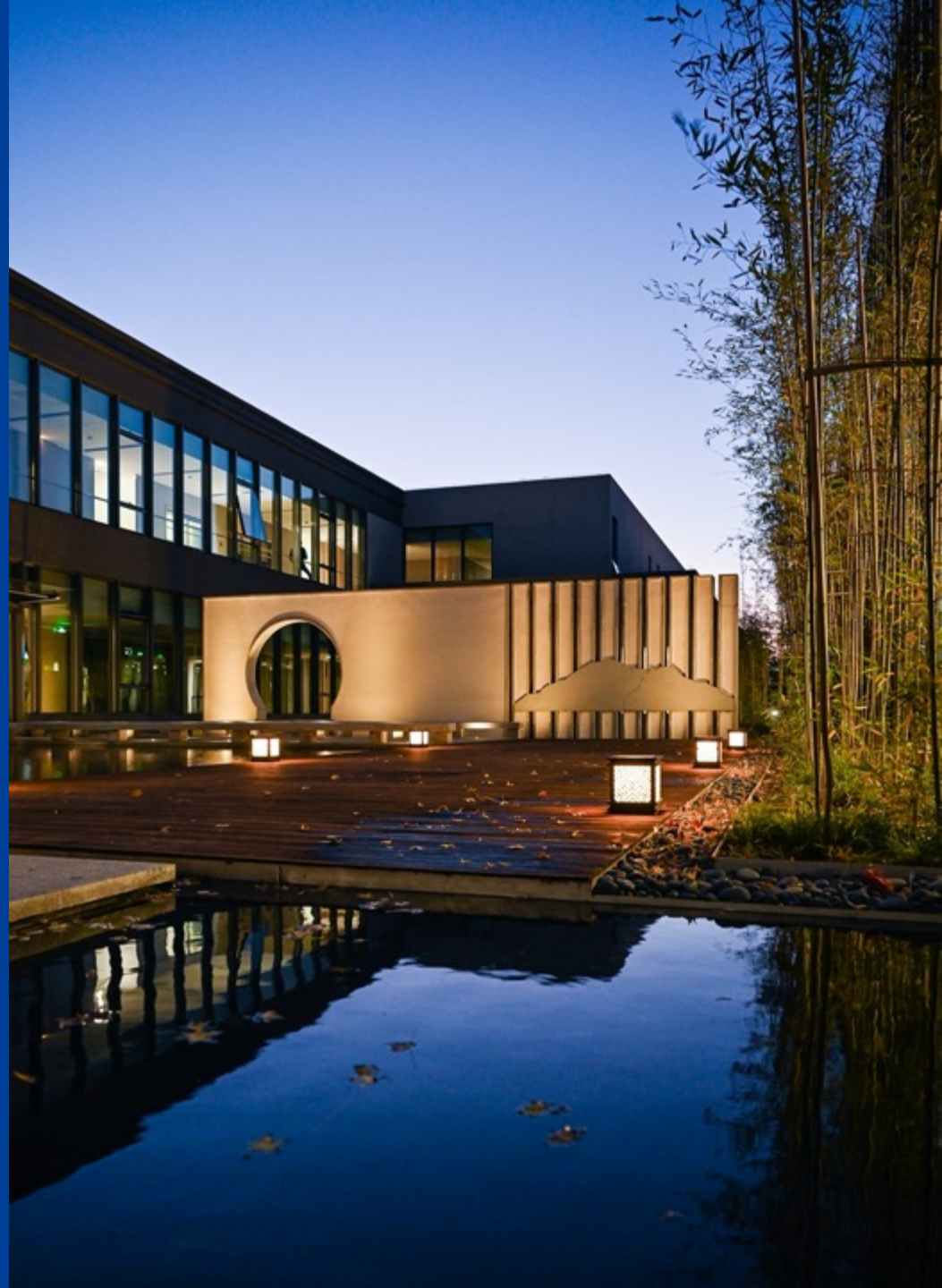
CIKD 中国国际发展知识中心
CENTER FOR INTERNATIONAL KNOWLEDGE ON DEVELOPMENT

Local Solutions for Climate Resilience in China

Cangshu Li

Associate Research Fellow, CIKD



Outline

- Photovoltaic Revolution in Qinghai
- Green buildings: Achieving Beijing’s Low-carbon Winter Olympics

Photovoltaic Revolution in Qinghai

In September 2020, China committed to peak carbon dioxide emissions before 2030 and strive to achieve carbon neutrality by 2060.

