Advancing Clean Energy Transition:
China Renewable Tech Innovations & APEC Collaboration
中国可再生能源技术创新与APEC协同合作
Expert Group on New and Renewable Energy Technologies (EGNRET)

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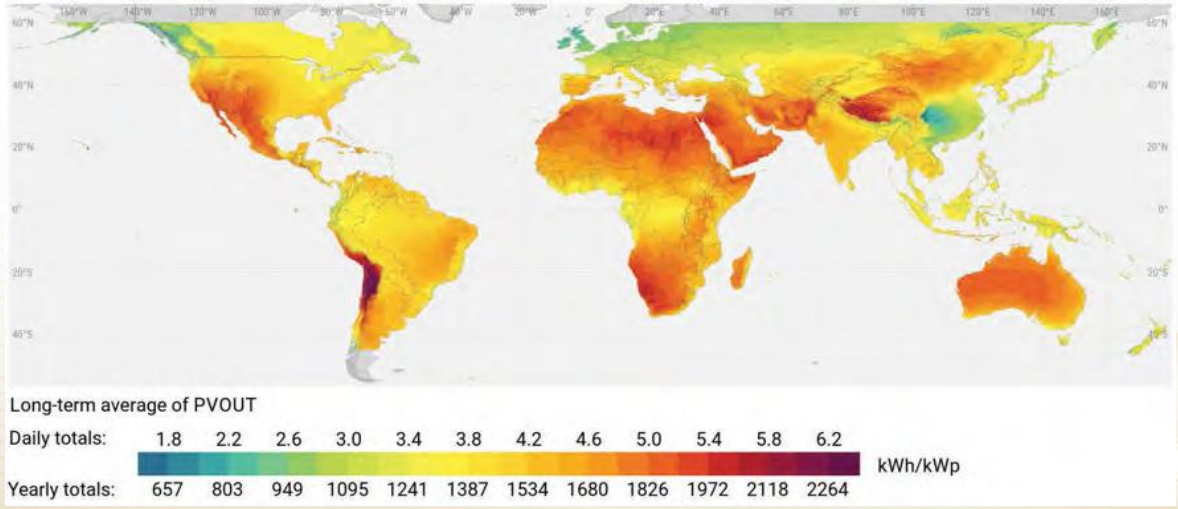
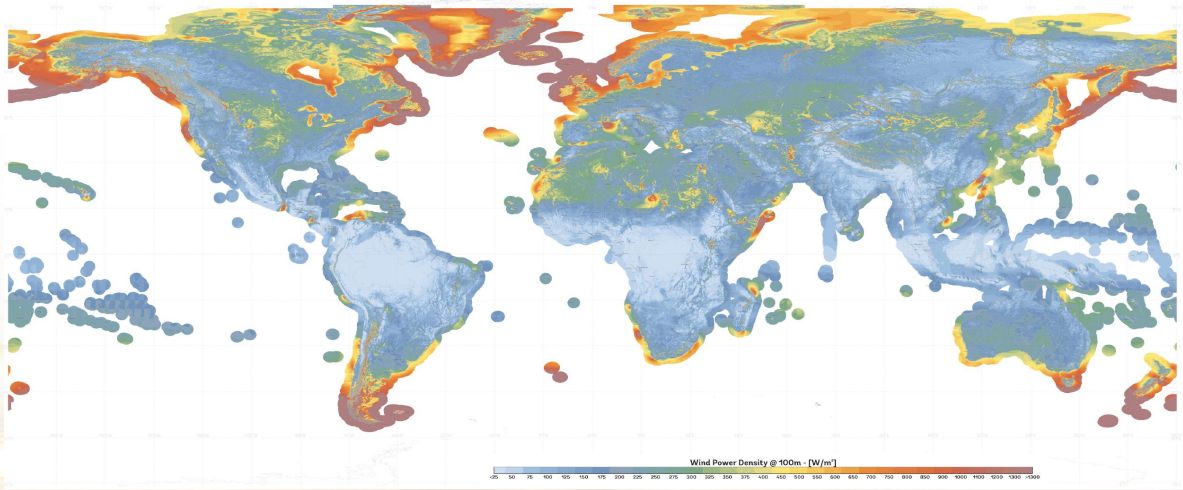
CONTENTS

