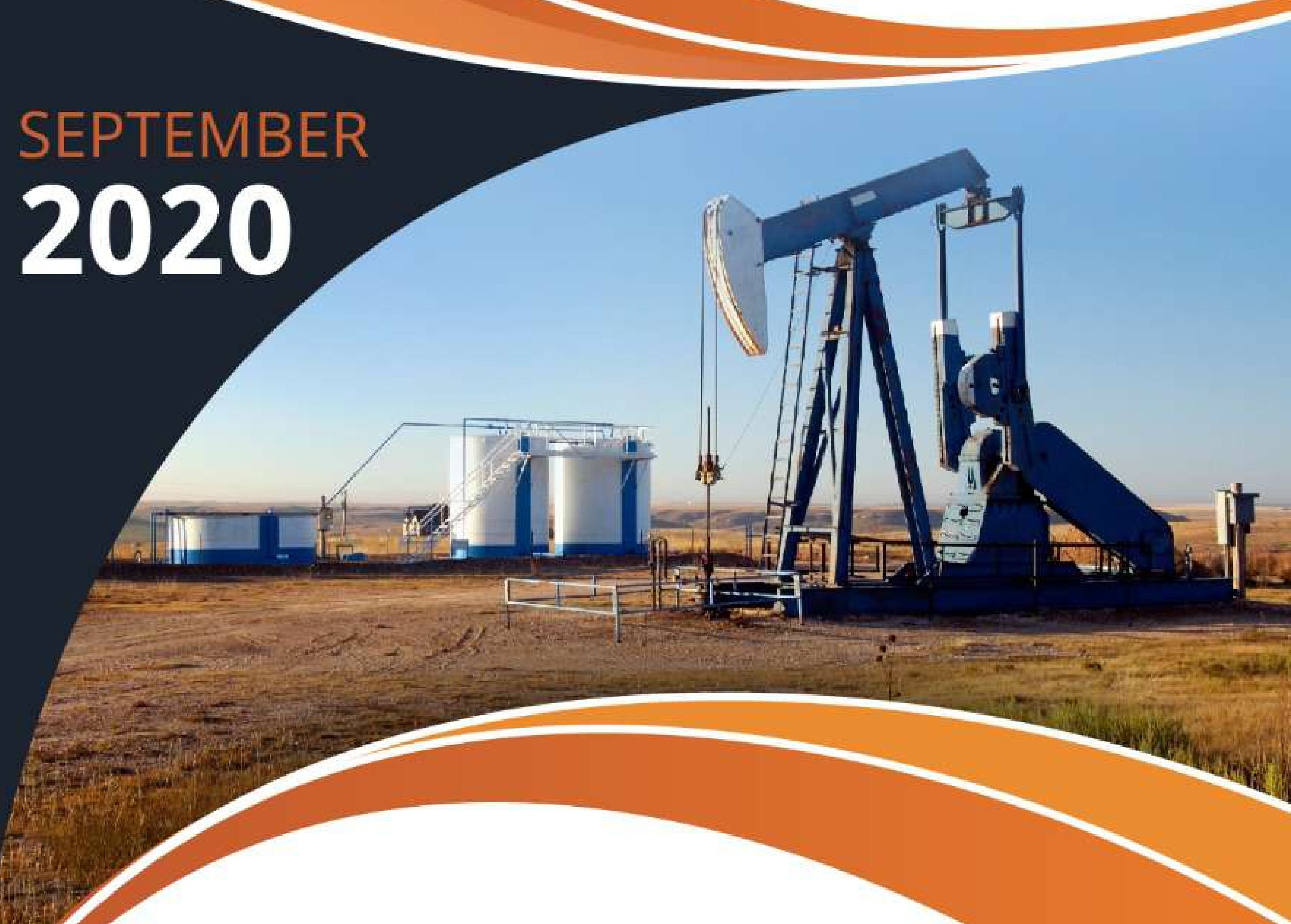
FIPI

Federation of Indian Petroleum Industry

SEPTEMBER
2020



POLICY & ECONOMIC REPORT

OIL & GAS MARKET

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Executive Summary

In September, the COVID-19 pandemic continued to spread at an aggressive pace and its impact started getting more visible on all major economies. By the end of the month, the pandemic has already claimed over 10 lakh lives globally. Over the last few months, the global economy has shown some signs of recovery after the COVID induced lockdowns. However, the economic recovery hasn't been uniform across geographies. Improvements recorded in the US and the EU during the second quarter of has counterbalanced for the challenges faced in Japan, India, other Asian countries and Africa.

A recent report by UN Conference on Trade and Development (UNCTAD) indicates that the world economy is experiencing a deep recession amid a still-unchecked pandemic. The report expects the global economy to contract by 4.3 per cent this year, leaving global output by year's end over USD 6 trillion short of pre-COVID estimates. The report claims that the world is grappling with the equivalent of a complete wipe-out of the Brazilian, Indian and Mexican economies. Amid an otherwise gloomy economic climate, China has emerged as the only country to post a positive growth of 3.4 per cent in Q2, 2020. However, a recent report by an independent agency indicates that an improvement in the performance of large firms are masking the struggle faced by small and mid-size firms in the country.

In India, towards the end of the month, the number of new COVID-19 cases have witnessed a significant fall. Some experts are of the opinion that the country has already seen its peak and is only set to fall from these levels. The unemployment rate in the country has also seen a drop in the month of September. The recent UNCTAD report claims that the Indian economy is set to contract by 5.9 per cent in 2020. The recent ICRA report shows that Coal India, motorcycles, and rail freight traffic recorded an expansion after contracting for four straight months till July. The rate of contraction of the scooters and passenger vehicles, domestic airlines' passenger traffic, port cargo traffic, GST e-way bills, and the consumption of ATF and petrol also fall by differing rates in August. The agricultural sector in India that remained the strength of the Indian economy during the last few months has shown some slowdown in the last month. Most experts believe that for India to chart a speedy recovery, the agricultural sector in the country will have to play a crucial role. Keeping this in mind, the Government of India has also introduced three farm bills. The legislation, which is being considered the, largest reform since the liberalization of the Indian economy in 1992, allows farmers to sell their harvest outside the notified Agricultural Produce Market Committee (APMC) and promotes contract farming in the country.

In the month of September, crude oil benchmarks saw a see-saw pattern. In the first two weeks, crude oil price went down due to sluggish demand for the crude. These losses saw some recovery in the second half of the month, as higher crude draw pushed the price little upwards. Average Brent, WTI and Dubai basket crude price declined by 3.81 %, 6.44 % and 4.46 % respectively from their August prices.

In the drilling side, the rig count trend saw a reversal as the rig count went up for the first time since last six months to reach 1,050. Except for the Middle East and the US, rig count went up in all other regions. Indian rig count went up by one. Three land rigs were added while offshore rig count declined by two.

World oil demand in 2020 is estimated to decline by 9.5 mb/d in 2020, a downwards change by 0.4 mb/d as compared to July month's assessment. Forecasted demand for 2020 is 90.2 mb/d. Downward revision is mainly due to the slower than expected recovery in demand in a countries like India, Indonesia, Thailand etc. With the demand performing better than the forecasted decline, the impact was lower in OECD Americas and OECD Europe. Refinery utilization decreased in the month of August and reached 86.04% as demand remained subdued.

In Asia refinery margin declined in August despite to the smallest extent compared with other region, and losing the recovery made in July 2020. In India, demand for refined products declined by 8.2 % as rising Covid-19 cases impacted the industrial and economic activities across the nations. Except Petrol and ATF all other major products had a demand decline by two digit percentage.

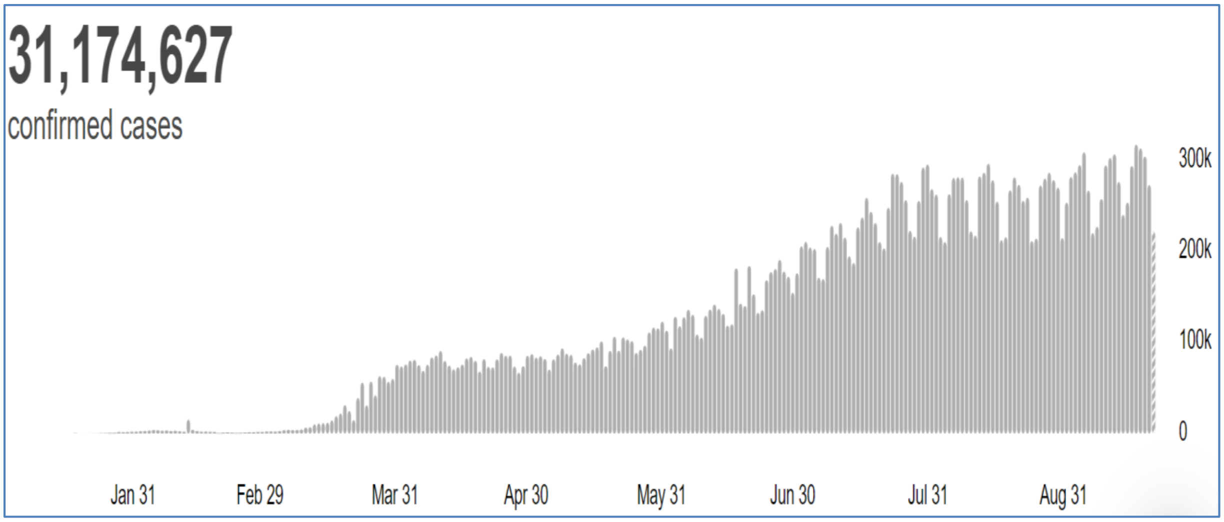
Natural Gas price in the Henry hub went up by 31.6% to reach $2.29/MMBtu. Increase in consumption of Natural Gas by industrial users and production curtailment helped the Henry hub price to increase in the month of August. Natural gas prices in Europe went up by 58.9% in the month of August. With industrial activities performing better than the expectation, demand for Natural gas picked up in the month as helped in recovery of the gas price. Average gas price in the Europe stood at USD 2.86 MMBtu. Asian LNG prices jumped to a more than four-month high to reach $3.10 per MMBtu. September deliveries in the region stood close to $3 per MMBtu across all the major producers in the region.

