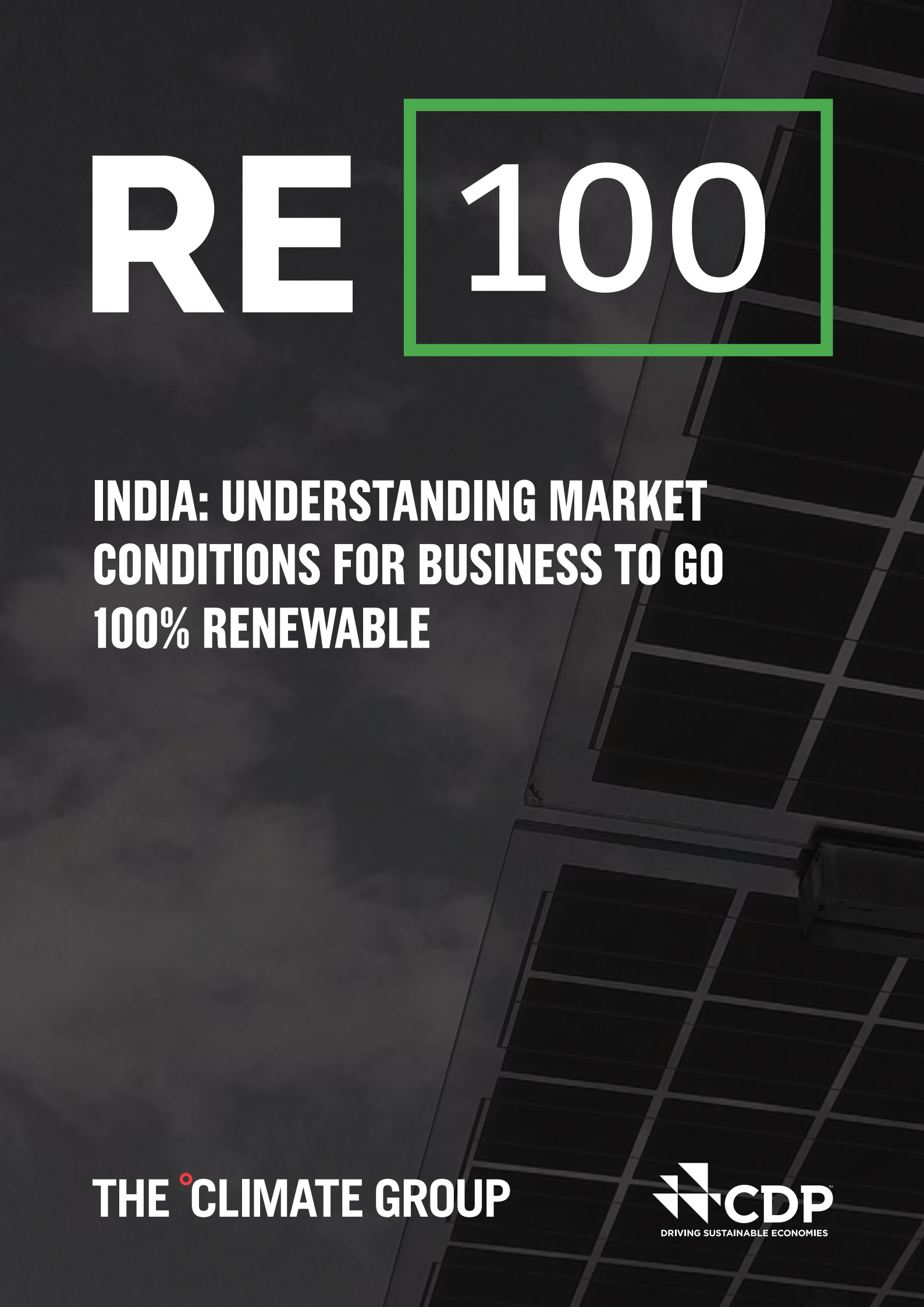
RE 100

INDIA: UNDERSTANDING MARKET CONDITIONS FOR BUSINESS TO GO 100% RENEWABLE



THE CLIMATE GROUP

CDP
DRIVING SUSTAINABLE ECONOMIES

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EXECUTIVE SUMMARY

India is the fastest-growing economy in the world – with an ever-increasing demand for electricity to power its expanding industry and urbanization. Because of this, India is currently the third[1] largest consumer of electricity in the world.

But despite adding considerable electricity generation capacity in the last decade, India's supply is inadequate to meet its growing demand. On top of this, the cost of electricity for industrial and commercial customers is steadily rising, partly driven by fuel shortages and infrastructure issues.

Renewable energy offers an increasingly affordable solution for businesses. It is widely available without the risk of fuel inflation. And given that over 50% of electricity demand in India is from businesses, the sector has the opportunity to shape India's transition to a low carbon energy future.

Companies can provide technologically sound, financially feasible and professionally managed energy solutions in return for policy support. From tax relief for generators to energy security and protection against cost inflation for consumers, there are clear benefits for businesses switching their electricity supply to renewables.

Of course there are challenges to overcome first. These include access to finance, land acquisition, inadequate grid infrastructure and even the attitude of state-owned utilities. But the cost of renewables, in particular solar power, is declining in India, making the opportunity of renewables hard to ignore. Costs are also set to fall further as more companies tap into the huge potential of renewables – be it through on- or off-site generation, third party provision or renewables credits.

