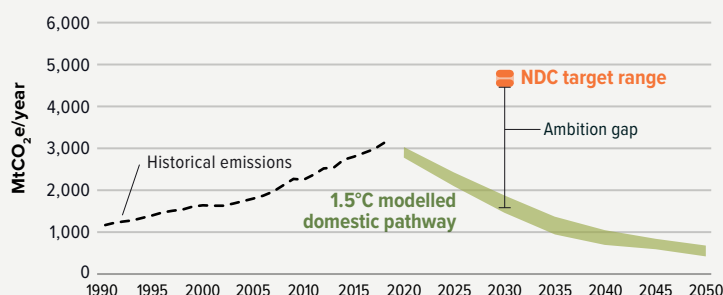




1.5°C COMPATIBLE EMISSIONS PATHWAY¹

1.5°C

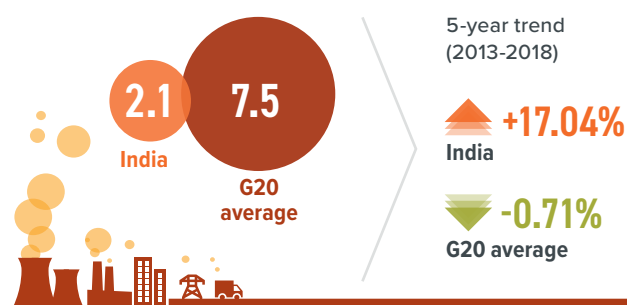
The Climate Action Tracker rates India's climate policies and action as in line with 2°C warming when compared to its 'fair-share' contribution to climate action, but not the whole NDC. Its current target would increase emissions to 146-152% above 2005 levels, or approximately 4,802-4,686 MtCO₂e, by 2030. To keep below the 1.5°C temperature limit, analysis by the 1.5°C National Pathway Explorer shows that India's 2030 emissions would need to be around 1,603 MtCO₂e (or 16% below 2005 levels), leaving an ambition gap of 3,199 MtCO₂e. Closing the ambition gap for India will require financial support. All figures exclude land use emissions.



Gütschow et al., 2021; Climate Analytics, 2021; Climate Action Tracker, 2021

PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS BELOW G20 AVERAGE

GHG emissions (incl. land use) per capita (tCO₂e/capita)² in 2018



India's per capita emissions, at 28%, are lower than the G20 average. Total per capita emissions have increased by 17% between 2013 and 2018.

Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2019

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Analyses show that India is **likely to achieve its NDC target by implementing current policies**. This presents an opportunity, therefore, for India to submit a more ambitious target.



India's COVID-19 recovery package creates opportunities to **stimulate the economy while building resilience to future shocks** and promoting "green infrastructure" as a pathway to recovery.



Solar and wind are India's lowest-cost electricity sources, largely due to financial policy support for risk reduction strategies. **Storage technology innovation will allow the renewable energy share to rise more than 50% by 2030.**

Climate Action Tracker, 2020, 2021; TERI, 2020

RECENT DEVELOPMENTS



The government's target is 275 GW of installed renewables capacity by 2027, 450 GW by 2030. As of August 2021, India has 100 GW of installed RE capacity. A further 50 GW is under construction and 27GW is at the tendering stage.



Indian Railways plans to electrify its network by 2023, and is moving towards becoming a **net zero carbon emitter before 2030**.



The 2030 alternative fuels target, **to blend 20% ethanol into petrol, has been brought forward to 2025**.

CEA, 2018; Ministry of Railways, 2020; TERI, 2020; MoPNG, 2021; NITI Aayog, 2021



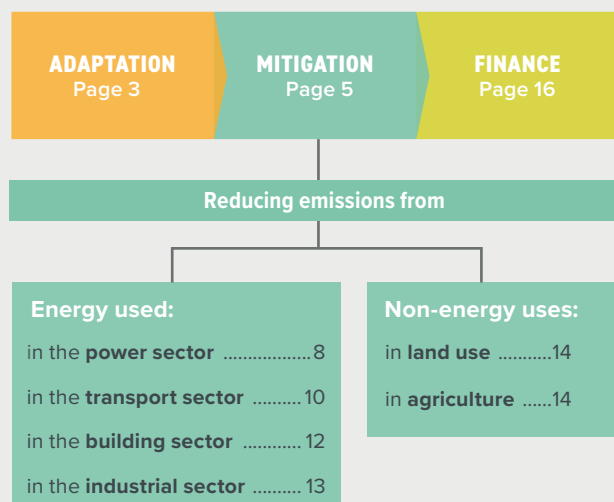
CORONAVIRUS RESPONSE AND RECOVERY

To minimise the effect of COVID-19 on the economy, the Indian government has earmarked at least USD 325bn to fund its recovery measures – approximately 11% of GDP in 2019. It mainly supports those industries likely to take the highest toll on the environment. Analysis by Vivid Economics reveals that while India's Green Stimulus Index (GSI) score has improved significantly, it remains negative, largely because of the country's continued support of coal and gas initiatives.

Garg, Schmidt and Beaton, 2021; Vivid Economics, 2021

CONTENTS

We unpack India's progress and highlight key opportunities to enhance climate action across:

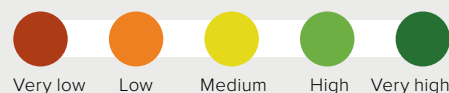


LEGEND

Trends show developments over the past five years for which data are available. The colour-coded arrows indicate assessment from a climate protection perspective: Orange is bad, green is good.



Decarbonisation Ratings³ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.

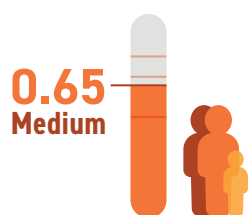


Policy Ratings⁴ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index (HDI)

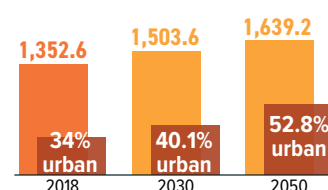


The HDI reflects life expectancy, level of education, and per capita income. India ranks medium.

Data for 2019. UNDP, 2020

Population and urbanisation projections

(in millions)

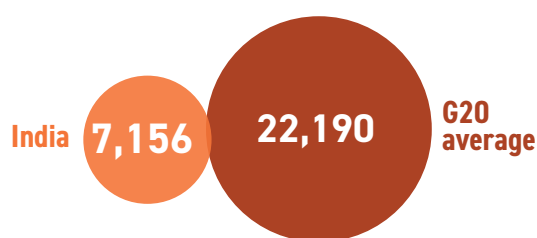


India's population is projected to increase by 19% by 2050, and become more urbanised.

United Nations, 2019; United Nations, 2018

Gross Domestic Product (GDP) per capita

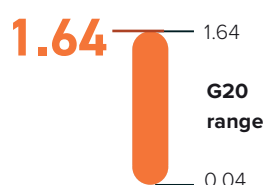
(PPP constant 2015 international \$) in 2019



World Bank, 2021; United Nations, 2019

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised in 2019



Around two million people die in India every year as a result of outdoor air pollution due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this remains one of the highest levels in the G20.

Institute for Health Metrics and Evaluation, 2020

This source differs from the source used in last year's profiles and, therefore, the data are not comparable.

A JUST TRANSITION

As India moves forward with its NDC implementation, its energy sector is also witnessing several structural changes. Accelerated transition away from coal in India has larger implications around the economic, social and political sphere. India's coal mining industry directly employs 485,000 people. Upskilling workers and creating jobs in the renewable energy sector is becoming urgent. However, just transitions for India are not solely about decarbonisation and the associated loss of livelihood. It is also about the extension of modern energy services to those who lack them and the building of resilience within communities vulnerable to climate change.

Bhattacharya, 2020; CIF, 2021



ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



PARIS AGREEMENT Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.



A decline of **30-40% in work performance** is projected over India by the end of the century, due to projected **elevated heat stress levels**.



