

Achieving an 80% Carbon Free Electricity System in China by 2035



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Key Conclusions

China could reach 80% carbon-free electricity by 2035 at 6% lower cost

China's power grids can be reliably operated with a high level of non-fossil generation even during summer and winter peaks

Faster transition to a clean power system can reduce additional emission and health impacts by 50+%

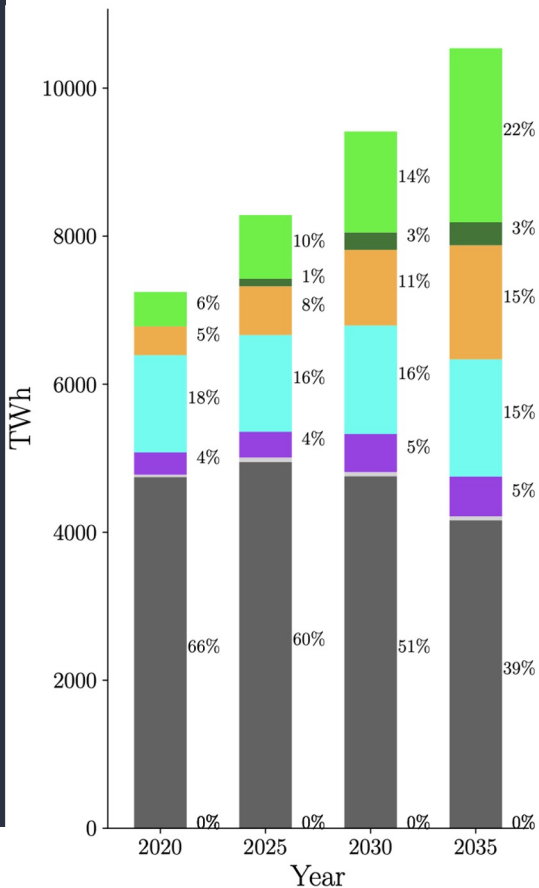
Job gains in clean energy sectors more than offset those lost in coal-related industries