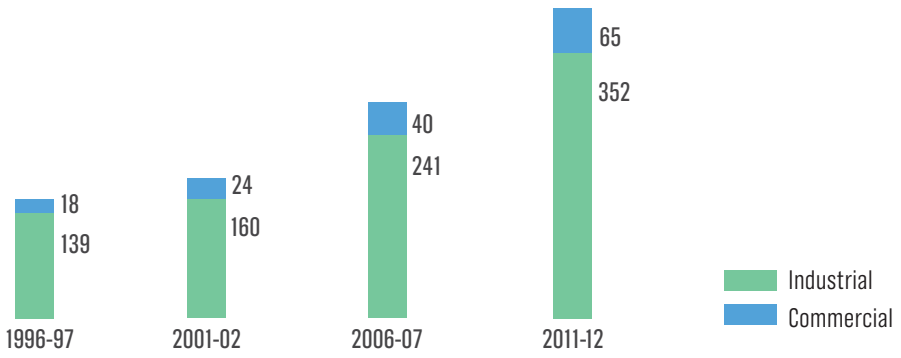
This report from CDP and The Climate Group as part of RE100, sets out how businesses have an opportunity to drive the development of a reliable and affordable supply of renewable energy in India, spotlighting companies that are successfully switching their electricity use to renewables.

The RE100 global campaign is convening companies in India which are aspiring to use 100% renewable electricity, supporting them on their journey and showcasing the progress they are making. For more information visit TheRE100.org.

UPWARD TREND OF RENEWABLES

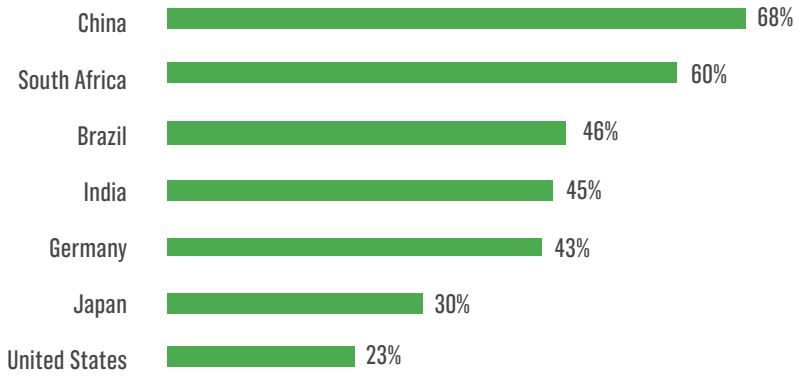
Due to rapid population and industry growth, electricity generation in India has grown dramatically in recent years – from merely 579 terawatt hours (TWh) in 2005-06 to 1,048TWh[2] in 2014-15 – increasing by about 6%[3] annually over the last 10 years. Based on predictions for India's rocketing economic growth, annual electricity demand is expected to reach 5,000TWh by 2035[4]. The Government of India also wants to accelerate industrialization to drive development, which will further raise electricity use.

FIGURE 1: CORPORATE ELECTRICITY DEMAND IN INDIA (TWH)



Source: Central Electricity Authority (CEA), 2015

FIGURE 2: PERCENTAGE SHARE OF INDUSTRIAL ELECTRICITY CONSUMPTION ACROSS COUNTRIES

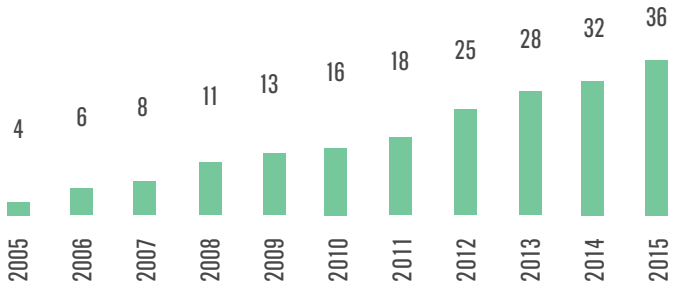


Source: CEA, 2015

Of this fast-rising electricity demand, India's corporate (industrial and commercial) sector accounts for more than 50% of total consumption. This puts the country in fourth[5] position – behind China, South Africa and Brazil – for industrial electricity demand globally.

Thankfully this growth is also reflected in India's renewables consumption, which has seen exponential growth in the last ten years. Since 2005, renewables have risen at an average rate of 25% annually, and now represent 13%[6] of the total installed grid-connected capacity for electricity generation in India. This share would be 28% if large hydroelectric generation was also included.

FIGURE 3: RENEWABLE ENERGY CAPACITY IN INDIA



Source: CEA, 2015

As of March 2015, out of 272 gigawatts (GW)[7] total installed power generation capacity in India, 36 GW[8] is from grid connected renewables. Wind energy has the largest share with 23.4 GW, followed by biomass power with 4.4 GW, and small hydro with 4 GW. Solar photovoltaic (PV) is quickly catching up: it has grown from a paltry 35 MW (0.035 GW)[9] of installed capacity in 2010 to 3.7 GW in March 2015.

