

BCG



Confederation of Indian Industry



A PERFECT STORM

INDUSTRY PERSPECTIVE ON THE EFFECTS OF
COVID-19 AND PROPOSED REGULATIONS ON THE
POWER SECTOR

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The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has around 9000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from around 276 national and regional sectoral industry bodies.

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India is now set to become a US\$ 5 trillion economy in the next five years and Indian industry will remain the principal growth engine for achieving this target. With the theme for 2019-20 as 'Competitiveness of India Inc—India@75: Forging Ahead', CII will focus on five priority areas which would enable the country to stay on a solid growth track. These are—employment generation, rural-urban connect, energy security, environmental sustainability and governance.

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PREFACE

GLOBALLY, THE PANDEMIC HAS created significant disruptions, across all facets of life, and has accelerated the economic slow-down which was already setting in at the end of 2019. The Indian economy has also been impacted due to reduced industrial activity caused by pandemic-related disruptions. Given the disruption, fundamental assumptions of business have changed across industries including in the power and utility sector. While some of these changes would be transient, several others are likely to have more lasting impact. At the same time, new and proposed regulations in the power sector have been introduced focussing on power markets and improving the environment footprint of the sector. The confluence of the crisis and forward looking policy changes create a unique situation of challenges and opportunities for the stakeholders in the sector.

In this report, we analyse the effects of COVID-19 on the power and utility sector. The report focuses on both the economic impact and the implications on ways of doing business going forward. We look at the global utilities sector as a reference—and draw lessons from there for India. The report further delves on the implications for key stakeholders in the sector—the power generation and distribution companies. We will also assess potential support that the regulators and the government could provide to the sector.

GLOBAL IMPACT OF COVID-19

Severe Global Economic Downturn Expected for 2020, some Green Shoots on Recovery Visible

The COVID-19 pandemic and the resultant lockdowns have severely impacted almost all economies with rebound to GDP levels of 2019 expected only by end-2021. (Exhibit 1).

However, green shoots of recovery are now becoming visible. BCG's Economic Recovery Pulse Check (ERPC)¹ tracks business activity across industrial sectors in major economies —Germany, France, UK, US, Brazil etc. The index has started showing signs of rebound to pre-COVID levels across several sectors.

EXHIBIT 1 | Global Economies Expected to Reach 2019 Levels only by End of 2021

GDP FORECAST LEVELS FOR 2021 INDEXED TO 2019 VALUE (BASE: 100)

As of 21 August 2020



Source: Bloomberg; World Bank; IMF; Range from forecasts (where available) of JPMorgan Chase; Morgan Stanley; Bank of America; Fitch Solutions; Credit Suisse; Danske Bank; ING Group; HSBC; BCG analysis.

Note: As of reports dated 31 March 2020 to 21 August 2020, YoY forecasts.

¹For India, forecast is for financial year; for other countries, the forecast is for calendar year.

Healthcare is witnessing a stronger rebound due to increased demand during the current crisis. Telecom, Media & Technology (TMT), Materials & Process Industries (MPI), Financial Institutions (FI), Engineered Products & Infrastructure (EPI) and Automotive & Mobility (AM) have seen moderate recovery and are currently above previous year levels.

However, Energy, Transportation & Logistics continue to remain below pre-crisis levels (Exhibit 2).

Changes in Geo-Politics— Leading to development of Supply Chain Risks

After growing to a record high value of \$18 trillion in 2019, global trade is likely to see the negative impact soon, as various countries protect their domestic industry, localize supply chains, and attract private investments.

According to estimates, trade volumes may recover to pre-COVID levels only by 2023. However, COVID-19 is expected to accelerate ongoing shifts in the global trade landscape

across specific corridors. The most significant change will be in the US-China trade volumes which are expected to decline by ~\$128 billion. This new reality calls for an increased emphasis on building stronger, more resilient supply chains.

Accelerated Move to the New ways of Working

The lockdown has been a game-changer for remote working and is expected to have a long-term impact on models adopted by companies globally. In a recent survey of 500+ HRDs in Europe², 85 percent of respondents were favorable towards development and continuation of remote working.

Companies are embracing remote working given its substantial long-term benefits in terms of savings on administrative and office rental costs, access to a larger workforce (tier 2 cities, gig workforce and broader talent pools), improved employee morale, and reduced attrition, among others.

In India, IT companies have led the adoption

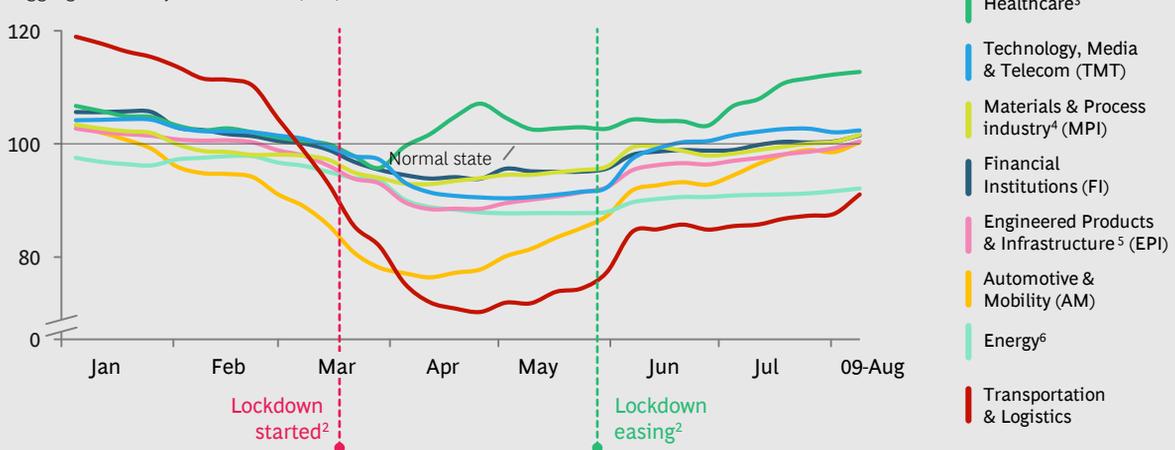
EXHIBIT 2 | Economic Recovery Varies by Sector

BCG ECONOMIC RECOVERY PULSE CHECK (ERPC)

Aggregated for GER, FR, UK, ITA, SPA, US, BR, CN, JP

As of 09 August 2020

Aggregate activity¹ across time (YoY)



Source: BCG analysis.

Note: ERPC tracks industries in EU5 (GER, FR, UK, ITA, SPA), US, Brazil, China and Japan. Index value of 100 indicates a normal activity compared to previous year's period.

¹ Sector level activity based on 100+ data sources, e.g. financial index, macro economic data, employment, sector confidence, specific data source by sector etc.

² Refers to average lockdown start and easing dates across countries except China; China first went into lockdown starting 23rd Jan until April.

³ Medical Tech, Biopharma, Consumer Health (excluding Hospitals).

⁴ Chemicals, Metals and Mining, Building Materials, Forest Products, Paper and Packaging.

⁵ Aerospace & Defense, Infrastructure, Machinery & Industrial Automation.

⁶ Oil & Gas, Energy & Utilities.

of flexible working norms and recent moves by industry leaders suggest the adoption of remote working will intensify further. Several leading companies including TCS, HCL, Infosys, Microsoft, Tech Mahindra, Salesforce and Genpact have indicated a 25 percent-50 percent shift to remote working beyond the COVID-19 pandemic.

NOTES

1. ERPC tracks industries in EU5 (GER, FR, UK, ITA, SPA), US, Brazil, China and Japan. Index value of 100 indicates a normal activity compared to previous year's period; Sector level activity based on 100+ data sources, for example, financial index, macro economic data, employment, sector confidence, specific data source by sector etc.
2. Survey conducted jointly by ANDRH and BCG from June 2-17, 2020; 458 respondents

Rapid Increase in Digital and AI Adoption across Industries

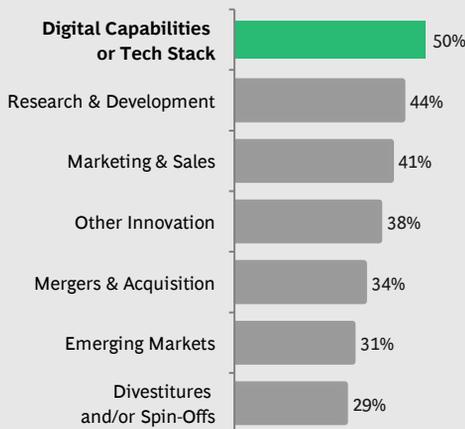
Although it has been a priority for a while, the COVID-19 crisis has catalyzed the increase in dependence on digital leading to a massive uptick in digital activities across industries with many behavioral shifts expected to persist beyond the crisis. In a survey of business leaders post the outbreak, more than 75 percent respondents said their companies planned to further accelerate the digital agenda (Exhibit 3).