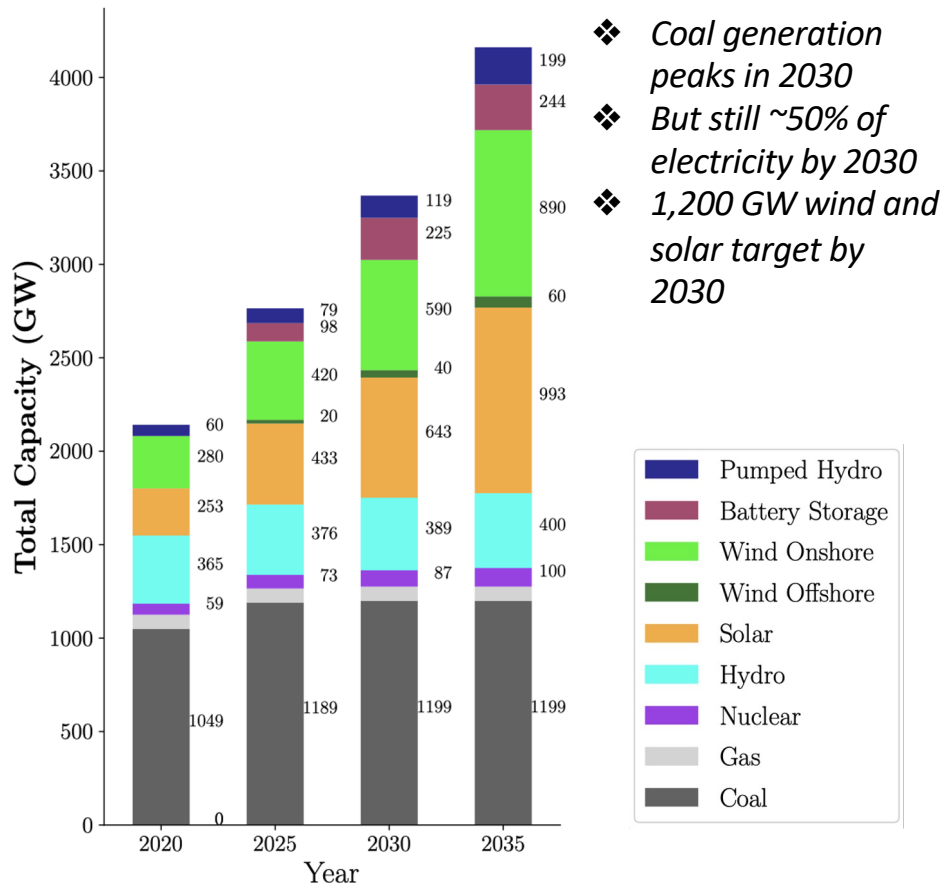
Current Policy Case

CURRENT POLICIES PLACE CHINA ON A PATH TOWARD CONTINUED RELIANCE ON COAL-FIRED GENERATION

