# *COVID-19: Demand and Supply Shock on Energy Sector in India*

BY KAKALI MUKHOPADHYAY AND KRITI JAIN

## INTRODUCTION

The recent Coronavirus strain, originating in the Wuhan province of China, has rapidly spread across the globe. The pandemic has resulted in the imposition of virtual lockdowns by economies, leading to a situation comparable to the global financial crisis that hit the world in 2007. However, the difference is the uncertainty surrounding the lasting impact and possible action strategy to be taken for maintaining the structural health of economies in which almost all the sectors are affected. Such a crisis hasn't hit the world since the 1920s but the historic measures in today's scenario provide a little relief as the economies are now much more developed and complex. One such sector which has changed significantly and played a crucial role in running the fuels of industries, as well as households, is energy. However, the energy sector has been facing the turmoil of COVID-19 as the consumption baskets and production baskets see a major compositional change to adapt to new circumstances. Energy consumption in India is the third largest in the world, after China and USA, and its production basket is diversified between domestic sources and imports from other countries. This provides a fundamental understanding of how the energy sector is linked with trade and the global economy as well. The fall in energy consumption across India signals the impact of the pandemic in India.

The All-India Energy Consumption has fallen by 22.1% on April 4, 2020, from March 18, 2020, when the restrictions were not imposed fully in all the parts (Table 1). As many states went into lockdown, the fall in consumed energy started happening at an increasing rate till March 26, 2020, after which the rate of change saw a decline but remained much below the consumption levels before lockdown. This change in pattern could be attributed to the clarity provided by the government on the functioning of essential services and increased demand of electricity by the households and hospitals. This moderated the fall in energy consumption but could not compensate for the loss of energy demand by Industrial and Commercial sectors.

The energy exchange i.e., Net Imports with Bhutan, Nepal and Bangladesh reflects the impact on the supply side of the pandemic (table 2).

The fall in energy exchanges with Bhutan might be due to lockdown in both Bhutan and India and consequent transportation bottlenecks. Energy exports to both Nepal and Bangladesh are consistent which implies that exports of energy are happening sufficiently, but imports are less.

Having the above information as a backdrop, the objective of this paper is to analyse the above-mentioned changes through an understanding of various factors influencing energy sectors in India due to the COVID-19 outbreak. It studies the impact of the pandemic on the oil sector, electricity by thermal and renewables sectors. The sectors are chosen for their important interlinkages with the development of core sectors and enhanced focus given by The Government of India in its policy targets.

The study is divided into four sections in which Section 1 is the analysis of the oil sector, followed by Section 2 studying the fall in the electricity sector and Section 3 outlining the impact on Renewable Sector. Section 4 provides concluding remarks and future

**Kakali Mukhopadhyay** is a Professor at Gokhale Institute of Politics and Economics in India. She is also a Senior Associate Fellow, Department of Natural Resource Sciences, Agricultural Economics Program at McGill University, Montreal, Quebec, Canada. **Kriti Jain** is a Research Assistant at Gokhale Institute. Mukhopadhyay may be reached at kakali.mukhopadhyay@mcgill.ca

| Date | Energy Consumption (GWh) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northern Region | | Western Region | | Southern Region | | Eastern Region | | North-Eastern Region | | All India Region | |
| 18-Mar-20 | 827 | | 1187 | | 1148 | | 383 | | 42 | | 3586 | |
| 22-Mar-20 | 734 | -11.25% | 971 | -18.20% | 975 | -15.07% | 315 | -17.75% | 36 | -14.29% | 3030 | -15.50% |
| 24-Mar-20 | 695 | -15.96% | 944 | -20.47% | 983 | -14.37% | 314 | -18.02% | 39 | -7.14% | 2975 | -17.04% |
| 25-Mar-20 | 665 | -19.59% | 844 | -28.90% | 911 | -20.64% | 320 | -16.45% | 36 | -14.29% | 2777 | -22.56% |
| 26-Mar-20 | 628 | -24.06% | 771 | -35.05% | 891 | -22.39% | 327 | -14.62% | 35 | -16.67% | 2652 | -26.05% |
| 31-Mar-20 | 623 | -24.67% | 791 | -33.36% | 902 | -21.43% | 326 | -14.88% | 36 | -14.29% | 2705 | -24.57% |
| 04-Apr-20 | 651 | -21.28% | 858 | -27.72% | 908 | -20.91% | 340 | -11.23% | 34 | -19.05% | 2791 | -22.17% |

