

More wind and solar, less coal: India's 13th National Electricity Plan examined

Summary

- India's 3rd National Electricity Plan (NEP13)¹, for the 13th Five Year Plan, marks a turning point in India's attitude on climate.
- NEP13 projects that fossil fuels will become a minority in India's electricity mix sometime around 2025. Non-fossil fuels - renewables, nuclear and large hydroelectric power plants - will account for 56.5% of installed electric power capacity in India by 2027.
- This shift will be driven by a rapid expansion of wind and solar power. The Indian government is rapidly increasing its ambitions for renewable power, and now projects two and a half times more renewable power capacity in 2022 than in 2012. Already, renewable energy has increased in India by 60% from early 2017 to August 2019, with solar seeing the largest growth from 9GW to 30GW.
- NEP13 shows India has an over-capacity of coal power stations. Many of the existing coal plants are struggling financially because of falling utilisation rate due to over-capacity and competition from renewables. At least 40GW of coal plants are not performing and 10GW of coal plants are seen as non-viable stressed asset. Coal power project financing has dropped by an astonishing 90% in 2018.
- The International Energy Agency (IEA) 2018 projections on Indian coal demand failed to acknowledge this transition, and instead portrayed a bullish growth in global coal demand.

Background

India's choices about how to develop its power sector have global significance. The International Energy Agency (IEA) suggests strong demand for coal in India will be the main driver of global demand over the next two and a half decades,² while the Financial Times describes India's appetite for coal as the "most important factor" for the future of the global coal industry.³ But India also has ambitious expansion plans for wind and solar power. If it reduces its reliance on coal with low-carbon power, it has the potential to fundamentally change the future of the global energy system.

India's Central Electricity Authority (CEA) releases a National Electricity Plan (NEP) every five years. India's Electricity Act 2003 mandates that the plans are produced as a part of a wider strategy to achieve universal electricity access across India, and ensure power is supplied efficiently and at reasonable rates.⁴ The National Electricity Plans provide guidance on how India's power sector will change in coming years. The approved 13th National Electricity Plan (NEP13) published in January 2018 sets out the government's projections for the development of India's electricity sector for the next five year period (2017-22), and the following five years (2022-27).