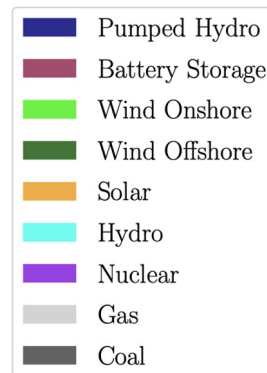
Energy



Capacity

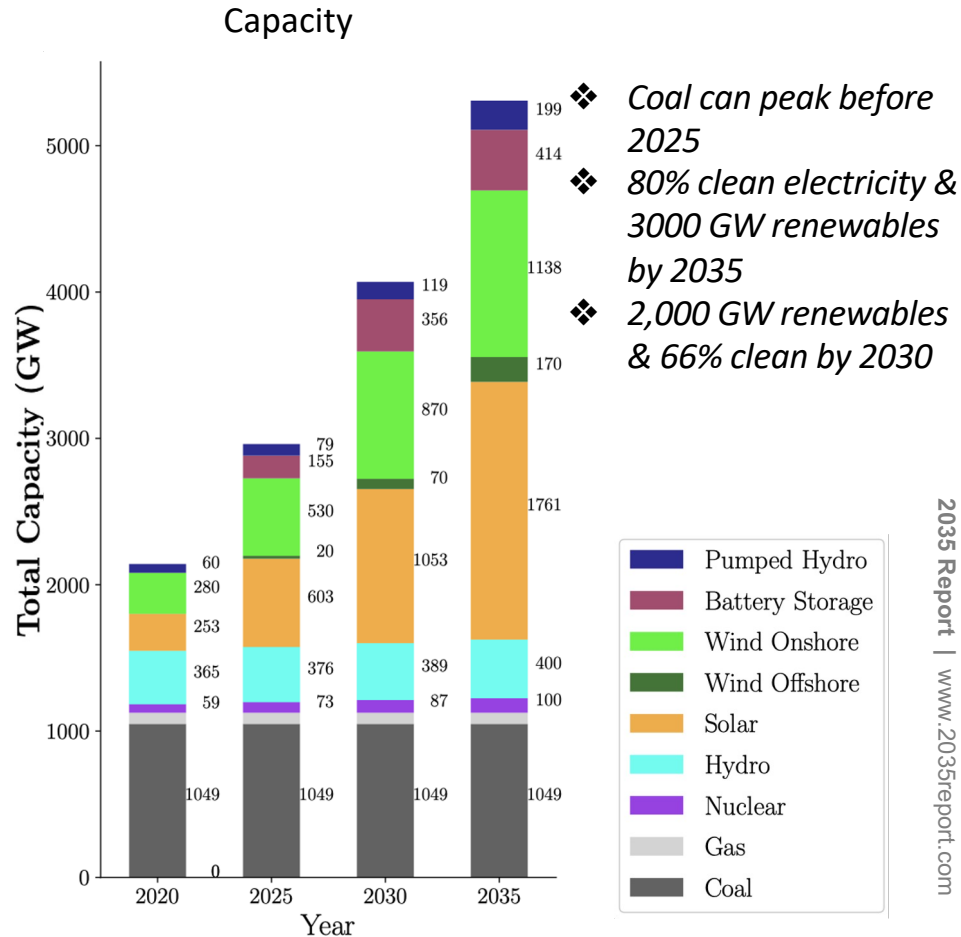
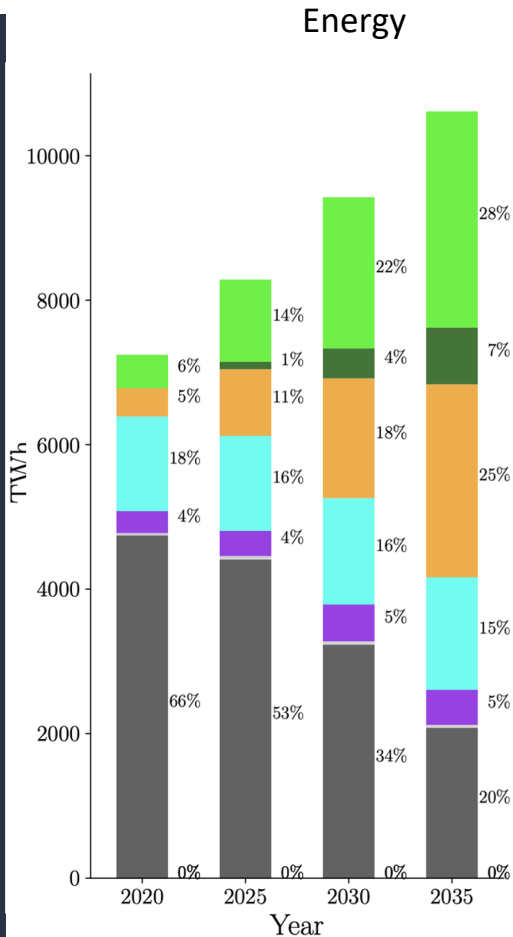


