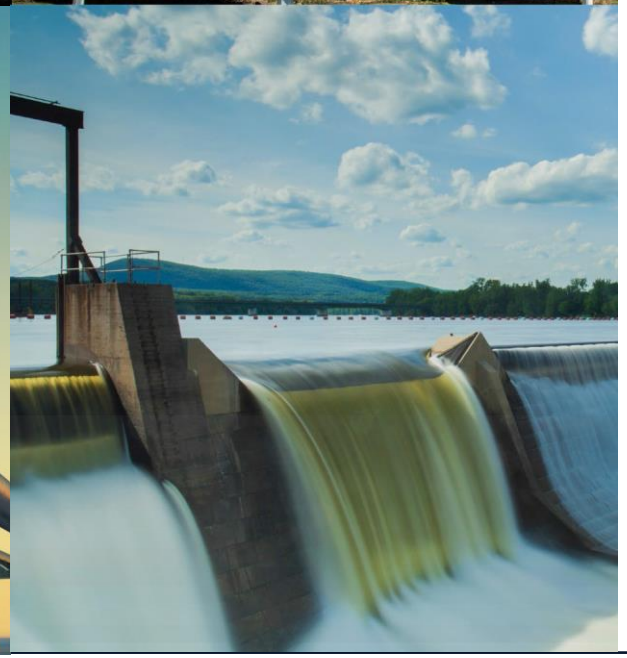

CESI
Shaping a Better Energy Future

An Evolving Energy Landscape

Sheila Hollis
Acting Executive Director
United States Energy Association

June 16, 2022

USEA
United States Energy Association

www.usea.org

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United States Energy Association

USEA convenes, educates, and provides a nonpartisan forum for the global energy community. Internationally, USEA supports energy development by expanding access to safe, affordable, and clean energy in partnership with the U.S. Government.

- USEA is a non-profit, non-lobbying institution founded in 1924. We currently have 30 staff members who speak a total of 16 unique languages.

- USEA member organizations come from across the energy industry, including the Solar Energy Industries Association (SEIA), Smart Electric Power Alliance (SEPA), Edison Electric Institute (EEI), American Petroleum Institute (API), Tennessee Valley Authority (TVA), American Gas Association (AGA), North American Electric Reliability Corporation (NERC), IHS Markit, Arizona State University, and Brookhaven National Laboratory.

- Over the past three decades, USEA has worked in 104 countries across six continents in coordination with the U.S. Government to improve the lives of people throughout the world with respect to energy supply, delivery, utilization, and training. USEA has ongoing relationships and projects in Africa, Eastern Europe, South America, and Asia.

- Funding agencies include the U.S. Agency for International Development (USAID), the U.S. Department of Energy (DOE), and the U.S. Department of State.

Realities To Consider

“Energy Never Sleeps”

-Energy impacts every living being.

-Directly or indirectly, all modern life is dependent on energy.

Reliable, Affordable, and Environmentally-conscious Energy

-A focus on development, delivery, distribution, and utilization is required for the health and well-being of the public.

-Assisting and building fair and transparent energy structures.

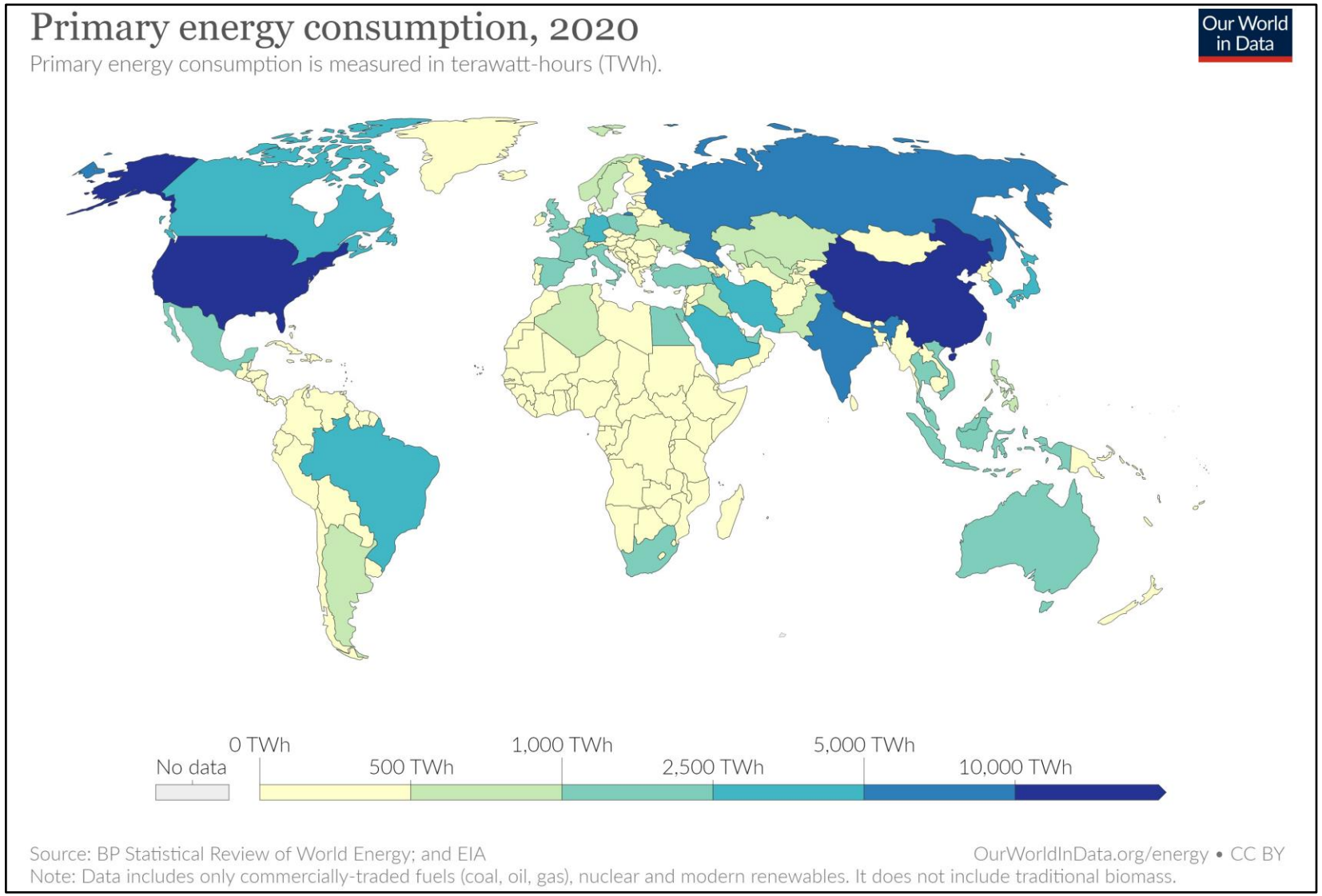
-A sincere, intense dedication to addressing problems of the past and looking to the future.

-An enhanced focus on energy availability and environmental considerations as we try to achieve a carbon neutral world.

Heightened Focus on Cybersecurity and Physical Security

-The convergence of cybersecurity and physical security will reduce system vulnerabilities and enhance resilience.

Global Energy Consumption



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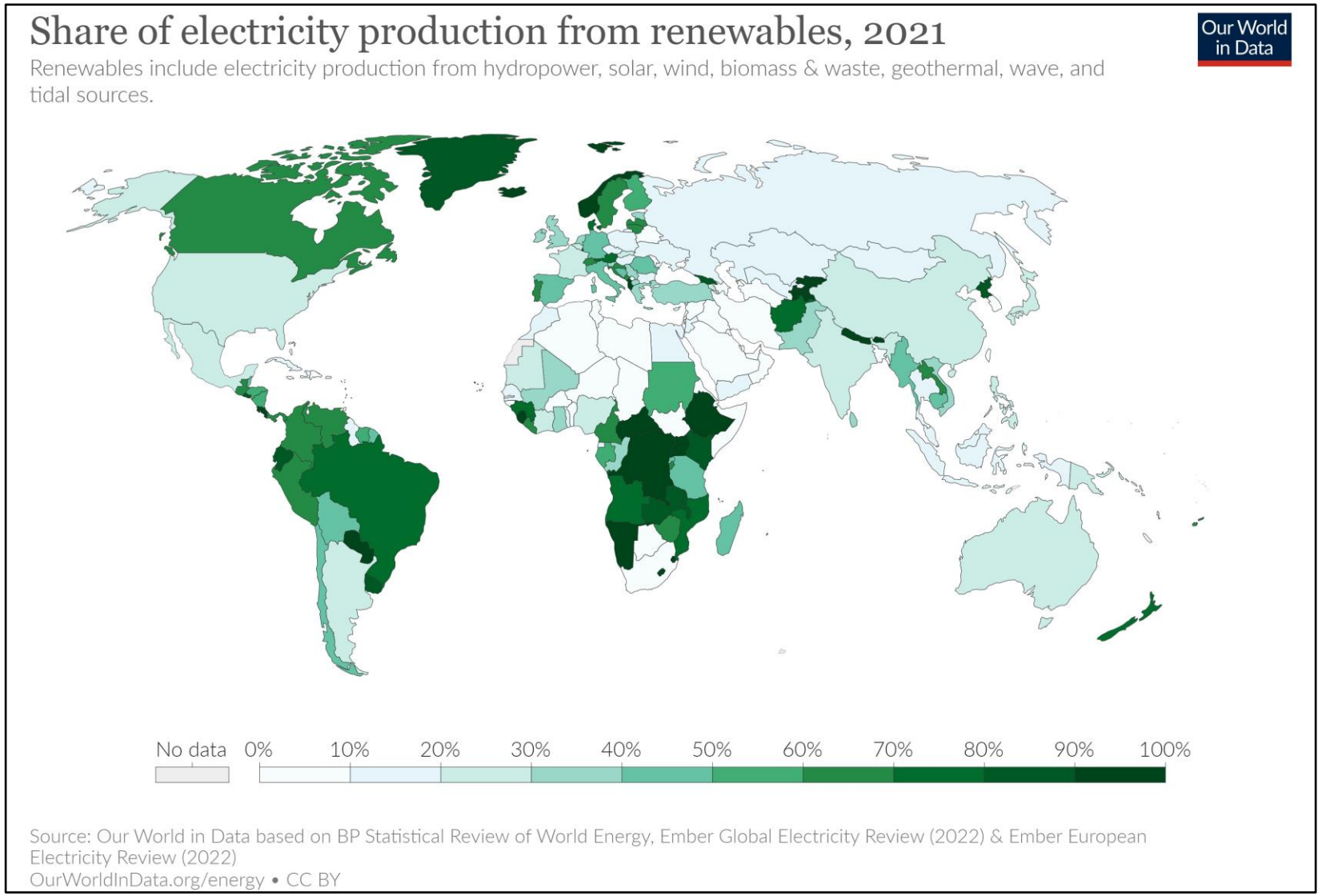
Global Share of Electricity Production from Renewables