Glacial retreat in the Hindu Kush Himalayas, compounding the effects of **sea-level rise, intense tropical cyclones leading to flooding, and an erratic monsoon** are all likely to impact India.



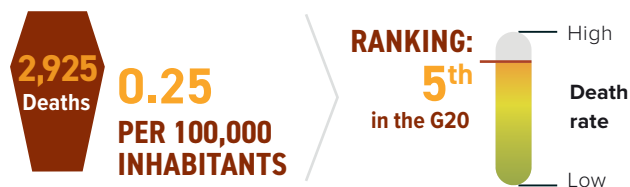
By the turn of the century the **economic costs of climate impacts in India are likely to be 3-10% of GDP**.

ADAPTATION NEEDS

Climate Risk Index

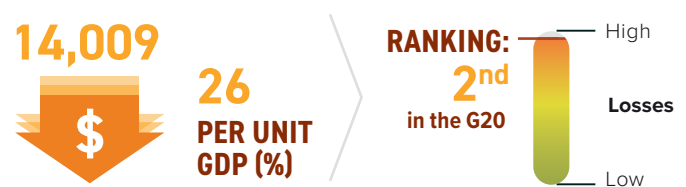
Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities



Based on Germanwatch, 2019

Annual average losses (US\$ mn PPP)



Based on Germanwatch, 2019

Exposure to future impacts at 1.5°C, 2°C and 3°C

Impact ranking scale: Very low Low Medium High Very high

			1.5°C	2°C	3°C
WATER	% of area with increase in water scarcity				
	% of time in drought conditions				
HEAT AND HEALTH	Heatwave frequency				
	Days above 35°C				
AGRICULTURE	Maize	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			
	Rice	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			
	Wheat	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			

Water, Heat and Health: own research; Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.



CORONAVIRUS RESPONSE AND RECOVERY

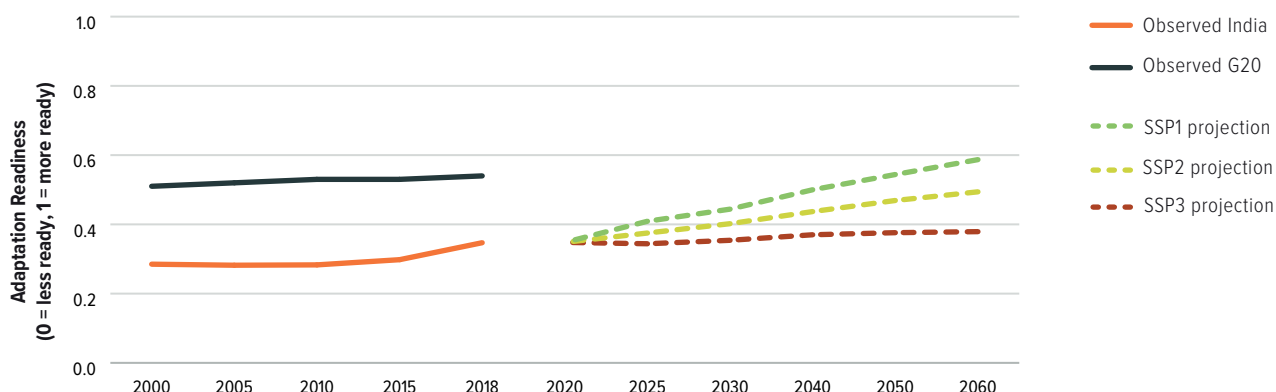
COVID-19 economic recovery spending has not focused on increasing India's climate change resilience. India's initial package focused on support for healthcare and welfare, but further measures have included substantial support for businesses, and enhancing credit availability in the agricultural and small and medium enterprises (SME) sectors so as to stimulate economic growth and create sustainable jobs.

Vivid Economics, 2021

Adaptation Readiness

The figure shows 2000-2018 observed data from the Notre Dame Global Adaptation Initiative (ND-GAIN) Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2020 to 2060.

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index



India scored well below the G20 average in 2018 in terms of adaptation readiness. It has both a great need for investment and innovations to improve readiness and an urgent need for implementation of adaptation measures. Even if it puts in place the social, economic and governance measures compatible with SSP1, it will only reach the G20's 2018 average score in 2040. Other socio-economic developments, as represented by SSP2 and SSP3, will perpetuate its ranking below the G20 average in 2018, until 2060.

The readiness component of the Index created by the ND-GAIN encompasses social (social inequality, information and communications technology infrastructure, education and innovation),

economic, and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of projections of future governance and, therefore, of possible adaptation readiness. The three scenarios shown here in dotted lines are described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2), and a 'Regional Rivalry' (SSP3) scenario.

Based on Andrijevic et al., 2020; ND-Gain Index, 2021

ADAPTATION POLICIES

National Adaptation Strategies

Document name	Publication year	Fields of action (sectors)												Monitoring & evaluation process	
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism		Water
National Plan on Climate Change	2008	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>			<div></div>	<div></div>				<div></div>	n/a

Nationally Determined Contribution (NDC): Adaptation

TARGETS

No specific target for adaptation in NDC.

ACTIONS

Actions are planned in relation to Agriculture, Biodiversity, Coastal areas and fishing, education and research, energy and industry, health, infrastructure water

MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW



India's GHG emissions excluding LULUCF have **increased by 172.2% between 1990 and 2018** and the government's climate targets of a 40% non-fossil-fuel share of power generation capacity, and a 33-35% reduction in the emissions intensity of GDP **are not in line with a 1.5°C pathway**.

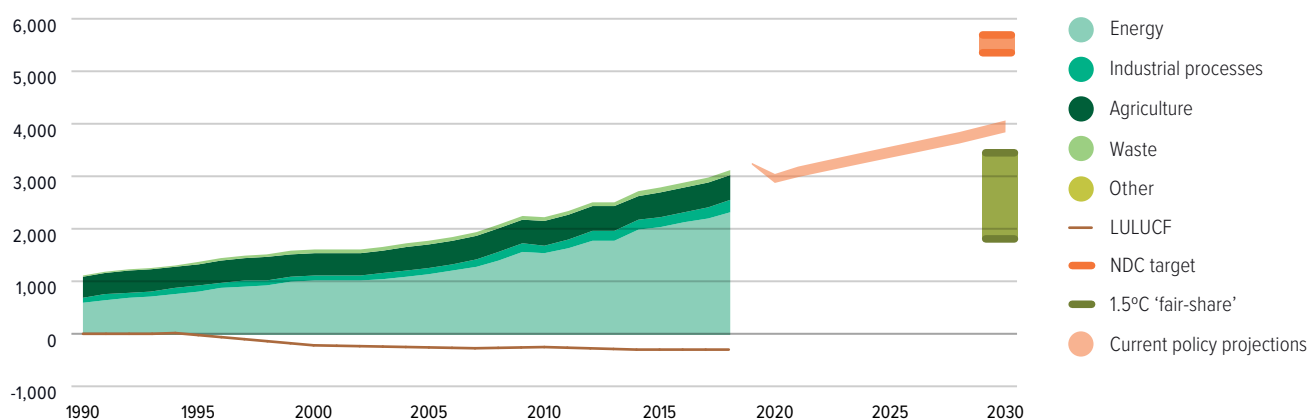


In 2030, global CO₂ emissions need to be **45% below 2010 levels and reach net zero by 2050**. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)⁵

Total GHG emissions across sectors (MtCO₂e/year)

