

Discussion Paper

India's Net Zero Transition is the World's Net Zero Transition:

Why (and How) Advanced Economies Should Provide Strong Support

Nicki Hutley, Independent Economist
Rovingstone Advisory
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Economy, Society, Environment

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At a glance

Why India holds the key to Net Zero for the world – and what is holding the transition back.

Why India A pivotal player in the global Net Zero transition.	**3rd** largest greenhouse gas (GHG) emitter	**+165 Mt** CO_2-e: world's largest rise in emissions in 2024	**2040 +** expected emissions peak
Where it stands A large and growing economy with rising emissions, but significant renewable potential.	**US$2,810** GDP per person (~1/5 of world average)	**3.1 vs 6.6** India's CO_2 per person compared to global average	**50%** non-fossil capacity **vs ~25%** share of generation
What it needs Massive investment to reach Net Zero.	**US$22.7 tn** Net Zero financing need to 2070	**US$6.5 tn** gap beyond domestic capital	**~40%** of the gap to come from abroad
What's in the way Higher costs, financing gaps and a challenging global context.	**13% vs 5%** cost of equity: India vs US	**~1/4** of transition investment reaches EMDEs ex-China	**US$300 bn** NCQG goal (US$1.3 tn stretch target) vs US$2.3–$2.5 tn need
What to do Turn ambition into action through coordinated effort.	**One table** policymakers, financiers, developers, MDBs	**One roadmap** named actions, named owners	**"Do tank"** not another think tank

1. Introduction

In September 2026, the UN Environment Programme announced that the opportunity to limit global warming to 1.5°C has now passed us by, and that it will take a best-case scenario to limit warming to 1.8°C above pre-industrial levels this century.[1] The time for talk is well and truly over.

As we look to accelerate solutions to the existential threat of climate change, one country stands out as offering a significant catalyst to achieving the Paris Target. While much of the world is focussed on climate action (and inaction) in China and the United States, India presents a particularly important opportunity which tends to be overlooked. However, India faces several hurdles to meet Paris-aligned goals.

This paper looks at why accelerating India's Net Zero transition is critical to limiting global warming to less than 2°C and provides a provocation for action to unlock transition investment, particularly from advanced economies.

The global climate imperative

Humanity has collectively failed to achieve the United Nations Intergovernmental Panel on Climate Change 2025 deadline for peak Greenhouse Gas (GHG) emissions,[2] and the consequences are now being felt in real time.

The mounting costs of our collective failure to rein in emissions are becoming increasingly obvious as the world experiences record numbers and intensity of (un)natural disasters, resulting in human death and displacement[3] and in ecosystem declines,[4] as well as economic losses. Groundbreaking research published in 2023 found "US$143 billion per year of the costs of [current] extreme events is attributable to climatic change."[5] Losses do not end with those to which a dollar sign can be attached.

1 United Nations Environment Programme (2026) 'UNEP: World set to cross 1.5°C global warming, but can still limit, adapt to and return from higher temperatures', press release, Nairobi, 2 September. Available at: https://www.unep.org/news-and-stories/press-release/unep-world-set-cross-15degc-global-warming-can-still-limit-adapt-and

2 IPCC, 2022: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report* (P.R. Shukla et al., eds.). Cambridge University Press, doi: 10.1017/9781009157926

3 Earth.Org (2025) 'Extreme weather events in 2024 led to highest number of new displacements since 2008', *Earth.Org*, 20 March. Available at: https://earth.org/extreme-weather-events-in-2024-led-to-highest-number-of-new-displacements-since-2008/

4 International Union for Conservation of Nature (2025) *Species and climate change*. IUCN Issues Brief, December. Gland: IUCN. Available at: https://iucn.org/resources/issues-brief/species-and-climate-change

5 Newman, R. and Noy, I. (2023) 'The global costs of extreme weather that are attributable to climate change', *Nature Communications*, 14, 6103. https://doi.org/10.1038/s41467-023-41888-1

The cause of these disasters has long been known. The extraction and burning of coal, oil and gas collectively account for over 75% of global GHG emissions and nearly 90% of all carbon dioxide emissions.[6] Of those fossil fuel emissions, coal accounts for 40%, oil 32%, and natural gas 21%.[7] The phasing out of fossil fuels from all parts of the economy is therefore critical to achieving Net Zero by 2050. In 2023, the UNFCCC's COP28 took a first step towards formally recognising this by including in its final text "a roadmap for transitioning away from fossil fuels."[8] In 2021, the head of the International Energy Agency said, "If governments are serious about the climate crisis, there can be no new investments in oil, gas and coal, from now – from this year."[9]

Balancing ambition with reality

However, the complexities and challenges of transitioning away from fossil fuels cannot be minimised, even when there is strong commitment to do so. Many developing economies currently have relatively low per capita energy use and emissions[10] but, for some, overall emissions are high due to large and expanding populations, together with an economic structure that relies heavily on fossil fuels for energy, industrial processes, transport and acceptable living standards. Energy, after all, underpins most of our most basic needs, such as the ability to light and cool a home, study or work after sunset, cook safely, travel and participate in a modern economy.

This does not diminish the urgency of phasing out fossil fuels, nor provide cover for greenwashing by countries or companies. But it does mean that the supply and demand sides of the transition cannot be considered separately. Reducing the supply of fossil fuels must be accompanied by rapidly expanding the affordable, reliable low-carbon alternatives that allow households, businesses and economies to stop demanding them in the first place.

The challenge, therefore, is not simply to constrain fossil-fuel supply, but to accelerate substitution: building the clean-energy generation, grids, storage, technologies and infrastructure that allow economies to grow while fossil-fuel demand declines. This is particularly important in lower-income countries, where the objective cannot be to constrain access to energy that is already inadequate. A just transition must enable people to move from one light bulb to two and add a fan, without locking that improvement in living standards into decades of additional fossil-fuel dependence.

6 United Nations (2022) 'Causes and effects of climate change', UN Climate Action, 1 March. Available at: https://www.un.org/en/climatechange/causes-and-effects-climate-change

7 CSIRO (2024) 'What are the sources of carbon dioxide in the atmosphere?', *Climate change Q&A*, last updated 1 October. Available at: https://www.csiro.au/en/research/environmental-impacts/climate-change/Climate-change-QA/Sources-of-CO2

8 United Nations Sustainable Development Group (2023) 'COP28 ends with call to "transition away" from fossil fuels; UN chief says phaseout is inevitable', 13 December. Available at: https://unsdg.un.org/latest/stories/cop28-ends-call-%E2%80%98transition-away%E2%80%99-fossil-fuels-un-chief-says-phaseout-inevitable

9 Harvey, F. (2021) 'No new oil, gas or coal development if world is to reach net zero by 2050, says world energy body', *The Guardian*, 18 May. Available at: https://www.theguardian.com/environment/2021/may/18/no-new-investment-in-fossil-fuels-demands-top-energy-economist

10 International Energy Agency (2024) 'The changing landscape of global emissions', in *CO2 Emissions in 2023*. Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/co2-emissions-in-2023/the-changing-landscape-of-global-emissions

A role for advanced economies

India is now the world's third-largest emitter of GHGs, behind China and the U.S.[11] Unlike in those two economies, however, India's emissions are still around 15 years away from peaking.[12]

All of this means that India will play an outsized role in determining whether the world achieves Net Zero. By extension, this mathematical reality makes supporting India's transition not simply an Indian imperative, but a global one – and gives advanced economies a critical role in helping to enable it.

That is not to suggest the Indian Government needs more advice on policy-setting – there are already plenty of minds working in this space.

Rather, this paper seeks to prompt greater understanding of the urgency of finding workable solutions for financial and other support for India's decarbonisation, and to highlight where action today can yield the best results, both for India and the world at large.

11 Friedrich, J., Ge, M., Pickens, A. and Vigna, L. (2023) 'This interactive chart shows changes in the world's top 10 emitters', *World Resources Institute Insights*, 2 March. Available at: https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters

12 Bloomberg News (2021) 'India sees carbon emissions peaking in 2040-45', *Bloomberg*, 3 November. Available at: https://www.bloomberg.com/news/articles/2021-11-03/india-sees-carbon-emissions-peaking-in-2040-45

2. India's critical role in achieving Paris goals

To overcome barriers to supporting India's Net Zero transition with the sense of urgency that is required, an understanding of the context of India's economic and emissions pathways – past, present and future – is essential. India cannot just "switch off the lights" or prevent millions of people from achieving basic living standards.

