



ICES Biennial 2026

GREEN STRATEGIES: comparative visions of Europe, China, US

Introduction Peter Head CBE FREng

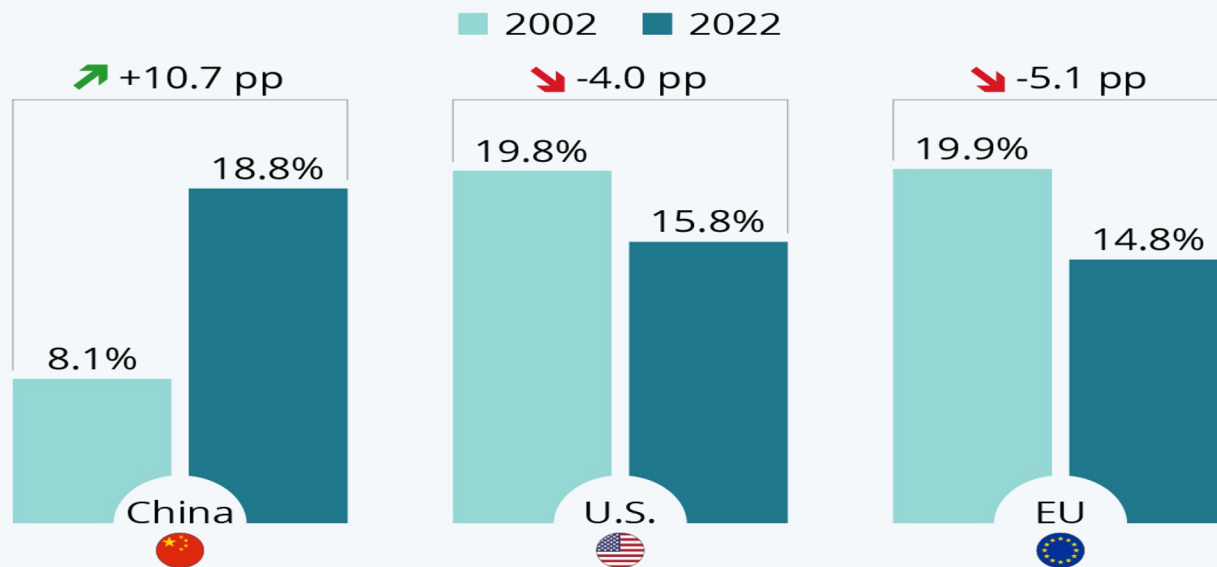
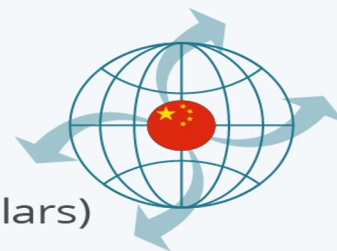
EU Dr. Arnulf Jäger-Waldau

China Prof. Li Zheng

USA Dr. Thomas Hauser

China's Rise to Economic Superpower

China's share of global GDP (PPP, current dollars)
vs. the United States and the EU