FIGURE 4: OVERALL GRID CONNECTED ELECTRICITY GENERATION CAPACITY IN INDIA BY SOURCE

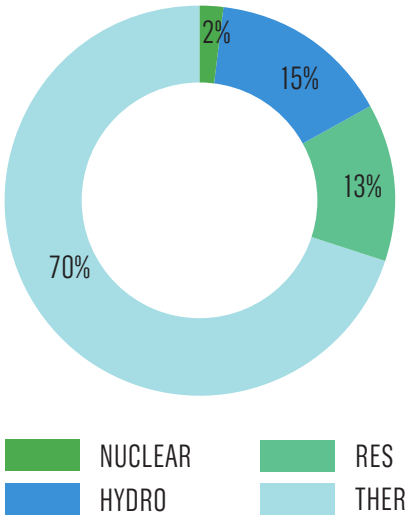
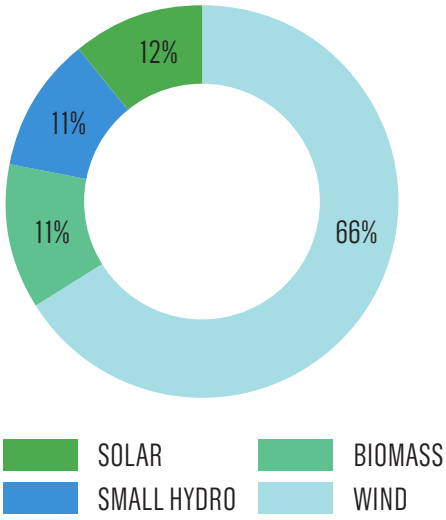


FIGURE 5: GRID CONNECTED ELECTRICITY GENERATION CAPACITY BASED ON RENEWABLE ENERGY SOURCE (RES)



EXISTING POLICY AND REGULATORY SUPPORT

Policy support has a large role to play in encouraging investment in renewable energy. In particular, since the national government announced a renewable energy target of 175 GW earlier this year, accelerated investment has been expected. Deutsche Bank Markets Research[10] estimates annual investment in solar energy alone will surpass that of coal by 2019-20, with US$35 billion[11] committed by global investors. The report also estimates that 5,000 megawatts (MW) of solar capacity addition per year between FY16-FY20 will reduce dependency on coal by 8%, which in turn will reduce coal imports and achieve significant greenhouse gas (GHG) emission reductions. The research also emphasizes private sector interest in decisively moving toward solar power.

As well as meeting its surging electricity demand, the Indian government is also counting on this rising renewables capacity to reduce its pollution and GHG emissions and bolster development. Largely driven by the need for energy security and to provide electricity to India's unconnected rural population, government policies and regulation first began supporting renewables generation with the Electricity Act of 2003. This first measure to support renewables mandates State Electricity Regulatory Commissions to take steps to promote renewables within their jurisdiction, in ways that include providing preferential tariffs to renewable electricity generators, allowing open access to the power grid for renewable energy consumers and generators, and providing concessional charges for using the grid.

Then in 2008, to strengthen its existing Renewable Purchase Obligations (RPO) under the Electricity Act, the National Action Plan on Climate Change set a target for achieving 15%[12] renewable energy penetration in India by 2020. RPOs set purchase targets for state electricity distribution companies and consumers sourcing renewable electricity from third-party generators through the grid (open access consumers).

The renewable energy targets total 175 GW and are made up of 100 GW from solar, with 40 GW[13] from rooftop solar alone. This target replaces the solar targets set under the Jawaharlal Nehru National Solar Mission in 2010 of 20 GW by 2022. The new 2014 targets also include 60 GW of new capacity from wind, 10 GW from biomass and 5 GW from small hydro. The government aims to add 30 GW of new renewable energy capacity by 2017[14] as part of its 12th five year plan. It is estimated that India needs to invest about US$200 billion[15] to meet these targets.

All of these targets are included in or contribute to the national climate plan India submitted to United Nations Framework Convention on Climate Change (UNFCCC) in October 2015, ahead of the global COP21 climate talks in Paris. In its submission, India intends to reduce the GHG emissions intensity of its GDP by 33-35% by 2030 from the 2005 level, and achieve about 40% cumulative electric power installed capacity from renewable energy based resources in the same timeframe. This policy ambition reflects trust in the renewable energy sector to achieve growth worth investing in.

FIGURE 6: INDIA'S RENEWABLE ENERGY POTENTIAL

Renewable energy source	Estimated potential	Current installed capacity
Solar[16]	748.9 GW	3.7 GW
Wind[17]	102.8 GW	23.4 GW
Biomass[18]	23 GW	4.4 GW
Small hydro[19]	19.7 GW	4 GW

