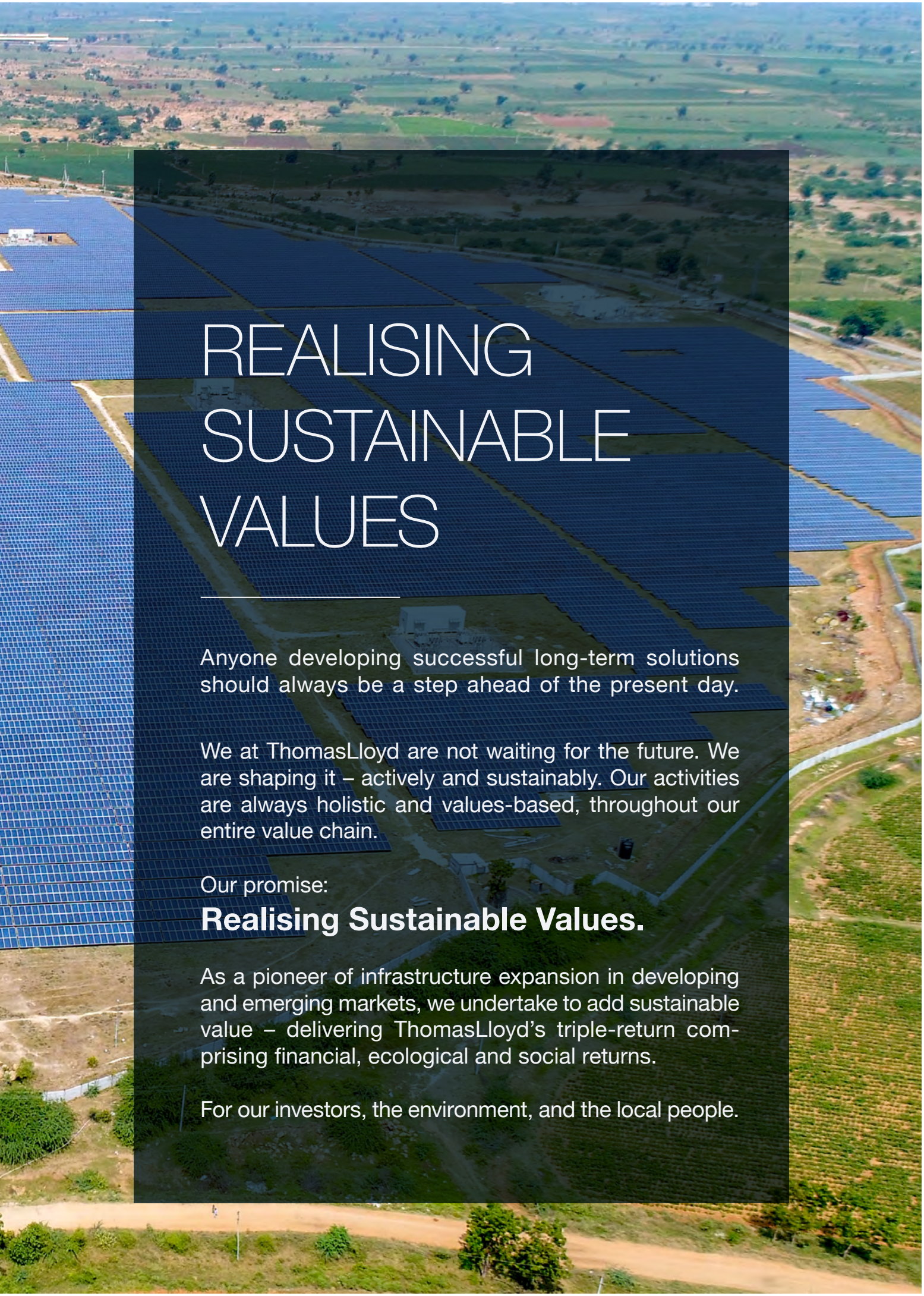
ThomasLloyd

Impact Report | 2019

INDIA

Solar Plant Telangana



REALISING SUSTAINABLE VALUES

Anyone developing successful long-term solutions should always be a step ahead of the present day.

We at ThomasLloyd are not waiting for the future. We are shaping it – actively and sustainably. Our activities are always holistic and values-based, throughout our entire value chain.

Our promise:

Realising Sustainable Values.

As a pioneer of infrastructure expansion in developing and emerging markets, we undertake to add sustainable value – delivering ThomasLloyd's triple-return comprising financial, ecological and social returns.

For our investors, the environment, and the local people.


BARDARMARKET – CIRDIKOT

Foreword

We are delighted to present this Impact Report. It describes the social, economic and ecological impact of the investments we make in renewable energy on the Indian subcontinent.

ThomasLloyd has been a pioneer in this field. We raise money directly from investors, co-partner with international development agencies such as the World Bank's International Finance Corporation and work alongside national and regional governments in Asia to advance sustainable social development through direct investment in physical infrastructure.

ThomasLloyd finances, creates and develops real assets, playing a crucial role in shaping the physical and social environment of the region. Unlike traditional institutional or retail investment managers who continue to invest in a global universe of stocks and bonds – screened nowadays for negative externalities and painted a fashionable shade of green – we fund and develop large-scale greenfield infrastructure projects; involved as principal or advisor in all stages of the capital structure and offering our investors the widest possible range of investment horizons, risk-return profiles and currency denominations.

But this Impact Report is not about the return on capital, nor indeed the return of capital. We have an established and fully-audited track record of market-driven returns which our investments have delivered and we are rightly proud of our financial performance. We deliver the investment returns expected and demanded of us.

This report is something totally different: As with our 2018 Impact report on the Philippines, it is an ambitious attempt to quantify the socio-economic impact of our investments in renewable energy. Just as ThomasLloyd has been a pioneer investor, so too are these pioneering reports as there are no templates for their creation. No off–the-shelf document where we simply fill in the blank spaces and no spreadsheet where we just enter numbers and tick boxes. In terms of its concept and execution, the work here is innovative and sets high standards in a new field of research and reporting.

After first entering the Indian market in Autumn 2018, ThomasLloyd has demonstrated its commitment to the economic, social and ecological welfare of a country which has ambitious goals for the development and transformation of its energy supply. We have a wide range of proprietary data on employment, salaries and associated spending and we can account for almost every dollar, cent or rupee of project expenditure from before the first shovel hit the ground to the day our renewable energy plants were connected to the grid and provided energy to power the country.

Our position as owner and trusted partner gives us a unique insight. We have always known that our investment would make a real difference to the quality of life through employment and clean energy. For the first time here, we are able to evidence and quantify it.

NICK PARSONS
Head of Research and ESG

Introduction

The ThomasLloyd Group ("TLG") is a global investment and advisory firm, solely dedicated to the infrastructure sector in Asia. TLG finances, creates and develops real assets, playing a crucial role in shaping the physical and social environment of the region. Unlike traditional institutional or retail investment managers who continue to invest in a global universe of stocks and bonds – screened nowadays for negative externalities and painted a fashionable shade of green – we fund and develop large-scale greenfield infrastructure projects; involved as principal or advisor in all stages of the capital structure and offering our investors the widest possible range of investment horizons, risk-return profiles and currency denominations.

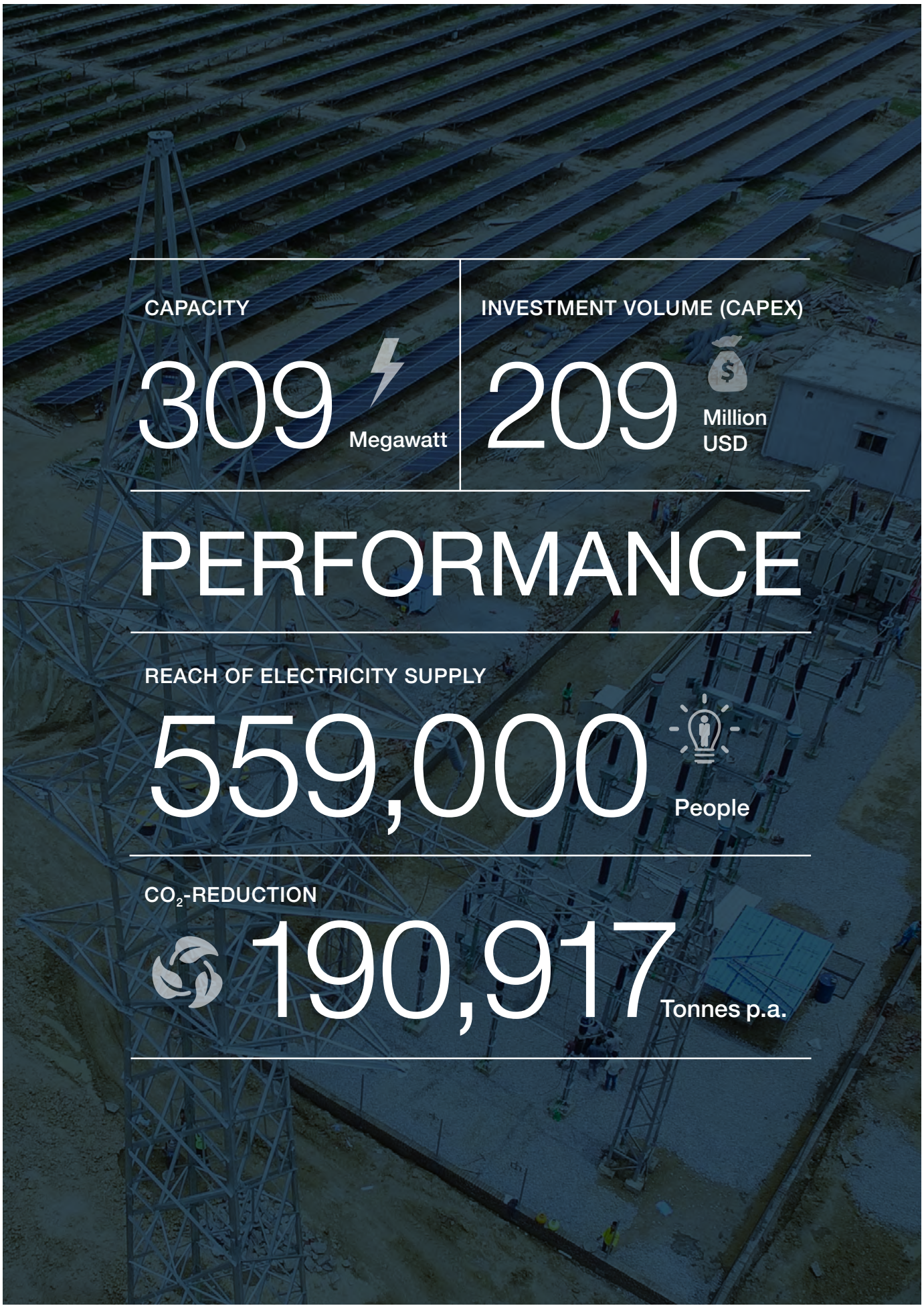
ThomasLloyd's local development partner in India is the Delhi-based SolarArise India Projects Pvt Ltd. The Company – hereafter referred to as SolarArise – currently owns and operates approximately 160 MW of grid-connected solar power projects at five sites in India: Telangana I and II, Maharashtra I and Karnataka I and II. ThomasLloyd first invested in SolarArise in December 2018, and is now the largest shareholder in the Company.