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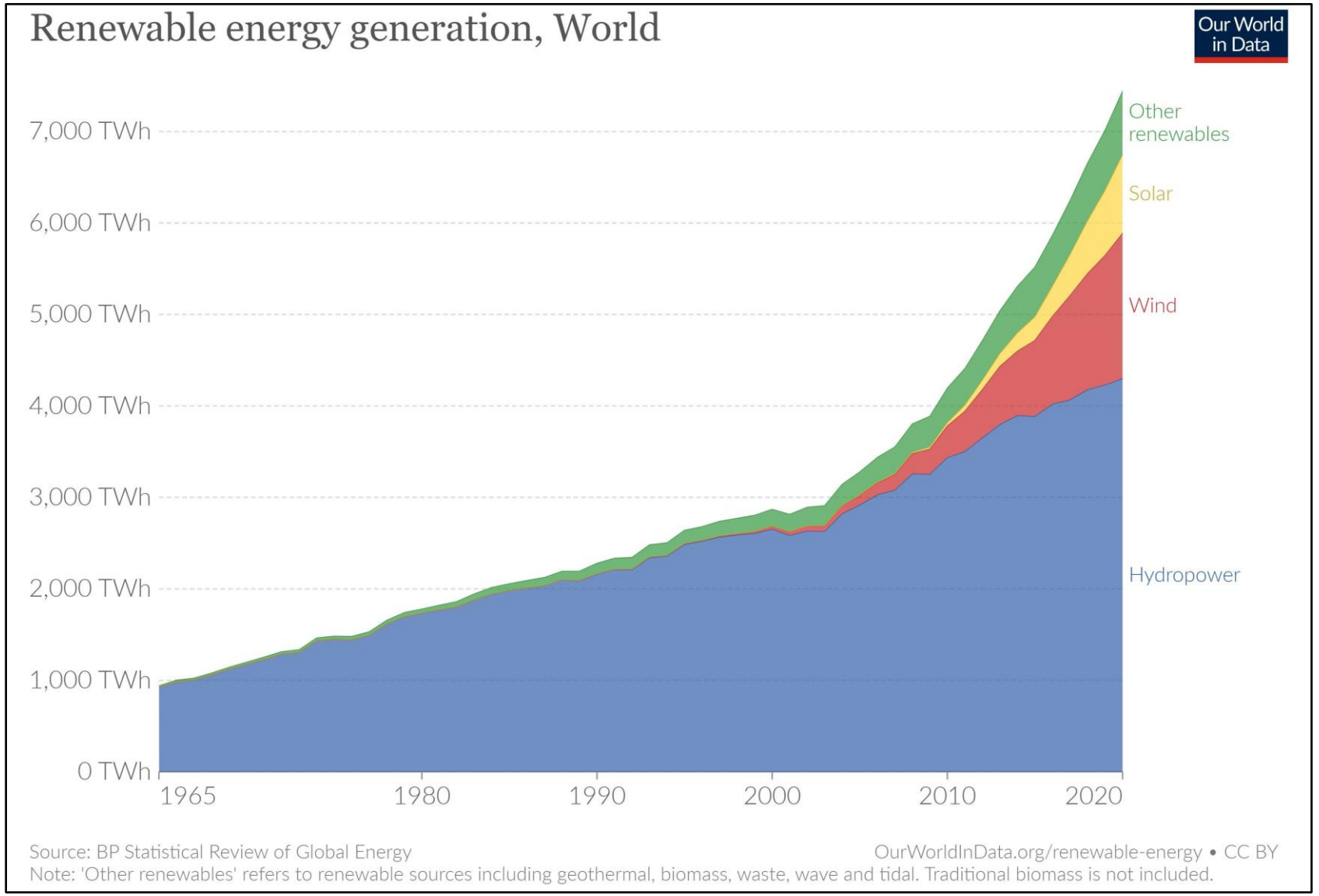
Global Renewable Energy Generation



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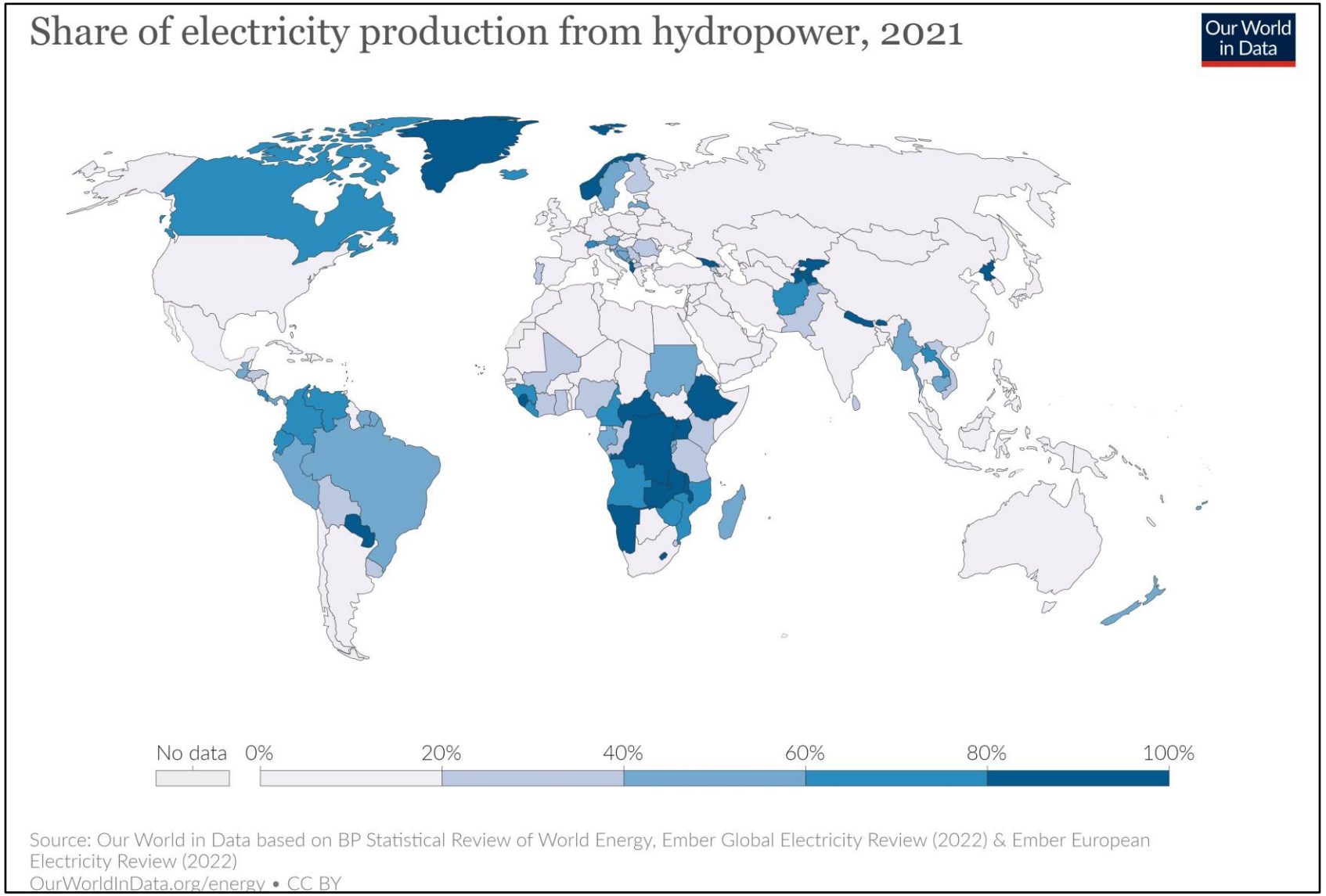
Share of Electricity Production from Hydropower