INDIA'S WEALTH OF RENEWABLE RESOURCES

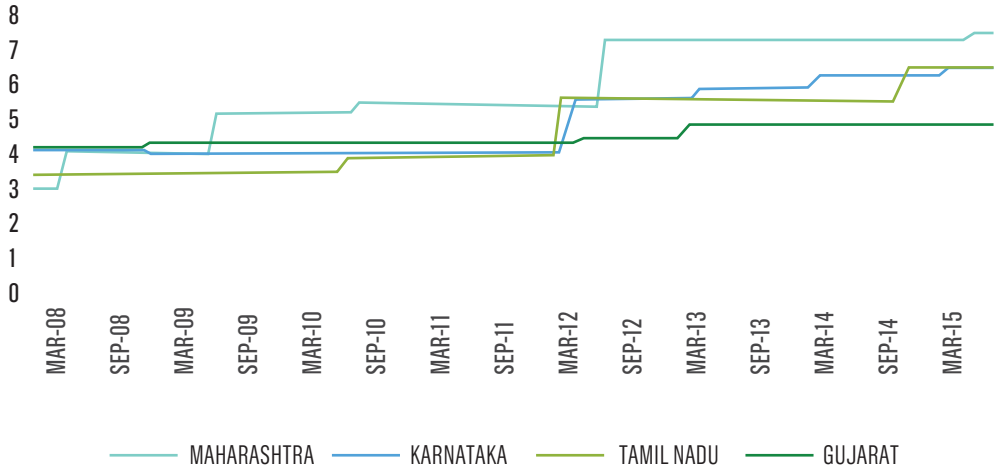
The potential for energy generation from renewable resources in India is vast, with the current installed capacity just scratching the surface.

Solar energy in particular has massive potential in India due to its geographical advantage: the country receives sunshine for almost 300 days per year. Wind energy also has a significant footprint in India, with 23.4 GW of capacity installed on the ground. But India still has a great deal of uncaptured wind potential, and biomass and small hydro energy also offer healthy potential in India.

BUSINESS SENSE FOR COMPANIES

Renewable energy is increasingly making business sense for companies in India. Electricity prices in India are growing steadily, due to a combination of different factors including fuel shortages, infrastructure issues and uneven pricing and regulation from state to state. By contrast, renewable energy consumed from own installations or procured via power purchase agreements (PPAs) from a third party generator is already cost competitive compared with electricity tariffs in several states.

FIGURE 7: INDUSTRIAL TARIFF TREND IN MAHARASHTRA, TAMIL NADU, KARNATAKA AND GUJARAT



Renewable electricity supply also offers a hedge against the risk of long-term fuel cost inflation. In addition to the benefit of costs below the average grid tariff price, business consumers can also sell the renewable electricity they produce at preferential tariffs, where available.

India's electricity tariffs have also been rising steadily over the past ten years. Figure 6 shows the base industrial tariffs in four highly industrialized Indian states: Tamil Nadu, Maharashtra, Gujarat and Karnataka – the largest electricity consumers in India. Electricity prices have increased steadily from approximately Rs. 2/kWh to Rs. 7.3/kWh for the industrial consumer. The state of Maharashtra has the highest electricity tariffs in India.

The rising cost of electricity is due to multiple factors, including shortage of fuels, especially coal, high transmission and distribution losses through the power grid and surcharges to electricity tariffs applied by power distribution companies.

The coal shortage is especially critical though, because the fuel source holds a 61% share in India's total power generation capacity. While India has considerable coal reserves, the proven extractable reserves are not adequate to meet the growing demand for power generation. The bulk of its reserves are located in forests or densely populated areas, which cannot be utilized due to strict forest clearance[20] regulations. The shortage is reflected in the almost steady production of coal by Coal India Limited (CIL) - the major supplier of coal for power plants in India. But despite CIL producing 435 and 462 million tons of coal in 2012 and 2014 respectively[21], the demand for coal from power generating utilities was recorded at 489 million tons[22] in 2014 alone which out paces supply. On top of this, the grade of domestic coal is scarcely suitable for power generation.[23]

In the absence of domestic coal and to avoid relying on more expensive[24] imported coal, power generators have to keep their capacity underutilized. The higher cost of using imported coal raises the tariffs, so power project developers determine electricity tariffs based on the Central Electricity Regulatory Commissions' cost-plus mechanism[25], which calculates tariffs based on various factors such as cost of fuel. The price of imported coal is based on factors such as type and duration of commercial contract, transportation cost and exchange rate.

In addition, regulatory regime changes in coal-rich countries can also impact the price or availability of coal. Indonesia for example, has introduced provision to impose the limit on coal to be traded internationally and a price benchmarking structure which is expected to increase the price of coal[26]. In Australia, strict environmental clearances are causing delay or not getting approval to the coal mines of Indian businesses. Recently, Adani's Carmichael coal project[27] got stuck in the approvals process on environmental grounds.

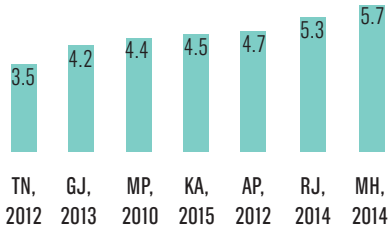
INFRASTRUCTURE AND TARIFFS

Inefficient electricity transmission and distribution (T&D) infrastructure is also a major cause of severe electricity loss from the grid network. This loss takes place during tariff setting and raises the cost of power to the customer. T&D losses in year 2012-13 were close to 23% (CEA[28]) which is very high compared to Brazil (17%), South Africa (9%), China (6%), US (6%) and Japan (4%)[29].

New York University's research paper titled How Do Electricity Shortages Affect Industry[30] estimates that electricity shortages are a substantial drag on Indian manufacturing, reducing revenue by 5.6 % to 8.6%. Additional loss is also happening due to the capital costs of back-up diesel generators.

