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REPORT

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RENEWABLE ENERGY DEMAND IN INDIA

Corporate Buyer's
Perspective

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RENEWABLE ENERGY DEMAND IN INDIA

**Corporate
Buyer's
Perspective**





सत्यमेव जयते

आनन्द कुमार
ANAND KUMAR



सचिव
भारत सरकार
नवीन और नवीकरणीय ऊर्जा मंत्रालय
SECRETARY
GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

FOREWORD

India has set an ambitious target of installing 175 GW of renewable energy (RE) capacity by 2022 and 40% of total installed capacity from non-fossil sources by 2030. This will not only increase the share of clean energy, but also help India achieve its sustainable development goals, energy security, promoting energy access, addressing electricity demand and climate change.

The government is playing an active role in promoting the adoption of renewable energy resources through a range of actions and measures, such as, offering various incentives, schemes, adopting policy and regulatory measures, developing market based mechanisms to drive down costs, developing and promoting missions, etc. All these have been instrumental in developing an enabling environment for renewable energy generation in the country.

India today is set to achieve its renewable energy 2022 target and meet non-fossil fuel 2030 ambitions with the active support of multiple stakeholders, including states, public, private sector, academic institutions and civil society.

Recognizing the critical role that the corporate sector can play in increasing the demand for renewable energy, World Wide Fund for Nature (WWF-India's) report, 'Renewable Energy Demand in India: Corporate Buyers' Perspective' assumes greater relevance. This report delves into understanding the magnitude of this demand and its role in increasing uptake of renewable energy. It provides the perspective of these corporate renewable energy buyers, highlighting not only the commitments that they are making towards renewable energy procurement, but also some of the challenges that they are facing in RE uptake.

I congratulate WWF-India on its effort in carrying out such a comprehensive assessment of the corporate sector's RE demand and its perspective.

The Ministry of New and Renewable Energy will continue to promote renewable energy in the country, as part of India's climate change commitments and also provide a conducive policy environment for greater uptake of renewable energy to achieve a sustainable energy future.


[Anand Kumar]



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ABBREVIATIONS

AAI	The Airports Authority of India
AD	Accelerated Depreciation
APPC	Average Power Purchase Cost
Buyers	Corporates that procure RE through captive generation, PPAs, or RECs
Capex	Capital expenditure
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
Cogen	Cogeneration
CPP	Captive Power Plant
CSR	Corporate Social Responsibility
C&I	Commercial and Industrial
CSS	Cross Subsidy Surcharge
DMRC	Delhi Metro Railway Corporation
ECB	External Commercial Borrowing
EHT	Extra High Tension
EPS	Electric Power Survey
EXIM	Export-Import Bank of India
FMCG	Fast-Moving Consumer Goods
FY	Financial Year
GBI	Generation Based Incentive
GW	Gigawatt
HT	High Tension
IEX	Indian Energy Exchange
INR	Indian Rupee
IOCL	Indian Oil Corporation Limited
IT	Information Technology
kW	Kilowatt
KERC	Karnataka Electricity Regulatory Commission
MNRE	Ministry of New and Renewable Energy
MW	Megawatt
NDC	Nationally Determined Contributions
NSE	National Stock Exchange
OA	Open Access
RET	Renewable Energy Technology
Opex	Operational expenditure
PPA	Power Purchase Agreement
PSU	Public Sector Undertaking
PXIL	Power Exchange India Limited
REBA	Renewable Energy Buyers Alliance
RECs	Renewable Energy Certificates
REDE	Renewable Energy Demand Enhancement
RERC	Rajasthan Electricity Regulatory Commission
RESCO	Renewable Energy Service Company
RET	Renewable Energy Technology
RPO	Renewable Purchase Obligation
SECI	Solar Energy Corporation of India
SLDC	State Load Dispatch Centre
SPV	Solar Photovoltaic
T&D	Transmission and Distribution
TWh	Terawatt hour
UNFCCC	United Nations Framework Convention on Climate Change
VRE	Variable Renewable Energy



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EXECUTIVE SUMMARY



The corporate sector accounts for about 50 percent of total electricity consumption in India. The sector, therefore, has a critical role to play for India to achieve its ambitious renewable energy targets of 175GW installed capacity by 2022. The electricity sector has transformed rapidly with a substantial fall in renewable energy prices (solar and wind power) in the last few years, dropping to historical lows in 2017/18, reaching a point where it now comfortably competes with conventional coal based power¹.

The corporate sector accounts for about **50%** of total electricity consumption in India

Corporates identified policy and regulatory challenges as the primary factor restricting corporate RE uptake in India, in spite of a strong business case for RE procurement

India is the third-largest country in terms of electricity generation (2015, IEA²). However, even though absolute figures are staggering, India's per capita electricity consumption is one-third of the world average. With rapid economic development, this demand is likely to increase by 170 percent by 2031-32, as per CEA estimates³.

Proactive policies, strong investor sentiment, cohesive public and private sector participation, sharp decrease in costs, and support from the states, among other factors have doubled India's installed RE capacity from 38GW to 72GW between 2015-18⁴ ⁵. While these positive trends have led to greater focus and development of renewable energy generation and supply, the demand uptake has not grown that significantly. It's therefore important to understand corporate demand and perspective in order to drive greater uptake of RE in India.

This report examines the role of the corporate sector, constituting commercial and industrial (C&I) consumers of power, in driving greater uptake of RE in India. RE buyers include corporates that procure RE through captive generation, power purchase agreements, or purchase of Renewable Energy Certificates (RECs), voluntarily or for compliance reasons. The report focuses more on solar and wind power due to overall rising installed capacity and greater interest shown by corporates when compared to other RE technologies.

The primary purpose of the report is to provide an RE Buyers' perspective by highlighting the rapidly increasing corporate RE procurement trends, the rationale for and mechanisms involved in this procurement. The report focuses on the challenges that these corporates are facing while procuring RE. The report also provides recommendations for corporates and policy makers to address some of these challenges.

It is imperative to understand as to how corporate demand can be unlocked. While the business case for procuring RE is strong, corporate RE procurement is still sluggish. Procurement is quite challenging due to multiple barriers such as, policy and regulatory uncertainty, complex and often inconsistent national and state policies and regulations, inadequate awareness of compliance processes, infrastructure issues, etc.

1 Busbar cost at plant gate, excluding applicable charges and levies.

2 <https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf>

3 http://www.cea.nic.in/reports/others/planning/pslf/summary_19th_eps.pdf

4 http://www.cea.nic.in/reports/monthly/executivesummary/2015/exe_summary-11.pdf

5 http://www.cea.nic.in/reports/monthly/installedcapacity/2018/installed_capacity-11.pdf

In order to understand and present the buyers' perspective, the report involves a combination of primary and secondary research. Secondary research involved an analysis of top 100 companies on the National Stock Exchange (NSE), by market capitalization and their climate and renewable energy initiatives. On the other hand, primary research involved direct interaction with 40 companies, already engaged in RE procurement or actively planning to purchase RE, to understand their perspective in RE procurement. The survey also included responses from 15 RE project developers.

SECONDARY RESEARCH: KEY FINDINGS

(from the NSE Top 100 companies, by market capitalization)

69%

of the companies are already procuring RE in some form or the other.

27%

of the companies have GHG reduction targets, 22% have RE procurement targets, and 10% of the companies have both.

8%

of the companies are signatories to Science Based Targets, while 5% have RE100 targets.

Software and Services Sector

is ahead of other industry groups, with 100% (all 6) companies having GHG reduction targets and 83% (five) companies having RE targets in place.

Sectors lagging behind on GHG reduction targets and RE procurement, include Banks, Diversified Financials, Pharmaceuticals and Household & Personal Products

5/9

banks have publically committed to lending to RE projects.

DETAILED INTERACTION WITH INDIAN CORPORATES SHOWS THAT:

- ▶ Primary drivers for corporates investing in RE are economic advantages, regulatory compliance requirements and sustainability commitments.
- ▶ Decreasing costs of RE in recent years, compared to tariffs charged by Discoms has made the business case for corporates, to transition to cleaner forms of energy, more compelling.
- ▶ Corporates identified policy and regulatory challenges as the primary factor restricting corporate RE uptake in India, in spite of a strong business case for RE procurement.
- ▶ A large number of corporates prefer to set up captive projects (including group captive) over other procurement models.
- ▶ Majority of corporates show inclination towards solar as a preferred technology for procuring RE.
- ▶ Investing 100% equity is preferred by large number of corporates followed by debt/equity option.

RECOMMENDATIONS FOR CORPORATES:

- Setting clear and ambitious RE targets is central to corporate commitment to procure RE, as part of a comprehensive greenhouse gas reduction strategy to address climate change.
- Corporates should choose an RE procurement model after careful assessment of the various models and their parameters, as feasibility can significantly vary based on the model.
- Corporates should look beyond short-term price trends, and build a long-term view on RE procurement, so that they don't get caught up with short-term variations.
- Negotiations with internal and external stakeholders of an organization, to develop the business case for RE, takes time and meticulous planning, and so adequate time should be allocated to this exercise.
- Analysing risk and opportunities are important as they allow corporates to plan their implementation better, and anticipate risks accordingly.
- Knowledge sharing and capacity building is important for corporates to keep abreast of the dynamic environment of renewables.

RECOMMENDATIONS FOR POLICY MAKERS AND REGULATORS:

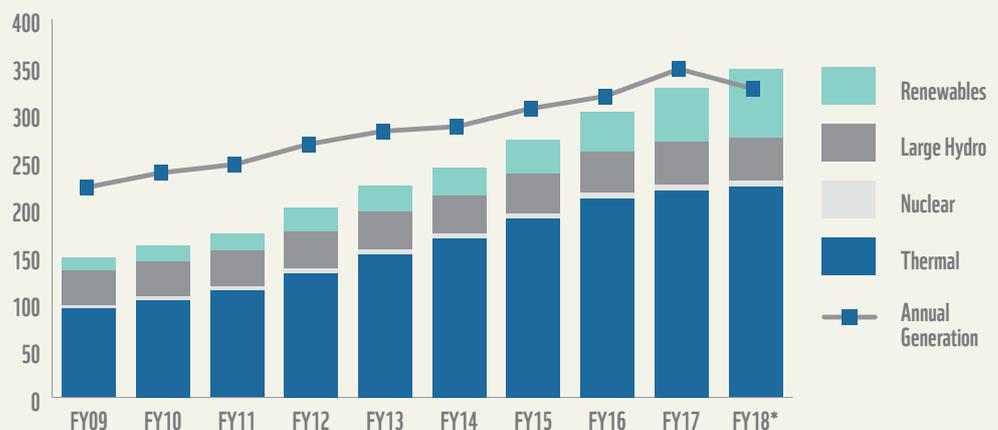
- Policy makers and regulators should ensure that there is greater certainty and consistency in policies and regulations and their implementation so that investors and corporates undertake long term investments in RE.
- Variation in policies from state to state makes it difficult for companies to have a uniform strategy for investment in RE at the national level. Policy makers should devise a way to have a national level policy for RE, similar to GST, if feasible.
- Uncertainty from frequently changing statutory charges hurt the business case for RE. Policymakers and regulators should provide a long term view on these charges to ensure longer term strategic planning for RE investment.
- Policy makers and regulators should also develop frameworks where, other issues, such as unplanned curtailment, are addressed.
- RE storage is an important element that needs to be developed at a time when share of Variable Renewable Energy (VRE) is increasing within the grid. It is important to manage the variable nature of RE and firm dispatch. Policymakers should provide an ecosystem that actively promotes storage capabilities to reduce grid instability.
- Open access is an important feature of the Electricity Act, 2003 that rationalized and provided freedom to buyers and sellers to exchange power at terms and rates that would benefit them. However, open access has become one of the fundamental barriers to RE procurement by corporates. Hence, policymakers and regulators should address these barriers to enable greater uptake of RE and also ensure implementation of policies which are already in place or develop policies that take a holistic approach, incorporating the interests of the buyers, sellers and intermediaries to enable greater uptake of RE.
- Enable flexibility and greater choice in RE procurement through diversification of sources, including Discoms, exchanges, or other means of RE procurement. This could be unbundled RE on preferential/direct contract basis.

INTRODUCTION



India accounts for nearly 17 percent of the world’s population⁶; however, it consumes about six percent of the world’s primary energy⁷, with about 31 million households without access to electricity⁸. Given the low per capita electricity consumption, RE could be a critical factor in India’s sustainable development agenda. India’s total installed power capacity was 345 GW in 2018 (till November), with 64 percent from thermal, and 21 percent from renewables, 13 percent from large hydro and two percent from nuclear sources.

Figure 1:
Growth of installed capacity and electricity generation in India⁹



CORPORATE SECTOR CONSUMES ABOUT 50% OF ELECTRICITY AND THIS DEMAND IS LIKELY TO INCREASE BY 66% BY 2030 FROM CURRENT LEVELS

GROWTH PLAN FOR RE

The government of India has established a target of 175 GW of RE installed capacity by 2022 as a part of its effort to address climate change. This target includes 100 GW solar energy, 60 GW wind, 10 GW biomass and 5 GW small hydropower projects. India has also set a target to achieve 40 percent cumulative electric power capacity from non-fossil fuel-based energy resources¹⁰ by 2030, as part of its Nationally Determined Contributions (NDC). In the run up to achieving these targets, the Indian government has initiated various policy reforms and developed specialized schemes and programmes, to create an enabling environment for greater installation of renewable energy capacity in India. India is now ranked the fifth largest in terms of installed RE capacity in the world¹¹. This installed capacity has increased at the rate of 20.5 percent between FY17 and FY18¹².

