



THOMAS LLOYD

Country Report | 2021

INDIA





## Summary

With a total land area of 3,287,263 km<sup>2</sup>, India is the 7<sup>th</sup> largest country in the world and over 13 times the size of the United Kingdom. India is the second most populous country in the world and is home to more than 1.3 billion people. The United Nations estimates that India will overtake China and become the world's most populous nation in 2028, further increasing the country's population density of 368 people per km<sup>2</sup>. The country's population is distributed across 28 states and 8 union territories.

India has witnessed a period of significant economic transformation in the past 20 years, overtaking several developed nations to be at the end of 2020, the sixth largest economy in the world. Between 2011 and 2020, Indian GDP has expanded at an average annual pace of 5.1%, trailing only that of China, Bangladesh and Vietnam. The emergence of COVID-19 has certainly affected the country's recent economic growth; however, the IMF forecasts growth will rebound to 9.5% in 2021 and average 6.7% per annum for each of the next five years 2022–26.

India is a federal republic, with a parliamentary democracy that operates under the constitution

of 1950. The country's bicameral federal parliament is comprised of two houses, consisting of 790 members. The last general election was held in 2019, with incumbent Prime Minister Narendra Modi receiving 37.36% of the vote. The 2019 election was marked by India's highest ever voter turnout, with 67.11% of the 911 million eligible voters casting a vote. Modi was sworn-in as the 16<sup>th</sup> Prime Minister of India on May 30<sup>th</sup> 2019.

The World Bank's 'Ease of Doing Business 2020' report presents various indicators that measure, among others, the ease of starting a business, registering a property and obtaining construction permits. India's ranking has improved considerably in the past few years, reaching 63 of 190 countries.

India's Central Bank, the Reserve Bank of India, is tasked, "to regulate the issue of Bank notes and keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage". The Central Bank's Monetary Policy Committee (MPC) is required to meet at least four times a year. The resolution adopted by the MPC is subsequently published,

*"Political will is required to bring in big changes, big reforms. Today, the world can see that there is no dearth of political will in India. Good and smart governance is needed to bring reforms. The world is a witness to how India is writing a new chapter of governance."*

*Today we see our villages changing rapidly. In past few years, facilities like road and electricity have reached villages. Today, optical fibre network is providing the power of data to villages, and the internet is reaching there. Digital entrepreneurs are getting ready in villages, too."*

*We have to pledge to make India energy independent before completing 100 years of independence. India has moved towards electric mobility and work is underway on 100% electrification of Indian Railways with the aim to becoming net-zero carbon emitter by the year 2030."*

Prime Minister Modi's speech on the 75<sup>th</sup> Anniversary of Independence  
August 15<sup>th</sup> 2021





illustrating the meeting's outcomes and the plans for monetary policy going forward.

There is no doubting the political will to embrace technological change and modernise the country's infrastructure. Prime Minister Modi has periodically announced several infrastructure investment packages, including Gati Shakti – a 100 trillion-rupee plan aimed at improving the country's logistics sector. Whilst India has made progress in improving its infrastructure, more must be done; India ranked only number 70 of 141 countries for Infrastructure in the World Economic Forum's 2018–19 Global Competitiveness Report.

As of end-March 2021, India's total installed power generating capacity stands at 382,151 MW, a 3.26% increase on the prior year's total. The country has made great strides in recent years, steering its energy mix towards renewable generation. With the exclusion of

large-scale hydro, India's renewable capacity has more than doubled in nine years. Nevertheless, coal-fired generation capacity still accounts for 54.8% of India's total and thus, the scope for further progress remains clear.

India is a world leader in renewable energy; the result of determined efforts over a long period of time. The transition towards renewable energy is not easy and requires the implementation of effective government policies. In 2008 the National Action Plan on Climate Change was launched, followed in 2010 by the National Solar Mission targeting 20 GW of solar energy by 2022. By 2015 the target was raised to 175 GW of renewables and in 2020 this was further increased to a massive 450GW of renewable energy by 2030. India has a proven track record of success in solar energy and is now a well-established and highly regarded investment destination.

## BTI 2020

The Bertelsmann Stiftung Transformation Index (BTI, scale 1 to 10) analyses and evaluates the quality of the democracy, market economy and political management in 137 developing and transitioning countries. Progress and regress is measured on a path to constitutional democracy and a market economy accompanied by social policy.

### Status Index

6.7 #29 || 137  
India

5.48  
Asia/Oceania\*

### Democracy Status

7.25 #29 || 137  
India

5.52  
Asia/Oceania\*

### Market Economy Status

6.14 #48 || 137  
India

5.46  
Asia/Oceania\*

### Governance Index

5.92 #32 || 137  
India

4.77  
Asia/Oceania\*

\*Regional average



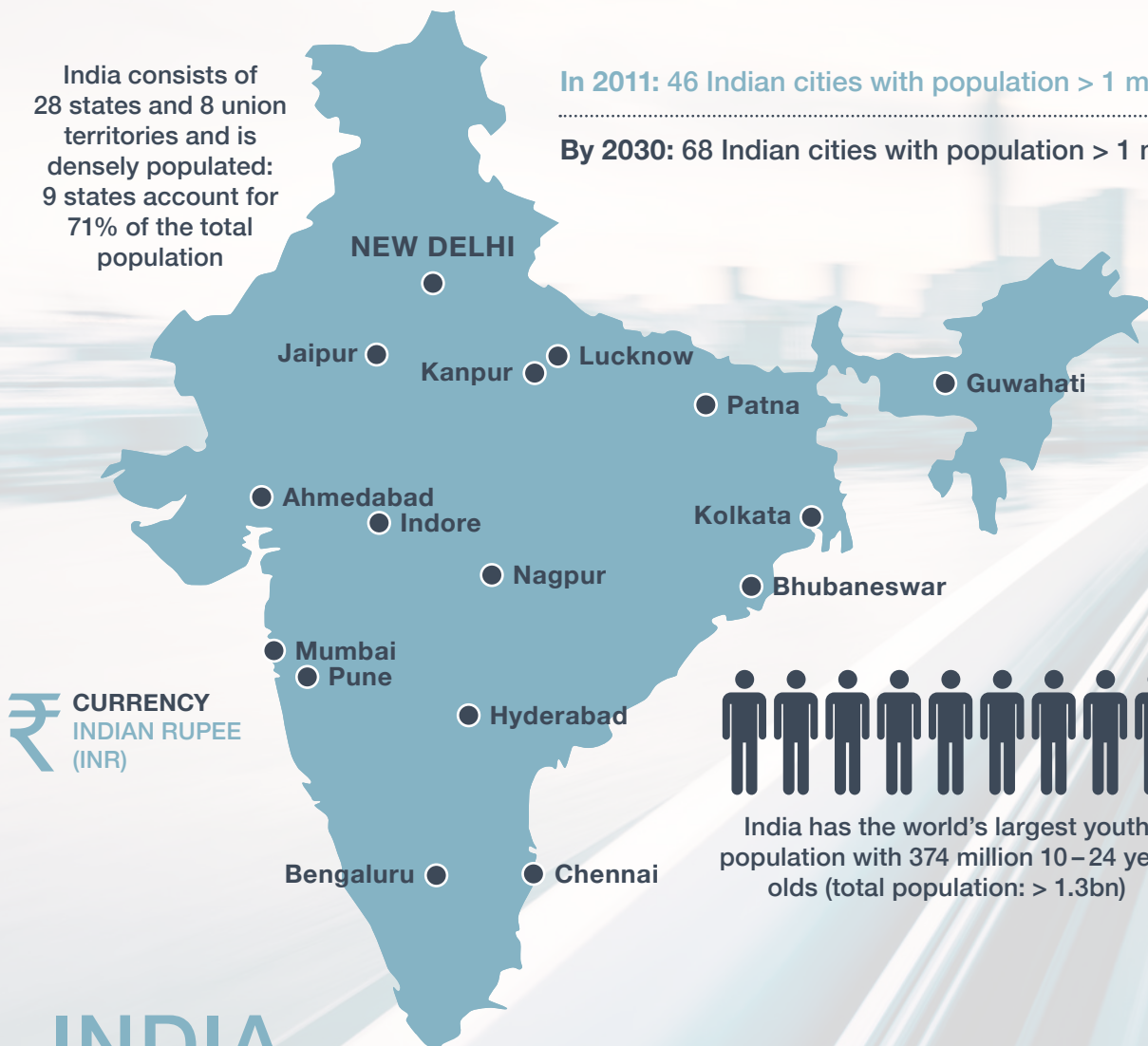
# INDIA

## AN OVERVIEW

India consists of 28 states and 8 union territories and is densely populated: 9 states account for 71% of the total population

In 2011: 46 Indian cities with population > 1 million

By 2030: 68 Indian cities with population > 1 million



India has the world's largest youth population with 374 million 10–24 year olds (total population: > 1.3bn)

## INDIA

### ACCOUNTS FOR ...

2.4%  
of the world's surface

17.7%  
of the world's population

## INDIA

### IS THE LARGEST ...



Democracy in the world,  
and English speaking nation  
in the world

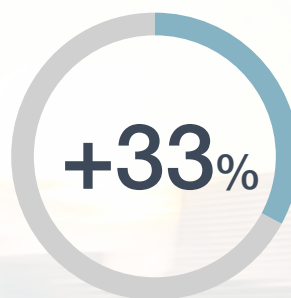




**POPULATION  
GROWTH**  
from 2000 – 2030



**GDP  
GROWTH**  
from 2010 – 2019



**POWER  
CONSUMPTION**  
from 2010 – 2018

**BBB-**  
WITH STABLE  
OUTLOOK

**CREDIT  
RATING**  
Standard & Poor's



largest economy in  
the world as at end-2020

BUT



70<sup>TH</sup>  
of 141 countries in the world  
by infrastructure quality



**No. 3**  
India is the world's third  
biggest consumer of electricity  
after the US and China



**FIFTH**  
largest solar market in  
the world after China, US,  
Japan and Germany

**278**  
BILLION US\$

The National Infrastructure Pipeline envisages  
a total investment of USD 1,390 billion.  
This is equivalent to USD 278bn per annum  
over next five years.





