



China power sector reform and power trading - an overview of recent policies and trends



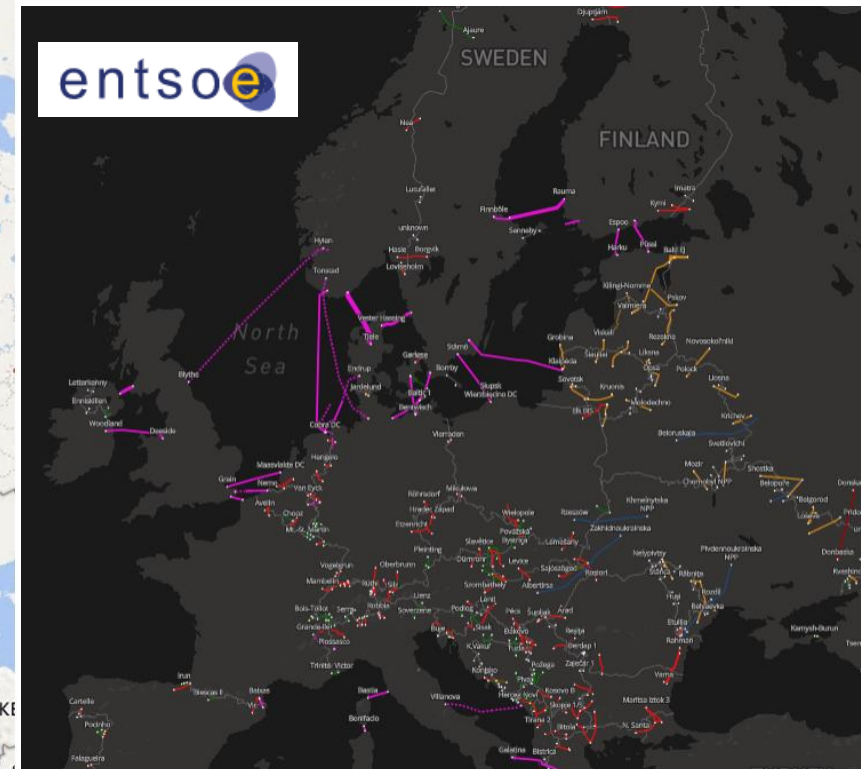
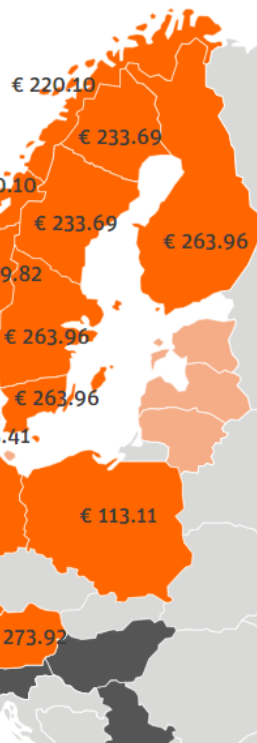
Yan Qin, Lead analyst at Refinitiv (Norway) & Research Associate at OIES