6 Worldometers. India PopulationData retrieved from<http://www.worldometers.info/world-population/india-population/>
7 BP. (2017). Energy Economics – India. Data retrieved from <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/country-and-regional-insights/india.html>
8 <https://www.forbes.com/sites/suparnadutt/2018/05/07/modi-announces-100-village-electrification-but-31-million-homes-are-still-in-the-dark/#68fa2ab063ba>
9 CEA. Renewables includes solar, wind, small hydro (below 25 MW), biomass and waste to energy projects
10 Non-fossil includes Renewable power, large hydro power and nuclear power
11 http://www.ren21.net/wp-content/uploads/2018/06/17-8652_GSR2018_FullReport_web_final_.pdf
12 http://www.cea.nic.in/reports/monthly/executivesummary/2018/exe_summary-03.pdf

CORPORATE SECTOR'S ELECTRICITY CONSUMPTION

Commercial and Industrial (C&I) consumers account for about half of the total electricity consumption in India. As per CEA, the total electricity consumption across India was 1,130 TWh during the year FY18 with about 50 percent being consumed by commercial and industrial consumers, followed by domestic at 24 percent, agricultural at 18 percent and the rest by other sectors¹³. Corporate demand is likely to increase by over 66 percent from the current levels (FY18) by 2030.¹⁴

Figure 2: Electricity consumption by commercial and industrial sector (TWh). As per estimates by PwC



A large number of corporate consumers do not rely on the grid electricity alone; many generate their own electricity through captive power plants (CPP). The total installed capacity of captive power plants is about 16 percent (55 GW) of total installed capacity and has been growing at a CAGR of about 6 percent between FY12-18¹⁵. About 60 percent of the CPP are based on steam cycle, followed by diesel, gas and hydro in a decreasing order.

RATIONALE FOR THIS REPORT

The quantum of electricity consumed by the commercial and industrial sector, accounting for about half of the power generated in the country, signifies the immense and promising potential of renewable energy consumption across this sector. Hence, this sector has an integral role to play in achieving India's climate commitments, energy security, energy access and sustainable development goal, especially since a significant proportion of energy consumed in India comes from imported fossil fuels, particularly oil, gas and coal.

The purpose of this study is to present the trends driving corporate RE demand in India from commercial and industrial consumers (corporates buyers') and provide their unique perspective on the rationale for their RE commitments, their mode of RE procurement and the challenges they are facing in RE uptake. A combination of primary and secondary research was conducted to provide a holistic overview of these trends.

¹³ http://www.cea.nic.in/reports/others/planning/pdm/growth_2018.pdf

¹⁴ As per estimates by PwC

¹⁵ http://www.cea.nic.in/reports/monthly/executivesummary/2018/exe_summary-01.pdf

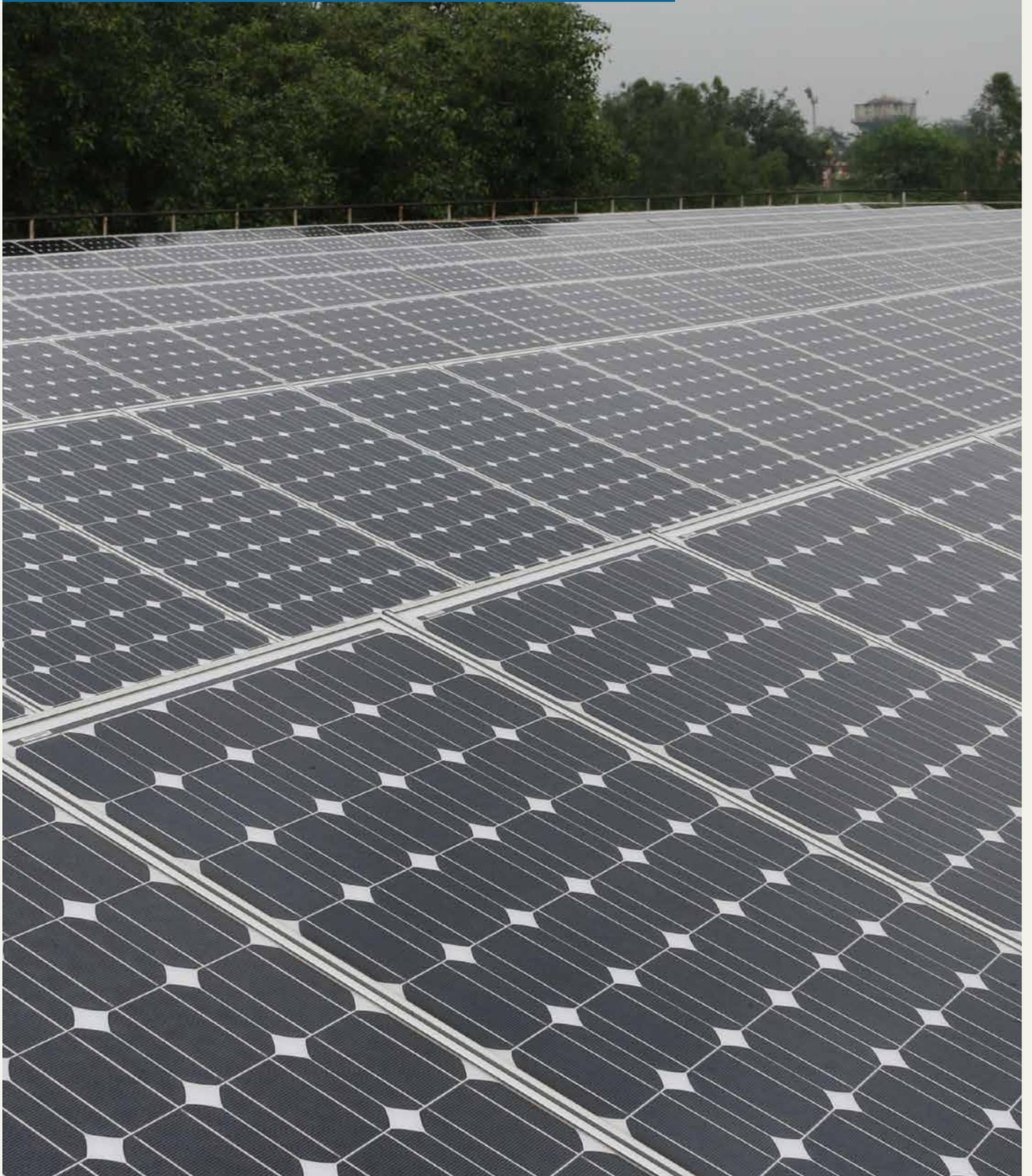
**INDIA'S TOP 100
COMPANIES LISTED
ON THE NSE WERE
ANALYSED ON THE
BASIS OF THEIR
PUBLIC DISCLOSURES
OF CLIMATE AND RE
COMMITMENTS**



As a part of this study, India's top 100 companies listed on the National Stock Exchange (NSE), by market capitalization, were selected. Their climate and RE commitments were analysed on the basis of their public disclosures. Further, based on the findings from this secondary research, an in-depth primary survey was carried out for 40 corporates to develop a better understanding of their perspective. This survey also included conversations with 15 RE project developers/ IPPs to seek their opinion on RE buyers with respect to these trends and also to understand the challenges that their customers were facing.

Based on the findings and analyses, overall recommendations have been made, both for corporates and for policy makers, given the challenges that these corporates are facing in RE uptake.

ARE INDIAN CORPORATES MAKING RENEWABLE ENERGY COMMITMENTS?



Globally, corporate RE procurement has gained significant traction, with corporates setting aggressive targets for reducing GHG emissions and procuring RE. About 48 per cent of Fortune 500 companies in 2016 set targets for RE procurement, GHG emission cuts, improving efficiency of energy consumption, or combination of these¹⁶. In India too, corporate commitments to reduce GHG emissions and procuring RE have been gaining momentum. Interestingly, what initially started as an intervention for environmental safeguard is now turning into commercial investments in RE for economic gains.

In order to understand the extent of awareness and initiatives undertaken by Indian companies towards containing GHG emissions and procurement of RE, a secondary survey was conducted for India's top 100 companies (refer Appendix 1) by market capitalization listed on the National Stock Exchange (NSE)¹⁷. Data set was collected from publically available information from sources like annual and sustainability reports, disclosure made through channels like the Carbon Disclosure Project, Global Reporting Guidelines, press releases, etc.

The top 100 companies surveyed cover a diverse range of sectors including cement, oil and gas, automotive, pharmaceuticals, IT, metals, telecommunications with 82 percent from the private sector and 18 percent from the public sector¹⁸. The analysis was carried out by segregating companies into 11 sectors and 24 industry groups as per Global Industry Classification Standard (GICS) used by the global financial community¹⁹.

Companies that have approved or committed to have Science Based Targets (SBT) and those having pledged to consume 100 percent RE as part of their GHG reduction strategies have been highlighted.²⁰ Identification of companies that have existing RE portfolio as against targets have also been analysed, along with their technology-centric interest, wherever data is available.

CORPORATE GHG AND RE TARGETS

Target setting is one of the most important steps that demonstrates long term vision and commitment to addressing climate change. Out of the NSE top 100 companies considered for this research, **69 percent of the companies have procured RE in some form or the other**, 27 percent of the companies have set clear GHG reduction targets, 22 percent have set RE procurement targets, and 10 percent have set both targets (Figure 3). The GHG reduction targets vary from intensity to absolute targets,

16 <https://www.worldwildlife.org/press-releases/report-fortune-500-companies-accelerating-renewable-energy-efficiency-efforts>

17 Top 100 companies by market capitalization, listed on the NSE on 6th September, 2018

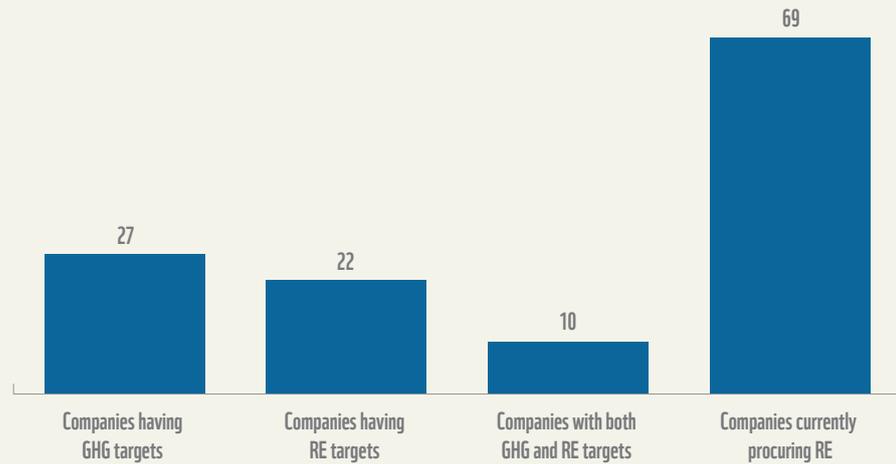
18 Government-owned corporations are termed as Public Sector Undertakings (PSUs) in India, as defined under Section 2(45) of the Companies Act, 2013. Source: <http://www.mca.gov.in/Ministry/pdf/CompaniesAct2013.pdf>

19 <https://www.msci.com/gics>

20 Approved or committed companies (from NSE list) to the SBT Initiative till October, 2018

while RE targets vary from targeted capacity (e.g. MW) or targeted energy consumption (e.g. MWh) or targeted percentage consumption. GHG targets are more of a common practice among companies than RE procurement targets, as the former usually leads to the latter.

Figure 3:
GHG and RE commitments and procurement



While it is encouraging to see that many companies have set targets for GHG reduction and RE procurement, as many as 61 percent of the companies do not have any set targets (GHG or RE).

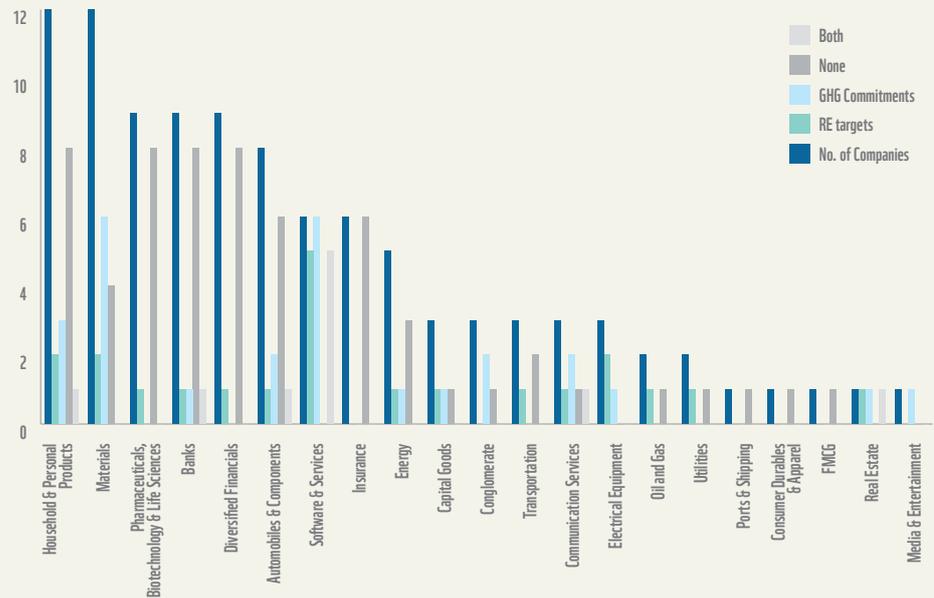
Setting GHG reduction targets plays an important role in not only tracking achievements, but also helps corporates build capacity to achieve these targets. Most of the targets mentioned above are set for 2020 (26 companies) or around that timeframe, while the rest of the companies have longer term targets (2030 and above). However, six percent of the companies that have set targets to procure RE or reduce GHG, have not indicated fixed timelines.

Of the various companies, eight companies have set GHG reduction targets or commitments based on Science Based Targets initiative (SBTi) framework, that include Hindustan Zinc, Tech Mahindra, Hindustan Unilever, Marico, Ambuja Cement, Wipro, Yes Bank and Mahindra and Mahindra, while five companies have committed to procuring 100 percent RE for their operations, that include, Tata Motors, Nestle, P&G, Hindustan Unilever and Infosys. In addition, five banks (out of nine), have solar-based ATMs or RE projects for using power for their operations in various offices.

Interestingly, out of the 69 percent of the companies that have procured RE in some form or the other, 62 percent are procuring RE from solar technology, 29 percent from wind, six percent from other sources and three percent have not disclosed technology used.

Figure 4 shows industry group-wise profile of NSE top 100 companies with respect to GHG reduction and RE procurement targets, in decreasing order of the number of companies within each sector.