## Geography

**The land of India – together with Bangladesh and most of Pakistan – forms a well- defined subcontinent, separated from the rest of Asia by the imposing northern mountain range of the Himalayas and by adjoining mountain ranges to the west and east.**

Due to India's vast land area, its climate varies across different regions. Most parts of the country experience a hot, tropical climate. To the north, near the Himalayas, the climate can be described as alpine tundra, while it has a desert climate to the west of the country. India has four seasons; winter (January and February), summer (March to May), monsoon season (June to September) and post-monsoon season (October to December).

The monsoon period can vary by several weeks; not only from one region of India to another, but also from year-to-year. The wet season occurs from early-June to late-September, causing heavy rainfall and often widespread flooding. Around three-quarters of the country's annual rainfall comes during these three months. Temperatures are generally warmest in May or June, just prior to the cooling monsoon rains, and the country can be prone to deadly heatwaves. India suffers several types of natural disasters, such as droughts, flash floods and hurricanes.

Almost 10% of the world's agricultural land is in India. The total cultivable area is 1,269,219 km<sup>2</sup> (56.78% of total land area), which is decreasing due to constant pressure from an ever-growing population and increased urbanization. India has a total water surface area of 360,400 km<sup>2</sup>

and around 14,500 km of inland navigable waterways.

The substantial year-to-year variability of monsoon rain brings much uncertainty to India's agricultural sector. Good years of rain bring substantial crop yields, though poor rainfall can lead to total crop failure, especially in those areas where man-made irrigation is not well-developed.

Around half of all Indians derive their livelihood directly from agriculture and food crops account for more than 60% of the total area under cultivation. Rice is the main crop in areas with more than 1,000 mm of average annual rainfall, as well as in some irrigated areas. Wheat is grown mainly in northern and north-western parts of the country where average annual rainfall is between 380 – 1,000 mm. Globally, India is the world's second largest producer of rice and wheat. Other important cereals include sorghum, millet and corn, whilst amongst the pulse crops, chickpeas is by far the most important.

Around a quarter of India's land is forested, although this figure is reducing rapidly as a result of population growth, agriculture, urbanisation and industrialisation. Moreover, some areas officially classified as forest have been over-exploited for timber and firewood and are little more than scrubland, with substantial amounts of woodland used for the production of charcoal.



**Total land area:**  
3,287,263 km<sup>2</sup>, 7<sup>th</sup> largest in the world, 90% land, 10% water

**Capital:**  
New Delhi

**Time zone:**  
UTC + 5:30

**Currency:**  
Indian rupee  
(abbreviated as INR)

**Continent:**  
Asia

**Coordinates:**  
28.6139° N, 77.2090° E

**Highest point:**  
Kangchenjunga  
(3<sup>rd</sup> highest mountain in the world), 8,586m

**Lowest point:**  
Kuttanad (region known for its paddy fields), -2.2m (below sea level)

**Longest river:**  
Brahmaputra-Tsangpo, 3,848km

**Largest lake:**  
Wular Lake, surface area varies between 30km<sup>2</sup> to 260km<sup>2</sup> (based on the season)



The flora of India vary from region to region according to the respective patterns of rainfall. Evergreen forests are found in areas of high precipitation (more than 2,000mm annually) with deciduous and mixed forests, grassland and desert vegetation as the rainfall gradually diminishes. Hardwoods such as teak and rosewood are grown commercially, with large mangrove forests along the river deltas and more than 100 species of palm trees in the tropical areas. Many types of bamboo grow over much of the country. There are around 17,000 species of flowering plants, some of which are native only to India and 1,300 of which are considered to be endangered.

The fauna of India are both numerous and highly diverse. Native mammals include the Indian elephant and rhinoceros as well as bison, buffalo, antelope and several species of deer. Primates such as the rhesus monkey and langur are found both in wooded areas and near human settlements whilst amongst the carnivores, the Asiatic lion is the only extant subspecies of lion found outside of Africa. The Bengal tiger is the national animal of India. Once on the verge of extinction, Indian tigers have increased to several thousand, thanks largely to Project Tiger, which has established reserves in various parts of the country.

India has more than 1,200 species of birds, estimated at around one-eighth of the world's total, although some migratory species are found in

the country only during the winter. Birds of prey include hawks, vultures, and eagles. Peacocks are also common, especially in Gujarat and Rajasthan, where they are kept as pets and are often seen as India's national bird.

Crocodiles inhabit the country's rivers, swamps, and lakes and of the 400 species of snakes, around 20% are poisonous, with the python and cobra the most widespread and deadly. There are 2,000 species of fish in India, one-fifth of which live in freshwater, whilst sharks are found in coastal waters and delta estuaries.

India's vast and varied geography gives it a huge variety of mineral resources and fossil fuel. Coal is abundant and relatively easy to mine and the country is the world's 2<sup>nd</sup> largest producer behind China. Virtually all of India's petroleum comes from the offshore Bombay High Field as well as Gujarat and Assam but it produces only a small proportion of its domestic needs. There are huge deposits of minerals such as iron ore, manganese and chromite along with copper, bauxite, zinc, lead, gold and silver. Non-metallic and non-fuel minerals include limestone, dolomite, rock phosphate, building stones, ceramic clays, mica, gypsum, fluorspar, magnesite, graphite, and diamonds.



For a long time the widespread use of pesticides was considered the panacea for Indian agriculture. However, attitudes have since shifted. Today India has the largest number of organic farmers worldwide, with organic supermarkets booming in its towns and cities.

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## Demographics

**India is the world's second largest country by population with more than 1.3bn people. The United Nations estimates the population will increase by more than 300m over the next 25 years and in 2028 it will overtake China to become the world's most populous nation.**

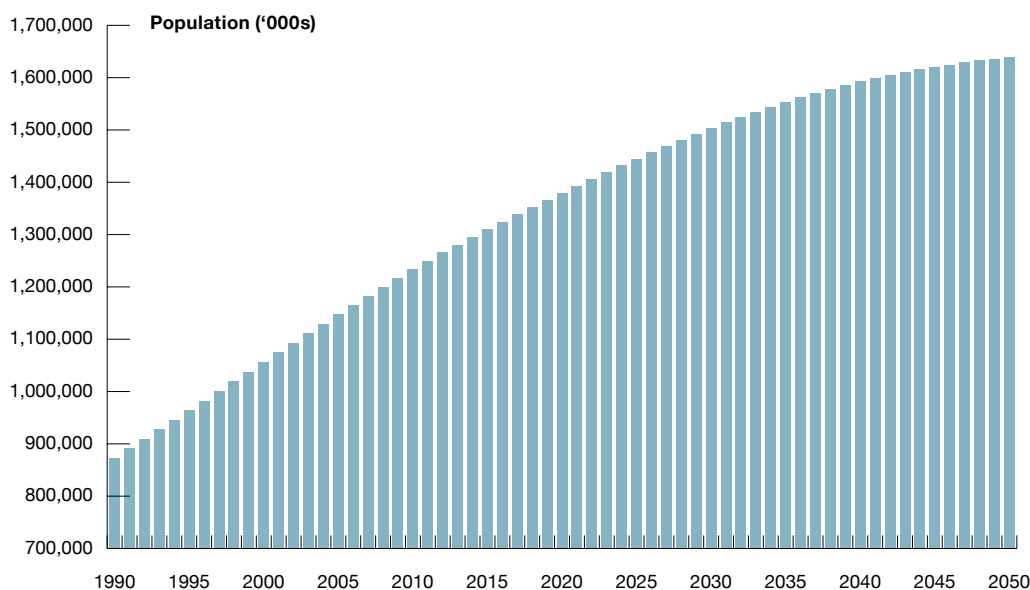
The population is quite young, with a median age of just 27.6 years of which male is 26.9 years and female is 28.3 years. Average life expectancy is around 68.3 years and is ranked 125<sup>th</sup> in the world according to the World Health Organisation. The birth rate for every 1,000 of the population is 19.3 and the death rate for every 1,000 of the population is 7.3.

India has a total of 40 cities that each has a population exceeding one million residents. Of these cities, two have populations that exceed 10 million. Delhi, the national capital, is the largest city both by area and population (19.8m) in North India. Mumbai, the financial capital, is the most populous (23.1m) and also the wealthiest city in India. Bengaluru (13.9m), formerly known as Bangalore, and Chennai (11.1m), formerly known as Madras, are the largest cities in South India. Kolkata (15.3m), the cultural capital, is the largest city in East India whilst Hyderabad has more than 13m people.



100 million people come every 12 years to the Kumbh Mela festival, the world's biggest gathering of humans.