European power system is highly connected

Liberalized power markets enable resources to be utilized in a wider area

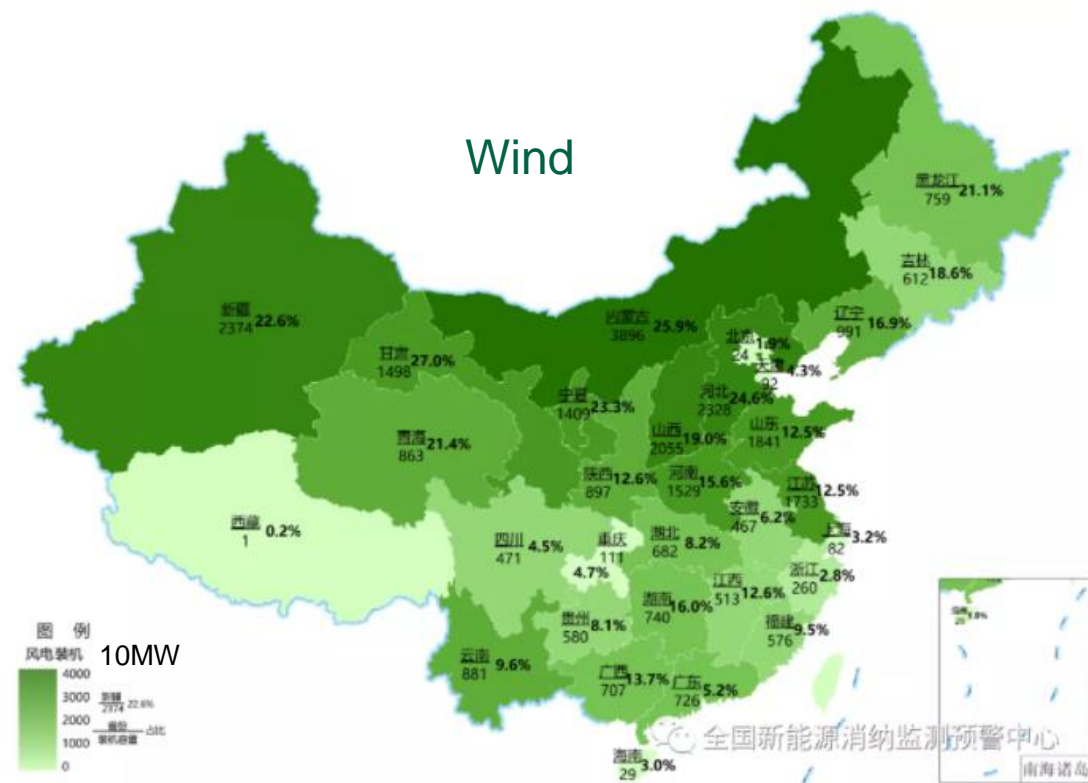
Day ahead market

epexspot

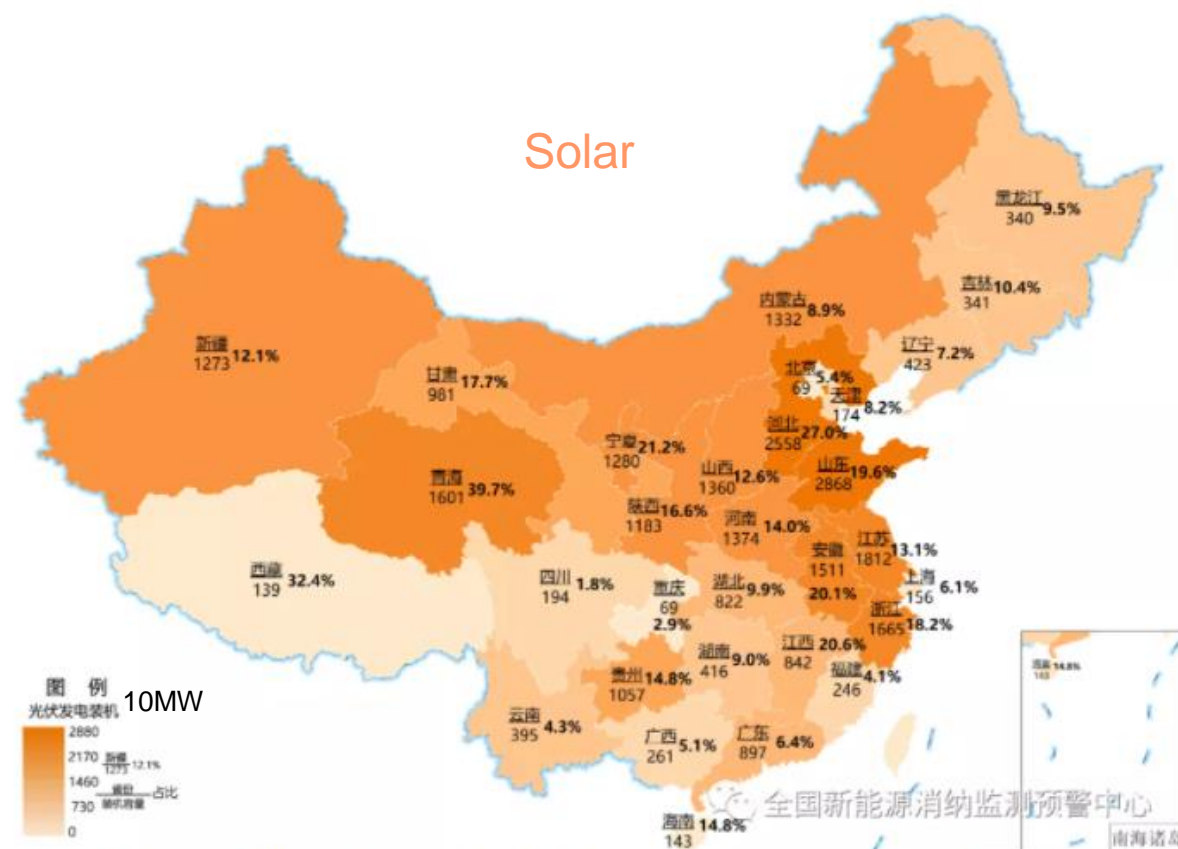


Efficient power market and grid can help renewables deployment in China

On 23 September when Northern China experienced power shortages and near 10 GW supply gap, the grid was still exporting 4.5 GWh/h electricity to Hebei/Shandong province due to rigid long-term power contracts



截至9月底各地区累计风电装机（万千瓦）及占本地区总装机比重
Wind installed capacity as of Sep 2021, and share of provincial fleet



截至9月底各地区累计光伏发电装机（万千瓦）及占本地区总装机比重
Solar installed capacity as of Sep 2021, and share of provincial fleet

China's power sector reform speeded up this October:

...triggered by power shortages in late September, but it is a long process in the making too

2002

First round
of reform

2015 Document No.9

New round of power sector reform

中共中央文件

中发〔2015〕9号

中共中央 国务院
关于进一步深化电力体制改革的若干意见
(2015年3月15日)

Oct. 2021

Coal-fired power tariff reform (No.1439)