This report analyses the direct and indirect impacts of the renewable energy projects, and how they have helped contribute to job creation, environmental protection, CO_2 reduction and the achievement of the United Nations seventeen Sustainable Development Goals (SGD's). It examines the substantial progress which India has made in reducing its dependency on fossil fuels and how the challenges of rapid demographic change and urbanisation are driving the government's ambitious targets for grid-connected solar power.

The right kind of economic growth – building safe and secure communities, enhancing human capital, growing businesses whilst preserving traditional values – requires the right kind of energy: renewable, sustainable and local. TLG is proud to contribute to India's development model and its continued transformation to a clean energy future.

MORE INFORMATION

Infrastructure. Indispensable. Sustainable. Profitable.



CAPACITY

309 Megawatt

INVESTMENT VOLUME (CAPEX)

209 Million USD

PERFORMANCE

REACH OF ELECTRICITY SUPPLY

559,000 People

CO_2-REDUCTION

190,917 Tonnes p.a.

INDIA

20° 35‘ 37.262“ N 78° 57‘ 46.368“ E

Source: www.nasa.gov/multimedia/imagegallery/index.html

Geography

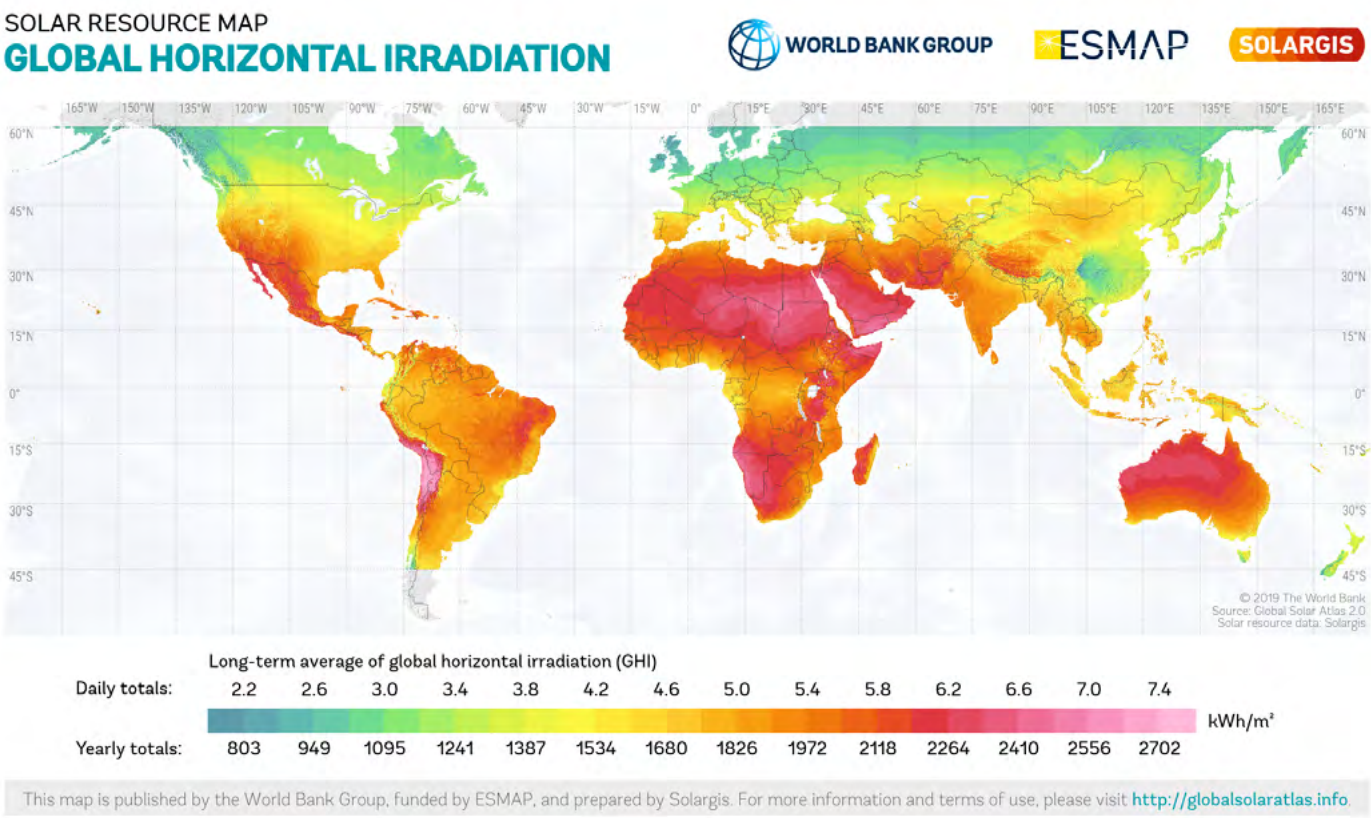
India is the 7th largest country in the world, with a total land area of 3,287,263km^2. Together with Bangladesh, Nepal, Bhutan, and most of Pakistan, it forms a well-defined subcontinent, separated from the rest of Asia to the north by the mountains of the Himalayas and by adjoining mountain ranges 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 alpine climate is cooler, 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. 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 monsoon rains, and the country can be prone to prolonged and sometimes deadly heatwaves.

As we outline in more detail later, 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 Resource Map – Global Horizontal Irradiation



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

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^2.

To help place this in a European context, Northern and Central Europe average around 850-1,000 kWh/m^2 per annum whilst the comparable measure for Southern Europe is 1,600-1,700 kWh/m^2.

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 almost 300m over the next 25 years and in 2028 it will overtake China to become the world's most populous nation.

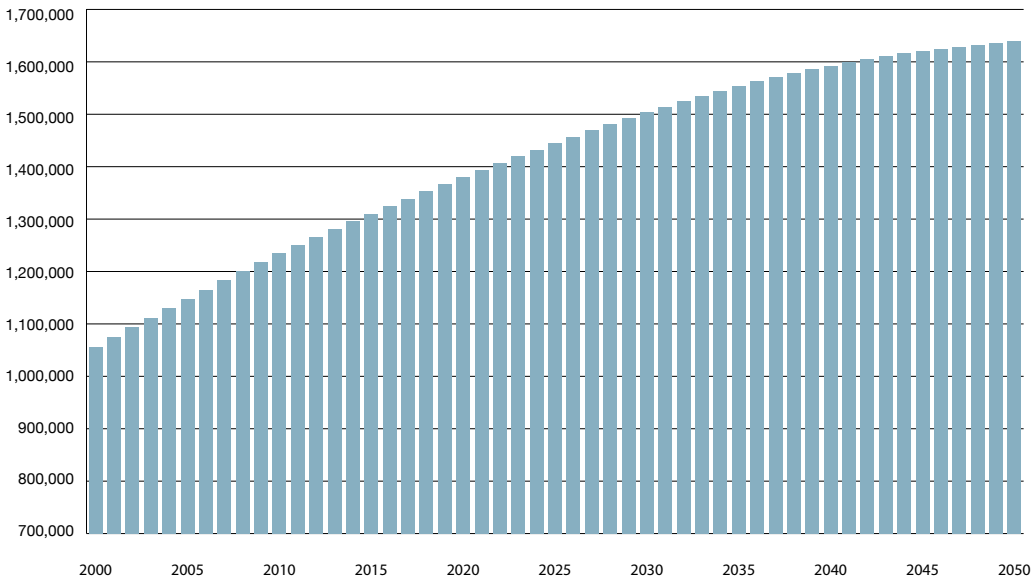
The country also has many smaller but still very populated cities, including 397 with between 100,000 and 1 million people, and 2,483 cities with populations between 10,000 and 100,000. The overall urban population rate is around 32.7 % whilst just over 67% are in rural areas. This is down from 82 %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

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.

INTERESTING TO KNOW

Each day the population increases by 37,000 and every week by enough to fill the Stade de France or the Allianz Stadium more than three times over. Approximately 1 in every 6 people on earth lives in India.

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



Source: United Nations Population Division

India

a federal republic with **29 States** and **8 Union Territories**

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

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

Kolkata

Population (millions)