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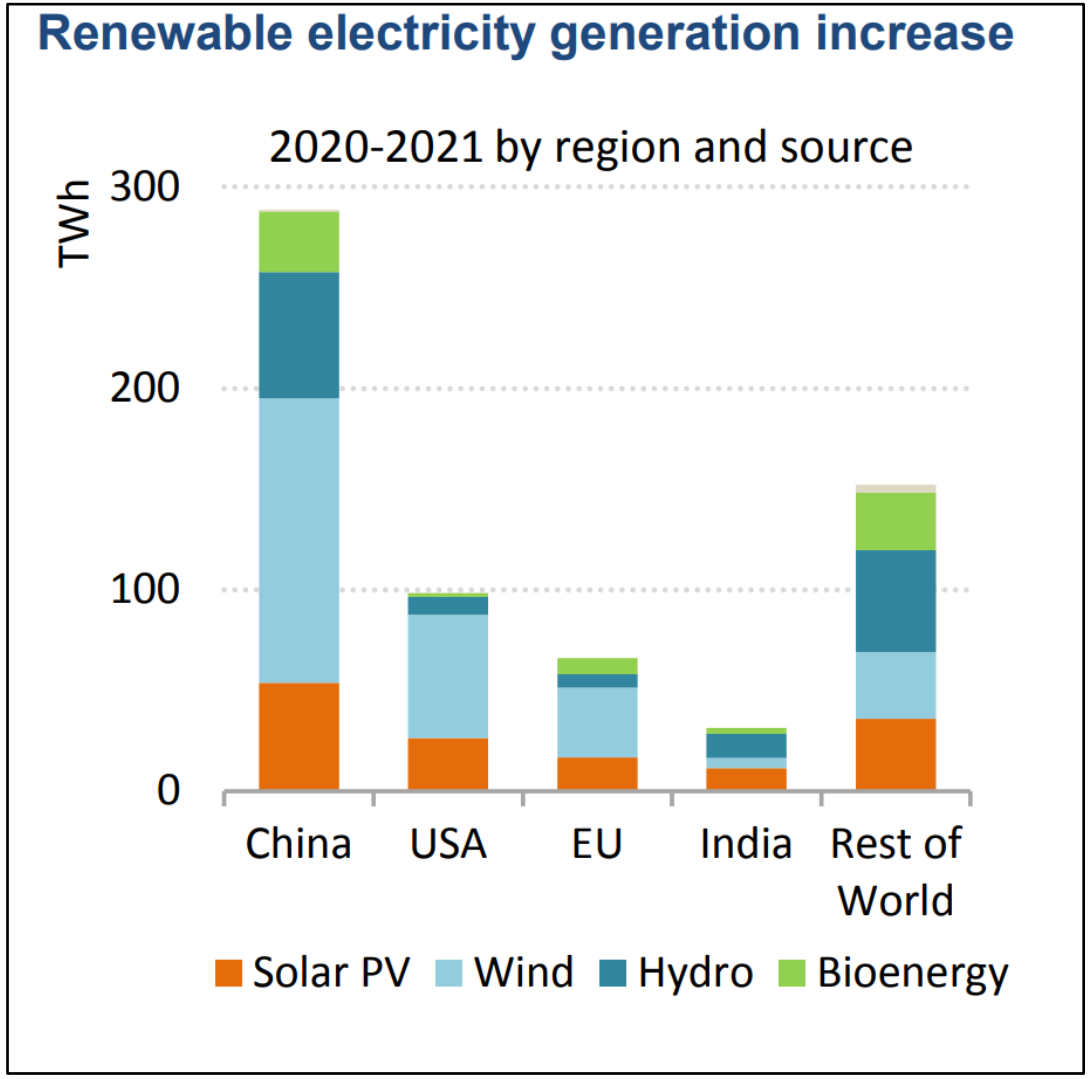
Renewable Electricity Generation By Region



- Renewable electricity generation in 2021 expanded by more than 8% to reach 300 TWh, the fastest year-on-year growth since the 1970s. Solar PV and wind contributed to two-thirds of renewables growth.
- China alone accounted for almost half of the global increase in renewable electricity in 2021, followed by the United States, the European Union and India.

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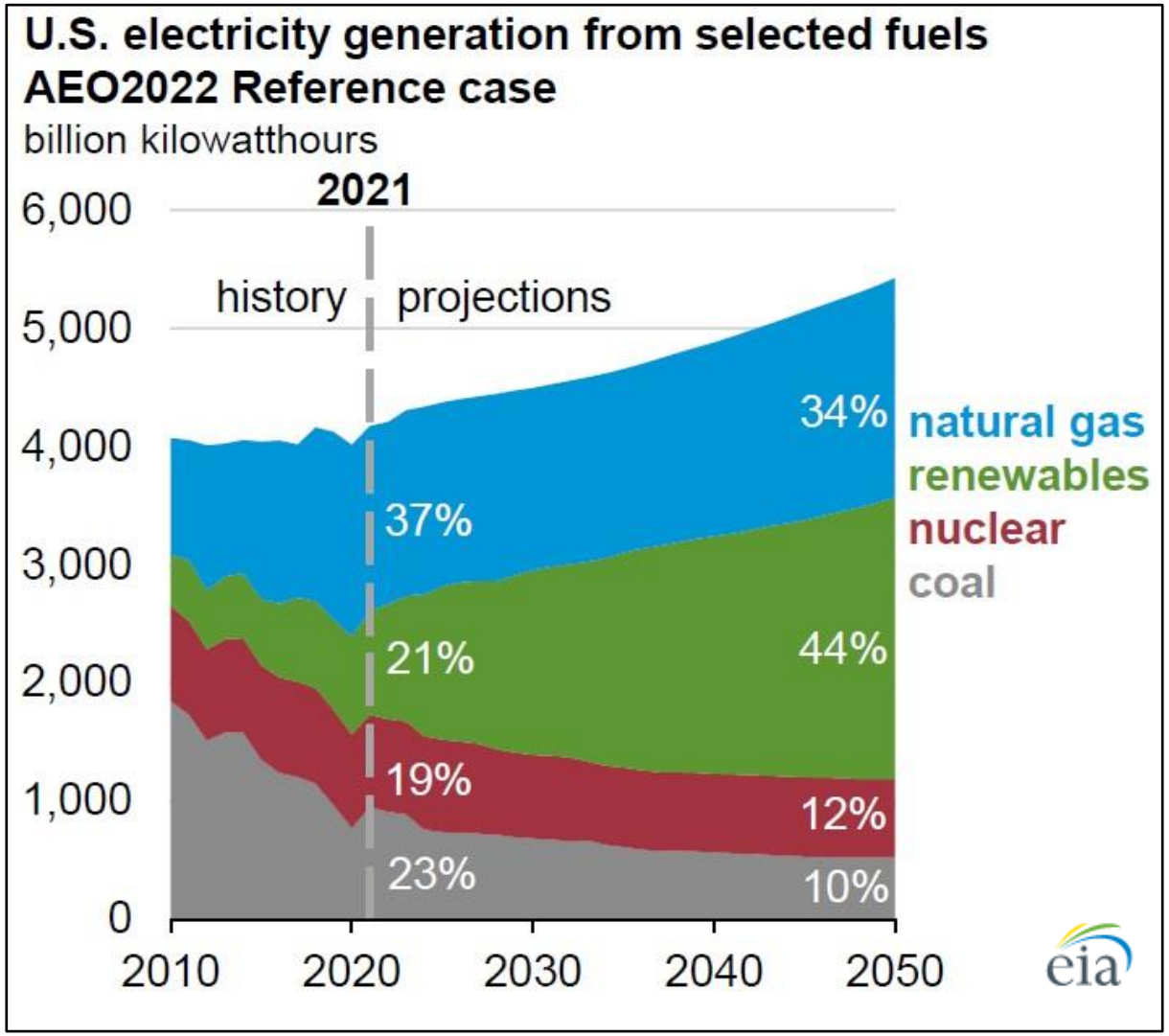
U.S. Electricity Generation By Source



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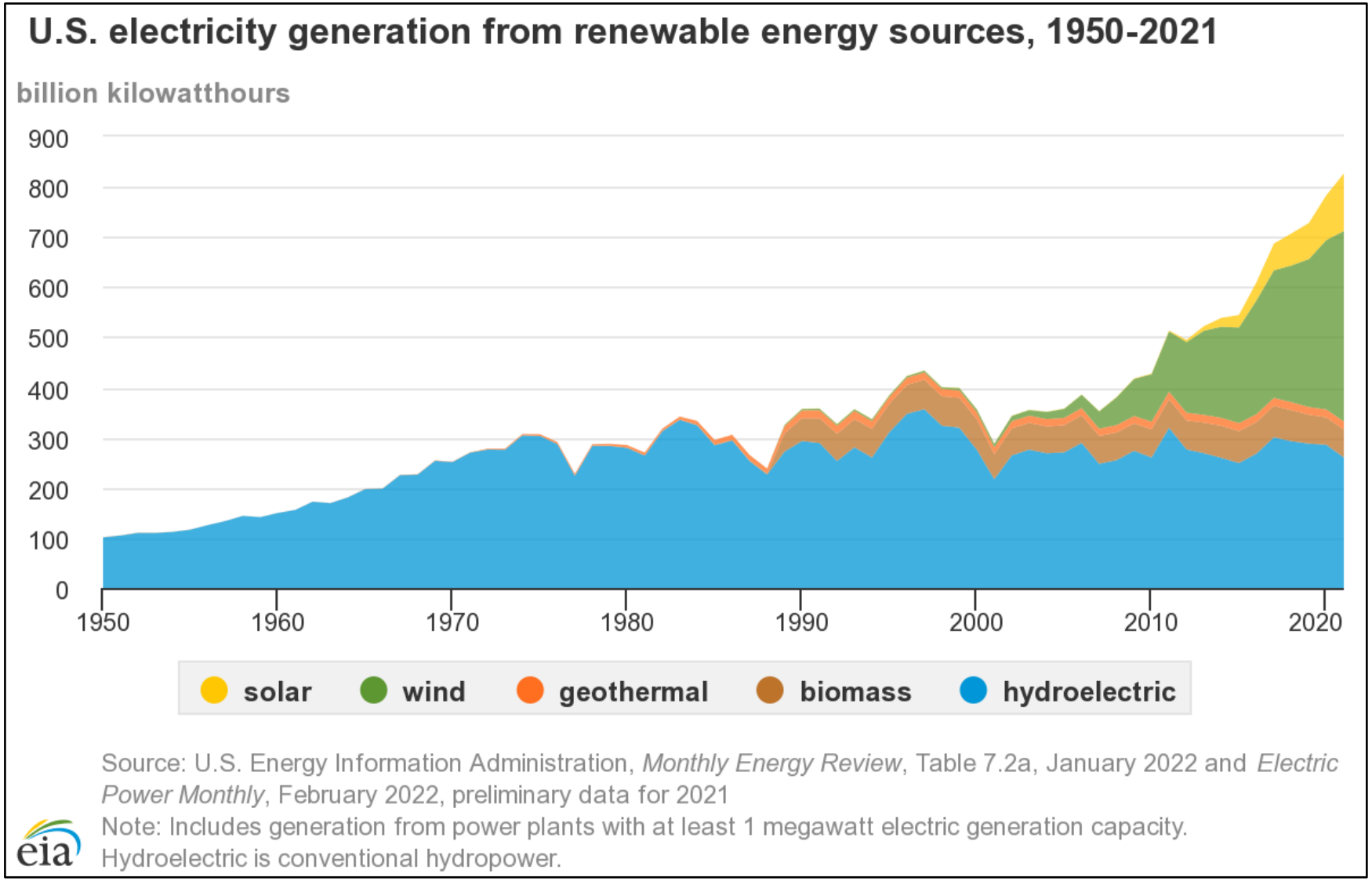
U.S. Electricity Generation From Renewables



Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.2a, January 2022 and *Electric Power Monthly*, February 2022, preliminary data for 2021

Note: Includes generation from power plants with at least 1 megawatt electric generation capacity. Hydroelectric is conventional hydropower.