India's economic growth and development

In 2023, the population of India surpassed that of China and, by 2024, was estimated at 1.44 billion,[13] making it the world's most populous nation. In 2025, it was the world's fourth-largest economy[14] and the world's third-largest emitter of carbon dioxide in volume terms.[15] India's use of coal and gas has already accelerated sharply and, without a major policy and investment shift, is set to expand dramatically over the decade ahead,[16] even as the deployment of renewables accelerates, as the country strives to achieve "developed economy" status by 2047, the 100th anniversary of independence.

India's current GDP per capita sits at just US$2,810, which is equal to a little less than one fifth of the global average,[17] placing it 142nd out of 193 economies, and underpinning its developing economy status. By comparison, the average across emerging and developing economies is US$7,560, in China it is US$14,870, and across advanced economies it averages US$66,180.[18] India's lower-income status means that it also ranks poorly on wider social progress measures such as nutrition, sanitation services and equal access to quality education.[19]

13 United Nations Population Fund (2024) *World Population Dashboard*. New York: UNFPA. Available at: https://www.unfpa.org/data/world-population-dashboard

14 Forbes India (2025) 'Top 10 largest economies in the world', *Forbes India Explainers*. Available at: https://www.forbesindia.com/article/explainers/top-10-largest-economies-in-the-world/86159/

15 Friedrich, J., Ge, M., Pickens, A. and Vigna, L. (2023) 'This interactive chart shows changes in the world's top 10 emitters', *World Resources Institute Insights*, 2 March. Available at: https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters

16 Gupta, D. and Pathak, M. (2025) 'Economic and environmental implications of India's industry transition to net zero', *Applied Energy*, 379, 124922. https://doi.org/10.1016/j.apenergy.2024.124922

17 International Monetary Fund (2025) 'GDP per capita, current prices (NGDPPC)', *IMF DataMapper: World Economic Outlook*. Washington, DC: IMF. Available at: https://www.imf.org/external/datamapper/NGDPPC@WEO/OEMCD/ADVEC/WEOWORLD

18 Ibid.

19 Social Progress Imperative (2026) *2026 Global Social Progress Index*. Washington, DC: Social Progress Imperative. Available at: https://www.socialprogress.org/social-progress-index

India's income per person is a fraction of the developed-economy mark

GDP per capita, US$ (current prices)

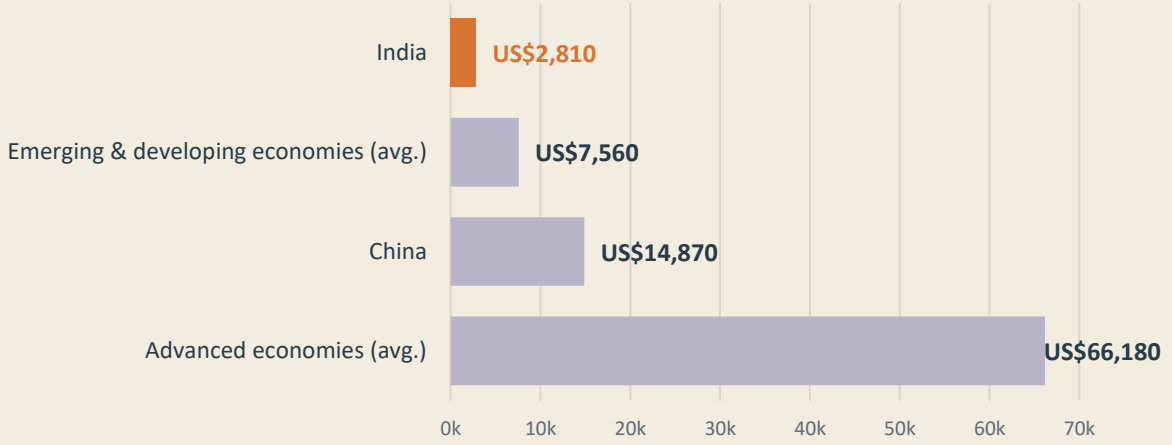


Figure 1 *Source: IMF World Economic Outlook DataMapper*

While there is debate about what constitutes developed economy status – and whether per capita GDP is a sufficient measure of "development" – there is broad agreement that it should be, at a minimum, in the order of US$12,500–$15,000 in today's terms, although some economists have put it at twice that figure.

The vision for social and economic development aims to set India on a growth pathway requiring average annual growth in nominal GDP per capita of 7.5% over the next two decades, adding approximately US$1 trillion (roughly the size of the Swiss economy) to the overall economy every 12 to 18 months.[20]

20 Singh, S. (2025) 'India's economic juggernaut on way to becoming the 3rd largest economy', *Forbes*, 14 July. Available at: https://www.forbes.com/sites/sarwantsingh/2025/07/14/indias-economic-juggernaut-on-way-to-becoming-the-3rd-largest-economy/

Even at 7.5% growth p.a., India just reaches developed-economy status in 2047

Illustrative path of nominal GDP per capita, US$ (compounding 7.5% a year from US$2,810)

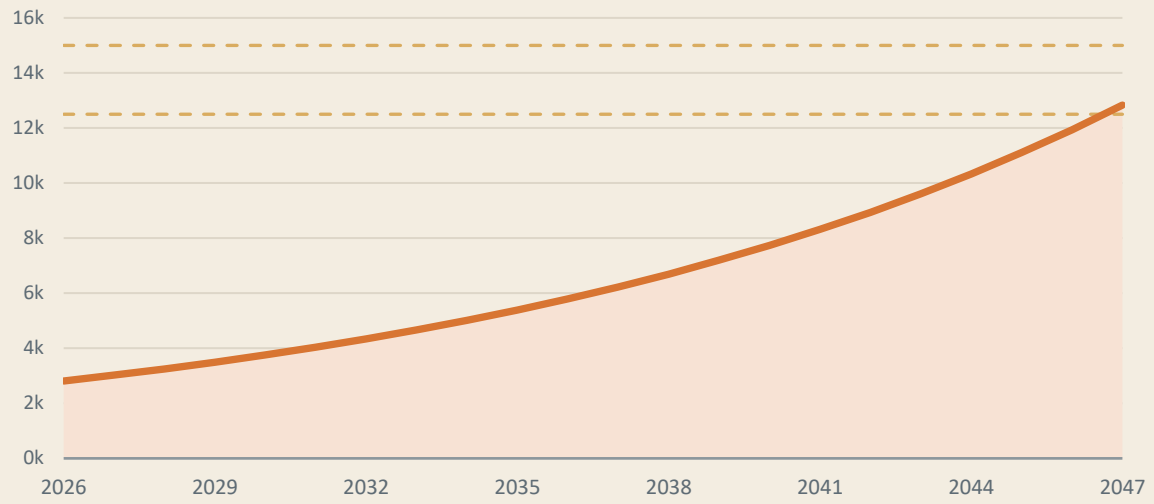


Figure 2 *Note: Illustrative only; not a forecast. Author's calculation based on 7.5% compound annual nominal growth rate from the IMF's estimate of US$2,810. Dashed lines represent developed-economy threshold (US$12,500–15,000)*

The country's current and future demographic and economic growth therefore has vitally important implications not only for the wellbeing of the nation but, given India's current heavy reliance on fossil fuels to drive that growth, also that of the entire world as we confront the existential challenge of climate change.

A perspective on India's emissions pathway

At the opening session of COP30 in Brazil in November 2025, the Indian Ambassador to Brazil said that "developed countries that have disproportionately appropriated the global carbon budget must accelerate emission reductions".[21]

Some argue that there are reasons to allow India greater latitude in its decarbonisation journey as it prioritises economic growth. Notably, India's historical emissions have, at least until recently, been very low, and remain so on a per capita basis. However, this fails to take into account two important considerations.