Figure 4:
Sector profile of corporates
and their targets



32%
OF THE PRIVATE
COMPANIES HAVE
SET TARGETS,
WHILE ONLY
7%
FROM THE PUBLIC
SECTOR UNITS
(PSUS) HAVE SET
TARGETS

From the industry group point of view, Software and Services is ahead of the other industry groups, with six out of six companies having GHG reduction targets and five companies with RE targets in place. On the other hand, industry groups such as, Pharmaceuticals, Household & Personal Products, Banks and Diversified Financials, are the laggards in term of setting up GHG reduction or RE targets. However, banks have made clear commitments towards lending to the RE sector. For example, as many as five banks out of nine have committed to lending to the RE sector.

About 32 percent of the private companies have set targets, while only seven percent of the public sector units (PSUs) have set targets. Among PSUs, while 12 companies are currently procuring RE, five of them have RE procurement targets. GAIL is the only PSU that has a GHG reduction target.

Beyond the top 100 companies mentioned above, it is worth noting that at the 1st RE-Invest organised by Ministry of New and Renewable Energy (MNRE), as many as 387 investors/project developers/companies/PSUs had submitted 'Green Energy Commitment' letters for developing, investing and/or lending for RE projects, aggregating to more than 272 GWs in the next five years²¹. As many as 29 Indian banks submitted commitments towards financing RE projects, with the highest commitment made by SBI to lend for deployment of 15,000 MWs of RE. However, no data is available for achievements against commitments. On the other hand, no insurance company has made any sort of commitments or exposure towards RE installation.

21 <https://mnre.gov.in/file-manager/UserFiles/Open-Invitation-RE-INVEST-Mumbai-26.6.2015.pdf>

RE BUYERS' PERSPECTIVE: DETAILED INTERACTIONS WITH SELECT INDIAN CORPORATES



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The business case for renewable energy procurement has clearly become quite compelling for Indian corporates given the initiatives and commitments that have been made towards renewable energy, as covered in the previous section. In order to understand the buyers' perspective better, direct interactions were set up with some of these commercial and industrial consumers. The purpose of these detailed interactions was to understand the rationale for their initiatives and commitments towards RE, the mechanisms through which they were procuring RE and the barriers they were facing in RE uptake.

Primary survey methodology

As a part of this process, 40 corporates were interviewed who had already initiated or procured RE, either through captive generation, power purchase agreements (PPAs) or renewable energy certificates (RECs) for their own operations. The purpose of the primary survey was to narrow the focus specifically on C&I customers who had already delved into RE procurement to ensure that the feedback was based on actual experience of RE procurement and not theoretical analysis that organizations undertake before procurement. In addition, 15 developers of RE projects (IPPs/RESCO/EPC contractor) were interviewed to seek feedback on a buyers' perspective and also to ground-truth some of the facts and data that was provided.

The following charts provide an overview of the profile of corporates that were interviewed, covering 15 sectors (Figure 5) with relatively large energy footprint. In addition, a majority of the companies had revenues in the range of INR <1 to >1000 crore (Figure 6).

Figure 5 (Left):
Corporate profiles – by Sectors

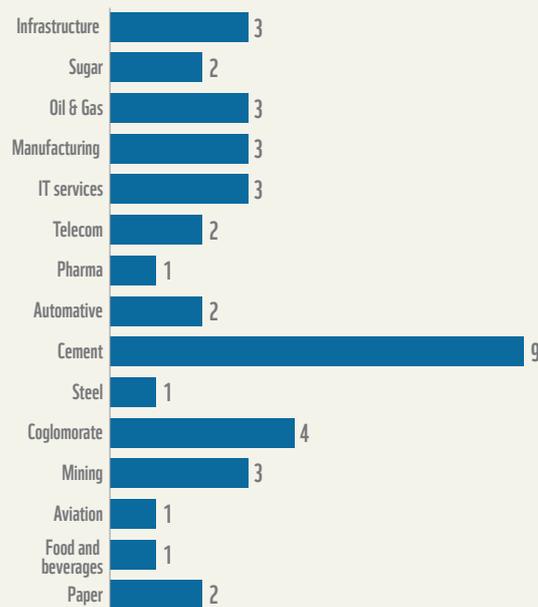
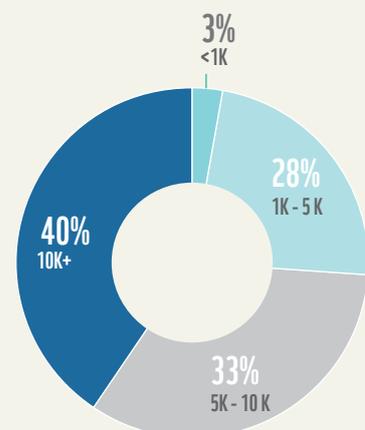


Figure 6 (Right):
Corporate profiles – by Revenue (INR Crore)

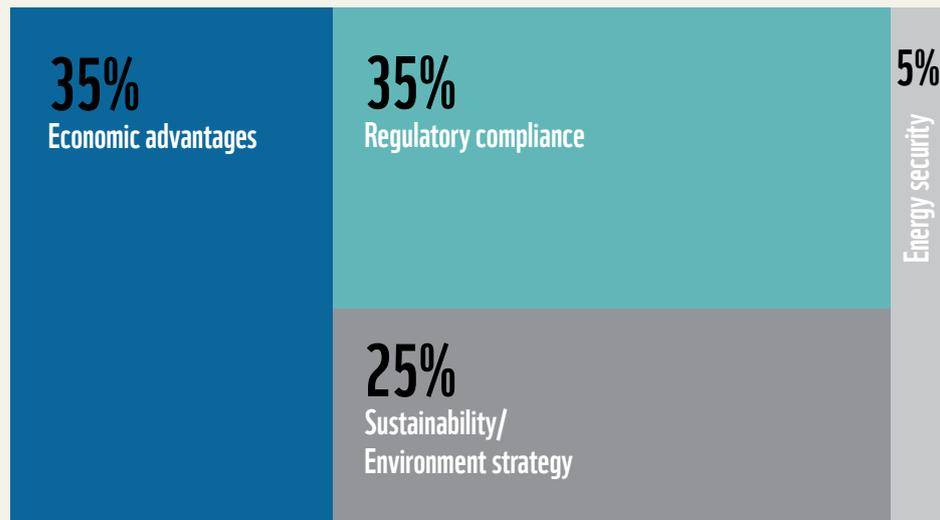


A. WHY ARE CORPORATES PROCURING RE?

Value proposition of corporate RE procurement is justifiably strong at present. To understand the rationale behind RE demand by corporates, they were asked to explain their reasons for moving towards RE procurement. Four key reasons emerged as the primary drivers for this increasing demand: economic advantage, regulatory mandate, environmental strategy and energy security.

Figure 7 illustrates the order of priority accorded to the rationale for corporate investment decisions. The business case for procuring RE is stronger today than it has been in the past, with 35 percent of the interviewed companies identifying fall in costs as their primary driver. In addition, an equal percentage of companies cited regulatory compliance (meeting Renewable Purchase Obligation) as their driver for increasing demand. Sustainability or environmental strategy were a close third, with 25 percent of the companies committing to RE to reduce their carbon footprint to address climate change. Energy security was also identified as a factor for investing in renewables and to diversify their energy mix.

Figure 7:
Corporate rationale for
RE procurement (%)



“The reduced solar panel cost and maturity of the industry has reduced cost of generation and made solar projects financially viable.”

JK ORGANIZATION

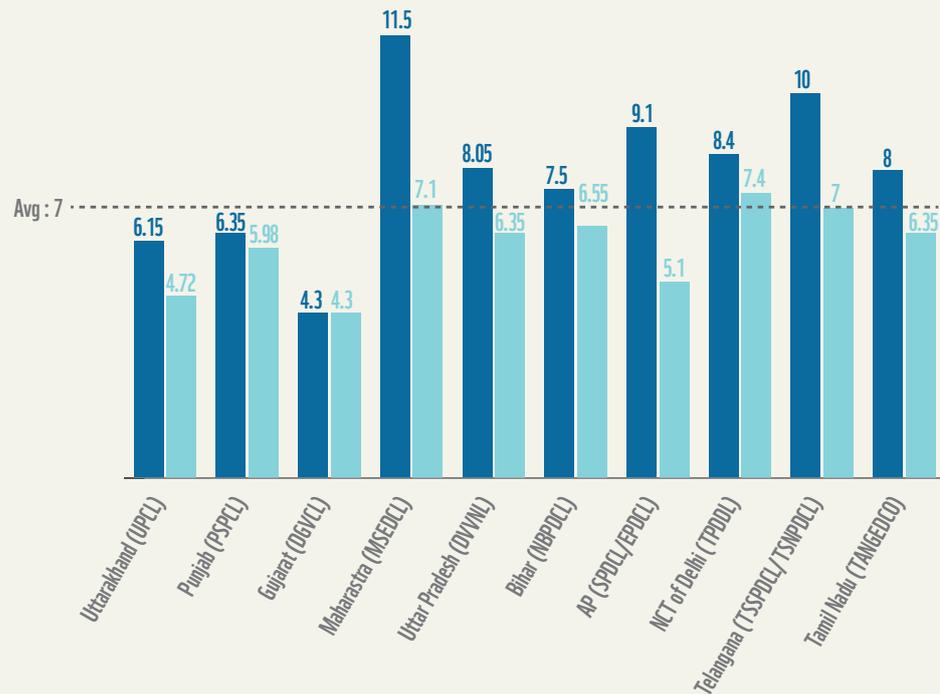
RE project developers/Independent Power Producers (IPPs) interact with many commercial and industrial customers as part of their business operations and hence their feedback was also sought to better understand the reasoning provided by these corporates. Their feedback largely coincided with the corporate sector, both identifying economic gains as the primary driver for RE procurement. These various parameters have been discussed in more detail in the subsequent sections.

1. Economic advantages: Decreasing costs of RE as compared to Discom tariffs

The energy sector has transformed rapidly with renewable energy prices falling significantly in the last few years, owing to solar and wind power becoming more cost-effective as compared to coal based power. It is therefore not surprising to see

the increasing interest from C&I customers with greater commercial viability of RE. Many factors have led to this drop in prices, ranging from promotion of competitive bidding, proactive government policies, strong investor sentiment and economies of scale (reduced equipment prices due to large scale demand), among others. As a result, more and more corporates are realizing the economic benefits of incorporating increasing proportion of RE in their energy portfolio to hedge against market volatility in traditional fuel markets.

Figure 8:
Average commercial and industrial tariff offered by Discoms in various states (INR/kWh)²²

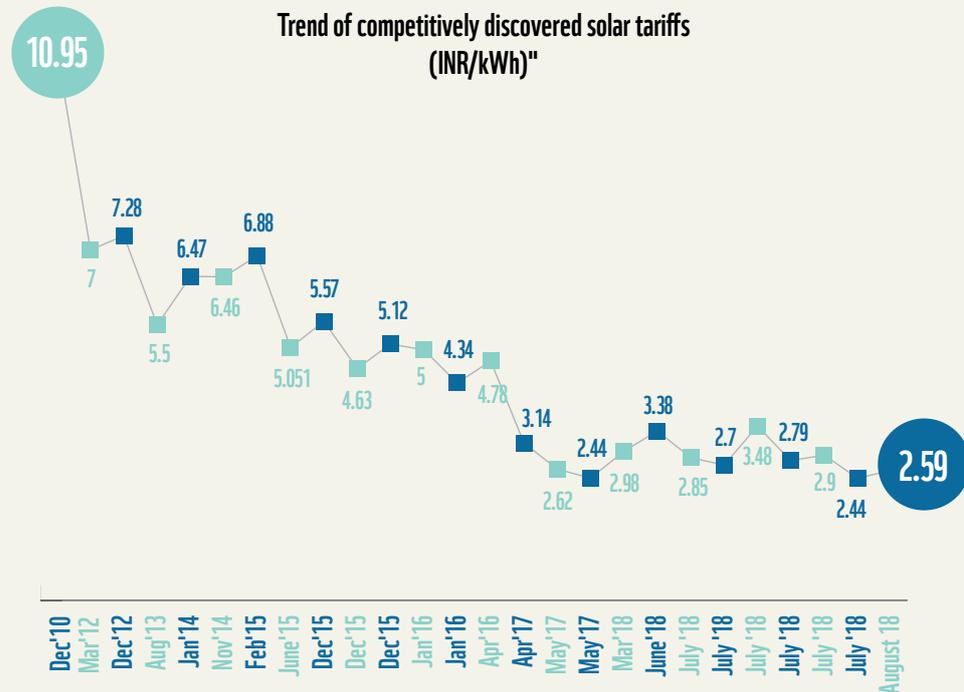


In order to set the context, the graph given above (Figure 8) provides the average cost incurred by commercial and industrial users for electricity purchased from Discoms (although these vary from state to state on a yearly basis and are subject to time of day charges), which ranges between 4.3 to 11.5 INR/kWh (FY17-19). On the other hand, the price of RE, as shown in the graph below (Figure 9) has plummeted rapidly. The prices dropped to as low as 2.44 INR/kWh in 2017 from 10.95 INR/kWh in 2010. However, landed cost of RE for an end consumer is much higher and depends on a range of factors, such as project size²³, applicable charges and duties, scheduling and forecasting costs, etc.

²² As of September, 2018)

²³ These are costs discovered for mega scale RE project. In other words, for a captive project of MW scale or in case a corporate decides to set up captive project or sign PPA for a lower capacity project, the landed cost for such projects would be much higher.

Figure 9:
Plummeting solar
power cost



2. Regulatory Compliance: Renewable Purchase Obligations

About 35 percent of the corporates identified Renewable Purchase Obligations (RPO) to be the primary reason for their RE procurement. RPO is a government mandate that requires Obligated Entities²⁴, including C&I customers that fall within the criteria laid out by State Electricity Regulatory Commissions (SERCs) as per the Electricity Act, 2003, to consume a certain percentage of their electricity from renewable sources of energy. It is applicable to corporates that procure power via open access with specific contract demand (varies from state to state) or have captive generation using fossil fuels.

Corporates invest in RE as a strategy to comply with RPOs, which is a government initiative to encourage demand for RE. However, if these corporates with compliance obligations are unable to meet this requirement, they are required to purchase renewable energy certificates (RECs) from designated energy exchanges (IEX & PXIL) at market determined rates. As per the National Action Plan on Climate Change and the National Tariff Policy²⁵, the RPO percentage will steadily increase while keeping a target of 8 percent by the year 2022 for solar, specified in the revised National Tariff Policy 2016²⁶. This was later updated by MoP in consultation with MNRE, taking total RPO target to 21 percent, enhancing solar energy component to 10.5 percent and non-solar to 10.5 percent by 2021-22²⁷.