国家发展改革委关于进一步深化
燃煤发电上网电价市场化改革的通知

发改价格〔2021〕1439号

Nov. 2021

Xi Jinping: Establish national electricity market

2021-11-24 19:08:51 来源：新华网

习近平主持召开中央全面深化改革委员会第二十二次会议强调

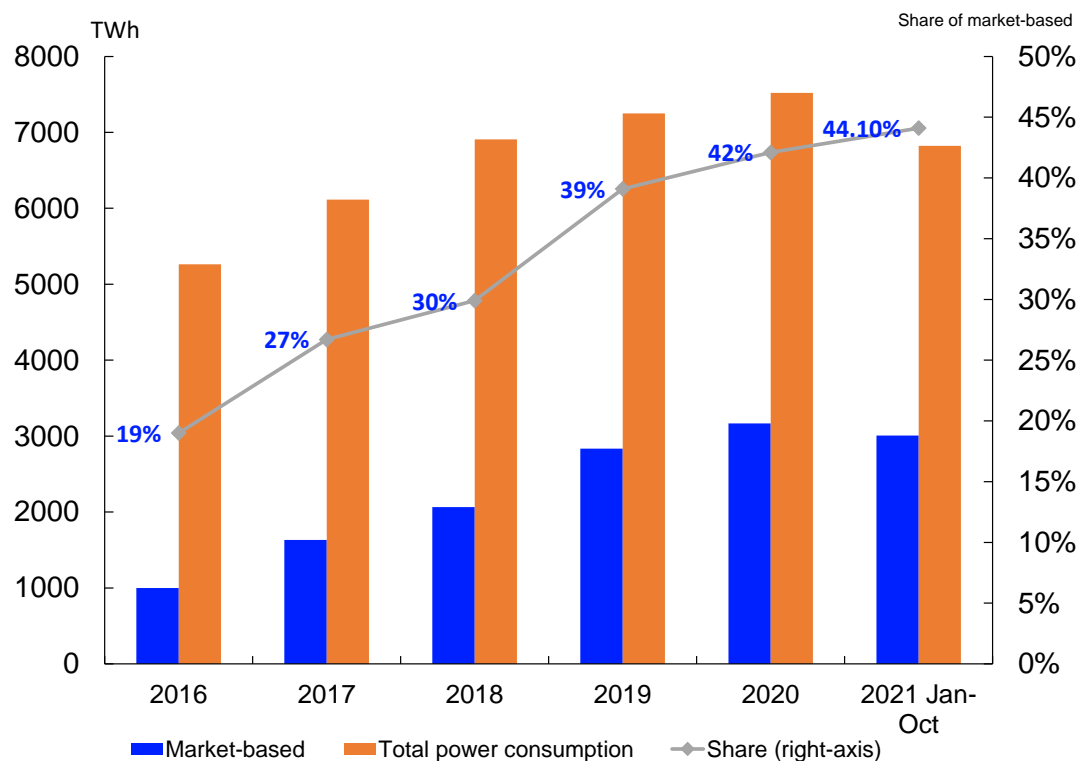
加快科技体制改革攻坚建设全国统一电力市场体系 建立中小学校党组织领导的校长负责制

Effective market and price signal could facilitate the decarbonization of energy system

Key highlights of the October 2021 Coal-fired tariff reform

It not only covers coal-fired tariff, but also fundamentally changes the role of grid company

- *Market-based: 44% of total power consumption*
- *Mid-to-long term trading*



Source: China Electricity Council

1. **Widening** the Coal-fired benchmark tariff fluctuation band to $\pm 20\%$ (from $\pm 15\%$, 0.35-0.6 CNY/kWh)
 - *Energy-intensive industry not subject to this limit*
 - *Spot trading not subject to this limit*
2. **All** of coal-fired power generation into market (70% to 100%)
3. **All** of industrial&commercial users into market (43% to 100%)
4. Residential and agricultural users' tariff **unchanged**

Gamechanger

All of industrial & commercial users will now buy electricity from the market, direct or via Grid companies
So this changes the role of Grid companies

'Power price can rise or decrease'

The energy regulators have put forward policies facilitating the reform

Comprehensive policy framework to build 'new power system' fulfilling the climate targets

'Time of use' electricity price

- Peak, Valley, Critical Peak

Cross provincial spot trading rules

- Covers both UHV and provinces in same regional grid
- All types of generation (not only RE)

Draft national spot power trading rules

- In internal consultation until late November

'Opinions' approved at 24 Nov Meeting of Central Commission for Comprehensively Deepening Reform

- 'Opinions on speeding up the establishment of national electricity market system'

Forthcoming

The October power tariff reform rolled out quickly in provinces

In Nov, 29 provinces officially implemented the new rules, over 10 have put more than 50% rise in tariff for energy-intensive industry

Sichuan province's Nov-Dec thermal power trading, cleared at ~700 CNY/MWh (€90) for electrolysis aluminium producers, +75% from coal power benchmark tariff.



Source: BJX news, Sichuan power exchange

China has 8 provincial spot power trading pilots since 2017, 5 more since March 2021

Southern (Guangdong), Inner Mongolia (west), Zhejiang, Shanxi, Shandong, Fujian, Sichuan, Gansu

Gansu: Spot market pilot with a plan announced, but problems with high curtailment and massive overcapacity will likely not be solved by internal markets alone. May unify with Xibei dispatch footprint for market implementation. Exporter.

West Inner Mongolia: Has fewer resources but potentially more autonomy to develop its reforms as a non-State Grid area. Abundant coal and RE resources. Exporter.