*Table 1: Change in Energy Consumption*

*Source- POSOCO weekly reports (March-April, 2020)*

| | BHUTAN | | NEPAL | | | BANGLADESH | | |
|---|---|---|---|---|---|---|---|---|
| DATE | Energy Exchange | Day Average (MW) | Energy Exchange | Day Peak (MW) | Day Average (MW) | Energy Exchange | Day Peak (MW) | Day Average (MW) |
| 29-03-2020 | 8.4 | 350 | -1.3 | -264 | -53 | -13.5 | -872 | -563 |
| 30-03-2020 | 8.1 | 337 | -3.9 | -270 | -162 | -13.4 | -862 | -558 |
| 31-03-2020 | 7.4 | 308 | -1.8 | -239 | -77 | -14.4 | -1082 | -600 |
| 01-04-2020 | 5.3 | 219 | -1.9 | -294 | -81 | -14.4 | -1078 | -599 |
| 02-04-2020 | 6 | 251 | -2.4 | -218 | -101 | -14.3 | -1058 | -595 |
| 03-04-2020 | 6.5 | 270 | -2.7 | -275 | -112 | -12.6 | -1027 | -523 |
| 04-04-2020 | 5.1 | 213 | -2.8 | -269 | -119 | -13.7 | -1072 | -571 |

*Table 2- Change in Energy exchange with Bhutan, Nepal and Bangladesh*

*Source- POSOCO weekly reports ((March-April, 2020)*

scope of the study.

## ANALYSIS OF OIL SECTOR

Presently, India is the third-largest consumer of crude oil and petroleum products in the world. Its consumption basket for raw crude oil is largely import driven constituting 82% of the total and it aims to bring it down to 67% by 2022 through various alternative mechanisms. At the same time, India is the largest exporter of petroleum products in Asia and the second-largest refiner in Asia. COVID-19 shutdowns and global scenarios have seen a new trend in the oil market where the demand has slumped by 70% equating to 3.1 million barrels a day of lost demand (Bloomberg, 2020), creating a glut in supply markets.

### Supply-side shocks

India's imports are in the form of Brent crude oil (25% of total) and a mix of Oman and Dubai crude (75% of the total). Recent oil market disturbances are bred through failed negotiations between Saudi Arabia and Russia, consequently resulting in the commitment of possible increased supply in the future. While Saudi Arabia is India's biggest oil partner with supply worth $21.2 billion, Russia's value stands only at $1.2 billion (Workman D, 2020). This global change along with the pandemic has brought down the oil prices to a new low at $30/ barrel from $70/barrel. However, recent negotiations of OPEC+ have shown positive signals which could imply that oil prices might moderate in the long run but the possibility of shooting up to high levels is less as demand will be comparatively lower till COVID-19 cases subside and final commitments are made by major oil-exporting companies.

### Demand induced slowdown

The pandemic has disrupted the demand markets for oil due to the reduced exports and lower domestic demand for oil because of shutdowns, especially air travel, Indian Railways, transport and logistics sector. The consumption of petroleum products has fallen to abysmal 0.21% in 2019-20, of which 18% fall occurred in March 2020 (Ministry of Petroleum and Natural Gas, 2020). In addition to this, the largest consumed liquid fuel in transport sector i.e., diesel saw a decline in consumption by 24.3% in March 2020 as compared to March 2019 (The Mint, 2020). This could be due to reduced demand by already stressed automobile sectors as they switch over from BS-IV engines to BS-VI. Further, Consumption of Aviation Turbine Fuel (ATF) declined 32 per cent to 484 TMT (Thousand Metric Tons) in March 2020, as airlines ceased operations due to lockdown measures announced by major economies around the world.

The Indian markets have not benefitted from reduced prices due to taxation laws where the Government has increased the excise duties resulting in no transmission of these prices to consumers. This has inhibited the possibility of both price-driven demand and growth-driven demand. Due to the above, imports of oil have fallen to 225 million tonnes (MT) in FY20 against 227 MT in FY19, resulting in 6% fall of import bills (PPAC, 2020). Reduction in oil import bills provide additional fiscal space to the government but poses a challenge for oil and gas companies running in India. The best performing states in terms of oil and gas companies are Maharashtra, Tamil Nadu, Telangana, Delhi, Madhya Pradesh and Gujarat (India Investment Grid, 2020), which are also among the worst affected by the outbreak. The companies might face financial distress in paying off existing debt covenants and take a prolonged period to recover as the sectors dependent on it for supply might pick up the differential pace for recovery.

However, the current situation provides incentives for boosting diversification of its oil procurement and building up strategic reserves for the future. Fiscal efficiency plays an important role in planning for the post-COVID-19 world. The saved import bills could be used to provide fiscal stimulus package to oil and gas companies and help the commercial users like transport industries to bring down their input cost. In the long-term, investments in cleaner fuel such as indigenous ethanol should be made to reduce oil dependency and achieve Government of India's policy target of lowering import dependence in oil to 67% by 2022.

