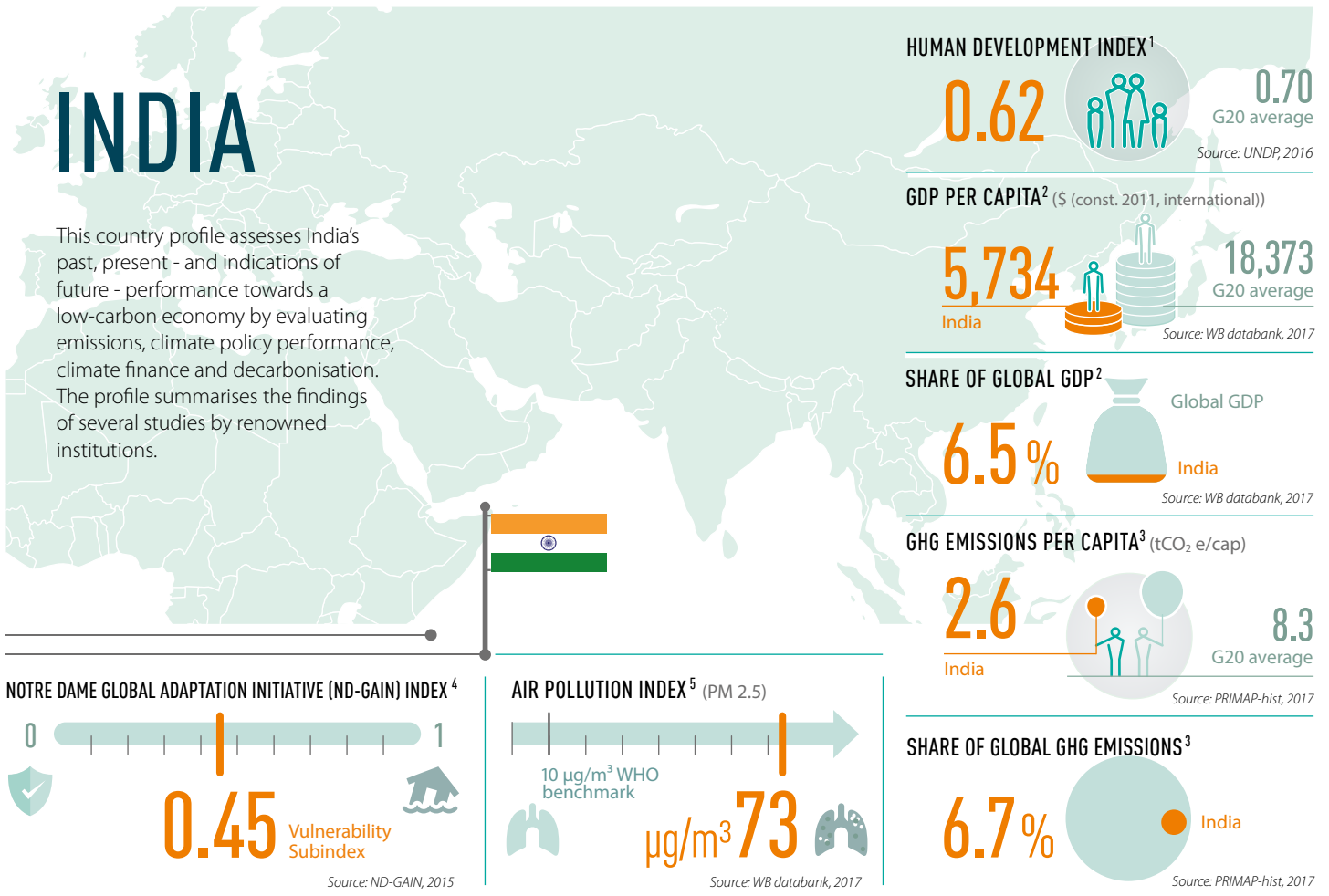




BROWN TO GREEN:

THE G20 TRANSITION TO A LOW-CARBON ECONOMY | 2017



This country profile is part of the **Brown to Green 2017** report. The full report and other G20 country profiles can be downloaded at:

<http://www.climate-transparency.org/g20-climate-performance/g20report2017>

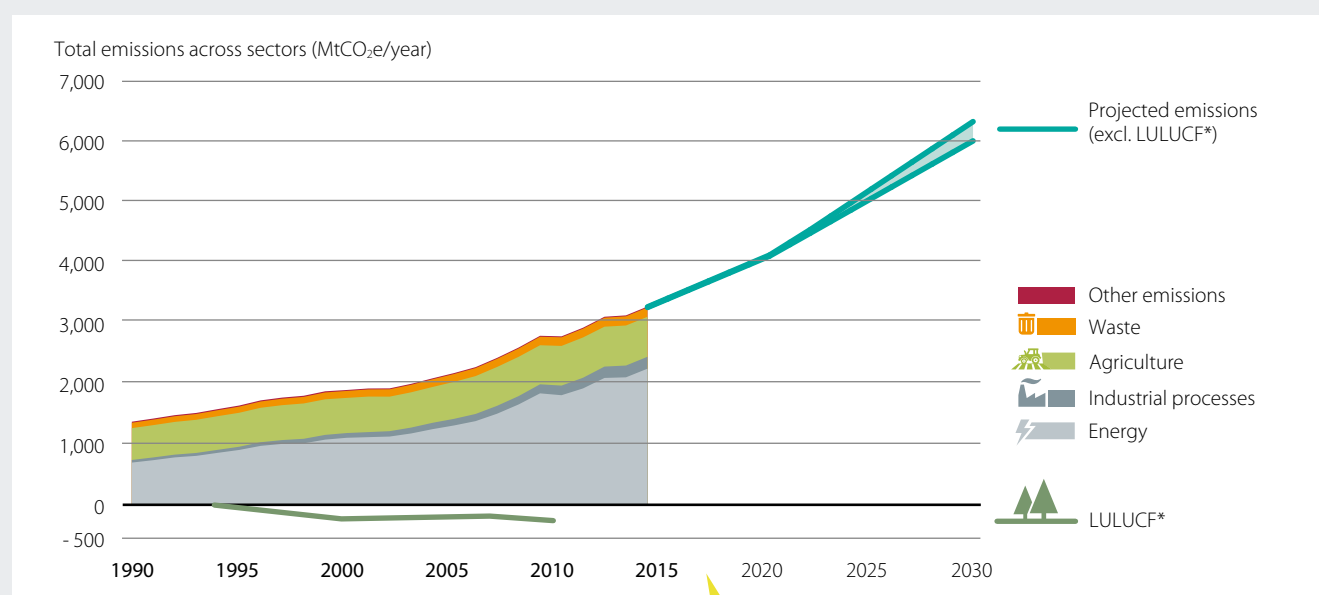
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INDIA