- ❖ Coal generation peaks in 2030
- ❖ But still ~50% of electricity by 2030
- ❖ 1,200 GW wind and solar target by 2030



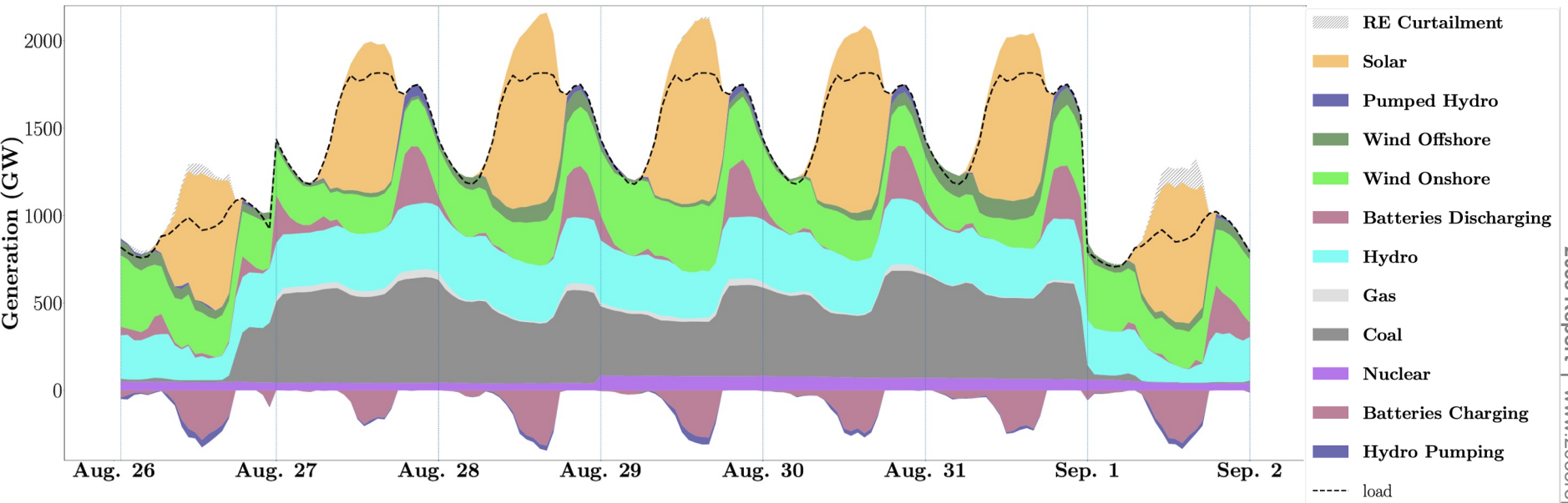
Clean Energy Case

OUR ANALYSIS SHOWS AN 80% CLEAN ELECTRICITY SYSTEM IS AFFORDABLE, FEASIBLE, AND RELIABLE IN 2035.



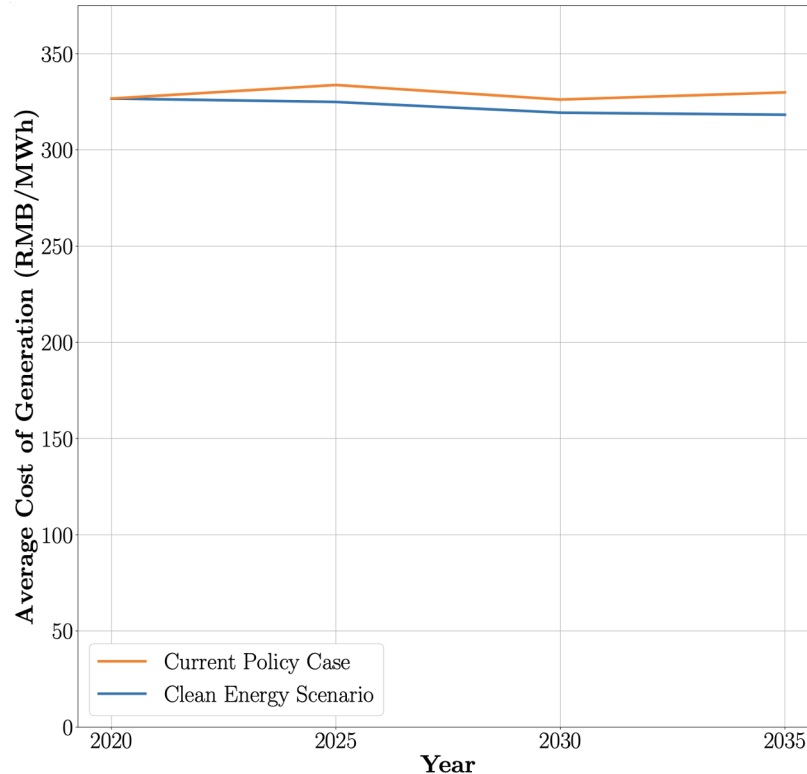
DEPENDABLE GRID WITHOUT NEW COAL CAPACITY - 2035

2035 Peak Net Load Week in Summer – Clean Energy Case



- By 2035, max coal dispatch is **613.2 GW**, **33.8%** of peak load, and **58.5%** of total coal capacity
- Percentage **renewable energy for peak net load week is 37%** (percentage of renewable contribution of the overall generation)

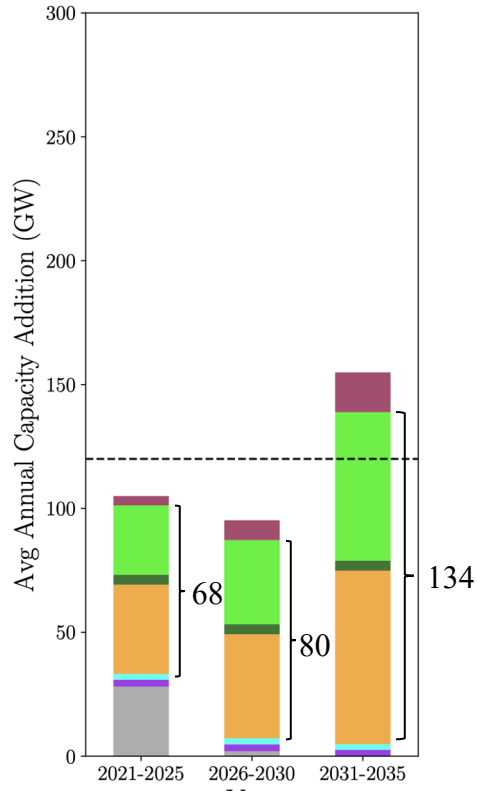
ELECTRICITY COSTS: AVERAGE COST OF GENERATION ~6% LOWER UNDER CLEAN ENERGY SCENARIO BY 2035