EXHIBIT 3 | While Digital has Been a Priority, Companies now Plan to Further Accelerate Digital Transformation

As of 29 August 2020

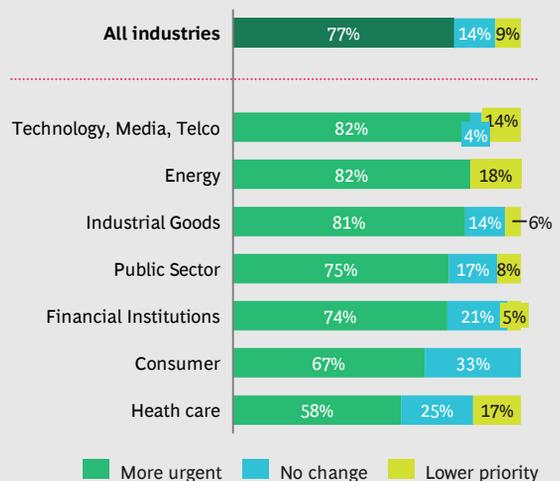
PRE-CRISIS, DIGITAL CAPABILITY INVESTMENTS HAVE BEEN TOP PRIORITY

Investor views on priority areas companies should aggressively invest in¹



NOW, >75% OF COMPANIES PLAN TO ACCELERATE DIGITAL TRANSFORMATIONS

Respondent views on priority of digital transformation post crisis



Source: BCG 11th annual investor survey 2019 (Published 12 Feb 2020); DSR Digital Transformation 2020 Survey; BCG analysis.
 Note: DSR Digital Transformation 2020 Survey still ongoing with n=121; BCG 11th annual investor survey 2019 with n=251.
¹ Respondents were asked what percentage of companies should be more aggressive in pursuing the following strategies for value creation.

IMPACT ON THE GLOBAL AND INDIAN POWER & UTILITY SECTORS

Decline in Power & Utility Share Prices across Continents

Power and utilities have been severely impacted by COVID-9, as evidenced by the sharp decline in their stock prices globally. While some markets are recovering with the easing of lockdown measures, stock prices have re-

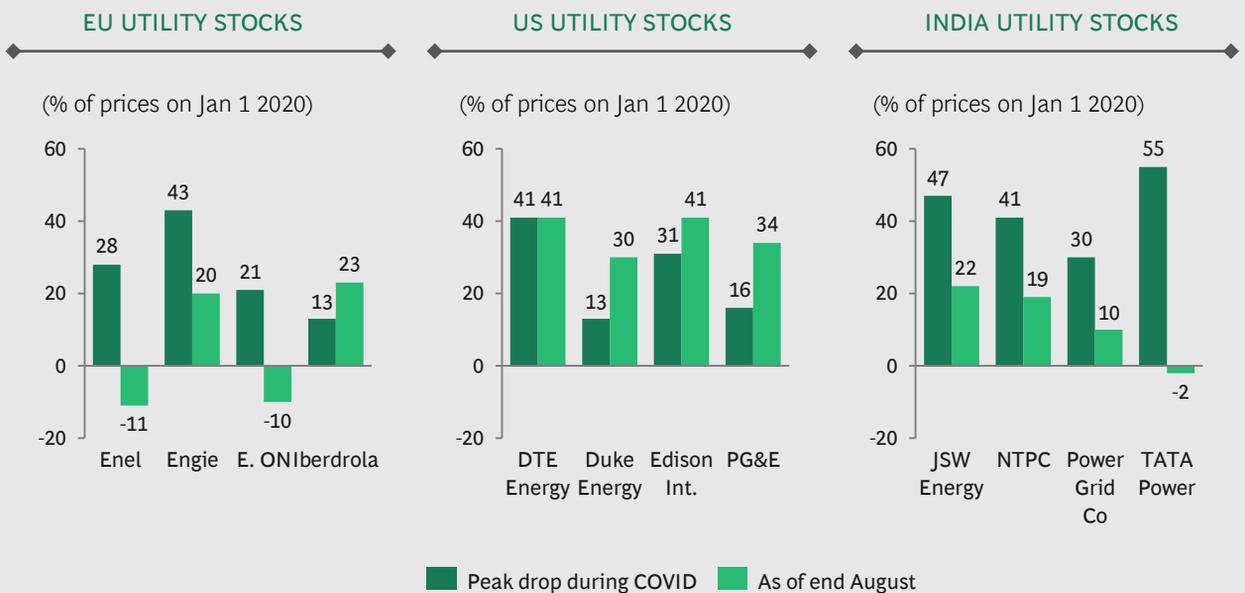
mained below the levels of January 2020.

The level of recovery varied across continents, commensurate with the progress of the pandemic in each market (Exhibit 4):

- Asian utilities have seen a partial recovery

EXHIBIT 4 | Decline in P&U Share Prices Across Continents

As of 28 August 2020



Source: Capita IQ, BCG analysis.
 Note: Negative number indicates increase over base value.

since peak drop-off during lockdowns. However, current prices in most markets are still well below 2020 starting levels

- With reduction in new infections and resumption of economic activity, European utilities have shown the best recovery since their peak fall in March and April. Still, quite a few stocks have not completely recovered to the Jan 2020 levels
- US utility stocks are yet to show any concrete signs of recovery since a sharp fall towards the end of March

Multiple Challenges have Emerged for the Utility Sector

Several demand and supply side limitations that emerged during COVID-19 have presented new challenges for the utility sector.

The sector has had to deal with two major demand-side shocks. The overall energy consumption has fallen due to reduced economic activity, and the demand pattern itself has shifted with people spending more time at home.

Similarly, on the supply side, multiple new challenges have emerged—from changes in the way of working to challenges of capital investment. For instance, restrictions on workforce mobility have pushed utilities to rethink their operating models. Companies are also facing inadequate availability of credit and increased volatility in the commodity markets. Finally, increased supply chain risks for equipment sourcing have also impacted any planned capital additions in the sector.

DROP IN ENERGY DEMAND

COVID-19 lockdowns have resulted in the biggest drop in energy demand in 70 years. The International Energy Agency (IEA) has projected a 6 percent drop in annual energy demand globally for the year 2020—in absolute terms, this is equal to the total energy demand of India.

The drop in power consumption has varied across countries depending on the extent and severity of imposed lockdown measures. While demand is reviving in most markets

with easing of restrictions, it has still not recovered to pre-COVID levels. (Exhibit 5)