Firstly, over the past 170 years, India still ranks fifth in the world on cumulative CO_2 emissions, accounting for 3.9% of total emissions.[22] Initially, India's emissions were heavily driven by changes in land use but, over time, emissions have increasingly been driven by fossil fuel burning.

21 Ray, K. (2025) 'Rich nations must accelerate emission reduction, says India at Belem ahead of COP30', *Deccan Herald*, 8 November. Available at: https://www.deccanherald.com/india/rich-nations-must-accelerate-emission-reduction-says-india-at-belem-ahead-of-cop30-3791494

22 Evans, S. (2021) 'Analysis: Which countries are historically responsible for climate change?', Carbon Brief, 5 October. Available at: https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change//

While considerably behind the massive Chinese and American economies on an historical basis (13.1% and 20.4% respectively), India is nevertheless an important – and increasingly large – GHG contributor, even if much of that contribution has come in more recent decades.

Fifth in history — but much smaller than the top three emitters

Share of cumulative CO_2 emissions, 1850-2024 including land use

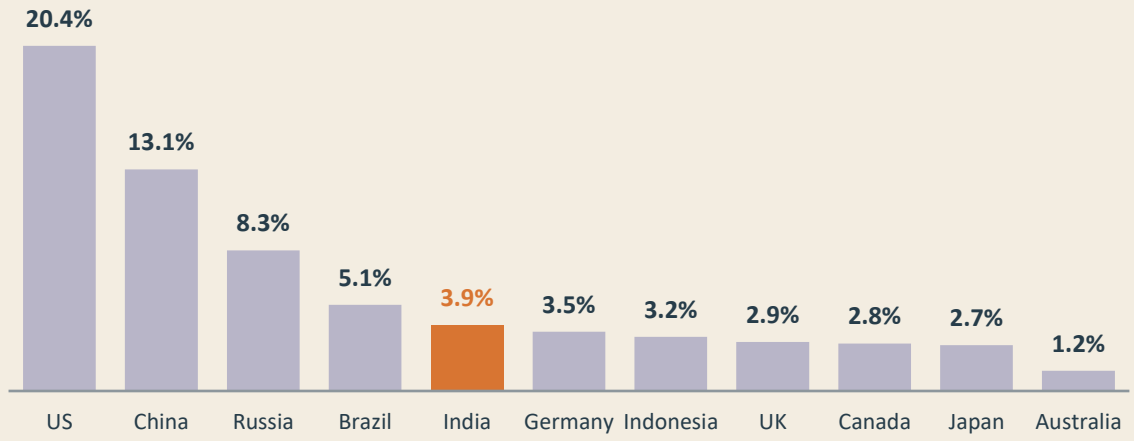


Figure 3 *Source: Our World in Data, using Global Carbon Budget data*

Indeed, India contributed the largest increase in volume of emissions in 2024 over 2023, with +165 megatonnes of carbon dioxide equivalent[23] ($MtCO_2$-e), compared to China's +126 $MtCO_2$-e, and the US's +22.4 $MtCO_2$-e.[24] The European Union saw emissions volumes decline by -58.6 $MtCO_2$-e (see **Figure 4** below).

India's emissions are now rapidly growing

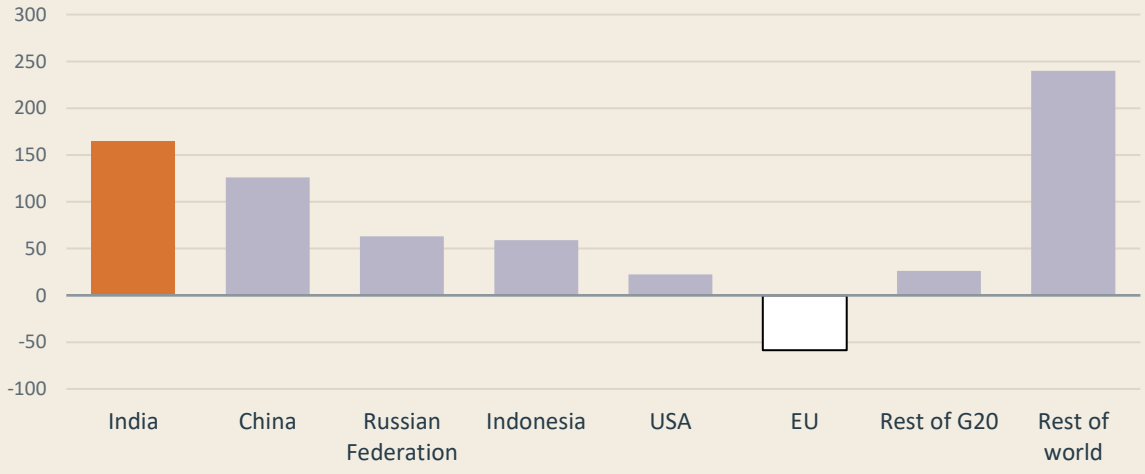


Figure 4 *Source: United Nations Environment Programme*

23 Includes all GHG emissions measured on a comparable warming potency basis

24 United Nations Environment Programme (2025) *Emissions Gap Report 2025: Off Target – Continued Collective Inaction Puts Global Temperature Goal at Risk*. Nairobi: UNEP. Available at: https://wedocs.unep.org/20.500.11822/48854

Secondly, and more importantly, while the Paris Agreement acknowledges that countries have "common but differentiated responsibilities and respective capabilities",[25] the world cannot afford for any country to do less than it is reasonably capable of at this critical juncture, irrespective of past accountability. The costs of already embedded climate change are mounting, and India is no exception in facing these costs.

Indeed, India is highly exposed to the impacts of climate change through human fatalities and economic losses due to increasingly frequent extreme and chronic events such as floods, heatwaves, cyclones, desertification, and drought.[26] For example, in agriculture alone, which employs almost half of India's workforce, studies estimate a potential loss in GDP of 1.5% to 2% *annually* due to climate-induced losses in yields and productivity.[27] It is unequivocally in India's own interests to accelerate its decarbonisation journey.

India is already paying for a warming world

Human and economic toll of extreme weather, and the risk to farm incomes

6th	80,000+	US$180bn	1.5–2%
most-affected country by extreme weather, 1993–2022	lives lost — about 10% of the global total	in economic losses from 400+ extreme weather events	of GDP potentially lost each year to climate-hit farm yields

Agriculture employs almost half of India's workforce — making India highly sensitive to the impacts of climate change

Figure 5 *Source: Germanwatch, Swain*

Nevertheless, India's annual *per capita* GHG emissions, at 3.1 tonnes of $CO_{2\text{-}e}$, were less than half the world average in 2025.[28] They are also well below those of countries such as the U.S. (17.5 t/$CO_{2\text{-}e}$), Australia (21.5 t/$CO_{2\text{-}e}$), and China (11.1 t/$CO_{2\text{-}e}$).[29] It might therefore be argued that some leeway should be given to India and others when considering the Paris Agreement's reference to "differentiated responsibilities".

