



CLIMATE ENERGY FINANCE

India-China investment analysis in Electricity as COP27 Progresses

Tim Buckley, Director - Climate Energy Finance, 8 November 2022

Key findings:

- At the current rate of installs, China is on track to reach its 2030 renewables target of 1,200GW five years earlier
- China is on track for a possible [plateauing of emissions](#) this decade, well ahead of the 2030 official peaking target
- India's total installed renewables capacity at the end of FY2022 was 157GW or 39% of India's 400GW capacity total, and 22% of total generation of 1,492TWh
- India is likely to reach peak and then plateau in thermal power generation at some stage this decade, even with strong sustained economic growth of 5-7% annually

With COP27 starting earlier this week, the idea of developed countries supporting developing countries with more than just talk has already backslid from "compensation" to the more nebulous political speak of "cooperation and facilitation". However, trends in the electricity sector in China and India are showing significant promise, and individual actions on decarbonisation will speak significantly more meaningfully than any watered-down global promise.

Russian sanctions and supply curtailment relating to Putin's failing invasion of Ukraine has triggered a global energy crisis of hyperinflation on all things fossil fuel – oil, gas, coal, and fertilizers. The [war-profiteering fossil fuel multinationals](#) are having their collective best year ever, giving rise to [windfall profits taxes](#) to help the rest of the planet cope with their gouging.

Whilst the medium term prospects of fossil fuel firms have improved considerably, the [International Energy Agency \(IEA\)](#) has concluded that this hyperinflation will only serve to accelerate already significant decarbonisation trends. Energy security and supply chain security issues have both been elevated to top priorities globally for all nations, and this is very evident in both China and India.

[China](#) is set to have a massive year in renewable energy installations, investing more in 2022 than the rest of the developed world combined. We are seeing expectations for [China to install 150-160GW of renewable energy in 2022](#) (+26% year-on-year (yoy), and within this, [solar installations](#) in the first half of 2022 doubling yoy). China is on track to deliver 2022 renewable energy installations five times the investment rate of its nearest rival, the [U.S. at 29GW](#). At the current rate of installs, China is on track to reach its 2030 renewables target of 1,200GW five years early, and [electric vehicle sales](#) are on track to more than double in 2022 to 6 million (reaching a record high penetration of 29.4% of total passenger vehicle sales in August 2022).

With country level emissions [falling for each of the last four quarters to June 2022](#), [peak steel production from China probably seen back in 2020](#) at 1.065Bt, and the property sector contraction accelerating over 2022, this puts the country on track for a possible [plateauing of emissions](#) this decade, well ahead of the 2030 official peaking target, even acknowledging the [delayed ambition of peak emissions for the building materials sector till 2030](#). Including hydro and nuclear electricity generation, [non-fossil fuel generation could reach 36%](#) of China's total by 2025, vs 30% in 2022.

Considering a slowing economic growth rate, ongoing energy efficiency gains and accelerating investment in all forms of electricity capacity, China's year to date September 2022 electricity production is up only 2.2% yoy. Within this, thermal power generation is up just 0.5% yoy or 22TWh. By comparison, wind and solar are up 71TWh (+12% yoy), hydro-electricity is up 45TWh (+5% yoy) and nuclear is flat. This means total non-fossil fuel generation is up 118TWh, delivering 84% of the total increase in electricity generation in 2022 to-date. With nuclear capacity adds continuing at 5-10GW pa, increased nuclear in future years will combine with the ongoing renewables capacity expansion to cover most if not all electricity demand growth in China. And even as trade barriers are being imposed on China solar manufacturing, their industry is [expanding capacity dramatically](#), driving increased supply and likely price reductions as a result.

While [President Xi has flagged new coal fired power](#) plant approvals in 2022, the context is to balance the intermittency of renewable energy in the absence of gas peakers. As such, this doesn't necessarily imply higher total coal-power generation, rather referencing tariff compensation to cover lower average utilisation rates. We also expect a [greening of the Belt and Road Initiative](#) to take a greater prominence in China's energy assistance for developing countries once its covid-19 domestic constraints are resolved.

Turning to India, Prime Minister Modi has long targeted an exceptionally ambitious 450GW of variable renewables by 2030. Relative to the 110 GW of renewables installed by end of the fiscal year to March 2022, this implies a 40GW annual install rate, 2-3 times the 15.4GW installed in FY2022.

Adding in hydroelectricity, total renewables capacity at the end of FY2022 was 157GW or 39% of India's 400GW capacity total, and 22% of total generation of 1,492TWh.

For FY2023, the first six months to September 2022 saw 8.3GW net capacity adds, and this was entirely zero emissions new capacity (8.2GW wind and solar, and 0.1GW of hydro). In addition, behind the meter [rooftop solar installs are expected to surge 60% yoy in FY2023 to 3.2GW](#)

annually. After some capacity building delays, we expect this growth to expand in future years. Whilst there has been an increased talk by the [Central Electricity Authority](#) of India requiring the government-owned NTPC to build new coal-fired power capacity this coming decade, this is largely due to the lack of new renewable energy, hydro and nuclear capacity additions relative to expectations.

Global and domestic private Indian finance has clearly pivoted massively away from building new coal power capacity, consistent with the global trend (outside of China). The only power firm still building any material new coal power capacity is the state-owned enterprises (principally NTPC). With the coal-fired power plant sector operating at just 55% utilisation rates over the last five years (a fraction of the 70-75% planned rate), the economics of non-mine mouth coal power (at Rs4-6/kWh) are substantially more expensive and inflationary than domestic zero emission renewable energy (particularly given its zero inflation indexation, locking in just Rs2-3/kWh fixed nominal for the next 25 years). This substantial cost differential is particularly evident for imported coal power (Rs6-8/kWh) in these days of hyper fossil fuel inflation globally.

We are forecasting a doubling of the annual rate of wind and solar installs in India to over 30GW in the next two years. The ongoing investment to modernise and expand the nationally integrated grid transmission network provides both a likely reduction in AT&C loss rates and greater renewable energy integration capacity. Combined with a much needed and sustained step up in 25 year power purchase agreement tenders from the government owned [SECI Ltd](#) and [PTC](#), India is likely to reach peak and then plateau in thermal power generation at some stage this decade, even with strong sustained economic growth of 5-7% annually (after a world leading 8% GDP growth this year).

India is also on track to see a significant step up in manufacturing supply chain self-sufficiency in its renewable energy sector, with [major](#) India [based](#) conglomerates competing to build multiple battery, electrolyzer, solar and wind manufacturing capacity as part of their US\$100bn and US\$70bn zero emissions capex plans this decade. Adani this month built its [first domestic 5.2MW onshore wind turbine](#) as a proof of delivery.

Whilst the hyperinflation of fossil fuel commodity prices in 2022 has driven a global energy crisis, we also expect this to accelerate global decarbonisation trends. Energy security comes from increasing domestic capacity, and both China and India are taking this lesson to heart with accelerated renewable energy investments, including strengthening domestic manufacturing supply chains. This combines with the massive uplift in decarbonisation investments in the US thanks to President Biden's US\$369bn [Inflation Reduction Act](#) and the associated [DoE US\\$250bn loan facilitation program](#), and the [RepowerEU](#) program in Europe, such that we exit 2022 with a global technology and investment driven [Race to Zero](#).

Contact:

Tim Buckley Director, Climate Energy Finance, tim@climateenergyfinance.org

Annemarie Jonson, Director of Communications, Climate Energy Finance

annemarie@climateenergyfinance.org