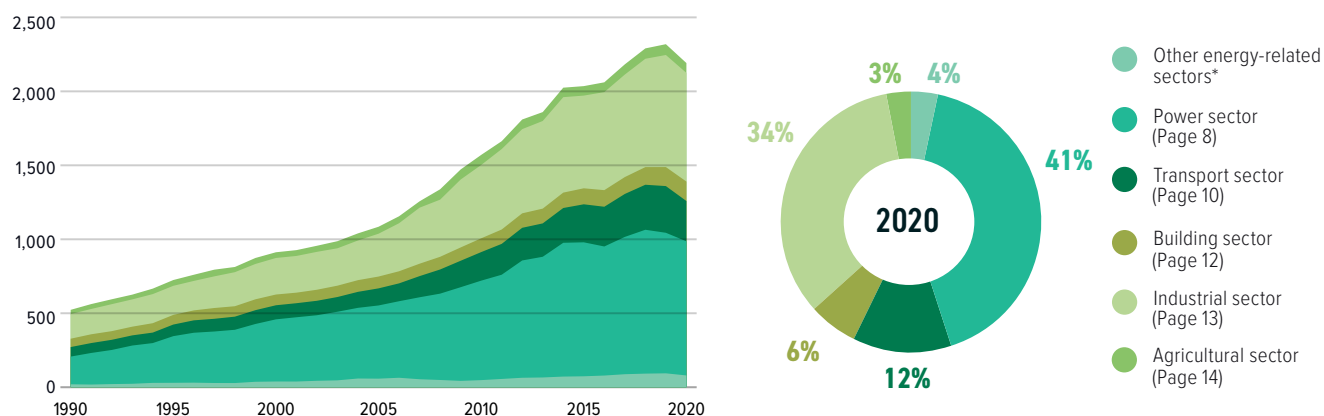


India's emissions (excl. land use) increased by 172% between 1990 and 2018, to 3,130 MtCO₂e. This increase was driven primarily by a sustained increase in energy-related emissions of 270% in the period. India's 2030 targets and policies are not consistent with a 'fair-share' contribution to staying below the Paris Agreement's 1.5°C temperature limit. India needs to increase its unconditional NDC target and set an ambitious conditional target – with support from developed countries – in order to be 1.5°C 'fair-share' compatible.

Gütschow et al., 2021; Climate Action Tracker, 2020a, 2021

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion, which have been increasing since 1990. The power sector is, at 41% of total emissions, the largest contributor, followed by industry and transport with 34% and 12%, respectively.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Other energy-related sectors covers energy-related CO₂ emissions from extracting and processing fossil fuels.

ENERGY OVERVIEW



India's energy mix is still dominated by fossil fuels (74%). Carbon intensity of the energy mix has remained almost constant at around 58 tCO₂ over the last five years, mainly because of improved energy efficiency. The share of renewable energy (excluding residential biomass) has consistently increased over time, and in **2020 was at 11% of total primary energy consumption.**

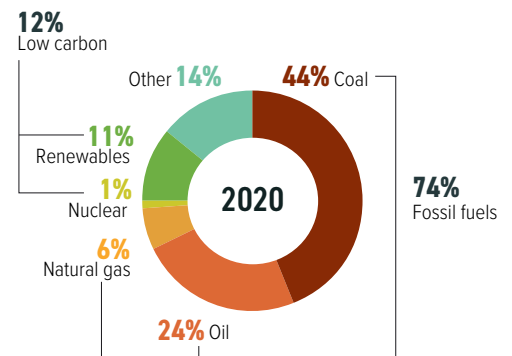
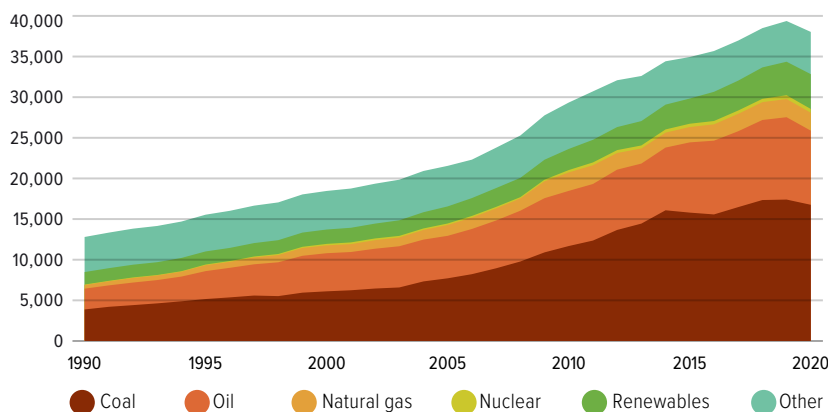


The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050, and to substantially lower levels without Carbon Capture and Storage.

Rogelj et al., 2018

Energy mix

Total primary energy supply (TPES) (PJ)

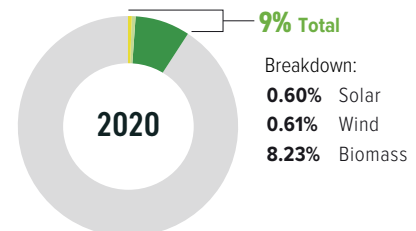
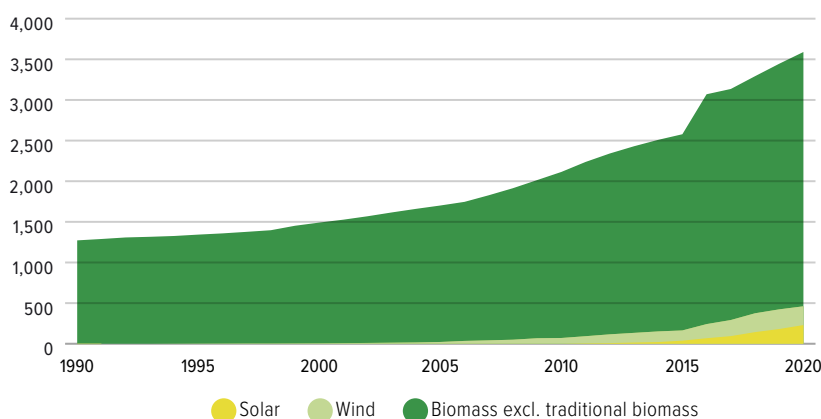


This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal, and gas) make up 74% of India's energy mix, lower than the G20 average of 81%. The share of renewable energy in the energy mix has increased.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Solar, wind, geothermal, and biomass development

TPES from solar, wind, geothermal and biomass (PJ)

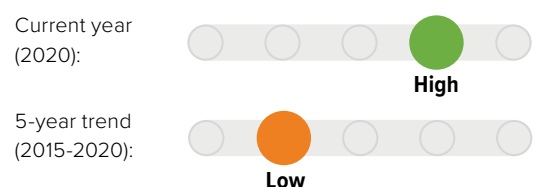


Renewables account for 9.4% of India's energy supply – the G20 average is 7.1%. The share of renewables increased by 28% between 2015-2020, with bioenergy (for electricity and heat) at around 87% of total renewable energy supply, and wind and solar PV at 7% and 6%, respectively. Solar capacity continued to increase during the pandemic.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

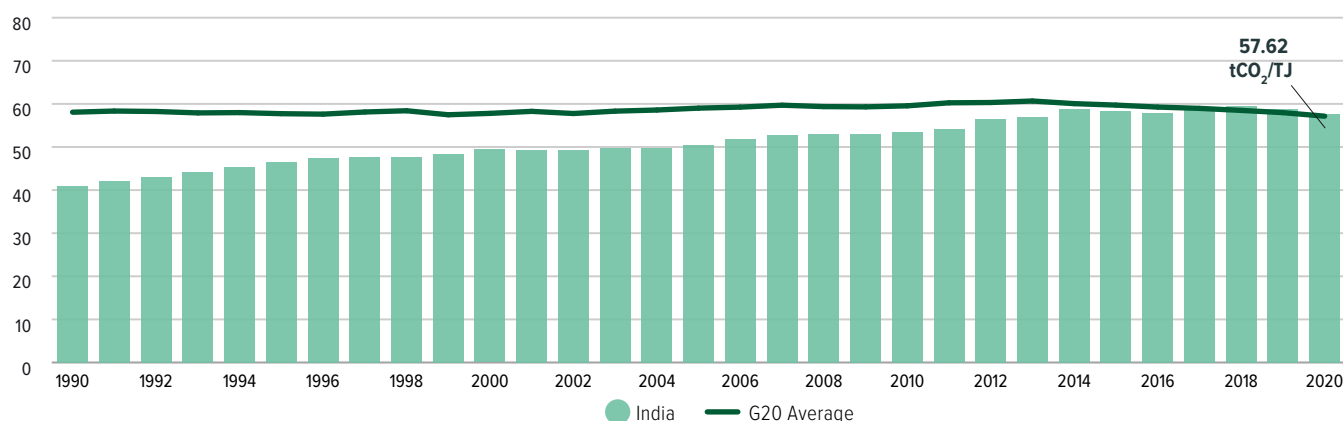
Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

Decarbonisation rating: renewable energy share of TPES compared to other G20 countries.



