

Environmental, Social, And Governance:

China Power Sector: Regulatory Support To Stay As Subsidies Fade

October 16, 2022

Key Takeaways

- China's power generators can navigate increased competition as coal and renewable generation become more exposed to market pricing.
- Returns of new unsubsidized renewable projects should stay viable, underpinned by enhanced utilization hours and protected by coal-based grid-parity prices. The government is seeking to achieve the share of nonhydro renewables exceeding 25% of total generation by 2030, up from just below 15% currently.
- Firms that rely on coal power will face a high financial burden given the high capex for renewable development.
- We expect the regulatory framework to remain broadly supportive, even if government intervention and policy risks linger.

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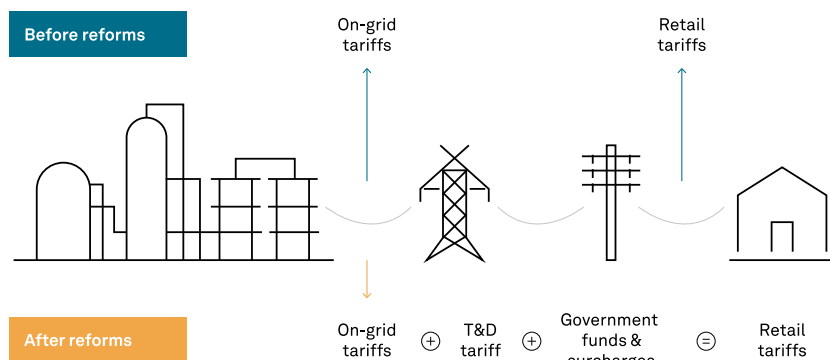
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Chart 1

Reforms Touch All Aspects Of China's Power Sector



T&D--Transmission and distribution. Source: National Energy Administration.
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China's power sector is entering another era of profound regulatory change. Most segments will see fading subsidies and more market-based pricing. For a few segments, regulatory scrutiny will increase, along with enhanced pricing transparency. Overall, S&P Global Ratings expects the regulatory framework to be supportive as segments adjust to a cleaner and more competitive energy market.

Deregulation is a recent shift, and market-based rules are less complete compared with developed markets'. This means execution hinges on the consistency of implementation and other factors, such as technology.

China's desire for energy security could sustain investment in coal power in the coming one to three years. Geopolitical tensions may increase the volatility of fuel costs and hurt power generators' (gencos) profitability if cost pass-through mechanisms are not effective and timely. But recent market setbacks won't likely derail the central government's commitment to climate targets.

Competitive Electricity Pricing For All Segments

Coal power: Paring back losses but more competition with more flexible tariff setting.

We expect the tariff mechanism for coal-based power will eventually move toward full market trade with less government intervention. This would expose coal gencos to more intense competition. IPPs with high efficiency and a low cost of energy may be less vulnerable to this shift. The government may also pass incremental energy costs to end-users, particularly when system costs may be driven up by increasing consumption of clean energy.

Last year's policy to widen tariff fluctuations for China's coal-fired generators was a response to losses suffered after a surge in coal prices since late 2021. The on-grid tariff of the coal power is set at a base tariff (determined by the provinces) with a floating band of +/-20%.

While most coal gencos have adjusted their tariffs up by 20% in 2022, this has been insufficient to cover surging fuel costs since late 2021. Central state-owned entities (SOEs) with more diversified projects, larger geographic coverage, and higher bargaining power in sourcing thermal coal, are better positioned versus their smaller, locally owned SOE peers.

The tariff widening was announced as part of a policy document issued in October 2021 by the National Development and Reform Commission (NDRC). The document also requires all coal-fired power be sold through market-based trading from 2022 (versus only about 60%-70% previously). This can be done either via bilateral negotiations with end-users or through a market-trading system.

These two changes--full market-based trading and a wider range for tariff adjustments--will lead to pricing that better reflects supply-demand dynamics. The changes will also give more flexibility to gencos to pass through costs. We expect their profitability will be more stable in a volatile fuel cost environment.