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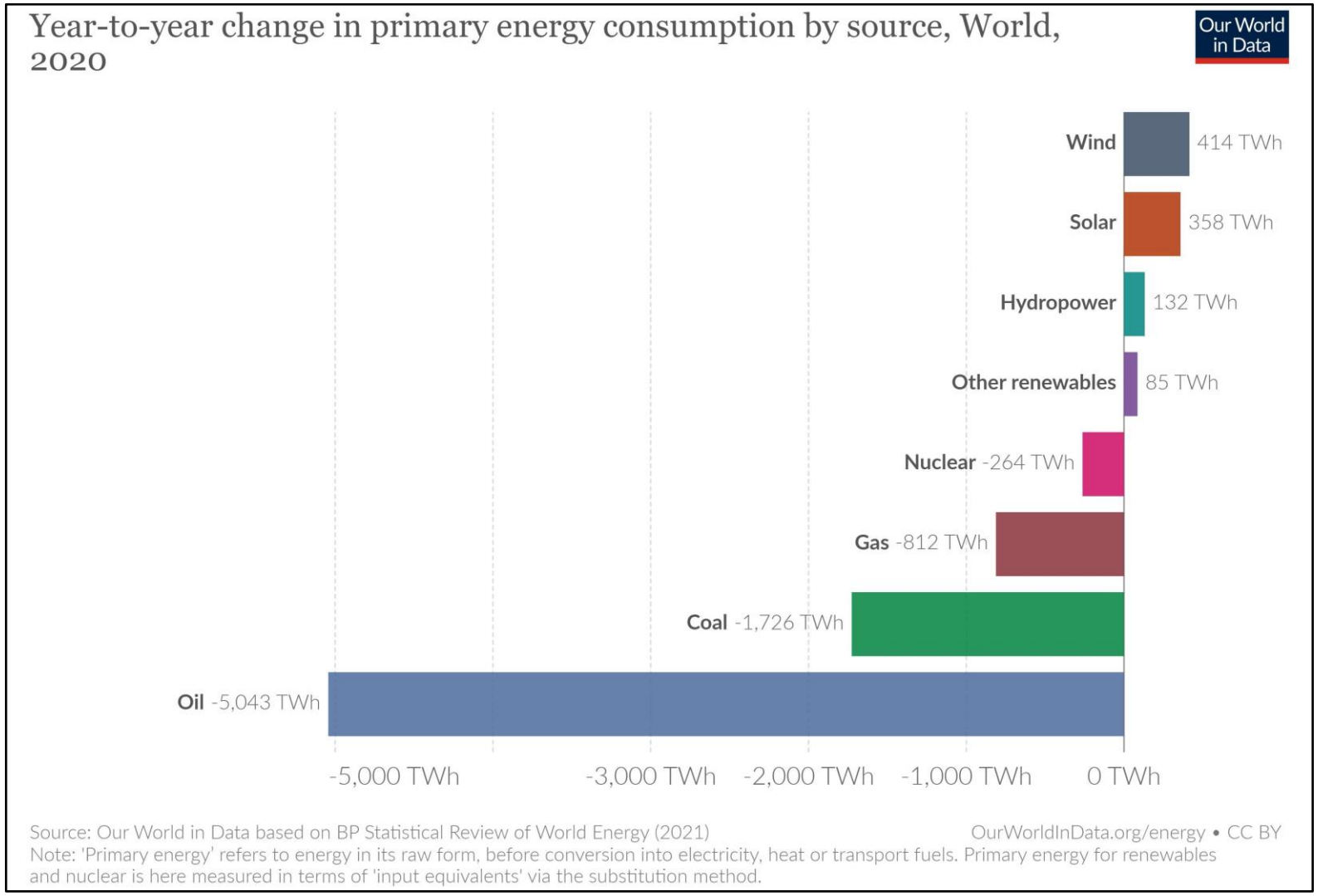
Impact of COVID on Energy Source Consumption



