Parallel Session on New Energy Storage Driving Future Energy Transformation

【Basic Information】

Moderator:

Sha Chen	News Program Host and Commentator at China Media Group

Opening Remarks:

Chen Wenkai	Vice President of Institutes of Science and Development, Chinese Academy of Sciences

Address:

Ren Jingdong	Deputy Director of the National Energy Administration of China
Laureano Ortega Murillo	Presidential Advisor for the Promotion of Investment, Trade and International Cooperation, Nicaragua

Keynote Speech:

Huang Zhen	Academician of the Chinese Academy of Engineering, Chair Professor of Shanghai Jiao Tong University
Niu Dongxiao	Academician of the International Eurasian Academy of Sciences Deputy Director of the Academic Committee of North China Electric Power University Distinguished Professor of the Changjiang Scholars Program
Li Zhong	Academician of the International Eurasian Academy of Sciences Chief Engineer at the CNOOC Research Institute Co., Ltd. Fellow of the Chinese Petroleum Society
Stanley Whittingham	Nobel Laureate in Chemistry in 2019
Zhao Tianshou	Academician of the Chinese Academy of Sciences, Director of the Energy Institute for Carbon Neutrality at Southern University of Science and Technology

Panel Discussion:

Hazem Ben-Gacem	Chief Executive of BlueFive Capital Vice Chairman of Investcorp Capital Executive Board Member of Harvard University School of Government
Wang Shaowu	Vice President, China Southern Power Grid
Shi Xiaofeng	Vice President of Sungrow, PV & Storage Business Group
Brian Joe	Emerson Vice President of Asia Pacific
Xiao Liye	Director of the Key Laboratory of Applied Superconductivity, Chinese Academy of Sciences; Director of Energy Storage Technology Research Department, Institute of Electrical Engineering of Chinese Academy of Sciences
Wang Peng	Executive Dean of the National Energy Development Strategy Research Institute, North China Electric Power University

【Brief Introduction】

On November 5, 2024, the Parallel Session on New Energy Storage Driving Future Energy Transformation of the 7th Hongqiao International Economic Forum (HQF), hosted by the Ministry of Commerce of China, organized by the Institutes of Science and Development of the Chinese Academy of Sciences and The Paper, was held at National Exhibition and Convention Center (Shanghai). Ren Jingdong, Deputy Director of the National Energy Administration of China, and Laureano Ortega Murillo, Presidential Advisor for the Promotion of Investment, Trade and International Cooperation of Nicaragua addressed the session. Stanley Whittingham, Nobel Laureate in Chemistry in 2019 and academicians from the Chinese Academy of Sciences and the Chinese Academy of Engineering delivered keynote speeches on lithium battery systems, electrofuel synthesis technology, flow battery technology, new-type power system operations, and marine carbon-neutral technologies in energy transition. In Panel Discussion section, representatives from well-known domestic and international companies, as well as academic representatives and other heavyweight guests, shared brilliant insights on issues such as the development of energy storage technology, energy investment and electricity markets, integration of new energy and energy system security, construction of new-type power systems, and future energy development.


第七届虹桥国际经济论坛
THE SEVENTH HONGQIAO INTERNATIONAL ECONOMIC FORUM (HQF)
新型储能驱动未来能源变革
NEW ENERGY STORAGE DRIVING FUTURE ENERGY TRANSFORMATION
主办单位：商务部
Hosted by: Ministry of Commerce of the People's Republic of China
承办单位：中国科学院科技战略咨询研究院 澎湃新闻
Organized by: Institutes of Science and Development, Chinese Academy of Sciences The Paper
2024年11月5日
November 5th, 2024
中国·上海
Shanghai, China

【Opening Remarks】

Chen Wenkai, Vice President of Institutes of Science and Development, Chinese Academy of Sciences, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and delivered Opening Remarks

Chen Wenkai, Vice President of Institutes of Science and Development, Chinese Academy of Sciences, stated that the development of new energy storage has broad prospects. The iterative progress of energy storage technology will effectively promote the open and shared consumption of energy production, realize multi-energy coordination, support the construction of the energy internet, and facilitate the development of new energy industries. It has become an important area for countries around the world to compete for leadership in energy strategy and equipment manufacturing. In recent years, China's new energy storage industry has made significant progress in areas such as technology and equipment research and development, demonstration project construction, business model exploration, and policy system development. The market application scale has been steadily expanding, and its role in supporting the energy transition has become increasingly evident.