Chart 2

Regulators Often Review The Rules For China's Power Infrastructure, Which Is Key To National Development

1997-2001	2002-2003	2004-2014	2015-2018	2019-2021	2021-now
State Power Corp. of China is established to separate regulatory and market activities. Power tariffs are determined on a project-by-project basis.	Reforms put more distance between the power grids and generators. State Power Corp. of China is split into two power grids and five IPPs.	On-grid tariffs are introduced for coal-fired power in each province. A coal-electricity price linkage mechanism is implemented to pass on upstream fuel costs to end-users. On-grid tariffs for renewables arrive in 2009.	New reforms strengthen regulation of the T&D segment, while also deregulating power generation and the retail segment. Pilot programs for power trading come in 2017.	To further deregulate the coal-fired power market, coal-fired base tariffs with a floating range replace on-grid coal power tariffs with a coal-electricity linkage mechanism.	The floating range for coal-fired power tariff is widened. The state requires all coal-fired power and C&I end-users to participate in the open market.

IPPs--Independent power producers. T&D--Transmission and distribution. C&I--Commercial and industrial.
Source: State Council, National Development and Reform Commission, S&P Global Ratings.
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The latest policy also partly shields households from volatility in electricity bills by shifting more of the adjustment onus to commercial and industrial (C&I) users. It did this by cancelling the pricing catalog (fixed tariffs) adopted by C&I users and encouraging them to purchase from the market or via retail agencies (mainly grid companies during the transition period). Meanwhile, industries with high energy intensity are to pay a tariff higher than the +20% floating cap, in line with the central government's emission control initiatives.

Table 1

Regulators Have Adjusted Settings For The Coal Sector

	Policy direction	Summary
Coal prices	More regulated	100% of coal for power generation use will be sold under long-term contracts
		Contract prices for seaborne coal with heat value of 5,500kcal should be traded at RMB570-RMB770/t; trading ranges for Shanxi, Shaanxi, and Inner Mongolia coals are also determined
		Spot coal prices should not exceed 1.5x long-term contract price ranges
Coal supplies	Increasing production	Penalties will be imposed if long-term contract volumes and prices are not strictly executed
		Emphasizes coal power as core to ensuring China's energy security
		Accelerates the approval of new coal mines, capacity expansion of existing mines, and resumption of closed mines
		Coal production capacity to be increased by 300 million tons in 2022, daily production to reach 12.6 million tons
		Coal producers should offer no less than 80% of their annual coal output through medium- and long-term contracts

RMB--Chinese renminbi. t--ton. Source: National Development and Reform Commission, S&P Global Ratings.

Renewables: From guaranteed FiT to grid-parity

As subsidies fade for renewable projects, project returns remain viable. In 2021, China's wind and

solar power sector officially entered an era of "grid-parity" --or non-subsidized tariffs. This transition is made possible by steadily declining construction costs, though it is also propelled by the need to lower the fiscal burden of hefty subsidies.

Newly built grid-parity wind and solar projects will see lower revenue due to the lack of subsidies. However, returns will be underpinned by improving utilization hours and the increasing mix of market-based trading. Authorities encourage entities to participate in power-market trading together with local coal power as part of an overarching goal to embrace supply-demand dynamics.

The 2021 NDRC notice further clarified the base for renewable tariffs compared with the policy set in 2019--grid-parity projects will receive the same base tariff as that for coal-fired power, as it is set by each province. In 2019, tariffs for all newly built projects were determined through a bidding process at not-higher-than the local fixed feed-in-tariff (FiT).

The phase-out from subsidies will take years. China still has a large accumulation of subsidized (or FiT) renewable projects. As of end-2020, the cumulated capacity of wind and solar was about 530 gigawatt (GW). This is set to grow to at least 1,200GW by 2030: implying 670GW of grid-parity projects will be developed by then. By 2030, all wind and solar power will eventually be traded at competitive market-based pricing.