2011 14.11

2019 **15.32**

2050 33.04

The largest of the states

Rajasthan

342,238 km²

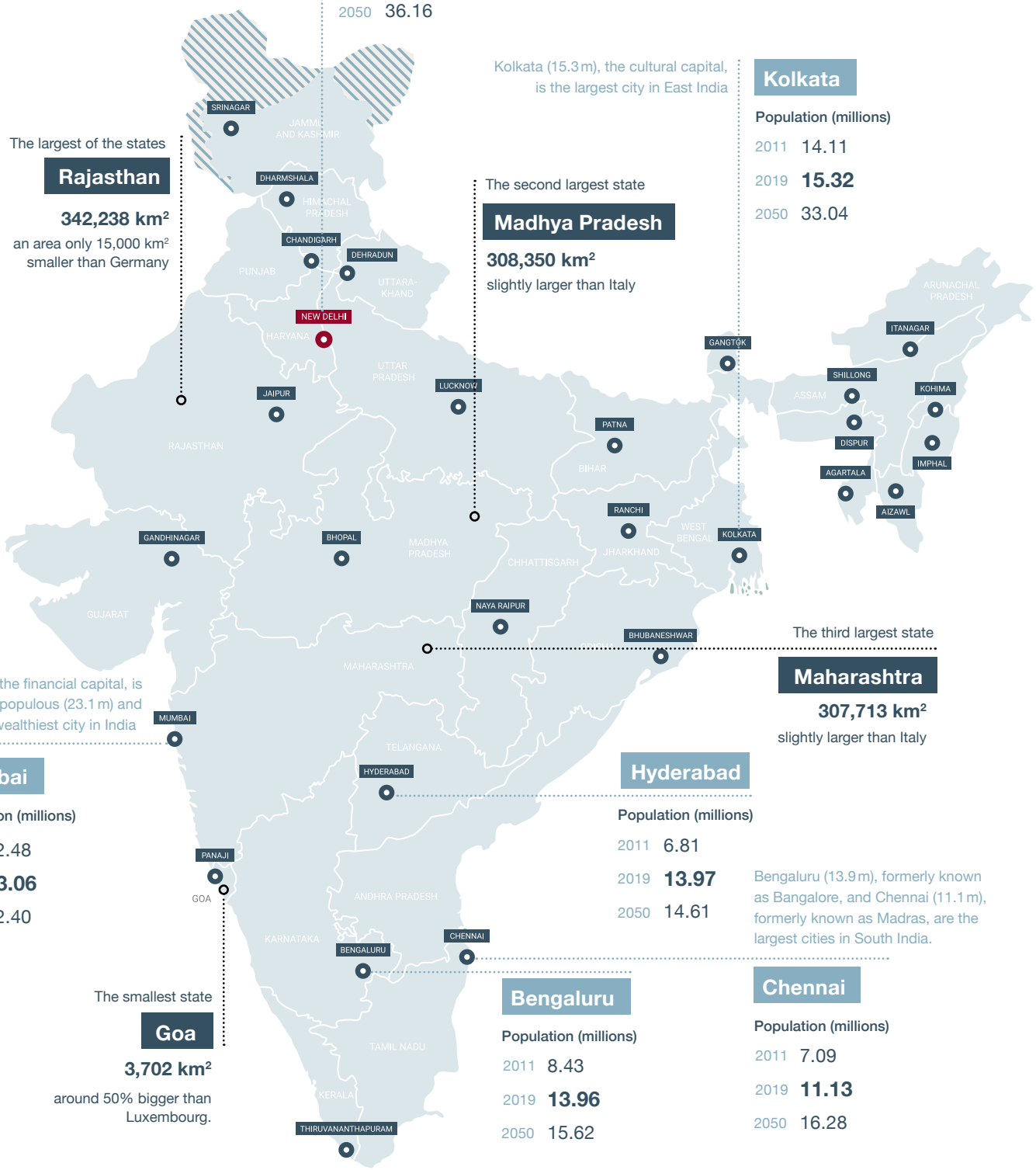
an area only 15,000 km² smaller than Germany

The second largest state

Madhya Pradesh

308,350 km²

slightly larger than Italy



The third largest state

Maharashtra

307,713 km²

slightly larger than Italy

Mumbai, the financial capital, is the most populous (23.1 m) 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 (13.9 m), formerly known as Bangalore, and Chennai (11.1 m), formerly known as Madras, are the largest cities in South India.

The smallest state

Goa

3,702 km²

around 50% bigger than Luxembourg.

Bengaluru

Population (millions)

2011 8.43

2019 **13.96**

2050 15.62

Chennai

Population (millions)

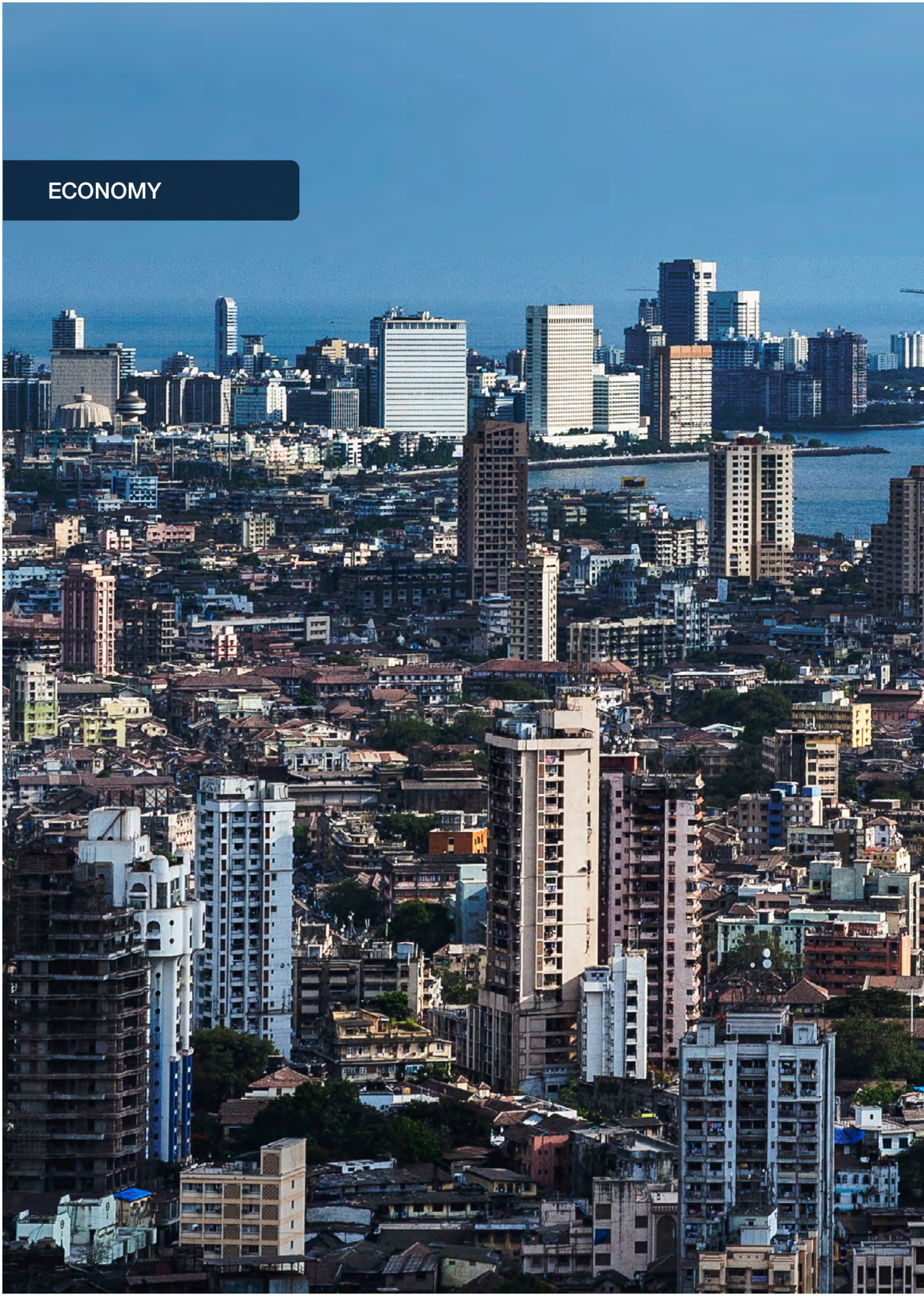
2011 7.09

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

ECONOMY



Indian Economy

At the start of this millennium, India's annual GDP stood at just $466,841 m; less than one-third the size of the French economy whose GDP was $1,502,245 m and the United Kingdom with $1,652,539 m. Its economy was barely one-fifth the size of Germany which was then the world's 3rd largest with a GDP of $2,202,845 m. 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 13th 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. Since 2010, Indian GDP has nonetheless expanded at an average annual pace of 6.9 % and its growth compares very well against other countries in Asia, in second place only to China. Indeed, India is just one of a group of Asian countries shown in the table below which have not had a single year of falling GDP since 2010.

INTERESTING TO KNOW

The Indian film industry is the largest in the world in terms of number of films produced. India produces 1,500-2,000 films every year in more than 20 languages. It is forecast to grow at 11.5% year-on-year, after expected total gross revenues of USD 3.7 billion by 2020.

Economic growth in selected Asian countries (annual % change)

	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Asia 30-country total	**7.9**	**7.0**	**6.9**	**6.8**	**6.8**	**6.7**	**6.6**	**6.4**	**5.9**	**6.0**	**6.3**	**6.2**	**6.1**	**6.1**
China	9.5	7.9	7.8	7.3	6.9	6.7	6.8	6.6	6.1	5.8	6.0	5.8	5.6	5.5
India	6.6	5.5	6.4	7.4	8.0	8.2	7.2	6.8	6.1	7.0	7.7	7.7	7.7	7.7
Indonesia	6.2	6.0	5.6	5.0	4.9	5.0	5.1	5.2	5.0	5.1	5.2	5.3	5.3	5.3
Thailand	0.8	7.2	2.7	1.0	3.1	3.4	4.0	4.1	2.9	3.0	3.5	3.5	3.6	3.6
Philippines	3.7	6.7	7.1	6.1	6.1	6.9	6.7	6.2	5.7	6.2	6.7	6.7	6.8	6.8
Malaysia	5.3	5.5	4.7	6.0	5.1	4.2	5.9	4.7	4.5	4.4	4.8	4.8	4.8	4.8
Pakistan	3.6	3.8	3.7	4.1	4.1	4.6	5.2	5.5	3.3	2.4	2.8	2.7	2.6	2.5
Bangladesh	6.5	6.3	6.0	6.3	6.8	7.2	7.6	7.9	7.8	7.4	7.0	7.0	7.0	7.0
Vietnam	6.2	5.2	5.4	6.0	6.7	6.2	6.8	7.1	6.5	6.5	6.5	6.5	6.5	6.5
Sri Lanka	8.4	9.1	3.4	5.0	5.0	4.5	3.3	3.2	2.7	3.5	4.3	4.5	4.6	4.8

Source: IMF World Economic Outlook October 2019

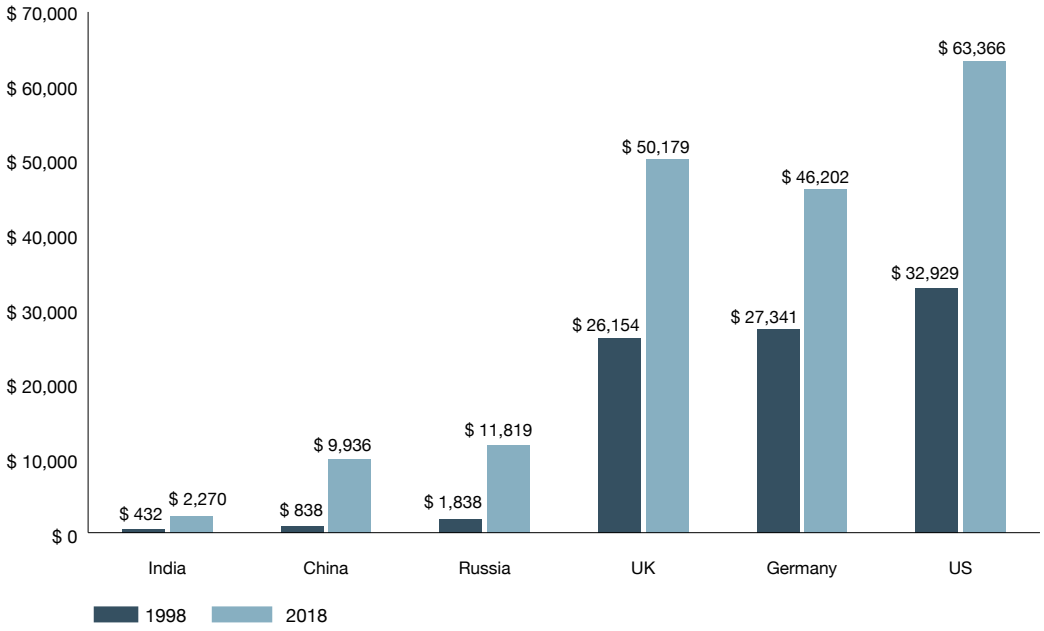
Most recently, the Indian economy has slowed quite sharply from its heady average pace of expansion of the past five years (7.2 %). In its comprehensive set of global economic forecasts released in October 2019, the International Monetary Fund forecast growth for that year of 6.1 %, with a rebound to 7.0 % in 2020 and 7.7 % for each of the following four years out to 2024. In a January 2020 update to these forecasts, the IMF revised its India projections to 4.8% in 2019 and 5.8% in 2020, noting a slowing in domestic demand amid stress in the non-bank financial sector and a decline in credit growth. The good news, notwithstanding the recent slowdown, is that the IMF sees a return to growth rates nearer 8 % in the final years of its forecast horizon. This leaves it at the top of the region's growth table for the next five years, swapping places with Bangladesh whose growth is expected to slip slightly from 7.5 % per annum in the last five years to 7.1 % in the next five.