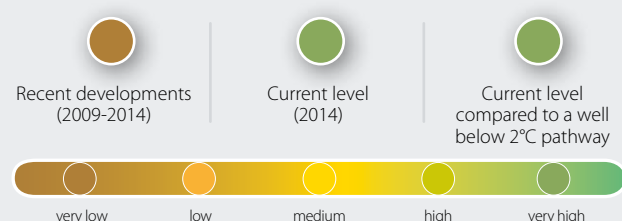


GREENHOUSE GAS (GHG) EMISSIONS DEVELOPMENT



*Land Use, Land Use Change and Forestry emissions according to the Climate Action Tracker
Source: PRIMAP, 2017; CAT, 2017

CCPI PERFORMANCE RATING OF GHG EMISSIONS PER CAPITA⁷



Source: CCPI 2017 – G20 Edition

A steady increase in energy sector emissions has led to India's emissions doubling since the 1990s. Projections indicate an increasing trend over the next two decades. LULUCF* emissions were close to zero in the mid-1990s, and became negative in the late-2000s.⁶

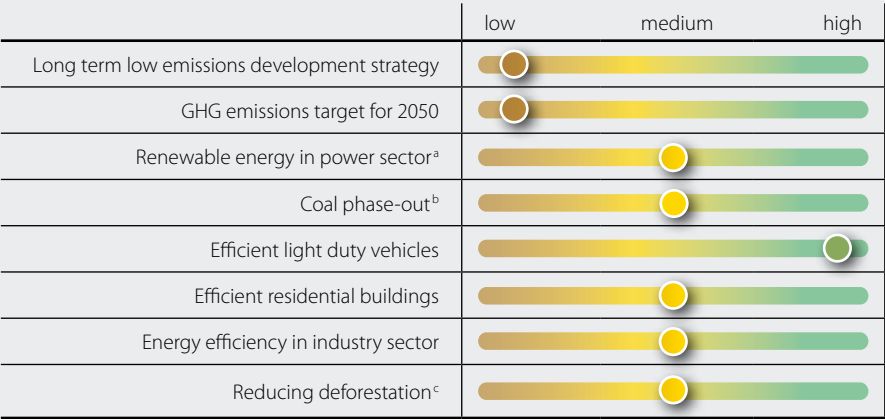


INDIA



CLIMATE POLICY PERFORMANCE

POLICY EVALUATION ⁸



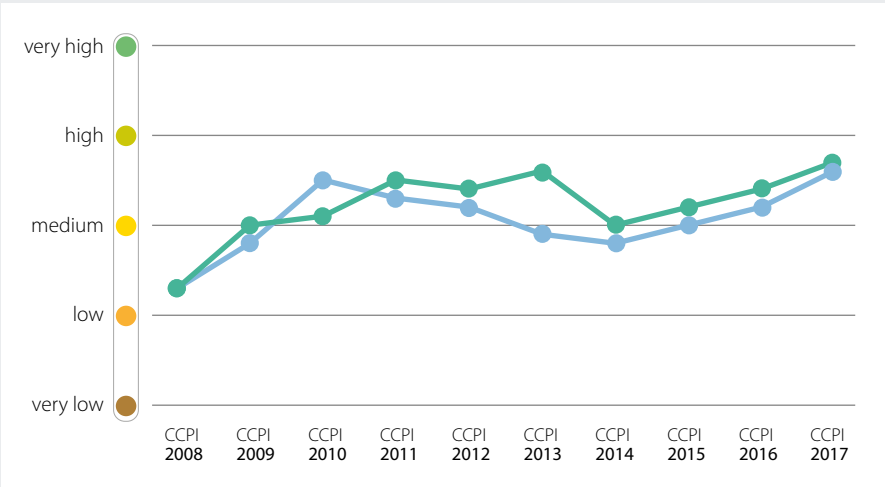
Climate Transparency evaluates sectoral policies and rates them whether they are in line with the Paris Agreement temperature goal. For more detail, see Annex.

a) Share of renewables in the power sector (2014): 15%
b) Share of coal in total primary energy supply (2014): 48%
c) Forest area compared to 1990 levels (2014): 110%

Source: own evaluation

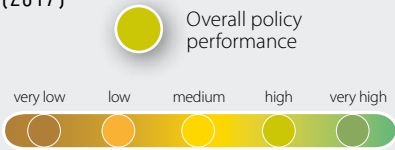
CCPI EXPERTS' POLICY EVALUATION ⁹

Indian experts acknowledge their government is running for one of the world-wide largest renewable capacity expansion programmes. They also give credit for India's progressive role in negotiation processes and international climate diplomacy.