²⁴ [https://www.recregistryindia.nic.in/pdf/REC_Regulation/2\(a\)CERC_Regulation_on_Renewable_Energy_Certificates_REC.pdf](https://www.recregistryindia.nic.in/pdf/REC_Regulation/2(a)CERC_Regulation_on_Renewable_Energy_Certificates_REC.pdf)

²⁵ Amendment, 2011

²⁶ <http://pib.nic.in/newsite/PrintRelease.aspx?relid=174832>

²⁷ https://powermin.nic.in/sites/default/files/webform/notices/RPO_trajectory_2019-22_Order_dated_14_June_2018.pdf

Figure 10:
Renewable purchase obligations can act as a demand pull for RE uptake



3. Sustainability or environmental strategy

The primary survey results revealed that at least 25 percent of the companies attributed sustainability or their environmental strategy as the primary driver for their RE procurement or investment. Sustainability strategies enable companies to incorporate environmental, social and economic factors, as part of their core business operations. A number of corporates are looking to voluntarily reduce their environmental impact as part of their corporate responsibility or sustainability strategy. In most cases, reducing carbon footprint is an integral part of their sustainability goals to address climate change.

Many companies wish to demonstrate strong climate action by means of their low-carbon growth strategies. These strategies range from reducing their greenhouse gas emissions (GHG) from energy consumption to increasing uptake of renewable energy. In addition, companies have made a range of specific GHG reduction and RE target commitments to mitigate their impacts. Some of the surveyed companies indicated that they had embarked on their RE procurement journey much before the business case for renewables was strong, highlighting their commitment to RE.

4. Energy security

Overall, five percent of the companies cited energy security to be another reason for diversifying their energy portfolio to include renewables.

The Indian government has positioned the manufacturing sector at the heart of India's growth model. As part of its 'Make in India' campaign, it will have to further increase the energy needed to fuel India's development. Industry-led growth requires at least 10 times more units of energy, as compared to growth led by the services sector²⁸. As per IEA estimates, it is expected that the steel industry alone will constitute about 30 percent of the industrial consumption in 2040²⁹. Industries require steady electricity supply for their operations and are adversely affected by power cuts or load shedding, leading to loss in production, service quality/standards and lower productivity. To compound the problem, industries rely heavily on alternative power sources such as diesel, which are also more expensive.

28 <http://www.makeinindia.com/article/-/v/pioneering-sustainability-solar-energy>

29 https://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf

ALL INDIA SURVEY OF COMPANIES ON INTERMITTENT POWER

As per a survey of 630 companies conducted by FICCI (2012), 63% of the companies faced more than one hour of power shortages in a week and 21% suffered more than 30 hours per week. 61% of the companies added that they had suffered over 10% cost escalation owing to frequent power cuts.

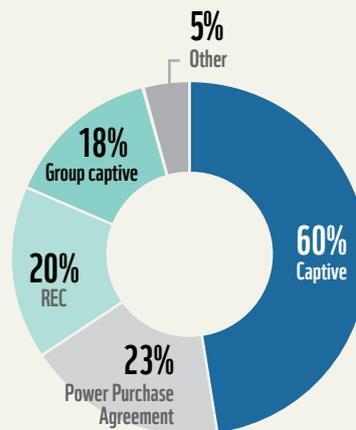
Thus, a shift to on-site renewable energy projects can help many industries reduce their dependence on costlier alternatives, such as diesel generator sets during power outages. Some industries pointed out that even though renewables could be unpredictable and variable in nature, they provide a good alternative energy source at the time of power outages.

B. HOW ARE CORPORATES PROCURING RE?

Corporates in India are increasingly inclined towards renewables as their preferred choice of electricity and now have access to a variety of options for procuring renewable energy. The corporate sector has witnessed the evolution of three broad major market models for procurement of renewable energy. Two of these models involve the actual procurement/generation of RE through direct capital investment or through Power Purchase Agreements, while the third model involves purchasing Renewable Energy Certificates (RECs) that represent one MWh of RE generation.

Selection of any one or more of these models depends upon various internal factors, such as, investment potential, management priorities, team strength and policy and regulatory environment. Many large corporates tend to use a combination of the three given models, depending upon their specific requirements. For instance, Figure 11 highlights corporate preferences within these business models based on the primary survey.

Figure 11:
Preferred RE
procurement model



About 60 percent of the corporates identified Captive Power Projects (CPP) as their preferred model despite upfront capital investment costs. This was followed by 23 percent of the corporates preferring Power Purchase Agreements (PPAs) with third parties and 20 percent choosing Renewable Energy Certificates (RECs).

In the following section, each of these mechanisms is discussed in detail, followed by the pros and cons of each of these models.

Figure 12:
RE sourcing models for corporates



DIRECT CAPITAL INVESTMENT

In case of this model, corporates deploy their own capital in the form of 100 percent equity or equity/debt mix for setting up RE projects. These projects can be on- or off-site depending on RE resource availability, availability of space for installation and other factors. Depending on the structure of investment, these projects may be classified as captive, group captive projects and sale to utility projects (at APPC tariff). Projects set up by corporates for sale to utility (Discom) at Feed-in-Tariff (FiT) are not considered here, as these projects are set up for the sole purpose of revenue generation, as an alternative business activity.

Captive Power Project

Corporates set up captive power plants to generate RE primarily for own energy use. These projects can be on- or off-site and can be grid-connected or off-grid. As per the Electricity Rules, 2005, a generating station or power project is considered captive if the entity who owns it, consumes not less than **51 percent of the aggregate electricity generated** from the plant, and holds not less than **26 percent of the paid up equity share capital** in such a plant, on an annual basis^{30,31}. Change in shareholding of the captive users is allowed within a year, subject to sanction by relevant authorities³². However, draft amendments related to CPP in Electricity Rules, 2005 intend to restrict these changes to two in a financial year³³.

In case of off-site generation, the generating company/consumer applies for open access with minimum contract demand (generally greater than 1 MW) for availing electricity from the point of generation to consumption. In case of open access of RE, electricity banking is allowed in a manner that excess generation or shortfall in consumption is banked with the Discom for use at a later stage. However, this has to be within the same Time of Day (ToD) slot and within the same financial year, April to March. Some states allow credit for the banked energy all around the year, while others do not permit it for some specific months, mainly because of prevailing grid loading conditions.

³⁰ <http://aptel.gov.in/pdf/N5.pdf>

³¹ https://powermin.nic.in/sites/default/files/webform/notices/proposed_amendment_in_electricity_rules_2005_0.pdf

³² <http://www.mercindia.org.in/pdf/Order%2058%2042/Order-159%20of%202016-19032018.pdf>

³³ https://powermin.nic.in/sites/default/files/webform/notices/Draft_Amendments_in_the_provisions_relating_to_Captive_Generating_Plant_in_Electricity_Rules_2005.pdf

Group Captive Power Project

Group captive power projects (GCPPs) are similar to captive plants. However, their ownership does not lie with a single user. In this case, ownership can lie with multiple users, associations, co-operatives or with a Special Purpose Vehicle (SPV). Other conditions for CPP, as mentioned earlier, remain applicable for GCPP as well. While fulfilling 51 percent criteria of captive consumption, the GCPP, as an association of persons, is required to source power in proportion to its shareholding³⁴. Each shareholder is restricted from transferring the equity shares during the term specified under the contract.

The advantage of setting up captive or group captive power plants is that the company can avail certain exclusive benefits or incentives extended by the state or central government, such as accelerated depreciation, tax holiday benefits; non-applicability of certain regulatory levies, such as Cross Subsidy Surcharge (CSS), Additional Surcharge (ASC). At the same time, corporates receive additional benefits such as stable cost of power and safeguard from frequently changing Discom tariffs and compliance to RPOs, where applicable.

On the other hand, challenges include upfront capital expenditure, approvals from multiple government offices, such as State Nodal Agencies (SNA), load dispatch centres, municipality (in case of roof-top project), Discoms, besides forecasting and scheduling of the generation, and others.

Corporates are shifting from Discoms to captive or group captive models due to multiple reasons, including cost difference between these options. Both captive and group captive can provide significant protection to corporates in the current environment, where tariffs charged by Discoms for industrial and commercial consumer have seen an upward trend and cross-subsidization levels have remained high in many states, recording an increase of more than 20 percent³⁵ (applicable in case of PPA).

Participation of IPPs is another option wherein corporates, within the group captive model, can have additional advantages, such as involving an experienced participant in power generation, who can manage the asset more efficiently, sharing equity and generation, etc. Additionally, in case GCPP consumers fail to consume power to the extent that the generator can supply, but within the limits of 51 percent, an IPP can find an open access consumer for trading excess power for maximizing revenue. IPPs can also opt to sell power to Discoms or trade it over the electricity exchanges³⁶.

Sale of RE at APPC tariff

For some corporates, RE procurement is either not financially competitive (at current price trends), or technically feasible (for reasons, such as, non-availability of space for on-site RE project, insufficient transmission corridor for wheeling RE etc.)³⁷. However,

³⁴ <http://aptel.gov.in/judgements/A.No.%20316%20of%202013.pdf>

³⁵ ICRA Research

³⁶ <https://www.indusind.com/content/dam/indusind/PDF/sembcorp-energy-india-limited-drhp.pdf>

³⁷ Because of existing procurement setup in the form of long term PPAs or CPP fulfilling current demand or congestion in the transmission corridor for wheeling electricity, etc.

they may have RPOs to comply with. In such cases, corporates can choose direct capital investment (100 percent equity or equity/debt mix) for setting up projects to sell electricity to the Discom at APPC tariff (subject to willingness of Discom to procure) and receive RECs that can be retired by corporates for satisfying RPOs³⁸. APPC tariffs are always lower than the FiT tariffs. Although they make much more commercial sense for a Discom (subject to regulatory approval) but are relatively less feasible for corporates. However, this arrangement is unique in a way that the investment is made with an intention to earn reasonable (but not competitive) return on investment, coupled with compliance of RPOs with a long-term view. For Discoms, such a deal makes sense only if the energy procurement satisfies energy demand-supply gap, and that the Discom has other means to satisfy their RPOs, as RE procured by Discom at APPC tariffs does not come with the RE attributes. Hence, in such cases, a Discom can choose to refuse to enter into a PPA. This would substantially increase the risk for a corporate and therefore should be assessed carefully.

POWER PURCHASE AGREEMENTS

In power purchase agreements (PPAs), the equity ownership of the project lies with a third party that supplies electricity as per the terms of the PPA between the corporate and the plant owner. Corporates sign PPAs with power generators. These are either independent power producers or other corporates with surplus power. The main advantage in this case is that the corporate does not incur the capital expenditure for the project, but only pays for electricity consumed on a per unit bases, while the supplier is able to receive a fair rate of return on his investment. Moreover, since the responsibility of running the plant lies with the supplier, he ensures optimum operation of the generating asset or lower downtime. Additional requirements towards compliances and payment of charges, such as forecasting and scheduling, payment of wheeling and transmission charges, banking charges, cross-subsidy surcharge, additional surcharge, losses incurred during transmission and distribution of electricity, etc., are payable by the consumer or the developer as per the terms of the PPA.

PPA effectively eliminates various forms of risks related to running the assets; however, applicable charges sometimes can be high enough to make the landed cost of generation for corporates economically unattractive. Hence, viability of RE procurement through PPA needs to be specifically determined, on a case by case basis.

On-site/RESCO

Corporates can install on-site RE projects, particularly solar (ground mounted or rooftop based), given the availability of space through a specific model called Renewable Energy Services Companies (RESOs). RESO is typically a company that is in the business of setting up RE projects, carrying O&M and supplying renewable electricity. Corporates can enter into PPA and/or site lease agreement with RESO, who install the project on-site. Within the RESO model there are variations that have evolved over time, as discussed below:

38 <https://www.recregistryindia.nic.in/index.php/publics/faqs>

- a. Built Own and Operate (BOO) model: PPA between corporate and RESCO, coupled with roof lease contract for the duration of the project life. In other words, the project investment in this case is made by the RESCO, and the generated electricity is sold to the corporate at the tariff agreed as per PPA. PPA and the roof lease rights are mutually exclusive wherein a corporate may enter into a PPA for a shorter period than the project life (say 10 years, after which generally PPA re-negotiations happen) following which, either party may exit the PPA. Meanwhile, the site/roof agreement remains valid for the life time of the project, and in the absence of PPA, RESCO can contract electricity to a third party or Discom (subject to conditions and the state specific policy).
- b. Build Own Operate and Transfer (BOOT): PPA is signed between corporate and RESCO for the time that is less than the project life coupled with the roof rights for the duration of PPA, after which RESCO transfers the asset to the corporate as per pre-determined conditions. In other words, RESCO makes the initial investment in setting up the RE project and operate it for an agreed period and charge the corporate on tariff plus bases and transfer the project to the corporate as per BOOT contract. The roof lease rights remain applicable for the entire duration of the PPA term.

Net- or gross-metering mechanism (wherever applicable and subject to specific state policies) can be used to sell surplus electricity to the Discom. In many states, a ceiling of 1 MWp (varying from state to state) is maintained for granting net- or gross-metering connection for roof-top projects. In some states, there is restriction to grant net metering based on solar rooftop project in case the consumer is already procuring power through open access, such as in the case of Maharashtra³⁹.

OPEN ACCESS – APPLICABLE FOR OFF-SITE PROJECTS BASED ON PPA OR CAPTIVE MODE

Open access is required for transmission of electricity so that power can be wheeled from the generation end to the consumption end. For PPAs or captive projects where open access is available within the same state, only intra-state distribution and transmission charges apply (wherever applicable), otherwise inter-state transmission charges are also levied, subject to sanction for such open access. Period of open access can be availed from the following three categories:

- **Long-term:** 12-25 years, where nodal agency is typically STU
- **Medium-term:** three months-three years, where the nodal agency is typically STU
- **Short-term:** less than one month, where the nodal agency is typically SLDC

Customers may reapply for the same type of open access for periods that are less than the succeeding level.

