

● DECEMBER 2023



CHINA ENERGY POLICY NEWSLETTER

China Energy Transformation Programme

1. Programme updates

China Energy Transformation Outlook 2023 (CETO 2023) is ready for download

The complete Chinese and English reports of the China Energy Transformation Outlook 2023 (CETO 2023) have now been released and are available to download from the [CET website](#). The 2023 version of the CETO 2023 analysis shows how China can reach the carbon peak and carbon neutrality targets and comply with the Paris Agreement targets with high energy security throughout the energy transformation process and a focus on optimal strategies and choices to attain a cost-efficient transformation.

This report examines potential trajectories for China's future energy transformation by establishing a baseline scenario and analysing two carbon-neutral scenarios. The purpose of the scenarios is to showcase different pathways to reach the targets and the different technology options for the future energy system.

In addition to the scenario analyses, the CETO 2023 report includes several thematic analyses on energy security, carbon pricing, methane emission and experiences from concrete project implementation. The report also summarises the experiences of the Danish energy transformation as part of the international cooperation and partnership between the Energy Research Institute (ERI) and the Danish Energy Agency.

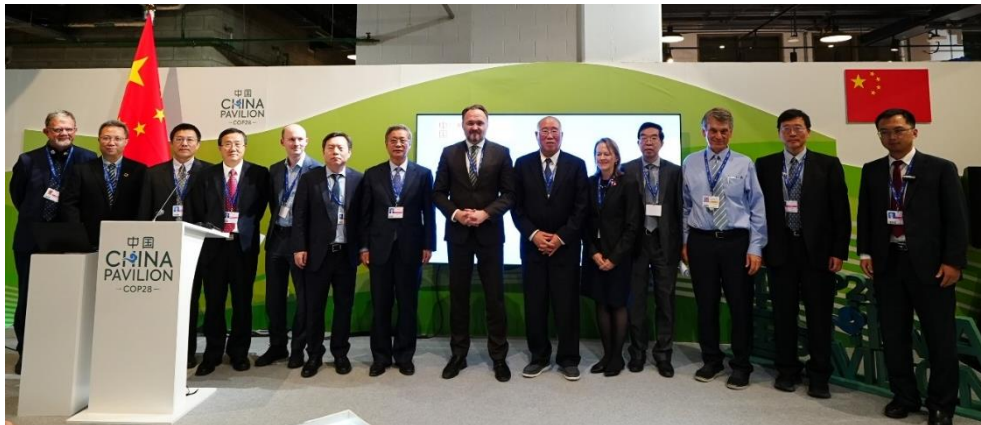
The China Energy Transformation Outlook is a think-tank research report exploring pathways to achieve carbon neutrality. It is updated and released annually based on the actual development of the previous year and the latest assessment of future technologies. The report aims to be used as part of the research background for the short-term policy-making process in China and internationally for a more sustainable, prosperous, and secure future for all.



CETO 2023 released at COP28

Dubai, UAE – In a significant gathering at the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28), the China Pavilion hosted a 'China Pavilion' side event titled *Jointly Shaping a Resolute Future for Global Energy Transformation*, marking the debut of the *China Energy Transformation Outlook 2023* (CETO 2023). This pivotal event, held on the evening of December 9, was a collaborative effort between the Energy Research Institute of the Chinese Academy of Macroeconomics Research (ERI of AMR) and the College of Smart Energy at Shanghai Jiao Tong University (SJTU) and State Power Investment Company (SPIC).