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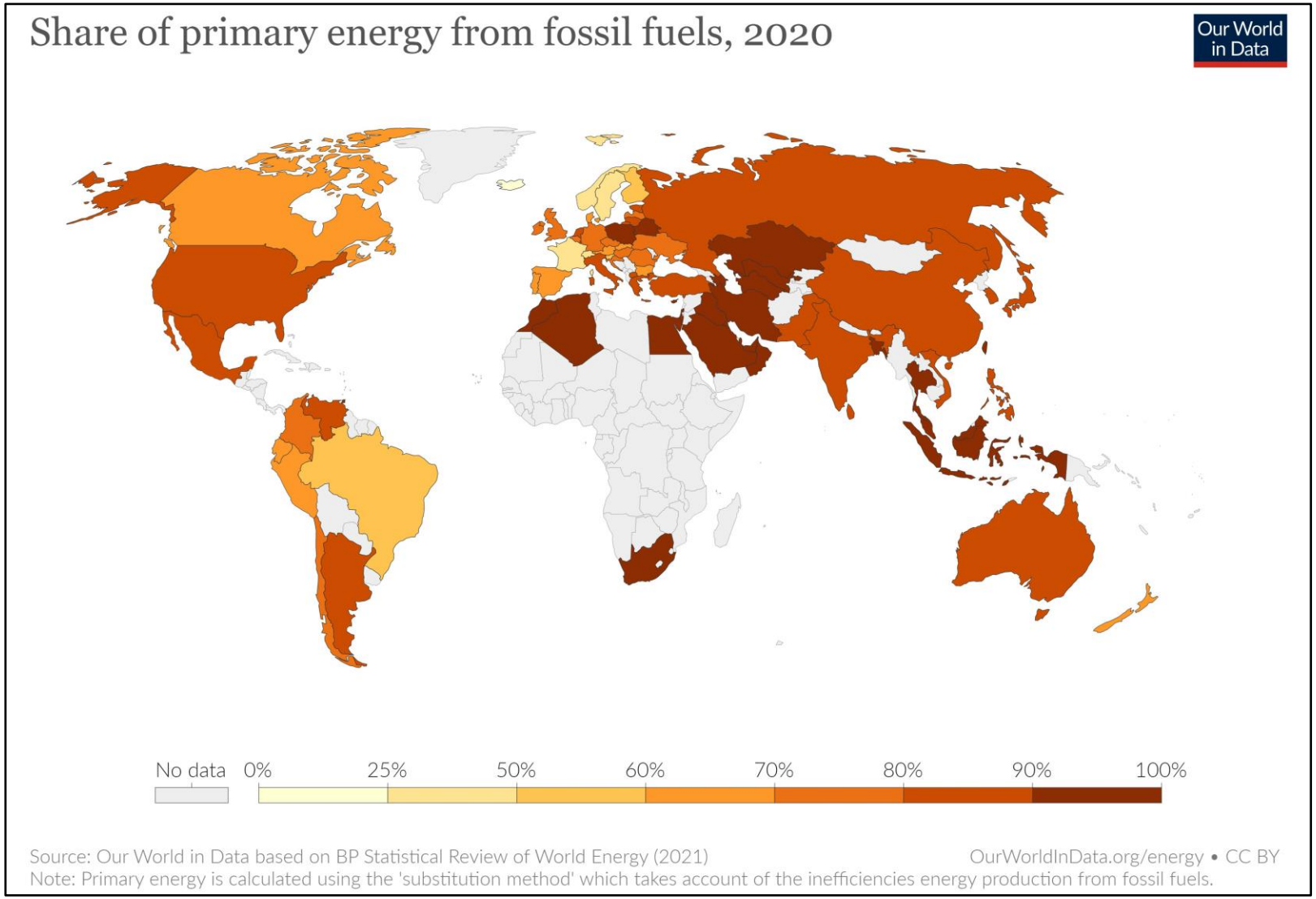
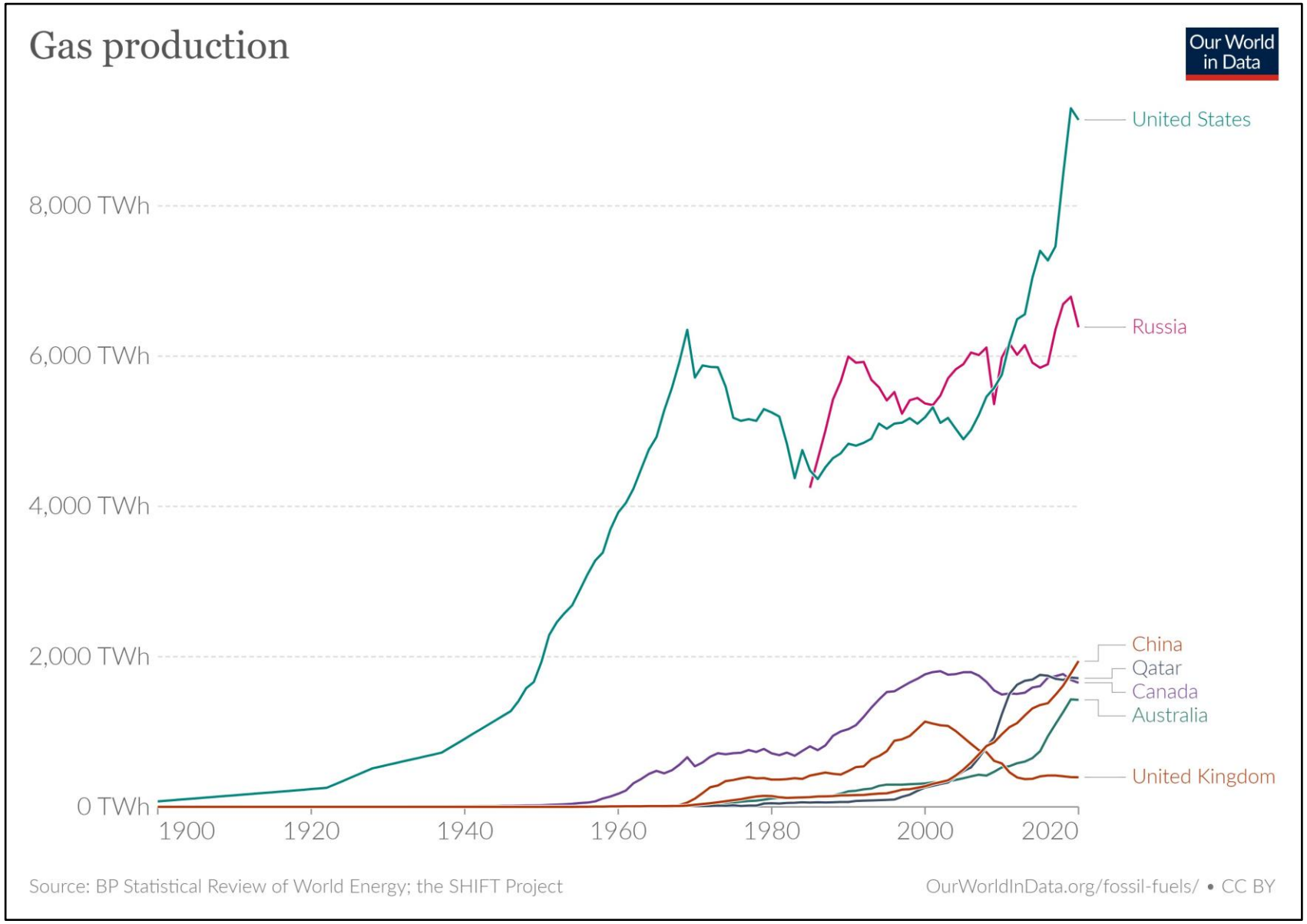
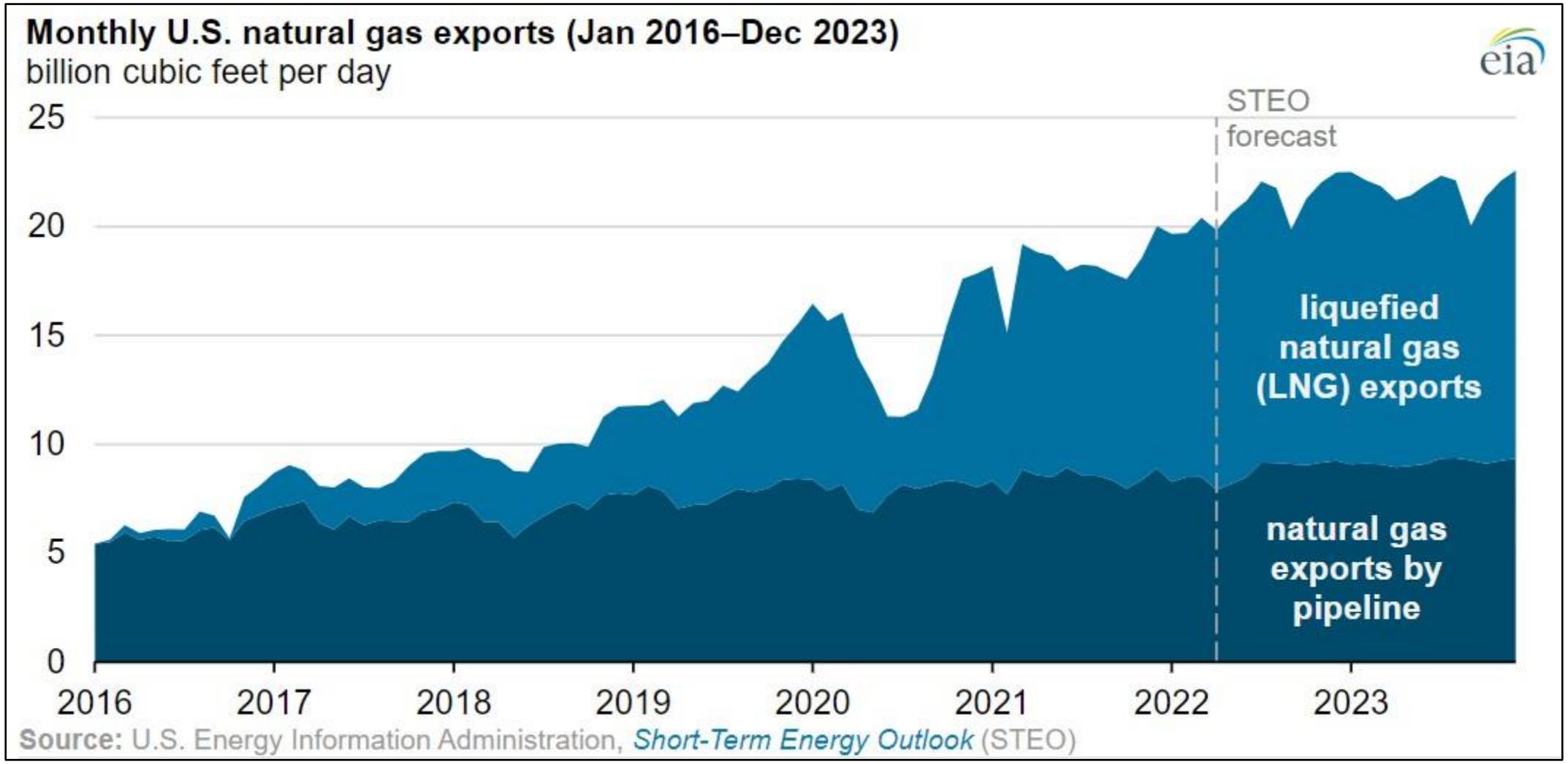
Share of Primary Energy Consumption from Fossil Fuels



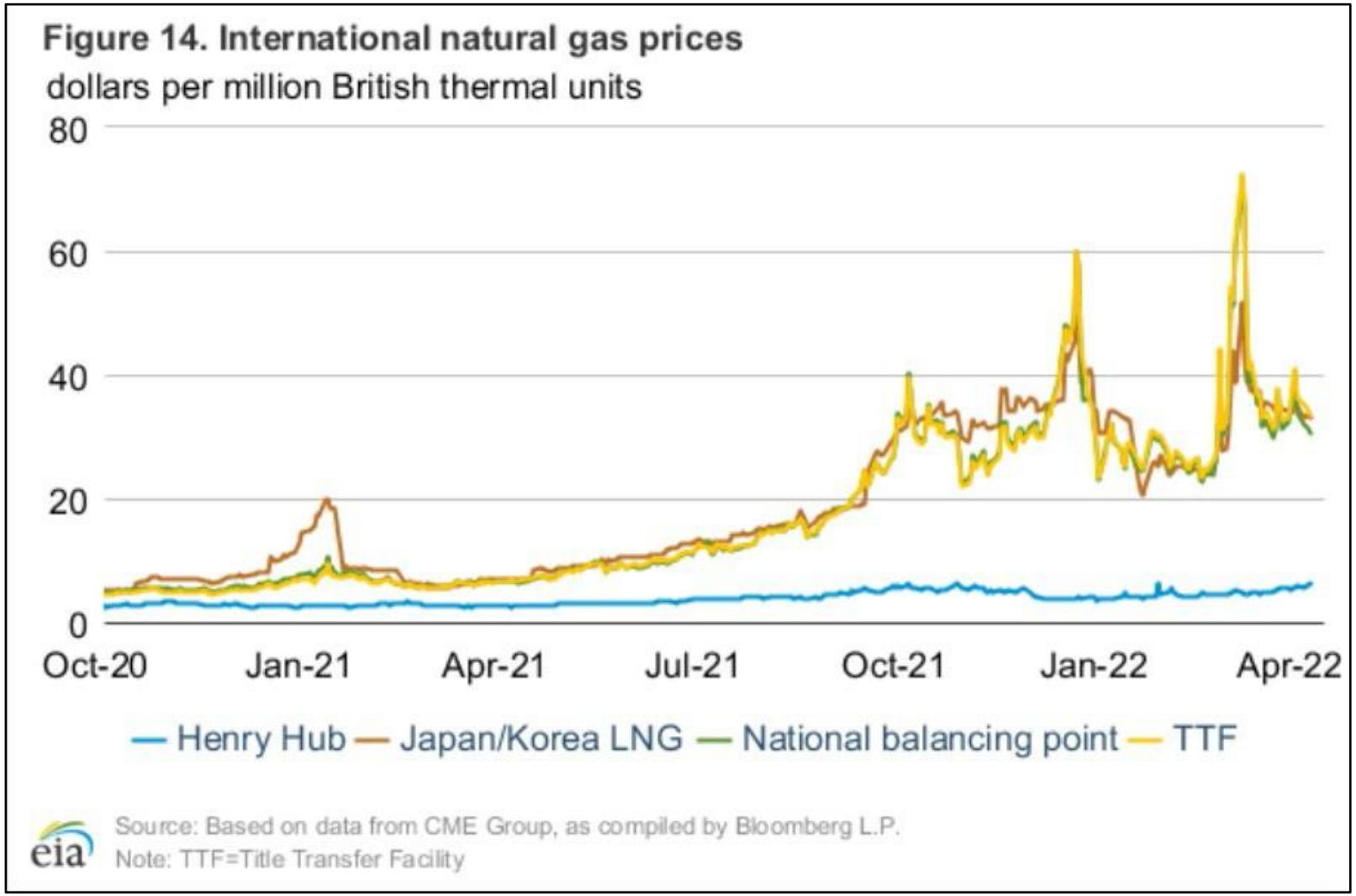
Global Gas Production



U.S. LNG Exports



International Natural Gas Prices



**The UK National Balancing Point (NBP) is the current price in a marketplace at which natural gas can be traded for immediate delivery.*