Policy & Economic Report – Oil & Gas Market

Economy in Focus

1. A Snapshot of the Global Economy: Green shoots visible; future growth depends on managing the pandemic

Throughout the month of September, the confirmed cases of COVID-19 continued to rise at an accelerated pace and reached 31,174,627 as on 23 September, 2020. The pandemic has already claimed 962,613 lives.



Source: WHO

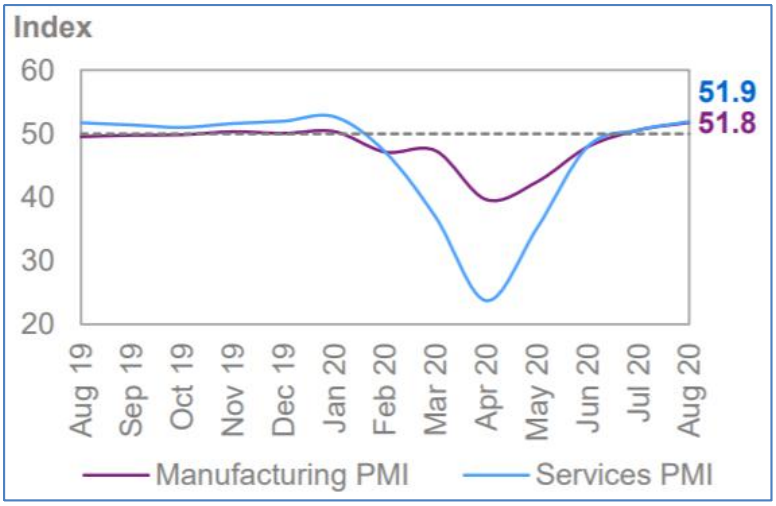
The growth patterns of various economies have continued to differ widely, depending very much on how COVID-19 developments have been handled over the past months, how effectively fiscal and monetary stimulus measures were applied and what the economic and fiscal situation was pre-COVID-19. Some improvements recorded by the end of second quarter of 2020 in the US and the EU have counterbalanced for the challenges faced in Japan, India, other Asian countries and Africa. While the infection rates have continued to rise across the world, number of deaths and hospitalizations have registered a notable drop.

It appears that most economies have now started to adapt to the new realities of the post-COVID world and manufacturing is picking up again, while the services sector sees some fragility in important subsectors, namely travel and tourism, leisure and hospitality. These sectors are expected to remain affected for some time to come and will reach their pre-COVID levels only by end of 2021.

Global Purchasing Manager's Index (PMI)

The global Purchasing Manager's Index (PMI) in August supports this recovery. The global manufacturing PMI rose to 51.8 in August, compared to 50.6 in July. The global services sector PMI recovered as well, to a level of 51.9 in August, compared with 50.6 in July. Hence both important indices remain well above the growth-indicating level of 50.

Global Purchasing Manager's Index (PMI)

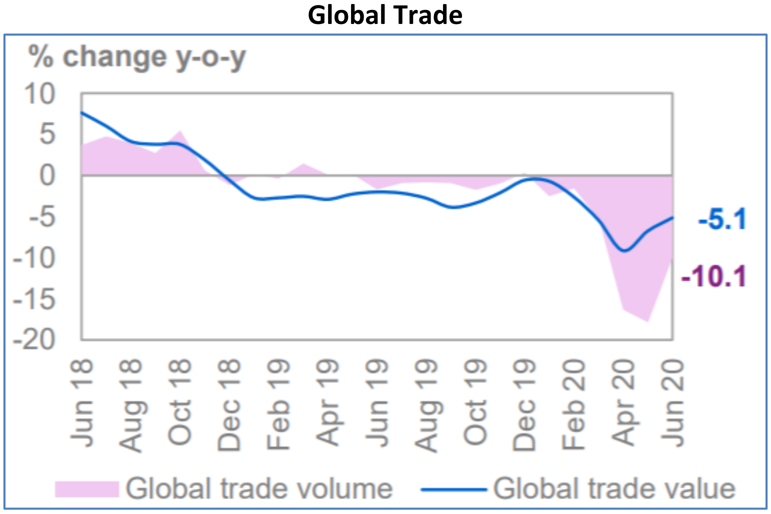


Source: JP Morgan, IHS Markit

Global Trade

The Global Trade data available till June shows that a recovery had already started from the very low levels. In June, world trade volume levels declined by 10.1 per cent y-o-y, compared with a fall of 17.8 per cent y-o-y in May and a decline of 16.3 per cent y-o-y in April.

Global Trade



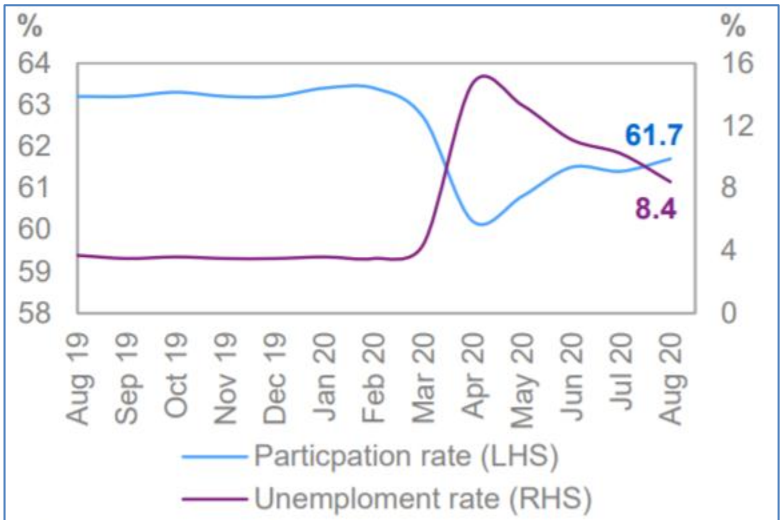
Source: Netherlands Bureau of Economic Policy Analysis, Haver Analytics and OPEC

The US

The industrial activity in the US fall by 8.3 per cent YoY in July, recording the third consecutive month of recovery since the lockdowns. Exports from the country improved in July, however, still remained 20.1 per cent below YoY.

The unemployment rate in the US fall to 8.4 per cent in August, after reaching 11.1 per cent in June and 10.2 per cent in July. Non-farm payrolls increased further by 1.371 million in August after a rise of 1.734 million in July and 4.781 million in June. Hence, since the sharp drop in April of 20.787 million, 10.611 million jobs were added again.

US Monthly Labour Market



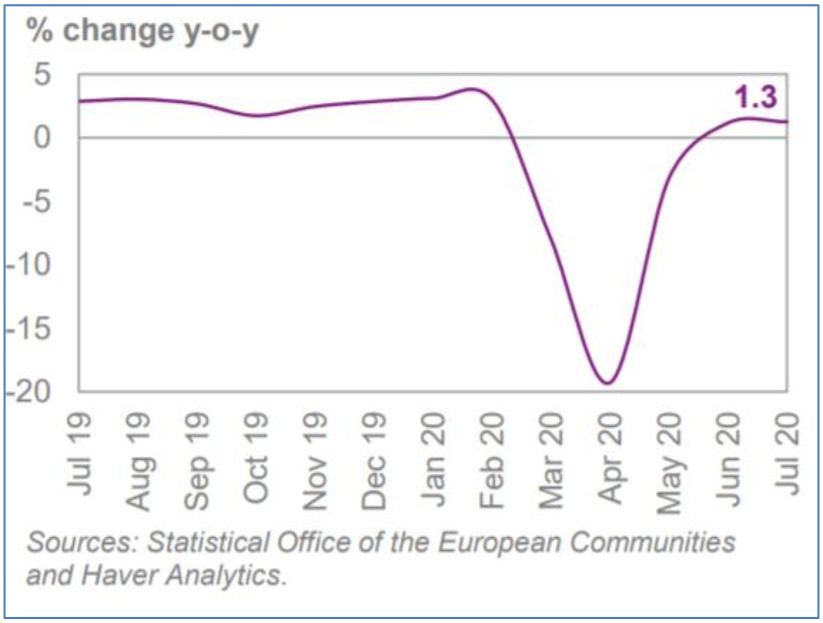
Sources: Bureau of Labor Statistics and Haver Analytics.