¹ http://www.cea.nic.in/reports/committee/nep/nep_dec.pdf

² https://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf

³ <https://www.ft.com/content/3486f2b5-b7b6-3b2f-9bea-2902d88029bb>

⁴ <http://www.powermin.nic.in/en/content/electricity-act-2003>

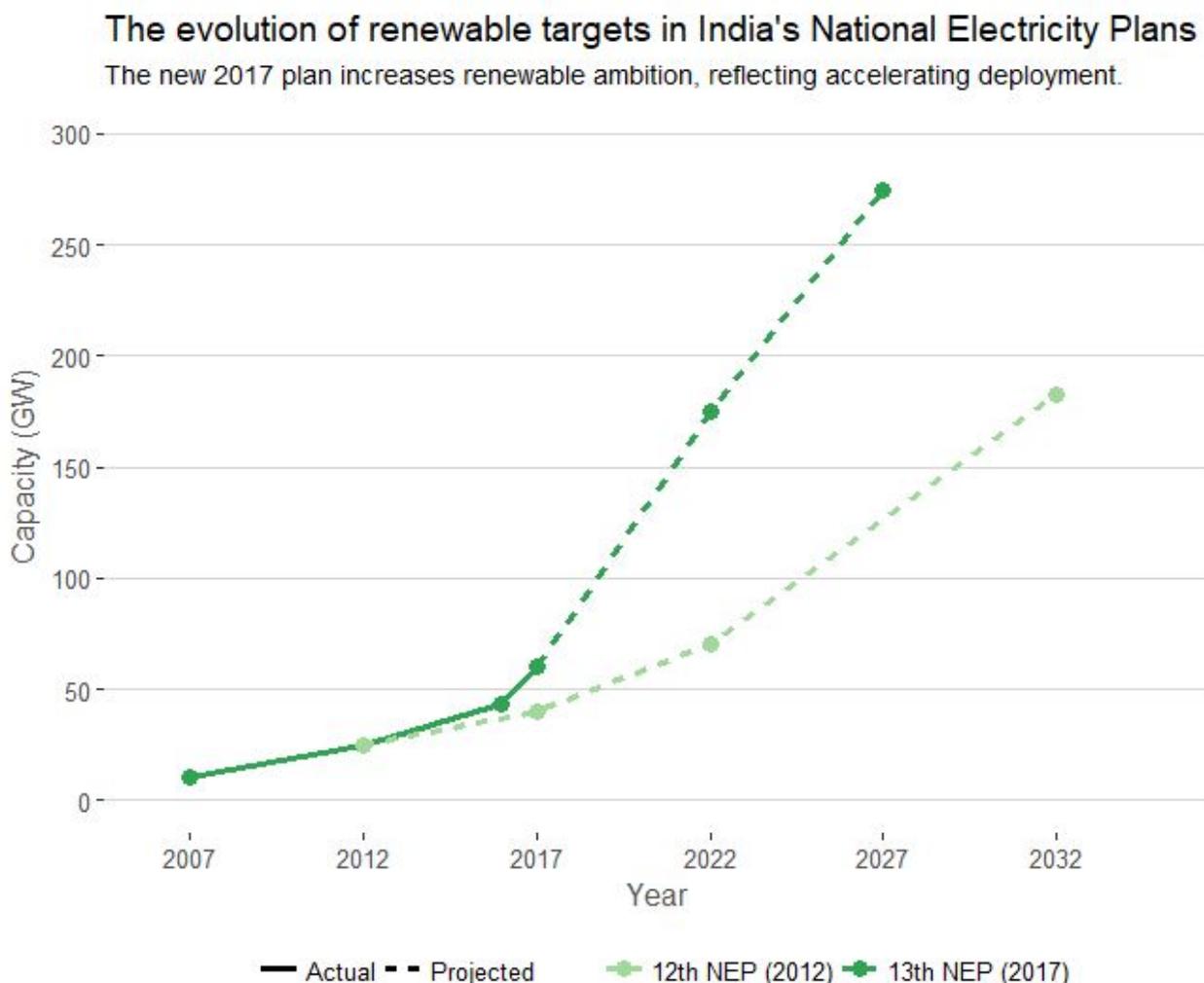
1. India's rapidly increasing renewable ambition

Renewable power provides a minority of India's power, but is growing at an unprecedented pace. At the start of 2017, India had 50GW of grid-connected renewable capacity, including 9GW of solar and 28.7GW of wind, compared with 188.5GW of coal and a total power sector capacity of 320GW.⁵ By August 2019, the renewable capacity has risen to 80 GW renewable energy sources, including 30GW of solar and 36.7GW of wind, compared with 196 GW of coal and a total power sector capacity of 361GW.⁶

Even more rapid growth will be necessary to meet national targets outlined in NEP13 to increase renewable capacity to 175GW by 2022, including 100GW from solar⁷ and 60GW from wind.⁸ NEP13 projects that India will deliver on its 2022 targets, and sets a high level of further ambition, with renewable power capacity projected to reach 275GW in 2027.⁹

A comparison with India's 12th National Electricity Plan shows how quickly expectations for renewables have increased. The 12th National Electricity Plan projected there would be 70GW of installed renewable capacity by March 2022.¹⁰ NEP13 updates this to 175GW - two and a half times more¹¹.

Figure 1: Planned expansion of renewable energy capacity in the 12th and 13th National Electricity Plans.¹²



⁵http://www.cea.nic.in/reports/monthly/installedcapacity/2017/installed_capacity-01.pdf

⁶http://www.cea.nic.in/reports/monthly/installedcapacity/2019/installed_capacity-08.pdf

⁷<https://cleantechnica.com/2015/06/22/india-officially-ramps-solar-power-target-100-gw-2022/>

⁸<https://cleantechnica.com/2015/06/24/india-expects-52-jump-annual-wind-energy-capacity-addition/>

⁹ NEP13 Table 6.4. P.6.13 http://www.cea.nic.in/reports/committee/nep/nep_dec.pdf