## FALL IN ELECTRICITY SECTOR

The electricity sector has seen visible impacts post-COVID-19 due to the effects on its supply chain and major compositional shifts in demand.

### Supply-side shocks on the generation of electricity

Although India has been rapidly trying to expand the share of renewable energy sources in the generation of electricity, conventional sources like coal and lignite based thermal power plants still account for 55.2% of the total (Ministry of Power, 2020). The imports of coal for power which grew at 12 % FY19, declined by 27.5% in March 2020 (Bloomberg Quint, 2020) due to the lockdown. The majority of imported coal has been from pandemic hit countries, where 60% is from Indonesia, 22% from South Africa and 5% each from Russia and Australia (The Hindu, 2020). Given the uncertainty about the retreat of these pandemic measures, India's coal imports might further decline in the coming months, which would imply relying on domestic production.

The coal which is classified as essential has registered record production of 2.56MT per day (Money Control, 2020) by Coal India Limited. A Buffer of 107 MT of coal stock would suffice the short-term demand but, the long-term capacity expansion is a challenge. The reduced global demand would pull down coal prices, leading to a fall in the valuation of the mines and loss of revenue for the government in the sale of coal mines as per recently launched Open Bidding Policy. In addition, the pandemic might also reduce FDI in this sector. The domestic capacity expansion will also be challenged as coal-based plants are dependent on Chinese power generation equipment manufacturing such as Dongfang Electric, Shanghai Electric and Harbin Power, which have been severely hit by closing down of Chinese markets (The Mint, 2020).

### Demand induced slowdown

Although relaxation and deferred payment options have been provided for the procurement of coal by power-producing companies to reduce the immediate financial stress on companies but, the demand for power has reduced. The plants which were operating at 80-90% capacity are now operating at about 50-55% (Bloomberg Quint, 2020a). This could be due to reduced consumption from 110.33 billion units in March 2019 to 100.2 billion kilowatt-hours in March 2020 (POSOCO, 2020). It has been observed that the largest fall is seen in states of Punjab and Haryana, which could be due to reduced irrigation driven consumption. The industrial and commercial consumers account for almost 50% of India's power demand which has been shut down due to lockdown, resulting in a 10.4% fall in dispatches of coal (The Hindu, 2020). This might result in the creation of coal stock for the companies but distress in terms of loss of revenue as the entire power supply chain gets disturbed.

On the transmission and distribution side, the state electricity boards operate under cross-price subsidy policies wherein high tariff rates for commercial and industrial sector subsidises the retail supply of electricity i.e. households. The increased household consumption due to work from home and requirement of uninterrupted supply to hospital and care centres for 24*7 operations of ventilators and machines have increased the retail demand but not as much to compensate for the commercial losses. This will impact the financial health of these companies and, reduce their investment and employment capacity in the long run. Distribution Companies' (DISCOM) total dues have increased to ₹80,345 crores in February'20 from ₹76,150 crores in December'19 (PRAAPTI, 2020). Aggregate Technical & Commercial losses (AT&C) for these companies have increased from 18.2% FY19 (PIB, 2020) to 19.02% at present (UDAY, 2020). Given the fall in demand, these losses could go up. This along with change in demand patterns, would impact the financial health of the generating companies and increase the fiscal burden of the state governments as electricity charges are highly subsidised across nations. If the companies start charging higher tariffs in future, it would increase the already COVID-19 hit industrial sector and household expenditure on electricity, constraining the government's Sustainable Development Goal of 24x7 i.e. accessible, affordable, reliable, sustainable and modern energy for all. Stockpiling of coal might compel sustained electricity production in future, hampering the achievement of Nationally Determined Contributions (NDC) targets under Paris Climate Agreement 2015.

## IMPACT ON RENEWABLE SECTOR

In 2019, the government announced the target of achieving 175 GW of installed power capacity from RES, primarily from solar (100 GW) and wind (60 GW) energy by 2022. At present, the share of RES in total installed capacity is 22.9% and it is expected to increase to 36.4% by 2022 (CEA, 2020), which might not follow the same trajectory due to COVID-19 supply shortages and low demand from the power sector.

### Supply-side shocks

Currently, RE is largely cornered towards the generation of electricity via micro-grids or solar-rooftops, but their expansion has been challenged by COVID-19 resultant supply chain blockades and inability to procure raw materials from foreign sources. The reliance of Indian Solar Industries for module glasses and wafers is about 80% (Power Technology, 2020) but the work restrictions imposed in China, delays in production, transportation & logistics would have considerable impacts in the medium term as the trade would take months to reach back to precedent levels. This might increase prices for the solar cell's setup,

adding to the fiscal burden of government who provide subsidies on it and delay the capacity expansion. Industries would face the risk of higher cost and delay in payments and their commitments to the power supply. The small-sized rooftop sector players rely on regular supply and have limited inventory capacity and account for 75% of the total market (MNRE, 2020). These small companies may exit the market, reducing market competition which has been the main target in Indian Economic Survey 2020.