— Evaluation of international climate policy
— Evaluation of national climate policy

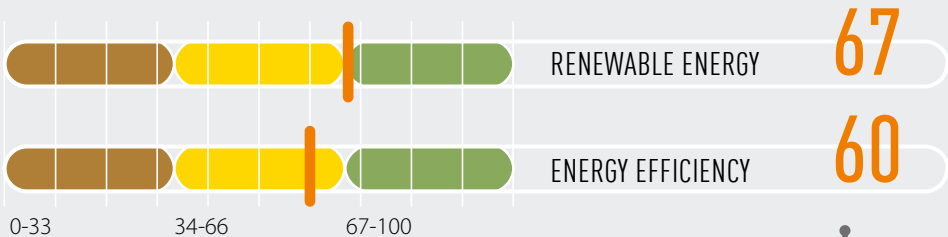
CCPI EVALUATION OF CLIMATE POLICY (2017)



Source: CCPI 2017 – G20 Edition

REGULATORY INDICATORS FOR SUSTAINABLE ENERGY (RISE) INDEX

RISE scores reflect a snapshot of a country's policies and regulations in the energy sector. Here Climate Transparency shows the RISE evaluation for Renewable Energy and Energy Efficiency.



Source: RISE index, 2017

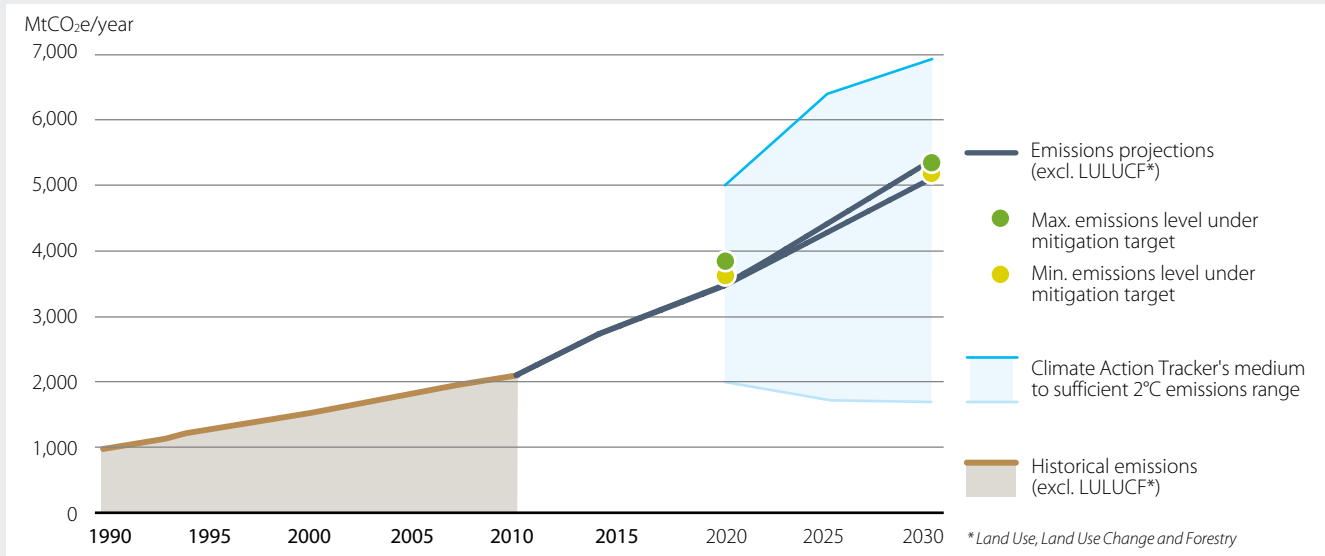


INDIA



CLIMATE POLICY PERFORMANCE

COMPATIBILITY OF CLIMATE TARGETS WITH A 2°C SCENARIO¹⁰



Under current policies, India will reach its 175 GW renewable power target by 2022, and is already set to overachieve its 2030 Nationally Determined Contribution (NDC) emissions intensity target under the Paris Agreement. The Climate Action Tracker (CAT) rates India's NDC "medium" as it is not ambitious enough to limit warming to below 2°C, let alone the Paris Agreement's stronger 1.5°C limit, unless others make much deeper reductions and comparably greater effort. India may be in a position to revise its NDC in line with current policy trajectory which currently demonstrates an achievement more than the targets in the NDC. Such a revision may take India towards CAT's "sufficient" rating on emissions from current "medium" rating.

CLIMATE ACTION TRACKER EVALUATION OF NATIONAL PLEDGES, TARGETS AND NDC¹⁰



INDIA



FINANCING THE TRANSITION

INVESTMENTS

INVESTMENT ATTRACTIVENESS

India continues to demonstrate commitment to climate action and renewables. There is a positive policy environment, with ambitious renewable energy targets and strong support schemes in place. Positive policy signals have translated into enhanced uptake of renewables in the last year, particularly for solar PV, which registered an 83% increase in 2016. However, capacity additions in per capita terms are still low compared to other G20 countries (Allianz, 2017).

ALLIANZ CLIMATE AND ENERGY MONITOR¹¹



RENEWABLE ENERGY COUNTRY ATTRACTIVENESS INDEX (RECAI)¹²



TREND



INDIA



FINANCING THE TRANSITION

GREEN BONDS

Green bonds are bonds that earmark proceeds for climate or environmental projects and have been labelled as 'green' by the issuer.¹³



Source: Calculations done by Climate Bonds Initiative for Climate Transparency, 2017

GREEN BONDS AS SHARE
OF OVERALL DEBT

0.35%

G20 average: 0.16%

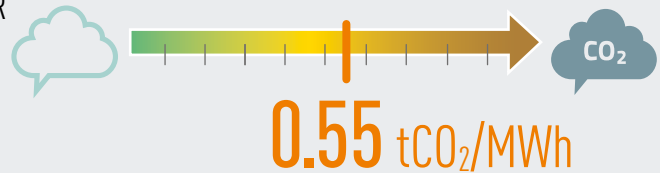
TOTAL VALUE OF GREEN
BONDS

2.7 billion US\$₂₀₁₇

EMISSIONS OF NEW INVESTMENTS IN THE POWER SECTOR

This indicator shows the emissions per MWh coming from newly-installed capacity in 2016. The smaller the value, the more decarbonised the new installed capacity. G20 average is at 0.43 tCO₂/MWh.