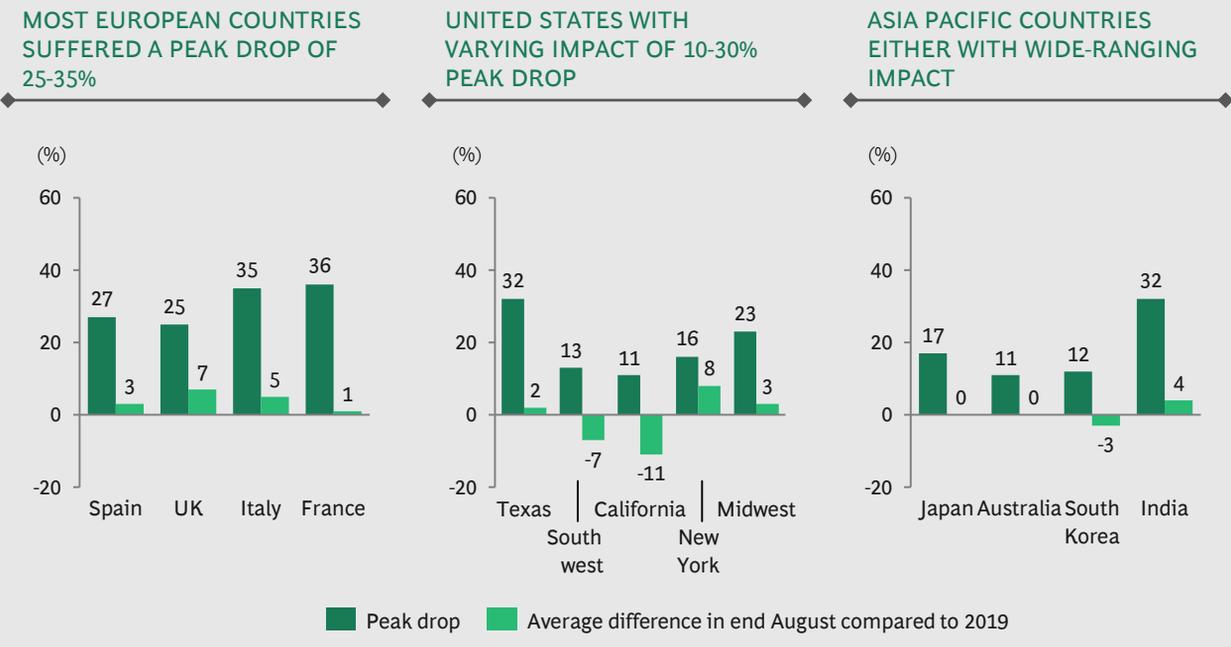
In addition to impacting demand, reduced manufacturing activity and altered operating models for the services industry have also changed daily consumption patterns in most markets, as people spend more time at home.

WORKFORCE MOBILITY LIMITATIONS: MEASURES TO CONTAIN THE SPREAD OF VIRUS ALSO INCREASE THE RISK OF BUSINESS INTERRUPTIONS

Several short-term precautionary measures (both mandated by governments and self-imposed by corporates) taken at the workplace to inhibit the spread of the virus are now expected to continue for long (Exhibit 6). These measures are impacting utility operations significantly. From reliability-critical activities such as substation operations and outage repair / management to commercially-critical operations such as meter reading—aspects that require large workforce deployment—have been impacted due to mobility restrictions. Balancing operations with zero safety risk for the workforce has emerged as a key challenge for the utilities.

Mr Vineet Kumar, IRSEE, Chairman, Kolkata Port Trust, Tata Steel, while responding to a question, said, “We put in place very systematic health checks and operating protocols to ensure safety of our workforce and continue operations all through the pandemic. Additional efforts have been put to ensure that the workforce feels confident in the support provided by the company and this has helped significantly.”

EXHIBIT 5 | Drop in Energy Demand: Drag on Power Consumption Varies Between Countries; Hardest Hit Countries Experienced ~20-30% Drop



Source: Bruegel, CENACE, EIA.gov, BCG analysis.
 Note: Negative number indicates increase over base value.

EXHIBIT 6 | Measures to Control the Spread also Increase Business Interruptions

KEY MEASURES TO LIMIT VIRUS SPREAD IMPACTING BUSINESS CONTINUITY

				
<p>Strict quarantine rules</p> <p>Curfews, widespread quarantine isolation for people to avoid further spread</p>	<p>No personal contact or gatherings</p> <p>Need to follow appropriate social distancing (e.g. 2m away from each other) - no meetings, no eating in groups, no queueing, etc.</p>	<p>Separation and reduced team sizes</p> <p>Critical teams (operators, HSE, etc.) have to operate separately, without a direct contact with non-critical personnel, and in smaller sizes</p>	<p>Limits on travel and transportation</p> <p>No collective transportation. Each individual needs to travel individually by car</p>	<p>Increased health and hygiene requirements</p> <p>Regular temperature checks, masks worn at all times, increased hygiene requirements (hand washing, sanitization of shared equipment, etc.)</p>
weeks	Expected duration of measure			months

Source: BCG analysis.

CREDIT AND LIQUIDITY CRUNCH

A large portion of electricity revenue collection, whether from households, commercial or industrial, can be at risk if the lockdowns persist and impact liquidity at the consumer's end.

- **Households:** financial pressure due to job loss, company furloughs and unemployment
- **Commercial:** reduced economic activity / quarantine restrictions impacting footfall at SMEs and specific industries such as hotels, offline retail, restaurants, etc.
- **Industrial:** slowdown in select industrial segments (for example, steel, non-ferrous metals, machinery, construction, transport and transportation equipment, textile and leather, mining) due to COVID-19

As part of COVID relief, governments globally are imposing measures that require power and utility companies to share the economic burden of the pandemic. For instance, allowing deferred payments with no / minimum interest, exemptions from disconnection for non-paying customers, reduction of tariffs, etc. (Exhibit 7).

These measures are expected to further aggravate credit and liquidity issues already mounting for power and utility companies.

COMMODITY PRICE SHOCKS

Reduced energy demand due to lockdowns has also resulted in a sharp decline in power and energy commodity prices. Apart from a fall in demand, increased supply due to the OPEC deal fallout has caused a further downward pressure on prices.

The drop in prices, however, has not been uniform. While gas and electricity saw steep drops, coal prices have remained relatively stable. (Exhibit 8)

SUPPLY CHAIN FRICTION

Several manufacturing facilities across the globe have either closed temporarily or have ramped down operations as a precautionary measure (for example, Siemens Gamesa has closed two plants temporarily; ABB closed their China factory in-line with government guidance).

Suppliers are notifying companies of possible delivery disruptions due to the pandemic.

EXHIBIT 7 | Measures Put in Place that Force P&U Companies to Share Impact on Economy

Measure	Description	Implementation probability	Example countries
Deferred payments	Delay of payment of electricity/gas bills with no/minimum interest	High	
Customer disconnection ban	Prohibition to disconnect non-paying customers	High	
Tariff change	Mandatory tariff decrease to subsidize most affected customer groups	Medium	
Revenue risk sharing	Network and generation players to share credit risk with the suppliers	Medium	
Taxation of P&U companies	Changes in energy related taxes, system charges or other taxation of the regulated subjects	Medium	
Loosening of contract obligations	More flexible options to change contract obligations (e.g. reserved capacity, daily maximums, tariff class)	Low-Medium	
Reconnection of disconnected customers	Previously disconnected residential customer to be reconnected to the grid	Low-Medium	
Full forgiveness	Complete waiving of customer bills or government relief package to cover utility bills	Low-Medium	

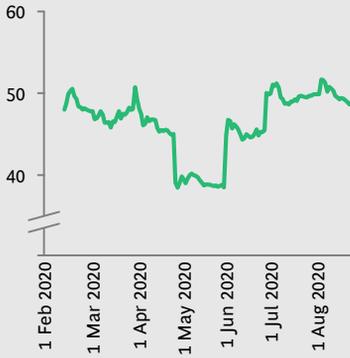
Source: BCG analysis.

EXHIBIT 8 | Sharp Drop in Power and Energy Commodity Prices

COMMODITY PRICE DEVELOPMENTS BETWEEN 15 MARCH – 28 AUGUST

Coal prices dropped by ~21% before recovery

Coal CIF ARA Futures (EUR/t)



Peak drop during COVID: -21%
As of end August: 2%

Gas price dropped ~66% shortly after oil price shock

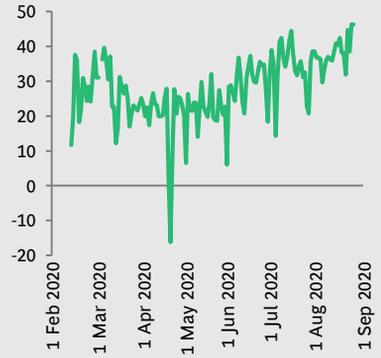
Gas TTF day ahead (EUR/MWh)



Peak drop during COVID: -66%
As of end August: -2%

Electricity prices in Europe momentarily dropped below zero; have since recovered

EEX - Phelix Base Hr.01-24 (EUR/MWh)



Peak drop during COVID: -239%
As of end August: 299%

Source: EIA, PowerNext, Bloomberg, Eikon, BCG, EEX.

Note: Forward prices above spot prices; For March 2020 numbers used from settlement prices on 20/3/2020.

Some are claiming force majeure for existing contracts or requesting the confirmation of protective measures. These problems are further amplified in cases of lean supply chains that are designed for just-in-time operations.