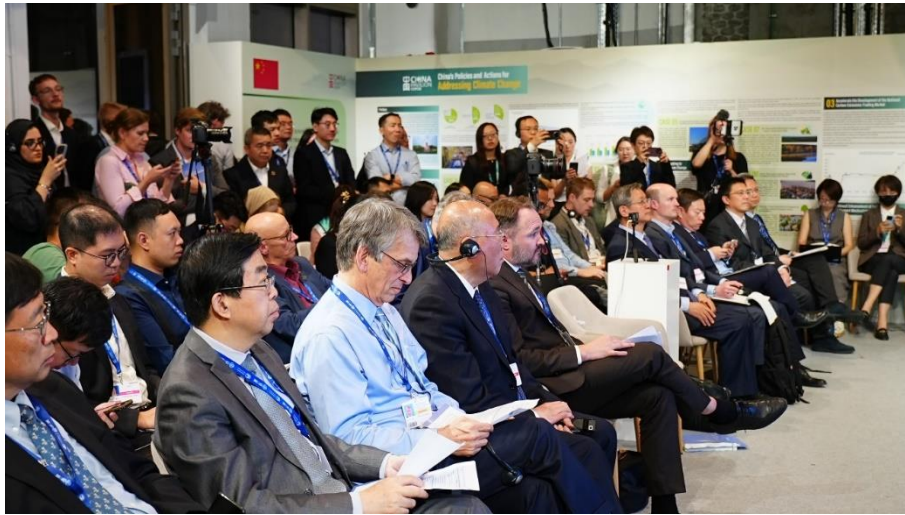
Notable attendees included Xie Zhenhua, China's Special Envoy for Climate Change; Dan Jørgensen, Minister for Development Cooperation and Minister for Global Climate Policy of Denmark; Mary Burce Warlick, Deputy Executive Director of International Energy Agency (IEA); Wang Hao, Deputy Division Head of the Promotion Division of Department of Resource Conservation and Environmental Protection of the National Development and Reform Commission (NDRC), Academician Huang Zhen, Dean of College of Smart Energy at SJTU & SPIC, and Hongpeng Lei, Global Director, Climate, the Children's Investment Fund Foundation (the United Kingdom) (CIFF). ERI Director General Lyu Wenbin chaired the meeting. Additionally, experts from Columbia University, the Danish Ministry of Climate, Energy and Utilities, UNFCCC Climate Champions, CIFF, Chinese Academy of Sciences (CAS), SJTU, China Circular Economy Association, Chinese Academy of Macroeconomic Research and several other esteemed institutions contributed their insights.



Attending leaders and experts



ERI Director General Lyu Wenbin chairs the meeting



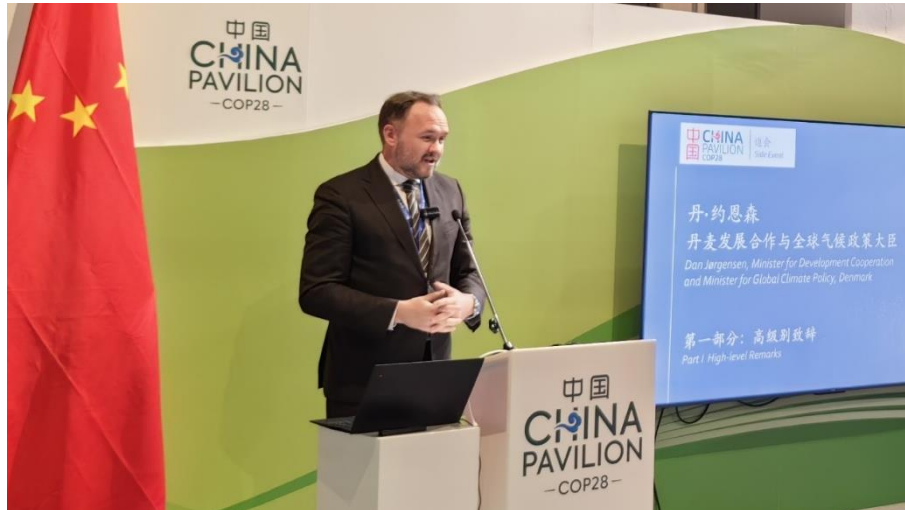
Meeting scene



Xie Zhenhua, China's Special Envoy for Climate Change, delivers a speech

In his speech, Special Envoy Xie Zhenhua pointed out that the energy sector is the most important source of greenhouse gas emissions, and there is an urgent need to accelerate the global energy transformation. He said that China is exploring a new green and low-carbon growth path and continues to make great efforts to promote the transformation of fossil energy. The installed capacity of renewable energy power generation nationwide has exceeded 1,400 GW, accounting for about half of the total installed power generation capacity. Additionally, new energy vehicle production and sales have ranked first worldwide for eight consecutive years, with ownership exceeding half of the global total. China also boasts the world's largest number, widest service coverage, and most comprehensive variety of charging and battery swap infrastructure. Furthermore, the energy efficiency levels of key industries, such as coal-fired power generation and electrolytic aluminium, have entered the world's advanced ranks.

Special Envoy Xie Zhenhua said that the CETO 2023 is an example of China-Denmark and China-US partnerships. He emphasised that it is crucial to explore optimal transformation pathways suited to each country's national conditions and form an inclusive, pragmatic, and feasible consensus on energy transformation. He hoped the think tank experts would conduct an in-depth analysis of global, common, systemic, and challenging issues and propose forward-looking and innovative energy transformation solutions. These efforts are aimed to help promote the full implementation of the *Paris Agreement* and contribute wisdom and strength to the global green and low-carbon transition.