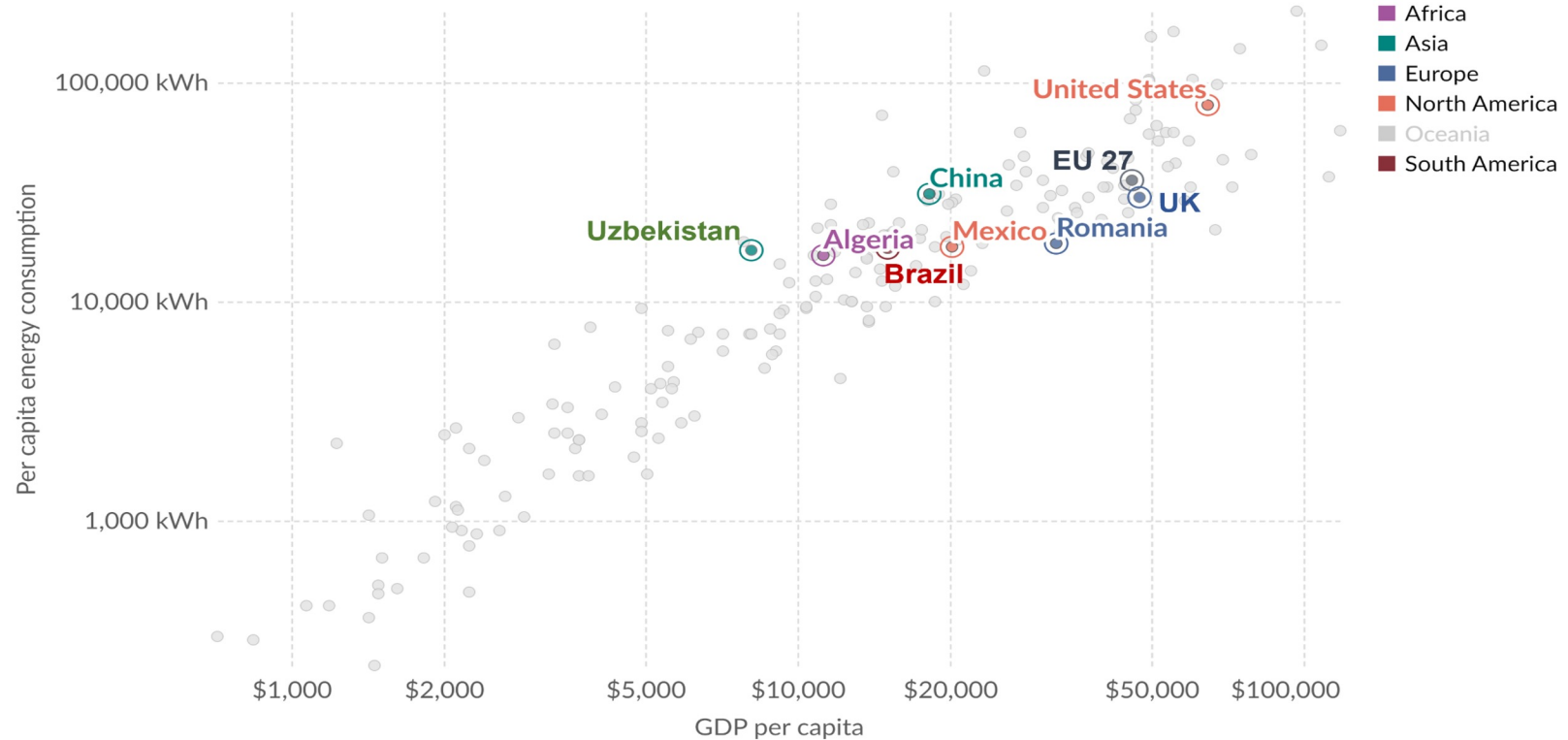


Source: IMF



Energy use per person vs. GDP per capita, 2022

Energy refers to primary energy, measured in kilowatt-hours per person, using the substitution method. Gross domestic product (GDP) is adjusted for inflation and differences in the cost of living between countries.



Data source: U.S. Energy Information Administration (2023) and other sources

Note: GDP data is expressed in international-\$ at 2017 prices.

OurWorldInData.org/energy | CC BY

Sustainable Urban Mobility in Rapid Urbanization: **Theory and Practice in China**

Lu Huapu Mao Qizhi Li Zheng
He Kebin Shuai Shijin Zhang Xiliang



China Railway Publishing House

- City development to be public transport led
- Electric traction for city mass transit plus inter-city high speed rail
- Underground metros preferred to buses
- Transition to electric vehicles by 2050

2008

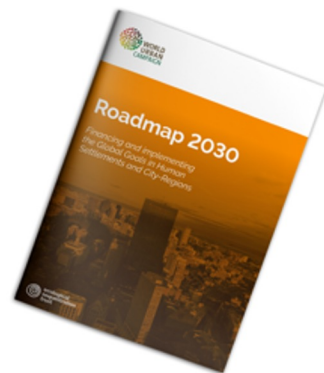
Infrastructure investment average per year

40% reduction through an integrated systems approach

Inner city metro 1% city GDP

National

.	<i>Transport</i>	<i>1.5% GDP</i>
1.	<i>Water supply, flooding, greening</i>	<i>1.0% GDP</i>
2.	<i>Energy transition</i>	<i>2.2% GDP</i>
3.	<i>Communications</i>	<i>0.4% GDP</i>