India's population forecast to increase by almost 300mn over next 25 years

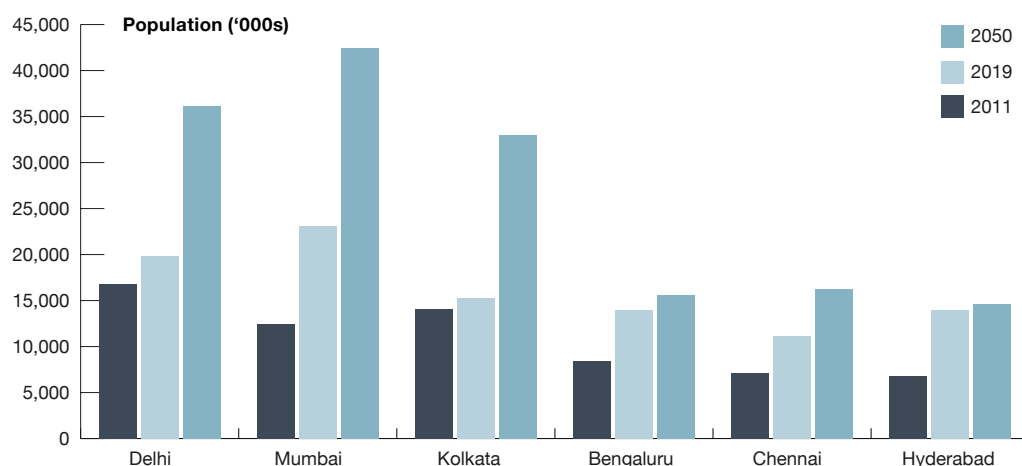


Source: United Nations Population Division





Projected growth in India's mega-cities



Source: Hornweg & Pope – Population Projections 2050

The country also has many smaller but still very populated cities, including 397 with between 100,000 and 1 million people, and 2,483 cities with populations between 10,000 and 100,000. The overall urban population rate is around 32.7% whilst just over 67% are in rural areas. This is down from 82% in the early 1960's but the decline has not been as dramatic as in many Asian countries.

According to the country's 2011 Census, the population density of India stands at roughly 368 people per km<sup>2</sup>. At present, India is comprised of 28 states and 8 union territories, with their respective population densities varying significantly. With a population density of 1,106 people per km<sup>2</sup>, Bihar is the most densely populated state in India. The National Capital Territory of Delhi – or Delhi as it is commonly known – is a union territory of India and home

to the country's capital. Delhi's population density stood at 11,320 people per km<sup>2</sup> as of 2011, roughly 31x the country average.

Increased rural to urban migration and endogenous population increase will result in further growth in many cities across India. By 2050 the country is expected to have increased its tally of megacities to 8, and by 2100 it is projected to have 12. Existing megacities are also predicted to continue to grow in size. Delhi will increase by nearly 16 million by 2050, whilst Mumbai is set to grow by almost 20 million to become the world's most populous city by 2050. Another current megacity, Kolkata is projected to more than double in size, from 15 to 33 million.



# Economy

At the start of this millennium, India's annual GDP stood at just \$466,841m; less than one-third the size of the French economy whose GDP was \$1,502,245m and the United Kingdom with \$1,652,539m. Its economy was barely one-fifth the size of Germany which was then the world's 3<sup>rd</sup> largest with a GDP of \$2,202,845m. In 2000, India was not even amongst the world's top 10 economies. Its annual GDP at that time was lower than Mexico, Spain and South Korea and it was only the 13<sup>th</sup> largest in the world.

In the first 8 years of the new century, India's economic growth accelerated from the 5.4% annual average of the previous decade; boosted by the rapid growth in the world economy and plentiful liquidity which helped lift previously-shunned emerging markets around the globe. There was a rapid increase in the rate of investment, financed by high credit growth and a surge in capital flows and bank lending. The average rate of GDP growth accelerated to 8.8%.

After the Global Financial Crisis (GFC) in 2008–09, growth continued at a somewhat more moderate pace, in part due to tighter global liquidity conditions and in part also due to a slowdown in domestic credit creation resulting from a high level of bad debts within the banking sector. Between 2011 and 2020, Indian GDP has nonetheless expanded at an average annual pace of 5.1% and its growth compares very well against other countries in Asia, in fourth place only to China, Bangladesh and Vietnam.

After the country's Election in 2019, growth began to slow. The country's annual rate of GDP growth fell to just 4%; the slowest pace since 2002 and exactly half the rate of growth seen just 4 years prior. Weakness in the rural economy, a deceleration of private consumption and credit supply constraints from non-banking financial companies (NBFC's) were largely responsible for this slowdown, whilst the country was by no means immune to global uncertainties relating to trade, tariffs and economic activity.

India's GDP growth was further hit by the COVID-19 pandemic in 2020 and actually contracted for the first time in 40 years, with a -8.0% annual drop. However, the IMF forecasts growth will rebound to 9.5% in 2021 and average 6.7% per annum for each of the next five years 2022-26.

 10<sup>12</sup>

India's economy has expanded 78% in the last decade. Annual GDP has increased by over USD1,100bn over the period.

Economic growth in selected Asian countries (annual % change)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Bangladesh</b>	6,5	6,5	6,0	6,1	6,6	7,1	7,3	7,9	8,2	3,8
<b>China</b>	9,5	7,9	7,8	7,4	7,0	6,9	6,9	6,7	5,8	2,3
<b>India</b>	6,6	5,5	6,4	7,4	8,0	8,3	6,8	6,5	4,0	-8,0
<b>Indonesia</b>	6,2	6,0	5,6	5,0	4,9	5,0	5,1	5,2	5,0	-2,1
<b>Malaysia</b>	5,3	5,5	4,7	6,0	5,0	4,5	5,8	4,8	4,3	-5,6
<b>Philippines</b>	3,9	6,9	6,8	6,3	6,3	7,1	6,9	6,3	6,0	-9,5
<b>Sri Lanka</b>	8,4	9,1	3,4	5,0	5,0	4,5	3,6	3,3	2,3	-3,6
<b>Thailand</b>	0,8	7,2	2,7	1,0	3,1	3,4	4,2	4,2	2,3	-6,1
<b>Vietnam</b>	6,4	5,5	5,6	6,4	7,0	6,7	6,9	7,1	7,0	2,9

Source: IMF World Economic Outlook



# India

a federal republic with **28 states** and **8 union territories**

Delhi, the national capital, is the largest city both by area and population (19.8m) in North India.

## Delhi

Population (millions)

2011 16.75

2019 **19.86**

2050 36.16

The country has a total of 40 cities that each has a population exceeding one million residents. Of these cities, six have populations that exceed 10 million.

The largest of the states

## Rajasthan

**342,238 km<sup>2</sup>**

an area only 15,000 km<sup>2</sup> smaller than Germany

Kolkata (15.3m), the cultural capital, is the largest city in East India

## Kolkata

Population (millions)

2011 14.11

2019 **15.32**

2050 33.04

The second largest state

## Madhya Pradesh

**308,350 km<sup>2</sup>**

slightly larger than Italy

The third largest state

## Maharashtra

**307,713 km<sup>2</sup>**

slightly larger than Italy

Mumbai, the financial capital, is the most populous (23.1m) and also the wealthiest city in India

## Mumbai

Population (millions)

2011 12.48

2019 **23.06**

2050 42.40

## Hyderabad

Population (millions)

2011 6.81

2019 **13.97**

2050 14.61

Bengaluru (13.9m), formerly known as Bangalore, and Chennai (11.1m), formerly known as Madras, are the largest cities in South India.

The smallest state

## Goa

**3,702 km<sup>2</sup>**

around 50% bigger than Luxembourg.

## Bengaluru

Population (millions)

2011 8.43

2019 **13.96**

2050 15.62

## Chennai

Population (millions)

2011 7.09

2019 **11.13**

2050 16.28

Source: University of Toronto, Global Cities Institute, Socioeconomic Pathways and Regional Distribution of the World's 101 Largest Cities





India's Central Bank, the Reserve Bank of India, is tasked, "to regulate the issue of Bank notes and keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage. To have a modern monetary policy framework to meet the challenge of an increasingly complex economy, and to maintain price stability while keeping in mind the objective of growth."

Under the RBI Act, its Monetary Policy Committee (MPC) is required to meet at least four times a year. Each member of the MPC has one vote, and in the event of an equality of votes, the Governor has a second or casting vote. The resolution adopted by the MPC is published after conclusion of every meeting of the MPC

in accordance with the provisions of Chapter III F of the Reserve Bank of India Act, 1934. On the 14<sup>th</sup> day, the minutes of the proceedings of the MPC are published which include:

- the resolution adopted by the MPC
- the vote of each member on the resolution, ascribed to such member
- the statement of each member on the resolution adopted.

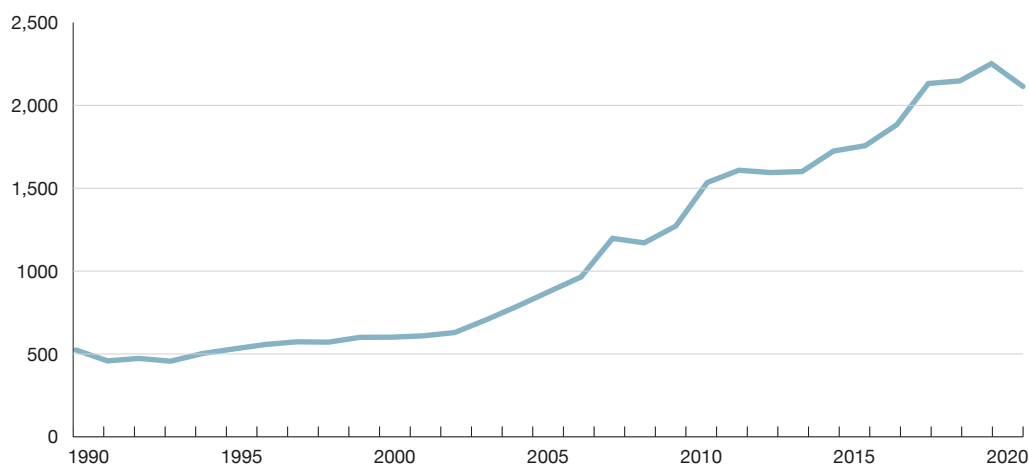
Once every six months, the Reserve Bank is required to publish a document called the Monetary Policy Report to explain:

- the sources of inflation
- the forecast of inflation for 6 – 18 months ahead.



