Scooping a Treasure Chest Full of Lunar History

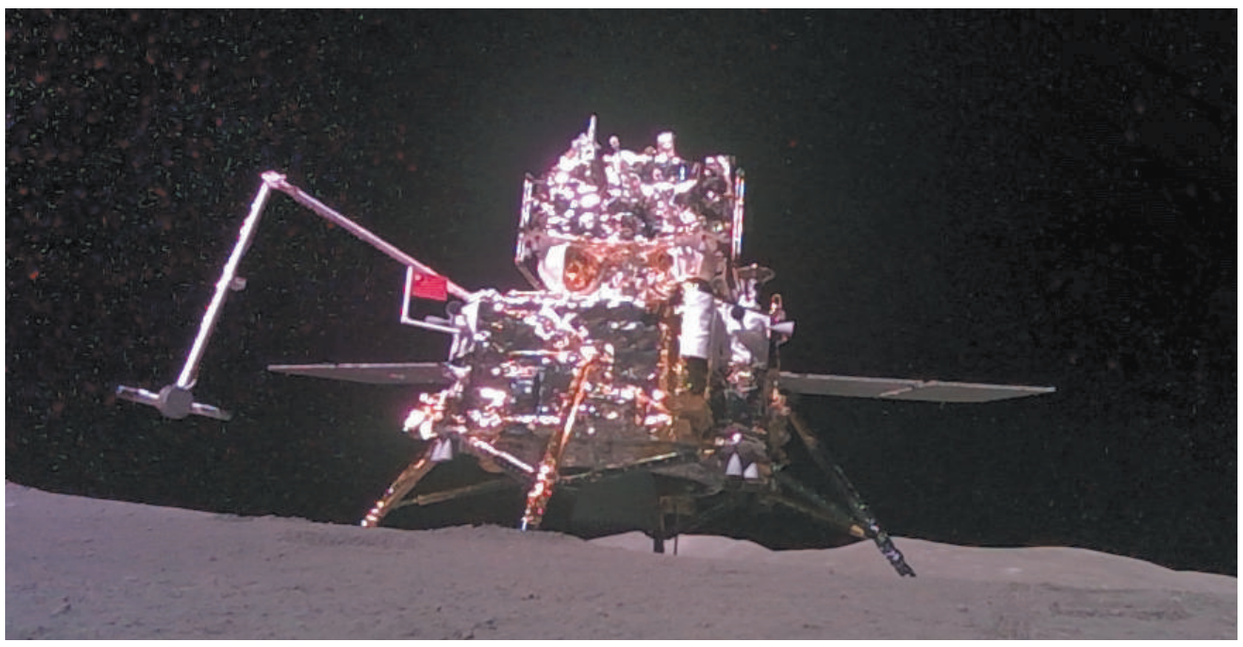
China's Lunar Mission Hailed by Int'l Scientific Community

Voice of the World

By Staff Reporters

On June 2, Chang'e-6 lunar mission made headlines after it successfully landed on the far side of the moon within the South Pole-Aitken Basin, the pre-selected area. The landing also elevates China's space power status in a global rush to the moon, said Reuters.

After collecting 2kg of rock samples, the Chang'e- 6 robotic moon- ascender lifted off from the lunar surface on June 4, and embarked on its much-awaited return to the Earth. Ahead of its takeoff, Chang'e 6 extended a robotic arm to raise the Chinese flag for the first time on the moon's far side. The flag, made of novel composite materials and special processes, can resist corrosion and the extreme temperatures on the lunar far side.



This photo taken and beamed back to Earth autonomously by a mini rover released from the lander-ascender combination of Chang'e-6 probe shows a view of the combination itself on the lunar surface, June 3, 2024. (PHOTO: China National Space Administration)

The historic mission has been celebrated by the international scientific community.

"This is a very important achievement," Professor Martin Barstow of the University of Leicester in the UK, told the *Guardian*. "It demonstrates an impressive capability in China's space programme. It's a technical feat to take off from the moon at all but even more challenging when carried out on its far side."

"Everyone is very excited that we might get a look at these rocks no one has ever seen before," Professor John Pernet- Fisher, a lunar geology specialist at the University of Manchester told the BBC. He said analyzing those samples could answer fundamental questions about how planets are formed.

In an article published by *Nature*, planetary geologist Jim Head at Brown University, in Providence, Rhode Island said the scientific value of Chang'e- 6 samples will be very high if successfully returned as they will be the first rocks ever retrieved from the moon's far side. "Obtaining dates and compositional information from many hundreds of fragments sampled by the Chang'e-6 drill and scoop is like having a treasure chest full of critical parts of lunar history, and will very likely revolutionize our view of the entire moon," said Head.

If everything proceeds as expected, the mission will offer China an untouched record of the moon's 4.5 billion-year history and provide new insights into the solar system's formation. Additionally, it will enable an unparalleled comparison between the dark, unexplored region and the moon's more familiar Earth-facing side, Reuters reported.

The mysterious lunar far side differs from the near side in many ways, making it impossible for lunar scientists to fully comprehend the moon as a whole planetary body without returned samples, Head, who has collaborated with Chinese scientists leading the mission, said to CNN. "Returned samples from Chang'e 6 will permit major strides to be made in solving these problems."