¹⁰ 12th NEP, p.59 <http://climateobserver.org/wp-content/uploads/2015/01/National-Electricity-Plan.pdf>

¹¹ http://www.cea.nic.in/reports/committee/nep/nep_jan_2018.pdf page 6.10

¹² http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v3/11v3_ch10.pdf,

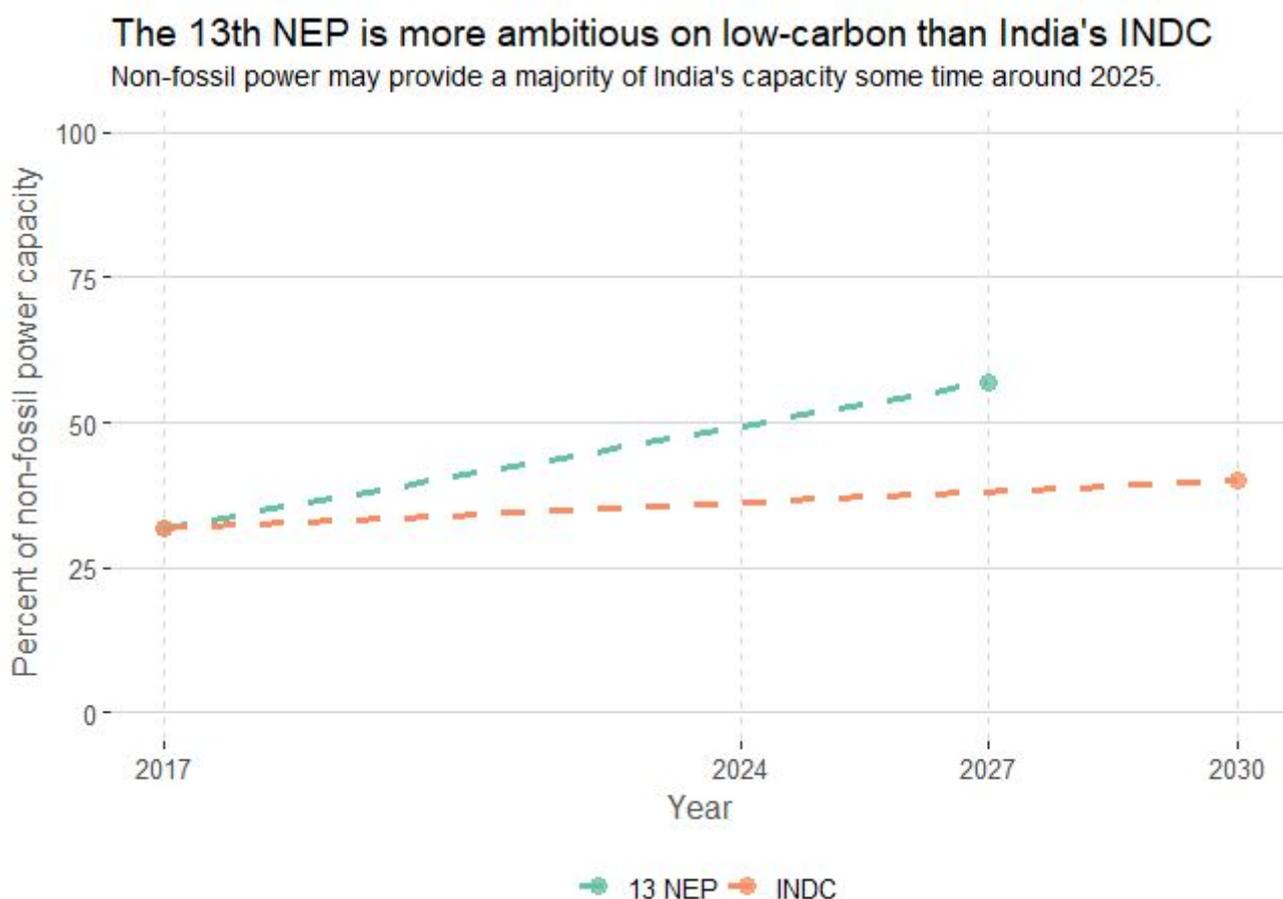
<http://climateobserver.org/wp-content/uploads/2015/01/National-Electricity-Plan.pdf>, http://www.cea.nic.in/reports/committee/nep/nep_dec.pdf;

<http://ieefa.org/ieefa-india-new-national-electricity-plan-reinforces-intent-toward-275-gigawatts-of-renewables-generated-electricity-by-2027/>

Comparing the NEP with India's 2016 Nationally Determined Contribution (NDC), which lays out its commitments under the Paris Climate Change Agreement¹³ also shows how quickly India's plans are changing in favour of more low-carbon power.