Over 1 billion Indians have a mobile wireless connection and enjoy some of the lowest call charges available anywhere in the world.

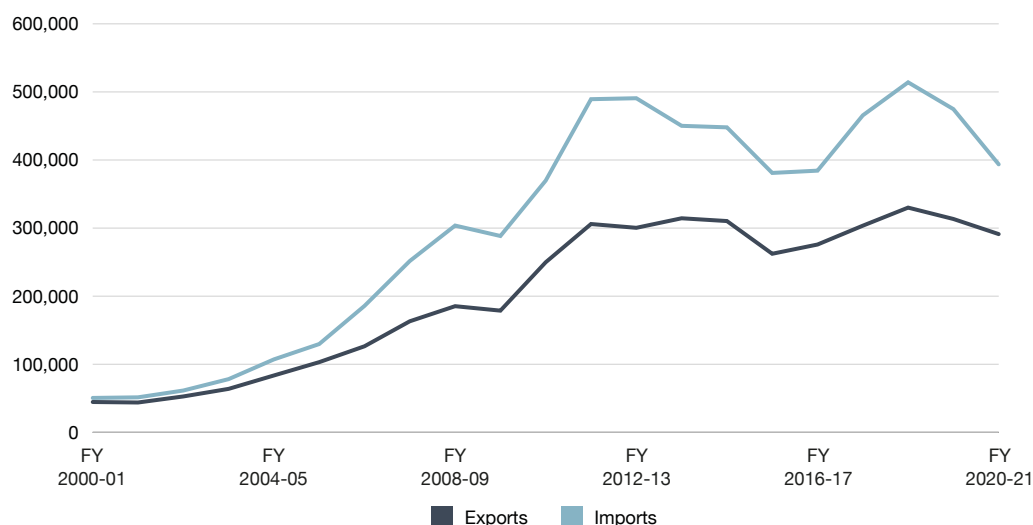
Per capita GDP of India (annual USD)



Source: International Monetary Fund



### Composition of Indian trade in the past 20 years



Source: Ministry of Commerce and Industry

### Trade

The value of goods exported stood at USD291.2 billion in FY 2020-21, with the value of goods imported standing at USD393.6 billion. The implications of COVID-19 on global trade are well known and India is no exception; the value of total trade (exports + imports) was down 13.1% in comparison to FY 2019-20 and 18.9% on FY 2018-19's total. India's exportation of goods was less heavily affected over the 2-year period, falling 11.8% and approximately 12 percentage points lower than fall of 23.4% seen in import value.

India has witnessed a significant increase in the exportation and importation of goods over time. Since FY 2000-01, the value of goods exported has increased at a CAGR of 9.8%. The exclusion of post-pandemic figures reveals a CAGR of 11.6%, further emphasising the country's impressive growth. The value of goods exported from India reached an all-time high of USD330,078 million in FY 2018-19, a 78.1% increase on the value exported a decade earlier. India nonetheless runs a consistent trade deficit which has increased significantly in the past 20 years, growing at a CAGR of 15.3%.

### Key trading partners of India – Value of Exports (USD Million)

Rank/Country	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21
1 United States	42.212	47.878	52.406	53.089	51.622
2 China	10.172	13.334	16.752	16.613	21.187
2 UAE	31.176	28.146	30.127	28.854	16.695
4 Hong Kong	14.047	14.690	13.002	10.967	10.162
5 Singapore	9.565	10.203	11.572	8.923	8.675

### Key trading partners of India – Value of Imports (USD Million)

Rank/Country	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21
1 China	61.283	76.381	70.320	65.261	65.212
2 United States	22.307	26.211	35.549	35.820	28.877
3 UAE	21.510	21.739	29.785	30.266	26.623
4 Switzerland	17.249	18.923	18.088	16.900	18.231
5 Saudi Arabia	19.972	22.070	28.479	26.857	16.187

Source: Ministry of Commerce and Industry, \*Ranking in order of FY 2020-21 values.



The United States is by far and away the largest recipient of Indian exports. At an export value of USD51,622 million in FY 2020-21, the US accounted for 47.6% of the total value attributed to the top five. The value of goods exported to China has consistently increased, growing at a CAGR of 20.1% since FY 2016-17.

The two largest recipients of Indian exports are also the two largest sources of imports, albeit in a different order. The value of goods imported from China stood at USD65,212 million in FY 2020-21 and accounted for 16.6% of India's total.

When addressing the nation on India's 75<sup>th</sup> Independence day, Prime Minister Modi was quoted as saying "India today spends more than Rs 12 trillion annually on energy imports. For India's progress, the country's energy independence is the need of the hour - necessary to make a self-reliant India. Therefore, today India has to take a resolution that will become energy independent before the completion of 100 years of independence and for this our roadmap is very clear."

## Employment

India's National Statistics Office (NSO) established the Periodic Labour Force Survey (PLFS) in April 2017, with the aim of estimating key employment and unemployment indicators over frequent time intervals. The third annual report was released in July 2021 and covers the one-year period between July 2019 and June 2020. The PLFS looks at the 'usual status' and 'current weekly status' of those surveyed. When the activity status of a person

(e.g. unemployed) is determined on the basis of the 365-day reference period preceding the survey, it is known as the 'usual activity status'. India's labour force participation rate (LFPR) for persons of age 15+ stood at 55.5% for those living rurally and 49.3% for those living in an urban location. Whilst the LFPR differed across areas, it also varied across gender; India's LFPR for males stood at 76.8%, more than 2.5x the 30% of females participating in the labour force. Encouragingly, the female LFPR was up roughly six percentage points on the year prior.

The agricultural sector is the primary source of employment in India, accounting for 45.6% of 'usual status' workers in 2019-2020. Agricultural employment is largely concentrated in rural areas, with only 5.7% of those living in an urban area engaged in the sector.

The trade, hotel and restaurant industry is a significant source of employment in urban areas, accounting for just over a quarter of total employment. The manufacturing sector follows closely behind, with nearly a fifth of all urban workers engaged in the activity.

India's unemployment rate stood at 4.8% in 2019-20, down one percentage point on the previous year.

Composition of India's employment									
Industry Division	Rural (%)			Urban (%)			Rural+Urban (%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	55.4	75.7	61.5	5.0	8.2	5.7	40.0	59.9	45.6
Mining & quarrying	0.3	0.0	0.2	0.5	0.1	0.4	0.4	0.1	0.3
Manufacturing	7.3	7.3	7.3	20.3	22.4	20.8	11.3	10.9	11.2
Electricity, water, etc.	0.5	0.1	0.4	1.4	0.6	1.2	0.8	0.3	0.6
Construction	15.0	5.6	12.2	12.0	4.9	10.3	14.1	5.4	11.6
Trade, hotel & restaurant	9.2	3.7	7.6	28.9	22.3	27.4	15.3	8.0	13.2
Transport, storage & communications	5.4	0.2	3.8	12.1	3.6	10.2	7.4	1.0	5.6
Other services	7.0	7.3	7.1	19.8	37.9	23.9	10.9	14.4	11.9

Source: Periodic Labour Force Survey 2019-20





## Economic and business environment

The Indian Government is publicly committed to an ongoing process of reform in the context of the United Nations' 17 Sustainable Development Goals (SDG's) for 2030 adopted by its 193 Member States in September 2015, and the Addis Ababa Action Agenda that came out of the Third International Conference on Financing for Development in July 2015.