Detailed breakdown of GDP forecast (annual % change)

	2016	2017	2018	2019	2020	2021
GDP at market prices	8.2	7.2	6.8	6.0	6.9	7.2
Private Consumption	8.2	7.4	8.1	5.0	6.5	8.0
Government consumption	5.8	15.0	9.2	8.6	9.5	7.2
Gross fixed investment	8.3	9.3	10.0	8.5	8.2	8.5
Exports of goods & services	5.1	4.7	12.5	6.0	6.1	6.3
Imports of goods & services	4.4	17.6	15.4	5.9	8.1	8.9
Consumer Price inflation	4.5	3.6	3.4	3.5	4.0	4.0
Government deficit (% of GDP)	6.9	5.7	5.9	6.0	5.8	5.6
Current account deficit (% of GDP)	0.6	1.8	2.1	2.0	2.0	2.3

Source: World Bank India Update October 2019

GDP per Capita ($)



Source: International Monetary Fund

In the space of less than 20 years, India has overtaken Mexico, Spain, South Korea, Brazil, Canada, Italy, France and the United Kingdom to become the fifth largest economy in the world after Germany. Due to its enormous and rapidly growing population, however, the per capita GDP numbers are much less impressive. For sure, average annual incomes per head have risen more than five-fold over the period from $432 to $2,270 but this is less than a quarter of China's average and only one-twentieth of the comparable G7 number.

Economic ranking by state

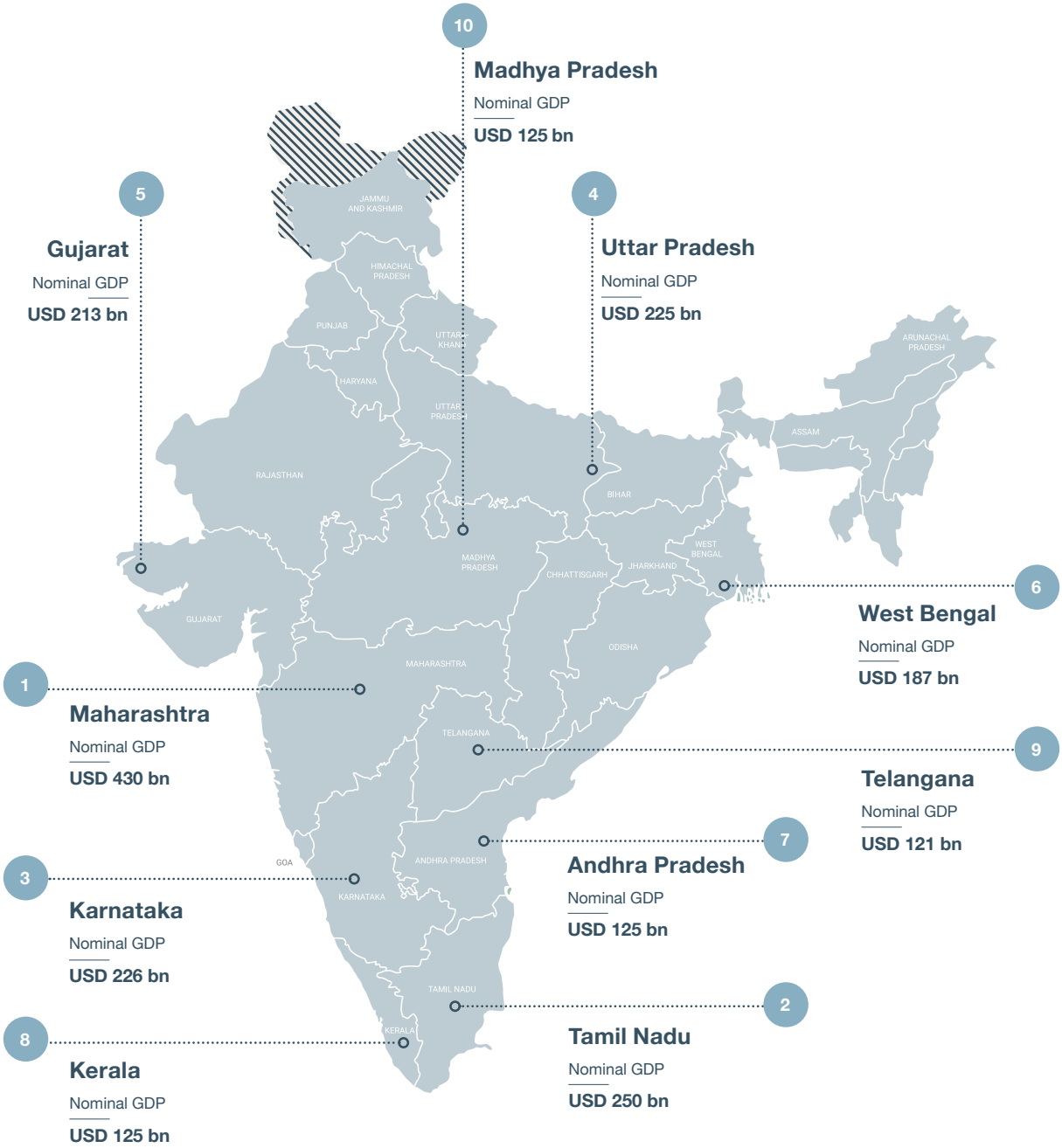
Just as India's states vary by area and population, so too there is a great variance in GDP. Maharashtra leads the way with USD 430 bn; around 70 % higher than second place Tamil Nadu's USD 250 bn, with Karnataka in third place at USD 226 bn.

On a per capita basis, the table is skewed significantly by population size, with Goa enjoying the highest net state domestic product per head. The Union Territories of Delhi, Chandigarh and Puducherry take three of the top 5 places whilst no state or Union Territory below 4th place on the list has a per capita GDP of more than USD 3,000.

INTERESTING TO KNOW

India's printed media industry with about 55,000 newspapers and magazines and a total circulation of over 140 million copies is one of the largest in the world.

Nominal and per capita GDP by State



Source: India Ministry of Statistics and Programme Implementation

Infrastructure

India has traditionally had significant expertise in engineering and a feature of both its colonial past and post-independence development has been its extensive government bureaucracy. 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 traditionally been public sector projects, though in recent years the use of Public Private Partnerships (PPP's) has become more widespread.

The Indian Government recognises several types of PPP: the so-called Build-Operate-Transfer (BOT) model in which it engages a private sector entity to design and build infrastructure and to operate and maintain these facilities for a certain period, a BOOT contract where the private sector retains Ownership of the asset, and Management & Maintenance contracts for infrastructure projects. The Department of Economic Affairs currently lists no less than 1,824 PPP projects in its public database, albeit their track record is somewhat mixed; whilst many road projects have done well, many power projects have not.

India's rail system, entirely government-owned and operated by the Ministry of Railways, has 121,407 kilometres of total track over a 67,368-kilometre route and is the fourth largest network in the world. Indian Railways runs more than 13,000 passenger trains daily, on both long-distance and suburban routes, from 7,349 stations across the country. Measured by the distance travelled each year by passengers it is the world's most heavily used system. In 1989, South Asia's first subway line began operation in Kolkata. Delhi followed with a new system which opened in 2002. With a total length of 277 kilometres and 202 stations, it is now the world's 11th longest metro system and 16th largest by passenger usage.

According to the Ministry of Roads, Transport & Highways, the total road-network is

INTERESTING TO KNOW

11 million journeys are made every day on India's railways.

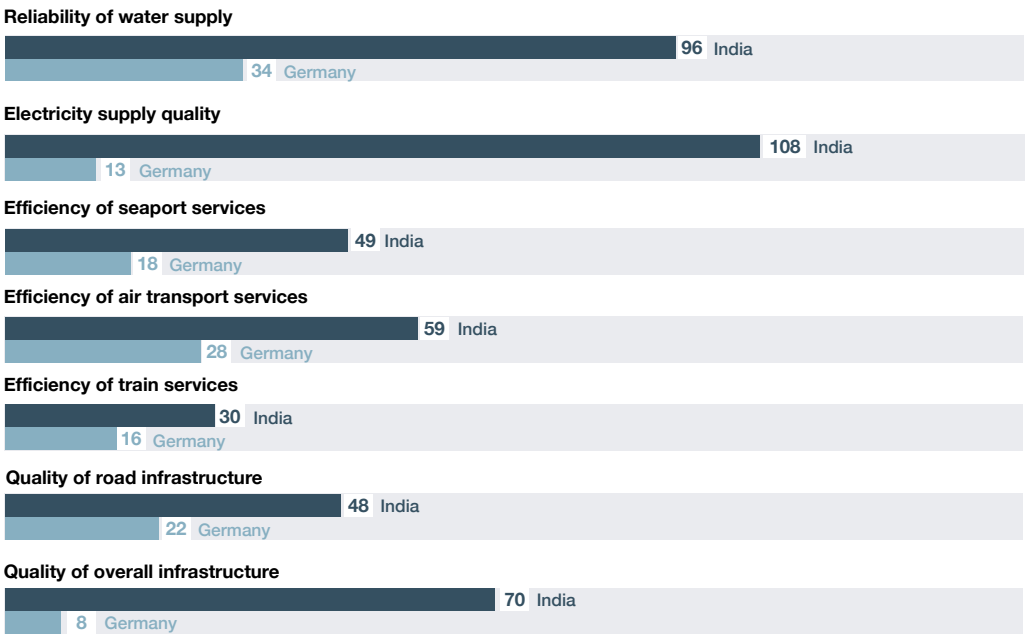
5,603,293 km; the second largest in the world although this total includes many narrow and unpaved roads. As of May 2017, India had completed and placed in use over 28,900 kilometres of recently built 4 or 6-lane highways connecting many of its major manufacturing centres, commercial and cultural centres. The length of national highways in India increased from 70,934km in 2010-11 to 101,011km in 2016. At 1.70 km of roads per square kilometre of land, the quantitative density of India's road network is higher than that of Japan (0.91) and the United States (0.67), and far higher than that of China (0.46), Brazil (0.18) or Russia (0.08).