25 United Nations (2015) *Paris Agreement*. Bonn: UNFCCC. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

26 Adil, L., Eckstein, D., Künzel, V. and Schäfer, L. (2025) *Climate Risk Index 2025: Who suffers most from extreme weather events?* Bonn: Germanwatch, 12 February. Available at: https://www.germanwatch.org/sites/default/files/2025-02/Climate%20Risk%20Index%202025.pdf

27 Swain, S. (2025) 'Economic burden of climate change in India: a review', *The Third Voice: Reality and Vision*, 6(2), pp. 7–15. https://doi.org/10.5281/zenodo.15168576

28 Crippa, M., Guizzardi, D., Pagani, F., Banja, M., Muntean, M. et al. (2025) *GHG emissions of all world countries – 2025 report*. JRC143227. Luxembourg: Publications Office of the European Union. https://doi.org/10.2760/9816914

29 Ibid.

Third-largest emitter in total — but less than half the world average per person

t/CO_2-e emissions per capita (2025, all sectors excluding land use)

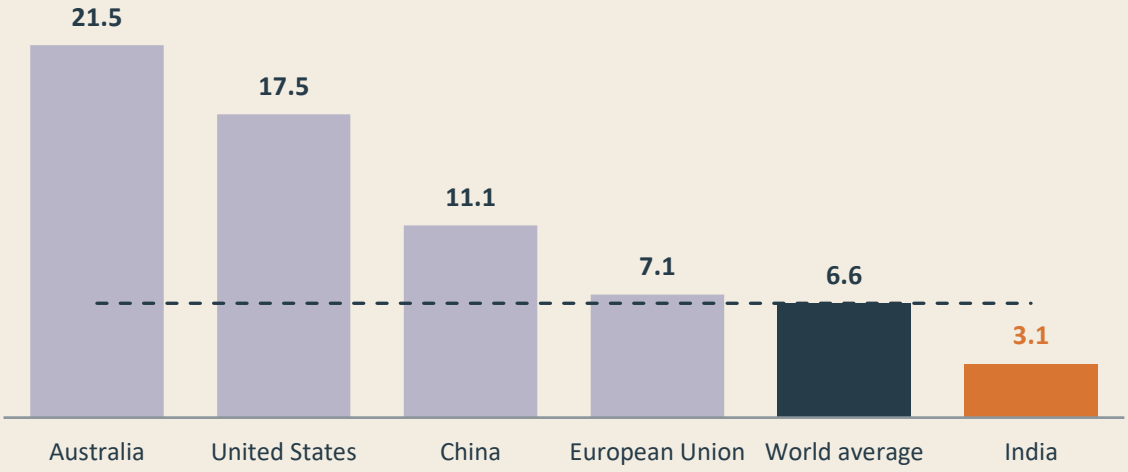


Figure 6 *Source: European Commission EDGAR database*

However, per capita emissions also need to be considered with some historical context. The options available today to decouple economic growth from fossil fuel use are now exponentially more viable, both technically and financially. In renewable energy in particular, the low cost of solar energy and onshore wind power[30] makes them a logical option for grid expansion to meet targets for growth and living standards without sacrificing global climate targets.

Irrespective of history, India today is one of the most critical players in the Earth's climate future.

So how can India balance the seemingly conflicting objectives of rapid economic development and urgent climate action?

It might be argued that India could pursue a somewhat slower rate of growth,[31] closer to rates experienced among healthy advanced economies, and still see significant economic development over the next two decades. This would slow the negative impacts from higher GHG emissions associated with that growth. However, it cannot reasonably be argued that growth should stagnate until India decarbonises because of the environmental damage caused by advanced economies over the past two centuries.

> **A more reasonable approach is to look for ways to ensure that India is able to accelerate its decarbonisation pathway while also ensuring sustainable growth and improved living standards.**

30 See, for example, Graham, P., Hayward, J. and Foster, J. (2026) *GenCost 2025-26: Final report*. CSIRO, Australia, July. Available at: https://www.csiro.au/en/research/technology-space/energy/electricity-transition/GenCost

31 See, for example, Bilandani, K. and Jain, P. (2025) 'Growth or emission targets: What India needs to sacrifice?' Available at: https://www.sciencedirect.com/science/article/pii/S2666188825009736

India's current climate goals

India aims to achieve Net Zero by 2070. Its Nationally Determined Contribution (NDC), updated in 2026, incorporates a goal to reduce emissions intensity (as opposed to absolute emissions) of 47% by 2035 against 2005 levels, together with 60% cumulative non-fossil electric power installed capacity by 2035.[32]

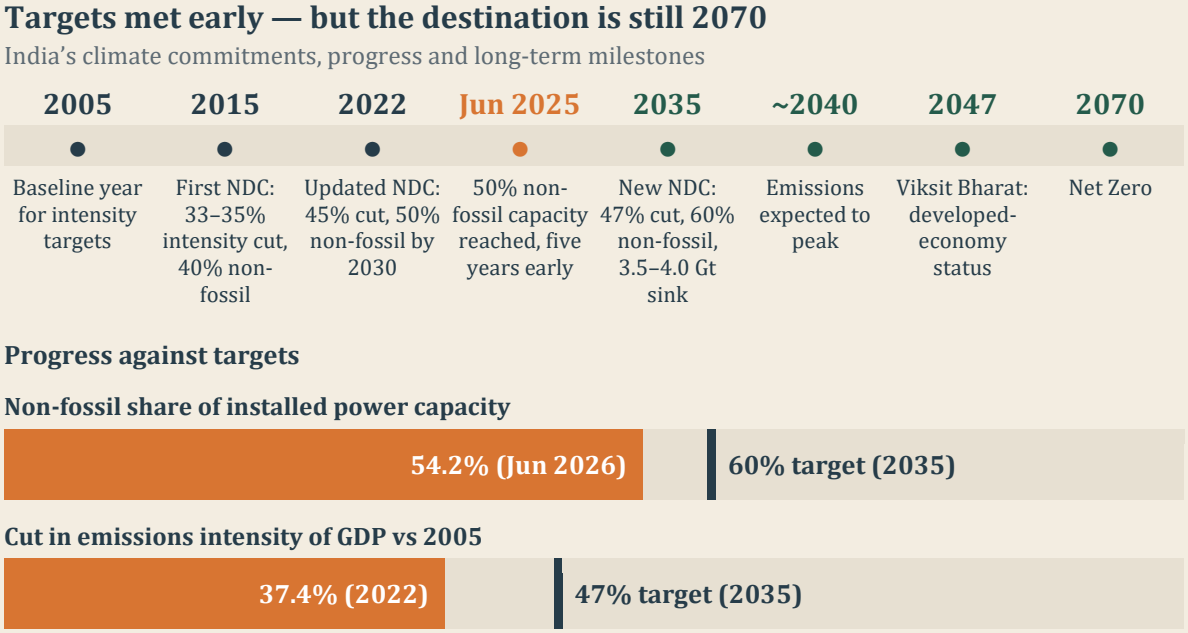


Figure 7 *Source: Government of India*

This represents a marginal step forward from its 2022 NDC commitments[33] for 2030 of 45% and 50%, respectively, with the 50% capacity target already achieved in 2025.

The energy sector is critical to India's emissions pathway, accounting for just over half of total emissions,[34] but accelerated progress in the transport, industrial, building, and agriculture sectors is also critical if Paris-aligned targets are to have any hope of being met. However, the energy sector should be the priority for transformation, which will also support lower emissions elsewhere, at least to some degree, as policy and technological progress in other sectors is further developed.

India's power sector provides both reasons for optimism as well as ongoing challenges. For example, in 2024, 83% of investment into the energy sector went into clean energy, supported by US$2.4 billion in development finance for clean energy projects (making it the largest recipient of

32 Press Information Bureau (2026) 'Cabinet approves India's Nationally Determined Contribution (2031-2035) to be communicated to the United Nations Framework Convention on Climate Change', Government of India, 25 March. Release ID 2245209. Available at: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2245209

33 Government of India (2022) *India's Updated First Nationally Determined Contribution Under Paris Agreement (2021–2030)*. Submission to the UNFCCC, August. Available at: https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

34 International Energy Agency (n.d.) 'India: Emissions', *IEA country profile*. Paris: IEA. Available at: https://www.iea.org/countries/india/emissions

such finance).[35] A total of US$33 billion in renewables investment represented a 17% increase over the previous year, with the IEA estimating a 12% increase in 2025.[36] In 2025, non-fossil energy had reached 50% of installed capacity, five years ahead of target.