The Euro-Zone

The EU member economies have shown different dynamics over the last few months. While countries like Germany, France and Italy have shown some recovery over the last few months, Spain and some of the smaller economies are more affected by the ongoing pandemic. The European Central Bank (ECB) has continued its monetary stimulus measures and indicated that it may even increase its support mechanism if necessary.

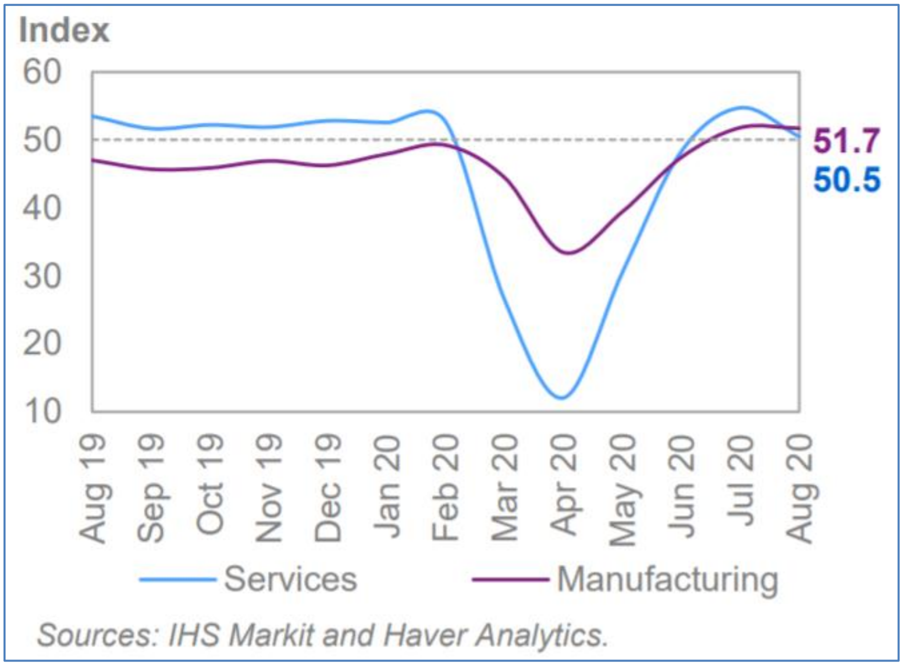
Measures supportive of the labour market in the Euro-zone have so far kept the unemployment rate at a relatively modest level. In the month of July, unemployment rate saw a modest increase to 7.9 per cent from 7.7 per cent in June. Despite the gradual increase in retail sales due to income related subsidies, which held up well in July, recovering further in value terms, up by 1.3 per cent y-o-y compared with 1.2 per cent y-o-y in June.

Euro Zone Retail Sales



The PMI for the Eurozone shows a recovery in the month of August. The manufacturing PMI dropped to 51.7 in July, compared with 51.8 in July. The PMI for services, the largest sector in the Euro-zone, fell strongly to a level of 50.5 in August, compared with 54.7 in July.

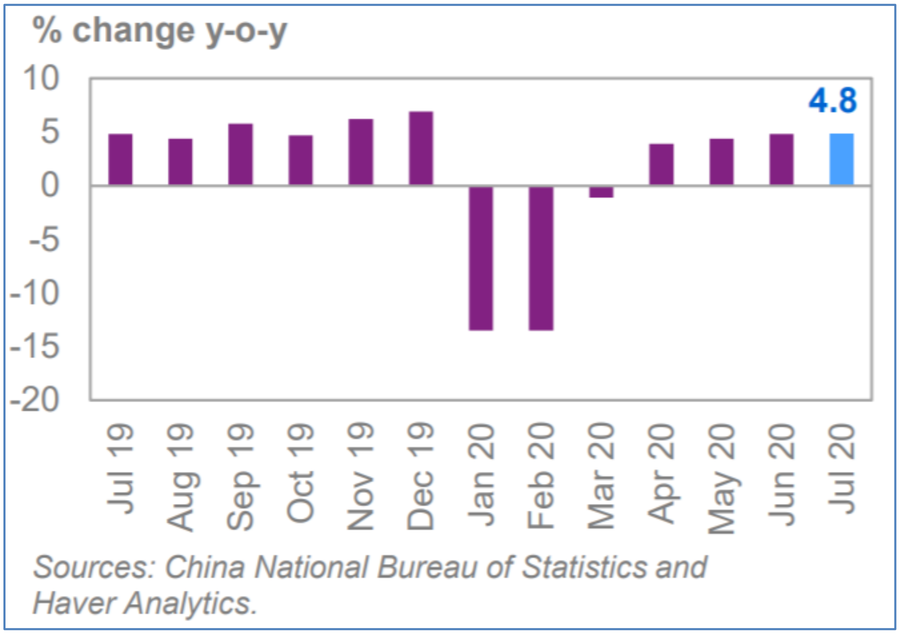
Euro Zone Purchasing Manager's Index



China

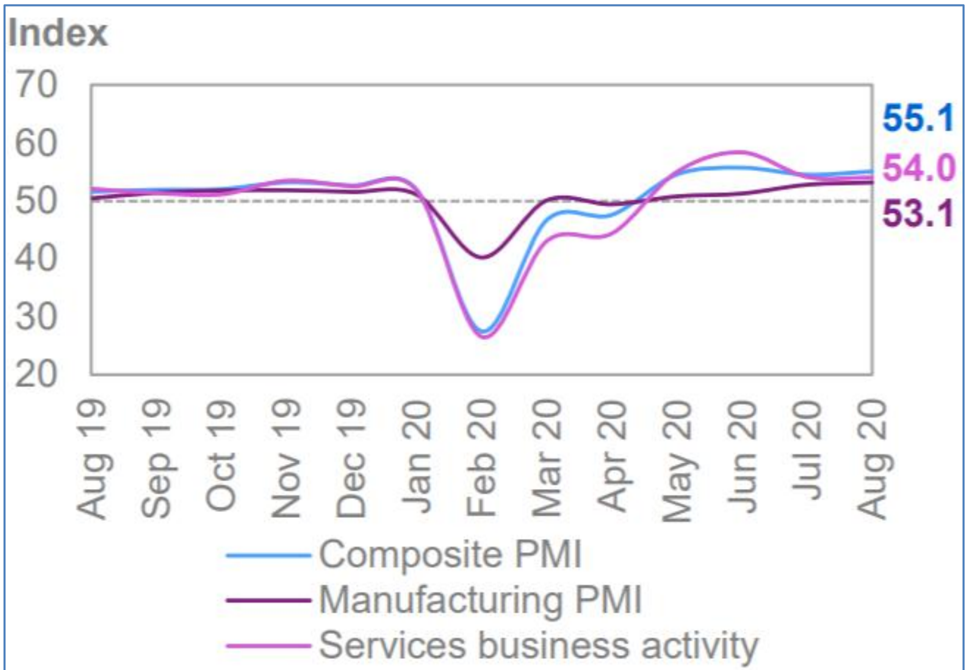
Even as the Chinese economy is set to post its weakest growth in decades, the economic activities in the country are on the path of recovery in the second quarter of 2020. The recovery in the economy is being fuelled by strong growth in real estate output and industrial output. However, the private consumption growth still remains lower than the pre-COVID levels. Through the month of July, the services sector in China has shown a robust growth. Auto sales in the country, which is also a broad representative of consumer spending, continued to rise for the fourth straight month, recording a 16.4 per cent increase in July. Further the sales of the new energy vehicles during the period increased by 19.3 per cent YoY.

China Industrial Production



Supported by policy measures and a possible recovery in the services sector, Chinese economy is most likely to maintain its recovery progress. However, risks may arise mainly due the ambiguous status of the phase one trade deal, along with slower growth in domestic demand and the fear of a rise in COVID-19 infection rates in winter. Consequently, China's general manufacturing PMI increased to 53.1 per cent in August from 52.8 in July.

China Purchasing Manager's Index



Sources: Caixin, IHS Markit and Haver Analytics.

2. Global economy to contract 4.5 percent in 2020; income disparity to further widen: UNCTAD Report

A recent report published by the UN claims that the Indian economy is set to contract by 5.9 per cent in 2020 due to the disruptions caused by the COVID-19 pandemic. While the report expects a stronger economic growth in the country in the next year, the economic contraction in the present year is likely to translate into permanent income loses.

The UN Conference on Trade and Development (UNCTAD) in its Trade and Development Report 2020 indicates that the world economy is experiencing a deep recession amid a still-unchecked pandemic. The report expects the global economy to contract by 4.3 per cent this year, leaving global output by year's end over USD 6 trillion short (in current US dollars) of what economists had expected it to be before the coronavirus began to spread. Painting a grim picture of the global economic climate the report points out that in short, the world is grappling with the equivalent of a complete wipe-out of the Brazilian, Indian and Mexican economies. And as domestic activity contracts, so goes the international economy; trade will shrink by around one-fifth this year, foreign direct investment flows by up to 40 per cent and remittances will drop by over USD 100 billion.