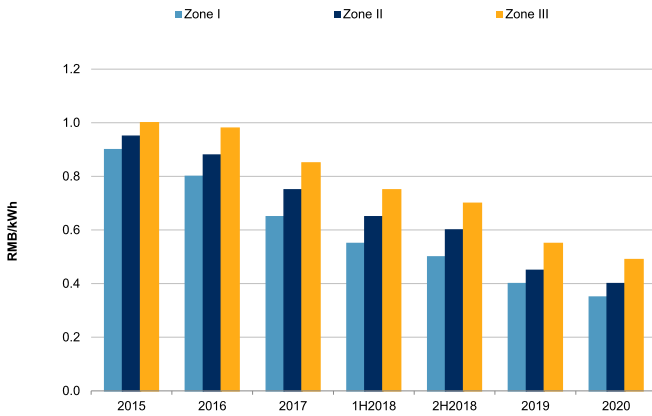
The Ministry of Finance (MoF) issued a notice in 2020 specifying the operating life term for a FiT project will be eligible for central-government subsidy of up to 20 years, or generation hours up to a certain limit set by different regions.

Projects running beyond their life term will not receive subsidies anymore. Instead, they can join green power trading and generate income by selling green certificates.

In addition, overdue subsidy payments may no longer be a drag on gencos' operating cash flow. As of end-2021, projects were owed a cumulative Chinese renminbi 400 billion (or about US\$55 billion in equivalent) from the Renewable Energy Fund (REF). So far, the "Big Five" IPPs have received about RMB100 billion. The central government has been looking at ways to accelerate payment of such funds.

Chart 3a

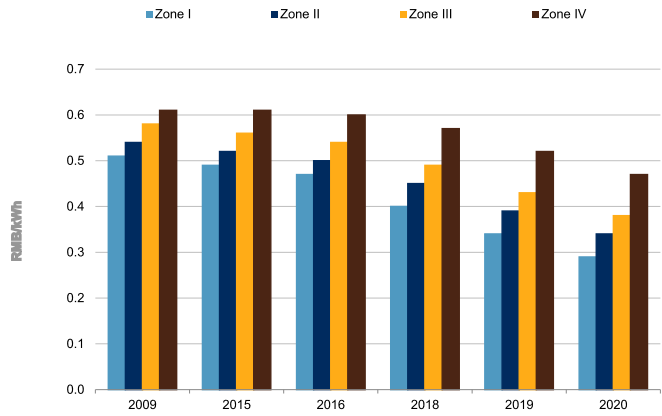
Wind And Solar Tariffs Are Converging With Coal Power...
On-grid tariffs for solar



1H--First half, 2H--Second half, RMB--Chinese renminbi, kWh--Kilowatt-hour. Source: National Development and Reform Commission, S&P Global Ratings.
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Chart 3b

...Due To Declining Costs For Renewable Projects
On-grid tariffs for wind



RMB--Chinese renminbi, kWh--Kilowatt-hour. Source: National Development and Reform Commission, S&P Global Ratings.
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Gridcos: Benefiting from a more transparent regulatory regime

