

Utilities - HK/China (H)

Watt's Up #11: Solar capacity add, Xi's speech on RE; RE output >20% by 2027

Industry Overview

Solar: Aiko will add 10GW ABC cell and module capacity

On Feb 25, Aiko Solar announced to start its Phase I 10GW ABC cell and module capacity construction, with total investment of RMB9.9bn. Phase I capacity will put into operation in 1H25. This is a cooperation agreement Aiko signed in Apr 2023 with the Jinan government to construct 30GW solar cell and module capacity in 3 phases, with 10GW in each phase. Aiko's ABC cell/module conversion ratio has reached >26.8%/24%. Besides Aiko, LONGi is another major player in BC tech and plans to have 35GW HPBC cell capacity to be commissioned in 2024.

Solar: CSI 14GW capacity addition and share buyback plan

CSI Solar announced on Feb 26th to add 14GW integrated N-type capacity of wafer, cell, and module in Jiangsu with a total investment of RMB9.6bn. CSI Solar expects the investment payback period in 3 years. Solar companies are stuck in a dilemma of capacity expansion to keep market share under the current severe oversupply condition. On the same day, CSI Solar announced stock buyback plan of RMB500mn- RMB1bn worth of shares at no more than RMB20.1/share (16x consensus 24E PE). The shares will be used for employee stock ownership plan.

Power: President Xi's speech on power/renewables

The Politburo of the Chinese Communist Party held a meeting on new energy technology and energy security on Feb 29. President Xi called for better planning of the relationship between new & traditional energy and energy security, actively developing renewable energy with vast resources in wind and solar power, pushing forward green- and low-carbon transition by building up infrastructure etc. He said China needs to push forward quality growth in new energy to ensure safe and reliable energy protection and to build a clean and beautiful world.

Power: Enhance energy storage, peak-valley shifting

On Feb 27, the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA) jointly released construction guidelines on peak-valley shifting, energy storage, and intelligent dispatching for power grid. The guideline targets 80GW pumped hydro energy storage and capacity capable to meet 5%+ of maximum grid load demand by 2027. **Renewable power output will reach >20% of total by 2027 compared to c.16% in 2023.** In addition, new gas-fired power plants will be built in areas with stable and affordable gas supply. Nuclear and solar power will also be deemed as potential peaking power sources.

(More on next page)

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MEE: Ministry of Ecology and Environment

CNETS: China National Emission Trading Scheme

GHGs: greenhouse gases

MoF: Ministry of Finance

NDRC: National Development and Reform Commission

NEA: National Energy Administration

RE: renewable energy

WTG: wind turbine generator

CMA: China Meteorological Administration

BC: back contacted

HPP: Huaneng Lancang River Hydropower

ABC: All Back Contact

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Solar: China to add 190-220GW solar power in 2024

On Feb 28, China Photovoltaic Industry Association (CPIA) released 2024 forecast of solar capacity installation at 190-220GWac for China, in line with our latest forecast of 200GWac, compared to 217GWac in 2023. We estimate of 410GWac global PV installation in 2024, also within the range of CPIA's estimate of 390-430GWac, compared to 390GWac in 2023.

Solar: Feb 29th solar supply chains – stable prices

Solar module prices were broadly stable per InfoLink with TOPCon averaging at RMB0.96/W and PERC at c.RMB0.92/W. March scheduled production looks to rise to 50-53GW but the actual demand recovery remains to be seen depending on European destocking and the start of China's major power projects. The RMB2-4c/W price hike proposal post CNY remains uncertain, while some of the low-end price quotes are seeing some support of RMB1-2c. On the wafer side, inventory looks to be rising for N-type 182mm with prices at RMB1.95/piece starting to show over the past week, and could see further downside pressure.

Renewables: Huaneng Group starting 34GW projects

ChinaDaily.com reports on Feb 26, that Huaneng Group will start and resume construction of 222 renewable energy (RE) projects of nearly 34GW, with a total scheduled capex of RMB150bn in 2024. In 2023, Huaneng Group's wind & solar cumulative capacity exceeds 72GW (new additions: >20GW in 2023, 2022: 13GW, 2021: 6.5GW), with clean energy penetration at 47% +5.4ppt YoY. Its 14th Five-Year Plan targets 80GW new renewable capacity addition during 2021-25, with >50% capacity being renewable energy.