Generally, charges pertaining to inter-state open access tend to make PPAs unviable. Thus, acknowledging this fact and for promoting inter-state exchange of RE, the Ministry of Power (MoP) has extended waiver of charges and losses for inter-state transmission of electricity generated from solar and wind projects for a period of 25 years from the date of commissioning, for projects commissioned till 31 March 2022. This scheme is valid in case PPA for RE is signed with entities for compliance of RPOs (including Discoms), and the projects are awarded through a competitive bidding process⁴⁰ ⁴¹ as per guidelines issued by the central government⁴².

39 <http://www.mercindia.org.in/pdf/Order%2058%2042/Order-163%20of%202017-12062018.pdf>

40 <https://mnre.gov.in/content/guidelines-tariff-based-competitive-bidding-process-procurement-power-grid-connected-wind>

41 <https://mnre.gov.in/sites/default/files/webform/notices/Clarification-Guidelines-for-TBCB-process-for-procurement-of-power-from-GCSPV-projects.pdf>

42 https://powermin.nic.in/sites/default/files/webform/notices/Waiver_of_inter_state_transmission_of_the_electricity.pdf

RENEWABLE ENERGY CERTIFICATES

The Renewable Energy Certificates (RECs) are a market-based mechanism that seek to promote renewable energy and enable virtual trade of RE without any exchange of actual power. The mechanism enables corporates to procure RE (carrying environmental attributes) to either meet their compliance needs or on a voluntary basis. Corporates can purchase these RECs at the price discovered at the power exchanges (IEX & PXIL) based on demand and supply. A REC issued to the RE generator accounts for 1 MWh of renewable-based electrical energy fed into the grid by a generator. The generator sells the electricity to the Discom at the regulated price (Average Power Purchase Cost - APCC) or to a consumer through open access.

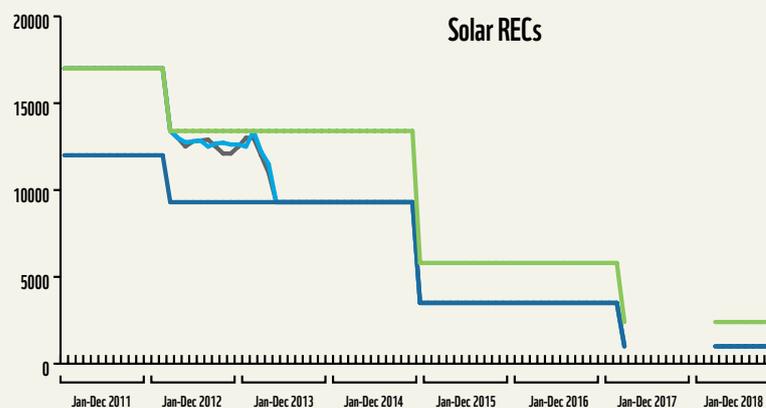
Salient features of RECs are listed below:

Specifications	
REC denomination	1 MWh
Validity	1,095 days after issuance
Categories	Solar REC and non-solar REC
Trading platform	Indian Energy Exchange (IEX) and Power Exchange India Limited (PXIL)
Banking	Not allowed
Transfer type	Single time transfer only

RECs are a much simpler or leaner option for corporates that have obligations to purchase RE, but do not wish to enter into PPAs or setup green-field RE projects for solar and non-solar compliance. Given the uncertain nature of RE generation, it can be tricky to ensure the quantum of energy that can be delivered either via PPAs or generating assets that equates to RPOs – that is where REC plays a role as a bridge to help in complying with RPOs against the deficit. In such cases, REC purchase provides a less cumbersome option than procuring RE through last minute bilateral contracts.

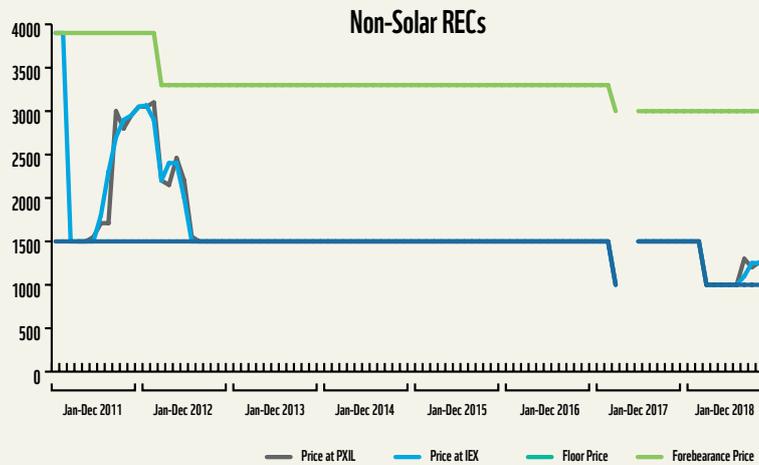
REC prices are determined in the market subject to demand and supply. Theoretically, the prices within a trading session are supposed to be volatile; however, in reality the volatility has remained lower than expected. The regulatory interventions on the other hand have played a much more dynamic role in defining REC price trends rather than the market forces, as shown in Figure 13.

Figure 13 (A):
REC clearance price
trends⁴³



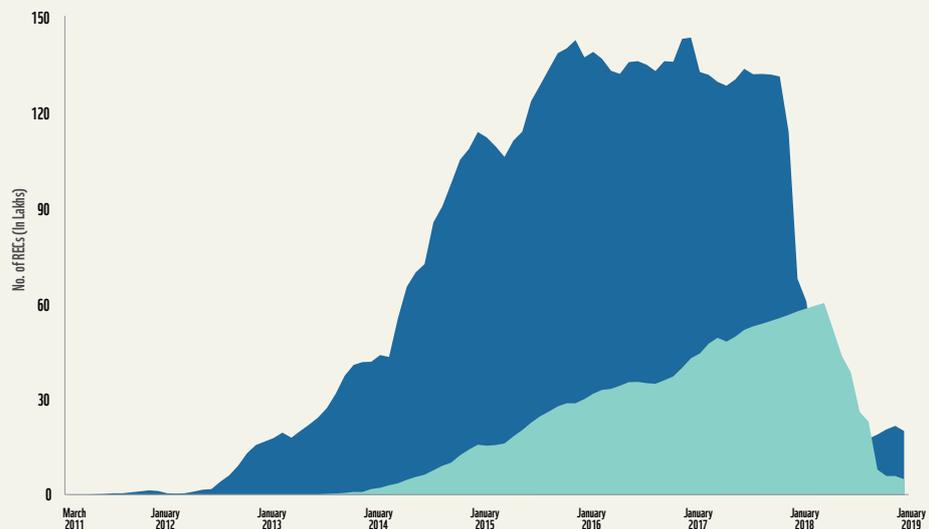
43 <http://www.prayaspune.org/peg/re-certificates.html>

Figure 13 (B):
REC clearance price trends



Factors such as low enforcement of RPOs, consistently reduced floor and forbearance price of RECs (by CERC) and REC prices historically following the floor price, have not just caused more damage to the generators and REC consumers, but have also resulted in an environment of uncertainty for them. However, consequent to an order upholding the validity of RPOs by the Supreme Court⁴⁴ in May 2015, the government’s commitment towards stricter RPO compliance⁴⁵ and regulators issuing notices to obligated entities for non-compliance of RPOs (e.g. KERC sent show cause notice to Honda Motor Cycle⁴⁶, ACC Ltd⁴⁷, Grasim Industries⁴⁸ etc. for non-compliance of RPOs) across different states has resulted in an upward trend in REC purchases or clearance of the backlog, as can be seen in Figure 14.

Figure 14:
REC Trade Trends⁴⁹



44 http://www.business-standard.com/article/companies/sc-order-upholding-rpo-big-boost-for-renewable-energy-trading-115051900544_1.html
45 <https://mercomindia.com/power-ministry-amend-laws-ppas-rpos/>
46 <https://www.karnataka.gov.in/kerc/Court%20Orders%202018/RPO%20Compliance%20for%20FY17%20by%20Honda%20Motor%20Cycle%20and%20Scooters%20India%20Pvt%20Ltd-Order.pdf>
47 <http://www.karnataka.gov.in/kerc/Court%20Orders%202018/Dated%2007.08.2018-%20RPO%20Compliance%20for%202016-17%20-ACC%20Ltd-Order.pdf>
48 <https://www.karnataka.gov.in/kerc/Court%20Orders%202018/Dated%2014.12.2018-RPO%20Compliance%20for%20FY17%20by%20Grasim%20Industries%20Ltd%20Chemical%20Division%20Karwar.pdf>
49 https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

As per the recent trends of REC purchase, about 61 percent of the total RECs have been purchased by Discoms, followed by about 39 percent by CPPs/OA consumers, whereas only 0.1 percent were purchased on a voluntary basis. The registered RE generators at the two exchanges have collective project capacities of 3,983 MW through a total of 912 projects, as on 11 September 2018. About 34 percent of the total number of registered projects (and 42 percent in terms of registered capacity in MW) as on 31 March 2018 were based on the APPC route, followed by OA accounting for about 33 percent projects (and 21 percent registered capacity), and CPP accounting for about 22 percent registered projects (and 24 percent in capacity terms)⁵⁰.

COMPARING RE PROCUREMENT MECHANISMS

Every mechanism used for RE procurement has its inherent risk and return profile, which needs to be weighed by corporates enabling them to choose the best fit for their requirements. The following table highlights some of the pros and cons for each RE procurement mechanism:

	Pros	Cons
Direct capital investment	<ul style="list-style-type: none"> Multiple regulatory and financial incentives, such as accelerated depreciation benefit and exemption from CSS, etc. Stable cost of power 	<ul style="list-style-type: none"> Upfront capital costs Additional responsibility of project management and oversight for stable performance Owner requiring: <ul style="list-style-type: none"> Various approvals from government offices Forecasting and scheduling of generation Transmission/wheeling charges and losses apply, in case of offsite captive RE projects
Power Purchase Agreement	<ul style="list-style-type: none"> Project management and overall risk is primarily borne by the developer Experienced developer ensures optimal performance No upfront investment – payment towards electricity consumed on per unit bases 	<ul style="list-style-type: none"> Costs, such as CSS and additional surcharge apply Transmission/wheeling charges and losses apply, in case of offsite projects
Renewable Energy Certificates	<ul style="list-style-type: none"> RPO obligation or voluntary requirements can be met without any project related challenges and risks Procurement is not restricted by geographical availability of RE resource 	<ul style="list-style-type: none"> The market is at the risk of price volatility. Unlike other mechanisms where there may be a financial gain from the transaction, REC purchase is an outright expenditure

50 https://recregistryindia.nic.in/flasher_attachment/Report_on_REC_Mechanism.pdf

C. WHICH TYPE OF RE TECHNOLOGY DO CORPORATES PREFER?

This section briefly covers different types of RE technologies adopted by corporates and their specific preferences. As part of the survey, corporates were asked to identify their RE technology preference. About 74 percent corporates chose solar as their preference over other technologies (See Figure 15). It was found that the primary reasons for choosing solar, included ease of installation, flexibility of system size, better predictability of generation, and diminishing costs, among others. As per market trends, overall investments in solar technology have increased from \$4 billion in 2014 to \$10 billion in 2017⁵¹.

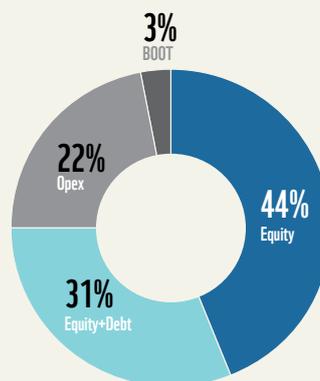
Figure 15:
RE technologies preferred by corporates



D. WHAT TYPE OF FINANCING MODELS DO CORPORATES PREFER?

The source of finance becomes an important question for corporates opting for RE consumption. As per the primary survey, about 44 percent corporates identified equity as their preferred choice for RE financing, while 31 percent mentioned an equity/debt mix, as shown in Figure 16.

Figure 16:
Corporate preference for RE financing



In case of debt financing, the debt raised may be recourse or non-recourse depending upon various criteria such as PPA terms, promoter capacity, and others. However, non-recourse financing comes with higher interest rates and depends on corporate relationship with FIs.

51 <https://mercomindia.com/indian-solar-financing-2017/>

“Every state has separate regulatory body and different open access charges. There should be some synergic policies”

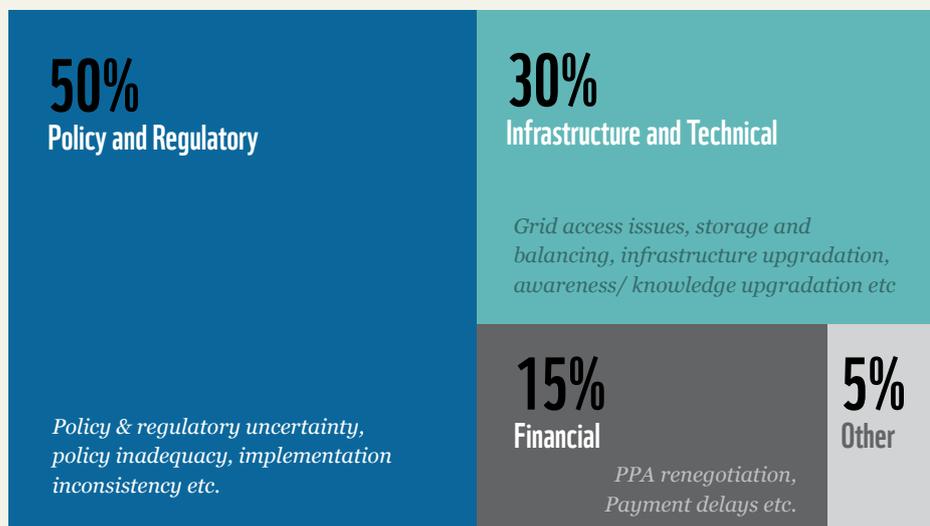
INFOSYS

E. WHAT CHALLENGES ARE CORPORATES FACING IN PROCURING RE?

In recent years, the interest of corporates in RE procurement has multiplied due to various factors, such as improved or better financial returns, RPO mandates and environmental strategies. For many corporates, RE procurement has become part of their long-term energy strategy and no longer remains a short-term intervention. While many corporates have already started increasing their investment in RE, others are exploring transaction options and mechanisms to join the bandwagon. There is no doubt that the trend of RE procurement has picked up momentum; however, numerous barriers and opportunities of improvement still prevail. Based on the results of the survey of 40 corporates and 15 RE project developers, regulatory and policy issues were identified as the big hurdles, followed by comparatively lesser intense roadblocks related to infrastructure, technology and financing. This chapter provided an elaborate view on such challenges faced by corporates in RE procurement.