Source: Calculations done by IDDRI for Climate Transparency, 2017

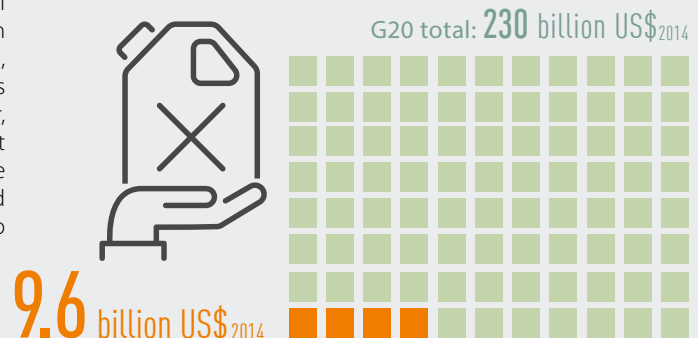


FISCAL POLICIES

FOSSIL FUEL SUBSIDIES (FOR PRODUCTION AND CONSUMPTION)¹⁴

India has been on a decreasing subsidy trend wherein it liberalised its petroleum prices in 2010, and consecutively deregulated diesel prices in 2014. As per estimations, in 2014, a total of US\$ 9.6 billion was provided in budgetary support to fossil fuel exploration, development and production. This was down from as much as US\$ 47 billion in 2013, according to some estimations. However, in 2014, India introduced a Direct Benefit Transfer (DBT) to support energy access in rural households. Till 2016, under this programme clubbed together with „Give it up“ campaign for subsidized wealthy consumers, LPG connections were made available to nearly 50 million improvised families at a subsidized rate.

Source: Calculations done by ODI based on OECD inventory, 2017

EFFECTIVE CARBON RATE¹⁶

In 2012, effective carbon pricing rates comprised entirely of specific taxes on energy use, with no explicit carbon tax or emissions trading system. 53% of carbon emissions from energy use were priced with 2% above €30/tCO₂ (~US\$ 37 -all from road transport where there are increased tax rates on fuels for road transport). Most unpriced emissions arose from the industry, residential and commercial sectors. An updated effective carbon price in India will be largely influenced by cess on coal (at US\$ 6.2 per ton of coal) and the two major mechanisms- Perform Achieve Trade (PAT), a market-based trading scheme of energy efficiency certificates in energy-intensive sectors, and the Renewable Energy Certificate (REC) trading system, which is a non-ETS, market-based mechanism.¹⁷

Source: OECD, 2016



INDIA



FINANCING THE TRANSITION

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. While there may be climate-related contributions through bilateral or multilateral development banks, these have not been included in this report.



PLEDGE TO THE GREEN CLIMATE FUND (GCF)

Obligation to provide climate finance under the UNFCCC	Signed pledge to the GCF (Million US\$)	Pledge per 1000 dollars of GDP (US\$ ₂₀₁₁ (constant))
no	n/a	n/a

Source: GCF, 2017

CONTRIBUTIONS THROUGH THE MAJOR MULTILATERAL CLIMATE FUNDS¹⁸

Annual average contribution 2013-2014 (Billion US\$)	Annual average contribution 2013-2014 per 1000 dollars of GDP (Billion US\$)	Adaptation	Mitigation
n/a	n/a	n/a	n/a

Source: Climate Funds Update, 2017

BILATERAL CLIMATE FINANCE CONTRIBUTIONS¹⁹

Bilateral finance commitments (annual average 2013-14) (Billion US\$)	Bilateral finance commitments per 1000 dollars of GDP (annual average 2013-14) (Billion US\$)	Financial instrument (average 2013-2014)				
		Grant	Concessional Loan	Non-Concessional loan	Equity	Other
		n/a	n/a	n/a	n/a	n/a
n/a	n/a	Theme of support (average 2013-14)				
		Mitigation	Adaptation	Cross-cutting	Other	
		n/a	n/a	n/a	n/a	

Source: Party reporting to the UNFCCC, 2013-14

CLIMATE FINANCE CONTRIBUTIONS THROUGH MULTILATERAL DEVELOPMENT BANKS (MDBs)²⁰

MDBs in aggregate spent \$21.2 billion on mitigation and \$4.5 billion on adaptation in developing countries in 2014.

No national disaggregation available

Source: MDB report, 2015

FUTURE CLIMATE FINANCE COMMITMENTS

Source: "Roadmap to US\$100 Billion" report, 2016



INDIA

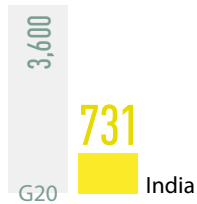


DECARBONISATION

SECTOR-SPECIFIC INDICATORS

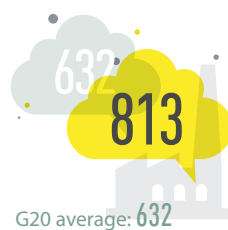
POWER SECTOR

ELECTRICITY DEMAND
PER CAPITA
(kWh/capita)



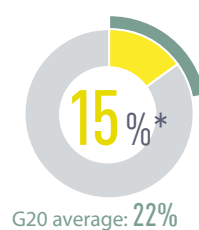
Data from 2014
Source: CAT, 2016

EMISSIONS INTENSITY
OF THE POWER SECTOR
(gCO₂/kWh)



Data from 2014
Source: CAT, 2016

SHARE OF RENEWABLES
IN POWER GENERATION
(incl. large hydro)



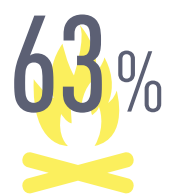
Data from 2014 / Source: CAT, 2016
* The Ministry of Power reports a share of 17.2% as of May, 2017.