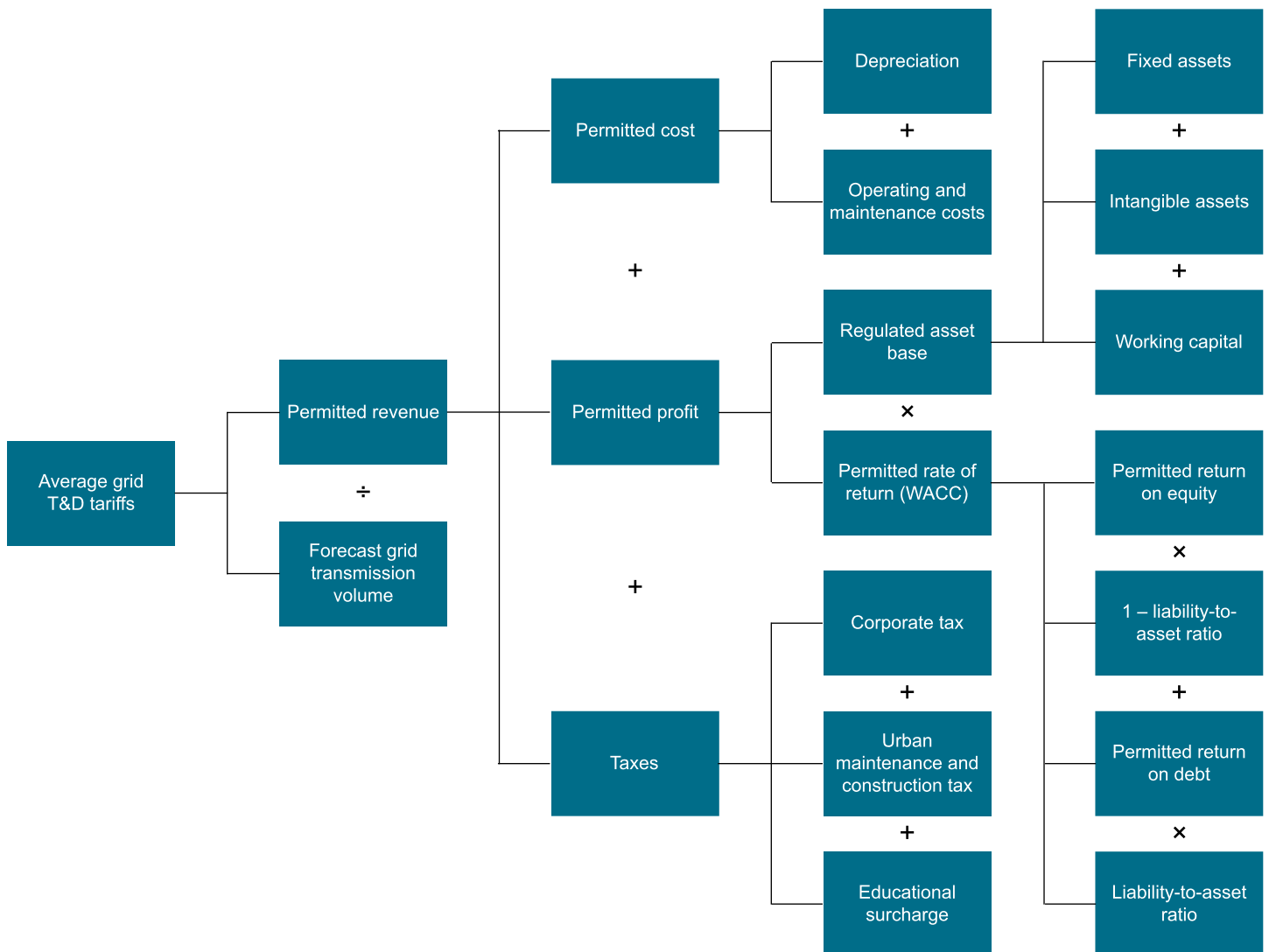
In the transmission and distribution (T&D) segment, the government will continue regulating operations to ensure a safe and reliable power supply. In our view, the tariff-setting process will become stronger and more transparent. Volatility in demand volumes for gridcos will be eliminated when their revenue and cash flow are based on permitted returns and approved assets, rather than the volume transmitted. Gridcos should largely be protected from demand deceleration so long as they continue making investments that the regulator approves.

Nonetheless, government intention to boost the economy by reducing retail tariffs could hurt gridcos' profitability and reduce visibility in their returns. An example of this occurred in 2019-2020, when gridcos had to bear the cut in retail tariffs for C&I users. We do not rule out the possibility of similar interventions given the gridcos are government owned and carry social welfare responsibilities. That said, we expect costs borne by the gridcos will be taken into consideration when setting tariffs and, therefore, can often be gradually recovered through this regulated resetting process.

China's gridcos look set to smoothly enter into the third three-year regulatory period from 2023. In the past two rounds (since 2017), the interprovincial T&D tariff was based on "permitted costs plus reasonable returns" to reward long-term capital-intensive investment. This approach was adopted for market-based trading volume which only formed 60%-70% of power generation as of 2021. The rest was still adopting a traditional model (earnings derived from the difference between selling electricity to consumers and purchasing power from gencos).