I. China Renewable Energy Resource

- **Wind power:** Robust and stable wind resources concentrated in Northwestern China offer optimal conditions for large-scale onshore wind farms.
- **Solar power:** Abundant and high quality solar resources concentrated in Qinghai, Gansu, and the Inner Mongolia Autonomous Region of China offer optimal conditions for large-scale onshore solar farms.
- **Hydropower:** Plentiful and reliable large hydropower resources concentrated in Southwestern China offer prime conditions for large scale hydropower plants.
- **Hydrogen Energy:** Northwest China, boasting vast and sustainable renewable energy resources, offers strategic upstream support for hydrogen storage and transportation infrastructure development.



Distribution of global photovoltaic resources (average annual power generation)
Source: World Bank, Global Photovoltaic Power Potential by Country, 2022.

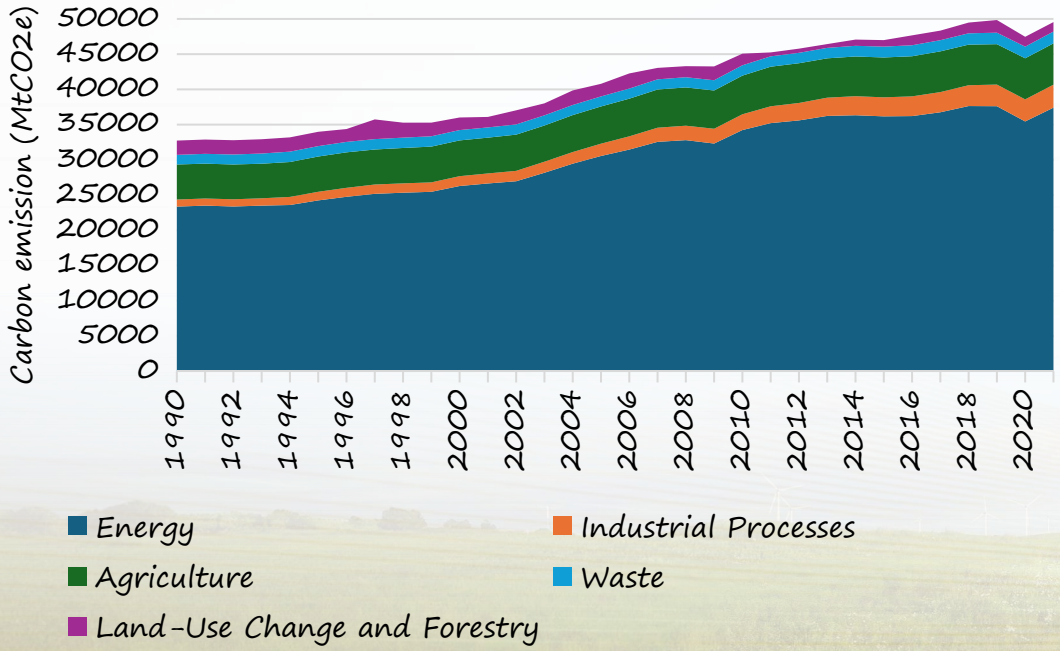


Distribution of global wind energy resources (wind power density)
Source: Technical University of Denmark, World Bank, Global Wind Atlas, 2022.