Carbon intensity of the energy sector

Tonnes of CO₂ per unit of TPES (tCO₂/TJ)

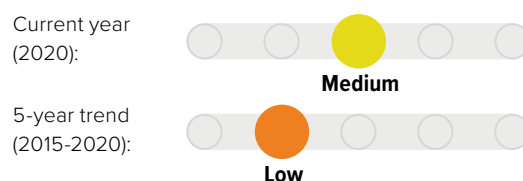


Carbon intensity is a measure of how much CO₂ is emitted per unit of energy supply.

Carbon intensity shows how much CO₂ is emitted per unit of energy supply. In India, carbon intensity has remained almost constant at around 58 tCO₂ over the last five years, the same as the G20 average, reflecting the continuously high share of fossil fuels – especially coal – in the energy mix.

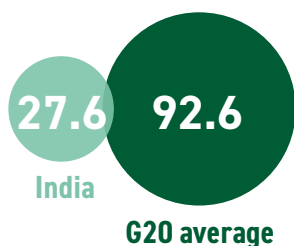
Enerdata, 2021

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries



Energy supply per capita

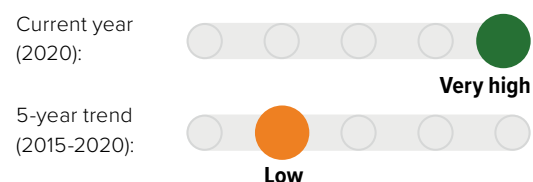
TPES per capita (GJ/capita) in 2020



TPES per capita (GJ/capita): 5-year trend (2015-2020)



Decarbonisation rating: energy supply per capita compared to other G20 countries

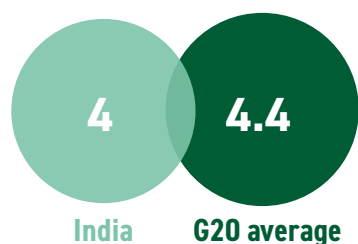


The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy. Energy use per capita in India, at 27.56 GJ/capita in 2020, is well below the G20 average, but increased at a faster rate of 5.8 % between 2015 and 2020 in contrast to the decreasing G20 average of 0.12% over the same period.

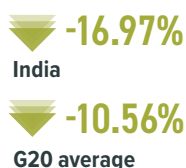
Enerdata, 2021; United Nations, 2019

Energy intensity of the economy

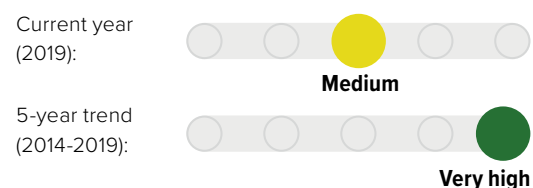
(TJ/million US\$2015 GDP) in 2019



Energy intensity of the economy: 5-year trend (2014-2019)



Decarbonisation rating: energy intensity compared to other G20 countries



This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. India's energy intensity is slightly below the G20 average and the five-year average of -17% (2014-2019) is trending downwards at a much faster rate than the G20 average of -10.5%.

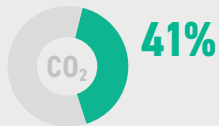
Enerdata, 2021; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat



India's power sector is dominated by coal, which provided 70% of electricity in 2020. The 2018 National Electricity Plan projected an increased coal capacity of 238 GW by 2027, up from 192 GW in 2017.



Share of energy-related CO₂ emissions from electricity and heat production in 2020.

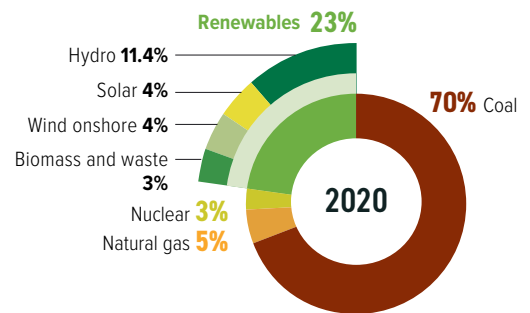
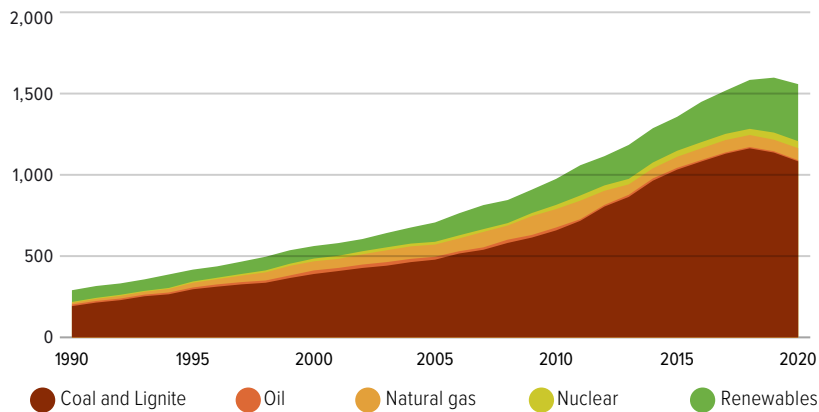


Worldwide, coal use for power generation needs to peak by 2020, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Electricity generation mix

Gross power generation (TWh)

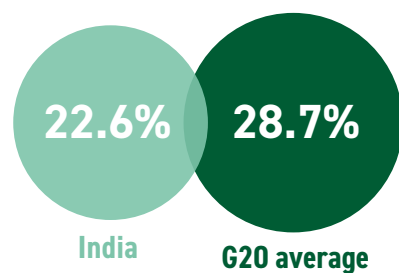


India's electricity mix is dominated by coal and in 2020, a total of 77% of electricity was from fossil fuels, which has increased considerably over the last decade. The share of renewable energy in India's power sector has also been increasing, but from a very low base, and accounts for approximately 23% of the power mix in 2020. Hydro power accounts for almost half of India's total renewable power generation (11% of total power mix), with wind and solar each producing roughly 4% of the power mix, and biomass producing just under 3%.

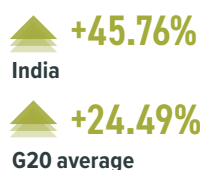
Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Share of renewables in power generation

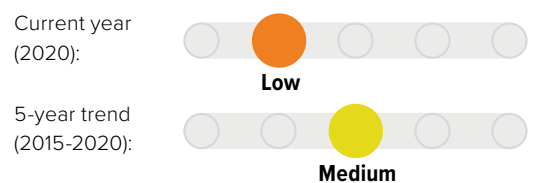
(incl. large hydro) in 2020



Share of renewables in power generation:
5-year trend (2015-2020)



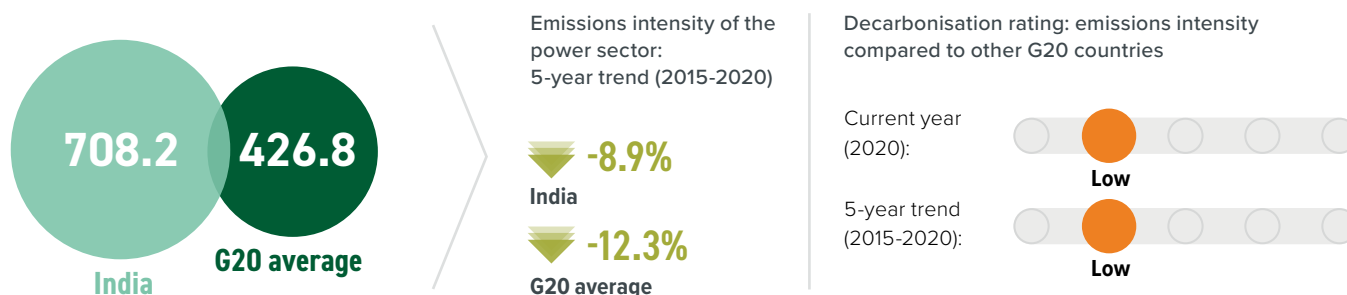
Decarbonisation rating: share of renewables compared to other G20 countries



Enerdata, 2021

Emissions intensity of the power sector

(gCO₂/kWh) in 2020



For each kilowatt hour of electricity, 708.2 g of CO₂ are emitted in India. This is well above the G20 average of 426.8 gCO₂, reflecting the high share of coal in power generation. Emissions intensity of power generation in India has dropped by 8.9% over the last five years, which is a slower rate of reduction compared with the G20 rate of 12.3%.