The National Institute for Transforming India (NITI Aayog) is the body charged to monitor, coordinate and ensure implementation of the globally accepted SDG's; bringing the 17 development goals into action across India. It is the premier policy 'Think Tank' of the Government of India which provides both directional and policy inputs, and replaces the Planning Commission instituted in 1950. While designing strategic and long term policies and programmes for the Government of India, NITI Aayog also provides relevant technical advice to the Centre and States to act together in the national interest,

thereby fostering 'Cooperative Federalism'. It is chaired by Prime Minister Narendra Modi. Its ambitious objectives include:

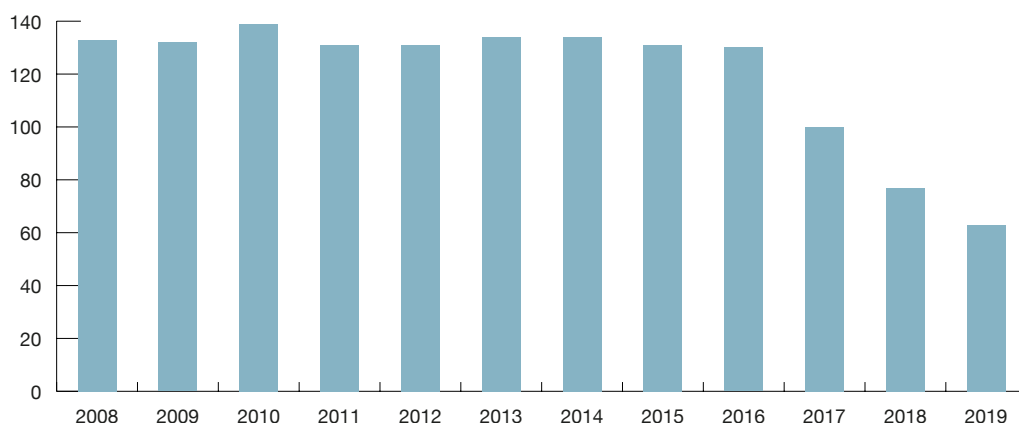
- To evolve a shared vision of national development priorities, sectors and strategies with the active involvement of States.
- To foster cooperative federalism through structured support initiatives and mechanisms with the States on a continuous basis, recognizing that strong States make a strong nation.
- To develop mechanisms to formulate credible plans at the village level and aggregate these progressively at higher levels of government.
- To ensure, on areas that are specifically referred to it, that the interests of national security are incorporated in economic strategy and policy.
- To pay special attention to the sections of our society that may be at risk of not benefiting adequately from economic progress



### THE GLOBAL GOALS For Sustainable Development

The 17 sustainable development goals (SDGs) are political objectives set by the United Nations (UN) with the aim of ensuring sustainable development economically, socially and ecologically. The goals were defined akin to the development process for the millennium development goals (MDGs) and took effect on 1 January 2016 for a period of 15 years (running until 2030). Unlike the MDGs, which were only for developing countries, the SDGs apply to all countries.

World Bank's Ease of Doing Business ranking



Source: World Bank 'Ease of Doing Business 2020'



The World Bank's 'Ease of Doing Business 2020' report presents various indicators that measure, among others, the ease of starting a business, registering a property, obtaining construction permits, getting credit, paying taxes, enforcing contracts and resolving insolvency. Despite the more challenging macroeconomic backdrop noted earlier, India's rank improved from 130 to 100 in 2017 and by 2019, it had risen further to 63. It was recognised for being one of the top 10 improvers amongst the 190 countries that are studied annually. The World Bank noted that, "Given the size of India's economy, these reform efforts are particularly commendable."

The World Bank notes that, "Prime Minister Narendra Modi's "Make in India" campaign focused on attracting foreign investment, boosting the private sector—manufacturing in particular—and enhancing the country's overall competitiveness. The government turned to the Doing Business indicators to show investors India's commitment to reform and to demonstrate tangible progress. In 2015 the government's goal was to join the 50 top economies on the ease of doing business ranking by 2020. The administration's reform efforts targeted all of the areas measured by Doing Business, with a focus on paying taxes, trading across borders, and resolving insolvency. As a result, the country has made a substantial leap upward, raising its ease of doing business ranking from 130 in Doing Business 2016 to 63 in Doing Business 2020."

### Foreign Investment

Invest India is "the advisor, guide and facilitator to every investor looking to make a home in India". The investment promotion agency works with every major country in the world, across

all Indian states and provides a range of services including detailed India entry strategies and research, end-to-end handholding and investment aftercare.

The agency recently published a report on the country's 'rising solar sector', providing insight into the level of investment needed for India to achieve its renewable energy targets. The government of India estimated a need for USD100bn between 2019 and 2022, and USD500bn over the next decade, respectively.

India's FDI equity inflows amounted to USD59,636 million in FY 2020–21, up 19% on the year prior. Approximately half of India's FDI equity inflows were attributed to the US and Singapore, with each country accounting for USD13,823 and USD17,419 million, respectively. In terms of sectors, the computer software and hardware sector was by far and away the largest recipient of FDI in FY 2020–21; the sector attracted a total of USD26,145 million in foreign investment.

### Credit Rating

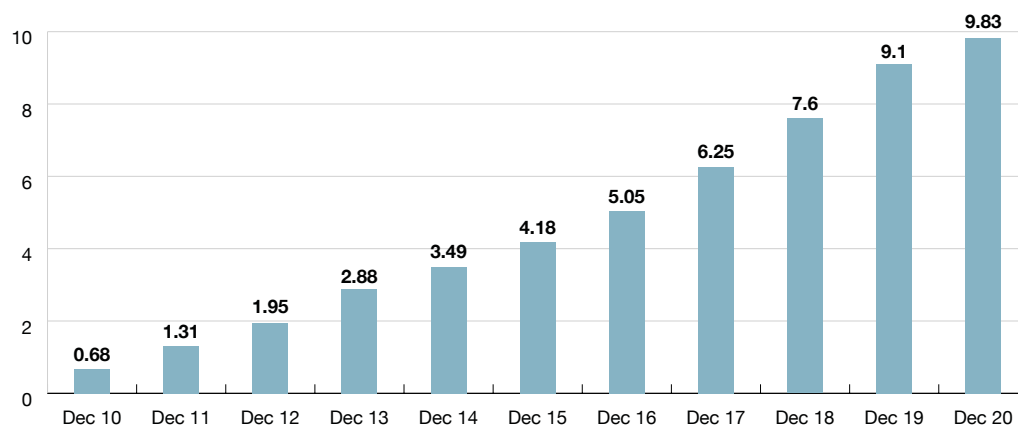
India has received the same credit rating from Standard & Poor's for 13 consecutive years, with the agency reaffirming the country's standing in July 2021. India's credit rating stands at BBB- with a stable outlook. The agency cited their "expectation that India's economy will recover from the resolution of the COVID-19 pandemic" as a reason for the stable outlook. They did, however, acknowledge the potential for a rating downgrade should the economy recover significantly slower than expected from fiscal year 2021/22, or the general government deficits and associated indebtedness materially exceeds its forecasts.



**NITI Aayog**

Its 2020–21 Annual Report noted that, "NITI Aayog plays an integrative role, with the active involvement of States, the civil society, and other think tanks, in the development of a shared vision of national priorities and strategies in critical areas of human and economic development. One of the main objectives of NITI Aayog is to design strategic and long-term policy and programme frameworks and initiatives and monitor their progress and efficacy. In 2020–21, NITI Aayog took the lead in setting up sectoral targets and fostering an environment of innovation and cooperation by bringing together technology, enterprise, and efficient management at the core of policy formulation and implementation.

Cumulative FDI Equity Inflows in the Renewable Energy Sector from April 2000



Source: Department for Promotion of Industry and Internal Trade





## Politics

India is a federal republic with 28 states and eight union territories. It has a parliamentary democracy which operates under the constitution of 1950. There is a bicameral federal parliament: the Rajya Sabha or council of states (Upper House) and the Lok Sabha or house of the people (Lower House).

The Lok Sabha has 545 members, 543 representing the states and union territories and two additional seats reserved for the Anglo-Indian community. Members are elected on a first-past-the-post system in single-member constituencies, every five years or less, based on universal suffrage.

The Rajya Sabha has 245 members, 12 of whom are presidential appointments and 233 are elected indirectly by the assemblies of the states and union territories for a six-year term, with one-third retiring every two years. Legislation may be introduced in either house, but the Lok Sabha has final say in financial matters.

The Prime Minister is elected by the members of the Lok Sabha and appoints and heads the Council of Ministers. The President is elected for five years by an electoral college consisting of members of the federal parliament and state assemblies. India's presidency is largely ceremonial but can play a significant role if, for

example, no party wins an outright majority in national elections.

The last General Election was held between April and May 2019. Voter turnout amongst the 911 million people eligible to vote was the highest ever at 67.11% across 542 constituencies; around 0.7% higher than the 2014 Election which was itself a then-record 66.44%.

The Bharatiya Janata Party (BJP) led by incumbent Prime Minister Narendra Modi won 303 seats by receiving 37.36% of the vote. As it is a 'first past the post' electoral system, seat totals are not determined by the popular vote, but by the result in each constituency. The BJP thereby increased its already substantial parliamentary majority. The National Democratic Alliance (NDA), a grouping of centre-right and right wing political parties led by the BJP increased its total seats in the Lok Sabha to 353 with a combined vote share of 45.43%. The Indian National Congress won just 52 seats, and the Congress-led United Progressive Alliance won 91. Other parties and their respective alliances won 98 seats. Narendra Modi was sworn-in as the 16<sup>th</sup> Prime Minister of India on May 30<sup>th</sup> 2019.



The 2019 Indian parliamentary election – the world's largest ballot. 911 million eligible voters, 611 million votes cast at 113,000 polling stations.

**911,000,000**

Eligible Voters

**611,000,000**

Votes

**113,000**

Polling stations



# Infrastructure

India has traditionally developed significant expertise in engineering and has an extensive government bureaucracy. Combining these two great traditions, much of the country's infrastructure has been undertaken by government-managed construction agencies such as the Central Public Works Department, which was founded back in 1854. Most large-scale building activities – such as the construction of railroads, national and state highways, harbours, hydroelectric and irrigation projects, stadiums, auditoriums and government-owned factories and hotels – have been public sector projects.

India's rail system, entirely government-owned and operated by the Ministry of Railways, has 126,366 kilometres of total track over a 67,956-kilometre route and is the fourth largest network in the world after the US, Russia and China. With a total workforce of 1.254 million people, it is the world's eighth largest employer. Indian Railways runs more than 13,000 passenger trains daily, on both long-distance and suburban routes, from 7,325 stations across the country. Measured by the distance travelled each year by passengers it is the world's second most heavily used system, with 1,051 billion passenger-kilometres travelled per year. India's railway carried 8.086 billion passengers in 2019–20, down 4.2% on the year prior.