Dan Jørgensen, Minister for Development Cooperation and Minister for Global Climate Policy of Denmark, delivers a speech

Dan Jørgensen, Minister for Development Cooperation and Minister for Global Climate Policy of Denmark, said that achieving the 1.5°C target requires the world to increase climate ambitions. Denmark has decided to advance its climate neutrality target to 2045 and has legally clarified the annual progress obligations towards the target. He pointed out that the green energy transformation must be a global effort, and China plays a vital role. China is actively promoting the realisation of this vision. As an important outcome of inter-governmental cooperation between China and Denmark, CETO 2023 depicts China's energy transformation path. It points the way forward to achieve the carbon neutrality target.

Mary Burce Warlick, Deputy Executive Director of the IEA, introduced the IEA's latest research findings on the roadmap for achieving near-zero emissions in the global energy sector. She pointed out that a new clean energy economy is emerging rapidly, and China is a major contributor to accelerating this process. In 2022, China's investment in clean energy accounted for about half of the global total, with approximately half of the global new installed capacity in solar PV and wind power, and over half of the global sales of electric vehicles. She said that developed economies and China have the opportunity to jointly lead global progress by accelerating domestic clean energy transformation efforts.

Wang Hao, Deputy Division Head of the Promotion Division of the Department of Resource Conservation and Environmental Protection, NDRC, said that energy transformation is China's most important climate action measure, but at the same time, it is a complex system-wide project. He emphasised that the increase in the proportion of renewable energy will bring considerable challenges to grid safety and stability. The UN Sustainable Development Goals suggest that everyone should access affordable, reliable, and sustainable modern energy, with affordability and reliability equally important, especially for developing countries. He said that China will focus on measures in three areas: technological innovation, improvement of mechanisms and business models, and strengthened supervision, to accelerate the construction of a clean, low-carbon, safe, and efficient energy system.

Academician Huang Zhen, Dean of College of Smart Energy at SJTU & SPIC, said that China's energy transformation faces tremendous challenges and will not happen overnight, but needs to proceed step by step with a strategy of 'establishing first and then breaking'. The design of energy transformation pathways needs to be based on multiple aspects, such as policies and laws, technology, and markets. It is important to accelerate the construction of the 'dual carbon' legal system, vigorously promote innovation in low-carbon, zero-carbon, and negative carbon technologies, and energy revolution, and give full play to the role of the market in allocating resources.

Hongpeng Lei, Global Director, Climate, CIFF, said that the climate crisis is a common challenge facing all mankind, and he hopes that the world will work together to achieve net zero emissions. He pointed out that China has made remarkable progress in renewable energy development. In the first three quarters of 2023, China's newly added renewable energy installed capacity nearly doubled year-on-year, and China's future dependence on fossil energy will be further reduced. CETO 2023 depicts the path for China's energy transformation. He said that CIFF is very pleased to cooperate with the project team and looks forward to more future energy transformation exchanges.

In the thematic report session, Bai Quan, Director of the Energy Efficiency Research Centre of the ERI of AMR, introduced the key research findings of CETO 2023. David Sandalow, inaugural Fellow at the Center on Global Energy Policy (CGEP), Columbia University, presented on the US energy policy. Christian Stenberg, Deputy Permanent Secretary of the Danish Ministry of Climate, Energy and Utilities, introduced Denmark's energy transition, highlighting the country's efforts to accelerate the transition to a climate-neutral society.



Bai Quan, Director of Energy Efficiency Research Centre, ERI, introduces key findings of CETO 2023



David Sandalow, Inaugural Fellow, Center on Global Energy Policy of Columbia University, delivers a speech