Shanxi: Spot market pilot with timeline established. Coal basin politics plus overcapacity could cause coal pricing distortions. Exporter.

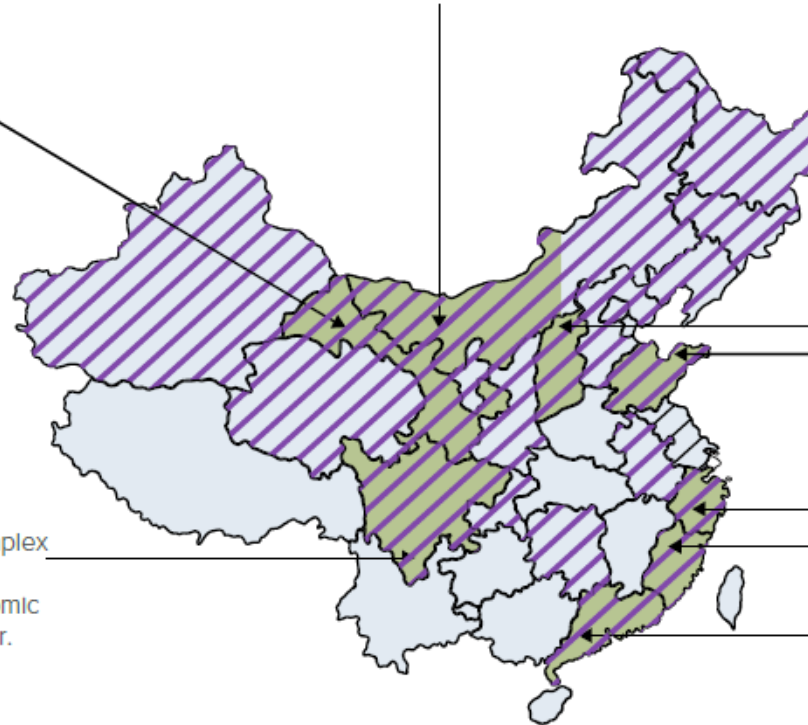
Shandong: The active M2L market may make the spot market transition easier. Captive generator response may be hard to predict. Importer.

Zhejiang: Leading spot market pilot province that hired PJM Technologies and CEPRI as its consulting team. Already designed the timeline and draft market rules. Market manipulation needs to be carefully managed due to single, strong market player. Importer

Fujian: Spot market pilot started but no information opens to public. Progressing on ancillary service market to address flexibility issue.

Guangdong: Southern Grid leading reform area, already far along in the process with a lot of implementation capacity. Pilot will likely expand to all of Southern Grid territory. Importer.

Sichuan: Stalled reforms due to complex hydro/export dispatch situation. Concerned with thermal plant economic health during runoff season. Exporter.



■ Spot market pilots
■ Ancillary services markets (AS Market)

Goal: continuous spot trading by end of 2021

Status:

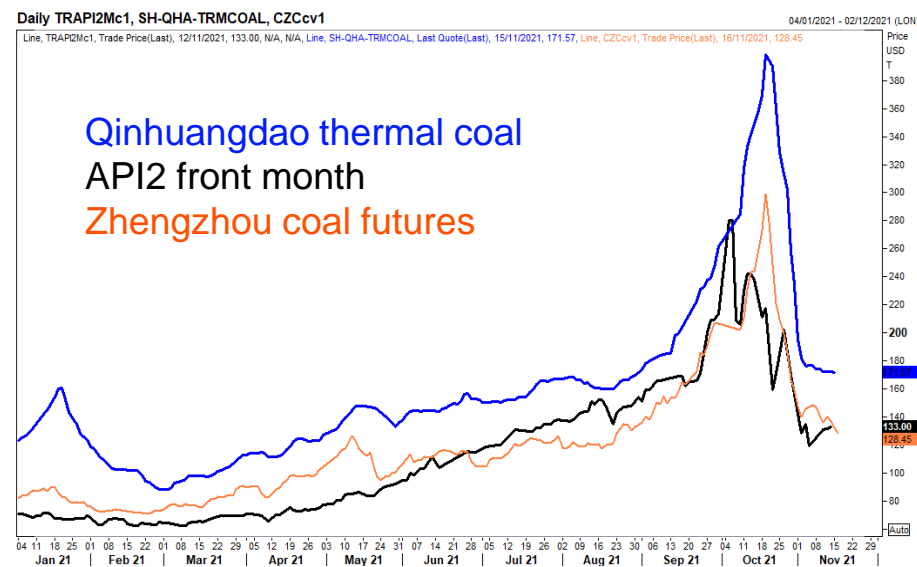
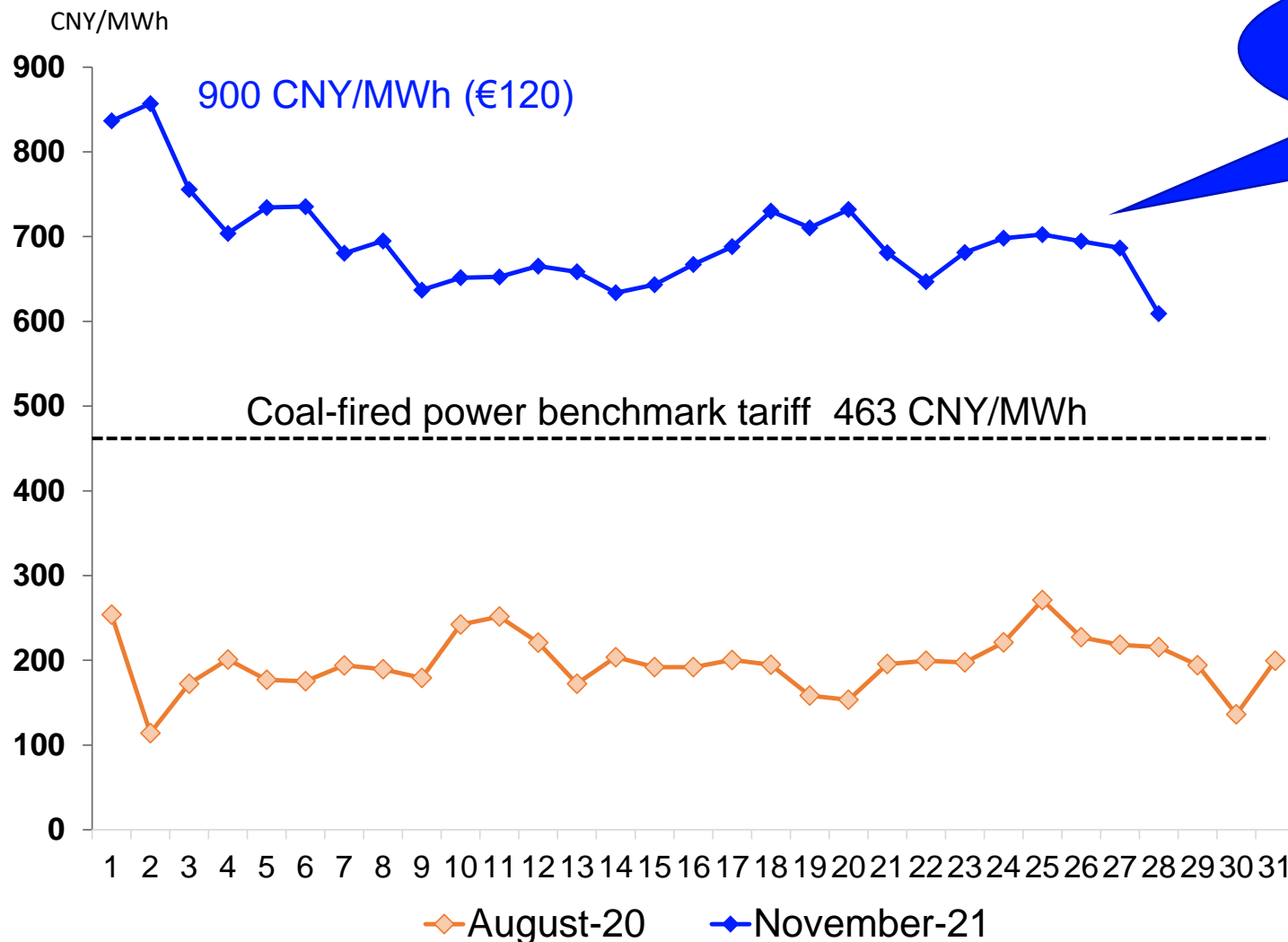
- Only Shanxi with continuous spot trading from July
- Guangdong (Aug 2020, May 2021, Nov-Dec 2021)
- Dec.2021: Zhejiang, Shandong