- *Qinghai, as an important new energy industry base in China, is focusing on leveraging its abundant hydropower resources and sunlight advantages to vigorously develop the photovoltaic industry as a source of green, clean energy. Currently, photovoltaic power has surpassed hydropower to become Qinghai's primary energy source, and the province ranks first in China for centralized photovoltaic power generation.*

Photovoltaic Revolution in Qinghai

Leading with innovation and prioritizing technology

- Qinghai uses water-sun complementary adjustment technology to address the variability, randomness, and intermittency of photovoltaic power generation, converting unstable solar power into a balanced, high-quality, and reliable energy source. The province has also established a photovoltaic industry technology innovation center, a photovoltaic new energy big data platform, and the country's first 100-megawatt national solar power base. By integrating new technologies, materials, and energy sources, Qinghai is driving the rapid development of the photovoltaic industry.

Photovoltaic Revolution in Qinghai

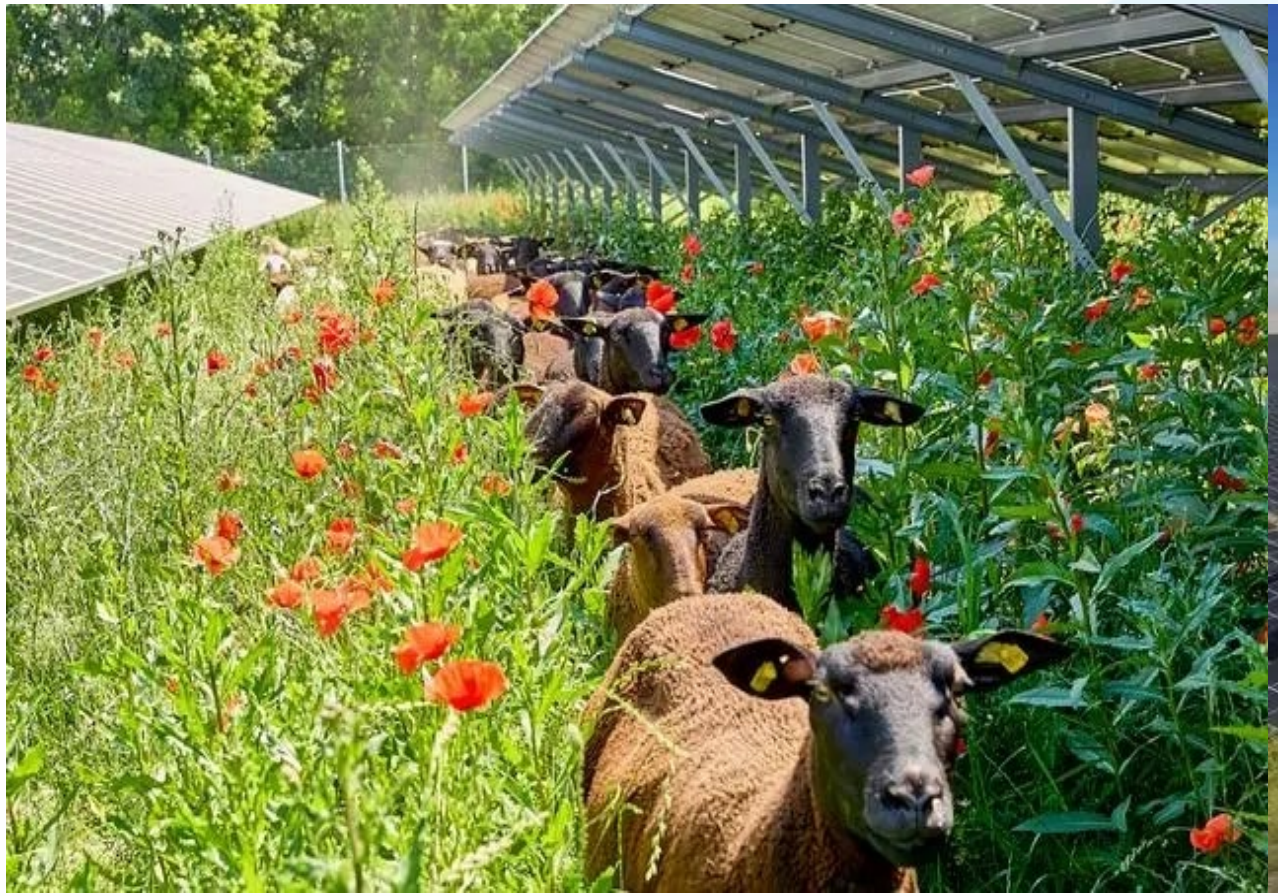
The Tarapand Green Industry Development Zone photovoltaic power station in Gonghe County, Hainan Tibetan Autonomous Prefecture, Qinghai Province