Segments that have lower sourcing flexibility are at greater risk. The pandemic has exposed the Photovoltaic (PV) industry's over-reliance on China, leading the Asian Development Bank (ADB) to suggest that countries should reconsider supply chains to ensure energy transition.

The impact of COVID-19 on the Indian electricity segment largely mirrors issues faced by the power and utility sector globally. The trends observed in global markets can perhaps inform the changes we can expect in the Indian electricity segment.

On the demand side—India, like its global peers, saw a sharp decline in power consumption during lockdowns. However, there are indications of a rebound as restrictions are eased. Global sectoral recovery trends can perhaps help us understand the trajectory of po-

tential recovery of industrial demand in India.

In particular, reduced demand has had a differential impact across plants depending upon fuel types and sources. Gas and renewables have seen increased traction due to steadier commodity prices and resilience to crisis situations.

Other supply side issues that are playing out globally are also relevant in India: geo-political dynamics are leading to an increased thrust on localized supply chains. Also, DISCOMs in India (which already had high outstanding dues) are facing an increased credit and liquidity crunch due to lower collections.

Significant Demand Decline During Lockdown—Levels of Decline Varying Across States

India witnessed a sharp decline in power demand since the announcement of lockdowns on 25th March 2020. The month of April saw a ~23 percent reduction in demand as commercial and industrial activity dwindled due to a complete lockdown.

With lockdowns easing in May, power demand has started to recover gradually. However, a deficit continues as most industrial and commercial establishments are still at only ~75 percent of their pre-COVID utilization levels. (Exhibit 9)

Decline in power consumption has not been uniform across the country. States with a larger share of industrial power consumption (for example, Gujarat, Odisha, Maharashtra, Chhattisgarh, Tamil Nadu, Goa, Uttarakhand, HP) have shown a higher decline in demand.

Recovery of Industrial and Commercial Demand is Likely to Vary by Sector

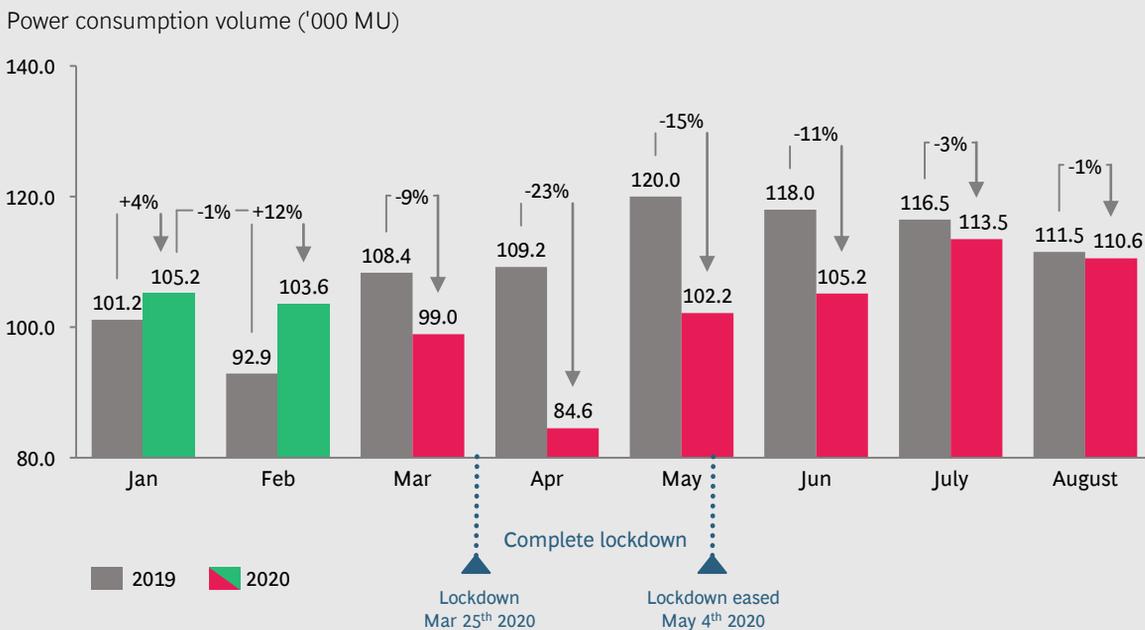
The recovery of industrial demand is likely to vary significantly by sector. It will depend on industry-specific demand and supply side factors and the evolution of the pandemic. Power and utility companies can therefore expect differential rates of recovery depending on the nature of industries in their catchment areas.

In the consumer sectors, on the other hand, there seems to be significant pent-up demand due to supply restrictions of several months. As the situation improves and economic activity resumes, several consumer sectors can expect a sudden spurt in demand which will aid recovery for power and utilities.

COVID-19 is also likely to bring about some long-term shifts in consumer behavior. This could mean that discretionary large ticket spend categories may take longer to recover given changed earnings expectations. On the other hand, sectors that are more export-oriented can expect a faster recovery.

On the supply side, resolution of three key constraints—access to affordable capital and insurance, return of migrant labor and daily wage workers, and availability of raw material and supplies, particularly imported material—can help in faster recovery. Above all, recovery is also contingent on how the pandemic evolves in India: length of the outbreak and subsequent waves and the speed of ramp-up of healthcare infrastructure.

EXHIBIT 9 | ~25% Drop in Demand during Lockdown; Now Recovered to ~90% Pre-covid Levels with Easing of Restrictions



Source: CEA, MOSPI Report on Energy Statistics 2019.

Each of the points mentioned above can have a varied impact on the recovery rate for specific industries. Recovery rate of various sectors in other global markets (Refer Exhibit 2) can potentially serve as a good starting point to understand how the situation in India will evolve.

Mr. Peeyush Gupta, VP Marketing & Sales, Tata Steel, while responding to a question, said, “We were momentarily down from a production perspective in April, but are pretty much back to normal levels now—rapidly shifting towards export markets has helped us maintain volumes”

Demand Shock Largely Absorbed by Coal; Gas-based Generation sees an Uptick with Changing Commodity Prices

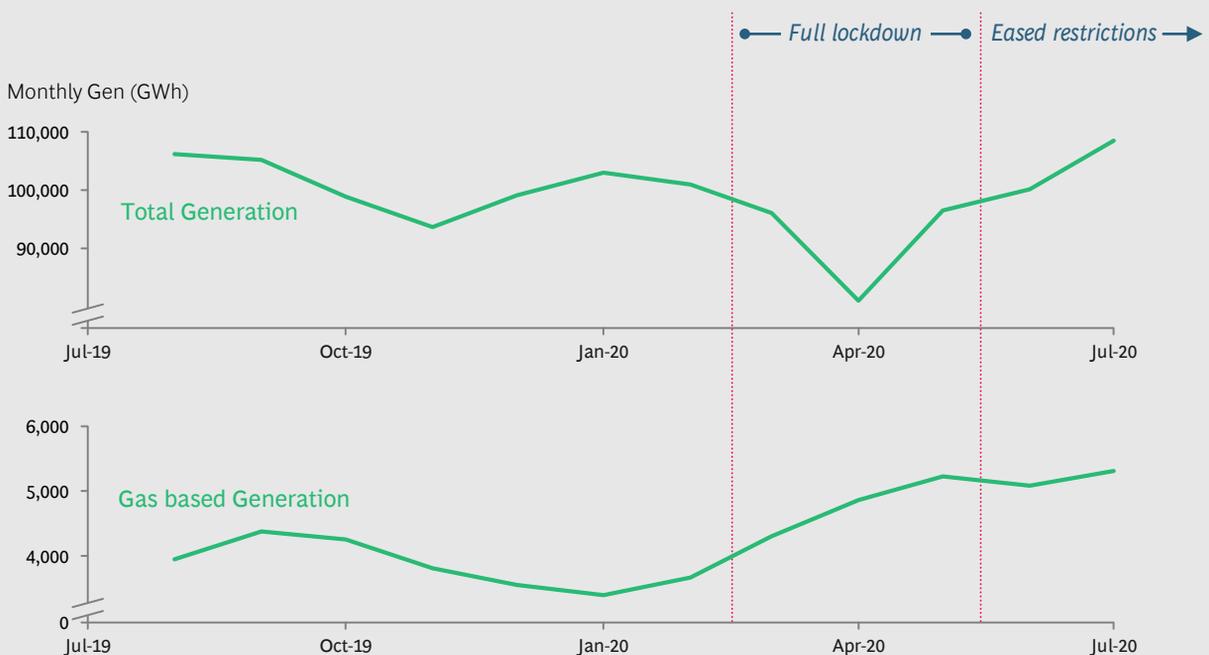
Interestingly, reduced demand has not had a uniform impact on power generation across fuel types. Most of the demand shock had to be absorbed by coal due to differential impact on commodity prices. Gas on the other hand has seen an uptick in demand, due to the prevalence of low spot prices. The PLF for gas-based power plants increased to ~28.1 percent in Q1 FY21 as compared to 23.5 percent in Q1 FY20. (Exhibit 10)

RENEWABLES EMERGE AS A MORE RESILIENT ALTERNATIVE DURING CRISIS

Renewables have emerged as the favorable choice across all stakeholder groups—governments, investors and DISCOMs, demonstrating a much higher resilience in crisis situations.