In addition to the national rail network, there are 13 rapid transit metro systems in India. The first of these opened in Kolkata in 1984, whilst the newest opened in Nagpur in 2019. The Delhi Metro is the largest in the country. With a total length of 347 kilometres and 229 stations, it is now the world's 11<sup>th</sup> longest metro system and 22<sup>nd</sup> largest by passenger usage although the number of daily passengers has decreased significantly since the emergence of COVID-19, falling 82.5% to approximately 1 million passengers per day. In an attempt to combat both pollution and congestion, the National Capital Region Planning Board (NCRPB) has identified eight Regional Rapid Transit System (RTTS) corridors, connecting various important towns in the NCR with high speed, mass commuter rail-based transit systems. The Delhi-Meerut corridor received government approval in 2019 and is scheduled for completion in 2025.

According to the Ministry of Roads, Transport & Highways, the total road-network is 6,215,797km; the second largest in the world although this total includes many narrow and unpaved roads. The country's road network has increased at a CAGR of 4.2% since 1951. The length of national highways in India increased from 70,934km in 2010–11 to 126,350km in 2017–18. At 1.89 km of roads per square kilometre of land, the quantitative density of India's

 1.3 Mio.

With approximately 1.3 million employees, Indian Railways is one of the largest employers in the world.

## World Economic Forum Global Competitiveness Index for Infrastructure

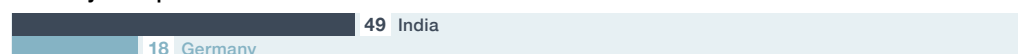
### Reliability of water supply



### Electricity supply quality



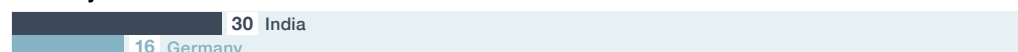
### Efficiency of seaport services



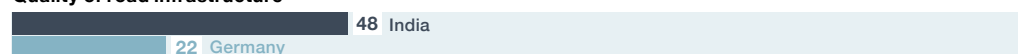
### Efficiency of air transport services



### Efficiency of train services



### Quality of road infrastructure



### Quality of overall infrastructure



Source: World Economic Forum, The Global Competitiveness Report 2019





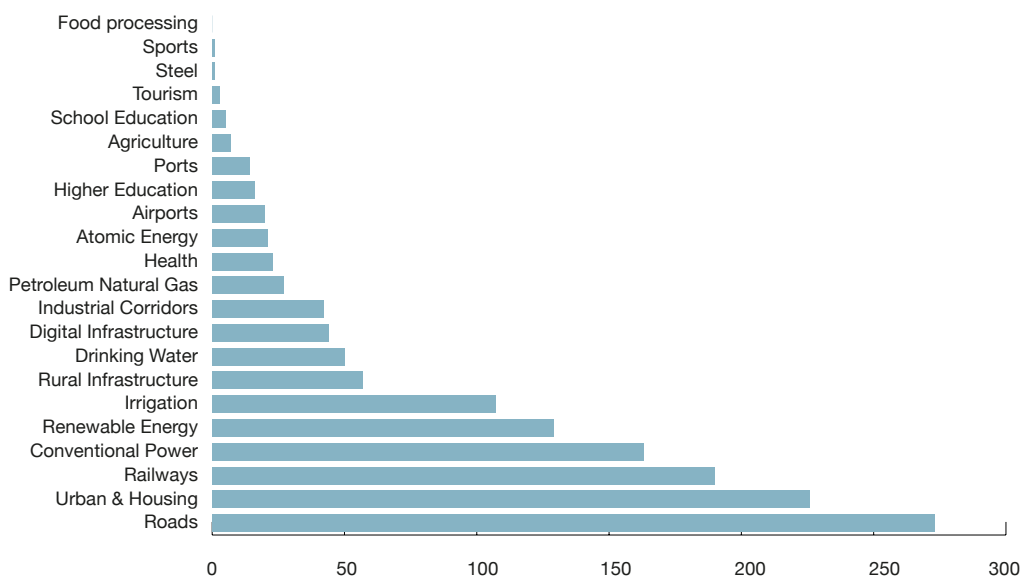
road network is roughly equal to Germany; higher than that of Japan (0.91) and the United States (0.68), and far higher than that of China (0.49), Brazil (0.19) or Russia (0.09).

Civil aviation was nationalised in 1953 into two government-owned companies: Air India for major international routes from airports at New Delhi, Mumbai, Kolkata, and Chennai; and Indian Airlines for routes within India and neighbouring countries. The two companies merged in 2011. As a result of subsequent deregulation, IndiGo, Spicejet, Air India, GoAir and Vistara are now the major carriers in order of their market share. Jet Airways, meantime,

has been grounded since April 2019, following financial difficulties resulting from aggressive price discounting across the sector. India is the third-largest civil aviation market in the world. It recorded air traffic of 341 million passengers in fiscal year 2019–20, of which 275 million were domestic passengers.

India has a coastline of 7,516 kilometres, forming one of the biggest peninsulas in the world. According to the Ministry of Ports, Shipping and Waterways, around 90 per cent of India's trading by volume and 70 per cent by value was done through maritime transport. India has 12 major ports with 200 notified minor and inter-

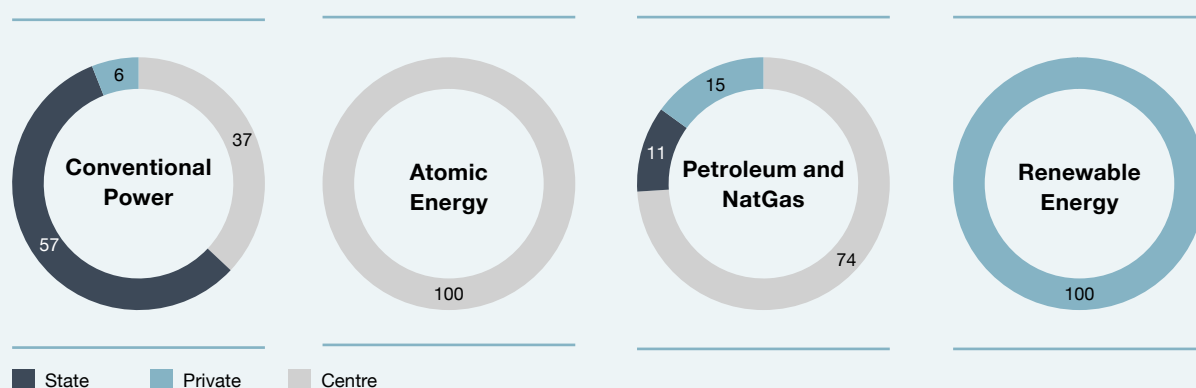
India's National Infrastructure Pipeline (NIP) (USDmn)



Source: Government of India, Ministry of Finance, Department of Economic Affairs



Sources of funding for India's National Infrastructure Pipeline (NIP) (percentages)



Source: Government of India, Ministry of Finance, Department of Economic Affairs

mediate ports. There are also 7 shipyards under the control of the central government of India, 2 shipyards controlled by state governments, and 19 privately owned shipyards.

India also has an extensive network of inland waterways in the form of rivers and canals. The Inland Waterways Authority reports their total navigable length is 14,500km, of which about 5,200km of the rivers and 4,000km of canals can be used by mechanized crafts. Freight transportation by waterways is highly under-utilized in India compared to other large countries and geographic areas like the United States, China and the European Union. The total cargo moved by inland waterways is just 0.1 percent of the total inland traffic in India, compared to 6.7% in the European Union.

The telecommunications sector has traditionally been dominated by the state although the industry underwent a high pace of market liberalisation in the 1990s and has now become one of the world's most competitive and fastest growing telecom markets with some of the lowest call charges available anywhere. As of end-May 2021, the Telecom Regulatory Authority of India reported a total of 1.199bn telephone subscribers, over a billion of whom were wireless customers. The number of broadband internet subscribers in India stood at 780.27 million.

For all its' impressive aggregate metrics, however, India ranks only number 70 of 141 countries for Infrastructure in the World Economic Forum's 2018–19 Global Competitiveness Report. A detailed breakdown shows it ranks 39 for railroads, 49 for ports, 48 for roads and 59 for air transport. Indeed, its overall rank of 70 was down places on the previous year; a period in which its population increased by over 16 million people; almost the entire current population of the Netherlands.

Rapid population growth means the nation must invest heavily merely to stand still. Recognising this reality, Prime Minister Narendra Modi's Independence Day speech in 2019 announced that ₹100 lakh crore would be invested on infrastructure over the next 5 years. In US Dollars, this amounts to investment of 1,390 billion or 278bn per annum. Finance Minister Nirmala Sitharaman at the end of 2019 gave more details of the infrastructure plan.

Roads, urban and housing, railways and power (renewable and conventional) comprise over 70% of the National Infrastructure Pipeline whilst renewable energy, atomic energy and conventional energy comprise 22% of the total NIP investment.

Prime Minister Modi announced the country's intention to invest 100 trillion rupees in infrastructure on the country's 75<sup>th</sup> Independence Day. The plan – called Gati Shakti – targets investment into the country's logistics sector and aims to make "local manufacturers globally competitive".

There is no doubting the political will to embrace technological change and modernise the country's infrastructure, although just as India's impressive bureaucracy has contributed to the country's relative economic and political stability, it can also be a source of frustration and weakness. Contract negotiations can be complex and protracted, and whilst legal agreements are necessary to protect consumers, investors and all relevant stakeholders, the sometimes conflicting priorities of State and National governments can create formidable challenges and delays in execution.