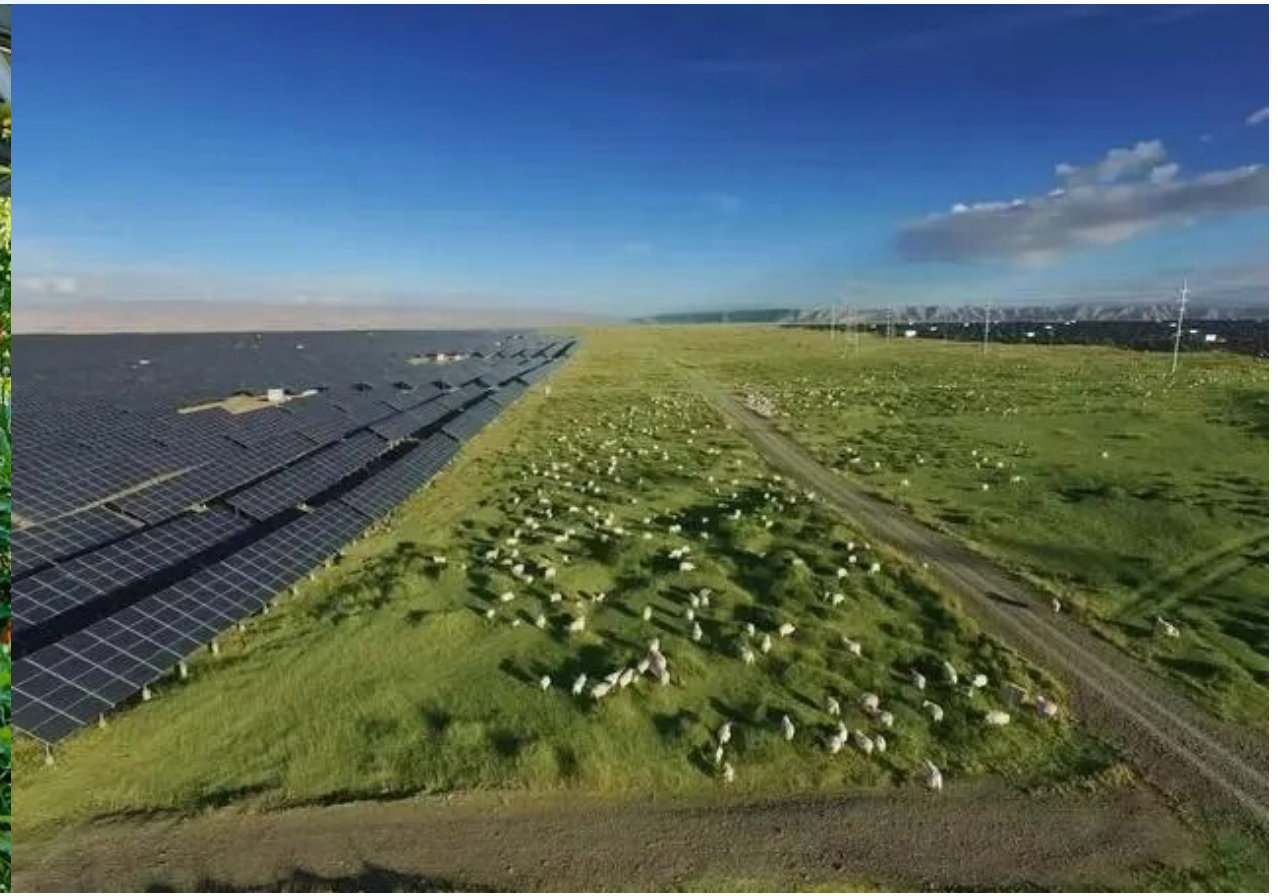
Photovoltaic Revolution in Qinghai

Economy and ecology mutually reinforce each other for a win-win outcome

- The development of the photovoltaic industry also helps curb land desertification. Extensive solar panels block intense sunlight, reducing water evaporation and wind speed by over 50%, and significantly improving water conservation. Collaborating with the Institute of Cold and Arid Regions Environmental and Engineering Research, and a hydropower company, crops suited to high-altitude conditions like snow chrysanthemum, oats, and alfalfa are planted under the panels, tailored to local soil and water quality. Regular cleaning of the panels ensures water infiltration that supports the growth of high-altitude crops and desert vegetation, transforming previously barren land into vibrant green areas.

Photovoltaic Revolution in Qinghai





The photovoltaic sheep in Qinghai

Photovoltaic Revolution in Qinghai

Poverty alleviation and increased income benefit the people

- In Qinghai, the profits from photovoltaic projects are allocated to village collectives, with each village earning about 42,000 USD annually. Sixty percent of this income is used for education, infrastructure maintenance, and developing specialty industries. The remaining 40% is used to create public welfare jobs to support disadvantaged individuals. Nearly half of the population in Qinghai has escaped poverty through photovoltaic earnings.

Photovoltaic Revolution in Qinghai

Currently, Qinghai's clean energy consumption ratio reaches 81%, significantly above the national average. By the end of 2023, the province had a total installed power capacity of 54.97 million kW, including 3.97 million kW from coal, 13.05 million kW from hydropower, 25.60 million kW from solar, and 11.85 million kW from wind. New energy sources account for 37.46 million kW, or 68% of the total. In the future, Qinghai will continue to advance the transformation to cleaner energy, integrate ecological protection with emerging industries, and convert abundant solar power into a continuous source of green energy.