Renewables: Standardizing management of RE subsidy

The Ministry of Finance (MoF), NDRC, and NEA jointly issued a notice to call for standardization management of renewable energy (RE) subsidy. Notice includes: 1) Build up RE projects' database, one code for one project, to make Guangzhou and Beijing subsidy settlement companies work more efficiently. 2) Grid companies are responsible for projects inspection, subsidy payment, adjustment and retrieving. 3) Grid companies to improve data sharing with the National Renewable Energy Information Management Center on relevant RE projects and subsidies condition.

We think investors have a low expectation on any major progress in renewables subsidies, so any new development will be positive to the sentiment. Note this latest policy may not directly translate to faster subsidies payment. Our checks suggest this policy doesn't change the funding to improve the renewable energy fund deficits.

Hydro: Huaneng private placement of RMB6bn

On Feb 27, Huaneng Lancang River Hydropower (HHP) announced private placement plan of raising no more than RMB6bn, implying no more than 3.6% of current market cap. The funds raised will be invested on RM Hydro station (2.6GW) and Tuoba Hydro station (1.4GW), The stock is trading at 19x 2024E PE based on consensus earnings.

Wind: Chinese WTG overseas expansion face challenges

According to BNEF on Feb 23, Mingyang Smart Energy failed to enter the shortlist of the first commercial offshore wind power auction in Norway. Mingyang tried to increase its international exposure through listing in London Stock Exchange in 2022. However, the 30MW Taranto project in Italy was still the only European offshore wind farm that has Mingyang's wind turbine generator (WTG) installed. The lack of overseas operation record is one of the major obstacles for Chinese WTG makers to expand abroad. By 2023, only <1% of Mingyang's commissioned offshore wind was outside mainland China.

Solar: Ningxia 2024 tariff at no more than RMB0.2/kWh

Ningxia government set 9am-5pm as valley time in 2024, implying almost all the solar power generation period will have valley tariff. The local government sets the peak tariff

at no less than Rmb0.34/kWh and valley tariff at no more than Rmb0.18/kWh, down by -12% YoY compared to RMB0.21/kWh in 2023 (80% of thermal benchmark tariff). Ningxia had 55bn kWh RE power output in 2023. Given large amount of RE addition last year, only less than 15% of wind and solar power can be priced at the local coal-fired power benchmark rate and the rest will participate in the market transaction this year. The overall solar power tariff in Ningxia is most likely to be less than RMB0.2/kWh in 2024.

Power: 2023 power shortage exceeds 300bn kWh

On Feb 27, IN-EN.com reported 2023 total power shortage exceeds 300bn kWh for 31 provinces, among which Shandong had the largest shortage of 205bn kWh. Hainan experienced the highest increase in power demand in 2023 with a growth rate of 16.1% YoY. 14 provinces have power oversupply issue, among which Inner Mongolia had the largest surplus of 263bn kWh. Inner Mongolia, Shanxi, Yunnan, Xinjiang and Sichuan are major power export provinces.

Exhibit 1: 2023 provincial power supply and demand gap

Total power shortage gap 315.06bn kWh in 2023

	Total power usage (bn kWh)	Total power output (bn kWh)	Gap (bn kWh)
Guangdong	850.20	671.86	-178.34
Shandong	796.56	591.57	-204.99
Jiangsu	783.30	610.63	-172.67
Zhejiang	619.20	435.31	-183.89
Inner Mongolia	482.32	745.05	262.73
Hebei	475.70	373.61	-102.09
Henan	408.95	317.18	-91.77
Xinjiang	382.10	491.21	109.11
Sichuan	371.10	471.26	100.16
Anhui	321.41	333.56	12.15
Fujian	309.00	307.36	-1.64
Shanxi	288.50	437.61	149.11
Hubei	270.64	301.26	30.62
Liaoning	266.30	220.25	-46.05
Yunnan	251.35	390.51	139.16
Shaanxi	245.00	294.58	49.58
Guangxi	244.94	228.73	-16.21
Hunan	227.70	170.04	-57.66
Jiangxi	202.55	166.90	-35.65
Shanghai	184.90	95.49	-89.41
Guizhou	178.30	227.14	48.84
Gansu	164.47	192.54	28.07
Chongqing	145.30	105.43	-39.87
Ningxia	138.70	224.63	85.93
Beijing	135.80	45.49	-90.31
Heilongjiang	118.40	123.38	4.98
Tianjin	105.10	80.81	-24.29
Qinghai	101.83	87.38	-14.45
Jilin	92.82	109.78	16.96
Hainan	48.20	44.80	-3.40
Tibet	13.50	13.74	0.24
Total	9,224.15	8,909.09	-315.06