However, installed capacity has not been matched by actual renewable energy supply, which sits at just 25% of total grid generation due to difficulties with transmission, storage and state-level demand. Meanwhile, construction of new coal-fired generation capacity has continued,[37] with 15 GW being added in 2024[38] and 10 GW in 2025.[39] Further, in 2025, the Indian power ministry announced plans to develop an additional 97 GW of coal- and lignite-based electricity generation capacity over the next decade.[40]

Clean on paper, coal in the wires

Clean capacity versus clean generation, and how far coal must fall for a Paris pathway

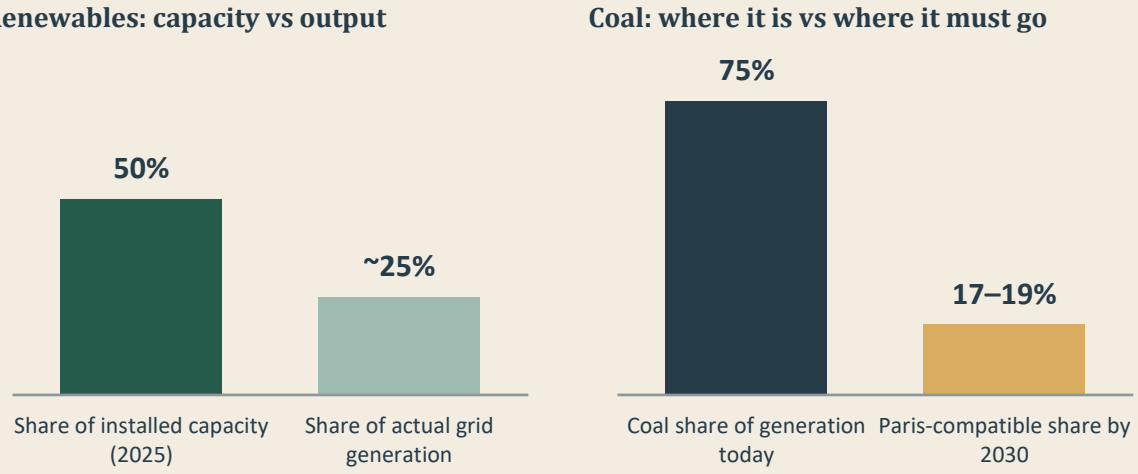


Figure 8 *Sources: IEA, Climate Action Tracker*

As with much of the world, a significant increase in investment in energy grids in India is needed to translate investment in generation capacity into actual generation. It is therefore encouraging that

35 International Energy Agency (2025) 'India', in *World Energy Investment 2025*. Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/world-energy-investment-2025/india

36 International Energy Agency (2025) *World Energy Investment 2025*. 10th edn. Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/world-energy-investment-2025

37 Climate Action Tracker (2026) 'India', country assessment, updated 9 September. Climate Analytics and NewClimate Institute. Available at: https://climateactiontracker.org/countries/india/

38 International Energy Agency (2025) *World Energy Investment 2025*. 10th edn. Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/world-energy-investment-2025

39 Lempriere, M. (2026) 'New coal plants hit '10-year' global high in 2025 – but power output still fell', *Carbon Brief*, 21 May. Available at: https://www.carbonbrief.org/new-coal-plants-hit-10-year-global-high-in-2025-but-power-output-still-fell

40 Press Trust of India (2025) 'Govt plans to develop 97 GW coal, lignite-based thermal power generation capacity', *The Economic Times*, 7 August. Available at: https://www.ptinews.com/story/business/govt-plans-to-develop-97-gw-coal-lignite-based-thermal-power-generation-capacity/2801006

India has approved US$110 billion for new transmission infrastructure investment between 2024 and 2032.[41]

Despite this progress, from a climate action perspective, India's focus on emissions intensity, rather than total emissions, is problematic. It demonstrates how much progress India still must make, with many experts predicting that India will not be ready to commit to hard emissions targets before 2040,[42] which is around the time that emissions are currently expected to peak. In other words, setting absolute emissions targets is reactive, rather than proactive.

India's current climate goals have therefore raised concerns among many as being inconsistent with the Paris goals. For example, the global independent think tank, Climate Action Tracker, which takes into consideration "fair share" contributions, ranks India's climate policies and actions as "insufficient" (i.e., consistent with 3°C of warming) and provides an overall rating of "highly insufficient" (i.e., consistent with 4°C of warming).[43] Climate Action Tracker estimates that, to be consistent with Paris targets, coal's share of total energy generation in India must drop from 75% today to just 17% - 19% by 2030.[44]

In February 2026, the National Institution for Transforming India (NITI Aayog, an Indian Government think tank) mapped out a pathway for India to achieve both its economic goals for 2047 and Net Zero by 2070. However, NITI Aayog observed that this would require energy demand to grow at a far slower pace than the economy, which India has not yet been able to achieve. Unfortunately, slowing energy demand will become even more difficult over the short to medium term[45] given trends in urbanisation, the very necessary demand for air conditioning, electrification in general, and booming data centres[46] across the country.

With India such a critical player in determining the world's climate path, the question the country must answer is: how might economic development goals be met while avoiding locking the country into long-term dependence on fossil fuels, and thereby locking the world into an emissions pathway of 3°C or greater?

The question advanced economies must now ask is what must we urgently do to support India to deliver an accelerated Net Zero pathway, given that the shared stakes are extremely high?

41 Srivastava, S. and Rana, T. (2025) 'De-Risking Can Boost Investment in India's Renewable Energy Sector', Outlook Business, January 2025 Available at: https://www.outlookbusiness.com/columns/de-risking-can-boost-investment-in-indias-renewable-energy-sector

42 View based on consultations with a range of Indian experts and think tanks in 2025 and 2026.

43 Climate Action Tracker (2026) 'India', country assessment, updated 9 September. Climate Analytics and NewClimate Institute. Available at: https://climateactiontracker.org/countries/india/

44 Ibid.

45 International Energy Agency (2026) *Electricity 2026: Analysis and forecast to 2030*. Paris: IEA, February. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/electricity-2026

46 Rajshekhar, M. (2026) 'How should India power its data centres?', *CarbonCopy*, 31 July. Available at: https://www.carboncopy.info/how-should-india-power-its-data-centres

3. Facilitating India's Net Zero transition

India's Net Zero transition

Electrifying economies, in conjunction with renewables, can achieve the largest emissions reductions most quickly, including in stationary energy and road and rail transport.[47] COP31 is expected to deliver a commitment by the parties to 35% electrification by 2035.[48]

For India, the priority in its Net Zero journey should be to continue to increase both clean energy capacity and clean energy utilisation at a speed fast enough to meet new demand and still improve the emissions intensity of the energy system.

India is not starting from a standstill. Current government incentives and policies are expected to reduce India's cumulative emissions by 23% between 2015 and 2070, compared to a no-policy scenario.[49] India is already implementing an immense expansion of clean energy to meet the needs of 1.4 billion people and the goal of developed economy status.

Large infrastructure companies in India have been successful at finding capital for grid-scale solar and wind projects due to the strong and proven business case for these renewables, and recognition by investors of India's immense growth potential.[50]

However, the scale of funding required to reach climate goals is far greater than current capital flows, while the cost of that capital comes at a significant premium for developing economies. In 2021, the IEA estimated that India's equity risk premium was twice that of the U.S. (two percentage points compared to one percentage point, respectively). The (economy-wide) weighted average cost of equity capital in India in 2020 was estimated at 13%, compared to 5% in the US, 4% in Germany and 9% in China.[51]

47 Ahluwalia, M.S. and Patel, U. (2024) 'How India can reach net zero: a strategy for 2025–35', *Oxford Review of Economic Policy*, 40(2), pp. 350–365. https://doi.org/10.1093/oxrep/grae016

48 COP31 Presidency (2026) 'COP31 Presidency announces "35% by 2035" electrification target as part of Action Agenda launch', *COP31 Türkiye news*, Bonn, 9 June. Available at: https://cop31.tr/news-detail/bonn-electrification-target-2026

49 Chaturvedi, V., Dey, A. and Anand, R. (2024) *Impact of select climate policies on India's emissions pathway*. Policy brief. New Delhi: Council on Energy, Environment and Water, November. Available at: https://www.ceew.in/publications/impact-select-climate-policies-indias-emissions-pathway

50 NITI Aayog (2026) *Scenarios Towards Viksit Bharat and Net Zero: Financing Needs* (Vol. 9). New Delhi: NITI Aayog. Available at: https://niti.gov.in/publications/division-reports

51 International Energy Agency (2021) 'The cost of capital in clean energy transitions', *IEA articles*. Paris: IEA. Available at: https://www.iea.org/articles/the-cost-of-capital-in-clean-energy-transitions