India has a coastline of 7,516 kilometres, forming one of the biggest peninsulas in the world. According to the Ministry of Shipping, around 95 per cent of India's trading by volume and 70 per cent by value is done through maritime transport. It is serviced by 12 major ports with 200 notified minor and intermediate 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. Their total navigable length is 14,500 km, of which about 5,200 km of the rivers and 4,000 km 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.

Whilst spending has seen rapid growth over the past 10-20 years, much of the existing infrastructure is of poor quality and needs substantial further investment merely to keep up with the rapid pace of demographic change. Almost one-third of the country's villages remain cut off during the monsoon season; a problem which is more acute in India's northern and north-eastern states which are poorly linked to the country's major economic centres.

World Economic Forum Global Competitiveness Index for Infrastructure



Source: World Economic Forum, The Global Competitiveness Report 2019

India ranks number 70 of 141 countries for Infrastructure in the World Economic Forum's 2019 Global Competitiveness Report. A detailed breakdown shows it ranks 59 for railroads, 49 for ports, 48 for roads and 59 for air transport. Whilst installed electricity supply capacity – as we show on the next few pages – has increased substantially, the quality as measured by percentage of output actually delivered to final consumers leaves India ranked at only 108 globally.

ThomasLloyd Delegation, India 2020

Current Electricity Provision

Figures from the Central Electricity Authority show that total installed power capacity in India as at the end of financial year 2018-19 amounted to 350,000 MW; a figure which has increased almost four-fold since 2000. Subsequent monthly data from the CEA to end-December 2019 show a 10,000 MW addition in coal capacity and a 7,000 MW increase in renewables; of which – as we show later – some 4,347 MW came from solar.

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	**220,019**	6,780	45,399	77,642	123,041	**349,840**	1.70%

Source: Central Electricity Authority

COAL: Coal and fossil fuels still account for almost two-thirds of all electricity supplied in India with 220 GW. The country has the third-largest hard coal reserves in the world (roughly 12% 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 45 GW of installed hydroelectric capacity (of which over 90% is large hydro) which represents a little under a third of the assessed resource. A further 14 GW are under construction, 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 21 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 4 GW to the total. Though the current share of nuclear power in the generation mix is relatively small at 3%, India has ambitious plans to expand its future role,

INTERESTING TO KNOW

In 2019, there were almost 374 million smartphones registered in India, about 39 percent of all mobile users. By 2022, the number of users is expected to hit 442 million.

including a long-term plan to develop more complex reactors that utilise thorium – a potential alternative source of fuel for nuclear reactors.

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 roughly a quarter of India's energy consumption, by far the largest share of which is the traditional use of biomass for cooking in households. There was around 9.3 GW of power generation capacity fuelled by biomass as of 31st March 2019, the largest share is based on bagasse (a by-product of sugarcane processing) and a smaller share is cogeneration based on other agricultural residues.

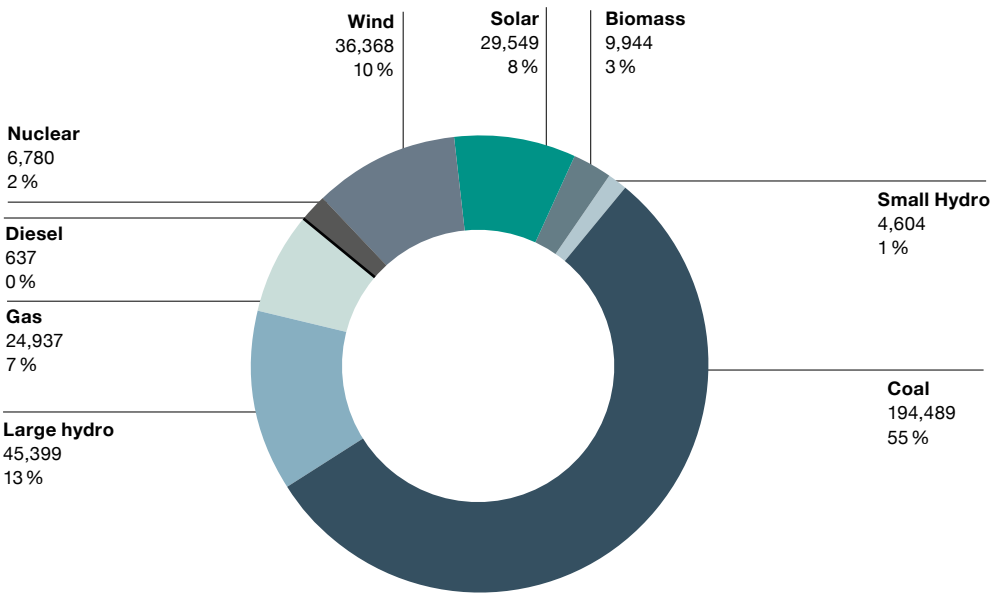
WIND: India has the fifth-largest amount of installed wind power capacity in the world. At the end of Q1 2019, the installed capacity of wind power was 35.63 GW; a 1.6GW increase over the past 12 months. The largest wind power generating state is Tamil Nadu accounting for nearly 23% of installed capacity, followed in decreasing order by Gujarat, Maharashtra, Rajasthan and Karnataka. Wind power accounts for 10.1% 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.

SOLAR: As of 31 March 2019, the installed capacity of solar electricity was 28.18 GW; a substantial increase of more than 30% over the previous 12 month's figure of 21.65 GW and which took solar's share of total installed capacity to just over 8%. December 2019's figures from the CEA show a further 4,347 MW was installed over the subsequent nine months; a somewhat slower but still very creditable annualised pace of growth of 20%.

INTERESTING TO KNOW

According to a study by the World Health Organization (WHO), 14 of the 20 most polluted cities in the world are in India.

Total installed generating capacity by source (% as at mid-2019)



Source: Government of India, Ministry of Power, Central Electricity Authority, Growth of Electricity sector in India from 1947-2019

Total installed generating capacity was 352.7 GW in mid-2019, of which renewables comprised 22.8% with wind 36.3 GW, solar 29.5 GW, biomass 9.9 GW and small hydro 4.6 GW.

Solar Energy Policy

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."

Evolution of Targets

India's strong emphasis on solar development was demonstrated in 2010 with the launch of the Jawaharlal Nehru National Solar Mission which targeted 20 GW of solar energy by 2022.

The NSM clearly stated that, "From an energy security perspective, solar is the most secure of all sources, since it is abundantly available. Theoretically, a small fraction of the total incident solar energy (if captured effectively) can meet the entire country's power requirements… India is endowed with vast solar energy potential. About 5,000 trillion kWh per year energy is incident over India's land area with most parts receiving 4-7 kWh per square metre per day. Hence both technology routes for conversion of solar radiation into heat and electricity, namely, solar thermal and solar photovoltaics, can effectively be harnessed providing huge scalability for solar in India. Solar also provides the ability to generate power on a distributed basis and enables rapid capacity addition with short lead times".

As the second decade of the new millennium progressed, and the world economy continued its recovery from the shock of the Global Financial Crisis, it was increasingly clear that India's inexorable demographic explosion and urbanisation would require substantial new investment in electricity generation. The new power, if delivered through traditional fossil-fuel sources, would have a significant double-negative impact on India; contributing to a significant worsening of already-poor air quality and environmental degradation, whilst increasing dependence on imported oil and worsening the external balance of payments position.

In the Union Budget of 2015-16, the Narendra Modi government therefore dramatically upgraded its renewable energy targets. It set out plans to install 175 GW of renewable energy capacity by 2022, of which 100 GW would be solar capacity: 40 GW of rooftop solar photovoltaics (PV) and 60 GW of large and medium-scale grid-connected PV plants.

Solar targets in 2015-16 Union Budget

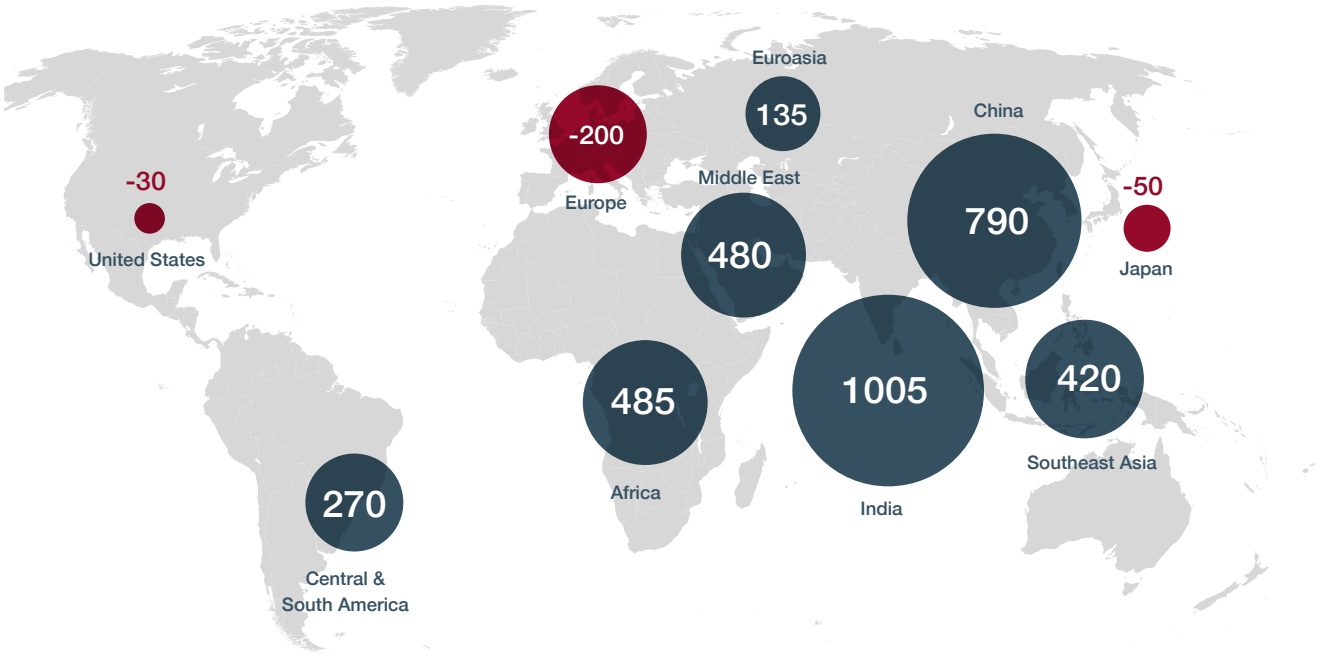
Year-wise Targets (in MW)