For governments, increased adoption of renewables translates to positive impact on foreign exchange reserves as well as the environment (lower CO2 emissions and increased

EXHIBIT 10 | Demand Shock Largely Absorbed by Coal, Gas-based Power Generation more Resilient



Source: CEA, POSOCO.

water conservation) and promises better accessibility and reach across the country.

For investors, renewables have a lower risk in crisis situations as compared to conventional sources on multiple counts:

- **Lower demand risks**—drop in demand unlikely to have any impact given their merit order position.
- **Lower operational and supply chain risks**—no system-critical components on park level; uniformity of assets meaning alternate WTG and PV lines can be used as spare part supplier to other assets.
- **Lower counterparty risks and lower regulatory risks**—support for renewables is also in the interest of governments.

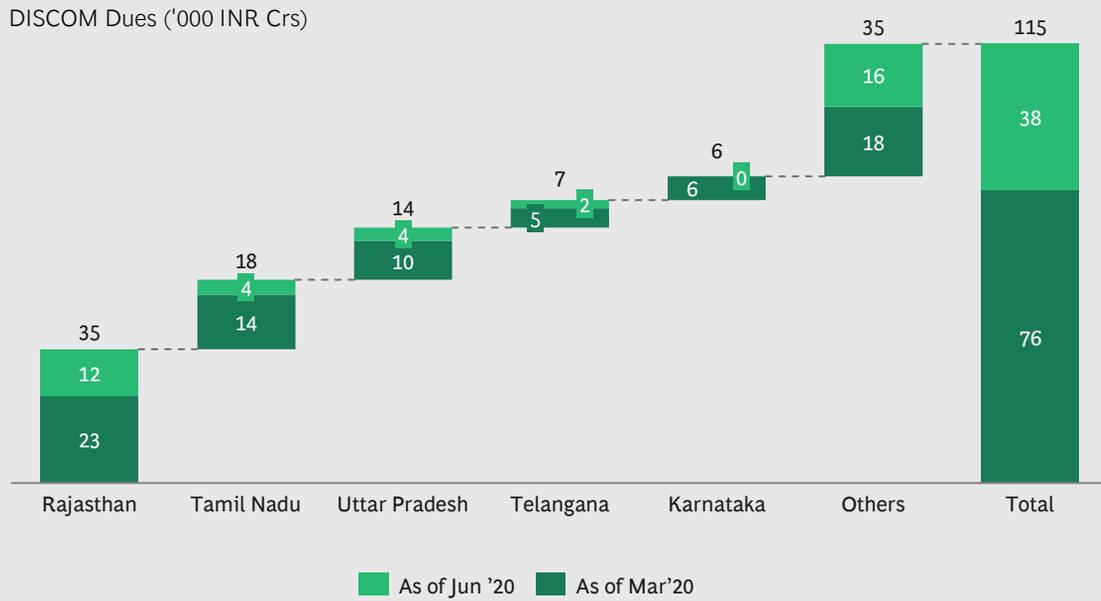
For DISCOMs, renewables are more price competitive, provide long-term visibility on tariffs and are more resilient to crisis. However, limited flexibility on scheduling remains a key drawback compared to conventional energy sources.

DISCOMs under Severe Liquidity Stress due to Poor Collections

The pandemic has exacerbated the stressed financial situation of several DISCOMs. Their total outstanding dues were already at INR ~76K crores at the close of FY20. Poor collections during the COVID period have further worsened the situation, with the dues increasing by almost 50 percent and now amounting to ~INR 115K crores as of June 2020. (Exhibit 11)

Mr Prabir K Mukhopadhyay, Member-Secretary, DVC, while responding to a question, said, “We have taken on the mantle of putting welfare of the society at the forefront during the crisis by setting up COVID blocks in our hospital, serving the needs of the local inhabitants around the plants, honoring the labor contracts in entirety, etc. Given the reduced demand during the lockdowns, this has negatively impacted profitability but has also shown the importance of the public sector in tough times”

EXHIBIT 11 | DISCOM dues Increased by ~50% in Three Months to ~INR 115k Cr by June '20



Source: CEA, MoSPI, PRAAPTI dashboard.

Note: Deficit Calculation: Demand drop of 25% from 3.5 BU to 2.7 BU, ACS-ARR gap expected to increase from 0.36 to 0.6-1 range and additional hit of Rs 0.1 expected due to fixed cost waiver. ~5% efficiency drop expected in collections leading to ~50 Cr deficit.

PROPOSED REGULATIONS IN THE SECTOR

Power Market Regulation Changes to Improve Competitiveness

The government and the regulator have played important roles in shaping the power market in India by bringing in new ideas (for example, draft PMR) or through steps to enhance market efficiency.

- **Trading regulations:** The trading norms by CERC, such as the relaxation of select trading margin caps, will help traders play a more active role in supporting the market to reach its optimal point
- **Draft PMR:** The draft Power Markets Regulations (PMR) will enable introduction of new initiatives in the market including new stakeholders such as a clearing house and OTC platforms as well as new products such as forward contracts.

Besides promoting a single merit-order and keeping a check on market practices, the PMR also propose market coupling among power exchanges, regulate margins and develop a stronger market monitoring mechanism. Key changes in the PMR have been listed below for reference. (Exhibit 12)

- **Real-time-markets:** The launch of real-time markets (RTM) has created a new window for buyers and sellers to meet their demand-supply requirement

post the 'day-ahead market'. It presents a new opportunity for DISCOMs to meet sudden increases in demand or sell excess scheduled capacity. It also helps power generation companies to sell unscheduled power and even buy power in case of an outage. The market continues to see increasing volumes and is expected to be a big support even for renewable energy (RE) given higher surety on forecast for supply only closer to schedule. (Exhibit 13)

Green-term-ahead market: In August, a separate 'term ahead market' for green power (G-TAM) was launched with the objective to allow buyers-sellers to directly procure green power for shorter time horizons outside of PPAs (Power Purchase Agreement).

Term ahead markets enable one to one (bilateral) contracts ranging from 3 hours to up to 11 days in advance on rolling basis. In combination with RTM, G-TAM can prove to be a boon for both buyers and sellers of renewable energy.

- **Push for MBED:** While the exact mechanism is being evaluated by MoP and CERC, the implementation of MBED (Market Based Economic Dispatch of electricity), will have a big impact on both efficiency and the manner of selling and buying power.