Source: BofA Global Research, IN-EN.com

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Carbon: MEE works on expanding scope of carbon market

75% of China's carbon emission is from 8 highly industrialized sectors where it is easy to control carbon emission and pass through carbon cost, said Mr. Zhao, Deputy Minister of MEE, on Feb 26th. Only power sector, 40% of China's emission, is included in CNETS, with generous emission allowances allocated for free and homogeneous paths in emission reduction. Mr. Zhao said, to include the other 7 sectors in CNETS will optimize emission reduction cost for society. MEE has been working on the verification of annual emission report for the other 7 sectors, especially cement, aluminum, and iron and steel, which we expect are the next 3 to include in CNETS. MEE will work on roll out paid allowance allocation, together with free allocations, and include more types of GHGs.

More on the topic: [Carbon Watch: overview of China National Emission Trading Scheme](#).

Water: Chongqing wastewater tariff reduction

On Feb 24th, Chongqing Water announced that Chongqing government cut its wastewater treatment service fee by 21% to RMB2.35/cbm, as allowed ROE reduced to 6.6%, basing on 2021 water supply tariff setting mechanism. Wastewater treatment ROE is usually set in the contract signed during bidding. We expect the adjustment in this case is due to: 1) Stretched local gov't balance sheet; 2) Previous Chongqing wastewater treatment service fee of RMB2.98/cbm was high vs. Beijing Enterprise Water 2022 level of RMB1.47/cbm. An alternative way would be for government lifting wastewater tariff charged for residents. We highlight the downside risk to Beijing Water if such adjustment prevails in other cities.

Renewables: 2023 provincial wind & solar resources

On Feb 7, China Meteorological Administration (CMA) released 2023 China Wind and Solar Energy Resources Report. According to the report, average annual solar irradiation was about 1,496kWh/square meter (sqm), which is 1.27%/1.58% less than the past 10/30 years' average level. Solar energy resources in western China are superior to those in central and eastern China. The wind energy resources were at normal level in 2023, with wind speed 0.03% less than average level in last 10 years.

Exhibit 2: 2023 China provincial wind and solar energy resources

Wind and solar power resources under different circumstances

	70m height wind resources		100m height wind resources		Avg. total horizontal irradiation (kWh/sqm)	Avg. irradiation of fixed PV power (kWh/sqm)
	Avg. wind speed (m/s)	Avg. wind power density (W/sqm)	Avg. wind speed (m/s)	Avg. wind power density (W/sqm)		
Beijing	4.86	179.1	5.17	213.1	1,429.9	1,719.3
Tianjin	4.70	124.8	5.13	168.4	1,483.0	1,769.8
Hebei	5.05	167.3	5.41	203.0	1,466.4	1,762.0
Shanxi	4.99	153.5	5.31	181.7	1,463.5	1,732.6
Inner Mongolia	6.48	285.8	6.96	348.0	1,538.8	1,989.6
Liaoning	6.24	286.8	6.75	358.5	1,378.2	1,672.7
Jilin	6.08	254.7	6.63	328.7	1,324.4	1,660.7
Heilongjiang	6.09	240.2	6.66	311.7	1,255.9	1,667.1
Shanghai	4.26	93.2	4.63	115.8	1,240.4	1,346.2
Jiangsu	4.84	122.1	5.29	160.4	1,335.4	1,481.1
Zhejiang	4.03	90.4	4.35	110.0	1,275.4	1,356.5
Anhui	4.65	122.9	5.06	157.0	1,291.2	1,408.4
Fujian	4.28	97.1	4.67	122.0	1,361.3	1,415.0
Jiangxi	4.47	114.8	4.87	145.3	1,220.7	1,274.5
Shandong	5.23	156.7	5.72	207.1	1,421.6	1,614.3
Henan	4.44	113.3	4.79	140.8	1,323.9	1,448.5
Hubei	4.13	95.1	4.45	118.0	1,161.9	1,215.3
Hunan	4.62	133.0	5.01	165.6	1,099.9	1,128.7
Guangdong	5.15	161.2	5.52	192.5	1,280.1	1,315.8
Guangxi	5.23	176.0	5.61	208.4	1,234.5	1,255.0
Hainan	5.58	192.9	5.80	215.9	1,442.1	1,439.6
Chongqing	3.85	81.8	4.15	100.6	1,032.3	1,031.9
Sichuan	4.91	141.2	5.16	159.2	1,408.9	1,519.6
Guizhou	5.06	156.8	5.45	191.2	1,178.9	1,205.0
Yunnan	4.17	92.7	4.34	101.9	1,497.5	1,611.5
Tibet	5.49	173.6	5.72	197.7	1,799.5	1,933.8
Shaanxi	4.56	121.8	4.88	148.3	1,341.4	1,495.8
Gansu	5.47	203.4	5.71	228.7	1,592.5	1,904.5
Qinghai	5.84	198.7	6.22	234.5	1,712.8	2,016.1
Ningxia	5.09	165.7	5.41	195.4	1,527.5	1,772.0
Xinjiang	5.34	215.3	5.49	241.8	1,579.9	1,891.9

