October 1, 2025

Will the decline and slowdown in CO2 emissions in China and India lead to a peak?

Takahiko Tagami
Executive Researcher, Manager, Climate Change Group
Climate Change and Energy Efficiency Unit
The Institute of Energy Economics, Japan

A series of reports have been published showing that CO2 emissions in China and India have either declined or slowed in growth in the first half of 2025 compared to the same period last year. Have China and India peaked in their CO2 emissions, is this a persistent trend, or is it influenced by short-term factors such as weather?

According to the Carbon Monitor, an international initiative that provides scientific estimates of daily CO2 emissions, China's CO2 emissions decreased by 2.7% in the first half of 2025 compared to the same period last year. A breakdown of this figure shows that electricity and industry each contributed -1.4 percentage points. China's electricity generation increased 3.4% year-on-year in the first half of 2025, while coal-fired power generation decreased 3.3%. India's emissions decreased by 2.2%. A breakdown of this figure shows that electricity and residential contributed -2.0 percentage points and -1.5 percentage points, respectively, while industry contributed +1.2 percentage points. India's electricity generation increased by only 1.2%, largely due to the early arrival of the monsoon season in May and June, resulting in lower-than-average temperatures.

Meanwhile, according to the Finnish research institute Centre for Research on Energy and Clean Air (CREA), China's CO2 emissions fell 1% year-on-year in the first half of 2025. Emissions from coal use in the power sector fell by 69 million tons and in cement and other building materials fell by 20 million tons, while emissions from coal use in the chemical industry increased by 47 million tons. The report states that coal-fired power generation capacity could increase sharply by 80-100 GW in 2025, but coal-fired power generation will decline. The chemical industry, which produces synthetic fuels and chemicals from coal, is also experiencing rapid expansion.

CREA's analysis of India's CO2 emissions also found that emissions growth slowed to 1% year-on-year in the first half of 2025. Of the approximately 13 million tons increase in emissions, steel

and cement accounted for an increase of approximately 13 million tons, power generation a decrease of approximately 6 million tons, and other sectors an increase of approximately 6 million tons. In the power sector, power generation increased by 9 TWh in the first half of 2025 compared to the same period last year, but CO2 emissions decreased by 1%. According to the data analysis, 65% of the decrease in fossil fuel power generation was due to a small increase in electricity demand, 20% to an increase in clean electricity other than hydropower, and 15% to an increase in output at existing hydropower plants.

These reports point to a decline in CO2 emissions in the power sector as a factor in the decline or stagnation of national-level CO2 emissions. Let's examine the first question, based on data from each country's government on the power sector, whether China and India have reached the peak of their CO2 emissions, whether this is a persistent trend, or whether it is influenced by short-term factors such as weather.

Let's start with China. In the first half of 2025, overall power generation increased by 2.4% year-on-year (National Bureau of Statistics of China), and thermal power generation capacity increased by 4.1% (National Energy Administration of China). However, thermal power generation decreased by 2.1% (National Bureau of Statistics of China) (coal-fired power accounts for around 95% of thermal power generation). The plant load factor for thermal power generation fell from 49.1% in the first half of 2024 to 46.5% in the first half of 2025. China has already introduced a capacity mechanism for coal-fired power plants and is also requiring them to have load adjustment capabilities.

Looking at monthly data, thermal power generation recovered from a year-on-year decrease of 29.4 TWh (down 5.4%) in January and February 2025 to an increase of 6.9 TWh in June (up 27.1 TWh in July). Overall power generation increased from a 2.5 TWh increase (up 0.3%) in January and February to an increase of 27.8 TWh in June (up 43.6 TWh in July). The national maximum power load reached 1,508 GW in July 2025, surpassing the previous record of 1,451 GW in 2024 (according to the National Energy Administration of China). The decrease in thermal power generation in January and February is likely temporary, due to stagnant electricity demand. Meanwhile, solar power generation capacity increased by 92 GW in the month of May due to last-minute installations ahead of the implementation of new renewable electricity pricing rules. In February 2025, the National Energy Administration of the National Development and Reform Commission issued a notice regarding the establishment of a contract for difference mechanism for new energy sources. For existing projects that began operation before June 1, electricity prices will be based on current pricing policies and will not exceed the local benchmark price for coal-fired power generation. For new projects that begin operation on or after June 1, the amount of

electricity covered by the mechanism will be determined based on factors such as the Responsible Amount for Renewable Energy Consumption, and electricity prices will be determined through bidding. In July, the National Energy Administration of the National Development and Reform Commission issued a notice regarding the Responsible Amount for Renewable Energy Consumption, setting the mandatory green electricity consumption ratio for major energy-consuming industries. As such, renewable energy policies are still in a transitional period, and it is unclear how renewable energy will develop in the future.

Next is India. In the first half of 2025, compared to the same period last year, overall power generation increased by 1.2%, and coal-fired power plant capacity increased by 1.5%, while coal-fired power generation decreased by 2.8% (Central Electricity Authority of India). It has been pointed out that the decrease in coal-fired power generation was due to lower-than-average temperatures and a small increase in electricity demand. While the peak electricity demand to date was 250 GW on May 24, 2024, the peak in 2025 is expected to remain at 241 GW on June 9, 2025 (Ministry of Power, India).

Looking at the data by month, coal-fired power generation decreased significantly compared to the same month last year, from an increase of 5.2 TWh in March 2025 to a decrease of 10.8 TWh in May (a decrease of 9.0% compared to the same month last year). Overall power generation also decreased from an increase of 11.1 TWh in March to a decrease of 8.3 TWh in May (a decrease of 5.0% compared to the same month last year). Coal-fired power generation recovered to an increase of 1.0 TWh in August. With regard to the future mix of power generation, (1) if electricity demand grows, coal-fired power is likely to remain the main source of electricity to address demand growth for the time being, and (2) although solar power generation capacity increased by 5.4 GW in the month of June, power purchase agreements have been delayed and output has been curtailed (the plant load factor for solar power generation fell from 16.1% in July 2024 to 13.8% in July 2025), and it has been reported that a decrease in bidding and permits is expected in the future, so it is thought that it will be some time before a decrease in CO2 emissions in the power sector becomes a trend.

Given the above, it is too early to say that there is a persistent trend of declining CO2 emissions in either China or India. We need to closely monitor the impact of short-term factors, such as recent policy changes.

Contact: report@tky.ieej.or.jp