SHARE OF POPULATION
WITH ACCESS TO ELECTRICITY



Data from 2016
Source: IEA, 2016

SHARE OF POPULATION
WITH BIOMASS
DEPENDENCY



Data from 2014
Source: IEA, 2016

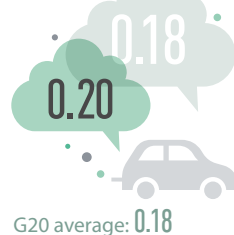
TRANSPORT SECTOR

TRANSPORT EMISSIONS
PER CAPITA
(tCO₂e/capita)



Data from 2014
Source: IEA, 2016

TRANSPORT EMISSIONS
INTENSITY
(kgCO₂/vkm)



Data from 2010
Source: CAT, 2016

SHARE OF PRIVATE CARS
AND MOTORCYCLES



Data from 2010
Source: CAT, 2016

SHARE OF GLOBAL ELECTRIC
VEHICLE SALES
(%)



Data from 2015
Source: IEA, 2016

INDUSTRY SECTOR

INDUSTRY EMISSIONS
INTENSITY
(tCO₂/thousand US\$2012
sectoral GDP (PPP))



Data from 2014
Source: CAT, 2016

BUILDING SECTOR

BUILDING EMISSIONS
PER CAPITA
(tCO₂/capita)



Data from 2014
Source: CAT, 2016

RESIDENTIAL BUILDINGS
EMISSIONS INTENSITY
(kgCO₂/m²)



Data from 2010
Source: CAT, 2016

RESIDENTIAL BUILDING
SPACE
(m²/capita)



Data from 2010
Source: CAT, 2016

AGRICULTURE SECTOR

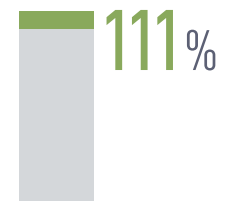
AGRICULTURE EMISSIONS
INTENSITY
(tCO₂e/thousand US\$2010
sectoral GDP (constant))



Data from 2014
Source: PRIMAP, 2017; WorldBank, 2017

FOREST SECTOR

FOREST AREA
COMPARED TO 1990 LEVEL



Data from 2015
Source: CAT, 2016



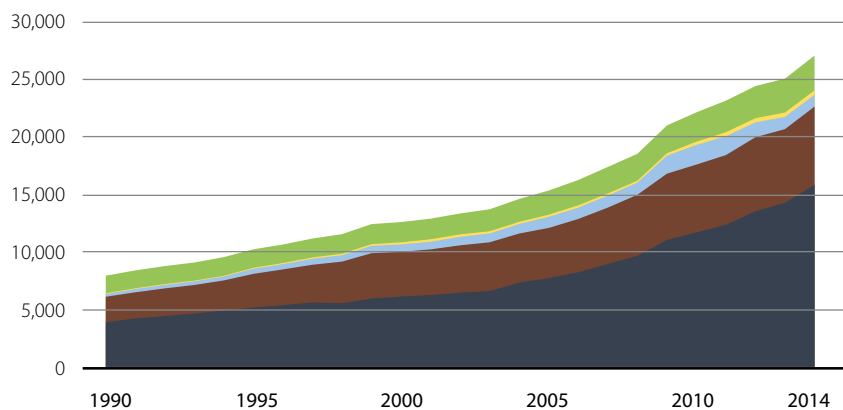
INDIA



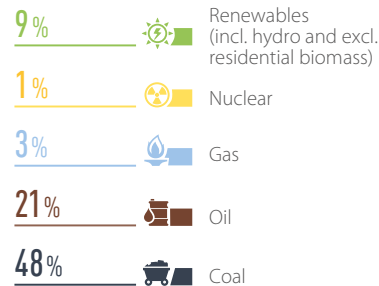
DECARBONISATION

ENERGY MIX²¹

Total Primary Energy Supply (PJ)



Share in 2014

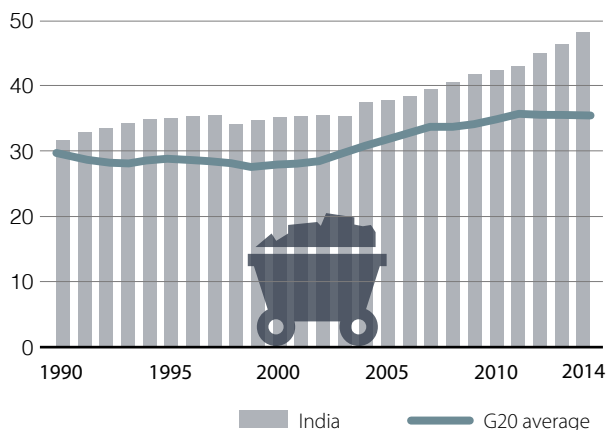


Note: numbers might not add up to 100% due to exclusion of residential biomass from the share of renewables.
Source: IEA, 2016

SHARE OF COAL IN ENERGY SUPPLY²²

India has the third highest share of coal in its energy mix in the G20 - at 48% in 2014.