Source: BofA Global Research, China Meteorological Administration

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Nuclear: AI successfully predicts fusion instability

According to WallStreetCN on Feb 24, the Princeton team successfully used AI to predict the unstable state of nuclear fusion plasma 300 milliseconds in advance, which is

enough to constrain the magnetic field adjustment to deal with the escape of plasma.
This research result enables scientists to prevent the interruption of controlled nuclear fusion and generate the high-power fusion reaction for sufficient energy.

Exhibit 3: Valuation comparison table for China Utilities and Renewable companies

Selected valuation metrics for utility and renewable sector companies in 2023-25E

		Prices (LCY)		PE		PB			EPS Growth			ROE			Dividend yield		
		2023E	2024E	2025E	2023E	2024E	2025E	2023E	2024E	2025E	2023E	2024E	2025E	2023E	2024E	2025E	
Wind																	
Longyuan -H	916 HK	5.5	6.3	4.8	3.6	0.6	0.6	0.5	38%	32%	33%	10%	12%	14%	3%	4%	6%
Datang Renewables	1798 HK	1.8	4.8	5.1	4.4	0.4	0.3	0.3	-16%	-5%	15%	8%	7%	7%	3%	2%	3%
Goldwind-H	2208 HK	3.0	4.7	4.5	3.5	0.3	0.3	0.3	10%	4%	28%	8%	8%	10%	6%	7%	8%
IPPs																	
China Resources Power	836 HK	16.9	7.5	6.1	5.6	0.9	0.9	0.8	53%	24%	9%	13%	15%	15%	5%	10%	7%
Huaneng-H	902 HK	4.4	5.9	6.8	6.7	0.9	0.9	0.8	n.a.	-13%	1%	18%	13%	12%	8%	7%	7%
Huadian-H	1071 HK	3.8	7.0	6.5	5.8	0.8	0.7	0.6	n.a.	9%	11%	12%	12%	11%	7%	8%	9%
CPID	2380 HK	3.2	10.9	6.9	6.1	0.9	0.8	0.8	20%	58%	12%	8%	12%	13%	5%	8%	9%
Gas																	
ENN Energy	2688 HK	64.4	9.7	10.7	10.3	1.6	1.4	1.3	17%	-9%	4%	18%	14%	13%	5%	4%	4%
China Resources Gas	1193 HK	23.7	8.9	9.0	8.1	1.3	1.2	1.1	27%	-1%	11%	15%	13%	14%	6%	6%	6%
China Gas	384 HK	7.2	10.0	7.6	7.1	0.7	0.6	0.6	-10%	31%	7%	7%	8%	9%	7%	8%	9%
BJ Enterprises Holding	392 HK	29.5	5.3	5.0	4.4	0.4	0.4	0.3	-7%	6%	12%	8%	8%	8%	5%	7%	8%
Environmental protection																	
Everbright Environment	257 HK	2.9	4.1	4.1	4.2	0.4	0.3	0.3	-5%	-2%	0%	9%	8%	8%	8%	8%	8%
BJ Enterprises Water	371 HK	1.8	8.2	8.2	7.7	0.6	0.5	0.5	70%	0%	7%	7%	7%	7%	9%	9%	9%
HK Utilities																	
CK Infrastructure	1038 HK	46.1	15.9	14.5	14.1	1.0	1.0	0.9	-6%	9%	3%	6%	7%	7%	6%	6%	6%
CLP Holdings	2 HK	65.3	24.8	13.9	13.5	1.6	1.6	1.5	620%	78%	3%	6%	11%	11%	5%	5%	5%
Guangdong Investment	270 HK	4.7	7.6	7.0	5.7	0.7	0.7	0.7	-15%	9%	21%	9%	10%	12%	13%	13%	13%

Source: BofA Global Research estimates

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Buy	≥ 10%	≤ 70%
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Underperform	N/A	≥ 20%

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