	Actual	Targets						
Category	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Rooftop Solar	0	200	4,800	5,000	6,000	7,000	8,000	9,000	**40,000**
Ground Mounted Solar Projects	3,700	1,800	7,200	10,000	10,000	10,000	9,500	8,500	**60,700**
Total	3,700	2,000	12,000	15,000	16,000	17,000	17,500	17,500	**100,700**

Source: Government of India, Union Budget 2015-16

Although the Indian government's ambition was impressive, so too was the growth of its economy and population. In 2017, the highly-respected International Energy Authority (IEA) forecast that from its 2016 baseline to 2040, India's primary energy demand would increase by just over one billion tons of oil equivalent; roughly the same as the entire current production of the European Union. The United Nations, meantime, estimated that India's population would grow by more than 300 million over the same period.

Change in primary energy demand 2016-40 (Mtoe) - World Energy Outlook 2017



Source: International Energy Authority

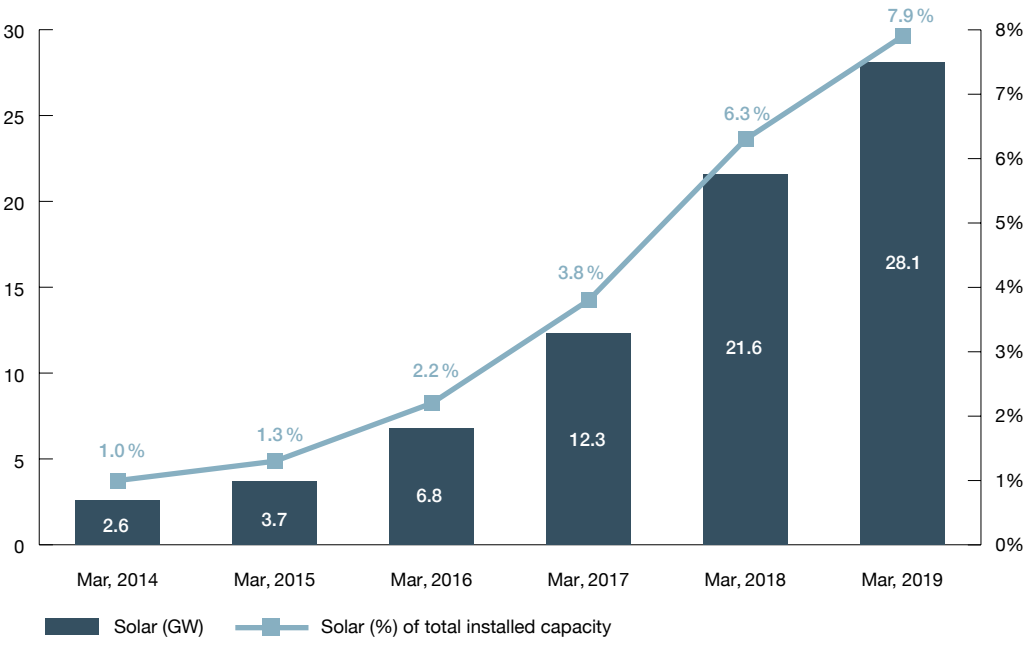
Growth of utilities‘ installed solar capacity

End-financial 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

Source: Central Electricity Authority

Solar Plant Telangana II

Utilities' installed solar capacity and market share



Source: Central Electricity Authority

Over the past five years, enormous investment has been seen in the solar sector. Total installed capacity has risen from 2.6 GW in 2014 to 28.1 GW in 2019. According to the Ministry of New and Renewable Energy (MNRE) in 2018, India had grid connected around 69.02 GW of renewable technologies-based electricity capacity; exceeding the capacity of major hydroelectric power for the first time in history and in 2019 this had increased to 77.64 GW.

Far from resting on its laurels, however, the Indian Government announced at the UN Climate Summit in 2019 that it will now be doubling its renewable energy target of 175 GW by 2022 to 450 GW by the same date. These newly updated targets include achieving 227GW (earlier 175 GW) of energy from renewable sources - nearly 113 GW through solar power, 66 GW from wind power, 10 GW from biomass power, 5GW from small hydro and 31GW from floating solar and offshore wind power. Compared to the position at the time of the Union Budget in 2015, solar capacity will have increased more than 40-fold; from just 2.6 GW to 113GW in 2022.

To further reinforce its sustainability credentials, the government has also announced that no new coal-based capacity addition is required beyond the 50 GW under different stages of construction likely to come online between 2017 and 2022. India is already the world's third-largest producer and third-largest consumer of electricity. The proportion of renewable energy in the capacity mix is set to rise inexorably over the coming decades.

INTERESTING TO KNOW

The Thar Desert is the world's 17th largest with 177,000km^2. Thus, to meet all the country's electricity needs, an area equivalent to just 7.7% of the Thar Desert would suffice.

Shri Nitin Gadkari
Honorable Union Cabinet Minister, Minister for Road Transport and Highways and Minister of Micro, Small and Medium Enterprise, ThomasLloyd Investment Symposium India, February 2020

INVESTMENTS

Solar Plant Karnataka II

Solar Plants in India

ThomasLloyd's local development partner in India is the Delhi-based SolarArise India Projects Pvt Ltd. The Company – hereafter referred to as SolarArise – currently owns and operates approximately 160 MWp of grid-connected solar power projects and is constructing a further 75 MWp solar project in Uttar Pradesh. ThomasLloyd first invested in SolarArise in December 2018, and is now the largest shareholder in the Company. The SolarArise sites are Telangana I and II (2*12 MW), Maharashtra I (67.2MW), Maharashtra II (75 MW), Karnataka I and II (40.5 MW and 27 MW) and Uttar Pradesh (75 MW).

Telangana I + II
The first of which to be commissioned in June 2016 was Telangana I and II, at Palwai village near Gadwal in the Mahbubnagar district of Telangana, geographical co-ordinates: 16.153026° N, 77.763979° E. The two solar plants were grid connected to the existing 33 kV Gadwal TSTRANSCO substation, 13.5 km away.

Features Telangana I + II:
- Size of project sites: 327,188 m^2
- Electricity supplied to: 36,544 people
- Annual CO_2 savings: 16,480 tonnes
- Investment spending: 23.6 Mio. USD

Karnataka I
The first Karnataka site is at Chikkoppa Village, Koppal District, geographical co-ordinates: 15.652016° N, 75.992484°E. The plant has been in full commercial operation since January 2018. It is grid connected to an existing 110 kV Yelburga KPTCL substation, 5.5 km away.

Features Karnataka I:
- Size of project sites: 721,049 m^2
- Electricity supplied to: 72,236 people
- Annual CO_2 savings: 24,720 tonnes
- Investment spending: 35 Mio. USD

Karnataka II
The second Karnataka site is in Kerehalli village, Koppal District, State of Karnataka, geographical co-ordinates 15.371604° N, 76.307229° E. The plant has been in full commercial operation since August 2019. It is grid connected to an existing 110 kV Kerehalli KPTCL substation, 2 km away.

Features Karnataka II:
- Size of project sites: 484,328 m^2
- Electricity supplied to: 41,988 people
- Annual CO_2 savings: 16,553 tonnes
- Investment spending: 13.8 Mio. USD

Maharashtra I
The Maharashtra I site is in Chatgaon Village, Beed District, geographical co-ordinates 18.961683° N, 76.212849°E. Maharashtra I has been in full commercial operation since August 2017. It is grid connected to an existing 132 kV Talegaon MSETCL substation, 5.5 km away.

Features Maharasthra I:
- Size of project site: 1,239,654 m^2
- Electricity supplied to: 126,196 people
- Annual CO_2 savings: 41,200 tonnes
- Investment spending: 60.3 Mio. USD

Maharashtra II
Maharashtra II is in the state of Maharashtra, further details to be confirmed. The power plant is scheduled to go into operation within 18 months of signing the Power Purchase Agreement (PPA).

Uttar Pradesh I
The Uttar Pradesh I site is in Khera Village, Budaun District, State of Uttar Pradesh, India, geographical co-ordinates 28.06240° N, 79.02576° E. The power plant is scheduled to go into operation in August 2020. It will be grid connected to an existing 132 kV Bilsi UPPTCL substation, 5 km away.

Features Uttar Pradesh I:
- Size of project site: 809,372 m^2
- Electricity supplied to: 109,312 people
- Annual CO_2 savings: 41,200 tonnes
- Investment spending: 38 Mio. USD

Land Acquisition

The primary objective of ThomasLloyd's infrastructure investments is to create lasting value, both for our investors and for the people living locally. We also assume responsibility for conduct which offers a benefit of systemic importance when social, ethical and environmental aspects are considered. TLG is committed to investing responsibly and we believe that the integration of material environmental, social and governance (ESG) factors into our investment process is a core part of our fiduciary duty to act in the best interests of our clients and beneficiaries.

Our Socially Responsible Investment Policy, Methodology and Framework is evidenced and implemented by our local development partners at the early stages of land acquisition in India with strict adherence to environmental standards. Specifically, there must be no deforestation, no inhabitation and no change of use from food to energy production.

Land is first identified by location, contour, shape, contiguity and soil type to determine its suitability for the installation of photo-voltaic solar panels. The subsequent determination of land ownership is a laborious process. Not all titles are electronically held and in some cases of ancestry there can be multiple owners of the same land. Land can be held in very small parcels and all owners must be identified and adequately compensated in return for ceding title.

Only when all the Company's standards on ownership, use and compensation are met can land be acquired for development in renewable energy projects.