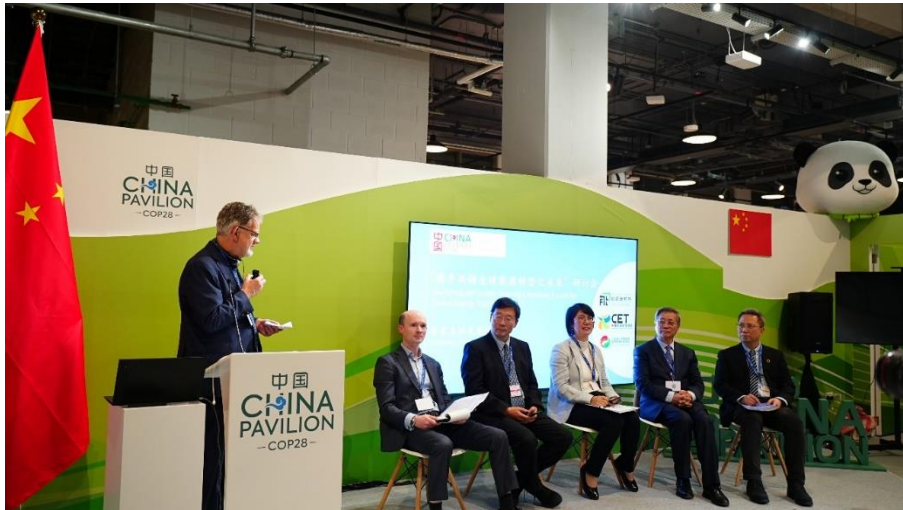


Christian Stenberg, Deputy Permanent Secretary, Danish Ministry of Climate, Energy and Utilities, delivers a speech

CETO 2023 delineates the strategic imperatives for attaining the scheduled peak in carbon dioxide emissions and carbon neutrality, adhering to the tenets of the *Paris Agreement*. The report focuses on the analysis and elucidation of maintaining energy security amidst a low-carbon energy transition, simultaneously navigating the optimal path for enhanced cost-effectiveness. The report delves into various energy transition pathways, articulated through a baseline scenario (BLS) and two visionary carbon neutrality scenarios (CNS1 and CNS2). It presents a spectrum of potential technological choices for future energy systems, reflecting a forward-looking perspective. Beyond mere scenario analysis, CETO 2023 offers in-depth examinations of pivotal areas such as energy security, carbon pricing, methane emission control, and practical insights from specific project implementations. As a testament to international cooperation between the ERI and the Danish Energy Agency (DEA), the report also integrates Denmark's robust experience in energy transition.

CETO 2023 culminates in a pivotal conclusion: the green and low-carbon transformation of the energy system can ensure China's carbon neutrality before 2060. Under the envisioned carbon neutrality scenarios, China navigates an innovative green and low-carbon development trajectory. This trajectory is marked by a continual enhancement of industrial capabilities and competitiveness in low-carbon development, a steady augmentation in energy efficiency, and an expanding application and prevalence of green electricity, green hydrogen, and electrically produced liquid fuels. The report anticipates a transformative shift in energy demand and production structure.

At the core of the transition path lies the continuous improvement of energy efficiency and electrification rates, serving as the critical groundwork for attaining carbon neutrality. The report underscores that deep decarbonisation of the energy structure and an accelerated transition to non-fossil energy sources is vital for realising net-zero emissions within the energy system. Furthermore, the rapid development and integration of renewable energy sources significantly hastens the establishment of a new-type power system. In this emerging landscape, new-type energy storage technologies, demand-side response mechanisms, and intelligent grid systems play a crucial role in ensuring the stability and security of the power infrastructure. The report also anticipates a strategic shift in the role of coal-fired power generation, transitioning from a base load power source to a more adaptable, flexible regulating power source. Green hydrogen is identified as a versatile, zero-carbon solution, serving dual purposes as both a raw material and a fuel source. Finally, the report acknowledges Carbon Capture and Storage (CCS) as a significant, though last-resort, option for attaining carbon neutrality, while cautioning against an over-reliance on CCS technology.



Kaare Sandholt, Chief International Expert of the CET programme, moderates the expert review and panel discussion

The side event's expert review and panel discussion session, moderated by Kaare Sandholt, Chief International Expert of the China Energy Transformation (CET) Programme, convened a distinguished assembly of experts and thought leaders from energy and climate change. The distinguished panellists included Wang Yi, prominent researcher at the Institute of Science and Technology Strategy of the CAS; Gu Jun, Vice President of the College of Smart Energy at SJTU & SPIC; Simon Sharpe, Director of the Economic Department at UNFCCC Climate Champions; Zhu Liyang, President of the China Circular Economy Association; and Liu Qiang, Deputy Chief Representative in China for the CIFF.

Profound and enlightening discussions on a spectrum of pivotal issues marked the session. Central to the dialogue was CETO 2023, where the discourse delved into the diverse opportunities and challenges of the global shift towards sustainable energy. The panellists scrutinised financing strategies and the essential support developing nations require for the energy transition. Furthermore, the session offered an in-depth exploration of avant-garde innovations in low-carbon and zero-carbon energy technologies, underscoring the criticality of international cooperation in cultivating a holistic and effective energy transition.