Share of coal (%)



Source: IEA, 2016

PERFORMANCE RATING

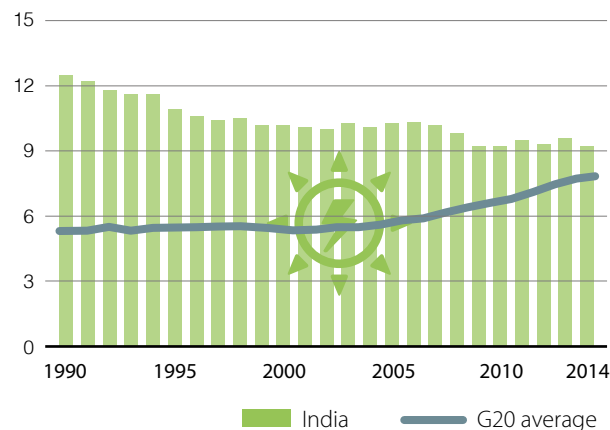


Source: own evaluation

SHARE OF RENEWABLES IN ENERGY SUPPLY²³

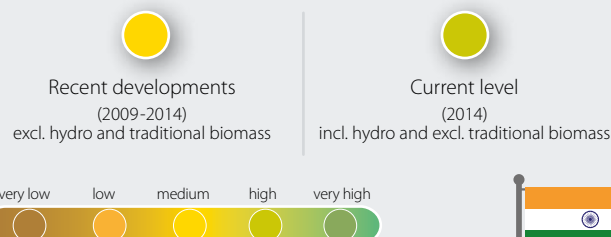
The share of renewables in India's energy mix was 9% in 2014 – 2% above the G20 average.

Share of renewables (incl. hydro) (%)



Source: IEA, 2016

CCPI PERFORMANCE RATING OF THE SHARE OF RENEWABLES⁷



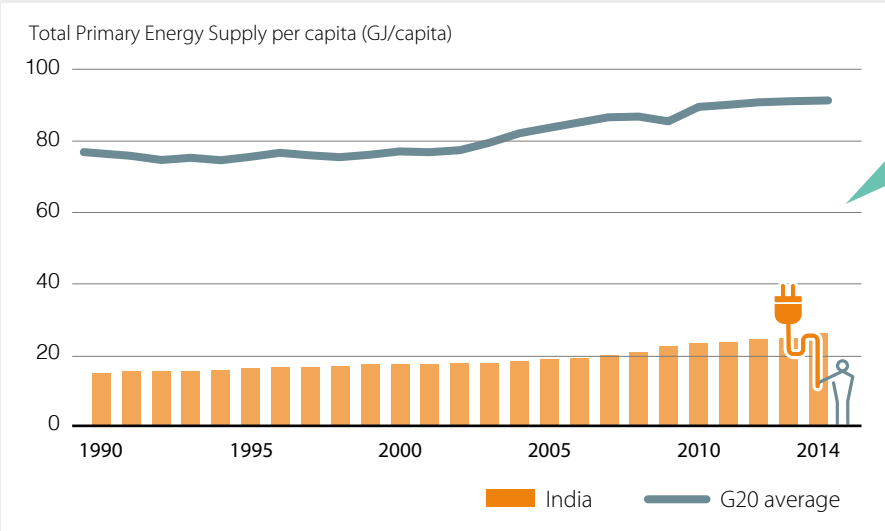
Source: CCPI 2017 – G20 Edition

INDIA



DECARBONISATION

ENERGY USE PER CAPITA²⁴



At 25 GJ per capita, India's energy use per capita is the lowest in the G20. It has risen over the last 14 years at a growth rate of 2%, but remains three to four times below the G20 average of 91 GJ/capita.

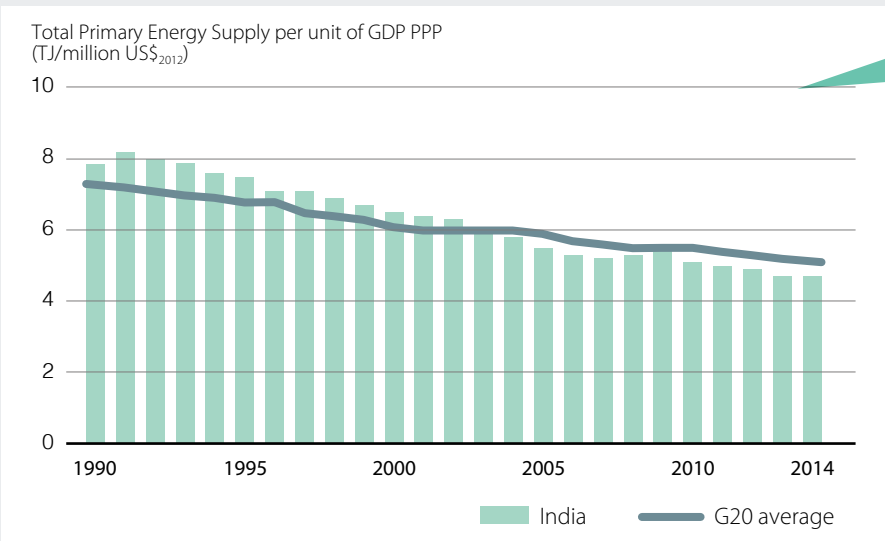
Source: IEA, 2016

CCPI PERFORMANCE RATING OF ENERGY USE PER CAPITA⁷



Source: CCPI 2017 – G20 Edition

ENERGY INTENSITY OF THE ECONOMY²⁵



The energy intensity of India's economy has fallen over recent decades and is currently at 4.7 TJ/million US\$ which is below the G20 average of 5.1 J/million US\$.