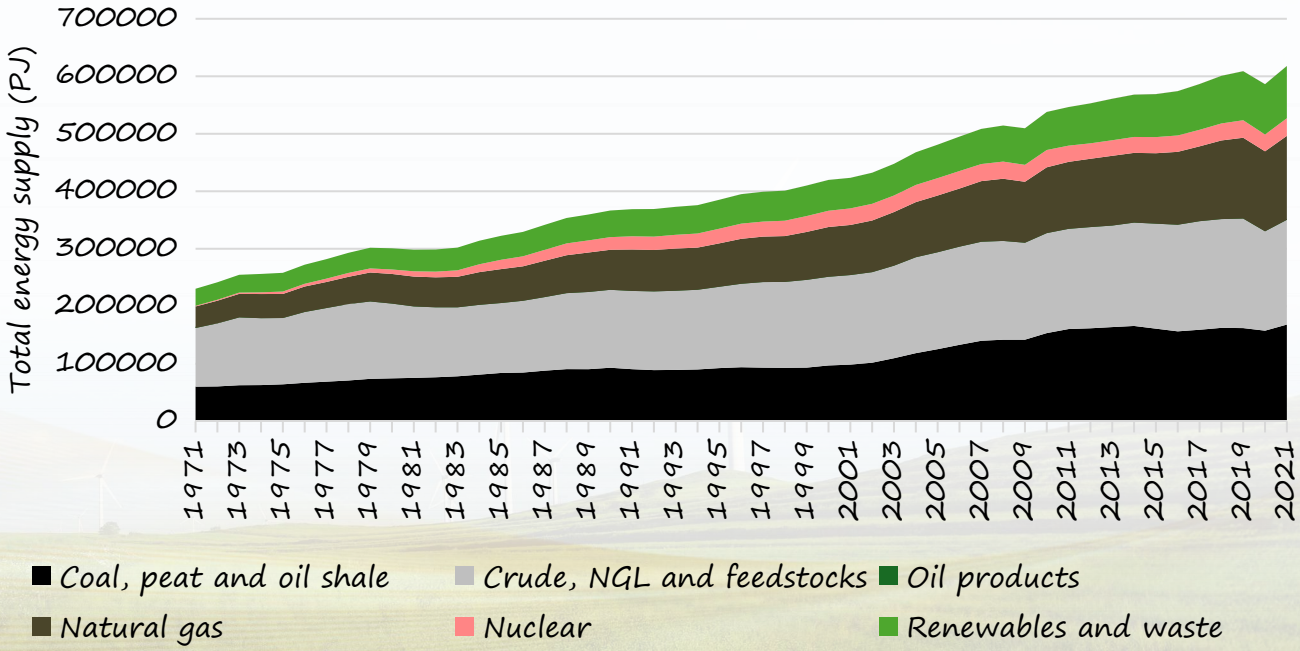
II. Energy Challenges

➢ Energy Challenges

- Accelerating economic growth continues to fuel the exponential rise in energy demand.
- Converging energy security challenges and ecological deterioration now demand urgent, coordinated decarbonization strategies across the Asia-Pacific.
- Relying persistently on fossil fuels has heightened regional climate risks.