So far, Chang'e- 6 has completed one of the most challenging parts of the entire mission: rendezvous and docking of the ascender with the orbiter and transferring the samples.

"We planetary scientists are crossing fingers for the success of the rest of the mission," planetary scientist Michel Blanc at the Research Institute in Astrophysics and Planetology, in Toulouse, France, told *Nature*.

Comment

Overcapacity Claims a Factual Fallacy

By TANG Zhexiao

As China enjoys a boom in new energy and green manufactured goods, some countries have accused China of "overcapacity" in an attempt to distort the country's economic relations with the world and hamstring its development.

The so-called "overcapacity" is a fallacy and contrary to common sense, and is seriously inconsistent with objective facts. Those who think this way are trying to politicize economic and trade issues, and to impede global green transition with protectionism.

The Cambridge Dictionary describes "overcapacity" as "A situation in which an industry or a factory is producing more than it can sell." According to market principles, the balance of supply and demand is relative, and imbalance is the norm. That means overcapacity may occur in any economy that practices a market economy system. For example, Western countries have repeatedly encountered this problem in coal, steel, shale gas and other fields.

It is a common phenomenon globally that a nation's production capacity surpasses domestic demand. This "mirrors comparative advantages and results from [the] international division of labor and cooperation," according to He Hailin, an official with the Ministry of Industry and Information Technology.

Data from China's Ministry of Commerce shows that China's new energy vehicles (NEVs) exports of 1.2 million only account for 12.7 percent of its output, however about 80 percent of U.S.- produced chips are for export, and around 80 percent and 50 percent of the cars produced in Germany and Japan respectively are exported.

Why are Chinese NEV exports labeled as overcapacity, while in the same breath exports from developed countries are reasonable?

In fact, there is huge potential and shortage on the new energy demand rather than excess. The International Energy Agency (IEA) estimates that the global demand for NEVs will reach 45 million in 2030, 4.5 times that of 2022. And global demand for new PV installations will reach 820 GW, about four times that of 2022. Meanwhile, accelerating new energy technology and product upgrades and new models will continuously create new demand. The current production capacity is far from meeting market demand.

In the context of global green transition, the so- called "swamping the world market" with China's green production capacity is groundless.

"China possesses both the capability and responsibility to leverage its comparative advantages in the new energy industry, contributing Chinese technologies, products and solutions for the world," said Huo Fupeng, a National Development and Reform Commission official.

Since 2023, sales of Chinese NEVs in Nepal have repeatedly hit new heights, fully demonstrating the recognition of Chinese NEVs' technological innovation and driving quality by more and more Nepali consumers, said Chen Song, Chinese Ambassador to Nepal. Chinese brands such as BYD and Chang'an, have become the top choice for Nepali consumers when purchasing NEVs, said Chen.

Besides supporting the stability of the global industrial chain, China has been sharing advanced green technologies with the world.

For example, new energy has remained an important part of China-Africa cooperation. In recent years, China has built numbers of new energy generation plants in African countries, which puts them on a path of achieving clean energy sufficiency and green development.

One such initiative is the Chinese-developed De Aar Wind Farm in South Africa. The project has supplied 760 million kilowatt- hours of clean electricity annually for about 300,000 households, reducing nearly 62,000 tons of carbon emissions each year.

Facts show that neither exports nor supply chain reasoning are valid in the "overcapacity" claim. What is truly in excess is not China's new energy production capacity, but the attempts of those who resort to protectionism and suppress the development of other countries.

China Leads Global NEV Trend

Opinion

By LIN Yuchen

On May 14, Leapmotor International, a joint venture between Leapmotor and Stellantis, the world's fifth- largest automotive group, officially commenced operations. In just four months, Leapmotor will market two pure electric vehicle (EV) models across nine European countries, including France, Italy and Germany. Additionally, on May 20, SAIC Motor Corporation and Audi launched a collaborative effort to develop a smart EV, with the first model expected to hit mass production in 2025.

These strategic partnerships highlight the international recognition of China's core EV technologies and model development capabilities, underscoring China's leadership in the global EV industry.

Over the past decade, China has seized opportunities in electrification, intelligence, and connectivity within the automotive sector. The strategic vision and robust industrial policies have spurred technological, product, and business model innovations, propelling China to new heights in automotive manufacturing. By 2023, China's annual new energy vehicle (NEV) sales reached 9.495 million units, a 126- fold increase from 2014, capturing over 60 percent of the global market and maintaining the world's top spot for nine consecutive years. NEVs now constitute 31.6 percent of China's total new car sales, demonstrating significant market penetration and consumer acceptance.

The comprehensive policy measures implemented over the recent past have established a well- coordinated industrial, market, and ecological system. More and more people are purchasing the NEVs, not only because of their low-carbon nature, but also having been attracted by their designs and advanced features.

In addition, the financial incentives, such as exemption from purchase tax and substantial savings on license fees, have made electric cars a cost-effective choice for many Chinese consumers. By mid- April 2023, the penetration rate of NEVs in China's passenger car market exceeded 50 percent, achieving the target 11 years ahead of schedule.