The NDC promised "about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from the Green Climate Fund (GCF)".¹⁴ NEP13 is significantly more ambitious, predicting that non-fossil power will make up 57% of India's installed electric capacity by 2027, comprising 362GW of renewable power capacity out of a 640GW total in March 2017.¹⁵

Figure 2: Projected percentage of non-fossil electricity capacity, 2017-2030, in India's NDC and NEP13.



If India exceeds the NDC 40% target, as NEP13 suggests it will, it is likely to also exceed its NDC emissions intensity target.¹⁶ Under NEP13, India's emissions intensity in 2030 will likely be ~50% below 2005 levels, according to assessment by Climate Action Tracker, making India's efforts as "2°C compatible".¹⁷

Such ambitions are underpinned by the rapidly changing economics of wind and solar. The price of renewables is falling rapidly in India. Since June 2018, all solar and wind auction prices have come in below 3.29 Rs/kWh, less than the average FY 2018-19 price of coal-fired electricity (3.46 Rs/kWh, equal to US\$0.045/kWh), according to new analysis by IEEFA.¹⁸ Bloomberg New Energy Finance analysis even shows that new utility-scale solar and wind in India is less expensive than new gas and coal.¹⁹

¹³ http://unfccc.int/paris_agreement/items/9485.php

¹⁴ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf> page 29

¹⁵ p.xxv http://www.cea.nic.in/reports/committee/nep/nep_dec.pdf; http://www.cea.nic.in/reports/committee/nep/nep_jan_2018.pdf

¹⁶ The NDC projects that the emissions intensity of India's GDP will fall 20-25% by 2020 and 33-35% by 2030, on 2005 levels.

<http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>

¹⁷ <https://climateactiontracker.org/countries/india/>

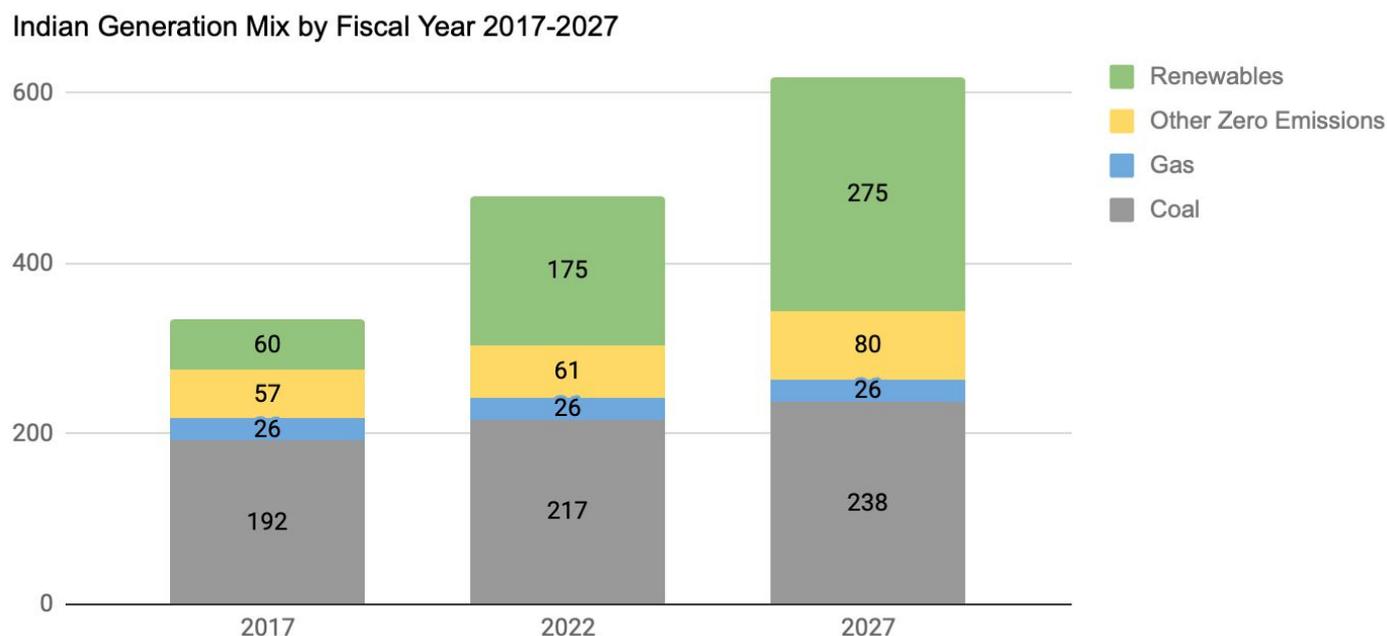
¹⁸ <http://ieefa.org/ieefa-report-major-water-and-other-stressors-raise-risks-for-indias-coal-sector/>; page 23