If these difficulties can be overcome or at least mitigated, then the scope for private sector investment – most notably in renewable energy – is enormous.



# Energy market

Figures from the Central Electricity Authority show that total installed power capacity in India as at the end of financial year 2020–21 amounted to just over 382 GW; a figure which has increased almost three-fold since 2007. Within this total, renewable energy capacity excluding large-scale hydropower rose to over 94 GW, with solar accounting for just over 40 GW and wind a further 39 GW. Taken together, solar and wind power now account for 20% of the total installed capacity.

**COAL:** Coal still accounts for more than half of all power capacity in India with 209 GW. The country has the fifth-largest hard coal reserves in the world (roughly 10% of the world total), and the mining sector is dominated by big state-owned companies, of which Coal India Limited (CIL) is the largest, accounting for 80% of India's output. At present, more than 90% of coal in India is produced by open cast mining. This method has relatively low production costs and is less dangerous than deep mining, but has a large, adverse environmental footprint in the form of land degradation, deforestation, erosion and acid water runoff.

According to the International Energy Association, "Among the other problems facing the Indian coal sector is a mismatch between the location of hard coal reserves and mines, which are concentrated in eastern and central India, and the high-demand centres of the northwest, west and south. A tonne of coal must travel on average more than 500 kilometres (km) before

it is converted to electricity, straining the country's rail network."

**HYDROELECTRICITY:** India currently has around 50 GW of installed hydroelectric capacity (of which over 90% is large hydro) which represents a little under a third of the assessed resource. 4.8 GW of small hydro is installed in India, with a further 0.5 GW currently being installed. The MNRE's 2020 year-end review revealed that 13 GW of large-hydro is under installation, although some of these plants have been delayed by technical or environmental problems and public opposition. Hydroelectric power development has lagged well behind thermal generation capacity, leading to a consistent decline in its share of total electricity output. Capacity additions and generation have routinely fallen short of the targets set in successive government programmes, while the objective of bringing in private investors has likewise proved difficult to realise.

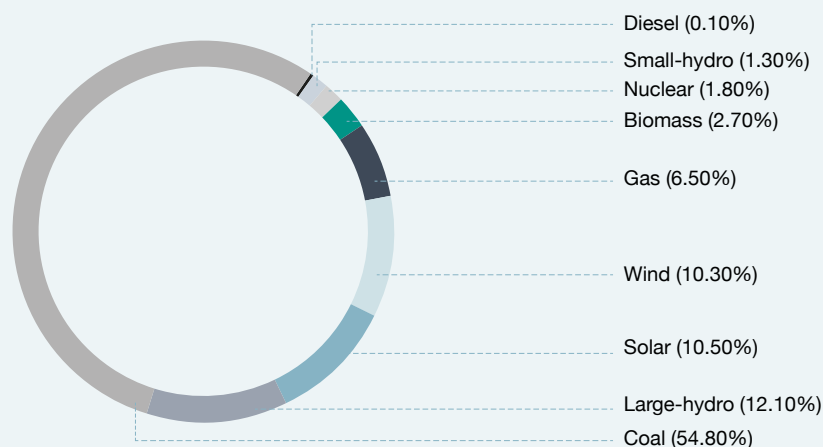
**NUCLEAR:** India has 22 operating nuclear reactors at seven sites, with a total installed capacity close to 7 GW. Another six nuclear power plants are under construction, which will add around 5.5 GW to the total. The current share of nuclear power in the generation mix is relatively small at 2% and is way lower than the vision of the Department of Atomic Energy (DAE), which hoped to produce at least 20 GW of nuclear power by 2020. Nonetheless, India still has ambitious plans to expand its future role, including a long-term plan to develop more

Total installed power capacity										
Installed Capacity as on	Thermal (MW)				Renewable (MW)				Total (MW)	% Growth (on yearly basis)
	Coal	Gas	Diesel	Sub-Total Thermal	Nuclear (MW)	Hydro	Other Renewable	Sub-Total Renewable		
31 March 1990	41,236	2,343	165	43,744	1,565	18,307	-	18,307	63,616	9.89%
31 March 1997	54,154	6,562	294	61,010	2,225	21,658	902	22,560	85,795	4.94%
31 March 2002	62,131	11,163	1,135	74,429	2,720	26,269	1,628	27,897	105,046	4.49%
31 March 2007	71,121	13,692	1,202	86,015	3,900	34,654	7,760	42,414	132,329	5.19%
31 March 2012	112,022	18,381	1,200	131,603	4,780	38,990	24,503	63,493	199,876	9.00%
31 March 2017	192,163	25,329	838	218,330	6,780	44,478	57,260	101,738	326,848	10.31%
31 March 2018	197,171	24,897	838	222,906	6,780	45,293	69,022	114,315	344,001	5.25%
31 March 2019	194,445	24,937	638	220,020	6,780	45,399	77,642	123,041	349,841	1.70%
31 March 2020	205,134	24,955	509	230,598	6,780	45,699	87,027	132,726	370,104	5.79%
31 March 2021	209,295	24,924	510	234,728	6,780	46,209	94,434	140,643	382,151	3.26%

Source: Central Electricity Authority



Installed capacity by source in India as on 31 March 2018



Source: Ministry of New and Renewable Energy

complex reactors that utilise thorium, a potential alternative source of fuel for nuclear reactors and of which India has the world's third largest reserves. At present, there are ten reactors (totalling 8,000 MW) at various stages of construction. In addition, the government has given administrative approval for the construction of ten 700 MW Pressurised Heavy Water Reactors (PHWRs). As a result, India anticipates a total installed nuclear capacity of 22,480 MW by 2031, a 230% increase on current capacity.

**NATURAL GAS:** Natural gas has a relatively small share (7%) of the domestic energy mix totalling around 25 GW. Optimism about the pace of expansion, fuelled by some large discoveries in the early 2000s, has been dashed by lower than expected output from offshore domestic fields and many of these power stations are shut down throughout the year for lack of natural gas supply.

**BIOENERGY:** Bioenergy accounts for around 20% of India's energy consumption, by far the largest share of which is the traditional use of biomass for cooking in households. There was just over 10 GW of power generation capacity fuelled by biomass at the end of FY 2020–21; around 3% of total capacity. The largest share is based on bagasse (a by-product of sugarcane processing) and a smaller share is cogeneration based on other agricultural residues. A Report from the Indian Renewable Energy Development Agency (IREDA) in 2018 suggested the potential for biomass energy in India includes 16 GW from biomass energy and a further 3.5 GW from bagasse cogeneration. The estimated potential of biomass in India has since been revised, following a study sponsored by the Ministry of New and Renewable Energy (MNRE). The study estimated surplus biomass availability at around 230 million metric tonnes per annum,

corresponding to a potential of around 28 GW. Furthermore, the study highlighted a bagasse cogeneration potential of 14 GW. The leading states for biomass power projects are Chhattisgarh, Madhya Pradesh, Gujarat, Rajasthan and Tamil Nadu.

**WIND:** India has the fourth-largest amount of installed wind power capacity in the world. As of March 31<sup>st</sup> 2021, the installed capacity of wind power was 39.2 GW, spread across many states. The largest wind power generating state is Tamil Nadu accounting for nearly 25% of installed capacity, followed in decreasing order by Gujarat, Maharashtra, Karnataka and Rajasthan. Wind power accounts for 10.0% of India's total installed power capacity, and 3.7% of the total power output. India targets installation of 60 GW of wind power capacity by 2022. The government, through the National Institute of Wind Energy, has installed over 800 wind-monitoring stations across India, in order to better select the locations of potential sites. Gujarat was found to be the most 'windy' state in India, with a wind potential of 142.6 GW. Rajasthan, Maharashtra, Tamil Nadu and Madhya Pradesh rounded off the top five, with the total wind potential of India projected at 695.5 GW.

**SOLAR:** The Indian government had an initial target of 20 GW capacity for 2022, which was achieved four years ahead of schedule. In 2015, the target was raised to 100 GW of solar capacity (including 40 GW from rooftop solar) by 2022, and in 2020 the target was further raised to 280 GW by 2030. As of March 2021, the installed capacity of solar electricity was 40.1 GW, around 10% of the country's total and a tenfold increase in the last 6 years alone. The largest solar power installations are in Karnataka, followed by Telangana, Rajasthan, Andhra Pradesh and Tamil Nadu.



In May 2018, the WHO released its study of air pollution in 795 cities across 67 countries. 14 of the top 20 most polluted cities in the world (as measured by fine particulate matter PM<sub>2.5</sub>) are in India.



# Solar energy policy

India is a world leader in renewable energy. Its' success has not been accidental, but a result of determined efforts over a long period of time, well before it became fashionable and without the boom and bust cycles and expensive subsidy-based failures which characterised European efforts.

Way back in 2008, the then Prime Minister of India, Dr. Manmohan Singh launched the National Action Plan on Climate Change. He said, "Our vision is to make India's economic development energy-efficient. Over a period of time, we must pioneer a graduated shift from economic activity based on fossil fuels to one based on non-fossil fuels and from reliance on non-renewable and depleting sources of energy to renewable sources of energy. In this strategy, the sun occupies centre-stage, as it should, being literally the original source of all energy. We will pool our scientific, technical and managerial talents, with sufficient financial resources, to develop solar energy as a source of abundant energy to power our economy and to transform the lives of our people. Our success in this endeavour will change the face

of India. It will also enable India to help change the destinies of people around the world."