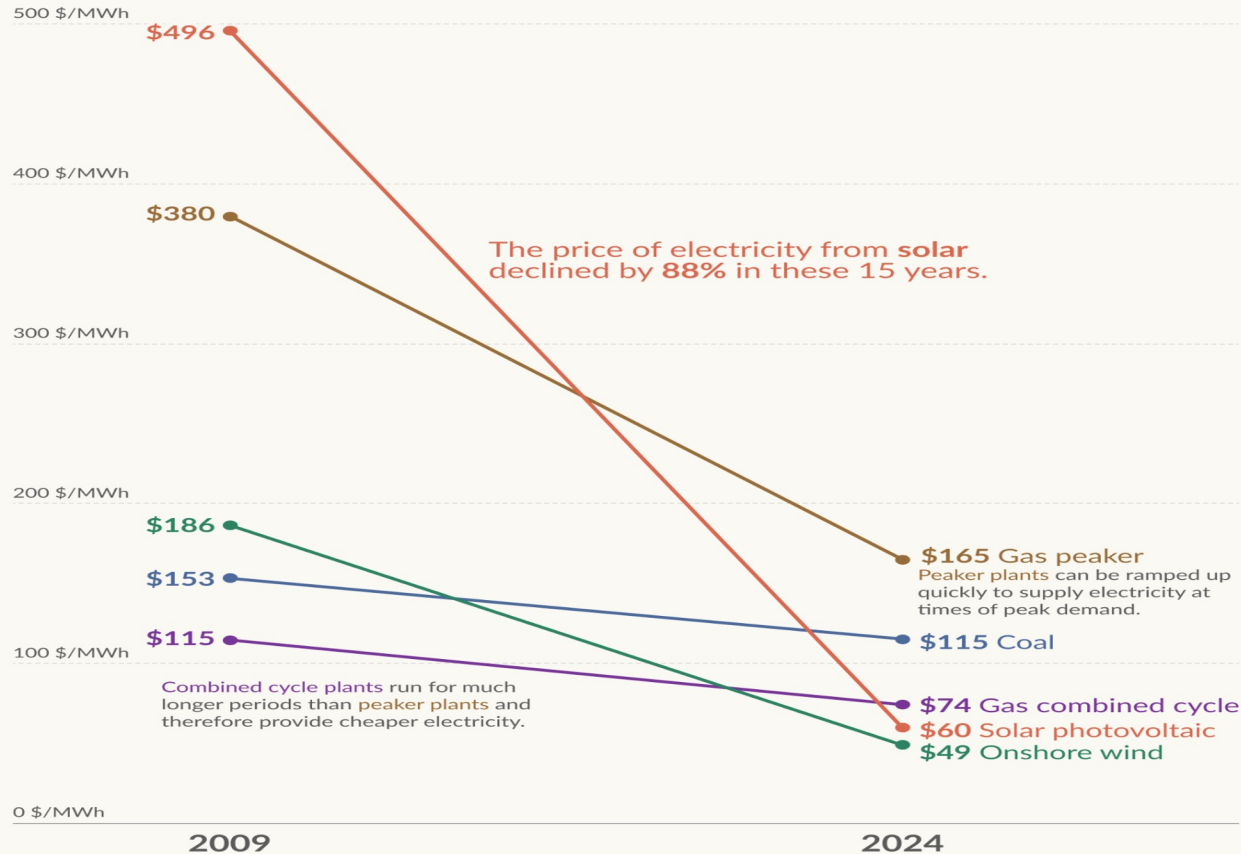
<https://ecosequetrust.org/roadmap2030/>

China 5% GDP investment in HSR 2010



How did the price of electricity from new power plants change over the last 15 years?

Electricity prices are expressed in 'levelized costs of energy' (LCOE). LCOE captures the cost of building the power plant itself as well as the ongoing costs for fuel and operating the power plant over its lifetime.



Note: Data reflects unsubsidized costs, expressed in constant 2023 US\$. This means costs are adjusted for inflation.

Data source: Lazard — Levelized Cost of Energy+ (2024); World Bank and OECD (2025)

OurWorldinData.org — Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Pablo Rosado and Max Roser

China leads the way on clean tech deployment

Installed capacity (GW)