Chart 4

The Grid Return Model Is More Transparent



T&D--Transmission and distribution. Source: National Development and Reform Commission. S&P Global Ratings.
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With more power (both coal and renewables) entering into competitive pricing, the penetration of the regulated T&D tariff will grow and eventually complete the transition from the traditional model.

Gridcos have been spending significantly on upgrading power infrastructure and developing distribution networks. In particular, they are accelerating the construction of ultra-high-voltage grids to transmit power from the energy-rich northern and western region to the economically more vibrant coastal region, where demand is strong.

We believe the major gridcos--State Grid Corp. of China (A+/Stable/--) and China Southern Power Grid Co. Ltd. (A+/Stable/--)--will maintain their monopolies in electricity transmission and

existing distribution networks under the stronger regulations. In our view, chances are low that their competitive landscape will change over the next five years.

Energy Security Remains A Priority

We believe energy security is a top priority for China. The central government has said as much on several occasions, particularly following the power crunch in 2021 (see "Credit FAQ: China's Power Outages--Get Used To It," Oct. 18, 2021) and the drought in southwestern China in mid-2022 ("China's Power Outages Highlight Renewables Risks For Industrial Companies," Aug. 31, 2022). In our view, energy security will take priority over decarbonization (see "Energy Transition: Asia-Pacific Faces An Uphill Climb To A Cleaner Future," April 26, 2022). China remains committed to hitting peak carbon by 2030, and to achieving net-zero emissions by 2060. This commitment won't, in our view, be derailed by periodic setbacks, such as the recent increase in coal power to back the economy as it recovers from COVID. This was apparent in the country's overdelivering its renewables targets for the power sector in the past five-year plan.

Coal power to remain the cornerstone for now...

Coal-fired power plants will continue to play a critical role in the power structure over the next decade. This is demonstrated by the accelerated approval of some 19.6GW of new coal-fired power plants from the fourth quarter of 2021 to the first quarter of 2022.

To support IPPs that made losses in their coal-power segments in 2021 due to surging coal prices, the central government has allocated some RMB20 billion in subsidies for 2022. At the same time, the government has put controls on coal prices since 2021 and required IPPs to sign annual coal contracts with suppliers at RMB570/ton-RMB770/ton (US\$79/ton-US\$107/ton equivalent).

The above changes, coupled with tariff hikes, accelerated repayment of renewable subsidies, and low interest rates, should restore the operating efficiency and profitability of most IPPs over the next one to two years.

Over the long term, coal power's utilization will come under pressure as the share of clean energy contribution grows and demand growth stabilizes. Coal-fired power will increasingly focus on ancillary services such as peak-shaving, frequency regulation, and reserve capacity. Regulatory and market risks exist as the industry evolves and more market participants enter the ancillary service sector.

...But renewable energy is still in spotlight

China supports renewable projects with its policies, and the segment (including hydropower) will account for about one-third of power generation as early as 2025 (or 18% if only wind and solar energy are counted). In a recent opinion-seeking document put out by the National Energy Administration (NEA), the renewable generation mix targets may potentially rise to 40% (including hydro, or 25.9% for wind and solar) by 2030.

These cover areas such as green electricity trading, preferential tax treatment for distributed solar power, and mega renewable energy hubs. While genscos with larger renewable contributions are direct beneficiaries, the impact on their earnings will take much longer.

In May 2022, the Beijing Power Exchange Center issued detailed rules for national green power trading. Green power trading should benefit renewable operators in the long run, as trading volumes and relevant tariffs increase. However, gains are minimal for now given low trading

volumes and the lack of suitable projects.

