigation, and medical protection for long-term in-orbit astronauts.