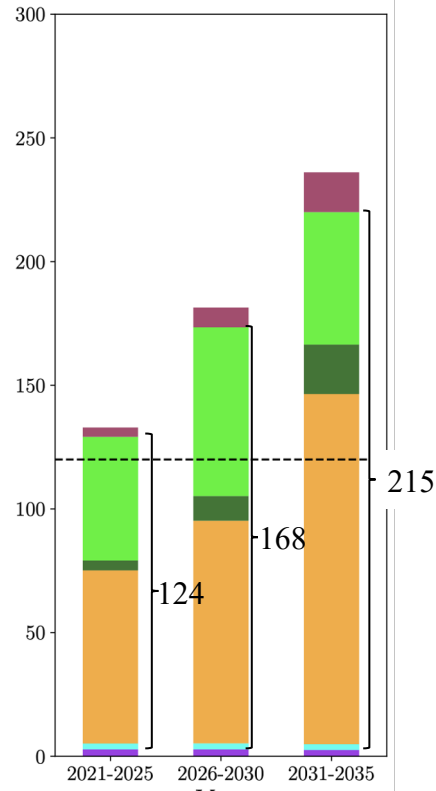
All generation costs (including fixed cost of existing + new capacity and fuel costs) and new transmission cost is included. Distribution cost and existing transmission cost are not included.