MAHARASHTRA I + II
142.2 MW

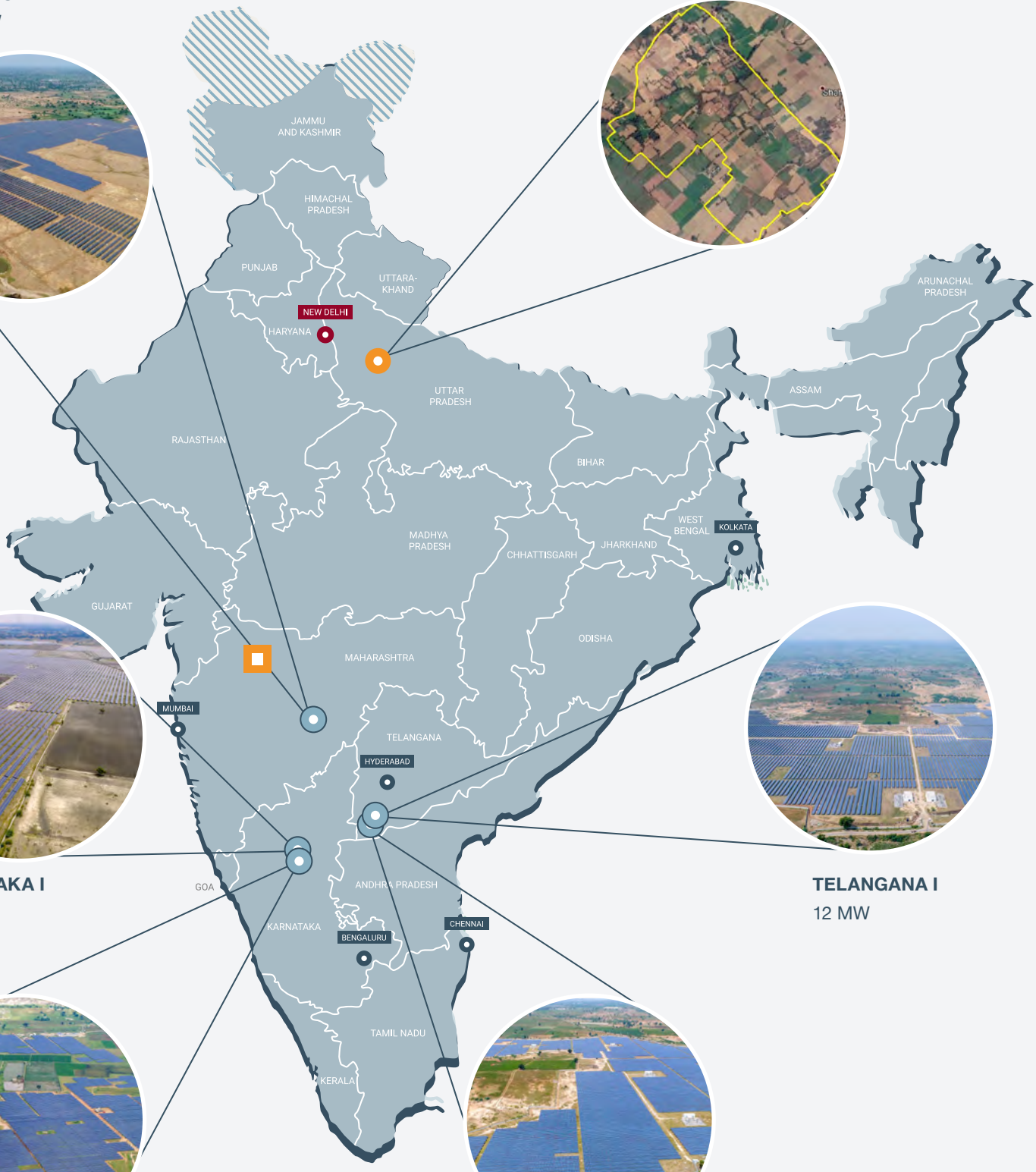
UTTAR PRADESH I
75 MW

KARNATAKA I
40.5 MW

TELANGANA I
12 MW

KARNATAKA II
27 MW

TELANGANA II
12 MW



MORE INFORMATION

Arial View **Telangana I & II**
Arial View **Karnataka I**
Arial View **Maharashtra I**

in construction
in development


IMPACT RESULTS

Impact Methodology

India has no system of local or municipal property taxes and there is no hypothecation of revenues from renewable energy development or generation. Drawing a direct link between corporation or income taxes and increased spending at the local government level – as we have previously done in the Philippines, for example – is therefore not possible.

To evidence and quantify 'Impact', we will therefore focus on the direct and indirect employment effects, and use internationally accepted conventions on CO_2 mitigation and the mapping of socio-economic outcomes to the United Nations' seventeen Sustainable Development Goals (SGD's).

The OECD/DAC (Organisation for Economic Co-operation and Development/Development Assistance Committee) defines impact as, "The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators".

TLG's local partners define standards, protocols, procedures and systems for managing environmental, health and social (EHS) risk. These are formulated as per the requirements of the International Financial Corporation (IFC) and the Japan Bank for International Cooperation (JBIC). Our partners engage specialist contractors IndusEnviro for implementing EHS methods and policies and detailed site assessments are produced to show compliance with the strictest standards of safety and governance.

Employment during construction phase

The construction phase of a solar plant is very labour-intensive with groundworks, foundations, perimeter-securing and an exhaustive list of installation and pre-connection safety checks to be carried out. The workers employed in Telangana, Maharashtra and Karnataka were a mix of hires by the third-party Engineering, Procurement and Construction (EPC) company and those hired or sub-contracted directly by Solar Arise.

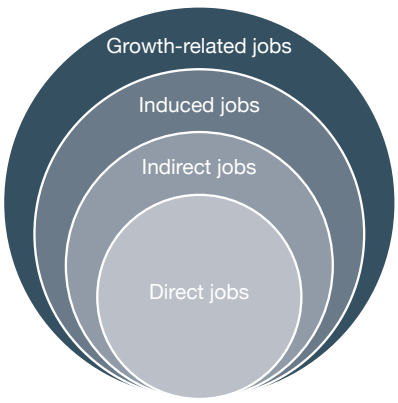
At the peak of activity in Q3 2017 at the largest of the solar plants in Maharashtra, just over 700 full-time employees were on site of which 5% were skilled technical, engineering and office staff, 50% were semi-skilled workers and 45% were unskilled manual labourers. The read-across to the other plants is essentially a linear function of power output: the larger the plant, the greater number of manual labourers is required to excavate foundations, mix and pour concrete and secure external boundaries.

Maharashtra I (67.2 MW)

	2016		2017			
	Q3	Q4	Q1	Q2	Q3	Q4
Employees (EPC hired)						
Technical		2	4	23	24	
Office staff		2	6	9	4	
General Labour (semi-skilled)		6	35	220	350	
Local workers (unskilled)		3	20	180	250	
Employees (SolarArise hired)						
Owners Engineers		0	3	3	3	
SolarArise Employees		1	1	2	2	
Employees (EPC Subcontractor hired)						
Unskilled workers		16	38	55	80	
Total		**30**	**107**	**492**	**713**	

Source: SolarArise company records

The growth-related job effects on infrastructure investments are the largest and affect the overall economy



Source: Worldbank

The World Bank's International Finance Corporation (IFC) notes there are two main categories of jobs created through infrastructure investments: Jobs associated with construction and maintenance and jobs associated with improved services and lower costs (see references). Jobs in the first category can be direct, indirect, or induced. Construction and maintenance activities generate employment not only for those workers directly involved (direct effect), but also for the corresponding suppliers and distributors (indirect effect), and for the providers of goods and services that are consumed by the direct and indirect workers (induced effect). A study of a power transmission line that IFC financed several years ago in India showed that many more indirect and induced jobs were created than direct jobs.

In the second category of jobs, the IFC observes, "a reliable infrastructure has an even greater effect on employment, and this is often overlooked in studies and policy analyses. Access to power, information, and communications technologies, or improved transportation, can add significantly to job growth by allowing businesses to increase their output and hence create more jobs. This growth effect can be substantial. The IFC

estimated that electricity provided by the new power transmission lines in India generated a total of about 75,000 jobs from 2006-12, a much larger number than the direct creation of about 2,000 jobs associated with construction and maintenance of the lines".

Using very conservative estimates – significantly less than the evidence from the IFC survey due to the remoteness of the solar sites – we assume a 2-4 times increase in local employment from all four types of jobs (direct, indirect, induced and growth-related) in the five year period since construction began. In addition to the 1800 jobs created during the construction phase of the completed solar sites (300 at Telangana I and II, 800 at Karnataka I and II and 700 at Maharashtra I), a further 800 construction workers will be employed at each of Uttar Pradesh I and Maharashtra II. The operational phase then requires ongoing full-time employees. Numbers vary according to the size and specificities of each plant, but average around 55 FTE at each site – engineers, technicians and security guards – plus 20 in head office accounting/purchasing/HR and admin functions and 10 management staff across the five existing sites; a total of at least 305 direct jobs. Applying a very low 2-4 times multiplier (due to the relatively remote locations) would suggest a permanent boost to employment between 610-1220 jobs. In their regular report and assessment of the Maharashtra plant, IndusEnviro noted, "many of the workers at the site are from nearby villages including the Security Staff who are provided with their uniforms… We were informed that there was an overall improvement in socio-economic environment in the area due to the employment opportunities provided by the project. Most of the construction workers and many of the petty contractors were also hired from nearby villages and they were paid well."

Local stakeholder engagement in current projects

Local communities are engaged at each stage of project development, from the initial discussions around land acquisition through to employment during construction and operation and the establishment of supplier relations with the completed plants. At the Maharashtra site, one of the key local concerns was medical facilities and so the Company has set up a health clinic for use by the local community. Plans are also underway to establish a vocational training unit for the solar industry so that existing and future employment opportunities can be maximised. In Telangana, meantime, some 400 bicycles were made freely available to local villagers to help with commuting to the plant and other places of work in the local neighbourhood.

IMPACT RESULTS

DIRECT EMPLOYMENT

Solar plants Telangana I+II, Maharasthra I, Karnataka I+II, Uttar Pradesh I

- Construction phase **2,600 jobs**
- Operational phase **305 jobs**

INDIRECT EMPLOYMENT

- More than **6,000 jobs**

FUTURE EMPLOYMENT

Maharashtra II

- Construction phase **~800 jobs**
- Operational phase **55 jobs**

INDIRECT EMPLOYMENT

- More than **1,700 jobs**

Environmental Impact

There is widespread recognition across South and South-East Asia of the need for action to reduce greenhouse gas (GHG) emissions and improve air quality more generally.