The UNCTAD report expects South Asian economy to fall by 4.8 per cent in 2020 and recover only to 3.1 per cent in 2021. India's GDP forecast is expected to shrink by 5.9 per cent in 2020 and recover to 3.9 per cent by next year. The report further claimed that in case of India, the baseline scenario is a sharp recession in 2020 as strict lockdown measures to stem the virus.

In the US, UNCTAD expects GDP to fall 5.4 per cent in 2020 and recover 2.8 per cent in 2021. China is expected to register an economic growth of 1.3 per cent this year and a whopping 8.1 per cent in 2021, registering the highest economic growth in the world.

The UNCTAD report underlines that the present year is set to be a bad year for the global economy. With many countries unprepared to respond to a health pandemic, lockdown seemed to be the only plausible way to protect lives and preserve health systems. This triggered an economic crisis that spread as quickly as the virus itself. Data from last two quarters show that output during this period contracted more sharply than during the recession of 2008-09, while in some cases this year has recorded the steepest drop ever. The report highlighted that estimates for the year point to a generalized global recession matching the Great Depression of the 1930s.

The report says that while 2021 is expected to see a rebound it will be uneven within and across countries and uncertainty will persist. The report further warns that unemployment will see an upward trend and increasing number of companies will face the threat of bankruptcy; supply chains will remain fragile and demand will be weak. The report further says that debt levels across the world, in both the public and private sectors, will increase significantly from the historically high levels registered before the crisis. Under such circumstances misplaced policies and ignoring the experience of the last decade may lead to further shocks which would not only derail recovery but could usher in a lost decade.

The report suggests that the biggest absolute falls in output will be in the developed world, with some countries set to register a double-digit decline over the year. However, the most significant economic and social damage will be in the developing world, where levels of informality are high, commodities and tourism major sources of foreign exchange, and fiscal space has been squeezed under a mountain of debt. According to the report, between 90 million and 120 million people will be pushed into extreme poverty in the developing world. Another 300 million people in these countries will face food insecurity.

Mukhisa Kituyi, Secretary-General, UNCTAD said that building a better world require smart actions and that the lives of the future generations will depend on the choices that the world makes over the coming months.

The report shows that even if economic activity bounces back and advanced Governments in advanced countries continue with the current mix of fiscal, employment may not fully recover and many countries will be pushed under high debts and income disparity in the world will further increase.

3. Global Innovation Index – Switzerland tops the list; India leads in Central and Southern Asia

The World Intellectual Property Organization's (WIPO) latest report on Global Innovation Index ranks 131 countries according to their innovation performance. Switzerland has emerged at the top spot for the tenth year in a row followed by Sweden and United States. The index looks at a variety of factors, including R&D, ICT, and knowledge and technology outputs.

How does Switzerland outshine others?

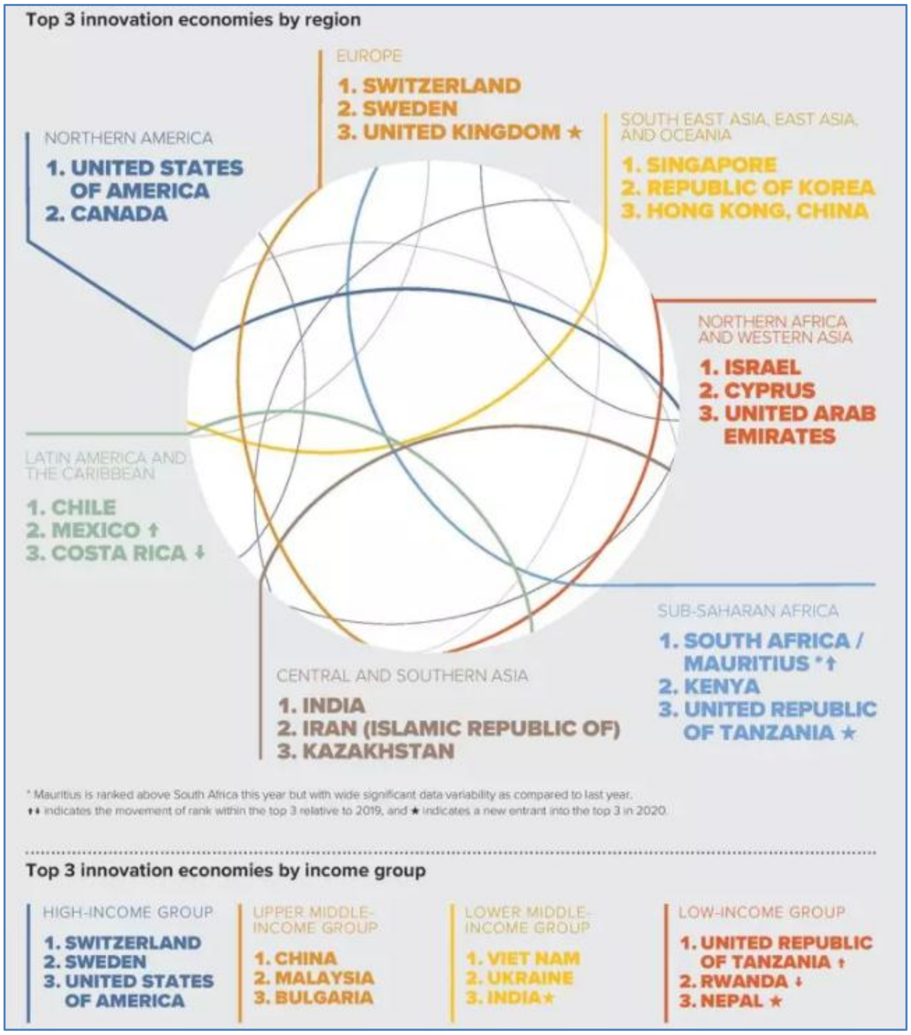
Switzerland has been a high scorer across all seven areas of the index. The country scores particularly high on R&D expenditure and for having an innovative business sector. It has ranked highly on innovation as well where it stands second only to the United States. This is thanks to the high-quality of its universities and scientific publications and the efforts that goes into internationalizing its inventions.

Source: World Economic Forum

How is Innovation Measured?

The index is largely based on two sub-indices indices - the Innovation Input Sub-Index and the Innovation Output Sub-Index. While the former takes into account the elements of national economies that go into enabling innovative activities such as research and development, the latter examines the results generated by these investments. An average of these two is then taken to give the overall score, with each given equal weighting.

Apart from WIPO, the World Economic Forum's Global Competitiveness Report also looks at the innovation capability of global economies. In the previous year's edition, while Germany occupied the top spot, the US and Switzerland stood at second and third places respectively.



Source: World Economic Forum

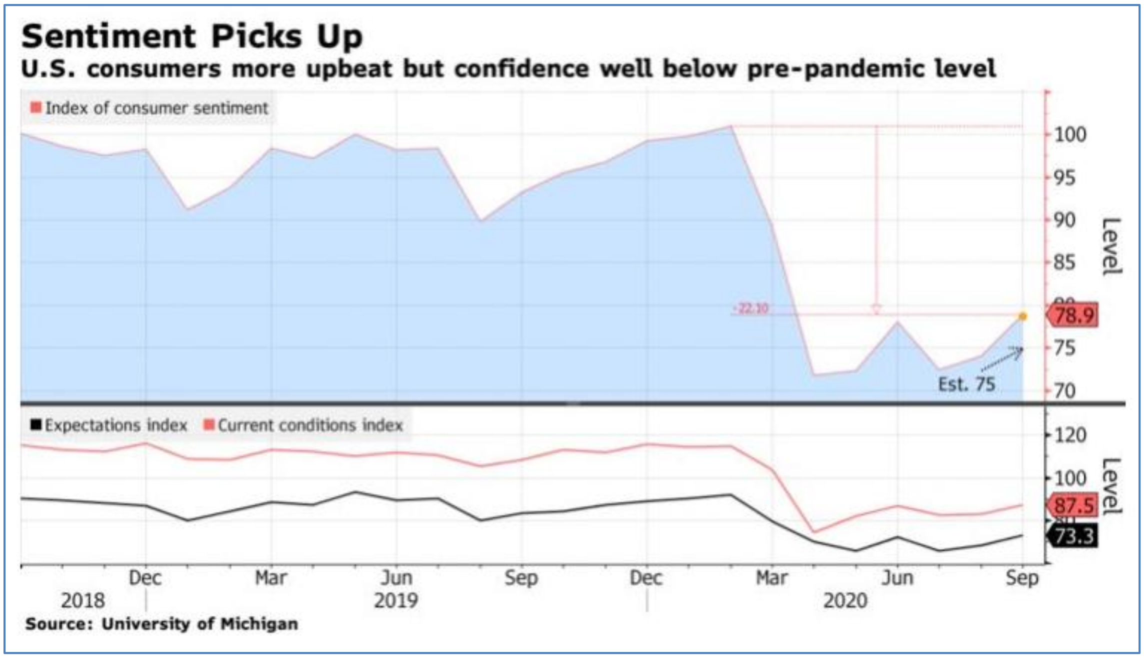
Impact of COVID on Innovation

The Global Innovation Report underlines that the world has been hit by the pandemic at a time when global innovation was flourishing. The report raises the crucial question of who will finance innovation in the future as emergency relief measures do not directly target at financing innovation, with the exception of health. This report indicates that the innovation will further broaden out as the pandemic comes under control. The report states that it is crucial that support for innovation becomes broader and that it is conducted in a countercyclical way – as there is a fall in business investment into innovation, Governments should push for innovation through a boost to their own expenditure.