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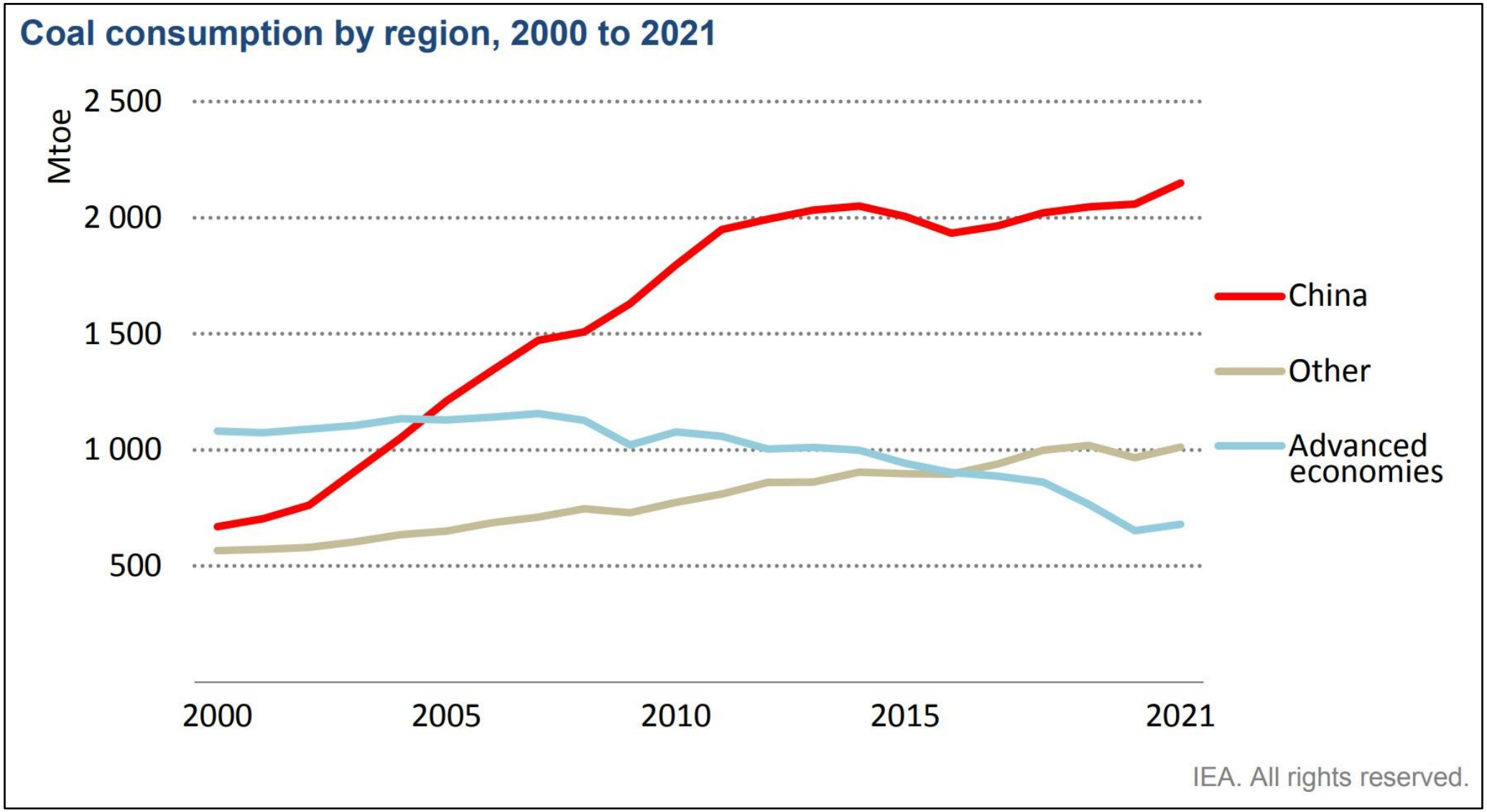
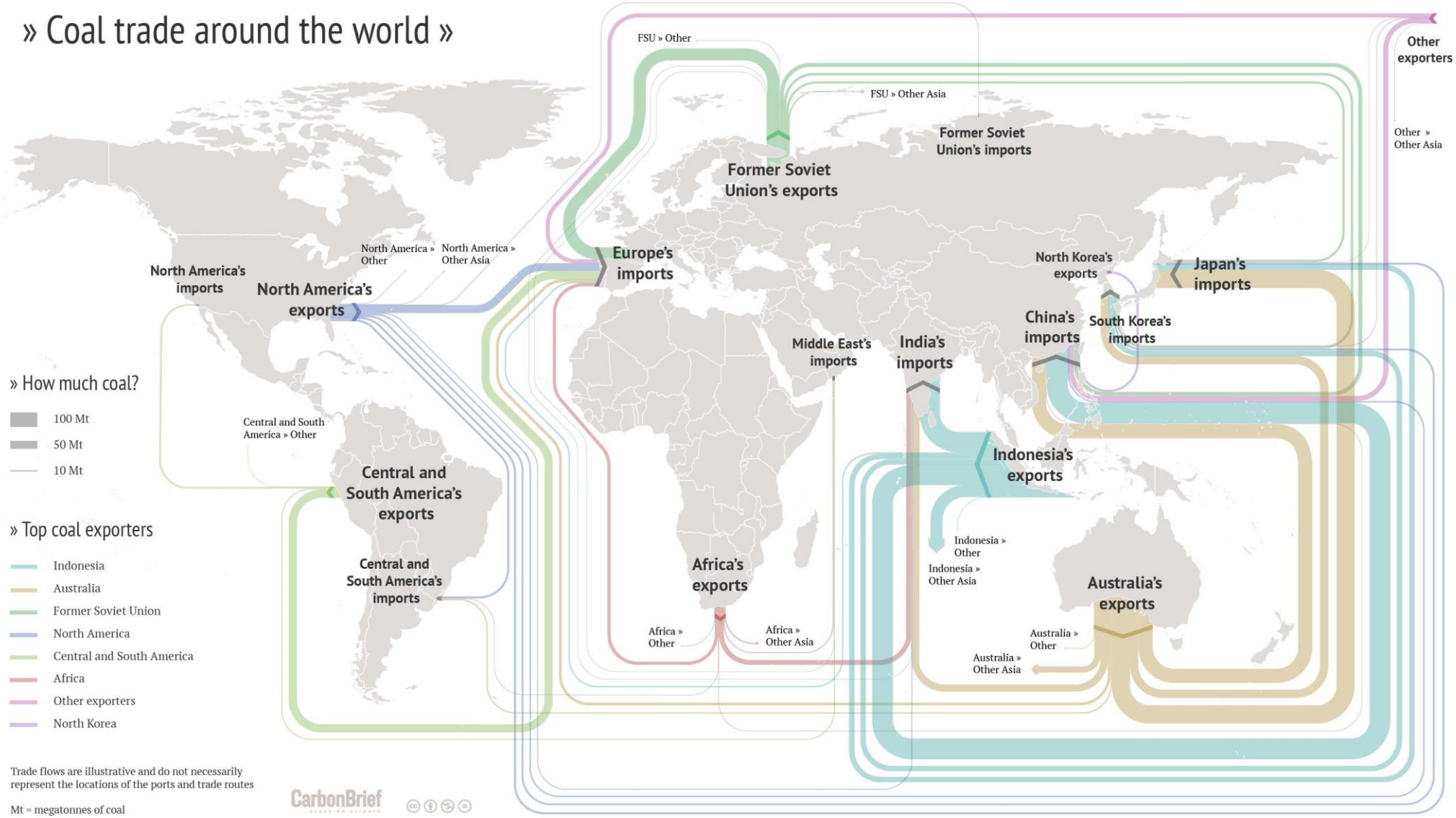
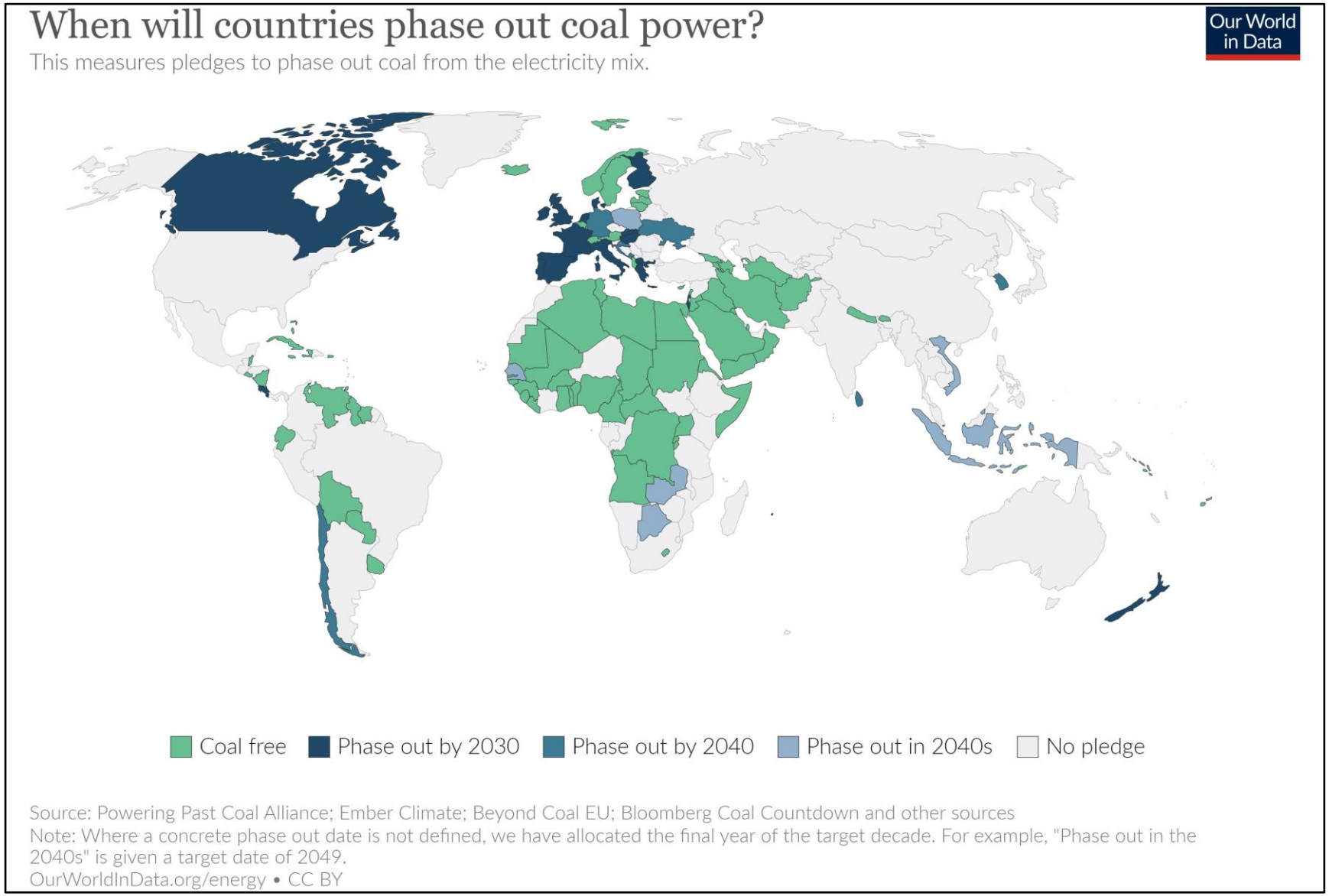
Global Coal Consumption