The following Figure 17 highlights the results of the survey, where data points emphasize policy and regulatory issues as the primary hurdles facing corporates, with 50 percent of the corporates citing these as the biggest barrier to their corporate RE procurement. In a similar survey with developers of RE projects, policy and regulatory challenges emerged as the bigger barrier to corporate RE procurement. Many of the barriers apply to developers/IPPs as well, but in this report we have highlighted the feedback we received on barriers for corporates.

Figure 17:
Challenges to RE procurement



In addition, other key barriers include, infrastructure and technical challenges, financing and miscellaneous challenges. The following sections provide an explanation of these barriers and how they are restricting demand uptake.

“Dalmia Cement (Bharat) Limited is the first cement company in the world to commit to 100% RE transition. Progressing on ambitious RE 100 roadmap through RE procurement would also require measures from both state and central government to address the existing RE policy variation (from state to state).

- DALMIA CEMENT (BHARAT) LTD.

1. Policy and regulatory challenges

Corporates and developers have identified challenges related to policies and regulations as the major barrier restricting corporates from procuring RE. A host of different challenges forms part of policy and regulatory challenges, and some of the important ones are listed in the following section:

Policy and regulatory uncertainties

RE policies vary from state to state. They generally have a control period of five years⁵², much shorter than the life of a project. The regulatory terms, on the other hand, are often amended, in fact multiple times within the life span of RE projects. Such situations are unfavourable for corporates as they spread uncertainty within the ecosystem, affecting the financial viability of the projects.

For example, cross-subsidy surcharge (CSS), additional surcharge, transmission and wheeling charges, PoC charges etc. are some of the regulatory levies determined on a yearly basis. This leaves the investor with uncertain information regarding cash flow projections required to assess the viability of a project. In fact, some of these charges have seen an upward trend in most of the states. These trends disproportionately increase the viability risks of these projects, over and above intrinsic generation uncertainty.

Corporates with operations in multiple states find themselves severely exposed to such uncertainties as they impact their corporate level strategies and operations. Simultaneously, other project proponents, such as financial institutions (FIs) are also affected. They either raise interest rates for financing these projects to cover risks related to these uncertainties, or lend selectively, reducing financing exposure to corporates, thereby affecting both corporate and FI bottom line.

In 2017, Karnataka state electricity regulator, KERC identified the need for mid-term revision of Generic Tariff for wind power plant given the drop in prices from wind auctions held by SECI. The discovered price of wind power through reverse auction was 20 percent less than the FiT price of Rs 4.50/ kWh, determined by the commission earlier, as a result it was revised to Rs 3.74/ kWh. The revision came at a time when Discoms had signed various PPAs at earlier determined tariff as per the prevailing order (some of these projects were already commissioned and injecting electricity into the grid) and submitted to KERC for approval. KERC declared that PPAs that are yet to be approved by commission would be passed only at the newly notified tariff. This created a great deal of turmoil within the ecosystem affecting all participants. However, after intervention from the state government, KERC had to accede to their request and approved PPAs (242.5 MW) at Rs 4.50/ kWh.⁵³

Unlike electricity generation from fossil fuels, generation from RE technologies (RETs) is significantly dependent on natural climatic variances. Hence, the two sources cannot

52 <https://mnre.gov.in/file-manager/UserFiles/Grid-Connected-Solar-Rooftop-policy/Policy-and-Regulatory-Framework-in-Various-States.pdf>

53 <http://www.karnataka.gov.in/kerc/Discussion%20papers%20%20Draft%20Discussion%20papers/Discussion%20Papers/Discussion%20Paper%20on%20Revision%20of%20Generic%20Tariff.pdf>

“Share of RE within ITC’s total energy consumption mix is as high as 43% at present, and we target to achieve 50%. However, the road to RE procurement has been challenging, due to significant barriers related to open access imposed by Discoms and SLDCs, together with changing levies, duties and concessions extended to RE project for corporates who generate their own RE.”

- ITC LIMITED

be treated at par and therefore some form of support or relaxation is a legitimate need. However, based on the way regulatory frameworks work on the ground, Variable Renewable Energy (VRE) is inherently considered at par with conventional power systems that tend to vary from state to state. Banking, for example, is exclusively needed for VRE. However, in some cases, while it is provided, prohibitive service charges make it relatively costly. For example, in case of Tamil Nadu that has a very high RE potential, the banking charges payable are as high as 12 percent, which have gradually increased from two percent in 1986, and likely to increase to 14 percent⁵⁴. On the other hand, in many other states, the charges are payable in-kind - at two percent. Besides, in many states banking is restricted to a selective RET; restricted for only limited period (varying from one month to 12 months); subject to Time of Day generation and consumption, not applicable in case of PPAs, etc. For example, in case of Maharashtra, credit for banked energy is not permitted for use during the months of April, May, October and November⁵⁵.

Implementation inconsistencies

There is an inherent expectation that when policies and regulations are in place, implementation will be undertaken as per their terms and conditions. However, if not implemented, these adversely affect the interest of multiple stakeholders, such as investors and buyers, severely impacting the entire ecosystem. There are many instances where policies developed by legislators and regulators were not implemented either in letter or in spirit. For instance, the policy of ‘must-run for RE or keeping RE out of merit-order dispatch, exist in many states, despite the large number of implementation defaults that have been reported. Similarly, while policies for rooftop solar exist in almost all the states⁵⁶, investors are facing issues, such as, Discom related barriers; non-functioning of single window clearance mechanisms.

In 2016, major wind power developers/IPPs filed a petition with Rajasthan Electricity Regulatory Commission (RERC) against Rajasthan State Load Dispatch Centre and the Discoms. The petitioners challenged the arbitrary instructions issued by the SLDC for RE generation to back down in contravention to the state’s RE policy, RERC grid code and tariff regulation. Hearing the petitioners and respondents, the commission suggested that SLDC should bear in mind that RE generation is strictly dependent on the natural resources and therefore power evacuation from RE should be done on a priority basis as per the grid code, and SLDC should maintain proper records for the reasons for such back down instructions to maintain transparency.

MNRE had also issued an advisory to CERC in 2016 against violation of must run status provided to RE and mentioned that the request for backing down solar projects must be done only in rare cases. Additionally, projects ‘be paid full tariff if they are forced to back down in rare cases’.^{57,58}

54 <http://www.tnerc.gov.in/orders/Tariff%20Order%202009/2018/Wind-6of2018.pdf>

55 <http://www.mercindia.org.in/pdf/Order%2058%2042/Distribution%20Open%20Access%20Regulations%202016.pdf>

56 <https://mnre.gov.in/file-manager/UserFiles/Grid-Connected-Solar-Rooftop-policy/Policy-and-Regulatory-Framework-in-Various-States.pdf>

57 <http://rerc.rajasthan.gov.in/Orders/Order444.pdf>

58 <https://mnre.gov.in/file-manager/UserFiles/Backdown-of-solar-projects.pdf>

Inconsistency across policies

India imported about 3.83 billion USD worth of solar cells and modules in the fiscal year 2017, 20 percent higher than the earlier year, during which 3 GWp of SPV project was built. About 90% of these imports were from China. Historically, the imports have seen incremental trends due to rising solar installations. In contrast, the data for exports show that the trend is going down. Clearly, there is a mismatch between the capacity of indigenous solar production and demand, due to which the developers disproportionately rely on imports, as imported solar cells and panels are much cheaper. Overall, the demand needs to be met by any means if 100 GW of solar target by 2022 is to be achieved. On the other hand, there is a 'Make in India' policy that encourages indigenous production, including solar. However, since the production cost of solar products that are made in India is higher than that of the imported ones, solar project developers are reluctant to purchase them at those costs. These two policies inherently lead to mismatch of expectations, with both competing to meet their individual goals.

The recently imposed Safeguard Duty by the Ministry of Finance (MoF), on imports from China and Malaysia, recommended by the Directorate General of Trade Remedies (DGTR), and the Good and Service Tax (GST) on RE products (plus, the confusion over applicable rate of GST on certain RE equipment, especially solar PV panels) is further creating additional issues within the market. This would not only push the solar tariffs upwards, significantly delaying or reduce capacity addition, but also create an uncondusive environment for investors.

2. Infrastructure and Technical Challenges

The absence or constrained availability of the infrastructure for mobilizing RE creates a whole new level of risk. Buyers, developers, investors and financial institutions have been exposed to such risks in many RE predominant states and have been struggling with it. Some of the risks faced by corporates are presented below:

Grid access issues

Inadequate power network and sub-optimal grid operation, such as demand-supply mismatch impact the renewable energy investment planning for corporates. Some of these issues include poor transmission and distribution infrastructure, inadequate load and generation forecasting, lack of grid flexibility and unavailability of grid till the tail end. Lack of infrastructure defeats the purpose of open access mechanism, i.e. to encourage competition in the electricity sector by giving a choice to buyers and suppliers of electricity. Moreover, poor infrastructure leads to grid unavailability due to unscheduled maintenance down-time, which affects the feasibility of renewable energy projects. For example, the annual grid availability for wind assets in Tamil Nadu from FY14–FY16 stood at less than 80 percent while the average annual grid availability from FY11-13 was approximately 95 percent.⁵⁹ Besides, T&D losses are one of the highest in India, unavailability of efficient power infrastructure causes large losses to buyers of electricity through captive or third-party open access mechanism.

⁵⁹ <https://indiaratings.co.in/PressRelease?pressReleaseID=24110&title=Market-Wire%3A-Grid-Curtailment-Contagion-Puts-Pressure-on-Credit-Profiles-of-Renewable-Energy-Projects->

Storage and balancing

Given the dependence on nature for electricity generation, two of the most important requirements associated with variable RE (VRE) are electricity storage and balancing capability for managing fluctuation that have far reaching impacts for buyers, generators, Discoms and most importantly, grid security. The major consequence of incrementing VRE capacity in the grid is the instability/ imbalance created due to variable generation from RE sources. Variable nature of renewable energy generation inherently does not obey demand response and is unpredictable. This causes reliability related issues. Load Dispatch Centres find it very difficult to manage demand and supply with high percentage of VRE generation that results in issues like stranded firm generation, frequent ramping-up and ramping-down of the conventional generation impacting the plant efficiency, etc. Further, on one hand variable RE generation impact Discoms financially and non-financially, on the other hand it also impacts end buyers due to addition of banking charges (wherever applicable) and Deviation Settlement Mechanism (DSM) penalties associated with scheduling and forecasting of RE.

CERC recognised the need for energy storage and grid balancing capability and came out with consultative papers^{60,61} with possible resolution mechanisms. CEA on the other hand had estimated System Balancing cost of RE as Rs 1.1/ kWh in 2017⁶². However, independent studies estimate the cost as Rs 3.5/ kWh. These costs at present are not loaded to RE tariffs at which PPAs are signed, however paid by different actors of electricity grid infrastructure in one way or the other, majorly by Discoms. Since the obligation of renewable purchase by Discoms are going to move up in the near future, the stress on Discom's financial statements will increase going forward. Along with hurting Discom's balance sheet, the stress will also be visible through incremental electricity charges for various consumer categories, especially C&I consumers.

Promoting reliable, predictable, schedulable & affordable Firm Renewable Energy (FRE) in maintaining grid stability and eliminating grid balancing cost, is need of the hour. In other words, co-located energy storage coupled with renewable energy projects is an important requirement for moving from variable RE to Firm RE (FRE) or even merchant RE. At the C&I consumer level too, the significance of storage can hardly be overemphasized because commercial and industrial loads, like any other load, require sustained supply as the demand arises. In some ways government has started promoting energy storage coupled with large scale RE projects^{63, 64}. However, policies that incentivise storage are needed to kick off large scale deployment. Scale of economies that has led to the reduced price of solar can also potentially help in bringing down storage costs as well.

60 http://www.cercind.gov.in/2017/draft_reg/SP.pdf

61 http://www.cercind.gov.in/2015/draft_reg/Ancillary_Services.pdf

62 Report of the CEA's Technical Committee on Study of Optimal Location of Various Types of Balancing Energy Sources / Energy Storage Devices to Facilitate Grid Integration of Renewable Energy Sources and Associated Issues, Dec 2017.

63 http://seci.co.in/show_whats_new.php?id=596

64 <http://pib.nic.in/newsite/PrintRelease.aspx?relid=181698>

The lack of sufficient balancing capabilities causes inflexibility within the grid in accommodating intermittent renewable power. For example, Jharkhand has invited solar bids for 1,200 MW, while its local peak demand is approximately 1,332 MW. This will certainly cause issues in efficiently managing the grid in the near term. Such cases are bound to increase as more renewable energy capacities are added with inadequate expansion of transmission infrastructure. This will require proper planning to ensure grid management, adequate forecasting and optimal scheduling.^{65,66}

Infrastructure upgradation

At a time when the share of RE is expanding within the grid, network augmentation in parallel, is a requirement so that optimal dispatching of the generation is achieved. However, in reality, expansion of the transmission and distribution network has not been at par with the expansion of RE generation. This has resulted in delayed CoD for many projects and increased instances of curtailment. Parliamentary Standing Committee on Energy also expressed concerns over the progress of transmission network and green energy corridor for evacuating RE to the load centres⁶⁷, including mismatch between the fund allocation and the targets set for 2018-19.

The rooftop solar programme, which is centred towards cities and industrial clusters, depends on the availability of infrastructure so as to manage the generation. However, many states still have sub-optimal infrastructure, much due to disinterest shown by Discoms. Issues such as restriction on the system sizes, non-sanctioning of the rooftop projects due to limitation of distribution transforms (DT) capacity (allowed solar penetration at the DT level varies from as low as 15 percent to as high as 80 percent from state to state⁶⁸), etc. are some of the hurdles that buyers face in different states. In 2014, the government announced Integrated Power Development Scheme (IPDS)⁶⁹ for strengthening of sub-transmission and distribution network in urban areas amongst other things. However, the result of the scheme is yet to be seen on the ground.