Source: https://www.climatewatchdata.org/ghg-emissions

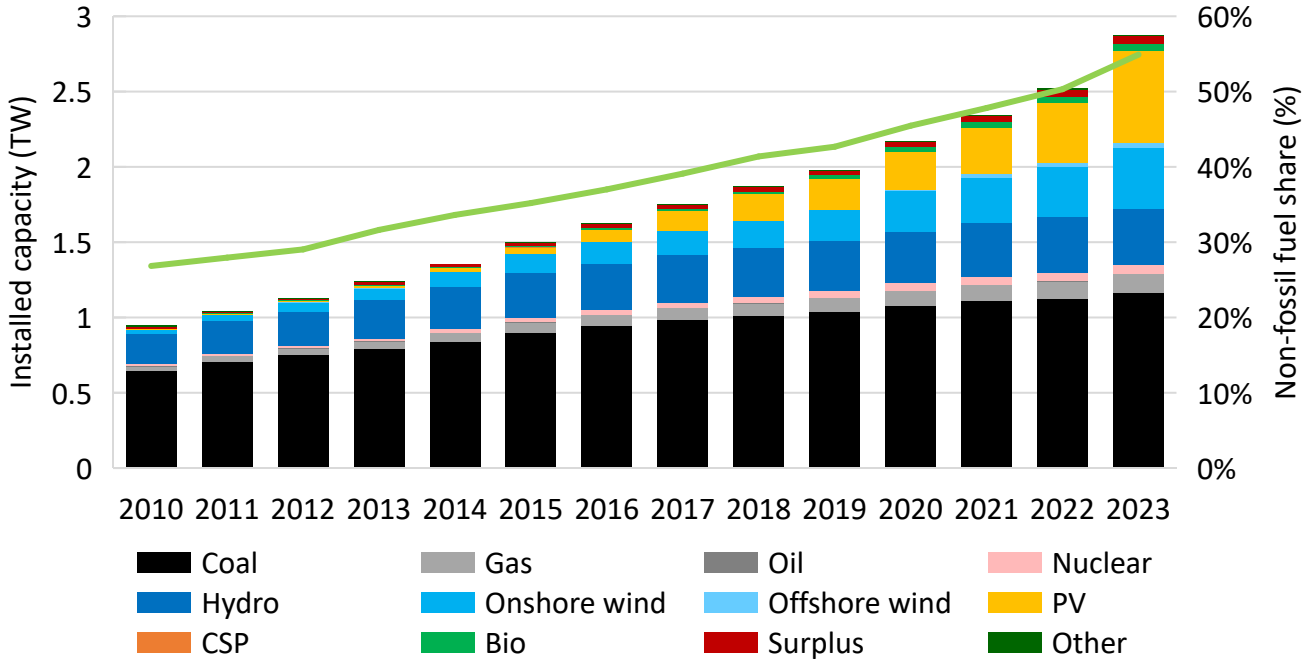


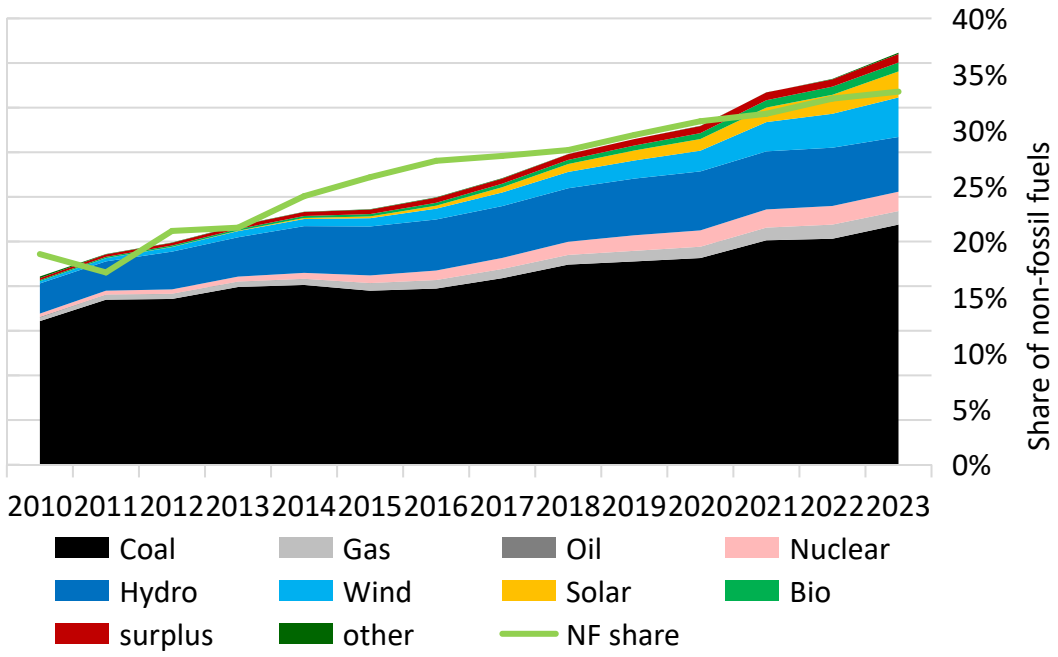
Source: IEA, Energy Statistics

II. China Energy Challenges

➢ China’s Renewable Energy Drive

- As APEC economy, China strategically deploys renewable energy systems to address massive domestic energy demand while reinforcing resilient clean-tech supply chains.
- Integrating new energy systems (wind-solar-hydro-storage-hydrogen) can effectively drive a measurable increase in the adoption of non - fossil energy.