Global Coal Trade



Phasing Out Coal



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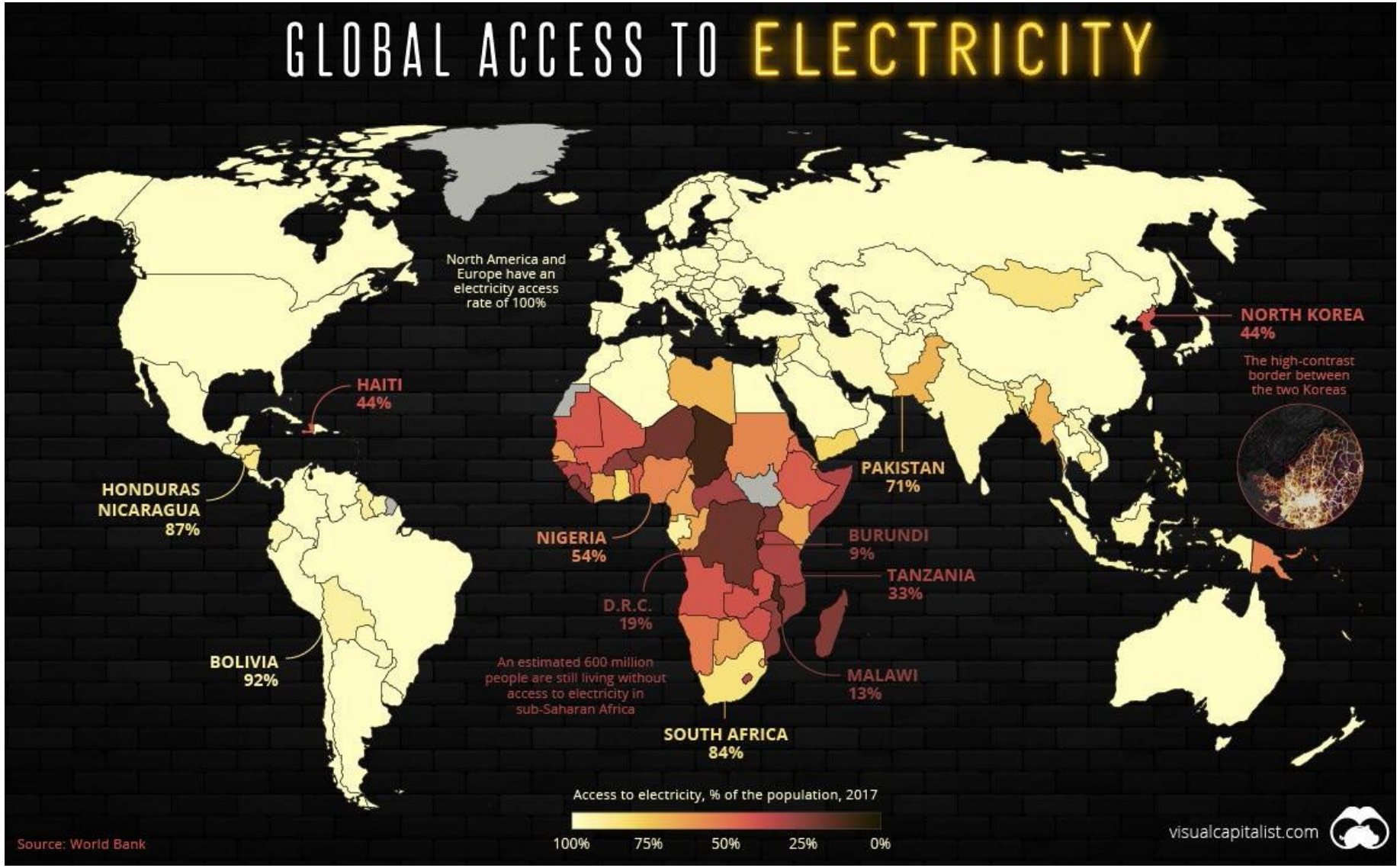
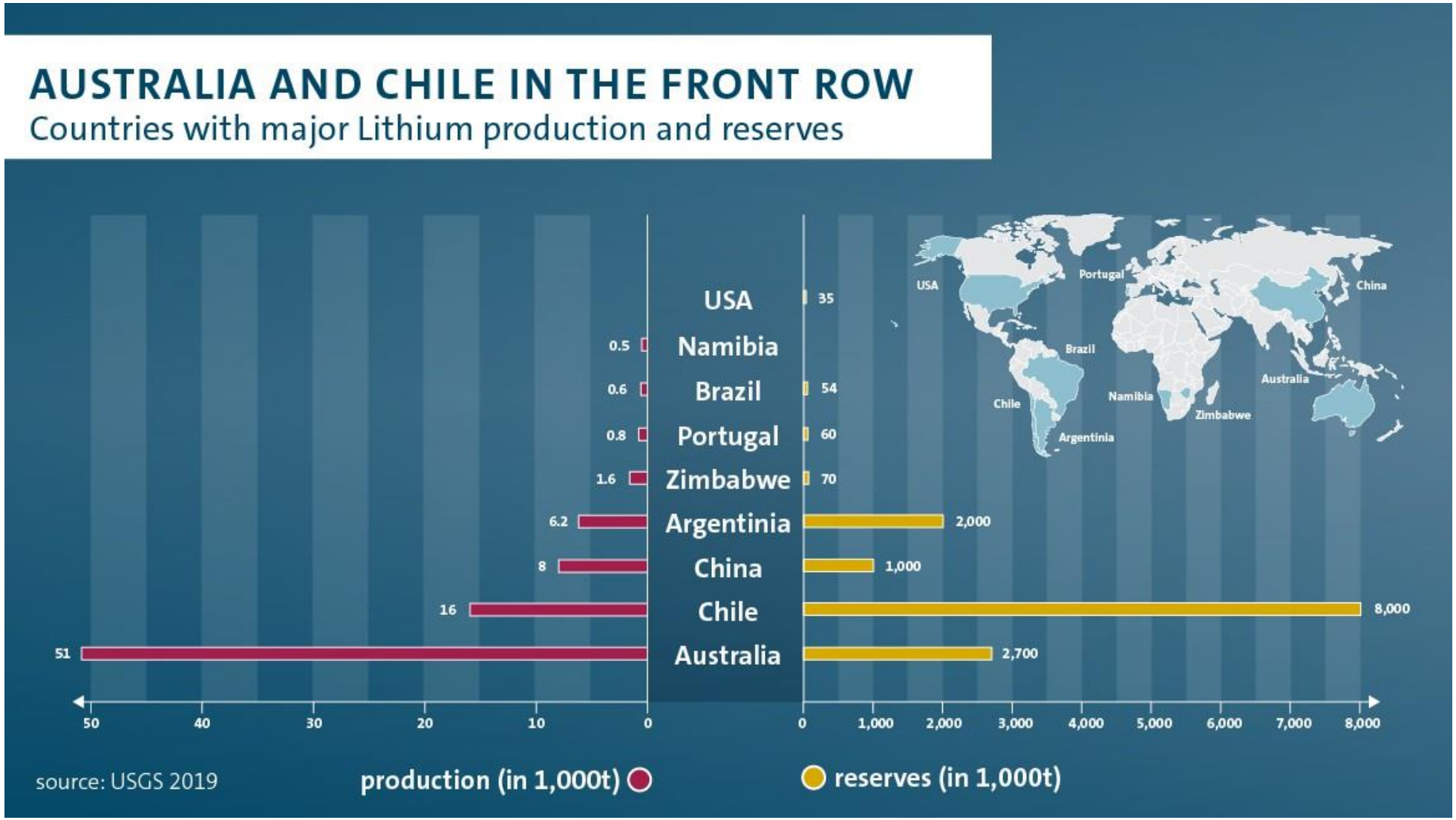
Global Electricity Access



- 760 million people, about 10.5% of the world's population, still do not have access to electricity.
- 60% of sub-Saharan Africa (600 million people) do not have access to electricity.