Enerdata, 2021

POLICY ASSESSMENT

Renewable energy in the power sector



Cumulative installed capacity of renewables (excl. hydro over 25 MW) increased from 35 GW in 2014 to 90 GW by the end of 2020; and by November 2020 renewable energy constituted just under a quarter of the country's installed power capacity. India will, however, still need to increase the pace of renewable energy installation to meet the government's (2015-16) target of achieving 175 GW of renewable energy capacity by 2022 and the "expansion target" of 450 GW by 2030.

Despite these promising developments, in its Third Biennial Report, submitted to the UNFCCC in 2021, the Indian government asserted that "coal is the only reliable source of energy that is domestically available in abundance" and further, that continued use of coal remained "essential for India's developmental needs and energy security".

Central Electricity Authority, 2021; MoEFCC, 2021; Global Energy Monitor, 2021

Coal phase-out in the power sector



India's current coal capacity is more than 200 GW and India has not yet set any target year for coal phase out. The National Electricity Plan of 2018, however, includes a timeline of retiring coal power plants older than 25 years in two phases. In the first phase approximately 48 GW of coal capacity is to be retired between 2017 and 2027.

In the past 10 years significant planned coal capacity expansion has been shelved, mainly due to the financial inviability of those projects, since prices for renewables can be up to 20% lower than for coal. The coal-fired power sector in India accounts for a significant share of non-performing assets.

A variety of studies project future electricity demand increases by 4-6% and India is relying on coal to meet this increased future electricity demand – the Central Electricity Authority (CEA) is projecting a 64 GW coal capacity expansion by 2030. To be on a 1.5°C pathway it is crucial for India to phase out coal.

Central Electricity Authority, 2018, 2020; Shah 2021; NITI Aayog 2021; MoEFCC, 2021

CORONAVIRUS RESPONSE AND RECOVERY

The Indian government's approach to COVID recovery and stimulus has been a mixed-bag. Early stimulus responses mainly supported activities related to energy and industry that would potentially have negative impacts on the environment by increasing emissions and unsustainable land use. More recent stimulus measures have, however, favoured the further development of battery storage and solar PV, with roughly USD 3bn announced in support of these industries. Simultaneously, India continues to support coal, with new loans to a number of thermal power projects, undermining chances of a "green" recovery.

Vivid Economics, 2021

TRANSPORT SECTOR

Emissions from energy used to transport goods and people



Emissions from transport represents 12% of India's energy-related CO₂ emissions in 2020. Total emissions fell in the past year, mainly because of multiple lockdown periods. **Fossil fuels, predominantly oil, dominate both passenger and freight transport.** Biofuels and electricity make up 2.3% of final energy consumption in transport.



The share of low-carbon fuels in the transport fuel mix globally must increase to between 40% and 60% by 2040 and 70% to 95% by 2050.

Rogelj et al., 2018; Climate Action Tracker, 2020b

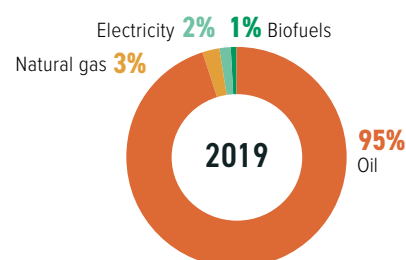
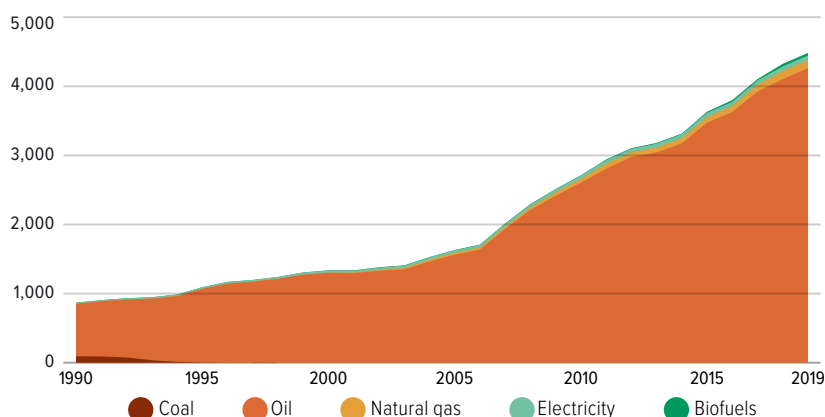


0.59%
Indirect emissions
12.42%
Direct emissions

Share of transport in energy-related CO₂ emissions

Transport energy mix

Final energy consumption of transport by source (PJ/year)

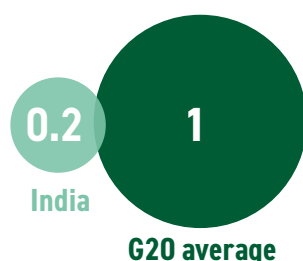


Electricity and biofuels make up only 2.30% of the energy mix in transport.

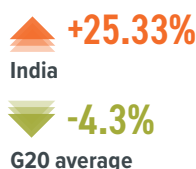
Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Transport emissions per capita

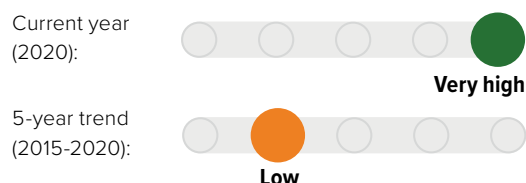
excl. aviation (tCO₂/capita) in 2020



Transport emissions:
5-year trend (2015-2020)



Decarbonisation rating: transport emissions
compared to other G20 countries

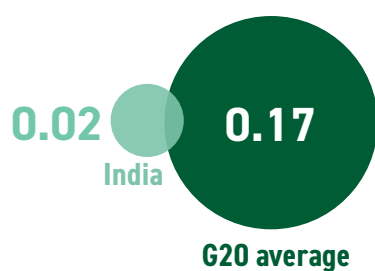


Reductions in transport emissions per capita in 2020, and concomitant changes in the 5-year trends and decarbonisation ratings, reflect widespread economic slowdowns and transport restrictions imposed in response to the COVID-19 pandemic. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2021, please see the Highlights Report at www.climate-transparency.org

Enerdata, 2021; United Nations, 2019

Aviation emissions per capita⁶

(tCO₂/capita) in 2018



Aviation emissions:
5-year trend (2013-2018)

▲ +45.04%
India

▲ +21.25%
G20 average

Decarbonisation rating: aviation emissions
compared to other G20 countries

Current year
(2018):



5-year trend
(2013-2018):



Enerdata, 2021; International Energy Agency, 2020; United Nations, 2019

Motorisation rate



27.9 VEHICLES
per 1,000 inhabitants in
2019 in India*

Enerdata, 2021

Market share of electric vehicles in new car sales (%)

Share of EV sales in 2020 was 0.05%

IEA, 2021

Passenger transport

(modal split in % of passenger-km) in 2015*



Enerdata, 2021

Freight transport

(modal split in % of tonne-km) in 2017*



Freight transport by air, pipelines
and waterways are excluded due
to lack of data.