¹⁹ <http://ieefa.org/ieefa-report-major-water-and-other-stressors-raise-risks-for-indias-coal-sector/>; page 24

2. India's redundant coal capacity

NEP13 shows clearly that there is an over-capacity of coal plants. Looking at the demand projections for 2022, with the large expected increases in wind and solar power, as well as smaller additions from gas, hydro and nuclear, NEP states that only 6,445MW of coal is required, but 47,855MW of coal are under different stages of construction.²⁰

Figure 3: India's generation mix by capacity between the end of 2017 and the end of 2027. Source: NEP13.



This is a significant change from India's INDC, which suggests India could require 100GW, and perhaps as much as 300GW of additional coal capacity by 2030.²¹

Such over-capacity has led to a drop in plant utilisation. NEP13 shows the average coal plant load factor - a measure of how much plants are used - has fallen from around 70% to just over 60% in the last five years,²² an "exceptionally low" level, according to one analysis.²³ The low utilisation rate has led to further financial trouble for the coal plant operators, a new IEEFA analysis showed.²⁴

NEP13 also announced the retirement of 22,716MW of coal capacity before 2022.²⁵ The plan notes that these retirements "would not likely pose any problem in meeting the demand (for electricity) during 2021/22." The plan also includes a new target for closure of 48.3 GW of end-of-life coal plants by 2027.

Such aggressive retirement is partly driven by concerns about air pollution and [water shortage](#), but more importantly by financial concerns. In May 2018, Power Secretary Ajay Kumar Bhalla said in a [Bloomberg interview](#) that The Reserve Bank of India, the largest public lender, was "concerned about the 40GW of coal plants that are not performing and 10GW of coal plants are seen as non-viable stressed asset." Perhaps as a result, a new analysis by the [Centre for Financial Accountability](#) reveals an astonishing 90% decline in 2018 coal power project finance/lending, compared to 2017.

²⁰ NEP13 5.20 http://www.cea.nic.in/reports/committee/nep/nep_jan_2018.pdf

²¹ According to reports, India previously projected an installed capacity of 850GW by 2030. E.g. <https://yourstory.com/2017/03/india-renewable-future/> It says renewables will account for 40% of this, and coal the bulk of the remainder. Coal capacity could therefore add up to 60% of 850 = 510GW. Current installed coal capacity in India is 199GW. 510-199=311GW. Similar calculations at <http://energydesk.greenpeace.org/2015/12/01/india-coal-solar-war/>.