In 2008 the National Action Plan on Climate Change was launched, followed in 2010 by the National Solar Mission targeting 20 GW of solar energy by 2022. By 2015 the target was raised to 175 GW of renewables and in 2020 this was further increased to a massive 450GW of renewable energy by 2030. The new target comprises 280 GW of solar and 140 GW from wind, with 30 GW from biomass and small hydro. The MNRE's 2020 year-end review revealed that approximately 49.59 GW of renewable energy capacity (excluding hydro >25 MW) is under installation, with a further 27.41 GW having already been tendered. As a result, the total renewable energy capacity, either already commissioned or in the pipeline, exceeds 160 GW. With the inclusion of large hydro, the country's total renewable energy capacity (installed & pipeline) stands at close to 220 GW.

Political support and visionary leadership have harnessed very favourable geographical and

 **700**  
million

India has been prioritizing access to electricity and clean cooking. Progress in both have been remarkable: 700 million people gained access to electricity since 2000, and 80 million new LPG connections for clean cooking were created. This reduces the use of traditional biomass in cooking, the chief cause of indoor air pollution that particularly affects women and children.

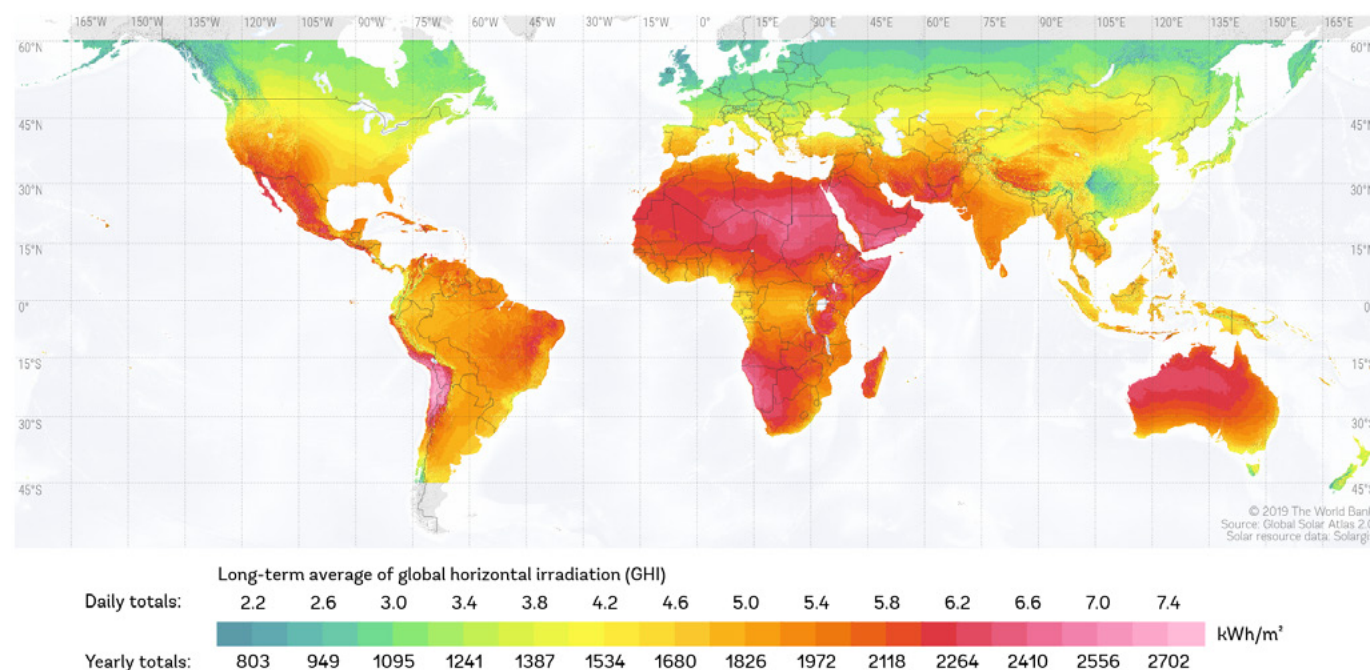
Solar Resource Map – Global Horizontal Irradiation

## SOLAR RESOURCE MAP

### GLOBAL HORIZONTAL IRRADIATION



WORLD BANK GROUP



Source: © 2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis





climatic conditions. Abundant sunshine and huge areas of barren desert land are key to India's future energy strategy and significant work has been done by public and private sector organisations to quantify and map its solar potential. Our preferred analysis is that from SolarGis and their measure of Global-Horizontal radiation which shows clearly and accurately the amount of solar energy that is available at a given time and location anywhere in India and predicts the potential future availability of solar energy in a location based on past conditions. This certainty and stability are vital components of future energy security.

Solar irradiance is the power per unit area received from the sun in the form of electromagnetic radiation. Global Horizontal Irradiance (GHI) at any particular location on earth

fluctuates seasonally according to the angle of the sun and the earth's orbit around it. To make meaningful comparisons across geographies, measurements are often expressed as either the long-term average daily or annual sum of kWh per square metre. The most plentiful solar irradiance in India is found in the Northwest and Central South of the country where the annual total can be as high as 2,000–2,100 kWh/m<sup>2</sup>. To help place this in a European context, Northern and Central Europe average around 850–1,000 kWh/m<sup>2</sup> per annum whilst the comparable measure for Southern Europe is 1,600–1,700kWh/m<sup>2</sup>.

### Paris Agreement on Climate Change

India is a signatory to the Paris Agreement on Climate Change and supports the achievement of the Sustainable Development Goals (SDG's). Its' Nationally Determined Contribution (NDC) under the Paris Agreement includes commitments:

- to reduce the emissions intensity of its GDP by 33–35% from 2005 levels by 2030.
- to achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
- to create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.
- to better adapt to climate change by enhancing investments in development programmes



### Climate protection gathering pace

- In 2017, Transport Minister Nitin Gadkari shocked the automobile industry (and the world) when he announced that he intended for India to move to 100% electric cars by 2030. The target has subsequently been reduced to 30%.
- The government has now decided to focus on the segment below cars: two-wheelers, where sales are much higher, and three-wheelers (largely auto-rickshaws).
- The new proposal is to have only electric three-wheelers operating in the country by 2023, and only electric two-wheelers by 2025.
- As part of the commitment made at the Paris Climate Conference in December 2015, India agreed to spend USD6 billion to reforest 12% of its land; bringing total forest cover to 235 million acres by 2030, or about 29 percent of the country's territory.

Growth of utilities' installed solar capacity

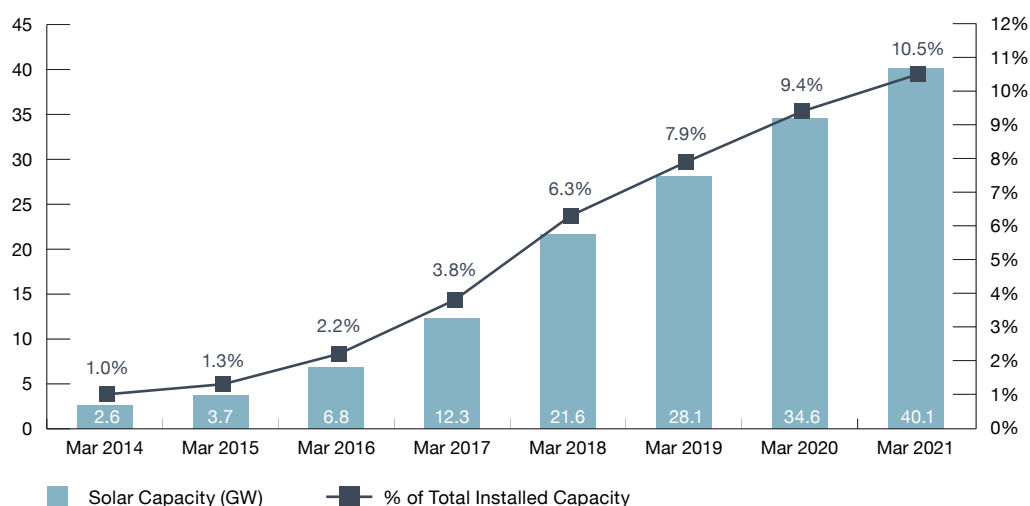
Year	Installed capacity (MW)	Annual growth (MW)	Annual growth (%)
2010	161	N/A	N/A
2011	461	300	186.34
2012	1,206	745	161.61
2013	2,319	1,113	92.29
2014	2,632	313	13.50
2015	3,744	1,112	42.25
2016	6,763	3,019	80.64
2017	12,289	5,526	81.71
2018	21,651	9,362	76.18
2019	28,180	6,529	30.16
2020	34,627	6,447	22.88
2021	40,085	5,458	15.76

Source: Ministry of New and Renewable Energy





Utilities' installed solar capacity and market share



Source: Ministry of New and Renewable Energy

in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.

India's immediate NDC challenge is to achieve 40 per cent installed capacity of power from non-fossil fuels by 2030. The current 46.2 GW of large-scale hydroelectricity plus the 94.4 GW of renewable energy capacity already installed gives a total RE capacity of 140.6 GW; around 37% of the country's overall capacity. At recent rates of expansion, installation and new bidding in the solar sector, the NDC target is at least within reach.

India has a proven track record of success in solar energy. It is a now well-established and highly regarded investment destination with significant positive momentum. The future opportunities are as large as its ambition, driven by the twin dynamics of technological and demographic change. Investment in solar energy in India remains a compelling proposition.



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Memberships and  
voluntary commitments

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