【Address】

Ren Jingdong, Deputy Director of the National Energy Administration of China,
addressed the Parallel Session on New Energy Storage Driving Future Energy Transformation

Ren Jingdong, Deputy Director of the National Energy Administration of China, pointed out that the parallel session on energy at the 7th HQF reflects the global concern about energy transition and development. China has made breakthrough progress in new energy, providing a new feasible way for the development of China's energy security. However, this progress has also brought new challenges to the safe and stable operation of the power system, necessitating the accelerated development of power system regulation capabilities, represented by new energy storage. China supports the diversified and high-quality development of new energy storage. By the end of September, China had built a total installed capacity of over 58 million kilowatts of new energy storage. New energy storage technologies continue to innovate, and the level of deployment and operation is steadily improving. The efficiency of energy storage continues to increase, making it an important component of the power system and one of the driving forces for the development of new quality productive forces.

Laureano Ortega Murillo, Presidential Advisor for the Promotion of Investment, Trade and International Cooperation of Nicaragua, addressed the Parallel Session on New Energy Storage Driving Future Energy Transformation

Laureano Ortega Murillo, Presidential Advisor for the Promotion of Investment, Trade and International Cooperation of Nicaragua, pointed out that new energy is a strategic priority for the Nicaraguan government. Nicaragua is a successful model of energy transition in Latin America. The country has extensive cooperation with China in the energy sector, including photovoltaic energy projects, large hydropower projects, and power transmission infrastructure, which have significantly enhanced Nicaragua's energy supply capacity and promoted sustainable energy development. Nicaragua firmly supports the global cooperation initiatives proposed by President Xi Jinping, such as the Belt and Road Initiative, and is willing to further deepen cooperation with China to jointly promote the building of a community with a shared future for mankind.

【Keynote Speech】

Huang Zhen, Academician of the Chinese Academy of Engineering and Chair Professor of Shanghai Jiao Tong University, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and delivered a keynote speech

Huang Zhen, Academician of the Chinese Academy of Engineering and Chair Professor of Shanghai Jiao Tong University, pointed out that with the rapid growth of renewable energy generation capacity in China, there is a significant surplus of electricity during periods of low demand and peak wind and solar power generation. Power-to-fuel technology is a key method for converting this surplus green power into storable energy. This technology not only enables the effective storage and consumption of renewable energy but also advances the energy decarbonization. The fundamental logic of the green energy transition is as follows: On the supply side, an increasing amount of renewable energy provides zero-carbon electricity, while backup energy sources are used to ensure stability and overcome the volatility and unpredictability of renewable energy, such as“fossil energy + CCUS” (CCUS refers to carbon capture, utilization, and storage) and nuclear power. On the demand side, the key is electrification. After a large supply of green electricity is available, re-electrification takes place, replacing coal with electricity and gas with electricity, achieving the “three substitutions”: green electricity replacing gray electricity, green fuels replacing non-renewable fuels, and green raw materials replacing non-renewable raw materials. Power-to-fuel technology is expected to achieve large-scale commercial applications by 2030.

Niu Dongxiao, Academician of the International Eurasian Academy of Sciences, Deputy Director of the Academic Committee of North China Electric Power University, and Distinguished Professor of the Changjiang Scholars Program, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and delivered a keynote speech

Niu Dongxiao, Academician of the International Eurasian Academy of Sciences, Deputy Director of the Academic Committee of North China Electric Power University, and Distinguished Professor of the Changjiang Scholars Program, pointed out that the operating model of the power system is shifting from "generation follows load" to a diversified interaction of "generation-grid-load-storage." By precisely controlling the load and storage in the power system through "generation-grid-load-storage," three key benefits can be achieved: Improving the stability and flexibility of the new power system, reducing energy losses and costs while improving energy utilization efficiency, and facilitating the integration of centralized and distributed energy sources. With the rise of the new power system, at least five industries are expected to reach trillion-yuan scales, including the wind power industry, the photovoltaic industry, the energy storage industry, the new energy vehicle industry, and the advanced grid industry, which includes ultra-high-voltage grids, microgrids, smart grids, and the energy internet.