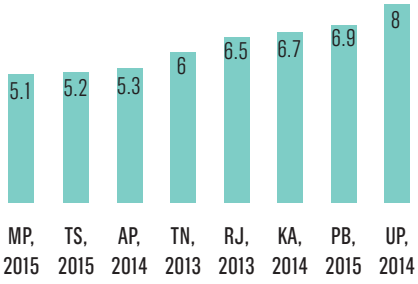
Another key issue is the distribution of power tariffs by utility. Power distribution companies supply electricity at different tariffs to different categories of consumers. The most common consumer categories are domestic, commercial and industrial. This uneven tariff pattern has been designed to cross subsidize domestic and agricultural supply by charging industries more than the average cost of supply[31].

FIGURE 8: WIND ENERGY PREFERENTIAL TARIFFS (RS./KWH) BY INDIAN STATE



Source: Respective state tariff orders

FIGURE 9: TARIFFS DISCOVERED AT VARIOUS SOLAR BIDS (RS./KWH) BY INDIAN STATE



Source: Respective bid results

As well as the rising costs of electricity, India's frequent power cuts are also impacting on operational budgets. The added risk of relying on expensive diesel power back-up generation (around Rs.15-25 per KWh) makes renewable energy supply an attractive alternative for businesses.

Having already achieved grid parity, wind energy is one of the most attractive. And recent tariff discovery at different state solar project bidding sessions also highlights the declining cost of solar energy in India. Figures 8 and 9 show wind and solar energy tariffs across Indian states.

Renewable electricity is most competitive in states with high industrial tariffs. As previously shown, Maharashtra, Tamil Nadu and Karnataka already have base industrial tariffs in the range of Rs. 6 to Rs. 7.3 per kilowatt per hour. After adding duties and taxes such as fuel adjustment charge, electricity duty and tax on sell of electricity, the landed cost of electricity goes up to Rs. 7 to Rs. 9 per kilowatt hour. But importantly, renewably sourced electricity, especially from wind energy, is already lower than grid tariffs in these states.

SUPPORTIVE POLICIES

Recent polices and tax incentives are helping to support the business case for corporate investment in renewable energy projects.

The Ministry of Power and the Central Electricity Regulatory Commission (CERC) are the national level authorities charged with formulating laws and regulations. At the State level, multiple agencies such as the State Electricity Regulatory Commission (SERC), State Renewable Energy Development Agencies, and state-owned power transmission and distribution companies play key roles in determining the regulatory and commercial framework within which the electricity market operates, because state governments can adopt and modify central government regulations.

Policy frameworks including the National Solar Mission, the National Bio-Energy Mission, the National Small Hydro Mission and the proposed National Wind Energy Mission are already creating a better policy and regulatory environment to drive utility sector investment in renewables. And the government is also looking at strengthening Renewable Purchase Obligations to apply to power generators[32]. This will increase investment in renewables as utilities will need to fulfil their obligations.

To facilitate private sector investment in renewables, the government has permitted companies to set up wind, solar and hydro projects with foreign equity participation as part of the country's 12th five year plan (2012-17). The plan allows renewable energy projects to receive up to 100% of funding from foreign investment where previously prior approval from either the government or the Reserve Bank of India was required. This has resulted in a huge increase in corporate sector projects as reported in Global trends in renewable energy investment 2015,[33] published by Frankfurt School-UNEP Centre. The report finds that the biggest investments in renewable energy in 2014 were made in China, US, Japan, India and Brazil. India received investment of US$7.4 billion in renewables in 2014, which is 14% higher than the previous year's investment of US$6.3 billion.

Other policy decisions are also stimulating the growth of corporate investment into renewables. For example, concessional customs duty[34] and excise duty waiver[35] on specific components used in solar and wind[36] power plants, income tax benefits in the form of accelerated depreciation which allows the renewable energy generator to claim accelerated depreciation at 80% on wind and solar projects, and tax holidays for ten years.

A particularly important provision that is opening up opportunities is the inclusion of renewable energy into the priority lending list[37]. This provision is expected to boost the loan approval process for renewable energy projects. The Government is also looking at borrowing from international agencies like Asian Development Bank (ADB), EXIM and World Bank for renewable energy projects in India[38].

The Ministry of New and Renewable Energy (MNRE) and Solar Energy Corporation of India (SECI) provide 15% capital subsidy[39] to grid-connected rooftop solar projects. For rooftop systems of sizes 100 kWp-500 kWp, subsidy can be possible through SECI. MNRE provides capital subsidy for off-grid rooftop solar projects.

Respective state nodal agencies are designated for effective implementation of renewable energy in each state. These agencies promote renewable energy deployment by channelling central government schemes and also frame their own policies such as preferential tariffs for renewable energy, solar policy to encourage solar sector investment, net metering policy for rooftop solar projects, granting access to use power grid (open access) for renewable energy projects, open access charges concession/waivers and electricity duty waivers. More information is available in the annexure of this report on page 13.

GOING 100% RENEWABLE

The private sector has a crucial role to play in contributing to India's low carbon future. It can provide technologically sound, financially feasible and professionally managed solutions to promote renewable energy. In return, it can benefit from government policy support and energy security. This action also relates to the private sector's environmental responsibility, as a significant amount of electricity consumption and associated GHG emissions are the result of industrial activity. In its World Energy Investment Outlook 2014[40], the International Energy Agency highlighted the importance of private sector participation in renewable energy investment.