4. As Americans grow optimistic about the economy, consumer sentiment index reach six month high

Consumer sentiments in the US saw an unprecedented surge in the month of September, reaching a six month high as more and more Americans grew upbeat about the prospects of the economy. The preliminary sentiment index of the University of Michigan rose to 78.9 from 74.1 at the end of August. According to a survey conducted by Bloomberg, the median estimate reached 75 during the month.

The measure of expectations rose 4.8 points to 73.3, also a six-month high, while a gauge of current conditions increased 4.6 points to 87.5.



Only 16 per cent of the respondents expected the economy to further worsen this year consistent with an economy and labour market that are slowly recovering. However, the consumer sentiments are still well below the pre-pandemic levels and few Americans are upbeat about the prospects of their finances.

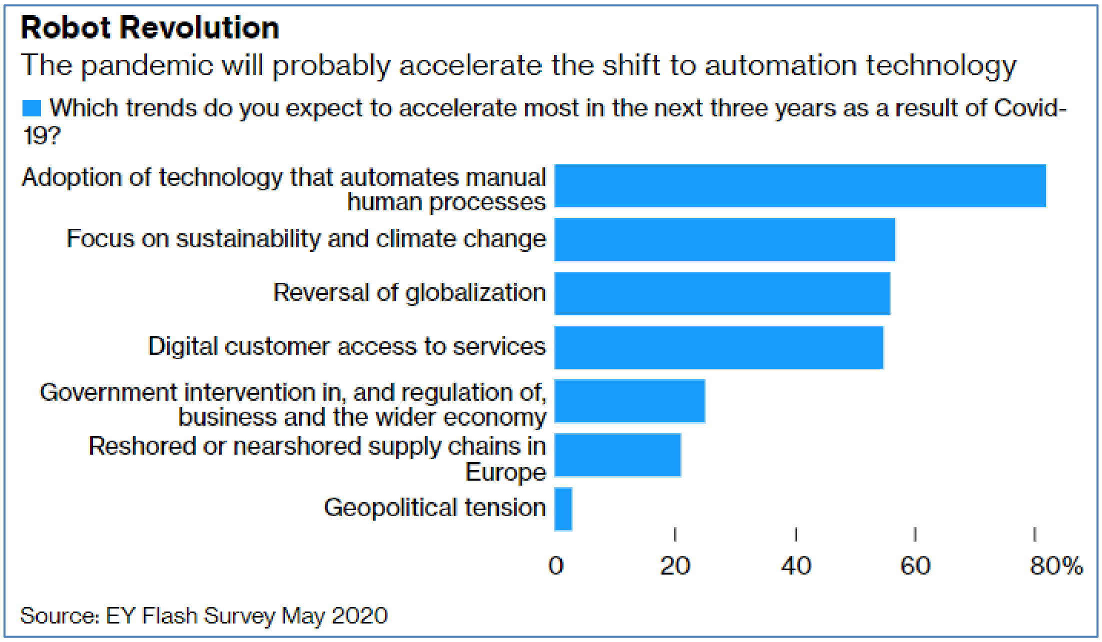
The S&P 500 continued to swing between gains and losses as investors searched for new catalysts to provide direction to the global markets. Treasuries were little changed and the dollar strengthened. Another study shows that the labour market in the country has been gradually improving as the number of people applying for jobless benefits declined during the month.

Consumers of durable goods are more sanguine about the purchasing durable goods. With the US elections approaching, public attitude about the economy, job market and financial situations will play a crucial role in deciding which candidate they support for president. According to Mr. Richard Curtin, director of the survey at the University of Michigan, over the next several months, there are two factors that could cause volatile shifts and steep losses in consumer confidence: how the election is decided and the delays in obtaining vaccinations.

The report also indicates that the expectation for inflation has also declined slightly in September. Consumers anticipated inflation rising 2.7 per cent in the year ahead, down from 3.1 per cent in August, while longer term inflation expectations also fell.

5. Pandemic bottlenecking the 'Fourth Industrial Revolution' in the UK

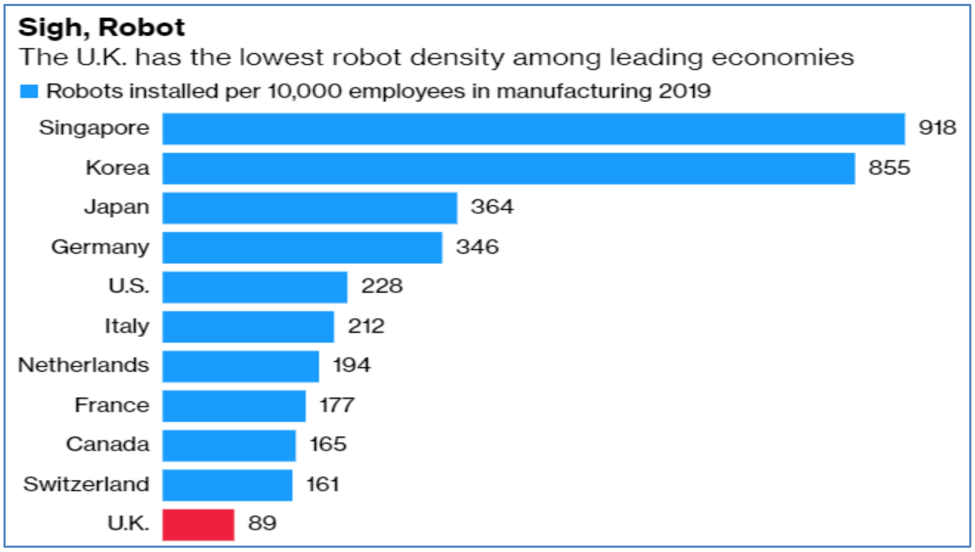
Britain, the country which pioneered the world's first industrial revolution in the 18th century, is facing a serious threat to its next industrial revolution due to the ongoing pandemic. Inn a world, where all major economies are seeing a shift towards robotics and artificial intelligence, UK's progress is being bottlenecked by COVID-19 and Brexit.



This is threatening Britain's competitiveness against rival economies which have already embraced the change to be more productive. This may lead to a greater pain for the UK's labour market, delaying the inevitable adjustment for workers who need to retrain as jobs in industries from manufacturing to retail become obsolete.

Ms. Tera Allas, director of research and economics at McKinsey has rightly pointed out that businesses need to automate as it is cheaper and better for the employees. In sectors that are competitive, the country needs to embrace automation and keep abreast with the changing world or someone else will automate and take the businesses away from Britain.

Britain has been among the slow movers in the so called 'Fourth Industrial Revolution" to harnessing the potential of robots and artificial intelligence. In a report by the lawmakers last years, it was recommended that the Government needs to accelerate the shift through developing a proper strategy in this direction. According to the International Federation of Robotics, the U.K. has just 89 robots per 10,000 workers, compared to over 900 in Singapore. It places the UK at the lowest level among all major economies.



According to a recent survey conducted by Confederation of British Industry, the transition in place when the U.K. did finally leave the EU in January provided some encouragement with spending intentions on plants and machinery rising to a two-year high. Another recent study shows that during this period robot orders in the UK reached its highest since 2012. However, as result of the pandemic, business investments dropped by almost 30 per cent due to nationwide lockdowns in the UK, keeping employees out of the work places and breaking international supply chains.

Immediate Action Required

Since then, the virus has created a new incentive for businesses to shift away from human employment, and find more reliable workers and processes that can't succumb to illness. Mr. Brian Palmer, Chief Executive Officer, Tharsus, a company that creates and commercializes robots, claims that people are still trying to figure out what this new normal looks like. While the industry is showing lot of interest in the new technology, there is hardly any investment or action taking place in this direction.

Such news might come as a faint relief for millions of U.K. employees already facing the threat of layoffs as government wage support winds down. The advent of automation and robotics has long been a specter hanging over labour markets that could displace as much as 50 per cent of the global workforce, Bank of England Chief Economist Andy Haldane said in 2018. However, this respite may be short lived as in a recent survey by EY, 80 per cent of the participants said the shift to automation technology will probably accelerate because of the pandemic.

It is high time that the UK Government takes necessary action to trigger technological revolution that will create "faster and smarter" economy and equip companies for the post-pandemic world. After the pandemic it is more expensive to employ people because companies will have to worry about social distancing, equipment safety and about testing and tracing.

However, there are some who strongly believe that the pandemic will not be able to hold this upcoming industrial revolution in the UK for long. Ms. Jurga Zilinskiene, founder of Guildhawk claims that after the pandemic, people have seen what the technology can do for them and many have started embracing these technologies. Technology, which has long been seen as a monster that takes away jobs, is now emerging as the hero during these difficult times.

Still, the risk if businesses don't respond to the shifting landscape is that the U.K. will lag further behind peers when it comes sowing the seeds of future growth by adopting technology to boost poor productivity. That could not only delay the labour market's adjustment to the new reality, but also curtail work prospects for future generations of employees.