Green buildings: Achieving Beijing’s Low-carbon Winter Olympics

Green power ensures energy supply

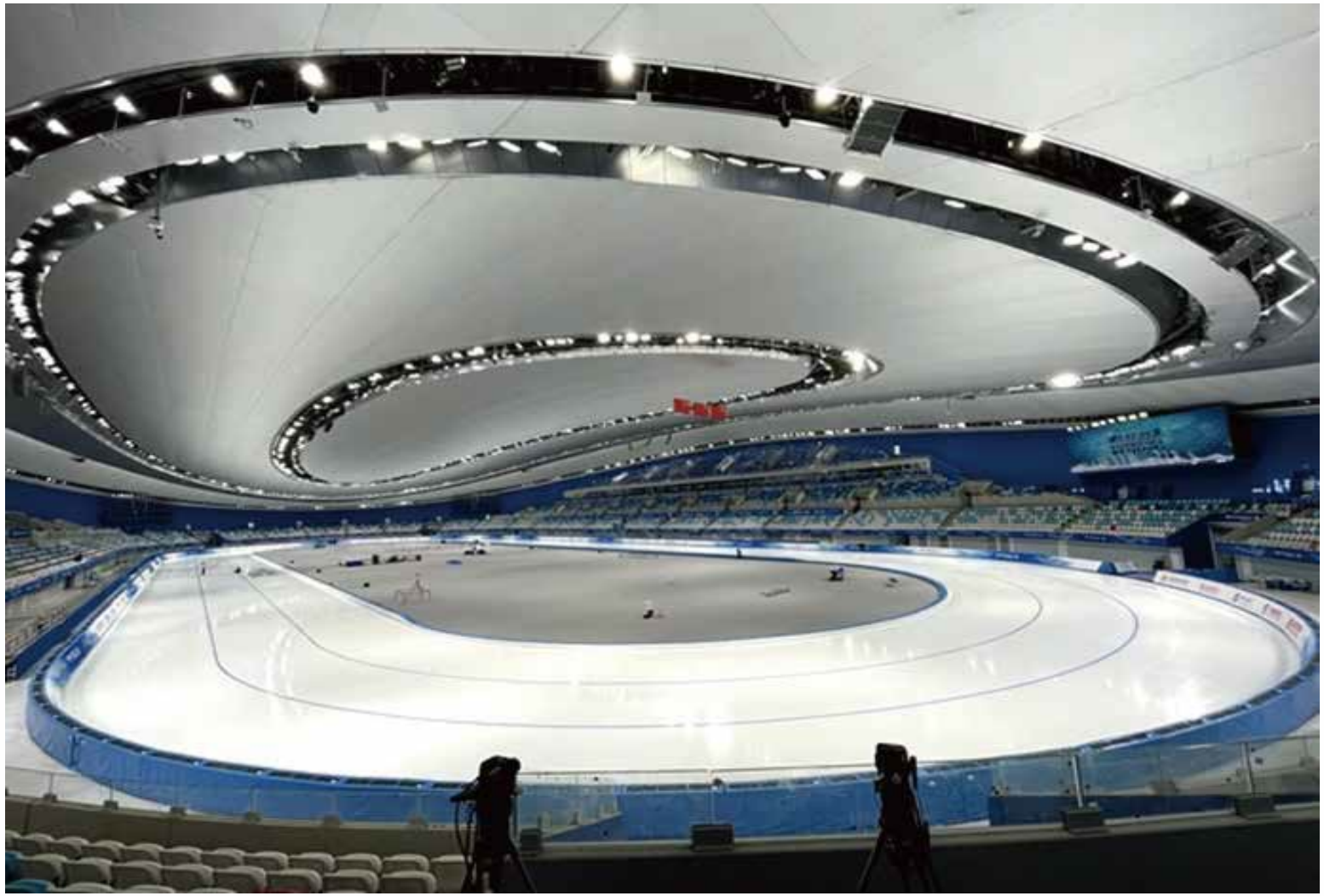
- The Zhangbei to Beijing flexible DC grid, the world’s first of its kind, ensured power supply for all Winter Olympic venues, marking the first time in Olympic history that 100% green electricity was used. Currently, wind and solar power from Zhangjiakou can deliver 14 billion kilowatt-hours of "green power" to Beijing each year, which is about one-tenth of the city's annual electricity consumption. The year 2020 marked Beijing's entry into the "green electricity" era, with all residents benefiting from and participating in clean energy. This achievement is equivalent to saving 4.27 million tons of standard coal and reducing carbon dioxide emissions by 11.65 million tons.

Green buildings: Achieving Beijing's Low-carbon Winter Olympics

Smart construction reduces carbon emissions

- The National Speed Skating Oval uses smart construction technology, significantly shortening the main construction period and greatly reducing water, electricity, and material usage. The saddle-shaped single-layer cable net structure, with unique light, thin, and flexible properties, weighs only a quarter of traditional roofs, thereby reducing material use and construction complexity. The Wukesong Ice Sports Center's solution dehumidification system lowers energy consumption by about 50% compared to traditional methods. Both the design and technology of smart construction reduce carbon emissions from the source.

Green buildings



National Speed Skating Oval

Green buildings: Achieving Beijing’s Low-carbon Winter Olympics

Ecological restoration achieves "carbon neutrality"

- The Yanqing competition zone in Beijing adhered to an "ecology first" principle, successfully restoring 1.85 million square meters of construction land using techniques such as tree transplantation and topsoil removal. During construction, waste materials were repurposed for snow track embankments and landscaping, recycling about 300,000 cubic meters of debris. Excavated stone was simply processed and reused as "gabion walls" in various structures, significantly reducing waste and enhancing the local northern mountain village culture. The modular construction used in the Yanqing Winter Olympic Village reduced carbon emissions from on-site wet operations, lowered energy consumption, and increased post-event material recycling to 40%, fulfilling the solemn pledge of achieving carbon neutrality for the Beijing Winter Olympics.

Thank you for your interest and participation.