EXHIBIT 12 | Draft Power Market Regulations 2020

DESCRIPTION		IMPACT
1	 Forward contract <ul style="list-style-type: none"> Cap on power contracts of up to 11 days removed 	<ul style="list-style-type: none"> This would create forwards market facilitating hedging price and volume risks in power market
2	 Market coupling <ul style="list-style-type: none"> Introduced for effective utilization of transmission network and maximize economic surplus in multi-exchange scenario Market coupling operator to perform price discovery for all exchanges 	<ul style="list-style-type: none"> Reduced price differences between different exchanges
3	 Market share of PXs <ul style="list-style-type: none"> Requirement of maintaining 20% market share for PX to continue operating as separate entity is removed 	<ul style="list-style-type: none"> Reduced entry barrier for new PX
4	 Net worth of PX <ul style="list-style-type: none"> Net worth requirement increased to INR 50 Cr owing to increased volume at PXs 	<ul style="list-style-type: none"> Crucial to strengthen infrastructure to deal in instance of crisis
5	 Clearing & settlement <ul style="list-style-type: none"> PXs to transfer its clearing and settlement function to an entity established under Payment and settlement act, 2007 	<ul style="list-style-type: none"> Clearing and settlement function transfer to other entity as transactions on PXs is expected to increase
6	 Ownership & governance <ul style="list-style-type: none"> Client or member cannot hold >5% share; other entities cannot hold >25% share in PXs; PX can have max 49% of its shareholding with entities like member, clients or others Governance structure defined and strengthened 	<ul style="list-style-type: none"> This would limit influence of any shareholder or party on PX functions and operations
7	 Market oversight <ul style="list-style-type: none"> Introduced provision to enhance market integrity, transparency, to identify and prevent manipulation, insider trading, cartelization and abuse of dominant position 	<ul style="list-style-type: none"> Strengthened fair practices in PXs
8	 New product on PXs <ul style="list-style-type: none"> Flexibility to introduce contracts or modify existing products 	<ul style="list-style-type: none"> Encourages PXs to bring/modify contracts suited for current market situations
9	 Transaction fees <ul style="list-style-type: none"> Transaction charge by PXs will be regulated (previously it was defined in the range of 0-7 paise/unit) 	<ul style="list-style-type: none"> This would ring-fence charges levied by PXs given the larger role it would be playing in future
10	 OTC platform <ul style="list-style-type: none"> Allows technology driven price discovery in addition to 1-to-1 agreed price and competitive bidding 	<ul style="list-style-type: none"> Greater transparency of prices in OTC transactions

Source: BCG analysis.

- **Other areas** where new opportunities are emerging
 - **Supplier franchisee model:** The draft of the Electricity Act seems to create headroom for the supplier franchisee model—to enable separation of content and carriage without disrupting current norms. If executed and then adopted by states, this will bring substantial improvements in both quality of service to customers and possibly on tariffs as well. Globally,

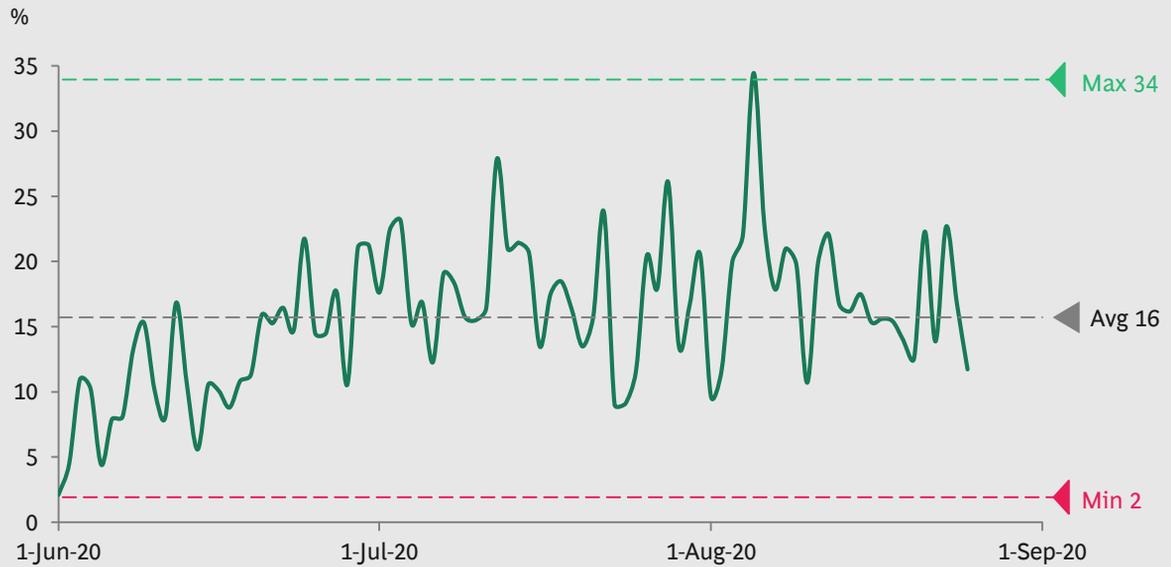
competition in retail has led to significant innovations by retailers. (Exhibit 14).

- **Privatization of DISCOMs:** There is also a strong push for privatization of DISCOMs especially in the union territories. This privatization is proposed through the earlier Distribution Franchisee model and also through PPP / Distribution Licensee models

EXHIBIT 13 | Volumes in RTM Consistently Rising as Compared to its Launch Month

Period: Jun 1-Aug 25, 2020

DAILY RTM VOLUME AS % OF DAM VOLUME



Source: IEX.

EXHIBIT 14 | After Retail Market Liberalization, Many Power Retailers Emerged and Offered Better Customer Experience than Incumbents

THERE ARE MANY POWER RETAILERS IN EVERY EU STATE...



Source: CEER, Uswitch Energy Awards 2019.

... FREQUENTLY BEATING INCUMBENT UTILITIES IN TERMS OF SERVICE QUALITY AND CUSTOMER EXPERIENCE

	Competitor	Customer satisfaction
Challengers	OVO	74%
	Octopus energy	80%
	Utility Warehouse	73%
	Bulb	72%
	Coop energy	66%
Incumbent 'Big 6'	Shell Energy	66%
	Utilita	71%
	SSE	58%
	eDF	57%
	Scottish Power	54%
	E-on	57%
	British gas	56%
	npower	54%

Measures Focused on Improving Environmental Footprint of the Sector

- **FGD for conventional power generation:** The tighter norms on NOx and SOx make it imperative for power plants to install FGDs (Fuel Gas Desulphurization) and other infrastructure in the coming years. The tightening of environmental norms is in alignment with India's focus to bring down pollution levels. However, the development of such infrastructure will come at a substantial cost which requires support both in terms of a) Financing for the new capital expenditure for this investment and b) Ability to recover the cost via tariff increase. This would further increase the tariff for conventional power for the end customers.

Given the legacy of the power sector and differing long term contracts for conventional power plants across the states, a few factors may hinder the implementation of FGD deployment. Plants come under different regimes (Section-62 Central, Section-62 State and Section-63) and each of them requires visibility and certainty of recovery of these investments to secure the requisite funding. Further, plants with untied capacity do not have an option to pass through these costs. Such plants will require need a mechanism (via change in law or other provisions), to bring them on par with existing assets (especially if MBED gets implemented and they compete against the PPA plants to get scheduled). Limited upfront clarity and assurance on the pricing / cost recovery mechanism for each type of plant above is resulting in challenges in securing funding and hence slowing down the pace of implementation.

- **RPO:** The RPO (Renewable Purchase Obligation) mechanism is a key lever to drive off-take of renewable energy in the country. Given our federal structure, each state has defined its own norms and own method of penalizing entities which miss targets on renewable energy purchases. With the resilience renewables have shown during the crisis and the steep national targets, there is an urgent need to

take a comprehensive view to ensure that overall national and state targets are aligned and the penalties / incentives are uniformly imposed across stakeholders to further ensure the envisaged growth of the sector.

Mr Rabi Chowdhury, Managing Director, Generation, CESC, while responding to a question, said, "For FGD, the CERC staff paper has already been released and the project financing should happen. But given the liquidity pressures, COVID impact and the state of the state DISCOMs, the timing of the tariff approval will play an important role in swift deployment of FGD plants"

GIVEN most DISCOMs had already tied-up nearly all of their capacity in long term PPAs, the REC (Renewable Energy Certificate) mechanism enables the achievement of RPO targets by way of purchase of certificates. However, the REC mechanism has its own shortcomings and needs to be refined further. Removal of floor-caps and support for merchant renewables could be one initial approach to open the REC market.