Awareness/Knowledge upgradation

RE sector is going through substantial changes, such as, technologies, markets, policies and regulatory frameworks. As it is growing increasingly difficult for corporates to stay updated on all these fronts, it is important for them to make a well-informed decision on RE procurement. Policy and regulatory aspects also change frequently across states. Thus, it becomes challenging for corporates to keep track of these changes so as to finalise the renewable energy purchase mechanisms.

In addition to the renewable energy policies, developers also tend to tweak their business and financial models, leading to changes in the dynamics of the renewable power market, which reflect in plummeting bids for solar projects. Corporates find it difficult to keep pace with such multifaceted changes in the RE landscape.

65 http://www.jreda.com/tenders/pdf/2015/07_12_15_solar_rfpd_1200_mw.pdf

66 <http://www.cea.nic.in/reports/annual/lgbr/lgbr-2018.pdf>

67 http://164.100.47.193/lssccommittee/Energy/16_Energy_39.pdf

68 https://www.bridgetoindia.com/wp-content/uploads/2015/11/BRIDGE-TO-INDIA_India-Solar-Rooftop-Map-2016.pdf

69 <http://www.ipds.gov.in/>

“Most of the Discoms are not cooperative to corporate RE procurement as they feel open access and net-metering will hurt Discom business”

JBM GROUP

3. Financial issues

PPA renegotiation

Power distribution companies form a very important part of the electricity network, where they procure electricity from various sources and distribute it to different section of consumers, including commercial and industrial users. In addition, they develop and maintain infrastructure that can be used by those who wish to buy electricity from a third party or wheel it from their own generator. The fall in RE prices, as a result of economies of scale and reverse bidding led to a series of events where many Discoms across the country have started reneging tariffs as against the spirit of PPAs signed with RE generators and sanctioned by the regulators. This directly affects the financial viability of projects set-up by generators/investors. For example, Discoms in Andhra Pradesh, Karnataka and Uttar Pradesh went on reneging contacts with investors. Such issues not only discourage corporates to invest in this sector, but also spread negative news about the certainty and sanctity of the contacts.

In 2017, Andhra Pradesh Southern Power Distribution Company (APSPDCL) told the Andhra Pradesh Electricity Regulatory Commission (APERC) that they were reviewing the Power Purchase Agreement that they had signed with 41 RE project proponents. Both MNRE and Niti Aayog took cognizance of the rising demand from Discoms for renegotiation of the PPAs and wrote to the principle secretaries stating that it was not appropriate to go back on the contractual agreements, as it would create uncertainty in the RE ecosystem. Finally, APERC in its order in December 2017 provided that the developers should not be forced to change the terms of the PPA.⁷⁰

Payment delays

Payment delays by Discoms have long been hurting solar and wind power projects in India, as these are soft targets compared to PPAs signed with conventional power plants, such as coal based plants that supply base load power, or power purchased via exchange. Payment delays directly hurt the cash flow for RE projects, especially towards operations and servicing bank loans. Discoms in all the RE rich or non-RE rich states viz. Tamil Nadu, Rajasthan and Maharashtra, Madhya Pradesh, Andhra Pradesh, Telangana, Uttar Pradesh and Jharkhand have been struggling to pay the RE project owners and are taking as much as 9-14 months for clearing dues. Corporates that have set-up power projects and signed PPAs at APPC rates for retiring RECs against their renewable purchase obligations suffer significant losses especially when APPC is way lower than FiT rates.

70 <http://aperc.gov.in/admin/upload/151549045414185113435a548c9614a41.pdf>

RECOMMENDATIONS



From a commercial point of view, choosing RE help companies save costs over traditional means of energy supply and helps them diversify their energy portfolio. In addition, it helps them implement their climate change and GHG reduction strategies. Many of these corporates are the biggest GHG emitters or consumers of energy and therefore have a critical role to play in the government achieving its climate change and GHG reduction targets. It is for this reason that initiatives from both sides are important to achieve India's RE and NDC targets.

Globally, corporate RE purchase has gained significant traction and has already reached a tipping point. More corporates than ever before are setting aggressive targets for RE procurement for multiple reasons, such as financial attractiveness, climate and environmental strategy, streamlined regulations and energy security. Needless to say many of these corporates had faced hurdles while integrating RE, as part of their energy strategy. Despite these challenges, some companies chose to go ahead with RE, indicating their commitment to address climate change

RECOMMENDATION FOR CORPORATES

SETTING RE TARGETS: RE is one of the key levers to reduce GHG emissions in addressing climate change. Corporates should set clear and ambitious RE targets, as part of a more comprehensive GHG reduction roadmap, such as Science Based Targets (SBT)⁷¹. SBTi is one such forum that drives ambitious corporate climate action agenda for helping companies set organization-wide GHG targets. The roadmap allows companies to take an informed decision based on the current climate science and the specific context of their overall operations. RE targets should be ambitious, long term with clear short and medium term milestones based on a thorough baseline assessment.

CAREFUL SELECTION OF THE BUSINESS MODEL: This report presents prevalent business models for RE procurement and their pros and cons. The models should be chosen based on thorough analysis, as feasibility can vary based on multiple factors. For example, parameters for procurement change from location to location, state to state, based on the type of model. Buyers that have a presence in multiple locations and have RE procurement policies or obligations at the corporate level would have to undertake deeper analysis as conditions of procurement vary from state to state and sometimes even within the same state. Similarly, the levies may differ, that significantly affect the business case for RE procurement; or conditions imposed by the utility that may affect the ability to procure requisite quantum of RE, etc.

INVESTING IN RE AS A LONG TERM STRATEGY: The tariffs offered by solar and wind power projects have recently seen historic lows, below conventional power tariffs. While the discovered tariffs are subject to conditions of supply and levies, overall long term prices of RE have been steadily going down as

71 <https://sciencebasedtargets.org/>

compared to conventional power tariffs. Hence, the business case of RE continues to be strong in the longer term and so corporates should not hesitate to take a long term view on purchasing RE, due to short term oscillations. Corporates should plan RE procurement with a systematic and streamlined longer term vision and not as a short-term tactic for quick financial gain to seek internal buy in.

NEGOTIATIONS: Similar to any business process, negotiations in case of RE procurement involve multiple stakeholders from within and outside the organization in order to arrive at a desirable business case. Negotiations within the organization usually involve developing the business case and roadmap for RE procurement with discussions with multiple stakeholders from across finance, operations, engineering, marketing and contracting in order to arrive at the most optional procurement parameters. While externally, corporates should get in touch with peers, multiple service providers, such as EPC contractors and/or developers to arrive at the right RE technology, contract terms and price points that makes business sense.

IDENTIFYING RISKS: RE procurement exposes corporates with different kinds of risks, such as energy supply uncertainty, uncertainty of payment security from Discoms (in case of sale to Discom projects), policy and regulatory uncertainty, etc. Hence, corporates need to undertake a careful assessment (including SWOT analysis) and profile the risks and evaluate each of them with regards to their possible impact on their business. Based on the SWOT matrix and overall analysis pertaining to impact incidence and mitigation of risk, a comprehensive risk mitigation plan needs to be developed, fostering long-term growth and decisive thinking.

KNOWLEDGE SHARING AND CAPACITY BUILDING: RE procurement for those who are new to this space can be challenging in a dynamic RE environment with changing prices, costs, technologies, policies and regulations, etc. Therefore, building capacity to keep abreast of the rapidly changing parameters of the sector is important. In addition to conferences, news, articles, interaction with service providers, knowledge exchange among corporates is particularly important, as it promotes direct and free access to information that is neutral and easier to understand, compared to other sources. Renewable Energy Demand Enhancement (REDE) Initiative is one such national platform that WWF-India and CII have developed for corporates in India to not only exchange knowledge and experience with each other in a neutral environment, but also address barriers restricting demand at an aggregate level⁷². Additionally, collaborative efforts through meetings, discussions, events and workshops promotes the culture of ‘collective knowledge dissemination’, proliferating knowledge about best practices they employed and how it has impacted their businesses positively. This exchange also encourages corporates to strive for greater ambition.

72 https://www.wwfindia.org/about_wwf/making_businesses_sustainable/corporate_renewable_energy_procurement/

RECOMMENDATION FOR POLICY MAKERS AND REGULATORS

Almost 70 percent of the top 100 companies, by market capitalization, have initiated efforts to procure RE. However, real demand uptake will happen only when many of the key issues identified below are addressed at a macro level.

POLICY AND REGULATORY CERTAINTY: Policy and regulatory uncertainty is the single largest issue that buyers and investors face in the RE sector today. Policy uncertainty is a significant challenge for businesses, and while some degree of uncertainty is always factored into energy cum financial models, the business case of investing in RE can easily fail, if deviations exceed beyond a critical point. Policy makers and regulators need to therefore provide an environment of long-term policy certainty and implementation to enable investments in the long term.

POLICY INCONSISTENCY: As many corporates have presence in multiple states, there is a need for consistency in pricing and policies across states to help corporates plan better investments. Currently, the policies/regulations/guidelines for renewable energy vary greatly across states and thus the project economics and mode of implementation have to be analyzed separately. As India has put in place a uniform tax structure across different states through GST, similar options could be considered towards uniform open access regulations, charges and mechanisms for RE procurement. Policy makers and regulators should devise framework in which corporates having operations in multiple states should be governed through a unilateral RE policies and regulations handled by a central agency.

LONG-TERM HORIZON ON STATUTORY CHARGES: As a standard financial modeling practice, businesses add taxes, duties, levies and other fundamentals of the project in order to derive cash flows and profitability of a project. In case of RE, energy generation is always uncertain, as to which businesses tend to factor in, as part of their overall due diligence and assessment. However, risks associated with statutory charges that remain uncertain further exacerbate this risk. Policymakers and regulators should make sure that investors get a long-term view of such charges so that clear business case can be envisioned at the time of project planning.

ISSUES, SUCH AS CURTAILMENT SHOULD BE MINIMIZED, AS MUCH AS POSSIBLE: Energy use planning is an important activity that directly affects cash flows for a corporate. Curtailment, on the other hand, disrupts planning and pushes the business to look out for alternatives. Unplanned curtailment is deterring the business of RE in almost every state in India, raising aggregate infirmness, and thus, uncertainty. This uncertainty can definitely prove to be detrimental for investor confidence in the sector. This can easily be avoided by ensuring adequate compensation against loss of generation. Transparency and data sharing practices in this regard are another weak link that policy makers and regulators need to focus their attention on.

FOCUS ON RE STORAGE: The variable nature of RE hurts various participants of the electricity sector, including the end consumer. The rising focus on RE capacity addition in the long run will not only impact the ability to utilize the entire capacity of RE generating asset, but also the cost economics for various actors in the electricity infrastructure. Of course, interventions like the building of a green energy corridor is a part of the solution, but it does not reduce the stress of managing RE generation versus load. Focus on storage for firming up RE dispatch has the ability to resolve many of these issues. The government should provide an ecosystem that promotes building RE storage for sustainable RE infrastructure in the future.

FOLLOW THROUGH ON OPEN ACCESS: Electricity Act, 2003 was pivotal in giving freedom to both generators and consumers to choose their trading partners; open access of power was one of its most important features. However, in reality, prohibitive levies and regulatory terms (banking, CSS, etc.) are dis-incentivizing the adoption of open access. Policies and regulations should strike a balance and allow each participant to benefit from the mode of transaction based on what makes the most sense for them. Many states have imposed prohibitive open access charges, which should be rationalized in such a way that it encourages corporates to procure RE.

ENSURE ENFORCEMENT OF RE POLICIES: Policy of net metering is outlined in most of the jurisdictions. However, there have been a large number of cases where some Discoms found a way to shift the goal posts and deter businesses' from taking advantage of the policy. Similar issues have come to light – corporates seeking sanctions for Open Access faced resistance from the state distribution companies, State Load Dispatch Centers (SLDCs) or other concerned stakeholders. In all these cases, while policies existed, enforcement of these policies had been weak. It is therefore, important for policymakers to address enforcement of these policies or develop holistic policies that balance the interests of all key stakeholders.

ENABLE FLEXIBILITY AND GREATER CHOICE IN RE PROCUREMENT DIRECTLY FROM DISCOMS AND EXCHANGES: Corporates in India today are keen to procure RE. However, they need flexibility in procurement options, allowing them to procure RE through multiple sources, such as directly from Discoms and exchanges. This could be in the form of unbundled RE at preferential/direct contract basis. This flexibility will allow companies to expand their scope of procurement, based on their respective needs and allow for greater uptake of RE in India. At the same time, this could generate greater business for the Discoms, while reducing the chances of their losing existing customers.

RENEWABLE ENERGY DEMAND ENHANCEMENT

FOR CORPORATE BUYERS IN INDIA



THE INITIATIVE

The Renewable Energy Demand Enhancement (**REDE**) Initiative for Commercial & Industrial (C&I) consumers aims to build an alliance among corporate buyers to increase commitment to renewable energy procurement and catalyze solutions to address challenges that are significantly restricting demand.

THE OPPORTUNITY

India has set ambitious targets of 175 GW renewable energy (RE) capacity by 2022 and 40 per cent power generation from non-fossil sources by 2030. This is increasing the share of clean energy in India's fuel mix and driving its goals for energy security and sustainable development.

The electricity sector has transformed rapidly with solar and wind tariffs dropping to historical lows in 2017/18, reaching parity with coal-based thermal power.

Proactive policies, strong investor sentiment, cohesive public and private sector participation, sharp decrease in costs, and support from the states have led to India's installed RE capacity doubling from 38 GW in 2015 to 76 GW today. Renewables now form 21.5 per cent of India's power mix. Recognizing these developments, leading companies are increasingly interested in sourcing renewable power.

THE NEED FOR REDE

The corporate sector accounts for about 50 per cent of total electricity consumption in India, most of which comes from conventional fuels. Increasing C&I consumer commitment to shift to renewable power sources and aggregating their demand will provide significant predictable offtake for the expected volume of RE power.

While the business case to adopt RE is stronger today than ever before, the process is very challenging for corporate buyers. Uncertain, complex and often conflicting national and state policies and regulations, inadequate awareness and compliance of implementation processes, technological issues, real and perceived costs, and operational inertia are the major deterrents to large-scale offtake of RE. Addressing these issues requires informed and concerted efforts by all stakeholders.