Solar Wind

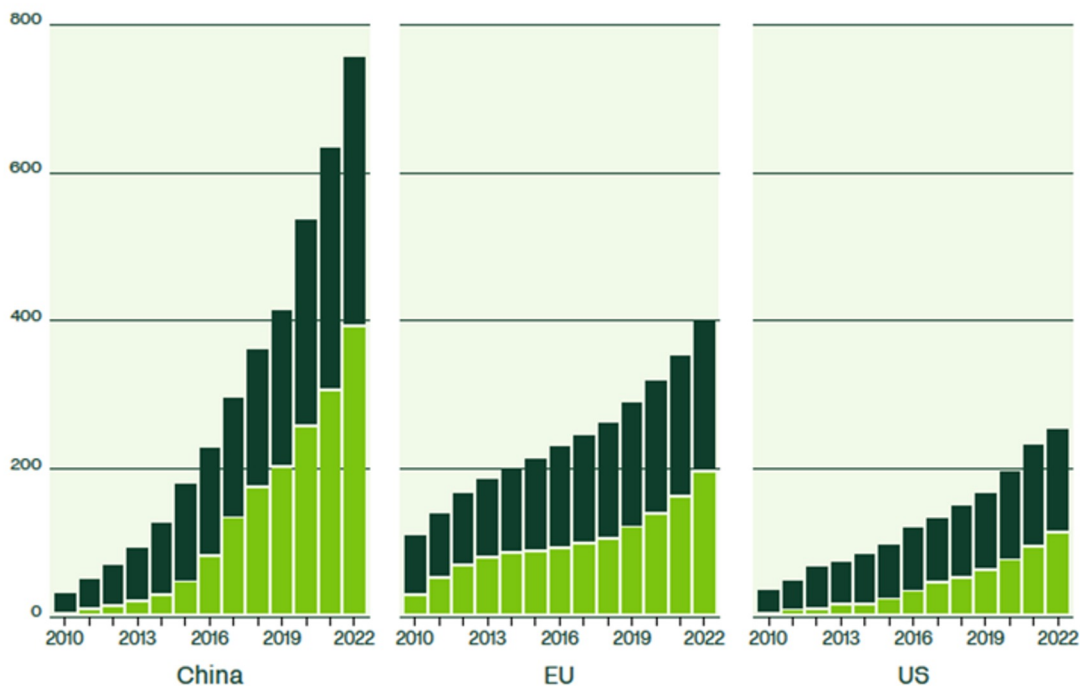


Figure 5: China leads the way on clean tech deployment (Source Financial Times 2024)⁴⁷

Source: Bruegel European Clean Tech Tracker on Ember and EIA

EU Green Deal and Digital Infrastructure

"Accessible and interoperable data at the heart of data-driven innovation.

This data and digital infrastructure (e.g. supercomputers, cloud, ultra-fast networks) and artificial intelligence solutions, facilitate evidence-based decisions

Immediate priority to boost EU's ability to predict and manage environmental disasters. To do this, the Commission will bring together European scientific and industrial excellence to develop a very high precision digital model of the Earth.

#DestinE. LUMI supercomputer centre in Kajaani, Finland.



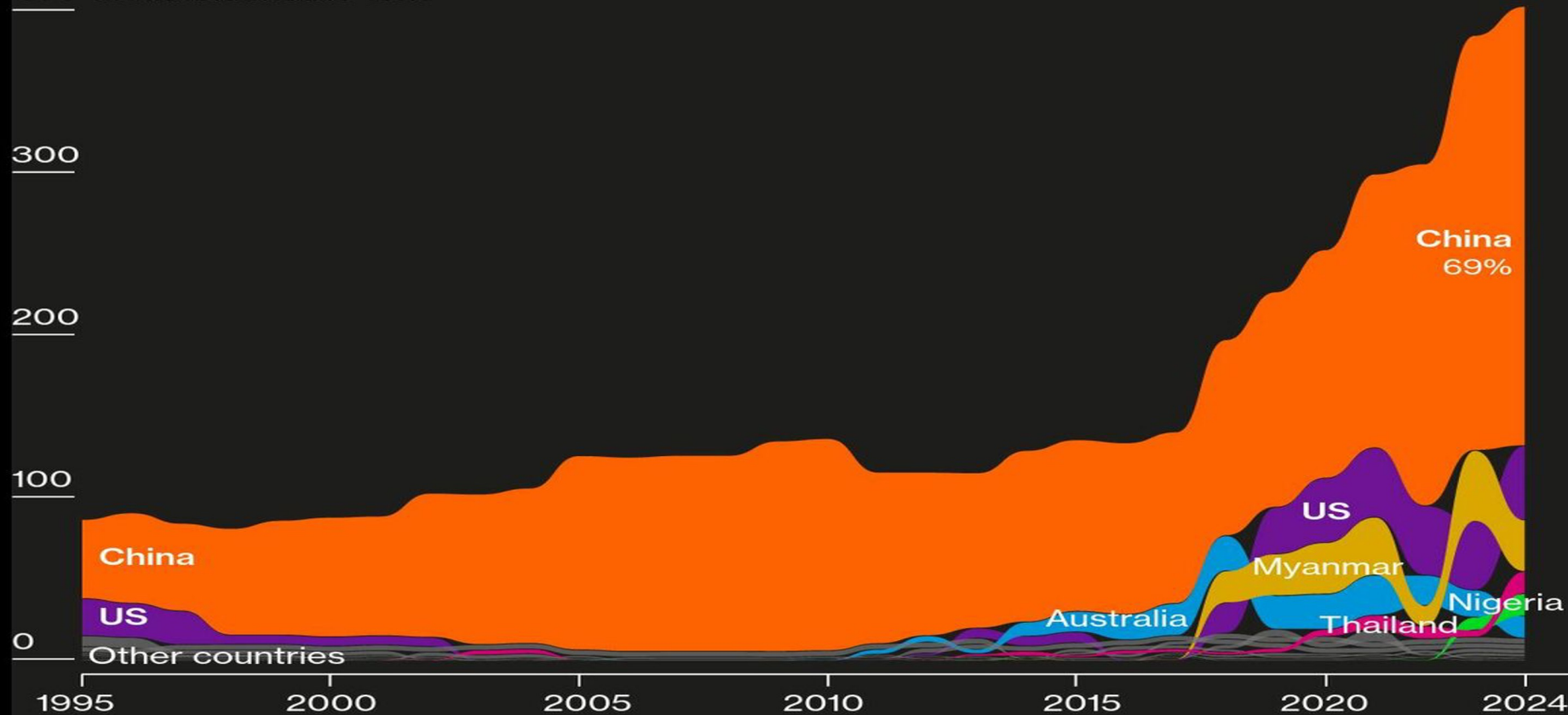
At least 35% of the €75bn budget of Horizon Europe will fund new solutions for climate, which are relevant for implementing the Green Deal."