²² NEP13, p.50 http://www.cea.nic.in/reports/committee/nep/nep_jan_2018.pdf

²³ <http://energy.economictimes.indiatimes.com/news/power/economic-survey-paints-a-bleak-picture-of-power-sector/56894650>, <http://economictimes.indiatimes.com/industry/energy/power/india-sees-lowest-plant-load-factor-in-15-years-power-capacities-operating-at-65/articleshow/47463610.cms>

²⁴ <http://ieefa.org/ieefa-report-major-water-and-other-stressors-raise-risks-for-indias-coal-sector/>

²⁵ NEP13, 5.15 http://www.cea.nic.in/reports/committee/nep/nep_jan_2018.pdf

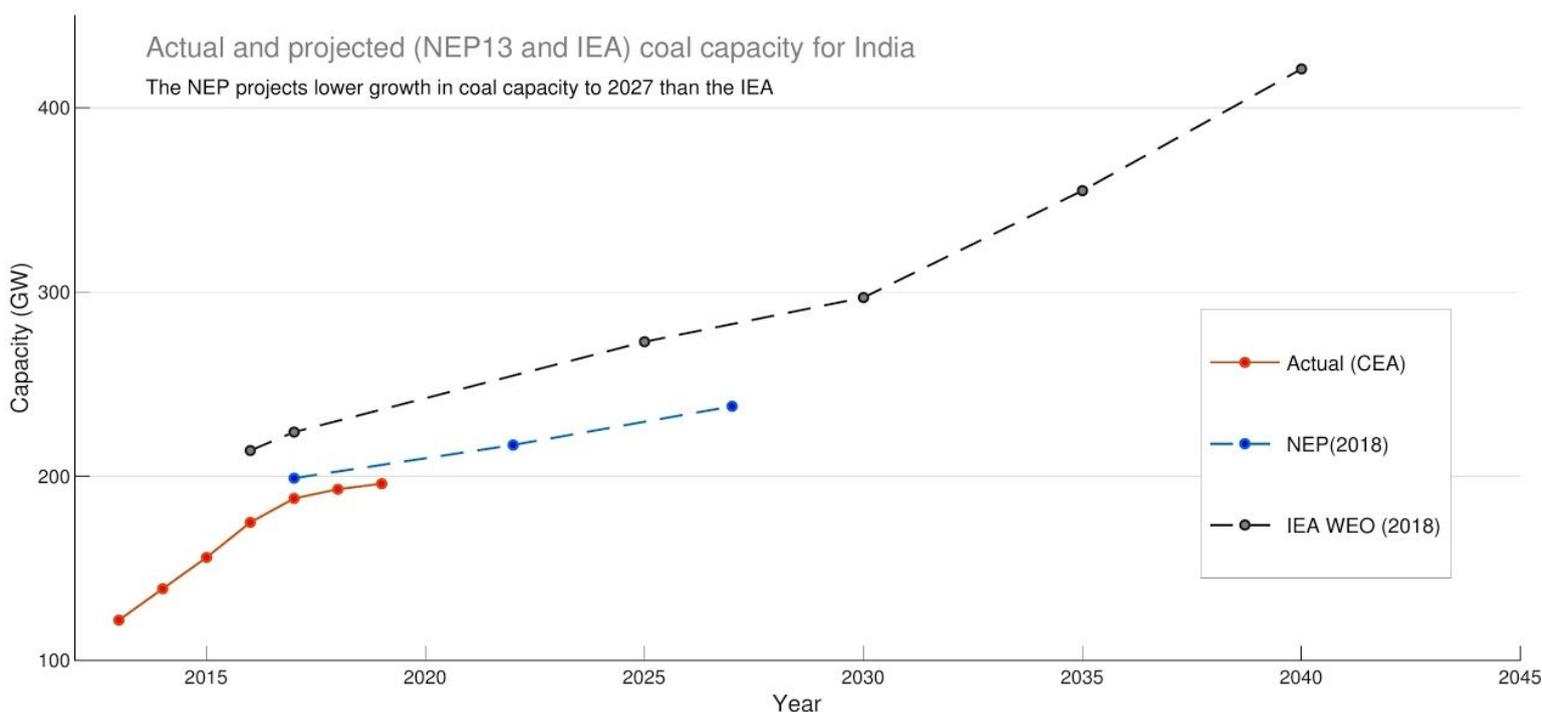
3. IEA projection fails to acknowledge India's energy transition