Enerdata, 2021

*Owing to the variety of sources and data years available, these data are not comparable across G20 countries.

POLICY ASSESSMENT

Phase out fossil fuel cars



India's passenger and freight transport sectors have the potential to avoid 1.7 Gt of CO₂ emissions by 2030. India has a target of 30% share of electric vehicles (EV) in new sales for 2030, down from an originally-announced much more ambitious target of 100%. The government is also working on plans to require all two-wheelers to be electric by 2026. In the current pandemic situation EV production could be affected, as overall auto sales declined by 45% in 2020-21.

NITI Aayog, 2020; Carpenter, 2019

Phase out fossil fuel heavy-duty vehicles



Bharat Stage (BS) IV standards (based on Euro IV) applied to all new vehicles nationwide in April 2017. BS VI standards (based on Euro VI standards), which have been in effect since April 2020, establish an important precedent for leapfrogging from Euro IV-equivalent directly to Euro VI-equivalent standards. BS VI is applicable on all vehicles with Gross Vehicle Weight (GVW) of more than 3,500 kg, including commercial trucks, buses and on-road vocational vehicles such as refuse haulers and cement mixers. Additionally a fuel efficiency standard for heavy duty vehicles weighing more than 12t has been in effect since 2018 and phase 2 has been in effect since April 2021. As a result, it is estimated that fleet-wide fuel consumption of new vehicles will drop by 10.4% between 2018 and 2021.

DieselNet, 2021

Modal shift in (ground) transport



Several national programmes, including the National Urban Transport policy and the Smart Cities Mission, have been established to reduce vehicle traffic and increase transport efficiency. Since the outbreak of the COVID-19 pandemic, there have been significant changes in the urban mobility trends, preferencing private vehicles and two-wheeled transport, and shifting away from mass transit. The usage of non-motorised modes of transport such as cycle and rickshaw, has also increased.

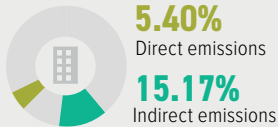
TERI, 2020

BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings



India's buildings account for 5% of direct CO₂ emissions and 15% of indirect CO₂ emissions. **Per capita emissions from the building sector** are not that high, **only a quarter of the G20 average.**



Share of buildings in energy-related CO₂ emissions. Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)



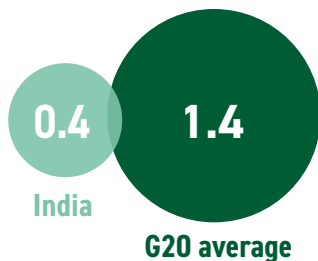
COMPATIBILITY

By 2040, global emissions from buildings need to be reduced by 90% from 2015 levels, and be 95-100% below 2015 levels by 2050, mostly through increased efficiency, reduced energy demand, and electrification in conjunction with complete decarbonisation of the power sector.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Building emissions per capita

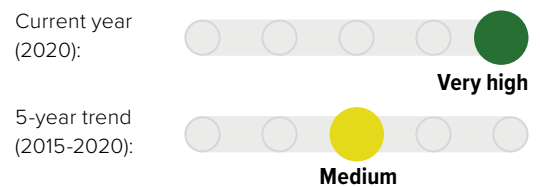
(incl. indirect emissions) (tCO₂/capita) in 2020



Building emissions:
5-year trend (2015-2020)



Decarbonisation rating: building emissions compared to other G20 countries



Building-related emissions per capita are nearly quarter of the G20 average of 2020. While per capita emissions from buildings in G20 countries have declined by just under 3% between 2015-2020, they have increased by 3% in India over the same period.

Enerdata, 2021; United Nations, 2019

POLICY ASSESSMENT

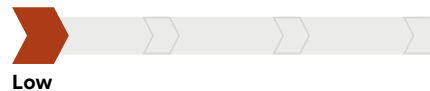
Near zero energy new buildings



India has not yet pursued a near zero energy buildings strategy. In 2017, the government revised its Energy Conservation Building Code (ECBC) for new commercial buildings, aiming to reduce energy use by 50% by 2030. Due to an increasing adoption of ECBC, a GHG emissions reduction of 0.14 MtCO₂ is estimated annually, which will scale up to 3.4 MtCO₂ in the 25-year lifespan of buildings. In 2018, in a push for energy efficiency in the residential sector, the government launched the ECBC-R for residential buildings, followed by an Energy Efficiency Label in February 2019.

Bureau of Energy Efficiency, 2020

Renovation of existing buildings



Energy Efficiency Services Limited (EESL), an initiative of the Ministry of Power, is implementing the Buildings Energy Efficiency Programme to retrofit commercial buildings in India with energy efficiency devices. The energy efficiency savings brought about by this programme are estimated to be 224 million kWh per year, with avoided peak demand of 75.64 MW, emissions reduction of 0.18 MtCO₂ per year and an estimated annual monetary savings of INR 1,940m in electricity bills.

Energy Efficiency Service Limited, 2020

INDUSTRY SECTOR

Emissions from energy use in industry



Industry makes up 33.5% of direct emissions and 16.4% of indirect electricity-related CO₂ emissions in India. **India has effectively deployed many policy interventions to improve industrial energy efficiency** and industry has been able to decouple its emission from economic growth.



Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Rogelj et al., 2018



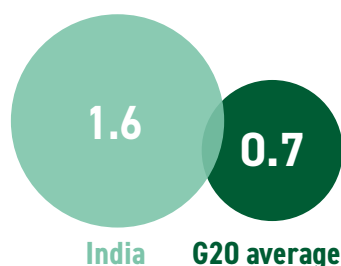
33.53%
Direct emissions

16.41%
Indirect emissions

Share of industry in energy-related CO₂ emissions.

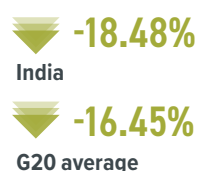
Industry emissions intensity⁷

(tCO₂e/USD2015 GVA) in 2017

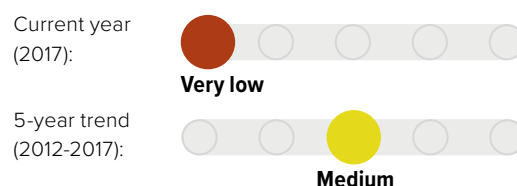


Enerdata, 2021; World Bank, 2021

Industry emissions intensity:
5-year trend (2012-2017)



Decarbonisation rating: industry emissions intensity compared to other G20 countries



Carbon intensity of steel production⁸

(kgCO₂/tonne product) in 2016



Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise. TERI estimates that emissions from steel sector will increase to just over 300 MtCO₂ by 2020, based on expected steel demand growth.

World Steel Association, 2018; Hall, Spencer and Kumar, 2020

POLICY ASSESSMENT

Energy efficiency



One of the key instruments to increase energy efficiency in Indian industry is the Perform, Achieve and Trade (PAT) Mechanism, implemented under the National Mission on Enhanced Energy Efficiency. Two cycles of PAT between 2012-2019 resulted in total savings of approximately 92 MtCO₂e emissions. By 2020, the PAT scheme coverage had been extended to the 13 most energy-intensive sectors in the country, including cement, iron and steel, fertiliser, thermal power plants, refineries, petrochemicals, railways. This initiative is currently leading to energy savings of about 17 MTOE and resulted in mitigation of about 87 MtCO₂ per year. Other energy efficiency initiatives in the Micro, Small and Medium Enterprises (MSME) sector have led to total avoided emissions of 0.124 MtCO₂ in 2018-19.