Li Zhong, Academician of the International Eurasian Academy of Sciences, Chief Engineer at the CNOOC Research Institute Co., Ltd., and Fellow of the Chinese Petroleum Society, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and delivered a keynote speech

Li Zhong, Academician of the International Eurasian Academy of Sciences, Chief Engineer at the CNOOC Research Institute Co., Ltd., and Fellow of the Chinese Petroleum Society, pointed out that there are currently 65 commercial CCUS (Carbon Capture, Utilization, and Storage) projects worldwide, most of which are land-based, with very few offshore projects. However, the potential of offshore CCUS is immense. China's first offshore million-ton CO2 storage demonstration project was successfully implemented at CNOOC's Enping 15-1 oil platform, showcasing advancements in this technology. The main methods for offshore CCUS include enhanced oil and gas recovery, development of methane hydrates, and solid-state CO2 hydrate storage. CO2 hydrate storage has a massive storage capacity and is relatively easy to form; one cubic meter of CO2 hydrate can store 184 cubic meters of CO2, offering a new approach to cost-effective deep-sea storage and applications. The abundant resources of offshore wind, solar, tidal, and temperature differential energy, along with local storage and utilization, will inevitably support deep-sea exploration and development activities and be key to the future development of new deep-sea energy.

Stanley Whittingham, Nobel Laureate in Chemistry in 2019,
attended via video the Parallel Session on New Energy Storage Driving Future Energy Transformation
and delivered a keynote speech

Stanley Whittingham, Nobel Laureate in Chemistry in 2019 and professor at Binghamton University in New York, emphasized that while the cost of renewable energy has decreased, its intermittent nature highlights the need for energy storage technologies, with batteries being the most flexible solution. Given the abundance of global lithium resources, the advantages of layered oxide NMC and lithium iron phosphate (LFP) as cathode materials, and the importance of localizing supply chains and improving production efficiency, lithium battery systems will continue to dominate the market in the next 5 to 10 years due to their scales and cost advantages. Other systems, such as sodium-based batteries and fuel cells, have potential in specific fields but are unlikely to compete with lithium batteries. Battery manufacturing should focus on the entire battery ecosystem, tracing the extraction of raw materials, reducing the use of toxic substances, phasing out carbon-based heating technologies in mining, and improving the systematic management and recycling of battery manufacturing materials.

Zhao Tianshou, Academician of the Chinese Academy of Sciences and Director of the Energy Institute for Carbon Neutrality at Southern University of Science and Technology, attended via video the Parallel Session on New Energy Storage Driving Future Energy Transformation and delivered a keynote speech

Zhao Tianshou, Academician of the Chinese Academy of Sciences and Director of the Energy Institute for Carbon Neutrality at Southern University of Science and Technology, emphasized that achieving carbon neutrality is fundamentally about the energy transition. The slower-than-expected progress in the energy transition is constrained by the uncontrollability of renewable energy, which requires long-duration and high-security energy storage technologies. China's energy storage market is dominated by pumped hydro storage and lithium-ion battery storage. While new energy storage technologies are experiencing rapid growth in cumulative installed capacity, their utilization rates remain low. This is primarily due to the immaturity of existing storage technologies, which face challenges such as safety concerns, geographical and duration limitations, and particularly the lack of long-duration storage solutions. Large-scale energy storage technologies should meet three key criteria: Safety and reliability, economic feasibility, and resource accessibility. Flow batteries, as an emerging energy storage technology, offer intrinsic safety, flexible duration, ease of scaling, long cycle life, and broad applicability, making them a critical breakthrough for the future of long-duration energy storage.

【Panel Discussion】

Sha Chen, News Program Host and Commentator at China Media Group,
moderated the Parallel Session on New Energy Storage Driving Future Energy Transformation

Hazem Ben-Gacem, Chief Executive of BlueFive Capital, Vice Chairman of Investcorp Capital, Executive Board Member of Harvard University School of Government, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Hazem Ben-Gacem, Chief Executive of BlueFive Capital, Vice Chairman of Investcorp Capital, and Executive Board Member of Harvard University School of Government, noted that global investment in renewable energy is substantial and is driving significant momentum in the transformation of the energy market. China, Europe, and the United States are leading sources of renewable energy investment, while the Middle East and Asia are also seeing robust new energy capital investment activity. Over the past two centuries, fossil fuels have propelled human development, and carbon investments will continue to play an important role for the next 30 years. Investors are also keeping a close eye on nuclear energy, which will contribute to the energy mix in the future.