6. Improvement in large firms masks the pain of the ailing smaller businesses in China: Report

According to a recent survey carried out by China Beige Book, the economic recovery in the country is only happening in the parts of the country.

China, the world's second largest economy, was the first country to be affected by the COVID-19 pandemic. In an effort to control the spread of the virus, Chinese Government was forced to shut down more than half of the country in the month of February. This lockdown resulted in a 6.8 per cent contraction in the Chinese economy in the first quarter. As the outbreak of the pandemic stated stalling in March, shops and businesses reopened and the official GDP grew by 3.2 per cent in the second quarter of 2020. Since then, data released by the Government shows continued recovery. Economists at Nomura expect the third quarter GDP of the country to increase by 5.2 per cent in 2020 from a year ago.

An independent survey of more than 3,300 businesses in the country between Aug. 13 and Sept.12 shows that growth story is intact — in the wealthier, coastal regions, according to the China Beige Book's early look brief. The report suggests that the economy is growing at a robust pace for large firms and those based in the Big 3 coastal regions surrounding Shanghai and Beijing, as well as Guangdong, the corporate elite. This also is the picture China is painting to the world. However, in the rest of the country, businesses are still seeing a much slower recovery and companies outside the core are earning, selling, investing, and borrowing far less than their counterparts.

The report finds that the revenue and profit for third-quarter has fallen in double digits in almost every other region. Most provinces in the landlocked parts of the country saw output and domestic orders decline from the prior quarter.

Improving employment situation

Employment is a priority area for the Chinese Government. During the third quarter significant improvements were recorded in the country's employment situation according to the report. The report claims that the manufacturing sector saw the fastest increase in new employments. Retail sector accounted for the greatest improvement in sales volume and prices. Shehzad Qazi, managing director at China Beige Book noted that geographically labour market conditions were better than Q2 in every region. He further added that the hiring was the highest at coasts, with cities like Shanghai witnessing double the growth in employment. According to National Bureau of Statistics, unemployment rate as measured by the official survey of cities was 5.6 per cent in August.

Other issues

Again, here, the broad scale recovery is eclipsing the major challenges faced by the sectors such as services, which employs a growing portion of Chinese over the last few years as the government tries to boost the economy's reliance on consumption for growth. Borrowing among the services companies declined. These companies were earlier only twice as likely to be rejected for loans as businesses in property.

The report underlines that the primary COVID impact now seems to be on Services, which saw only marginal improvement over Q2 in revenue, profits, and sales prices, along with no uptick in hiring. Logan Wright, Lauren Gloudeman, and Daniel H. Rosen from consulting and research firm Rhodium Group highlighted that China faces more risks on its current path than is commonly understood and that the country has encountered incidents of stress within its financial system that could have spread to broader crises.

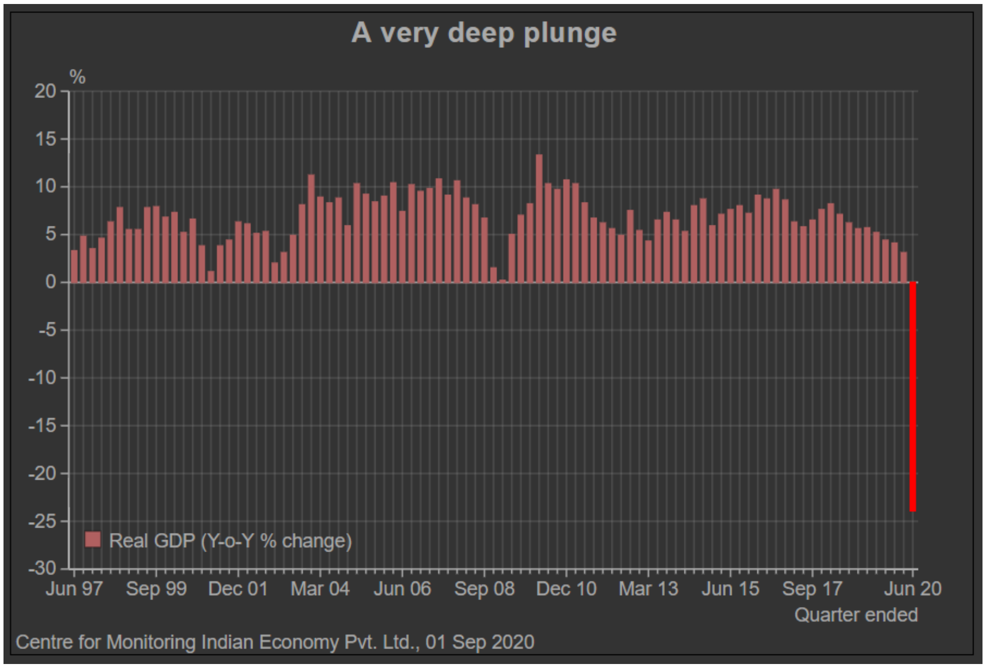
The report further points out that cycles in the property sector strike at the heart of some of Beijing's vulnerabilities in containing financial stress. There is no strong record of policymakers in any country being able to deflate a sizable property bubble without negative consequences

7. Snapshot of Indian Economy: Noticeable improvement in employment levels

The number of COVID-19 cases in India continued to increase during the month and reached 57.3 lakhs as on 24 September. The pandemic has already claimed over 91,149 lives in the country.

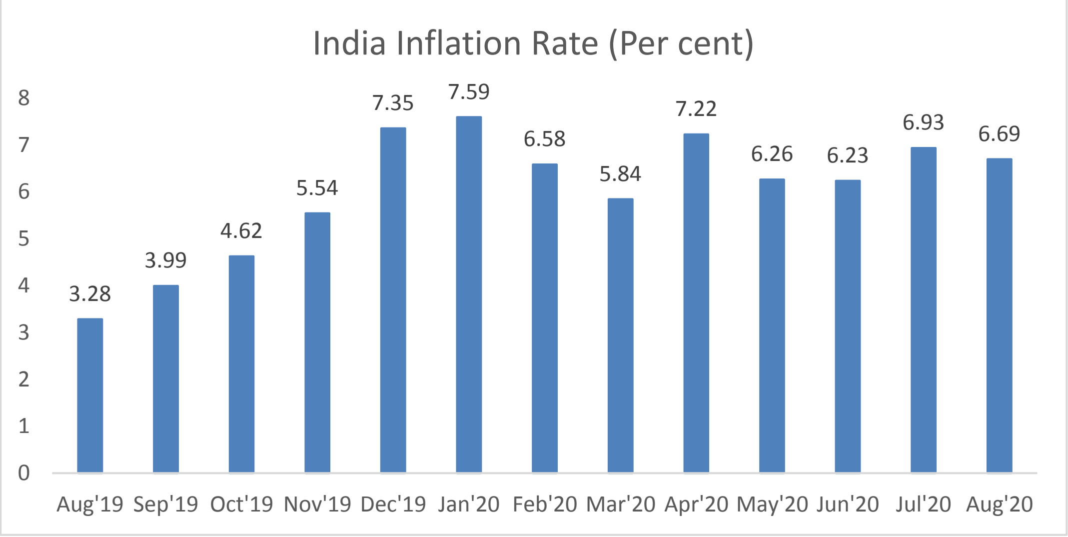
GDP

In the quarter ending June 2020, India's GDP dropped by 23.9 per cent, recording the maximum contraction among all major global economies. This has taken the economy back to its 2014 levels of less than INR 27 trillion



Inflation

Consumer prices in India rose by 6.69 percent year-on-year in August of 2020, against expectation of 6.73 percent rise in the previous month and well below forecasts of 6.85 percent. However, the inflation is still above the RBI's upper band of 2 percent-6 percent target range. A slowdown was also noticed in food prices where vegetables went up 11.41 percent, pulses 14.44 percent, cereals 5.92 percent, meat and fish 16.5 percent and sugar 3.93 percent.

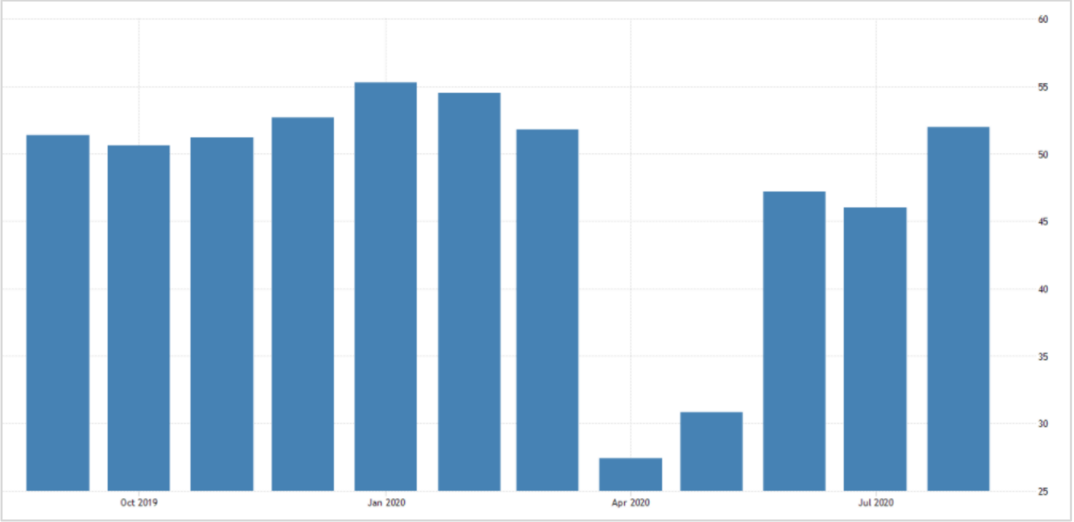


Source: Ministry of Statistics and Programme Implementation (MoSPI)

Manufacturing PMI

The IHS Markit Manufacturing PMI for India rose to 52 in August 2020 from 46 in July, against the market consensus of 48.2. The latest reading indicates the first monthly expansion since March, resulting from increased customer demand and reopening of client businesses. On the price front, input costs rose for first time since March and by the most since November 2018, due to higher raw material prices.