CLEAN ENERGY CASE IMPLIES RAPID BUT FEASIBLE WIND & SOLAR DEPLOYMENTS

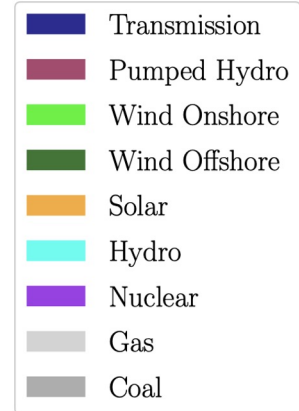
Current Policy Case



Clean Energy Case

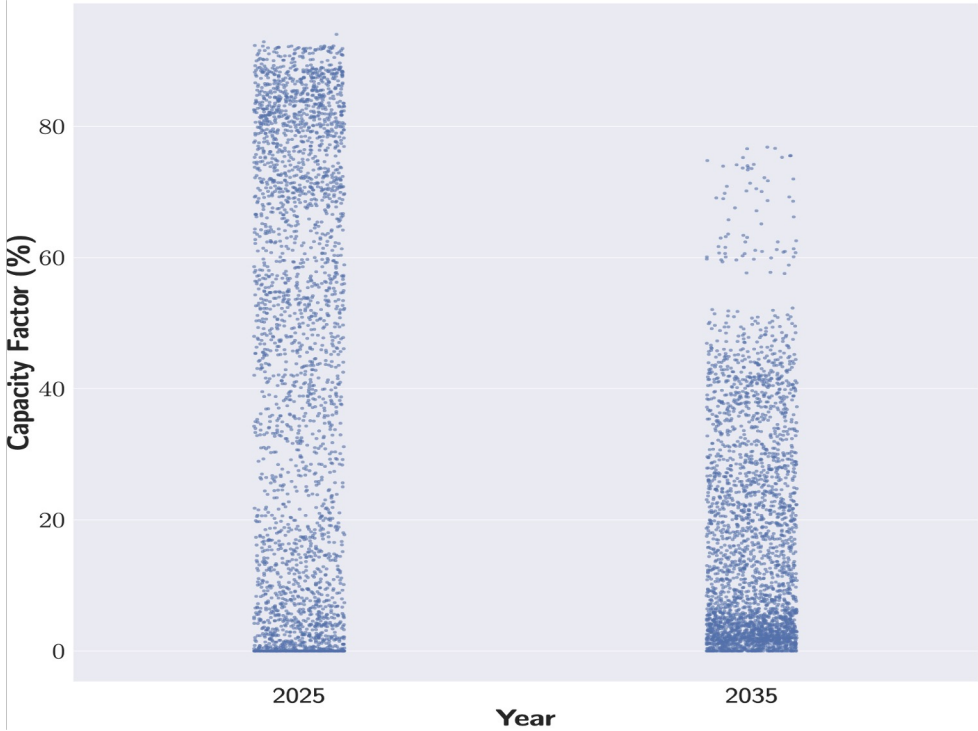


In 2020, China deployed 120 GW of wind & solar



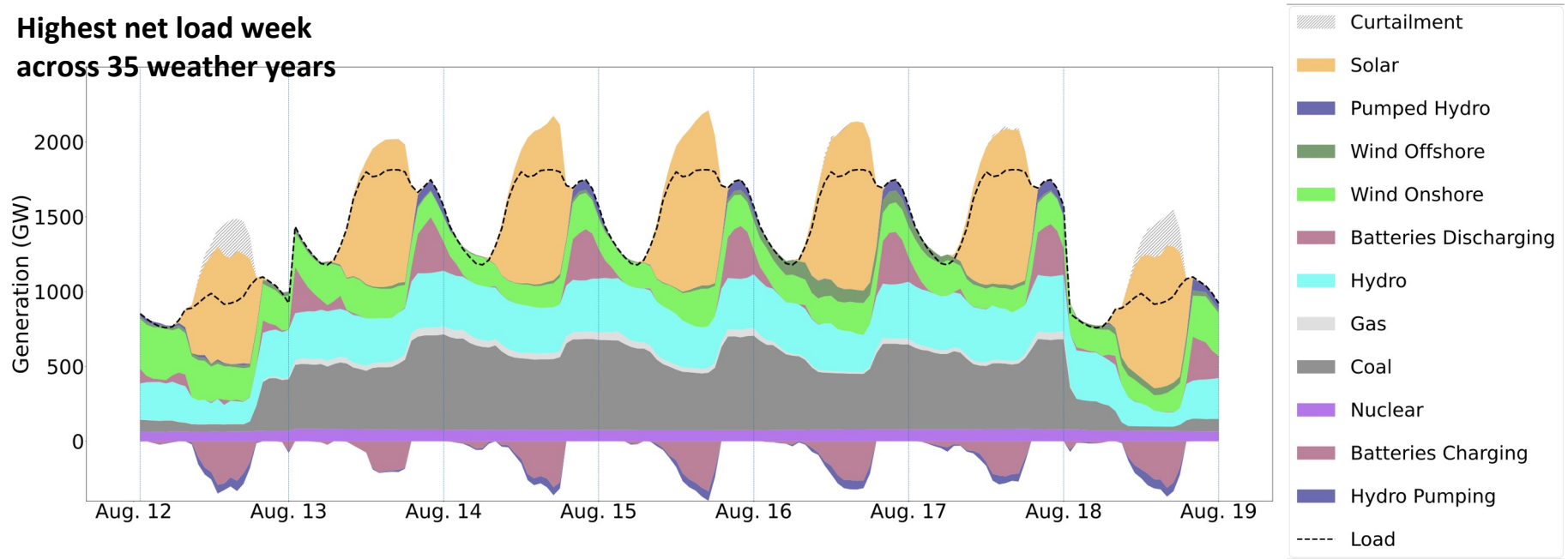
INDIVIDUAL COAL PLANTS OPERATE AT VERY DIFFERENT CAPACITY FACTORS: HALF ARE RUNNING <10% BY 2035