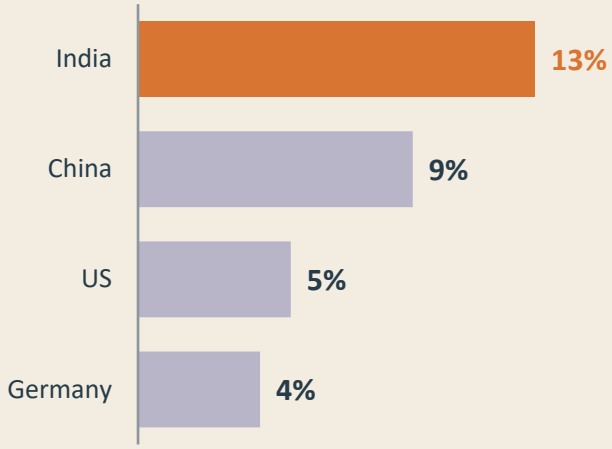
Figure 9

This higher cost of capital reflects a range of risks, both actual and perceived. For India, in the clean energy sector alone, these include sovereign and legal risks, currency risk, financial stress among electricity distribution companies (DISCOMs), fragmented land ownership, lagging transmission deployment, slow planning processes and the interplay of state and Union policies and responsibilities across the energy sector.[52]

52 Institute for Energy Economics and Financial Analysis (2025) 'What's holding India back in its renewable energy transition?', *IEEFA*. Available at: https://ieefa.org/resources/whats-holding-india-back-its-renewable-energy-transition

The cost of capital in India's energy sector is more than twice that in the US

Weighted average cost of equity, 2020 (%), and the risks behind India's premium



What drives the premium (clean energy)

- Sovereign and legal risk
- Currency risk
- Financial stress at DISCOMs
- Fragmented land ownership
- Lagging transmission build-out
- Slow planning processes
- State–Union policy interplay

Figure 10 *Source: IEA, IEEFA*

Additionally, a successful Net Zero transition means overcoming barriers to new technologies, which are typically both technical and economic. These include green hydrogen, nuclear power, battery storage, carbon, capture, and storage/use, agriculture, and hard-to abate industry sectors such as cement and steel. Raising finance for uncertain technologies with long payback periods is difficult in any country.

The Net Zero transition is full of complex challenges. It is certainly not India's problem alone to solve, but a focus on supporting India's transition will deliver far greater impact than in most other countries, given the size and shape of its economy and its population, and therefore its cumulative emissions.

India therefore warrants far more attention than it is currently getting, particularly from investors, international bodies and the climate community at large, on how barriers to capital can be reduced. If we can address this hurdle with India, we will shift the dial for the world on global warming. This should not be seen as an act of charity – renewable energy investments in India typically return 11%–15%.[53]

Funding the transition

Domestic capital is a vital part of the solution to financing Net Zero investments, but it is international capital that will enable India to achieve the final miles of the journey.

53 Gandhi, H.H., Hoex, B. and Hallam, B.J. (2024) 'Private equity renewable energy investments in India', *Heliyon*, 10, e41098. https://doi.org/10.1016/j.heliyon.2024.e41098

Domestic capital

Analysis by NITI Aayog suggests India has a cumulative need of **US$22.7 trillion** by 2070 to fund its Net Zero transition, with the energy sector accounting for about half of this.[54] NITI Aayog estimates that domestic capital can provide just over 70% of financing needs, but significant reforms are required to achieve this. Reforms should include expanding corporate bond markets, mobilising pension savings, encouraging insurance investment, and increasing green bond issuance.[55]

On this front, collaboration with more established capital markets in advanced economies may help India make these reforms. Nevertheless, a funding gap of US$6.5 trillion remains, with international capital needing to find a way to fund 40% of the gap at a minimum.



Figure 11 *Source: NITI Aayog*

International capital: Walking the walk, not talking the talk

The concept of international climate finance was written into the text of the UNFCCC in 1992, which states that developed nations should provide financial help to developing countries.[56] In other words, climate finance has been a key pillar of discussions for more than 30 years. Despite this, progress on delivering that finance, at scale, has been stymied.[57]

Where we stand now

Debate on climate finance, and what is required, has increased in prominence in recent years, as the subject of research, on a range of sectoral conference agendas, and as a key thematic at COPs. This increased focus reflects the urgency of the Net Zero transition and the need to financially support

54 NITI Aayog (2026) *Scenarios Towards Viksit Bharat and Net Zero: Financing Needs* (Vol. 9). New Delhi: NITI Aayog. Available at: https://niti.gov.in/publications/division-reports

55 Sinha, R. (2026) *Role of financial intermediaries in unlocking mitigation finance in India: challenges and enablers*. CRF Research Article 57/2026. New Delhi: Chintan Research Foundation, 19 June. Available at: https://www.crfindia.org/publications/research-article/role-of-financial-intermediaries-in-unlocking-mitigation-finance-in-india-challenges-and-enablers

56 United Nations (1992) *United Nations Framework Convention on Climate Change*, Article 5. FCCC/INFORMAL/84. Available at: https://unfccc.int/resource/docs/convkp/conveng.pdf

57 Ameli, N., Kothari, S. and Rickman, J. (2023) 'Addressing inequities in low-carbon finance flows toward developing countries', *One Earth*, 6(10), pp. 1277–1280. https://doi.org/10.1016/j.oneear.2023.09.010

(increasingly frustrated) developing economies. Stalled action on emissions mitigation means that developing economies now also need adaptation finance in addition to mitigation dollars.

Nevertheless, copious talk has produced insufficient new commitments from either the public or private sector, and funding remains well below required levels.[58] Advanced economies are not walking the walk.

Following the 2009 Copenhagen Accord, in 2010 developed countries committed to provide US$100 billion per annum by 2020 to "address the needs of developing countries."[59] This goal was reached, albeit two years late, in 2022, and with approximately half coming from multilateral development banks (MDBs) rather than individual developed economies.[60] Some finance also represents a reallocation of developed economy funds from aid budgets, meaning the overall pool of finance available has not increased.[61] However, by 2022, even US$100 billion per annum was considered well below the actual mitigation finance needs of developing economies.[62]

The US$100bn promise was kept — two years late

Climate finance provided and mobilised by developed countries for developing countries, US$bn

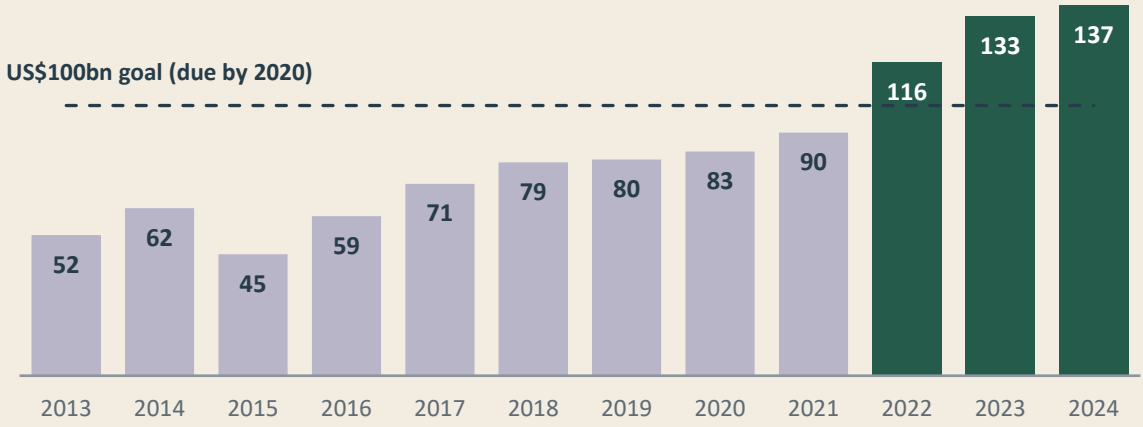


Figure 12 *Source: OECD*

58 OECD (2026) 'Climate finance and the USD 100 billion goal', *OECD topics*. Paris: OECD. Available at: https://www.oecd.org/en/topics/climate-finance-and-the-usd-100-billion-goal.html

59 UNFCCC (2010) *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009. Addendum. Part Two: Action taken by the Conference of the Parties at its fifteenth session* (Decision 2/CP.15, Copenhagen Accord). FCCC/CP/2009/11/Add.1. Available at: https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf

60 OECD (2026) 'Climate finance and the USD 100 billion goal', *OECD topics*. Paris: OECD. Available at: https://www.oecd.org/en/topics/climate-finance-and-the-usd-100-billion-goal.html

61 Jennings, M. (2024) '"New and additional": why funding climate finance from aid budgets is a problem', *SOAS Blogs*, 4 September. Available at: https://www.soas.ac.uk/about/blogs/new-and-additional-why-funding-climate-finance-aid-budgets-problem-0

62 Circular Carbon Markets Research Team (2026) 'The true cost of net zero: who pays and how much?', *Circular Carbon Markets*, 6 January. Available at https://www.circularcarbonmarkets.com/2026/01/the-true-cost-of-net-zero-who-pays-and-how-much.html

A subsequent agreement was reached at COP29 in 2024 on a New Collective Quantified Goal (NCQG), by which developed nations were expected to "enable" a significantly larger target of at least US$300 billion per year by 2035 to support climate action in developing countries.[63] However, this agreement is already considered inadequate both in terms of the quantum of finance actually required and the means to achieve it, with a heavy reliance on the private sector.[64]

The NCQG also called on all parties (not just developed economies) to make "efforts" to reach US$1.3 trillion per annum, but without any supporting financial architecture, this will be well-nigh impossible to achieve. Again, this is still well below the US$2.3-$2.5 trillion that the Independent High-Level Expert Group on Climate Finance, which operated under the auspices of the UNFCCC and COP estimates is required by developing countries (excluding China).[65]

Even the new goal covers a fraction of the need

Climate finance goals and needs for developing countries, US$bn per year

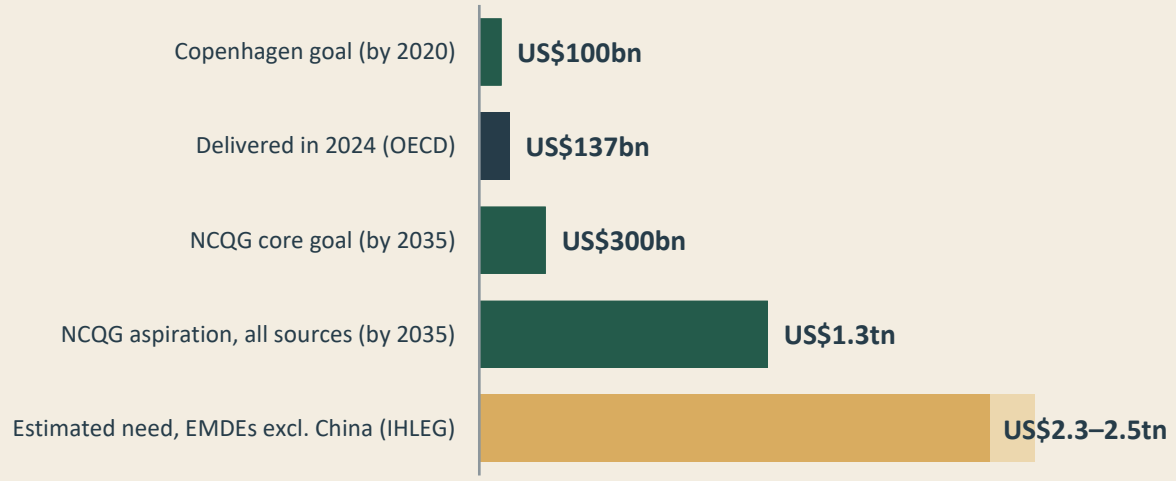


Figure 13 *Source: UNFCCC, OECD*

63 UNFCCC (2024) *New collective quantified goal on climate finance*. Draft decision -/CMA.6, proposal by the President. FCCC/PA/CMA/2024/L.22 (advance unedited version), November. Available at: https://unfccc.int/sites/default/files/resource/cma2024_L22_adv.pdf

64 Srivastava, A. and Shukla, N. (2024) 'Unpacking COP29's NCQG: what happened, why, and what now?', *Sustainable Futures Collaborative blog*, 22 December. Available at: https://www.sustainablefutures.org/blog/unpacking-cop29s-ncqg-what-happened-why-and-what-now/

65 Bhattacharya, A., Songwe, V., Soubeyran, E. and Stern, N. (2024) *Raising ambition and accelerating delivery of climate finance*. Third report of the Independent High-Level Expert Group on Climate Finance. London: Grantham Research Institute on Climate Change and the Environment, LSE, November. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2024/11/Raising-ambition-and-accelerating-delivery-of-climate-finance_Third-IHLEG-report.pdf

Why is climate finance so difficult?

There are numerous reasons why goals are bound to fall short if due consideration is not given to the barriers to investment.

From a public finance perspective, rising budget pressures and public sector debt, particularly since the Global Financial Crisis and then the COVID-19 pandemic, have seen international funding commitments of many developed economies shrink. Those same debt pressures in developing economies may limit their ability to raise new capital at acceptable rates of interest. A fragmenting global economic order, including the withdrawal of the U.S. from a number of its multilateral commitments such as the Paris Agreement, adds to the challenge.

There is clearly a need for private sector finance to play a far stronger role in financing the Net Zero transition than has been the case to date, as reflected in the wider NCQG target of US$1.3 trillion.

However, the barriers to private sector finance are numerous and, although well-understood, have yet to be addressed at sufficient scale. These barriers include factors that raise sovereign risk such that investors and lenders are reluctant to enter markets or require a prohibitively high cost of capital to do so.[66] Developing economy sovereign risk is typically linked to:

- Weak governance in democratic institutions and corruption
- Political instability
- Weak financial infrastructure
- Compliance and regulatory hurdles.

Additional barriers can include:

- Inflation risk (typically higher in developing than in advanced economies)
- Information asymmetry and lack of data transparency
- Volatile and/or illiquid markets
- Foreign currency risk
- For institutional investors, investment benchmarking and low appetite for patient capital, and the scale of investable projects.

The impact of these risks can be clearly seen in investment statistics. Global investment into the energy transition hit a record US$2.3 trillion in 2025, up 8% from the prior year.[67] Yet only a quarter of this was directed to developing and emerging economies other than China.[68]

66 See, for example, International Energy Agency (2025) *Cost of Capital Observatory* (dashboard). Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/cost-of-capital-observatory/dashboard

67 https://about.bnef.com/insights/clean-energy/bloombergnef-finds-global-energy-transition-investment-reached-record-2-3-trillion-in-2025-up-8-from-2024/

68 International Energy Agency (2025) 'Source, flows and destination of global energy-related investment spending', in *World Energy Investment 2025*. Paris: IEA. Licence: CC BY 4.0. Available at: https://www.iea.org/reports/world-energy-investment-2025/source-flows-and-destination-of-global-energy-related-investment-spending

A record US$2.3 trillion — but India drew about 3% of it

Global energy transition investment, US$bn (left); by market in 2025, US$bn (right)

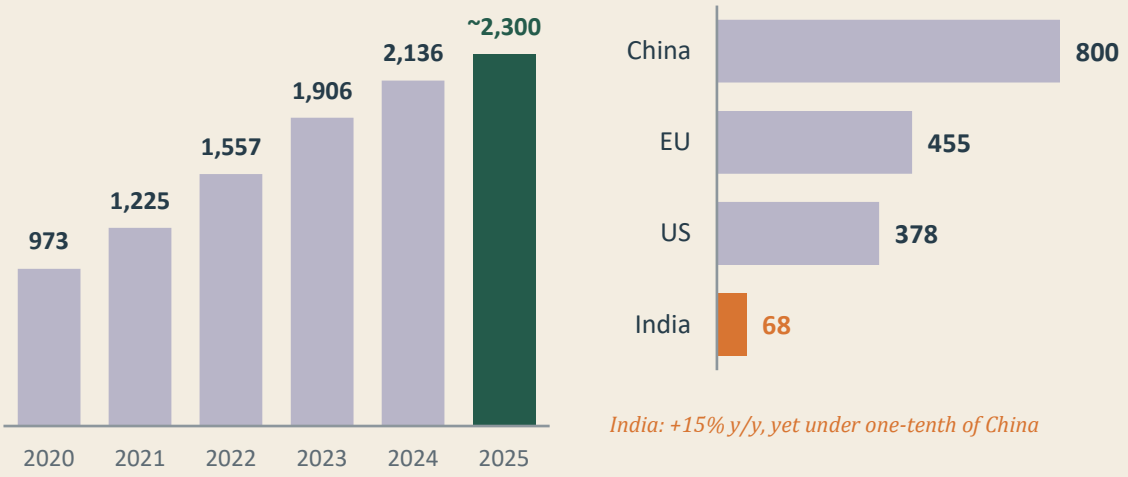


Figure 14 *Source: BloombergNEF, IEA*

Despite detailed understanding of the risks that are holding back investment at a greater scale, **there is no single, coordinated approach among potential global collaborators to overcoming these risks *at scale***.