India Manufacturing PMI

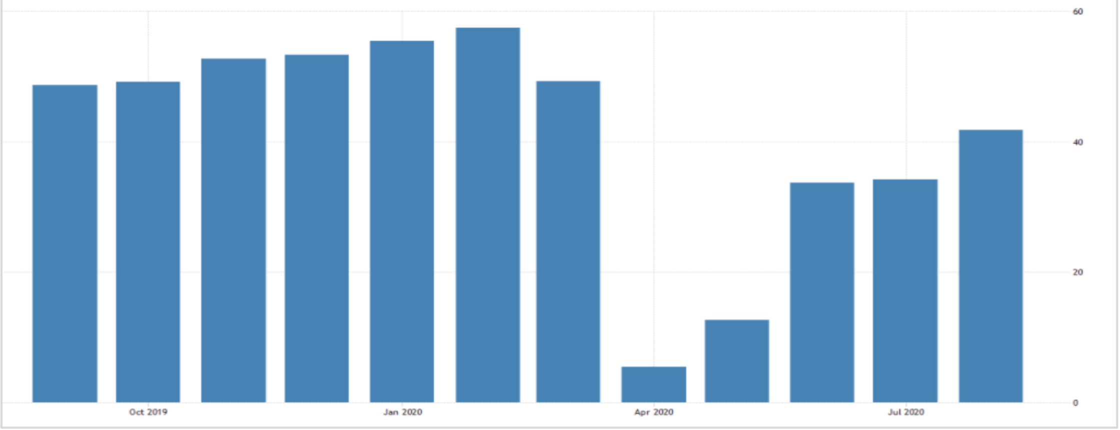


Source: IHS Markit

Services PMI

The services PMI in India rose to 41.8 in August 2020 from 34.2 in July, recording the highest reading since March when the COVID induced lockdowns started. However, it was still below the neutral level, signaling a fifth consecutive decline in private sector business activity. The number of new orders placed dropped to the lowest in five months while rate of decline in new export orders was among the steepest since September 2014.

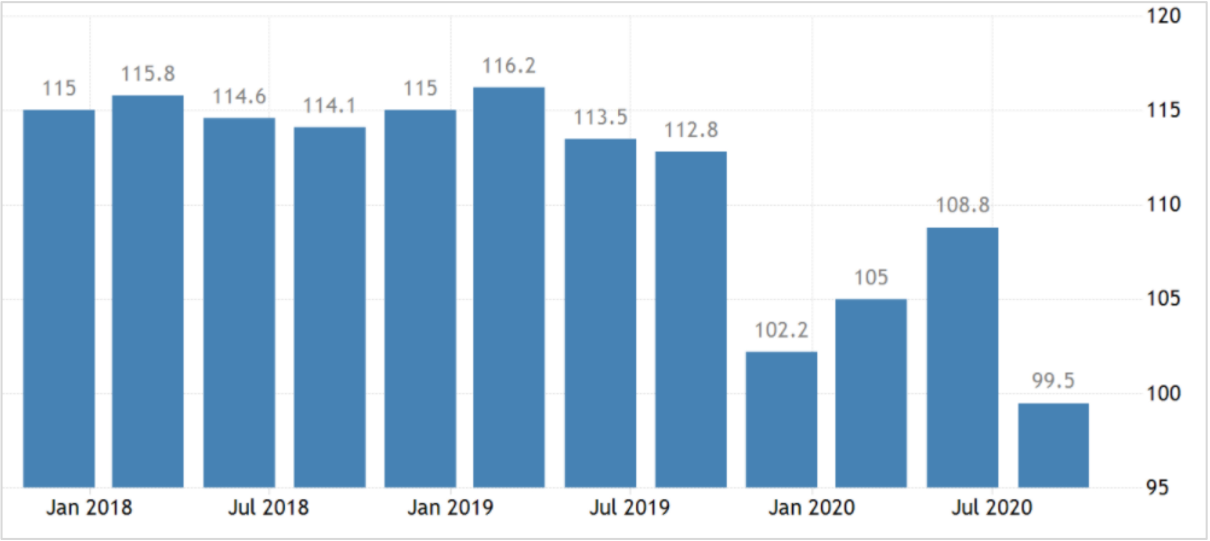
Services PMI



Source: IHS Markit

Business Confidence

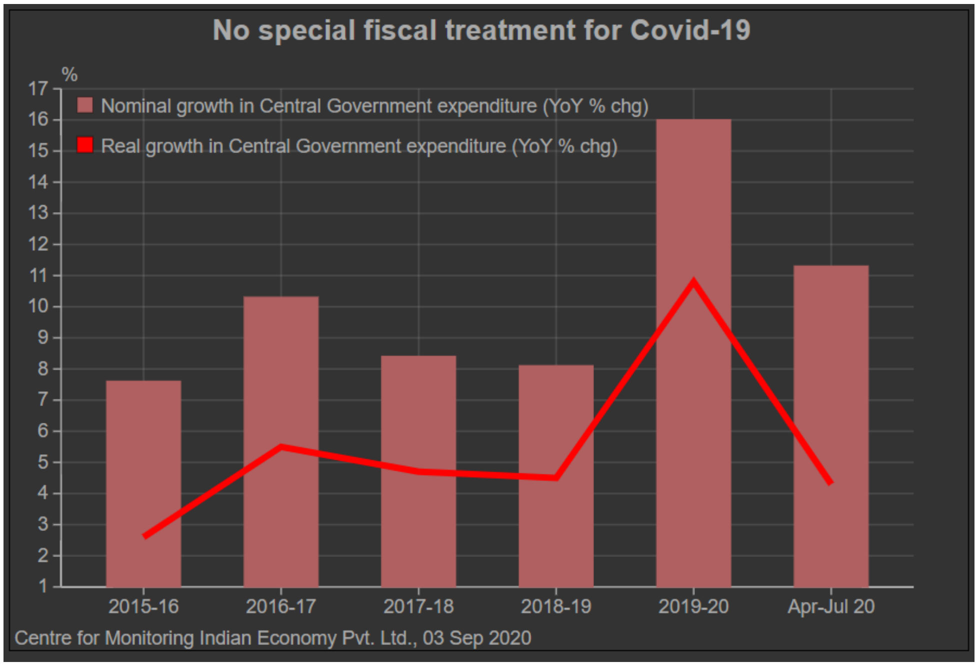
In the second quarter of 2020-21, the business confidence in the country fall to 99.5 points



Source: Reserve Bank of India (RBI)

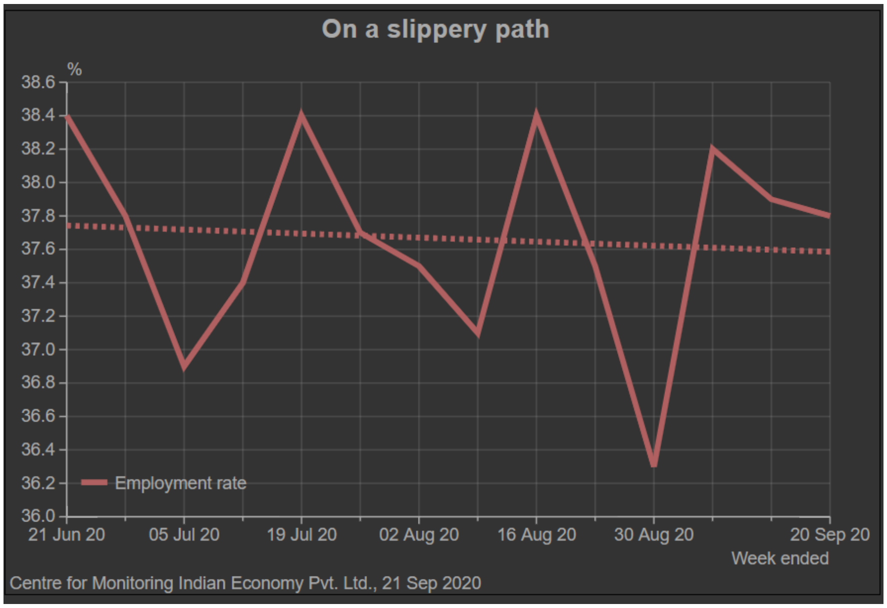
Government Spending

The Central Government increased its expenditure by 11.3 per cent to Rs.10.5 trillion during April-July 2020 compared to its year-ago level. The fillip was on revenue expenditure which rose by 12.2 per cent to Rs.9.4 trillion. Capital expenditure, at Rs.1.1 trillion, was only 3.9 per cent higher than its year-ago level.