Capacity Factor of Individual Coal Plants



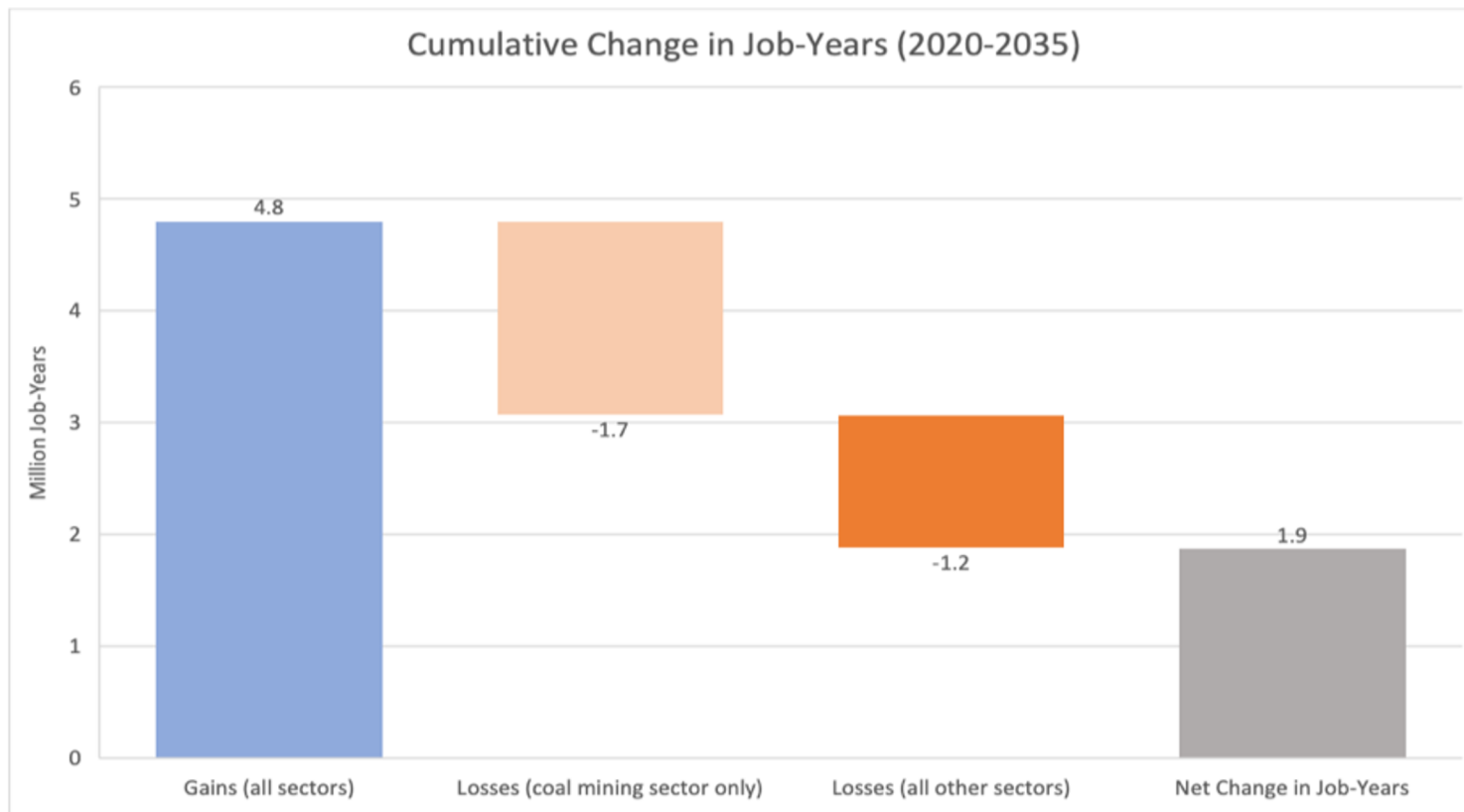
What about the days with historically low RE Generation ? (Summer)