The question of scale is the crucial element here. It is a key objective to enable a more rapid transition for developing economies, but simultaneously a potential barrier if we treat all developing economies – or sectors – as one. In fact, there is no single solution, no one-size-fits-all approach, that can change the status quo, yet that is exactly the approach that is generally taken whenever we say "developing economies" as if they were a homogeneous group.

The COP process itself makes commitments to broad targets, such as the NCQG, but implementation falls well short because not all the right people are at the table. The same can be said of the World Economic Forum, which has been excellent at identifying challenges, and even identifying case studies on how these might be overcome at an individual project level, but not at a whole-of-country (or industry) level.

If achieving finance goals were easy, it would already have been done. However, to date, action has largely been at either too high a level (global forums) or with too small a focus (project level).

In an ideal world, those who can identify the necessary decisions – and who have the motivation and authority to action them – would be at the table together. Even when the focus is on private sector finance, decisions will involve policymakers as well as the finance sector and the companies that are implementing projects on the ground. MDBs and multilateral climate funds should also be included.

Parties cannot leave that table without a detailed roadmap and specific responsibilities assigned to specific actors. Without this, change at the required speed will not happen. **We need to move from a "think tank" model to a "do tank" model.**

As a first step, we need to build a workable framework and roadmap that will ensure the right decision-makers can be seated together with the right tools to make progress. While complex, such a process is not impossible. After all, "The journey of a thousand miles begins with a single step."[69]

A roadmap for India?

This paper has already highlighted the critical role that India plays in the world's transition to Net Zero.

Notwithstanding the key role of domestic capital markets, NITI Aayog estimates a **US$6.5 trillion financing gap** for the Net Zero transition, of which international capital is expected to fund around **40%**.

NITI Aayog suggests that this gap will only be closed with further reforms across a range of areas including electricity distribution, project preparation, land and permitting processes, capital markets, and climate-finance frameworks, alongside greater use of blended finance and risk-sharing instruments to make clean-energy projects more attractive to global investors.

From 'think tank' to 'do tank': filling the missing middle

Why finance stalls today, and what a country-level solution might look like

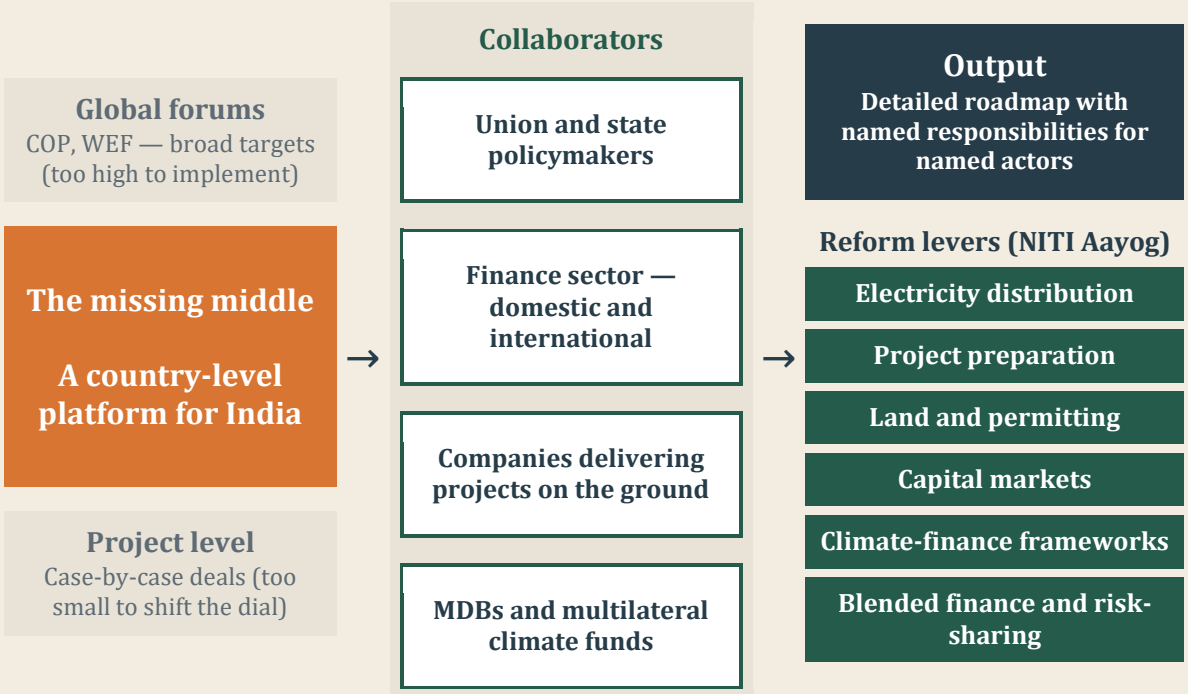


Figure 15

From a finance perspective, the next consideration is: what is the most effective mechanism to bring about genuine change in areas such as risk management and financial architecture that are specific

[69] Quote attributed to Lao Tzu

to India's needs? Some of this will be country-specific and some of it will be organisation-specific, but capital will only flow once we have mechanisms in place to address these barriers.

We need to consider what lessons can be taken from the relative success in large-scale renewable energy infrastructure and what barriers still need to be addressed. These lessons can then be applied to support future flows across a range of organisational and project sizes and industries.

It is sometimes said that to address climate change successfully, countries need to be on a "war footing". If we consider how we are under attack from climate forces that are increasingly damaging our economies, societies and environments, surely, it is worth our while to make these conversations happen – and then to turn words into action.

4. In conclusion

India does not need less energy to develop; it needs the means to meet rapidly growing energy demand with progressively less carbon – and achieving that transition is a shared global interest.

As hundreds of millions of people in India understandably seek higher living standards, the objective must be to enable that social and economic growth without locking India into medium- and long-term dependence on fossil fuels.

Building clean-energy alternatives and enabling households, industry and transport to switch at speed and scale requires enormous capital. Domestic finance alone cannot fund the transition and, despite India's importance to the global transition to Net Zero, international capital is not flowing fast enough.

In practical terms, this paper seeks to shift the discussion from "what should developing countries such as India do?" to "what is preventing willing international capital, India-specific opportunities, and a shared global climate action imperative from connecting?"

The specific recommendation of this paper, therefore, is to identify the stakeholders who control and/or materially influence the barriers to international financing and bring them together to work out solutions – as a matter of urgency and for our collective future.

About the author

Nicki Hutley is one of Australia's leading economists and a respected commentator on economic and public policy issues. Over more than three decades, she has worked in banking and investment and in economic consulting. Since 2020, she has run her own consulting practice, Rovingstone Advisory.

Over the past decade, her focus has shifted to climate economics, advising governments, businesses and not-for-profits on practical approaches to climate mitigation and adaptation, and policies to accelerate the transition to net zero. Nicki was appointed as a Councillor on the Climate Council of Australia in 2021, providing expert economic advice, and has authored and co-authored numerous papers for the Council.

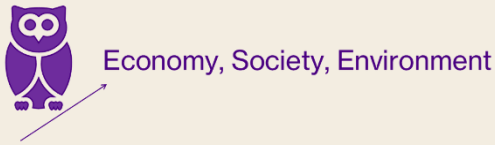
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Nicki Hutley
Rovingstone Advisory
1 November 2026


Economy, Society, Environment