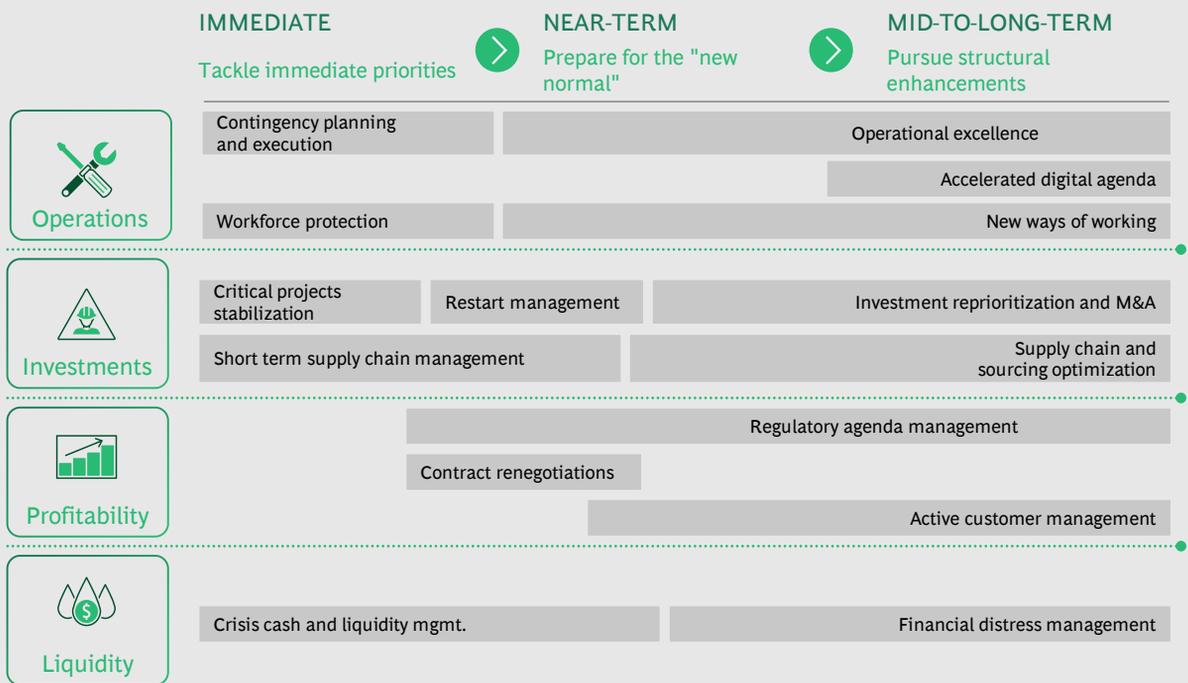
OPPORTUNITIES AND IMPLICATIONS FOR STAKEHOLDERS

THE COMBINED IMPACT OF COVID-19 and proposed regulatory reforms has resulted in a ‘perfect storm’ for the power sector. It is likely to have far reaching implications—both in the near and long term—on all aspects including business operations, investment planning, profitability, and liquidity manage-

ment. (Exhibit 15)

The factors discussed above (both resulting from COVID-19 and policy changes) will have different implications for different stakeholders in the power sector. It is critical that stakeholders across the value chain—generators,

EXHIBIT 15 | Fundamental Questions for Companies to Address



Source: BCG analysis.

distribution companies and regulators - understand the implications relevant to them and act accordingly.

Implications for Generators

Given the pandemic and its medium to long term impact on financials and ways of working, it becomes important for generators to re-evaluate conventional business practices.

In particular—the pandemic has created 4 imperatives for the generators:

- Rethink cost structure to build resilience
- Rapidly adopt digital and new ways of working to ensure people safety
- Mitigate impact of volatility in commodity prices
- Source domestically—especially for renewables

NEED TO FUNDAMENTALLY RETHINK COST STRUCTURE TO BUILD RESILIENCE

If the current power market dynamics of low / stagnating demand and low-price continue to prevail in the medium to long term - it can fundamentally change the existing market structure. Merchant plants might require governmental support to survive and high marginal cost producers may be pushed into hibernation or shutdown.

To ensure sustainable profitability, generators need to fundamentally rethink current cost structures. This involves de-risking supply chains, re-thinking all operating costs, deferring non-critical capex, and aggressively managing working capital.

De-risking supply chains and increasing sourcing flexibility has now become critical to deal with supply chain uncertainties. Therefore, adjusting operating inventory levels to manage supply variability and adopting a more dynamic and agile planning process can help de-risk availability of material. Companies must also learn to operate with increased manpower flexibility—by utilizing contract / temporary staff.

Re-evaluating operating costs can help unlock operational efficiencies to ensure sustainable levels of profits. Techniques such as zero-based budgeting and re-thinking raw material specs can be employed by organizations to improve cost transparency, to rigorously reset their cost bases and ensure costs remain lean on a long-term basis.

Generators should consider deferring all non-critical capex in the near to medium term, to help better navigate through the prevailing market dynamics. All capex decisions should be re-evaluated, setting a high bar on any new short-term capex. For all on-going contracts, companies must explore feasibility of renegotiating prices with suppliers.

Working capital management is important in a time of crisis. Liquidating excess / obsolete spares and inventory, renegotiating payment terms with suppliers and enforcing discipline in receivables management can help companies maintain liquidity.

REVAMP OPERATIONS WITH DIGITAL AND EFFICIENCY BOOSTERS TO MAINTAIN PROFITABILITY

Across the world, digitization and automation have been deployed to improve operational efficiencies. Adoption of digital use cases has accelerated during COVID-19 and has emerged as a key response measure to ensure business continuity.

For generators, several use cases have now emerged, particularly in equipment inspection and maintenance—helping to reduce downtime and maintenance costs (Exhibit 16). Ensuring adoption and long-term sustenance of these measures is critical to drive cost and operational efficiencies.

DIFFERENTIAL IMPACT ON COMMODITY PRICES TO IMPACT MERIT ORDER

Differential changes in prices between gas and coal have resulted in a change in merit order amongst conventional sources—pushing gas before coal (Exhibit 17). With lower demand and more renewable curtailment scenarios, gas plants might see more activation in the ancillary service market to stabilize the grid.

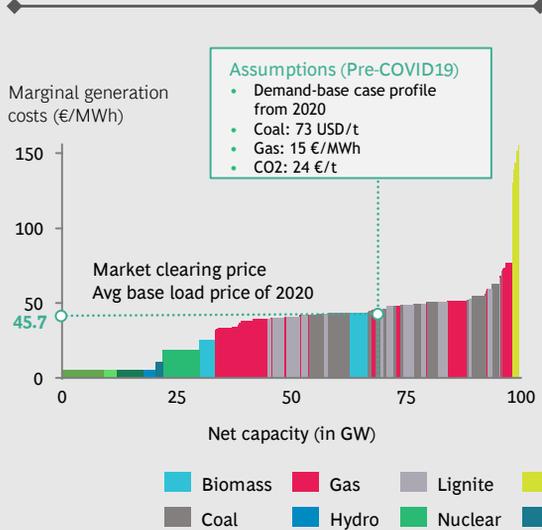
EXHIBIT 16 | Key Digital use Cases for Generators

	Alarm Trigger	Early identification of failure	➤ 3-4% Failure time reduction
	Equipment Health Index	Constantly assess operational buffers	➤ 3% Equipment output increase
	Mobile workforce management	Digitalize and optimize the whole E2E field operations process	➤ 15-20% field work efficiency increase
	Dynamic Adjustment	Adjust key parameters to match production profile	➤ 4-5% Equipment O&M TOTEX reduction
	Inspection Targeting	Target inspection to top priority assets	➤ 70% Inspection cost reduction
	Maintenance Cycle Alignment	Extend maintenance cycles	➤ 4% Planned downtime reduction
	Predictive Maintenance	Focus maintenance to where it matters the most	➤ 2-10% Preventive maintenance cost reduction

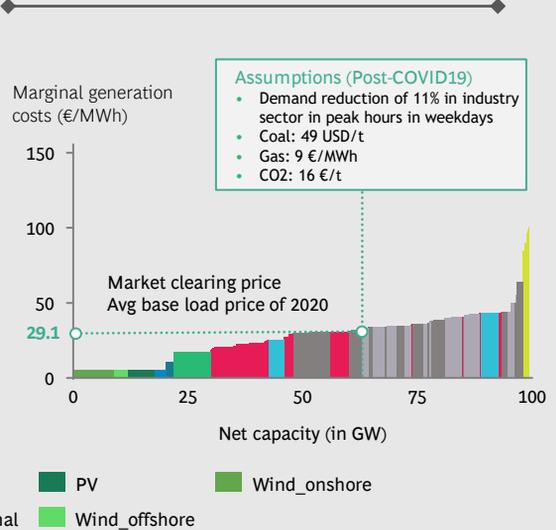
Source: BCG analysis.