Highest net load week
across 35 weather years



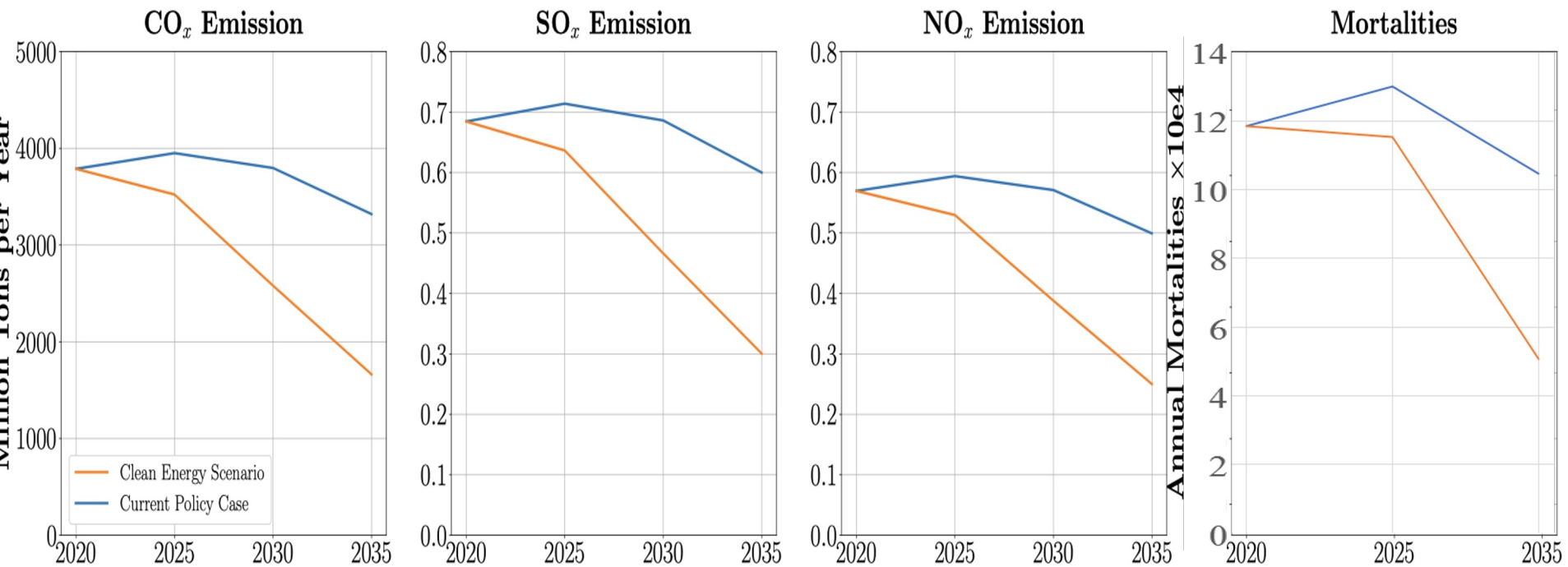
RE generation drops by 12% (**162 GW**) and as a result, the net load increases by **162 GW**.
Even if 266 GW of coal capacity is retired and historically low RE generation, the grid still remains dependable.
Existing coal and gas capacity fills this gap.
(max coal + gas generation = **732 GW** against **690 GW** in the base year).

TRANSITION TO 80% CLEAN GRID RESULTS IN NET INCREASE IN EMPLOYMENT, BUT REDUCES JOBS IN COAL MINING SECTOR



AN 80% CLEAN GRID ENSURES CHINA CAN PEAK EMISSIONS BEFORE 2030, WITH MASSIVE CLIMATE AND PUBLIC HEALTH BENEFITS

China's Electricity Sector Emissions



China RE Policy Updates

NEA raised 2023 solar & wind target to 160 GW, likely to achieve its 2030 goal of 1200 GW solar/wind, around 2025

NEA also release Mid-to Long-term Development Plan for PHS: ~421 GW by 2035
By 2025, 80% of incremental demand to be met by clean energy

Aim for a unified national electricity market by 2025, potentially accelerating RE integration and squeezing out coal generation

Yet, another rush to coal power (88 GW approved so far in 2022) to address energy security





QUESTIONS/DISCUSSION

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