Wang Shaowu, Vice President, China Southern Power Grid,
attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Wang Shaowu, Vice President and Party Member of China Southern Power Grid, stressed that energy storage is a critical strategic technology for achieving dual carbon goals. The large-scale development and utilization of renewable energy are inseparable from energy storage; they are two sides of the same coin. From the user perspective, electrochemical energy storage is on the verge of a breakthrough that will accelerate rapidly, but requires government support to promptly establish a market-based value framework for new energy storage technologies. In the near future, we will enter “uncharted territory,” where traditional power system principles will no longer apply, and our capacity to assess grid stability will diminish. Addressing this challenge will require collaborative efforts among users, grid operators, power producers, and energy storage suppliers.

Shi Xiaofeng, Vice President of Sungrow, PV & Storage Business Group,
attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Shi Xiaofeng, Vice President of Sungrow, PV & Storage Business Group, said that with the large-scale and high-proportion integration of renewable energy into the grid, energy storage should not only focus on the deep integration of "three-electric fusion" (power electronics, electrochemical storage, and grid support technologies) and ensure safety thresholds but also take on new functions such as "grid formation" to support the new "generation-grid-load-storage" power system. Sungrow has been exploring energy storage technologies since 2006 and continues to innovate, developing diversified technologies such as 6D cell AI detection, high-current AI arc extinguishing monitoring, and "network-tailored, one network, one strategy" grid formation solutions. These efforts have accumulated extensive case experience, supporting projects such as the largest single-unit power station in China, the Tuogeruoge 1GWh shared energy storage station in Qinghai, China's first "generation-grid-load-storage" leading demonstration power station, Shenneng Zhongkai 120MWh Power Station in Jiezechaka, Xizang, and the world's largest 7.8GWh energy storage project in Saudi Arabia.

Brian Joe, Emerson Vice President of Asia Pacific,
attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Brian Joe, Emerson Vice President of Asia Pacific, said that hydrogen energy has immense potential but operates under demanding conditions and still faces a range of research and development challenges. Solutions should address issues such as reliability and safety. Emerson remains optimistic about the future of hydrogen energy and works closely with customers and regulatory bodies to ensure solutions comply with regulations and meet future challenges. Emerson is committed to providing automation and software technologies to meet the market's demand for safer, more reliable, and cost-effective energy storage devices. The company has launched the Ovation ™ Green solution, which is designed to support the development of energy storage batteries for renewable energy systems and facilitate the transformation of the power sector, enabling remote monitoring and management of power plants.

Xiao Liye, Director of the Key Laboratory of Applied Superconductivity, Chinese Academy of Sciences; Director of Energy Storage Technology Research Department, Institute of Electrical Engineering of Chinese Academy of Sciences, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Xiao Liye, Director of the Key Laboratory of Applied Superconductivity, Chinese Academy of Sciences, and Director of the Energy Storage Technology Research Department, Institute of Electrical Engineering of Chinese Academy of Sciences, noted that photovoltaic power generation has already achieved a relatively low cost per kilowatt-hour. The development of new photovoltaic fuels is expected to further reduce these costs. In the future, renewable energy at a few cents per kilowatt-hour is not just a dream. However, the large-scale integration of renewable energy hinges on resolving two critical issues: First, the power grid should have sufficient capacity, and the pace of grid construction should match the rapid development of renewable energy; second, energy storage should be supported at the source to make the characteristics of renewable energy equivalent to, or even surpass, those of coal-fired power. He emphasized that physical energy storage technologies, such as pumped storage and compressed air energy storage, hold significant promise and are likely to account for a large share of electricity storage in the future.

Wang Peng, Executive Dean of the National Energy Development Strategy Research Institute, North China Electric Power University, attended the Parallel Session on New Energy Storage Driving Future Energy Transformation and participated in Panel Discussion

Wang Peng, Executive Dean of the National Energy Development Strategy Research Institute, North China Electric Power University, stated that the priority in power market reform should address market access issues, and allow diverse elements such as wind and solar resources, independent energy storage, and microgrids to be integrated into the market. Currently, market access is primarily granted to coal-fired power, while wind and solar resources are allowed but are price takers, and users are also price takers. Virtual power plants have been developed during the 14th Five-Year Plan period, and in the next three to five years, market-oriented virtual power plants will be widely used, aggregating user resources to participate in wind and solar energy regulation. After 2030, virtual power plants will enter the autonomous dispatch stage and achieve self-dispatch capability through the existing 5G grid scheduling system. He believes that in the future, integrated energy will be ubiquitous, ushering in an era where users become producers and consumers; energy will be "rural-based," with the majority of energy being primarily supplied by rural areas, requiring energy storage and integrated measures to unleash the energy potential of rural areas.