Second batch (5, since March 2021): Liaoning, Jiangsu, Anhui, Henan, Shanghai

- Explore *regional spot power* markets in Beijing+Tianjin+Hebei, and Southern provinces

Guangdong's new spot market test run in November

Rather high clearing prices reflected the surging coal prices this year

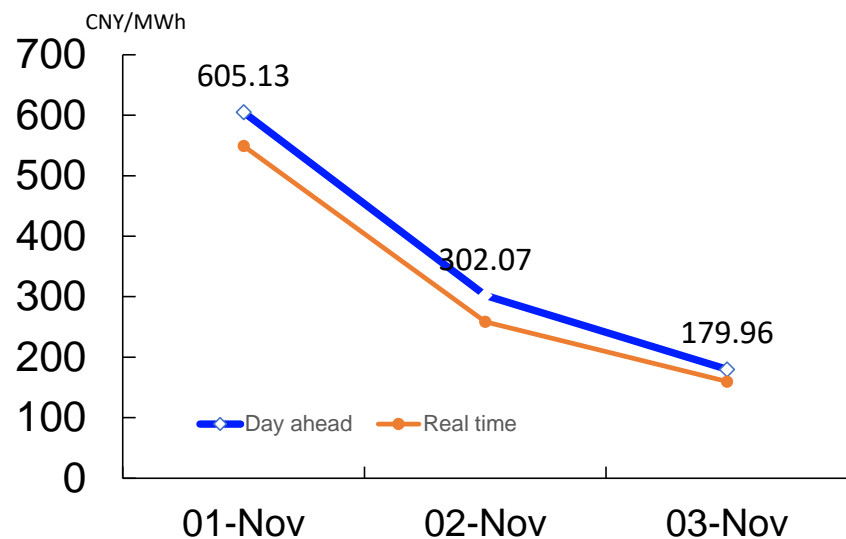


*The first trading week of November used coal price of 1418 CNY/tonne (last available CECI index)+ freight 66.6 CNY/tonne to calculate coal generators' fuel cost + o&m etc. Upper limit is then 1.5 * generators' cost