At present, India is the world's fourth-largest onshore wind market with 38.06GW of wind capacity (MNRE, 2020). The pandemic would delay the setup of new plants and expansion of the existing plants due to challenges of land acquisition, grid unavailability, supply chain bottlenecks and a lack of project financing. However, India, in this case, is self-sufficient in manufacturing the wind components but the delay in construction activities, transportation lockdowns and states' withdrawal from financing the projects would increase the costs of the projects and financial stress of these companies.

The worst-hit states by the pandemic are the ones leading in solar and wind energy generation (MNRE, 2020) capacity in 2019 (4,880 MW of solar and 24,949 MW of wind capacity). Since renewables are under essential industries, the operations of existing plants might not be impacted but it will affect the projects in development due to restriction on movement. According to Wood Mackenzie's Report (2020), India might face 21.6% or 3GW of solar PV and wind installations being delayed as a result of the lockdown. The current support measures taken by the government to mitigate the downturn might help in the immediate short term but if the situations escalate, there would be a severe financial impact on utility companies.

### Demand induced slowdown

The power demand shortage might affect the financial health of distribution companies who procure renewable Net Metering System. The government instructions to DISCOMS to compulsorily purchase power from renewable energy might not dampen the already low demand, but low prices and unlikely immediate increase in demand might hamper RE generators to operate at economies of scale. Total installation of rooftop capacity in 2019 has been 1700 MW, out of which 90% constitute Commercial and Industrial Segment (MNRE, 2020). Most of these industries are shut down including the educational institutions and government offices which also form a major share in the installation demand for solar. The unused generation capacity would leave these setups underutilised, increasing the cost for power companies, uncertainty in jobs and financial insecurity. Even though the hospitals, pharmaceutical companies and other running essential services might be incentivised to make up for the fall in demand in the short term, if the lockdown persists further, situations might worsen in the long term. Further, the installation of residential rooftop capacity for solar may as its demand does not form a regular part of the consumption basket.

## CONCLUDING REMARKS

COVID 2019 will impact the energy sector in the long run depending upon the severity of the pandemic in the coming month and how quickly prices become stable. At present, India's cases are rising but it is performing relatively better than other countries. If the cases stabilize and lockdown is revoked in a shorter period, the country would be able to utilise its available stock but, if it persists for a longer-term, say 4-6 months, then the energy sector

| Sector | | Short term | Long term |
|---|---|---|---|
| **Oil** | | Positive: Savings on import bills | Negative: Financial burden on Oil and Gas Companies |
| **Electricity -Non-Renewable** | **Imports of coal** | Negative: Reduced due to low demand | Positive: Fall in prices and capacity expansion |
| | **Generation of electricity** | Negative: operating at 40-45% less than total generation capacity | Negative: restructuring required to meet increased demand and financial stress |
| | **Transmission and Distribution** | Negative: Low demand and Existing high debt | Negative: Financial stress |
| **Renewable** | **Solar** | Negative: Low demand by DISCOMS | Negative: Heavy dependence on China for inputs |
| | **Wind** | Negative: Low demand by DISCOMS | Positive: Exports and Capacity Expansion at economies of scale |

*Table 3: Impact of COVID-19 on energy sector*
*Source: Author's assessment*

may face a shortage of inputs. Based on above, assessment is provided in Table 3.

It will also depend on how the global pattern follows as India is dependent on other countries in terms of trade. The present crisis challenges India's long-term commitment to achieving 5 trillion-dollar Economy and sustainable development goals as the slowdown would impact the social factors as well. To address the issue of energy security in the long term, this provides opportunities for import substitution production rather than relying on Chinese markets. This might boost the Make in India initiative, especially when the markets have been provided with natural shields from foreign at present. India could cap on its experience and expand its domestic production and look for a potential trade with unexplored markets who are facing constraints due to shortage of supply from China. Raising funds through renewable bonds and boost to the renewables would help in channelizing savings in the long term while reducing the government's burden of subsidising them. This would put India in a better position to achieve its NDC targets and sustain improved environment conditions such as pollution post-COVID-19, which has been a major problem for the country. Air quality in India's major industrial cities has improved by up to 60% compared to last year (ET Energy, 2020). These could be taken as a positive externality in environmental terms where money could be saved in pollution abatement programs and using the same at investing in cleaner energy sources and financing of projects promoting cleaner fuel. The pace of recovery would depend on the efficiency of social infrastructure and investment climate supported by government's future policies. The short-term implications have been made based on the stock availability and performance of sectors in the immediate past. Modelling exercise would provide further insight into the effect of COVID-19 shock in the economy for the long term.

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