BEE, 2018; MoEFCC, 2021

LAND USE SECTOR

Emissions from changes in the use of the land



In its NDC, India has pledged to create an additional carbon sink of 2.5-3.0 billion tonnes of CO₂e by 2030. India's current policies of **expansion of coal mining and clearing of forested land for infrastructure and industry developments are not in line with this kind of sink creation.**

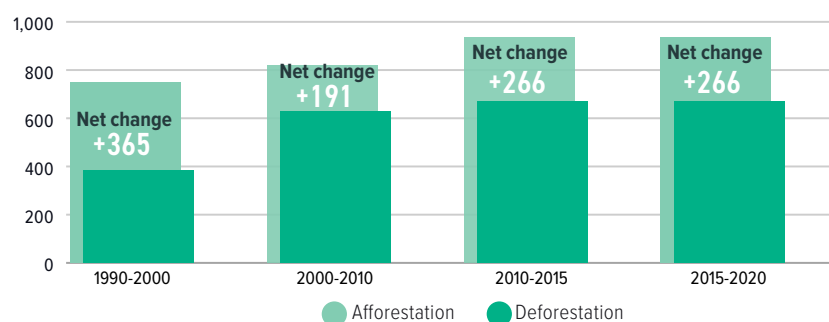


Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

Rogelj et al., 2018

Annual forest expansion, deforestation and net change

Forest area change in 1,000 ha/year



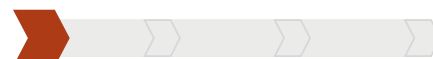
Between 2015-2020, India gained 266 kha of forest area per year.

Global Forest Resources Assessment, 2020

Note: There is a change of source and methodology for measuring this indicator from last year's profiles, which means the two years may not be directly comparable.

POLICY ASSESSMENT

Target for net zero deforestation



Low

India has no net zero deforestation target, and while a National Forest Policy was drafted in 2019, this had not yet been adopted (as of August 2021). The draft calls for a minimum of one-third of India's total geographical area to be under forest or tree cover to support the NDC target of creating an additional (cumulative) carbon sink of 2.5-3 GtCO₂e by 2030. The National Mission for a Green India was launched in 2014 to enhance carbon sequestration. Forest and tree cover in India have increased by 1.3 million hectares between 2015 and 2019.

MoEFCC, 2021

AGRICULTURE SECTOR

Emissions from agriculture



India's agricultural emissions are mainly from the digestive processes of cattle. Use of nitrogen-based fertiliser, livestock manure and rice cultivation also contribute significantly. **A 1.5°C 'fair-share' compatible pathway requires behavioural changes in humans, dietary shifts in cattle and less fertiliser use.**

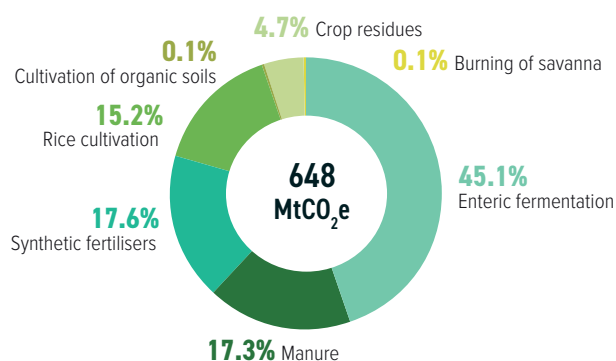


Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

Rogelj et al., 2018

Emissions from agriculture (excluding energy)

Emissions from the agriculture sector in 2018



In India, the largest sources of GHG emissions in the agriculture sector are enteric fermentation (45%), livestock manure (18%), use of synthetic fertiliser (17%) and rice cultivation (15%). Dietary changes for cattle and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector.

FAO, 2021

Due to rounding, some graphs may sum to slightly above or below 100%

MITIGATION: TARGETS AND AMBITION

WARMING OF

2.4°C

The combined mitigation effect of Nationally Determined Contributions (NDCs) assessed by April 2021 is **not sufficient and will lead to a warming of 2.4°C by the end of the century**. This highlights the urgent need for all countries to submit more ambitious targets by COP26, as they agreed in 2015, and to **urgently strengthen their climate action to align to the Paris Agreement's temperature goal**.

Climate Action Tracker, 2021a

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

TARGETS

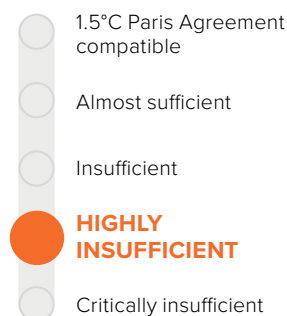
- 33-35% reduction in emissions intensity of GDP (compared to 2005 by 2030)
- At least 40% non-fossil-fuel electric power capacity by 2030
- Additional (cumulative) carbon sink of 2.5-3 GtCO₂e by 2030 through additional forest and tree cover.

ACTIONS

Not mentioned.

Climate Action Tracker (CAT) evaluation of targets and actions

INDIA'S OVERALL RATING



This CAT evaluation is a **new, overall rating**, that combines the several, separately rated elements, of policies and actions, domestic and internationally supported targets, 'fair-share target' and the country's contribution to climate finance. The CAT rates India's climate targets and policies as "Highly insufficient," indicating that India's climate policies and commitments are not consistent with the Paris Agreement's 1.5°C temperature limit.

Under India's current targets and policies, emissions will continue to rise and are consistent with 4°C or more of warming when compared to a modelled domestic emissions pathway. India's policies and action would result in overachieving its targets, but still only in line with 2°C warming when compared to its fair share contribution to climate action. For India to improve its rating, it needs to increase its unconditional NDC target to significantly reduce the speed of emissions growth. With international support, India also needs to set an ambitious conditional target to curb its expected growth in emissions from its dependence on fossil fuels, and begin the shift to a net zero economy. For the full assessment of the country's target and actions, and the explication of the methodology see www.climateactiontracker.org

Climate Action Tracker, 2021

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability. The NDC Transparency Check has been developed in response to Paris Agreement decision 1/CP.21 and the Annex to decision 4/CMA.1, which sets out the "information to facilitate clarity, transparency and understanding" as crucial elements of NDCs.

NDC Transparency Check recommendations

India's NDC was submitted to the UNFCCC on 10 February 2016. To ensure clarity, transparency, and understanding, it is recommended that India provides additional detailed information in its next NDC or NDC update, including:

- Specifying the reference year and how the reference indicators are constructed and quantified.
- Providing detailed information on the coverage of the NDC.
- Elaborating on the planning process, public participation, institutional arrangements for developing the NDC, and how India will account for its targets.
- Integrating the assumptions and methodological approaches for accounting for anthropogenic GHG emissions and removals.
- Detailing India's emissions peaking year and grounds to link its NDC with the Paris Agreement's long-term temperature goals.

For more visit www.climate-transparency.org/ndc-transparency-check

AMBITION: LONG-TERM STRATEGIES

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition towards net zero emissions and climate-resilient economies.