Business corporations in India can source renewable electricity using three different models:

1. Direct investment in their own renewable assets.
2. Purchase of renewable electricity produced by third parties.
3. Purchase of renewable energy credits.

DIRECT INVESTMENT IN OWN ASSETS

In this scenario a company invests in its own renewable electricity assets and uses the electricity generated for its own operations, either through decentralized renewable energy systems or via the existing grid transmission network if the renewable energy asset is at another location. With this option, investment in the renewable electricity asset will be reflected in the company's balance sheet.

CASE STUDY: INFOSYS

Leading IT firm Infosys has already invested in 12 MW of onsite solar PV projects, and aims to install 175 MW of onsite and offsite solar PV in the coming years.

Benefits: The solar PV projects are eligible for accelerated depreciation, making them cost-competitive with other sources of energy. This is helping the company to achieve energy security and move towards a low carbon future.

The majority of business consumers don't have space for a renewable energy generating system at the point of consumption. These consumers can invest in renewable energy projects at other locations and transmit power using the grid. Many states have favorable policies for this arrangement, more information is available on pages 16.

CASE STUDY: ITC

Diversified conglomerate ITC has invested in 132.25 MW of wind-farms in India, in addition to onsite solar PV. These renewable electricity sources, combined with the use of bio-diesel, renewable biomass residues, biogas and solar thermal energy for heating, have enabled the company to source over 43% of its energy from renewable sources in 2015. The company has also set targets moving towards 50% renewable energy share by 2020.

Benefits: ITC has set an example for companies looking to increase their use of renewable energy across diversified business operations. ITC identified energy security as a risk to the organization and is addressing this risk through energy conservation measures and investment in renewable energy assets.

Companies can also use a 'group captive scheme'[41], where the electricity consumer and a separate investor of a renewable energy project invest in proportion by forming a Special Purpose Vehicle (SPV).[42] Here, the consumer forms the SPV and holds 26% equity in the renewable energy plant. As per the rule, the consumer must consume 51% of the power produced. The renewable energy plant is connected to the grid, and investment in common equity shares of SPV will be reflected in a consumer's balance sheet.

CASE STUDY: BRAKES INDIA

Leading brakes manufacturer Brakes India has formed a joint venture in Tamil Nadu with energy company SunEdison for the supply of solar power. A 7.72 MW solar plant has been installed under the venture where the cost of power is fixed under a long term Power Purchase Agreement (PPA – see next section). The plant will generate about 13 million units per year. The group captive mechanism is more common for wind power in India, so Brakes India is pioneering with this solar venture.

Benefits: Brakes India is paying a high rate for the solar electricity compared with state utility tariff. However, the PPA assured steady rate of solar electricity for longer periods whereas state utility tariffs are increasing frequently. Locking solar electricity tariffs for longer periods is leading to financial savings.

Decentralized[43] renewable energy (DRE) projects constitute 1,175 MW of installed capacity in India as of March 2015. Whether projects are located onsite or offsite, decentralized renewable energy is an excellent solution for companies in areas where power grid connectivity is poor. Consumers can avoid heavy transmission and distribution losses if generation and consumption occurs at the same location.

Biomass-based power generation is feasible in areas where sufficient fuel such as agricultural residues, biological waste, sugar industry byproducts, i.e. bagasse, and other renewable biomass is available. By March 2015, 766 MW of biomass-based power generation capacity was installed on the ground. Of this, biomass-based cogeneration and industrial biomass gasifiers have a major share with 592 MW and 152 MW of installed capacity respectively. Decentralized solar PV is also an appropriate option for on-site generation. Rooftop solar PV systems are very common in this category. MNRE, March 2015 data shows 234 MW of installed capacity for decentralized solar PV systems. As per Bridge to India[44] – a solar market research firm, Maharashtra, Tamil Nadu and Gujarat are the leading states with close to 30% share of total decentralized PV system capacity.

Purchasing from a renewable energy installation owned by a third party, is a very common option available on the renewable energy market. Such transactions happen through Power Purchase Agreements (PPAs), which guarantee a supply of power from a third party at a steady rate over a long period of time, depending on the mutually agreed terms and conditions in the PPA. Consumers do not have to invest in their own renewable energy assets.

PPA WITH ON-SITE RENEWABLE ENERGY GENERATOR OWNED BY THIRD PARTY

In this case, electricity generated from on-site facilities owned and operated by a third party is delivered to the consumer, either directly or through the local grid. The consumer signs a PPA with the third party seller.

PPA WITH GRID-CONNECTED RENEWABLE ENERGY GENERATOR OWNED BY THIRD PARTY

Here a third party investor will generate renewable electricity by using its own asset and sell power to consumer. The consumer signs a PPA with the third party seller.

CASE STUDY: INFOSYS

In addition to investing in solar PV, Infosys has procured about 75 million kWh of wind powered electricity through a PPA, enabling the company to source a total of 30% of its electricity from renewables in 2015.

Benefits: By taking out a PPA, Infosys is able to source more of its electricity from renewable energy while it works to install more renewable energy projects and become 100% powered by renewable sources.

CASE STUDY: LARSEN & TOUBRO

Engineering, construction, manufacturing and financial services conglomerate Larsen & Toubro Limited (L&T), has sourced 33 million kWh of electricity from wind energy sources though PPA, in addition to 1.65 million kWh of electricity from onsite solar installations. The combination constitutes about 10% of the company's total electricity requirement. Further to this, L&T has developed 8.7MW windfarms that provide a clean source of energy for L&T's establishments in South India.