Source: CEC, NEA, NBS.

III. China Rnewable Energy Tech Breakthroughs

➢ Wind Power

- Deploying large-scale 18+ MW offshore wind turbines and 10+ MW onshore wind turbines can effectively increase the wind power generation.

➢ Solar Energy

- Achieving economies of scale in photovoltaic manufacturing can continuously enhance technological competitiveness by improving efficiency and reducing costs.

➢ Hydropower

- Implementing intelligent coordinated cascade operation of the hydropower system can enhance the overall efficiency and stability of power generation.
- Designing and constructing high - capacity hydropower units (1,000 MW) can effectively increase the hydropower generation.

➢ Hydrogen Energy

- Building green hydrogen hubs with the surplus of renewable energy in Northwestern China and improving the efficiency of green hydrogen production.

IV. CHN Energy: Rnewable Energy Tech Breakthroughs

- **CHN Energy Investment Group (branded as CHN Energy):** A state-owned energy and mining company administrated by the State-owned Assets Supervision and Administration Commission of the State Council. CHN Energy is engaged in development, investment, construction, operation and management of power plants and power generation for electricity supply in China.
- **CHN Energy is the world's largest company in wind power, thermal power, coal mining and coal-to-liquids industry:**
  - **1/7 of China power generation**
  - **1/10 of China new energy power generation**
  - **1/6 of China coal production**
  - **1/8 of China heat supply**
  - **1/9 of China railway freight volume**

IV. CHN Energy Rnewable Energy Tech Breakthroughs

➢ Integrated Renewable Development

- **Wind power innovation:**

✓Pioneered the research of 18 MW+ offshore wind turbine and 10 MW+ onshore wind turbine deployment.

✓Commissioned the world's first floating wind (4 MW)-aquaculture platform ("Guoneng Share Vessel").

✓Advanced hydro-wind-solar hybrid energy system and ernergy base development.

- **Hydropower Advancement:**

✓ Connected successfully to the grid, the Maerdang hydropower station ranks as the Yellow River's highest-altitude (3,200 m) and largest-capacity (2,200 MW) hydropower station.

✓ Intelligent Coordinated Cascade Operation of Hydropower Systems.

IV. CHN Energy Rnewable Energy Tech Breakthroughs

➢ Integrated Renewable Development

- **Energy storage breakthroughs:**

✓Operationalized China's largest grid-forming energy storage facility in Ningdong (200 MW/400 MWh).

- **Hydrogen ecosystem development:**

✓ Established full-chain hydrogen capabilities covering production, storage, distribution, and application.

✓ Established green hydrogen plants in Ningdong (Ningxia) and Chicheng (Hebei) represents a critical milestone in advancing hydrogen energy adoption.

✓ Developed by CHN Energy engineers, the nation's first hydrogen-powered heavy-duty truck represents a milestone in hydrogen transportation innovation.

V. CHN Energy Global Collaboration

➢ APEC-CHN Energy Synergy

- In 2021 March, CHN Energy and the APEC established the Future Clean Energy Technologies (CET) Center. The CET Center aims to conduct clean energy research and exchange under the APEC mechanism, promote international cooperation in new energy technology innovation, foster new energy industry chain cooperation, build new models for green and low-carbon transformation and facilitate the implementation of high-quality projects in the Asia-Pacific region.
- CHN Energy opearting 15 renewable projects across 10 countries (include APEC economy Australia, Canada, Indonesia).

➢ EU-China Hydrogen Synergy

- In 2023 March, China-Europe Hydrogen Technology Innovation Center has been established in Suzhou, China.
- The Hydrogen Technology Commercialization Pathway is structured to systematically translate R&D breakthroughs into industrial applications via phased market validation and scalable deployment frameworks.


Thanks for Listening