Status	NA
Interim steps	NA
Sectoral targets	NA
Net zero target	NA
Net zero year	NA

FINANCE

MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



In 2019, India spent USD 13.35bn on fossil fuel subsidies, almost all on petroleum (98%). India does not have an explicit carbon price/tax, but introduced the GST Compensation Cess on coal production at the rate of Rs 400 per tonne while simultaneously **maintaining financial incentives for coal mining and coal power plant construction.**



Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

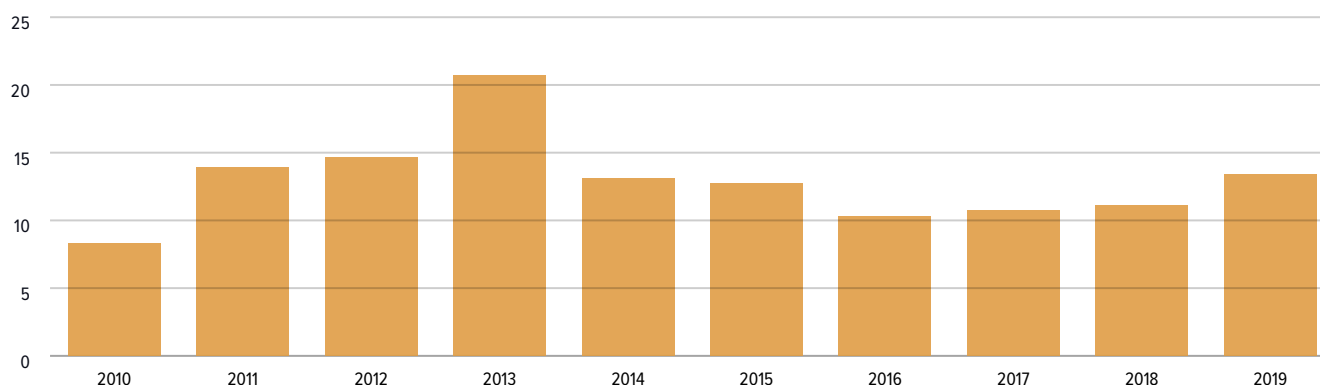
Rogelj et al., 2018

FISCAL POLICY LEVERS

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

Fossil fuel subsidies

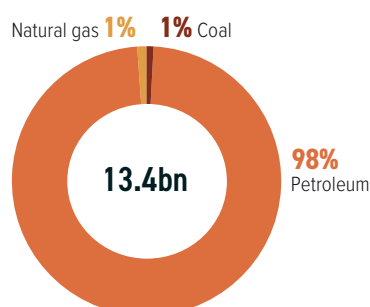
(USD billions)



OECD-IEA Fossil Fuel Support database, 2020

Fossil fuel subsidies by fuel type

USD in 2019



Over the past decade (2010-2019), India's fossil fuel subsidies have remained relatively stable, apart from a 2013 peak where they reached a value of USD 13.4bn in 2019. The majority of subsidies support the production and consumption of petroleum, and these subsidies are among the highest in the world.

Comparable data is not available yet for 2020. However, according to the Energy Policy Tracker, during 2020 India has pledged at least USD 17.9bn to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. These include investments by the Indian state-owned enterprise CIL (Coal India Limited) into five projects to produce methanol from coal (USD 5.8bn) and into coal transportation infrastructure (USD 6.7bn).

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020
Due to rounding, some graphs may sum to slightly above or below 100%



CORONAVIRUS RESPONSE AND RECOVERY

325bn), as a share of around 11% of GDP. India's overall COVID recovery stimulus package initially focused on economic recovery. Still, its most recent stimulus measures are two-thirds green, as India announced roughly USD 3bn in battery development and solar PV. Still, India continues to support coal, with fresh loans to a number of thermal power projects, undermining a green recovery.

Vivid Economics, 2021

The Indian government has responded to the economic crisis by unveiling one of the largest stimulus packages in the world (USD

Carbon pricing and revenue

India does not have a national carbon tax or emissions trading scheme (ETS), nor are any schemes currently under consideration. In 2017, India phased out the earmarking of revenue from the Clean Environment Cess (taxing coal) for environmental purposes, subsumed under the introduction of the centralised Goods and Services Tax.

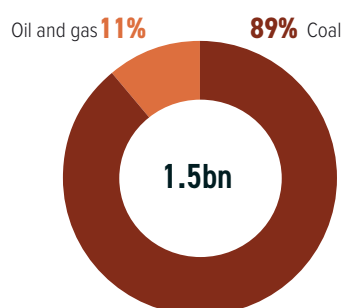
I4CE, 2021; Energy Policy Tracker, 2021

PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for fossil fuels

USD per annum (2018-19 average)



Between 2018 and 2019, India was the G20's third biggest public financier of coal, with an average support of USD 1.5bn per year. A comparatively smaller amount of public finance support (US\$ 172m on average per year) was provided by the government to the oil and gas sector. The oil and gas financing included, most notably, a USD 1.4bn loan in 2019 by the Power Finance Corporation, to be used by the Indian conglomerate Adani for the construction of an ultra-supercritical coal-fired power plant in the state of Jharkhand.

Oil Change International, 2020

Due to rounding, some graphs may sum to slightly above or below 100%

Provision of international public support

India is not listed in Annex II of the UNFCCC and it is, therefore, not formally obliged to provide climate finance. Nonetheless, it continues to provide international public finance via the Global Environment Facility (GEF) Trust Fund. While India may channel international public finance towards climate change via multilateral and other development banks, it has not been included in this report.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation, governments can overcome challenges to mobilising green finance, including real and perceived risks, insufficient returns on investment, capacity and information gaps.



India has shown some good early moves toward greening finance, but there is limited evidence of uptake.

In April 2021, the Reserve Bank of India (RBI) joined the Network for Greening the Financial System (NGFS). RBI also announced

a call for a cross-industry disciplinary forum in July 2021 to launch a comprehensive climate risk assessment exercise for India.

The Securities and Exchange Board of India (SEBI) issued a stewardship code with six principles in December 2019 which was set to commence in July 2020. The code regulates the number of obligations on mutual funds and alternative investment funds, in their role as investors in listed Indian companies.

RBI Financial Stability Report, 2021

The principles focus on monitoring and actively engaging with investee companies on various matters including performance, strategy, corporate governance, material environmental, social, and governance (ESG) opportunities or risks.

In August 2020, SEBI released a consultation paper on the format for business responsibility and sustainability reporting. This came as an effort towards adapting to and mitigating climate change impact, inclusive growth and transitioning to a sustainable economy. This will update the existing Business Responsibility Report, improve the quality of disclosures and to incorporate the National Guidelines on Responsible Business Conduct. The official Business Responsibility and Sustainability Report (BRSR) was launched in May 2021. The BRSR will be mandatory for the top 1000 listed companies by market capitalisation.





Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	Not mentioned

ENDNOTES

Where referenced, “Enerdata, 2021” refers to data provided in July 2021. For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2021

- 1 The ‘1.5°C compatible pathway’ is derived from global cost-effective pathways assessed by the IPCC’s SR15, selected based on sustainability criteria, and defined by the 5th-50th percentiles of the distributions of such pathways achieving the long-term temperature goal of the Paris Agreement. Negative emissions from the land sector and novel negative emissions technologies are not included in the assessed models, which consider one primary negative emission technology (BECCS). In addition to domestic 1.5°C compatible emissions pathways, the ‘fair share’ emissions reduction range would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emissions reduction contribution of that country down to the required ‘fair share’ level.
- 2 ‘Land use’ emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from LULUCF, which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- 3 The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.
- 4 The selection of policies rated and the assessment of 1.5°C compatibility are primarily informed by the Paris Agreement and the IPCC’s 2018 SR15. The table below displays the criteria used to assess a country’s policy performance.
- 5 The 1.5°C ‘fair-share’ ranges for 2030 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C ‘fair-share’ ranges reaching below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. In order to maintain comparability across all countries, this report harmonises all data with PRIMAP, 2021 dataset to 2018. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories. Where countries submitted updated NDC targets before August 2021, these have been analysed and included.
- 6 This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- 7 This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- 8 This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 4.	 Low	 Medium	 High	 Frontrunner
Renewable energy in power sector	No policies to increase the share of renewables	Some policies	Policies and longer-term strategy/ target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place
Coal phase-out in power sector	No targets and policies in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)
Phase out fossil fuel cars	No policies for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/ malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil fuel-based light-duty vehicles by 2035 worldwide
Phase out fossil fuel heavy-duty vehicles	No policies	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
Modal shift in (ground) transport	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
Near zero energy new buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries)
Energy efficiency in industry	No policies	Mandatory energy efficiency policies cover more than 26-50% of industrial energy use	Mandatory energy efficiency policies cover 51–100% of industrial energy use	Policies + strategy to reduce industrial emissions by 75-90% from 2010 levels by 2050
Retrofitting existing buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
Net zero deforestation	No policies or incentives to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation/ reforestation in place)	Policies + national target for reaching net zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

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