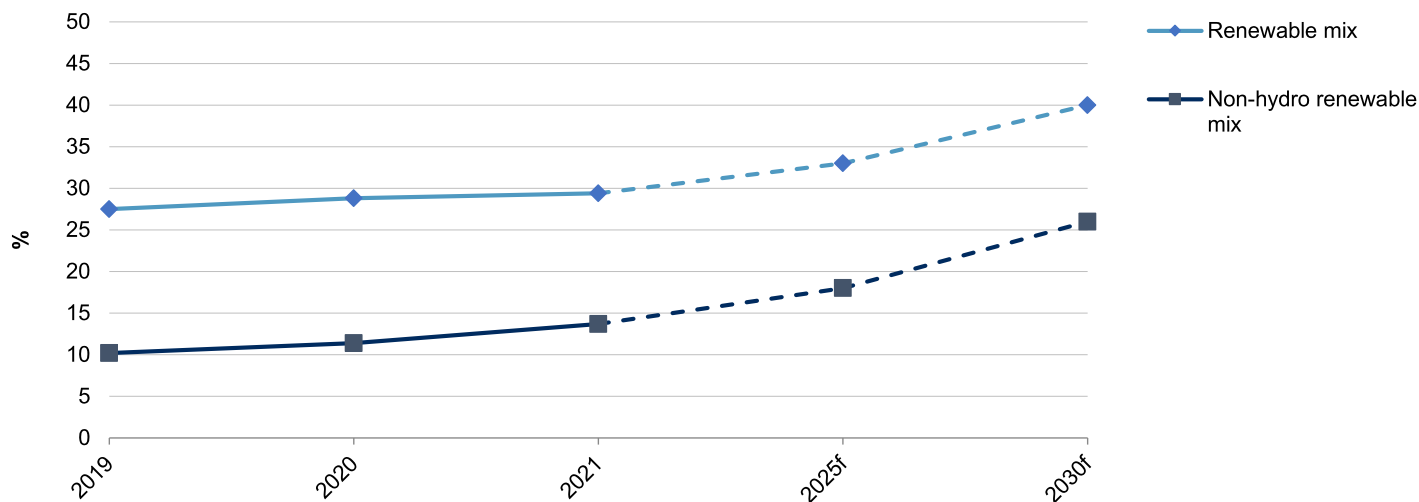
In November 2021, the NDRC and the NEA announced the first batch of projects related to mega renewable hubs at 97GW (wind: 43GW) while goals for the current and next two five-year plans are preliminarily set at 200GW and 255GW, respectively. To avoid curtailment issues due to limited local power demand, the NDRC, NEA and State Grid are pushing for:

- Coordination between renewable and coal-fired projects for peak shaving and valley filling purposes to ensure stable supply;
- Energy storage capacity to be paired up with renewable projects (about 15% of the installed renewable capacity); and
- Construction of more ultra-high voltage lines to support long-distance transmission of electricity generated (this means 38 new lines before 2025).

This system will entail additional costs, such as environmental protection related fees and energy storage costs. Still, the higher wind and solar resources in the northern regions of China, where these mega projects will be based, should boost utilization hours and improve the project returns.

Chart 5

Renewable Mix Will Grow Substantially Through 2030
Renewable energy as a percentage of total power generation



f--Forecasts. Source: National Energy Administration, S&P Global Ratings..
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Table 2

Summary Of Favorable Policies For Renewable Energy

Area	Regulator	Policy summary
On-grid tariff	NDRC	Feed-in tariff to provide incentives for renewable energy development from 2009
		Multiple rounds of tariff cuts followed to maintain relatively stable project returns

Table 2

Summary Of Favorable Policies For Renewable Energy (cont.)