A decade ago, the landscape was starkly different. NEVs faced numerous challenges, including immature technology, battery safety concerns, high production costs, and insufficient charging infrastructure. Despite these obstacles, China and Western countries started almost on an equal footing in the race towards automotive electrification. The substantial achievements of China's NEV industry can be attributed to the unwavering strategic commitment, forward- looking policies, proactive infrastructure development, and relentless technological innovation by the industry and enterprises.

At the China Electric Vehicle 100 Forum (2024) held in March, its vice president and secretary- general, Zhang Yongwei, publicly stated that in 2024, China's Plug- in hybrid electric vehicles will contribute one- third of new energy vehicle sales.

Take BYD's fifth- generation DM technology, for example. Thanks to the electric- based power architecture, full temperature domain vehicle thermal management architecture, and intelligent power integration electronic and electrical architecture, the overall fuel consumption is reduced, and battery power is increased.

"The world's most advanced plug-in hybrid technology is in China, [and] the global plug- in hybrid has entered the Chinese moment," BYD President Wang Chuanfu said at the forum. According to him, in 2023, China's plug- in hybrid sales grew 85 percent year- on-year, and has become highly sought after in the new energy market. Currently, of every four plug-in hybrids sold globally, three are Chinese brands.

Moreover, China's charging infrastructure has seen remarkable advancements. By the end of 2023, the country had built the world's largest and most comprehensive charging network, with 8.596 million charging facilities, including 3,567 battery swapping stations. The integrated development of the power battery recycling industry has further strengthened the NEV ecosystem, with over 150 licensed recycling enterprises and more than 10,000 recycling service points nationwide.

Innovation remains at the core of China's NEV strategy. Companies like Chery, with its extended- range engine achieving 44.5 percent thermal efficiency, and BYD, with its fifth- generation DM technology, exemplify breakthroughs in long- range plug- in hybrid solutions. These innovations address consumer concerns about range anxiety and charging convenience, ensuring sustained market growth.

The integration of AI in NEVs represents another frontier of innovation. The application of AI models exemplifies the rapid advancement in intelligent vehicle technologies. China's NEV industry also leads in smart cockpit and autonomous driving technologies, with 56.2 percent of new NEVs equipped with L2 or higher autonomous driving features, according to recent data from the China Association of Automobile Manufacturers.

Visitors gather around an electric vehicle at the 2024 Hohhot International Auto Show on June 7. (PHOTO: XINHUA)

Embracing High-end, Intelligent Manufacturing

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Advancing digital and smart manufacturing

Intelligent manufacturing integrates a new generation of information technology and manufacturing. The 2024 Government Work Report promised China will digitalize the manufacturing sector and fast-track large- scale application of industrial internet, promoting the digitalization of the service sector.

At the Shaanxi Zizhao Equipment Co., digitalization and intelligent technology is used in all aspects of production management, Zhao Yongchao, deputy general manager of the company, told *Science and Technology Daily*.

In the company's workshop, laser equipment precisely cuts thick steel plates within minutes, a remarkable improvement over traditional methods. "This is one of the results of our drive to transform into intelligent manufacturing and build digital factories," Zhao said.

Acquiring new industry advantages

China's high-tech zones are generating scale effects and competitive advantages, such as collaborative innovation, talent aggregation, cost reduction, and efficiency enhancement.

The Shanghai Zizhu National High-tech Industrial Development Park is a hub of global strategic emerging and high- end industries, attracting many multinationals to build their R&D headquarters in it and high- end intelligent manufacturing enterprises to settle in. Currently, it has over 7,300 enterprises and over 500 foreign-funded enterprises.

It has attracted a total foreign investment of 9.44 billion USD, has a registered capital of 7.04 billion USD, and contracted foreign capital of 6.198 billion USD, all of which have combined to make it a powerful new quality productive industrial cluster.

Wearing Contact Lenses to Control Objects

Hi! Tech

By ZONG Shihan

After putting on your contact lenses you now only need to move your eyes to control smart devices such as mobile phones to input text, draw, play games, and perform other touchless actions.

This innovation is down to work by a research team from Nanjing University, Nanjing University of Aeronautics and Astronautics, and Jiangsu Province Hospital, who recently developed a kind of contact lens with eye-tracking capabilities. This contact lens has broad application prospects, including rehabilitation assistance for the disabled, medical diagnosis and treatment, and psychological research.

The smart contact lens is similar to the commonly used contact lenses on the market in terms of material, both using medical-grade silicone rubber material with a thickness of approximately 100 micrometers. Its uniqueness lies in the four evenly distributed golden coils on the lens. These coils are radio frequency (RF) chips which are the core of eye movement perception.

The innovation of this smart contact lens lies in its ability to track eyeball movement trajectories and recognize eye movement commands with high precision through the built- in RF chip.

Meanwhile, it works collaboratively with a set of wireless RF devices , which are similar to card readers on buses and can send RF signals to the RF chip. When the eyeball moves, the frequency and intensity of the signal reflected back by the RF chip will change. By analyzing these signal data, the movement trajectory of the eyeball can be accurately tracked.