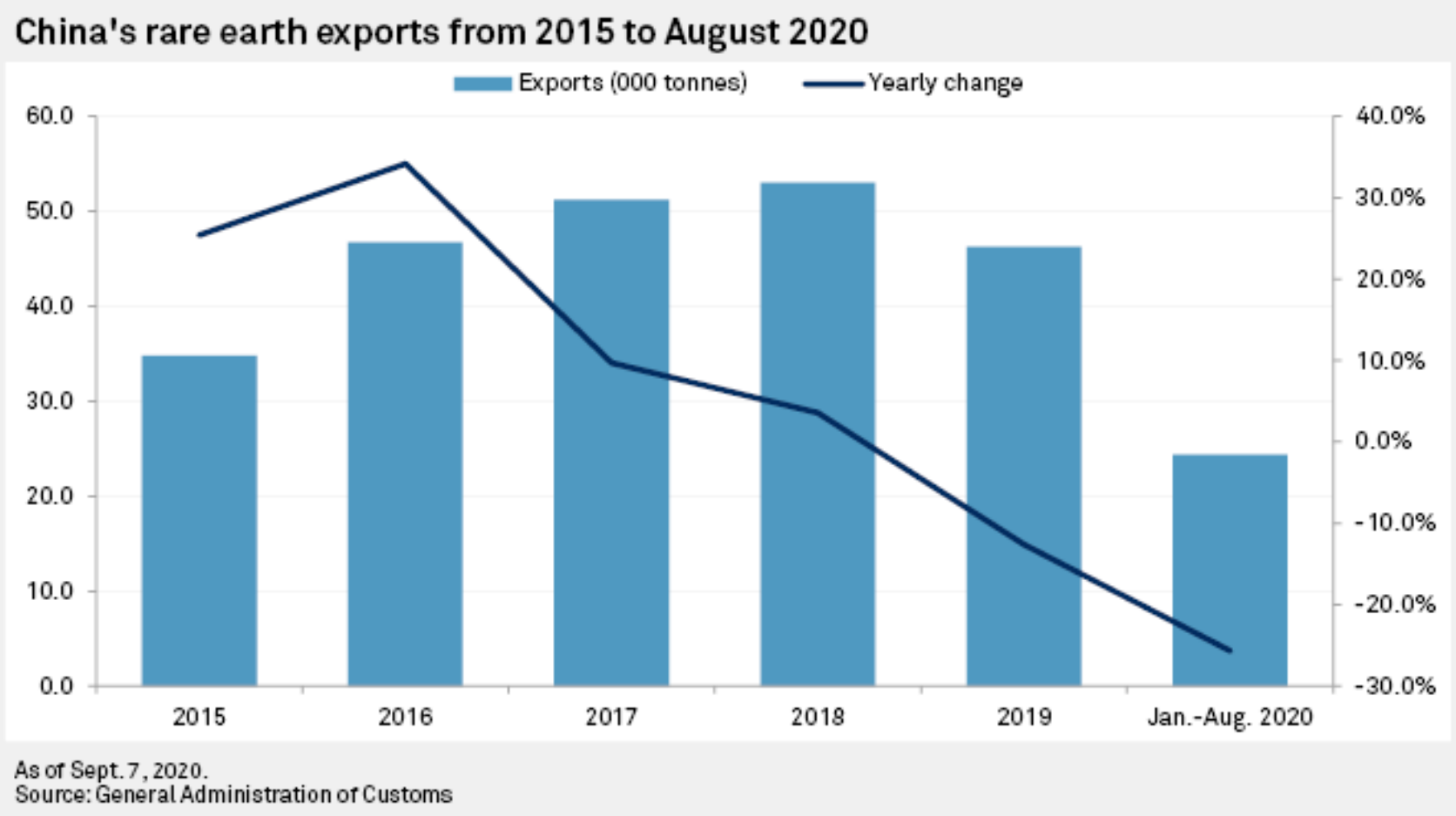
Our World in Data

Global Lithium Supply



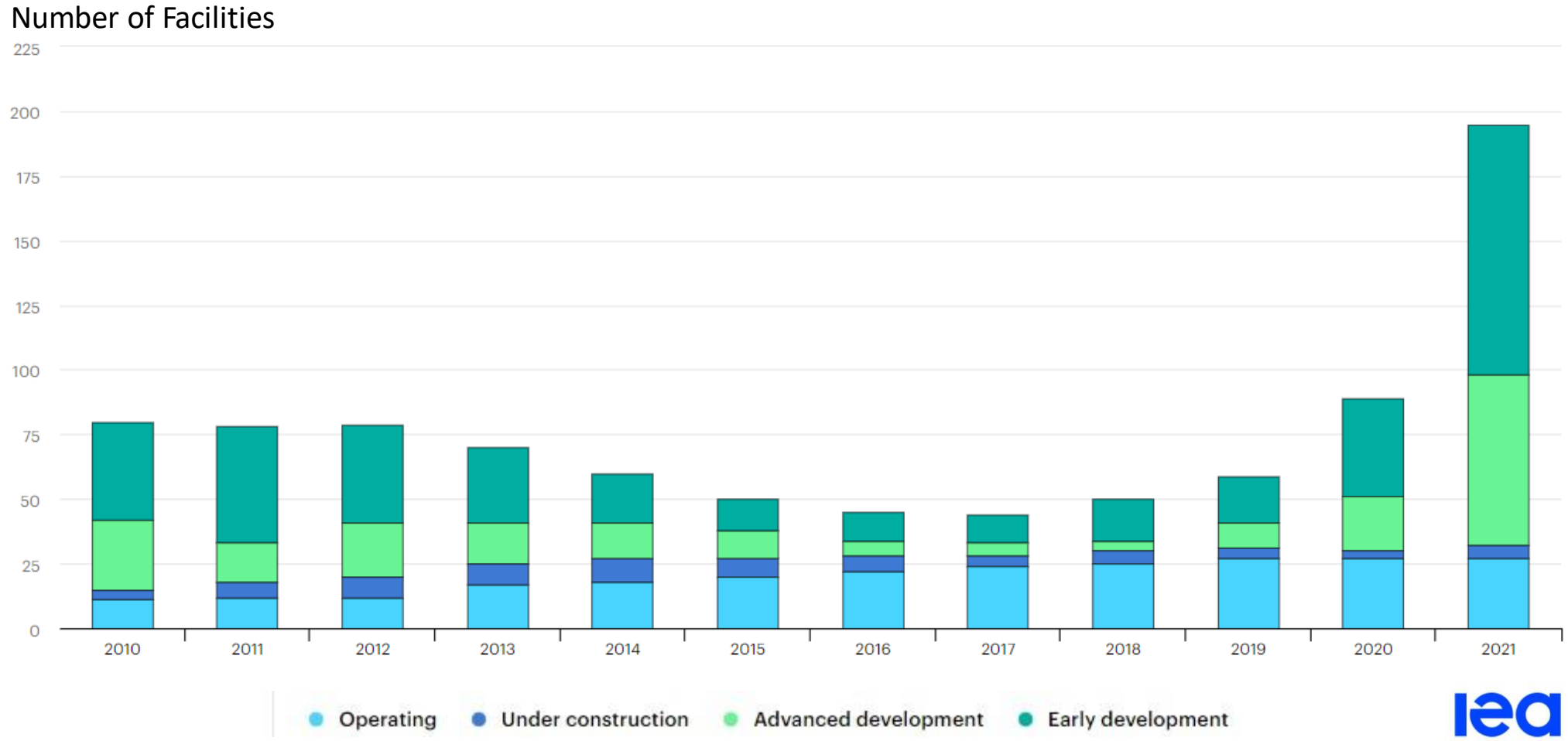
China's Rare Earth Exports

- Battery storage systems – an increasingly important complement to renewable energy – need rare earth minerals in their production.



Global CCUS Facilities: Operating & Development

World large-scale CCUS facilities operating and in development, 2010-2021



Ongoing Energy Considerations

- ESG (environment, social, governance), including an increasing focus on environmental justice
- Robust and changing worldwide energy trade
- Energy storage and battery development and related material requirements
- Infrastructure: transmission and pipelines
- Significant development of wind and solar
- Electrification of transportation
- Continued intense focus on climate change and environmental issues related to all energy infrastructure development
- Wake up call on need for energy diversity and flexibility
- Significant energy poverty remains

Concluding Observations

- The political landscape is rapidly shifting, with an enhanced focus on environment and climate change. Nevertheless, there will be high dependence on fossil fuels for the foreseeable future, before carbon neutrality can be achieved.
- Imports and exports are unpredictable worldwide, due to wars, geopolitics, the pandemic, and other known and unknown variables.
- Increased risks associated with cybersecurity, physical security, and other possible incursions and disruptions with the potential to affect overall national security.
- New energy technologies, including advanced storage systems, will emerge to address climate change and to improve the state of the world's energy supply, transportation, and utilization.
- Changes in the energy and environmental arena will accelerate dramatically and unpredictably.