The World Health Organisation (WHO) in May 2018 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 PM2.5 such as sulfate, nitrates and black carbon) are in India: Delhi, Varanasi, Kanpur, Faridabad, Gaya, Patna, Lucknow, Agra, Muzaffarpur, Srinagar, Gurgaon, Jaipur, Patiala and Jodhpur. The WHO reports, “Around 3 billion people - more than 40% of the world’s population - still do not have access to clean cooking fuels and technologies in their homes, the main source of household air pollution,” whilst more than 90% of air pollution-related deaths occur in low and middle-income countries (including India), mainly in Asia and Africa.

The electricity produced by the solar sites Telangana I + II, Maharashtra I and Karnataka I + II already reaches 276,974 people, with an overall CO_2 reduction of 98,953 tonnes per annum. According to the US Environmental Protection Agency (EPA), this total CO_2 reduction is roughly equivalent to the amount sequestered by 129,228 acres of mature forest or 1,636,209 tree seedlings grown for 10 years.

CO_2 production, mitigation and offset

Greenhouse gas emissions from

21,009 Passenger vehicles driven for one year	or	**245,540,943** miles driven by an average passenger vehicle	

CO_2 emissions from

11,134,579 gallons of gasoline consumed	or	**9,720,334** gallons of diesel consumed	or	**109,032,631** pounds of coal burned	or	**1,310** tanker trucks´ worth of gasoline

Greenhouse gas emissions avoided by

33,657 tons of waste recycled instead of landfilled	or	**4,808** garbage trucks of waste recycled instead of landfilled	or	**4,210,408** trash bags of waste recycled instead of landfilled	or	**21,4** Wind turbines running fo a year

Greenhouse gas emissions avoided by

1,636,209 tree seedlings grown for 10 years	or	**129,228** acres of U.S. forests in one year	or	**669** acres of U.S. forests preserved from conversion to cropland in one year		

Source: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

United Nations' Sustainable Development Goals
Goals and actions taken by ThomasLloyd

Seventeen Sustainable Development Goals (SDGs) were introduced at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that met the urgent environmental, political and economic challenges facing the world.

The SDGs replace the Millennium Development Goals (MDGs), which catalysed a global effort in 2000 to tackle the indignity of poverty. The MDGs established measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities.

- At least one third of all workers on each site are unskilled locals.

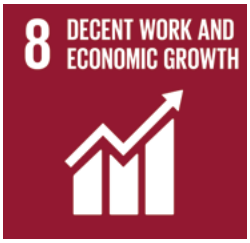
- Unemployment decreased in Telangana, Karnataka and Maharashtra due to jobs created through these solar plants.
- Reliable energy is essential for the agriculture industry.

- The solar plants provide residents with clean energy, reducing air pollution.
- A local health clinic was upgraded to cover basic medical help for the local community.

- The local schools are encouraged to visit a state-of-the-art solar power plant.

- SolarArise encourages women to grow and succeed in their personal and professional lives. Several women hold leadership positions, including in strategy and data analytics. Tanya Singhal, director and co-founder, was awarded "Woman of the Year" in solar industry in India.

- SolarArise produces clean, renewable energy.
- Number of households with access to electricity increased since the solar plants were built.



- At peak times during construction, 1800 employees were on site.
- Post-completion, at least 210 full-time jobs have been created. These, in turn, contribute to a permanent boost of around 1050 jobs.

The UN describes the 17 Goals as “a bold commitment to finish what we started, and tackle some of the more pressing challenges facing the world today”. The Global Impact Investing Network (GIIN) 2017 survey reported that 60% of impact investors actively track or plan to track the performance of their investments with respect to the SGD’s and MSCI’s investor survey notes that SGD’s are clearly emerging as the dominant framework around which to invest for impact. We highlight below how ThomasLloyd’s investments in solar energy map across to the UN’s development agenda.

- The local areas have developed through the infrastructure built.

- Skilled and unskilled workers hired across each solar plant.
- Distributed more than 400 bicycles to the locals, to facilitate commuting.

- Clean renewable energy is vital to support urbanisation and population growth.

- Our motivation is to combine ecology and economy in every project, in every investment product and more generally as the basis of our business.

- Our renewable energy plants offer the country an alternative to coal fired power stations.

- All SolarArise solar plants lead to a substantial CO_2 reduction, minimising the effects on oceans.

- Land is assessed to determine its suitability for the installation of photo-voltaic solar panels. No deforestation occurs.
- Sustainable energy is crucial for ecosystems.

- Reliable, secure and sustainable energy is one of the foundations of economic and social stability.

- ThomasLloyd is a member of the United Nations Environment Program Finance Initiative, a signatory of the United Nations Global Compact a member of the GIIN and a supporter of the Task Force on Climate-Related Financial Disclosures (TCFD).

Inauguration

ThomasLloyd Foundation

As one of the largest investors in the infrastructure sector in South East Asia, we have a strong sense of affiliation with the local people. Above and beyond our infrastructure projects, we assume a clear responsibility to alleviate hardship, to assist with the establishment of elementary living conditions, and to further lasting social progress.

ThomasLloyd has pooled all its corporate social responsibility activities under the banner of the ThomasLloyd Foundation in three areas of action which best correspond to the regional specificities and requirements.

- The foundation is dedicated to the initiation and realisation of concrete “off-grid solutions” in remote and underdeveloped districts, which are not likely to be connected to the electricity grid in the foreseeable future and which without the off-grid solution would therefore be permanently cut off from the benefits of social institutions dependent on electricity (e.g. health centres, clinics and modern educational establishments).

- The second action area is the provision of affordable housing for employees or other people who for financial reasons cannot find adequate accommodation on the conventional housing market.

- In addition the foundation is committed to emergency relief activities – which may include providing direct funding and suitable materials or equipment quickly and without red tape in areas hit by natural disasters, as well as continuous support for regional aid organisations and projects that are dedicated to providing assistance to particular social groups.

The Electrification of four schools in the state of Maharashtra, India

Surrounding the solar power plant Maharashtra I, which is part of ThomasLloyd's Solar Portfolio Indian Subcontinent, are the four villages Bhopa, Chatgaon, Bodkha and Kothimbir Wadi in the Beed District.

Each of these villages has a Government primary school, which are attended by a total of 414 pupils (204 girls and 210 boys) up to the age of 14. To date these schools have been cut off from reliable, external power supplies. The classrooms had little or no lighting and there were no ceiling fans, although temperatures often exceed 45 degrees centigrade. There was also a lack of sanitary facilities – when there even were any toilets, they were in a very run-down condition.

The following results were achieved:

- A total solar capacity of 13.1 kWh was installed on the roofs of the schools, and the necessary equipment, such as batteries for storing electricity, was purchased and installed.
- In addition, a total of 25 ceiling fans and 34 lights were fitted in the classrooms.
- Run-down sanitary facilities were also refurbished and new bathrooms built.
- Other work done includes compulsory civil and electrical upgrades

The four projects were handed over to the schools in February 2020 as part of an inaugural ceremony attended by representatives of the regional and municipal administration, as well as a large delegation from ThomasLloyd.

@ Further projects of ThomasLloyd Foundation

CONCLUSION

India has set bold and ambitious targets for renewable energy production. When first announced, they were widely dismissed as unrealistic and unachievable but within just a few years the country was so far ahead in terms of execution versus plan that the original targets could be credibly revised substantially higher.

The new goals for renewable energy are arguably the most impressive of all the major countries in the world; a peer group of which India can now proudly claim membership. It has grown inexorably in less than 20 years from the 13th largest economy in the world and should now sustain 5th position in the global league table.

Rapid economic growth, demographic change and urbanisation present formidable challenges for policymakers, not least with air quality in the major cities. Fortunately, India's abundant solar potential is being rapidly realised and India is the only country in the top ten globally to have exceeded its United Nations Environment Programme Greenhouse Gas emissions targets. Visionary leadership has encouraged significant capital investment without the need for costly production subsidies. As generation costs have tumbled, clean solar energy is now cheaper than heavily-polluting and environmentally destructive fossil fuel alternatives.

With its population set to overtake China in the next decade, the scope for continued rapid growth in renewable energy seems assured. Balanced economic development – building safe and secure communities, enhancing human capital and growing businesses whilst preserving traditional values – requires clean and sustainable energy.

The solar plants in which ThomasLloyd has already invested, and the future developments to which it intends to commit further capital, will help reverse the degradation of air quality and improve lives both locally and nationally. The cumulative impact is substantial, creating well-paid jobs in otherwise impoverished regions, directly supporting philanthropic projects in areas local to the solar plants and offering education, training and healthcare facilities to boost skills and livelihoods.

The sheer scale and pace of demographic growth has driven the policy response and it also requires the commitment of more private sector capital. ThomasLloyd's investment is driven not just by the search for profitable opportunities, but for those where we can make a positive difference to people and the communities they live in. This report helps evidence that process.

India has a bright future. With respect for nature, the environment, its culture and history, the growth of renewable energy helps secure its potential for current and future generations.

Bibliography

India Impact Report – Demographics

- http://www.indiaonlinepages.com/population/delhi-population.html
- https://sites.uoit.ca/sustainabilitytoday/urban-and-energy-systems/Worlds-largest-cities/population-projections/city-population-2050.php

India Impact Report – Economy

- https://economictimes.indiatimes.com/industry/media/entertainment/media/film-industry-in-india-to-hit-3-7-billion-by-2020-says-report/articleshow/60998458.cms

India Impact Report – Infrastructure

- http://www.indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/IRSP_2016-17/Annual_Report_Accounts_Eng/Statistical_Summary.pdf
- http://morth.nic.in/showfile.asp?lid=3100
- https://www.ibef.org/industry/ports-india-shipping.aspx
- http://www.pppinindia.gov.in
- http://www.infrastructureindia.gov.in

India Impact Report – Current Electricity Provision

- http://cea.nic.in/index.html
- http://cea.nic.in/reports/annual/annualreports/draft_annual_report-2018.pdf

India Impact Report – Solar Energy Policy

- http://indianpowersector.com/home/renewable-energy/solar_new/solar-power/
- https://www.worldenergy.org/news-and-media/news/india-addresses-the-fourth-energy-revolution/
- http://www.cea.nic.in/reports/monthly/installedcapacity/2018/installed_capacity-03.pdf
- https://economictimes.indiatimes.com/industry/energy/power/indias-utility-solar-capacity-grows-72-in-fy18-report/articleshow/64675139.cms?from=mdr
- https://www.pv-tech.org/news/india_releases_annual_targets_for_100gw_solar_goal
- https://mnre.gov.in/file-manager/UserFiles/Statewise-Solar-Potential-NISE.pdf

India Impact Report – Impact Results

- http://siteresources.worldbank.org/CFPEXT/Resources/299947- 1364681190360/IFC_Jobs_Report_Summary.pdf

Memberships and
voluntary commitments