Demand for coal is falling globally,²⁶ but the IEA's central New Policies scenario (2018) still suggests an optimistic vision of coal's long-term prospects, in part because it projects strong continued growth in Indian coal demand. However, IEA's latest projections for Indian coal in the 2018 World Energy Outlook failed to acknowledge India's energy transition, despite describing India's electricity market as undergoing "a dramatic transformation".²⁷

In a 2015 report examining the India energy market, the IEA projected India would see massive further growth in coal power, with 438GW of coal generation capacity by 2040.²⁸ In the 2018 World Energy Outlook, this has been revised down only slightly to 421GW in 2040. As Figure 4 (below) illustrates, the 2018 projection is still significantly higher than the actual national electricity plan.

IEA estimated India's installed coal capacity as 224GW in 2017, higher than the actual installed coal capacity of 193GW (Central Electricity Authority data).²⁹ IEA projections for growth in India's coal capacity up to 2022, reflecting the 50GW of coal plant currently under construction, but projects India's coal capacity will not increase further from 2022, in contrast to the IEA which projects further rapid growth.

Figure 4: Actual installed coal generation capacity and projected coal capacity in NEP13 (2018) and the IEA's 2018 World Energy Outlook new policies scenario.



The NEP does not give any indication of India's plans after 2027, and if energy demand continues to grow and renewable power cannot meet India's needs, coal could begin to expand again. But the falling price of renewables³⁰ and India's ambition to cut emissions³⁰, along with concerns about the health impacts of air pollution associated with coal power plants³¹, suggest that the global coal expansion projected by the IEA looks increasingly unlikely.

²⁶ <https://www.iea.org/newsroom/news/2016/october/medium-term-renewable-energy-market-report-2016.html>

²⁷ International Energy Agency, World Energy Outlook 2018. P. 344

²⁸ https://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf Table 2.4

²⁹ http://www.cea.nic.in/reports/monthly/installedcapacity/2017/installed_capacity-12.pdf

³⁰ <http://www.climatechangenews.com/2017/02/13/india-may-never-need-another-coal-plant-teri/>

³¹ <https://www.ft.com/content/dbcb8502-f1d8-11e6-8758-6876151821a6>

4. NEP13 marks a turning point in India's attitude on climate

NEP13 marks a turn in the Indian government's attitude on climate action. IEEFA analysis remarked, "one of the key updates in the NEP is its adoption of the assumption that hydropower generation will decline by 30% over the next decade because of climate-change impacts of monsoon flows".³² The plan itself also states repeatedly, "Government of India has set up the target of 175 GW for renewable energy sources. The major focus is to arrest adverse climate change."

And the government is reinforcing this energy transition. In August 2019 the Power Ministry submitted a paper to the PM's Office stating that "there is no additional need for any new private investment" on coal.³³ In an unprecedented move, the State Government of Gujarat also announced in September 2019 that it will not give any further new permit for thermal power stations in the state, instead they will ramp up on new solar.³⁴

India's action has a significant and meaningful contribution to the global action on climate. After analyzing the emissions implications of NEP13, Climate Action Tracker revised India's rating to "2°C Compatible".

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This briefing was compiled by researchers in Europe and the US. For more information or questions, please contact info@mission2020.global, or visit mission2020.global.

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³² <http://ieefa.org/ieefa-india-new-national-electricity-plan-reinforces-intent-toward-275-gigawatts-of-renewables-generated-electricity-by-2027/>

³³ https://www.business-standard.com/article/economy-policy/india-s-5-year-power-vision-plan-to-move-away-from-generation-thermal-119090500495_1.html

³⁴ [https://indianexpress.com/article/india/gujarat-coal-thermal-power-plants-vijay-rupani-solar-carbon-emission-adani-clean-energy-5975547/;](https://indianexpress.com/article/india/gujarat-coal-thermal-power-plants-vijay-rupani-solar-carbon-emission-adani-clean-energy-5975547/)

<https://www.thehindubusinessline.com/news/national/gujarat-says-no-to-new-thermal-plants/article29362509.ece>

³⁵ https://climateactiontracker.org/media/documents/2018/4/CAT_2017-11-07_CountryAssessment_India.pdf