Source: IEA, 2016

PERFORMANCE RATING



Source: own evaluation

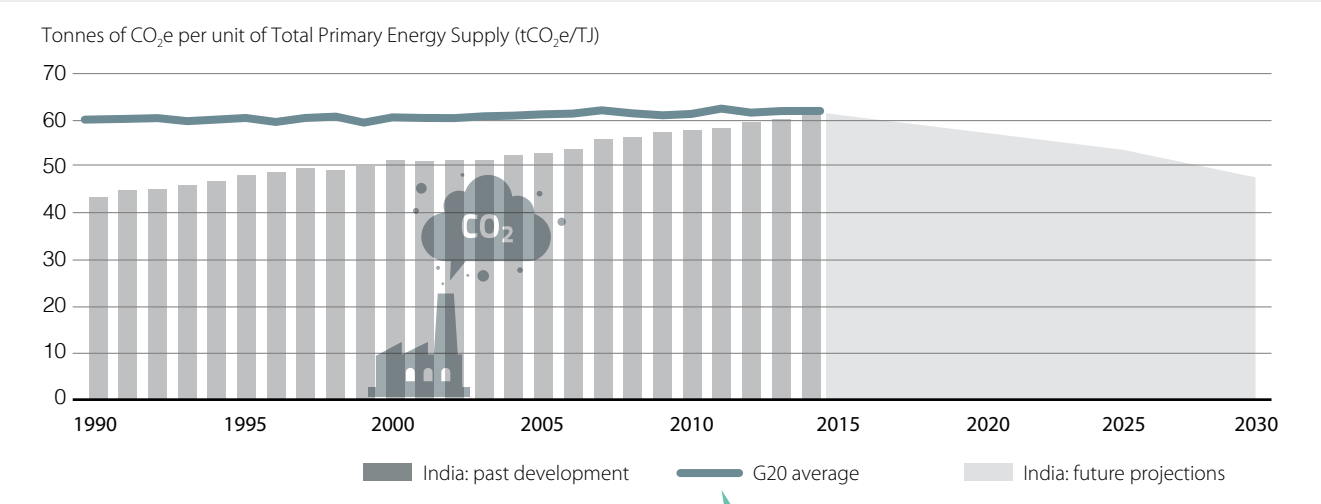


INDIA



DECARBONISATION

CARBON INTENSITY OF THE ENERGY SECTOR ²⁶



Source: IEA, 2016

PERFORMANCE RATING

very low low medium high very high



RECENT DEVELOPMENTS (2009-2014)

very low low medium high very high



CURRENT LEVEL (2014)

Source: own evaluation

The carbon intensity of India's total primary energy supply has increased from 43 tCO₂e/TJ in 1990 to 60 tCO₂e/TJ in 2014. With this increase, India's emissions in the energy sector have touched in par with the G20 average at 62 tCO₂e/TJ.

ANNEX

G20



KEY INDICATORS

- 1) The Human Development Index (HDI) is a composite index published by the United Nations Development Programme (UNDP). It is a summary measure of average achievement in key dimensions of human development. A country scores higher when the lifespan is higher, the education level is higher, and GDP per capita is higher. Data for 2016.
- 2) Gross Domestic Product (GDP) per capita is calculated by dividing GDP with midyear population figures. GDP is the value of all final goods and services produced within a country in a given year. Here GDP figures at purchasing power parity (PPP) are used. Data for 2015.
- 3) PRIMAP-hist combines several published datasets to create a comprehensive set of greenhouse gas emissions pathways for every country and Kyoto gas covering the years 1850 to 2014 and all UNFCCC member states as well as most non-UNFCCC territories. The data resolves the main IPCC 1996 categories. Data for 2014.
- 4) The ND-GAIN index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It is composed of a vulnerability score and a readiness score. In this report, we display the vulnerability score, which measures a country's exposure and sensitivity to the negative impact of climate change in six life-supporting sectors – food, water, health, ecosystem service, human habitat and infrastructure. In this report, we only display the vulnerability score of the index. Data for 2015.
- 5) Average level of exposure of a nation's population to concentrations of suspended particles measuring less than 2.5 microns in aerodynamic diameter, which are capable of penetrating deep into the respiratory tract and causing severe health damage. Data for 2015.

GREENHOUSE EMISSIONS (GHG)

- 6) This indicator gives an overview of the country's emissions profile and the direction the country's emissions are taking under current policy scenario.
- 7) The Climate Change Performance Index (CCPI) aims to enhance transparency in international climate politics. On the basis of standardised criteria, the index evaluates and compares the climate protection performance of countries in the categories GHG emissions, renewable energy and energy use. It assesses the recent developments, current levels, policy progress and the compatibility of the country's current performance and future targets with the international goal of limiting global temperature rise well below 2°C.

CLIMATE POLICY PERFORMANCE:

- 8) The table below displays the criteria used to assess a country's policy performance. For the sector-specific policy criteria the 'high' rating is informed by the Climate Action Tracker (2016) report on the ten steps needed to limit warming to 1.5°C and the Paris Agreement.
- 9) The CCPI evaluates a country's performance in national climate policy, meaning the performance in establishing and implementing a sufficient policy framework, as well as international climate diplomacy through feedback from national climate and energy experts.
- 10) The Climate Action Tracker is an independent, science-based assessment that tracks government emissions reduction commitments and actions. It provides an up-to-date assessment of individual national pledges, targets and NDCs and currently implemented policies to reduce greenhouse gas emissions.

FINANCING THE TRANSITION

- 11) The Allianz Climate and Energy Monitor ranks G20 member states on their relative fitness as potential investment destinations for building low-carbon electricity infrastructure. The investment attractiveness of a country is assessed through four categories: policy adequacy, policy reliability of sustained support, market absorption capacity and the national investment conditions.
- 12) The Renewable Energy Country Attractiveness Index (RECAI) produces scores and rankings for countries' attractiveness based on macro drivers, energy market drivers and technology-specific drivers which, together, compress a set of 5 drivers, 16 parameters and over 50 datasets. For comparability purposes with the Allianz Monitor index, we divided the G20 members included in the latest RECAI ranking (May 2017) in two categories and rate the top half as "high performance" and the lower half as "medium performance".
- 13) The green bonds country indicator shows which countries are active in the green bond market by showing green bonds per country as a percentage of the overall debt securities market for that country. Green bonds were created to fund projects that have positive environmental and/or climate benefits.
- 14) The data presented is from the OECD inventory: www.oecd.org/site/tadffss/ except for Argentina and Saudi Arabia for which data from the IEA subsidies database is used. The IEA uses a different methodology for calculating subsidies than the OECD. It uses a 'price-gap' approach and covers a sub-set of consumer subsidies. The price-gap approach compares average end-user prices paid by consumers with reference prices that corresponds to the full cost of supply.