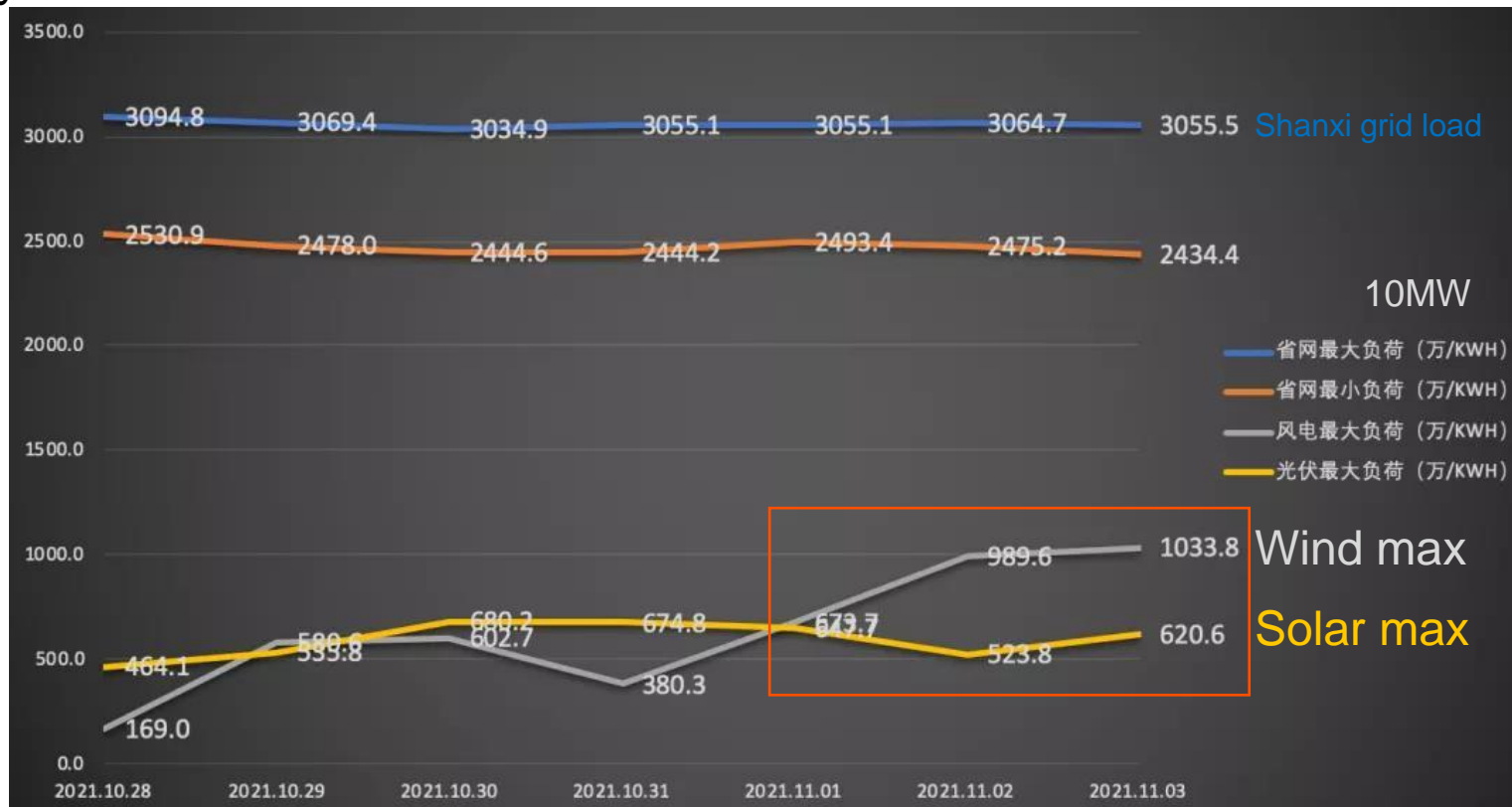
Renewables participating power trading: Shanxi province

Lack of derivatives market for risk management, Duck curve/cannibalization

- Continuous spot trading since July
- Clearing price as high as 1500 CNY in July
- Spot price plunged in early November



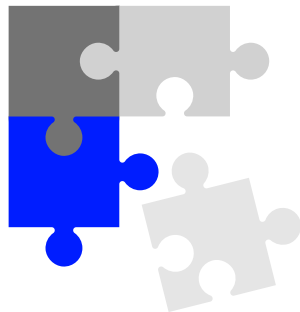
WHY? On 3 November, Wind+ Solar > 50% of total load



Source: Xiangnenghui News, Shanxi Power Exchange

Summary

- China power sector reform **speeded up** after 6 years
- It is triggered by power shortages, but fundamentally driven by **climate goals**
- Many supporting policies have been long in the making, aiming to fully transform the power market and build up '***New power system with renewables as the mainstay***'
- Optimistic, but nationwide (price zones?) spot market **unlikely before 2030**



Dual Track: Market constrained
by the State



Thank you!

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