Benefits: The PPA has guaranteed stable energy costs for L&T over a long period. In addition, the company has been able to save 13.2 million INR by generating onsite solar power.

PURCHASE OF RENEWABLE ENERGY CREDITS

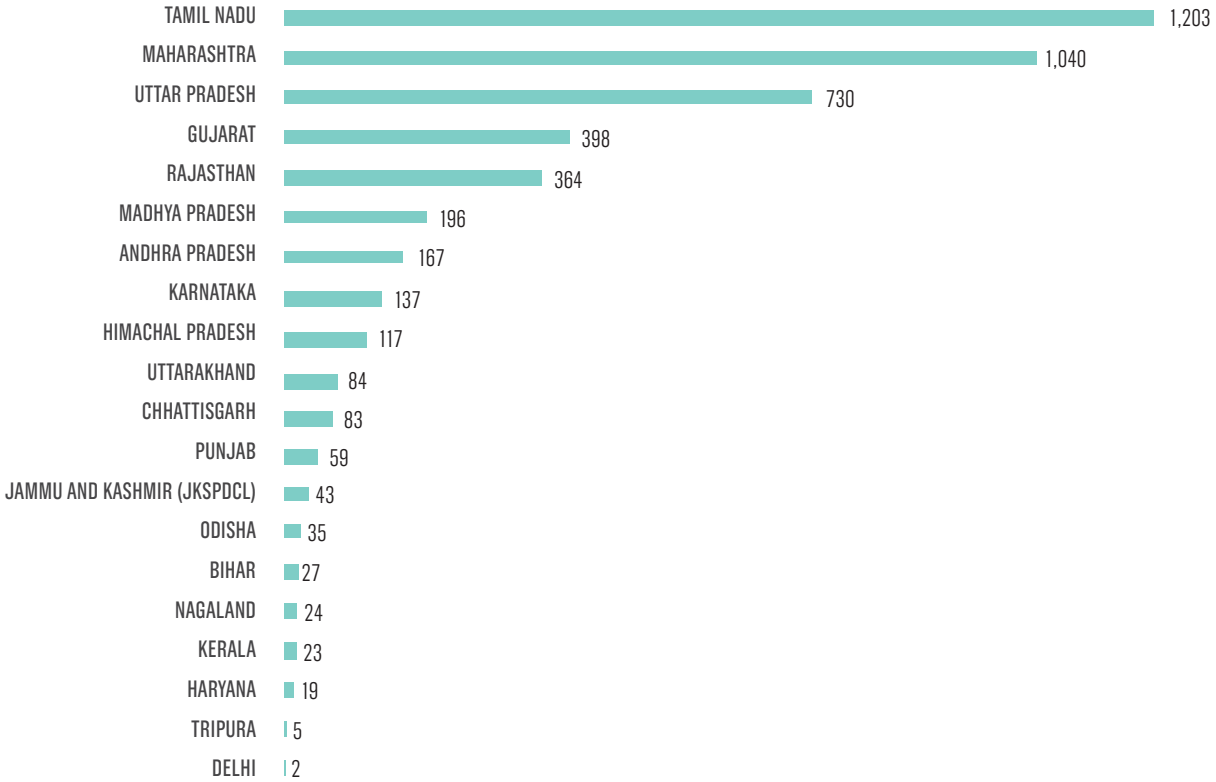
Companies can claim the environmental benefits of renewable energy production by acquiring electricity attribute/credits/certificates issued to renewable electricity generators. Electricity produced by renewable energy sources may conceptually be split into the pure electricity component and the environmental component. The environmental component is called the Renewable Energy Certificates (REC) in India and it is tradable on the REC market run by designated energy exchanges, i.e. Indian Energy Exchange (IEX) and Power Exchange India (PXIL). The REC market is regulated by the government to fulfil Renewable Purchase Obligations (RPO) targets applicable to electricity distribution utilities and captive electricity consumers. Companies without mandatory RPO targets can also purchase RECs voluntarily to claim renewable energy consumption.There are two types of RECs i.e. solar RECs and non-solar RECs.

FIGURE 11: PRICE OF RECS[45]

Price	Solar	Non-Solar
Floor price (Rs./REC)	3,500	1,500
Forbearance price (Rs.REC)	5,800	3,300

The REC mechanism has been in operation since 2010. As of March 2015, 4,754 MW of renewable energy capacity has been registered under the REC mechanism and about 9.42 million[47] RECs were traded on IEX and PXIL together. One REC is treated as equivalent to 1 Megawatt hour (MWh) of power produced and consumed.

FIGURE 12: RENEWABLE ENERGY CAPACITY UNDER REC MECHANISM



But at the moment, there are very few voluntary REC buyers in India. IEX recorded[48] seven registered with it currently. These are Indian Renewable Energy Development Agency, Power System Operation Corporation Limited, Rashtriya Ispat Nigam Limited, Security Printing and Minting Corporation of India Limited, EKI Energy Services Limited, Manikaran Power Trading Limited, and Sumit Kumar (Individual buyer). All of these buyers have purchased and redeemed RECs to claim the environmental benefits of renewable energy.