OBJECTIVES

Develop a platform to increase C&I consumer demand with an overall RE offtake commitment of 10GW by 2022

Identify innovative and collaborative solutions to address RE procurement barriers to help stakeholders, such as policymakers, regulators, discoms and generators better understand and address C&I customer needs

Identify and support corporate capacity building needs to enhance offtake of RE

Create a global renewable energy network and drive innovation towards renewable energy purchase models

BUYER'S PRINCIPLES

The following principles outline the common needs of corporate renewable energy buyers. They aim to increase corporate Renewable Energy demand in India and inform key stakeholders about what leading C&I consumers are looking for when it comes to buying renewable energy.

- 1. Long-term policy and regulatory stability** to create a favorable environment for renewable energy offtake and investment
- 2. Greater choice for corporates to procure renewable energy** through diversification of sources, including:
 - Purchasing unbundled renewable energy on preferential / direct contract basis from discoms, power exchanges, aggregators, etc. versus the universal bundled multi-source delivered by discoms today
 - Opportunities to engage with regulators and utilities to provide more options for RE purchasing
 - Sourcing power directly from generation sources, such as solar parks and wind farms
- 3. Low risk, firm power** at competitive prices
- 4. Capacity building** to enhance uptake of renewable energy

These principles will unveil new opportunities, choices and collaborations that will help businesses meet their goals to increase RE procurement.

ARE YOU REDE? JOIN THE INITIATIVE!

REDE will help you be a part of a global movement to scale your renewable energy procurement from low-carbon energy markets, foster innovation, influence policy and decarbonize corporate energy in the longer term. WWF-India and Confederation of Indian Industry (CII) welcome C&I consumers that are interested in being part of the Renewable Energy Demand Enhancement (REDE) Initiative. This entails:

- **Policy Engagement:** engage with policymakers, regulators and utilities for addressing policy & regulatory barriers to corporate RE procurement.
- **Capacity Building:** understand the business case for RE procurement and how C&I consumers can improve their purchasing options, through webinars, boot camps, etc.
- **Member Networking:** exchange RE ideas, questions and experiences with leading C&I consumers in India.
- **Global Connect:** access resources on clean energy best practices in India and around the world.
- **Market Intelligence:** access knowledge products focused on policy & regulation, transaction models, state policy guides, capacity building tools, etc.

A GLOBAL MOVEMENT

REDE is part of a growing group of national-level platforms supporting renewable energy sourcing, such as Renewable Energy Buyers Alliance (REBA). REBA was founded in June 2016 in the United States, with support from WWF, BSR, the Rocky Mountain Institute and the World Resources Institute. REBA has grown into an independent business association of 74 leading US multinational corporations that helps companies overcome RE procurement barriers and influence suppliers and policymakers to meet corporate demand for RE purchasing options. Similar efforts are growing in Mexico, China, Australia, South Korea, Vietnam, and elsewhere around the world.

Please email your expression of interest to:

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Head – New Initiatives Energy & Infrastructure

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OTHER RENEWABLE ENERGY INITIATIVES IN INDIA

RE100⁷³ is a collaborative, global initiative uniting influential businesses committed to 100% renewable electricity, working to massively increase demand for - and delivery of - renewable energy. Led by The Climate Group in partnership with CDP, RE100 brings together the world's most significant, ambitious and forward-thinking companies who are accelerating the transition to a zero emissions economy by committing to 100% renewable electricity across their operations. Globally, 125 multinational businesses have made the RE100 commitment by February 2018.

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WBCSD'S RESCALE PROJECT: INDIA CORPORATE RENEWABLE PPA FORUM

Through REscale, leading global companies are working together on solutions to accelerate the deployment of renewable energy. In recognition that corporate renewable PPAs are an important instrument for accelerating renewable energy deployment, REscale set up the India Corporate Renewable PPA Forum in 2017.

In 2018, the India Corporate Renewable PPA Forum published the report. 'Accelerating corporate procurement of renewable energy in India'. Building on this work, the India Corporate Renewable PPA Forum convenes twice a year to share and discuss its biannual PPA market and policy publications.

To find out more about REscale and the India Corporate Renewable PPA Forum, please visit our website, www.wbcsd.org/Programs/Climate-and-Energy/Energy/REscale/.

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GREEN POWER MARKET DEVELOPMENT GROUP (GPMDG) INDIA

⁷³ is an industry-led initiative aimed at rapidly increasing the share of renewable energy in the overall energy consumption of commercial and industrial establishments. This will be accomplished by addressing the policy, regulatory and market barriers that currently impede the growth of renewable energy sector. GPMDG works with the government agencies and other relevant institutions to help member companies voluntarily set and achieve their renewable energy goals.

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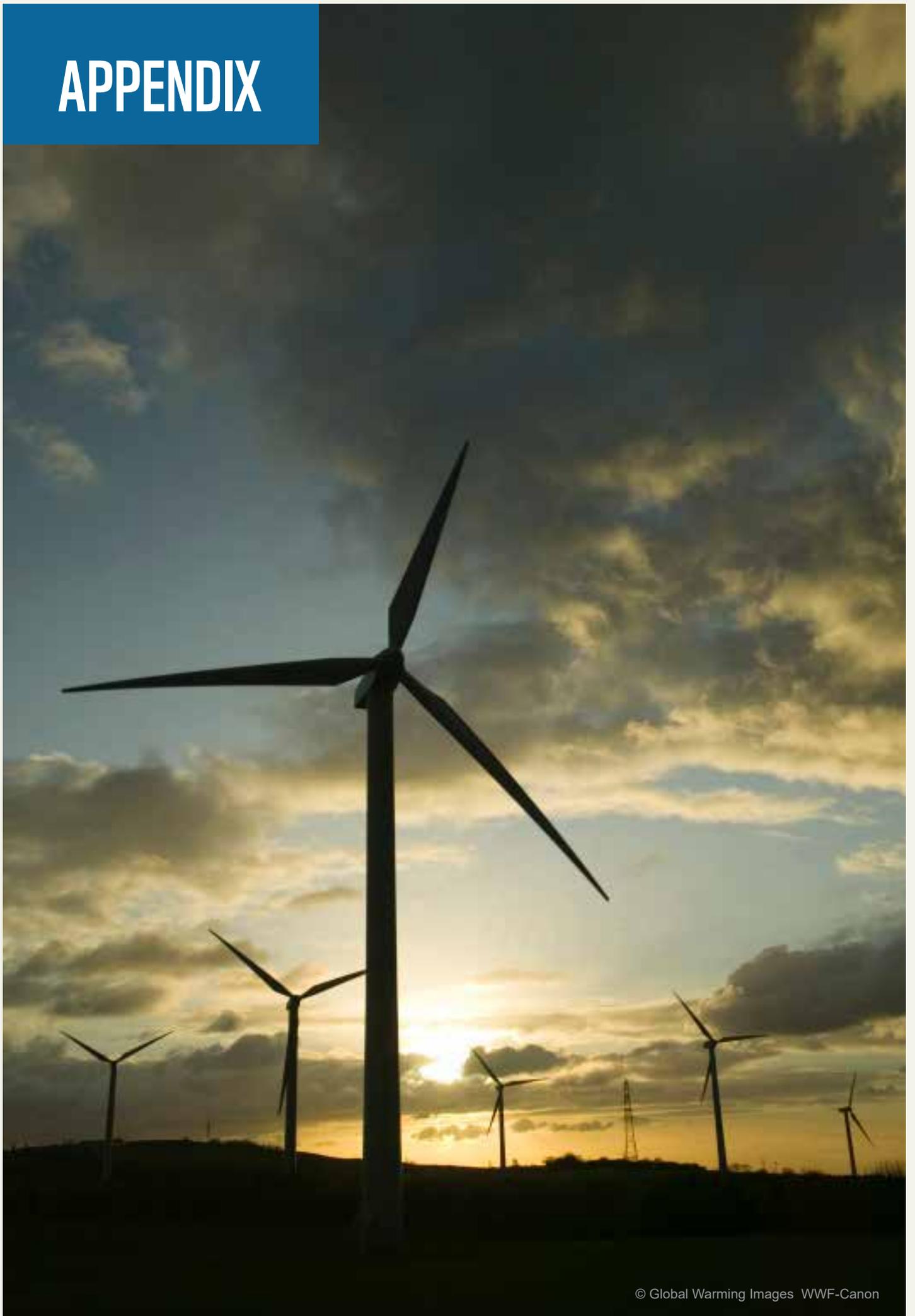
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APPENDIX



1: LIST OF NSE TOP 100 COMPANIES⁷⁴

S.No.	Corporates	Sector	Industry Group
1	Reliance Industries	Industrials	Capital Goods
2	TCS	Information Technology	Software & Services
3	HDFC Bank	Financials	Banks
4	ITC	Industrials	Capital Goods
5	HUL	Consumer staples	Household & Personal Products
6	Infosys	Information Technology	Software & Services
7	HDFC	Financials	Diversified Financials
8	Maruti Suzuki	Consumer Discretionary	Automobiles & Components
9	SBI	Financials	Banks
10	Kotak Mahindra	Financials	Banks
11	ONGC	Energy	Oil and gas
12	ICICI Bank	Financials	Banks
13	Larsen & Toubro	Industrials	Capital Goods
14	Godrej Consumer	Consumer Discretionary	Consumer Durables & Apparel
15	Coal India	Energy	Energy
16	Axis Bank	Financials	Banks
17	Sun Pharma	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
18	Bajaj Finance	Financials	Diversified Financials
19	HCL Tech	Information Technology	Software & Services
20	Bharti Airtel	Communication Services	Communication Services
21	IOC	Energy	Energy
22	Wipro	Information Technology	Software & Services
23	NTPC	Utilities	Utilities
24	Asian Paints	Materials	Materials
25	Hindustan Zinc	Materials	Materials
26	Mahindra & Mahindra	Consumer Discretionary	Automobiles & Components
27	UltraTech Cement	Materials	Materials
28	IndusInd Bank	Financials	Banks
29	Power Grid Corporation	Utilities	Utilities
30	Bajaj Finserv	Financials	Diversified Financials
31	Nestle	Consumer staples	Household & Personal Products
32	JSW Steel	Materials	Materials
33	Avenue Supermart	Consumer staples	Household & Personal Products
34	HDFC life	Financials	Insurance
35	Vedanta	Materials	Materials
36	Bajaj Auto	Consumer Discretionary	Automobiles & Components
37	GAIL	Energy	Energy

⁷⁴ Top 100 companies by market capitalization, listed on the NSE on 6th September, 2018

S.No.	Corporates	Sector	Industry Group
38	Dabur India	Consumer staples	Household & Personal Products
39	Eicher Motors	Consumer Discretionary	Automobiles & Components
40	Adani Ports	Industrials	Ports & Shipping
41	TATA Motors	Consumer Discretionary	Automobiles & Components
42	Bandhan Bank	Financials	Banks
43	Yes Bank	Financials	Banks
44	BPCL	Energy	Energy
45	Titan Company	Consumer Discretionary	FMCG
46	TATA Steel	Materials	Materials
47	Tech Mahindra	Information Technology	Software & Services
48	Britannia	Consumer staples	Household & Personal Products
49	Grasim	Consumer Discretionary	Conglomerate
50	SBI Life Insurance	Financials	Insurance
51	Bosch	Consumer Discretionary	Conglomerate
52	Hero Motocorp	Consumer Discretionary	Automobiles & Components
53	Motherson Sumi	Consumer Discretionary	Automobiles & Components
54	Shree Cements	Materials	Materials
55	General Insurance	Financials	Insurance
56	Pidilite	Consumer staples	Household & Personal Products
57	Hindalco	Materials	Materials
58	Piramal Enterprise	Health Care	Conglomerate
59	Cipla	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
60	ICICI Prudential	Financials	Insurance
61	Indiabulls HSG	Financials	Diversified Financials
62	Bharti Infratel	Communication Services	Communication Services
63	Aurobindo Pharma	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
64	Ambuja Cement	Materials	Materials
65	Zee Entertainment	Consumer Discretionary	Media & Entertainment
66	Indiabulls Venture	Financials	Diversified Financials
67	Marico	Consumer staples	Household & Personal Products
68	Lupin	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
69	Dr. Reddy's Lab	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
70	Cadilla Health	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
71	ICICI Lombard	Financials	Insurance
72	United Spirits	Consumer staples	Household & Personal Products
73	Havells India	Utilities	Electrical Equipment
74	Idea Cellular	Communication Services	Communication Services
75	New India Assurance Company Ltd.	Financials	Insurance
76	Biocon	Health Care	Pharmaceuticals, Biotechnology & Life Sciences

S.No.	Corporates	Sector	Industry Group
77	NMDC	Materials	Materials
78	Ashok Leyland	Consumer Discretionary	Automobiles & Components
79	HPCL	Energy	Energy
80	Page Industries	Consumer staples	Household & Personal Products
81	UPL	Materials	Materials
82	DLF	Real Estate	Real Estate
83	Oracle Finserv	Financials	Diversified Financials
84	Petronet LNG	Energy	Oil and gas
85	Bank of Baroda	Financials	Banks
86	HDFC AMC	Financials	Diversified Financials
87	United Breweries	Consumer staples	Household & Personal Products
88	Bajaj Holdings	Financials	Diversified Financials
89	Divis Lab	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
90	Interglobe Aviation	Industrials	Transportation
91	Siemens	Industrials	Electrical Equipment
92	P & G	Consumer staples	Household & Personal Products
93	L & T Infotech	Information Technology	Software & Services
94	GlaxoSmithKline	Health Care	Pharmaceuticals, Biotechnology & Life Sciences
95	SAIL	Materials	Materials
96	L & T Finance	Financials	Diversified Financials
97	ABB India	Industrials	Electrical Equipment
98	Container Corporation	Industrials	Transportation
99	Colgate Palmolive (India) Ltd	Consumer staples	Household & Personal Products
100	HAL	Industrials	Transportation





~50%

of total electricity in India is consumed by C&I consumers

69%

of the NSE top 100 companies procuring RE in some form or the other.

POLICY AND REGULATORY BARRIERS

are the major challenges restricting corporates from procuring RE.

22%

of NSE top 100 companies have RE procurement targets





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