Area	Regulator	Policy summary
		Market elements introduced in 2019 with feed-in tariffs determined through competitive bidding process, fostering cost-cutting for wind and solar projects and eventually reaching grid parity
		Wind and solar projects (except residential rooftop projects) received coal-fired benchmark tariffs starting 2021
Market-based trading	NDRC	Market-based ratio will reach 100% by 2030 for renewable energy
		Marketization may take a long time given limited incentives by operators...
		..e.g., the current market trading volume is limited to the portion beyond minimum utilization hours and inter-provincial renewable energy trading
		Green power trading introduced in 2021 to bundle green certificates and market-based trading
Project approvals	NDRC	Simplified project approval process for both wind and solar projects as both enter grid parity
		Yearly development plan depends on gridco' ability to connect instead of quotas from regulators before grid parity, so more projects can be commissioned each year
Minimum utilization hours	NDRC	Guarantees minimum utilization hours for wind and solar projects in major curtailment-prone provinces
		Minimum utilization for wind: 1,800-2,000 hours, minimum utilization for solar: 1,300-1,500 hours
		Financial compensation given to projects if minimum dispatches are not met
		Execution of the policy is not too strict and at discretion of local governments
Renewable portfolio standards	NDRC	Minimum proportions of renewable energy with the power consumption mix are assigned to each province
		Local government and local grids disseminate the target to market participants
		Renewable energy mix shortfalls will be replenished through buying green certificates or quotas from other power consumers who have surplus
		Central government is allocating RMB100 million to central SOEs to settle overdue subsidy issues in 2022
Subsidy payment	MOF	Sustainable solution likely to be introduced soon. Gridcos meanwhile are setting up special purpose vehicles to settle renewable energy subsidies. Capital source includes renewable energy surcharge, central government budgets, and bond issuance.

NDRC--National Development and Reform Commission. MOF--Ministry of Finance. Source: NDRC, MOF, S&P Global Ratings.

Climate Transition Dominates Environmental Risks

Climate transition risk is the key environmental, social and governance (ESG) factor for fossil fuel-based gencos in China. We apply environmental risk credit indicators of E-4 to our rated IPPs that use coal as a dominant fuel source, indicating some negative environmental considerations in our credit assessment.

Though coal will continue to be the key baseload power source at least until 2030, its energy-mix share will erode. This is because renewable energy generation will have a higher dispatch priority.

As a result, coal-fired plant utilization will likely be under greater pressure.

China aims to reach peak carbon emissions by 2030 and carbon neutrality by 2060, in accordance with its commitments under the Paris Agreement. Power generation, which accounts for 40%-50% of total carbon emissions in China, is a major part of the country's plan to cut carbon emissions.

IPPs will be required to purchase carbon credits from the market for their emissions, adding to generation costs. We anticipate the government will aim to strike a delicate balance between market-based reforms and social and economic tolerance, as well as between energy security and better sustainability.

How Environmental Factors Influence Credit Quality

Most China IPPs have coal as the dominant fuel type in their power mix. They tend to have an E-4 credit indicator, implying that environmental considerations are a negative in our credit rating analysis. Examples of such entities include China Huaneng Group, Huaneng Power International, China Huadian Power, China Resources Power, State Power International, Guangdong Energy, and Shenergy. As central state-owned IPPs or key regional state-owned IPPs, these companies are expected to lead the power sector's transition to clean energy.

Capital expenditure for these firms will likely surge over the next few years as they accelerate their renewable energy projects. This will squeeze profitability, as will likely utilization declines and increased carbon costs.

We apply an E-1 indicator to China Three Gorges because we view climate transition risk factors as a positive consideration in our credit rating. The company's 96GW of installed renewable capacity is a material contributor to China's decarbonization efforts. It accounts for nearly 20% of the country's hydroelectric power generation. Government regulation strongly supports this sector, particularly as large hydro projects also address significant flooding, irrigation, and river routing issues. China Three Gorges also invests heavily in nonhydro renewables, which contribute 30% of its EBITDA.

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- China's Independent Power Producers Are Set To Break Their Losing Streak, Oct. 13, 2022
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- Ebbing Coal Prices To Lead China's Independent Power Producers On A Year Of Repair, April 12, 2022
- Industry Top Trends 2022: Asia Pacific Utilities – Energy Transition Will Be The Key Credit Driver, Jan. 26, 2022
- ESG Credit Indicator Definitions And Application, Oct. 13, 2021

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- Credit FAQ: China's Power Outages--Get Used To It, Oct. 18, 2021

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