To endnote 8) Rating

	Criteria description		
	● Low	● Medium	● High
Long term low emissions development strategy	No long term low emissions strategy	Existing long term low emissions strategy	Long-term low emissions strategy submitted to the UNFCCC in accordance with Article 4, paragraph 19, of the Paris Agreement
GHG emissions target for 2050	No emissions reduction target for 2050 (or beyond)	Existing emissions reduction target for 2050 (or beyond)	Emissions reduction target to bring CO ₂ emissions to at least net zero by 2050
Renewable energy in power sector	No policy or support scheme for renewable energy in place	Support scheme for renewables in the power sector in place	Support scheme and target for 100% renewables in the power sector by 2050 in place
Coal phase-out	No consideration or policy in place for phasing out coal	Significant action to reduce coal use implemented or coal phase-out under consideration	Coal phase-out in place
Efficient light duty vehicles	No policy or emissions performance standards for LDVs in place	Energy/emissions performance standards or support for wLDVs	National target to phase out fossil fuel cars in place
Efficient residential buildings	No policy or low-emissions building codes and standards in place	Building codes, standards and fiscal/financial incentives for low-emissions options in place	National strategy for near-zero energy buildings (at least for all new buildings)
Energy efficiency in industry sector	No policy or support for energy efficiency in industrial production in place	Support for energy efficiency in industrial production (covering at least two of the country's subsectors (e.g. cement and steel production))	Target for new installations in emissions-intensive sectors to be low-carbon after 2020, maximising efficiency
Reducing deforestation	No policy or incentive to reduce deforestation in place	Incentives to reduce deforestation or support schemes for afforestation /reforestation in place	National target for reaching zero deforestation by 2020s

ANNEX (continued)

G20



- 15) This footnote had to be deleted as the data for the corresponding indicator was not available at the time of publication of this report.
- 16) In addition to carbon pricing mechanisms, emissions trading schemes and various energy taxes also act as prices on carbon, although they are generally not developed with the aim of reducing emissions. The OECD report presents calculations on 'Effective Carbon Rates' as the sum of carbon taxes, specific taxes on energy use, and tradable emission permit prices. The calculations are based on 2012 energy policies and prices, as covered in OECD's Taxing Energy Use database. According to OECD estimates, to tackle climate change emissions should be priced at least EUR 30 (or US\$ 37) per tonne of CO₂ revealing a major 'carbon pricing gap' within the G20.
- 17) The effective carbon rate presented in this country profile does not factor in emissions from biomass, as many countries and the UNFCCC treat them as carbon-neutral. However, in many cases biomass emissions are found to be non-carbon neutral over their lifecycle, especially due to the land use changes they cause.
- 18) Finance delivered through multilateral climate funds comes from Climate Funds Update, a joint ODI/Heinrich Boell Foundation database that tracks spending through major multilateral climate funds. Figures include: Adaptation for Smallholder Agriculture Programme; Adaptation Fund; Clean Technology Fund; Forest Carbon Partnership Facility; Forest Investment Program; Global Environment Facility (5th and 6th Replenishment, Climate Focal Area only); Least Developed Countries Fund; Partnership for Market Readiness; Pilot Program for Climate Resilience; Scaling-up Renewable Energy Program; and the Special Climate Change Fund.
- 19) Bilateral finance commitments are sourced from Party reporting to the UNFCCC under the Common Tabular Format. Figures represent commitments of funds to projects or programmes, as opposed to actual disbursements.
- 20) Data for the MDB spending on climate action includes ADB, AfDB, EBRD, EIB, IDB, IFC and the World Bank. Data is self-reported annually by the MDBs, based on a shared methodology they developed. The reported data includes MDBs own resources and expenditure in EU13, not funding from external sources that are channelled through the MDBs (e.g through bilateral donors and dedicated climate funds that are captured elsewhere). Data reported corresponds to the financing of adaptation or mitigation projects or of those components, sub-components, or elements within projects that provide adaptation or mitigation benefits (rather than the entire project cost). It does not include public or private finance mobilised by MDBs.

■ DECARBONISATION

- 21) Total primary energy supply data displayed in this factsheet does not include non-energy use values.
- 22) The share of coal in total primary energy supply reveals the country's historical and current proportion of coal in the energy mix. As coal is one of the dirtiest of fossil fuels, reducing coal's share in its energy mix is a crucial step for a country's transition to a green economy.
- 23) The share of renewable energy in total primary energy supply shows a country's historical and current proportion of renewables in the energy mix. The numbers displayed in the graph do not include residential biomass and waste values. Replacing fossil fuels and promoting the expansion of renewable energy is an important step for reducing emissions.
- 24) TPES per capita displays the historical, current and projected energy supply in relation to a country's population. Alongside the intensity indicators (TPES/GDP and CO₂/TPES), TPES per capita gives an indication on the energy efficiency of a country's economy. In line with a well-below 2°C limits, TPES/capita should not grow above current global average levels. This means that developing countries are still allowed to expand their energy use to the current global average, while developed countries have to simultaneously reduce it to that same number.
- 25) TPES per GDP describes the energy intensity of a country's economy. This indicator illustrates the efficiency of energy usage by calculating the energy needed to produce one unit of GDP. A decrease in this indicator can mean an increase in efficiency but also reflects structural economic changes.
- 26) This indicator describes the carbon intensity of a country's energy sector (expressed as the CO₂ emissions per unit of total primary energy supply) and gives an indication on the share of fossil fuels in the energy supply.

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at:

<http://www.climate-transparency.org/g20-climate-performance/g20report2017>