THE REMAINING HURDLES FOR RENEWABLES

Despite the incredible progress that India has made in scaling up renewables, companies still face hurdles on their journey to a 100% supply.

Access to finance for renewable energy projects, especially for off-grid projects, is one challenge. The biggest renewable power projects are most likely to sell power to the distribution companies and hence enter PPAs with government agencies. This makes favorable legal structures for the project to get financed from the bank or other financial institutions. However, in the case of off-grid projects such as rooftop solar, this advantage is not available. Financial institutions are not comfortable providing finance for such projects. In addition, the high cost of debt is also a big hurdle.

The renewable energy sector is under the same umbrella as the power sector, which has reached its limit in terms of available bank finance. Making renewable energy an independent sector can create more avenues for banks to provide finance. The government recently came up with the inclusion of renewable energy into a priority lending list which is expected to speed up bank loans for renewable energy projects after this provision. However, most banks are still unaware of this as capacity building and awareness programs are needed for bank officials as well as consumers.

Land acquisition is another challenge. The National Institute of Solar Energy, MNRE has determined India's solar power potential to be as high as 750 GW, a figure which is also based on wasteland and rooftop availability in the country. But many projects and associated transmission infrastructure is built on agricultural lands where land acquisition is critical – not only the price of the land, but small and distributed land holdings create disputes among owners which delay transfer of ownership to project developers.

Many utility scale solar and wind energy projects are not progressing due to unavailability of grid infrastructure. At many areas in Tamil Nadu where a major proportion of wind capacity is already installed, grid unavailability still happens during peak generation periods in the monsoon which has resulted in revenue loss for project developers. The government is planning the alternative transmission network for renewable power through "green corridors" but this will take time.

The "unfriendly" attitude of state-owned power distribution utilities toward open access customers and rooftop solar projects is also discouraging. For rooftop solar projects, despite net metering policy available in various states, distribution utilities are not providing necessary support. There is a strong requirement from the distribution utilities' side to consider rooftop solar projects as renewable energy generating units which provide power during peak periods instead of considering them as a revenue loss maker.

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ACKNOWLEDGEMENTS

Data and analysis provided by CDP

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ANNEXURE

FIGURE 13: STATE INITIATIVES FOR THE PROMOTION OF RENEWABLE ENERGY

STATE INITIATIVES	DETAILS
Preferential tariff/ Feed in tariff (FIT) for wind energy	Various State Electricity Regulatory Commissions have declared preferential tariff (PT) to purchase energy from wind energy projects. PT is slightly higher than the average grid tariff to ensure a fair return on equity for wind energy investors. PT varies across states depending upon state wind resources and cost of the wind project in the particular state. Maharashtra, Tamil Nadu, Karnataka, Gujarat, Rajasthan and Andhra Pradesh, are the major states having PT for wind.
State Solar Policy	Along with the central government flagship Solar Mission, several states have come out with their own solar policies, providing preferential tariffs and other deployment support to solar sector within the state. Following states[49] have exclusive solar policies- Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu, Uttarakhand and Uttar Pradesh have solar policies in place.
Net Metering Policy for solar	Net Metering arrangement allow Solar PV system deliver surplus electricity to the grid (under the control of concerned power distribution company i.e. DISCOM) after setting off the quantum of electricity supplied by DISCOM during the applicable billing period. This provision is very attractive when there is less consumption but the solar PV system is generating high amounts during the peak period. Hence, loss of solar electricity can be avoided. As of August 2015, the following states and union territories have come up with net-metering guidelines for rooftop solar projects: Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Haryana, Himachal Pradesh (draft), Karnataka, Kerala, Madhya Pradesh, Maharashtra (Draft), Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal.
Open access for renewables	Open access regulations[50] allow a user to buy electricity from the third party generator using transmission and distribution network (grid) instead of being forced to buy electricity from their existing electric utility. The buyer and seller of electricity can go for bilateral transactions where a PPA is signed between the buyer and seller. This creates an attractive option for the renewable energy generator as well as the consumer. Captive consumers having their own RE asset can also avail open access facility. Parties involved in open access transaction have to pay transmission, wheeling and distribution charges, banking[51] charges and Cross Subsidy Surcharge[52] (CSS) to the transmission and distribution utilities. These charges are known as Open Access (OA) charges and are additional to the basic cost of electricity. Some states offer concessional[53] OA charges whilst some offer complete waiver[54] of OA charges. Ex. Andhra Pradesh offer concessional OA charges for wind projects whilst Karnataka offer complete waiver of OA charges for solar PV projects. Banking facility is important for infirm renewable power sources such as wind where major portion of generation occurs during monsoon months. The electricity generated during this period is banked with the concerned state utility and can be utilised later in the prescribed time frame as per the banking regulations. Applicability of banking facility varies across state to state as per consumption category and duration of banking facility. Some states offer banking facility for captive consumption as well as for procurement of electricity from third party generator. Some states only allow captive consumer to avail the facility. Time duration also varies across states such as state of Rajasthan offers banking facility on six month basis i.e. between April –Sept and Oct – March for solar projects whilst Maharashtra state offers it for whole year starting from March. Following are the major states offer open access to solar power projects- Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, Rajasthan, Karnataka, Uttar Pradesh and Kerala. Following are the major states offer open access to wind power projects- Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka

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42	The SPV is usually a subsidiary company of parent company.
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