#EUGreenDeal

China Dominates Mined Production of Rare Earths

It was responsible for almost 70% of global output in 2024

400 thousand metric tons



Source: US Geological Survey

Bloomberg



7000 China EV's arriving in UK August 2026

CHINA: ENERGY TRANSITION IMPLEMENTED

CHINA HAS ALREADY WON THE ENERGY TRANSITION.



SOLAR RECORD

Installs more capacity than the rest of the world combined (2023).



BATTERY DOMINANCE

Controls global battery manufacturing.



75%

Controls global battery production.

BATTERY DOMINANCE

Controls global battery production.

ACTION

E-MOBILITY

Largest EV market, >50% new car sales electric.



BATTERY SWAPPING

300+ stations, truck routes, grid stability via charging management.



EUROPE HAS THE TECHNOLOGY,
BUT CHINA'S SPEED IS DECISIVE.
CAN WE STILL CATCH UP?

EUROPE: ENERGY TRANSITION DISCUSSED

EUROPE STILL SLEEPING.

POSITION PAPERS

Writes concepts and reports.



CONSIDERATION?

DEBATES

Debates viability, grid fees, future concepts.

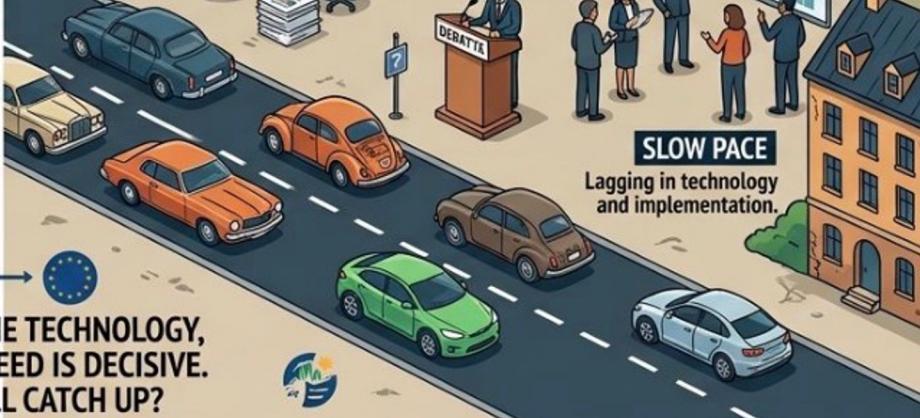


EUROPE STILL SLEEPING

DEBATE

SLOW PACE

Lagging in technology and implementation.





Peter Head

peter.head@resiliencebrokers.org

@PeterHeadCBE