EXHIBIT 17 | Longer-Term Demand Drop and Reduced Commodity Prices Impact Merit Order and Could Push Coal Further out of Dispatch

PRE-COVID MERIT ORDER WITH THE ACTUAL MERIT ORDER IN FEBRUARY 2020¹



POST-COVID MERIT ORDER WITH GAS PLANTS EXPECTED TO MOVE LEFT²



Source: CME; Montel; BCG power market model.

Note: Battery and imports not included, Hydro pump capacity included, Average utilization of onshore and offshore wind, PV and hydro accounted (16%, 38%, 11%, 60% respectively); Market model does not consider: the plants' contract types (e.g. take-or-pay) which could make them must-runs; and gas capacities that should be saved for ancillary markets.

¹ 2020 February Base case used as Pre-COVID baseline scenario.

² Long-term merit order impact considering similar demand development as after 2008 crisis.

Implications for Distribution Companies

Like generators, DISCOMs would also need to fundamentally re-evaluate their ways of working. DISCOMs would need to explore digitization—from automation in operations to digitizing their interfaces with the customer.

In addition, DISCOMs would also need to evaluate financial options to manage increased stress on profitability and liquidity owing to the crises.

DIGITIZATION AND AUTOMATION OF OPERATIONS

Existing and new digital use cases have become increasingly relevant for DISCOMs. (Exhibit 18). Manpower constraints and mobility limitations during COVID-19 have resulted in a lot of these applications seeing mainstream adoption.

Digital is now being leveraged across network operations—inspection and maintenance, system operations, workforce management, network planning and project supervision.

DIGITIZATION OF CUSTOMER INTERFACES IMPERATIVE FOR SERVICE AND COLLECTIONS

Like DISCOMs, customers are also challenged

by lack of mobility to avail services, and redressal of grievances and other issues. Digitization of customer interfaces is now a basic operational requirement, as it brings efficiency and potential to reduce costs for the DISCOMs. As an example, during the COVID induced lockdowns, limited meter reading by DISCOMs led to instances of “bill shocks” for many customers and further exacerbated the need to connect with the utility. Further, these interfaces provide DISCOMs the ability to connect with customers beyond the regular points of interaction and throughout the life-cycle of the customer. This creates an opportunity to develop and sell new products and services that the DISCOMs develop (e.g. rooftop solar solution, home automation products, etc).

PRIVATIZATION OF DISCOMS

With some of the underlying drivers expected to persist, the liquidity situation for DISCOMs could decline further in the coming months. Three forces at play are continuing to increase stress on the State DISCOMs. While demand is gradually recovering to pre-COVID levels, the change in consumption patterns has remained persistent and the reduced share of industrial consumption (and subsequently reduced cross subsidies) for domestic

EXHIBIT 18 | Key use Cases for Digital in Network Operations

	Digitally enabled inspections	Increase quality and speed of inspections	➤ 30% Reduction in customer interruption
	Data-driven maintenance	Focus maintenance to where it matters the most	➤ 15% Preventive maintenance cost reduction
	Digital system operation	Advanced digital practices in system dispatch, load monitoring	➤ 4-5% Equipment O&M TOTEX reduction
	Mobile workforce management	Digitalize and optimize the whole E2E field operations process	➤ 15-20% field work efficiency increase
	Advanced Network planning	Extend maintenance cycles	➤ 1-2% Less spend or postponement of CAPEX
	Digital project supervision	Focus maintenance to where it matters the most	➤ 1-2% CAPEX reduction

Source: BCG analysis.

tariffs is leading to lower overall revenue. This is further exacerbated by continued lower collections owing to the lockdowns & risk of infections. Lastly, in fulfilling the role of the welfare of the citizens, relief measures around electricity tariff reduction are further impacting the profitability of the DISCOMs.

With the financial situation expected to continue on this path in coming months, governments may increasingly consider privatization of state owned DISCOMs as a potential avenue to relieve the stressed cash flow situation through private investment that can help introduce the much needed capital investment towards operational efficiency, loss reduction and network upgrades to bring back profitability in the DISCOMs.

Implications for Regulators and Government

POLICY AND REGULATORY SUPPORT FOR FORWARD-LOOKING CHANGES IN THE SECTOR

As discussed in Section 4, there are several forward-looking policy changes that have been introduced or are being actively considered for the sector. These changes will undoubtedly increase the competitiveness and efficiency of the companies within the sector and benefit the sector in the long run.

However, these changes are fundamental changes to how the sector operates (and will operate going forward). We have a diverse set of GenCos and DISCOMS and their equally diverse set of assets, contracts and operating practices. Making such fundamental shifts will not be easy for these companies and there are likely to be many teething challenges. The federal nature of the power sector both aids the execution and at the same time increases the complexity.

The policy makers and the regulators will need to be the guiding light for the stakeholders across the sector to realize the intended benefits for our country. They will be required to play a very active role in providing clear policy guidance to the stakeholders in their states and adapting the policies with a view towards smoother and faster implementation. Further, all the allied issues (like funding, tariff revision, etc) that emerge going for-

ward, will need to be addressed in a holistic manner to remove any friction points that are bound to emerge when such fundamental changes are introduced into any system.

JUDICIOUSLY CRAFTED ECONOMIC STIMULUS FOR THE SECTOR RECOVERY

The economic stimulus for the power sector needs to achieve the twin objectives of supporting the sector recovery and ensuring job creation while doing so. Further, the speed at which the program can be implemented on ground will be critical for the recovery to be effective in supporting our country's recovery from the crisis. needs to be carefully crafted while balancing job creation with speed of implementation

Many of the "green" energy options provide a great avenue for the economic stimulus to achieve its multiple objectives. Significant potential to move towards green recovery while balancing these priorities. Large-scale renewables, green public transport and industrial efficiency improvement programs are a few examples of areas where the potential for job creation is high and the initiatives can be implemented faster than other large projects.

Mr Rajanvir Singh Kapur, IAS, Managing Director, West Bengal Transport Corporation, while responding to a question, said, "There is high consciousness towards the environmental effect of transportation. We are already taking significant steps towards reducing our carbon footprint through electric buses and electrification of other transport modes."

CONCLUSION

THE COVID-19 PANDEMIC AND the resulting economic upheaval have created winds of change across multiple sectors—with the power sector being no exception. Mirroring trends seen globally—the Indian power sector has seen significant decline in overall demand. While the industrial and commercial sectors have globally shown signs of recovery, the recovery in India is expected to vary by segment. In spite of the fall in gas prices (and resulting decline in power costs), DISCOMs continue to be under severe liquidity stress—a problem that has only been further exacerbated by poor collections

Given these challenges, stakeholders across the power value chain—from generators to regulators—would need to reevaluate current business practices

Generators in particular would need to rethink their cost structures to build resilience. Digital and automation have emerged as focus areas in this regard globally. Equipment inspection and maintenance have been thrust areas for adoption—helping to reduce downtime and maintenance costs. Generators would also need to be cognizant of the impact that commodity price variance has created on the merit order of dispatch. Fall in gas prices has seen it replacing conventional coal-based power in multiple instances

DISCOMs in turn would need to revalue their ways of working. To mitigate liquidity pressures DISCOMs would need to aggressively explore digitization of their customer interfaces to shore up collections. However, with declining financials of state governments, privatization of state DISCOMs might also need to be considered

Adjacent to the changes foreseen for DISCOMs and generators—the government and regulators would also need to be thoughtful in the impact that any economic stimulus might create. Regulators would need to walk the tightrope of balancing the need for job creation with speed of implementation. The pandemic has however also created an opportunity for regulators to push the green agenda and bring in long-lasting changes to improve the efficiency and competitiveness of the sector. The entire sector will look to them as the guiding lights to help them navigate the crisis and build on the fundamental changes being introduced to increase the sector's performance and contribution to the country's economic recovery and growth.

While the way ahead is likely to be challenging, the pandemic also presents the power sector an opportunity to fundamentally restructure itself and emerge far more resilient on the other side of the crisis.

FOR FURTHER READING

Boston Consulting Group published other reports and articles on related topics that may be of interest to senior executives. Recent examples include:

Decentral energy and DISCOMs
(Aug, 2019)

How the Wind Industry Can Harness Gale-Force Change
(Dec, 2018)

Digital in Power
(Aug 2018)

The Digital Energy Retailer
(April, 2018)

Will Your Offshore Wind Strategy Sink or Swim
(Jan, 2018)

Finding the Sweet Spot in Distributed Energy
(May, 2017)

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