Employment

The unemployment rate in the country fall to 6.4 per cent in September 2020. This marks the lowest unemployment rate in a long time. However, economists warn that it is hardly a reason to celebrate as labour market metrics for the month of September so far indicate deterioration in conditions compared to the situation in August and also compared to the earlier months since the recovery.



Salaried employees are among the worst hit due to the pandemic. While other types of employment have recovered most of their initial losses and some have even gained in employment, salaried employees continue to suffer increasing job losses. Despite an increase in entrepreneurship, no significant increase in salaried jobs have been noticed over the month.

8. Falling growth in agricultural sector may bottleneck India's recovery

A recent report by the State Bank of India (SBI) suggests that the agricultural sector in the country may be losing the steam after driving the economic recovery over the last few months.

The month of August witnessed a rise in rural unemployment. The average wages under the national rural employment guarantee scheme has also fallen over the last month.

The SBI report foes on to claim that for 12 Indian states, more than two-thirds of the loss in gross state domestic product (GSDP) in the current fiscal was contributed by rural areas. Some of the states that have witnessed a significant loss in GSDP includes Chhattisgarh, Assam, Himachal Pradesh, Bihar, Odisha, Andhra Pradesh, Telangana, Uttar Pradesh and Madhya Pradesh.

The report underlines that the states such as Chhattisgarh, Assam and Himachal Pradesh over 90 per cent of the GSDP losses can be attributes to the rural areas. Bihar at 86 per cent, Odisha at 84 per cent, Uttarakhand at 79 per cent, Rajasthan at 75 per cent, Andhra Pradesh, Telangana and Madhya Pradesh at 71 per cent and Uttar Pradesh at 65 per cent are among the other states with high output losses from the rural sector.

Rural development key to India's recovery

The report has come out at a time when the economists were expecting agriculture and the rural economy to emerge as the pillar of growth for the ailing Indian economy. The GDP data also shows that agriculture was the only sector to report positive growth in the April to June quarter. During the period, the sector grew at a rate of 3.4 per cent. Other sectors such as construction, manufacturing, and hotels and transport had reported sharp contractions by 50 per cent, 39 per cent and 47 per cent, respectively.

The RBI report underlines how the urban consumption demand has been more affected due to the pandemic than the rural consumption. Highlighting tractor sales and motorcycle purchase data, it had pointed to improved rural recovery, but warned that a full recovery in the rural segment is bottlenecked by muted wage growth which is still hostage to the migrant crisis and associated employment losses.

The report hopes that a rise in employment generation from the rural area under the Pradhan Mantri Garib Kalyan Rojgar Abhiyaan and increased wages under the Mahatma Gandhi National Rural Employment Guarantee Act would provide the much needed boost to the rural economy.

9. Parts of Indian economy have already started showing signs of recovery: ICRA

In a recently released report ICRA claims that the high frequency lead indicator for the month of August indicate a fragment recovery in the Indian economy is in process.

Aditi Nayar, principal economist, ICRA clarified that the year on year performances of the 11 out of the 16 indicators showed a pick-up in August compared to July. The report suggested that Coal India, motorcycles, and rail freight traffic recorded an expansion after contracting for four straight months till July. The rate of contraction of the scooters and passenger vehicles, domestic airlines' passenger traffic, port cargo traffic, GST e-way bills, and the consumption of ATF and petrol also fall by differing rates in August. However, the performance with regard to diesel consumption, thermal and hydroelectricity generation, non-oil merchandise exports and bank deposits fall in August compared to the previous month. The report warns that there may be some intermittent setbacks before the economy gets back to its pre-COVID levels.

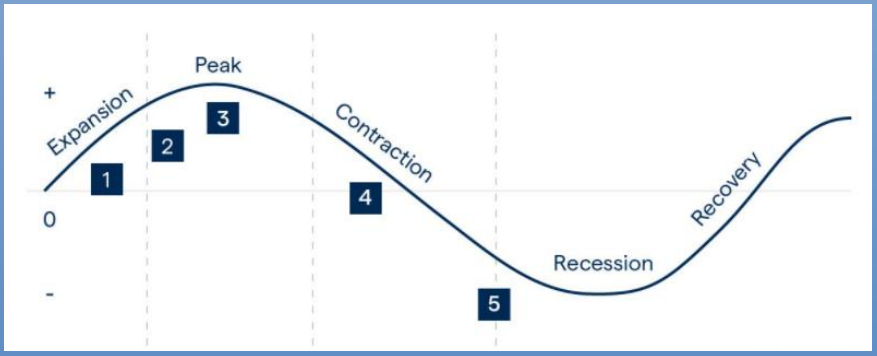
Further, the report goes on to suggest that the contraction in the index of industrial production may ease by 6 – 8 per cent in august after recording a sharp contraction f 10.4 per cent in July. During the first quarter of FY 20-21, the Indian GDP contracted by as much as 23.9 per cent against a growth of 5.1 per cent in Q1, 2020. The report shows a strong growth with production of motorcycles recording a 20 month high of 5.9 per cent growth in August due to sustained rural demand.

Electricity demand improved by 1.2 per cent on year in the first half of September 2020. Due to a contraction in electricity generation from August-December 2019, the electricity generation sector may out-perform much of the rest of the economy within the next few months. Such growth in power generation will support the growth of other sectors. In stark contrast, non-oil merchandise exports fall in August compared to the previous month as demand is still constrained due to rising Covid-19 infections in various trading partners of the country.

Lessons from Economics

What is an economic recovery?

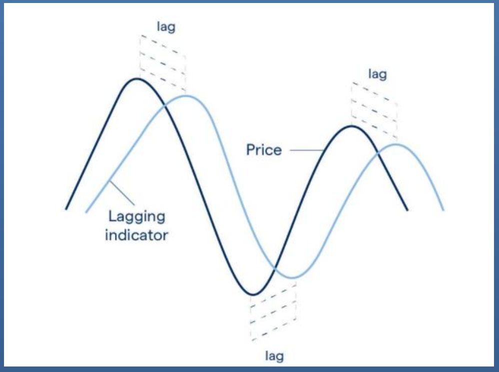
The commencement of an economy, bouncing back from a recession and starting to expand again is termed as an economic recovery. Once an economy has contracted and fallen into a recession, it enters a stage of recovery before the cycle begins again.



Source: IG.com

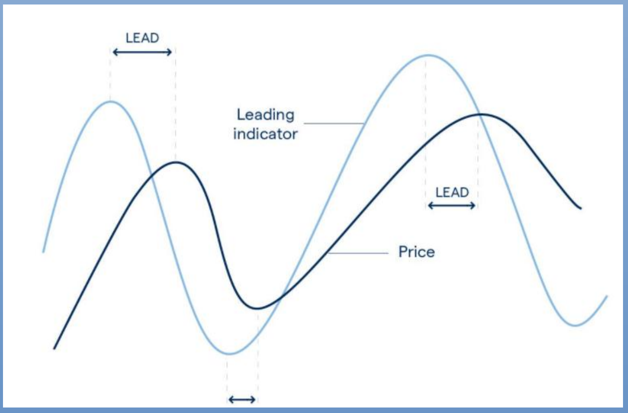
The response to a recession is what will drive the type and speed of any economic recovery and will also play a significant role in shaping the next period of expansion.

Inorder to judge the state of the economy and where it is headed, two types of indicators are essentially monitored: lagging and leading indicators. While leading indicators can be used to help predict market movements, lagging indicators confirm trends that are already taking place. The man lagging indicator usually tends to be the gross domestic product (GDP). An economy only technically enters a recession once it has reported two consecutive quarters of GDP contraction. An economy won't exit recession and enter a recovery until it starts to grow again.



Source: IG.com

Leading indicators usually help to predict where the economy is headed and hence are especially useful in strategizing.



Source: IG.com

Types of recession and economic recovery

Since the onset of the COVID-19 crisis, a concoction of "lettered" recession and recoveries have been tossed around. Over the past couple of weeks, new letters seem to have made the list. Here we analyse all the possible recoveries that have been mentioned.

I. **Z-shaped recovery**
Considered to be the most optimistic scenario, this is when an economy quickly rises after an economic crash. It makes up more than for lost ground before settling back to the normal trend-line, thus forming a Z-shaped chart.

II. **V-shaped recession and economic recovery**
A V-shaped recession and economic recovery is characterised by speed and sharpness. While a sharp contraction in the economy is observed, it also experiences an equally sharp recovery to pre-recession levels.
The recession of 1953 in the United States is a clear example of a v-shaped recession. a v-shaped recession. However, the increase of interest rates by the Federal Reserve tipped the economy in to recession, resulting in growth to slow down and shrinking of the economy by 2.4 percent in the third quarter. The fourth quarter saw the economy shrink by 6.2 percent, and in the first quarter of 1954 it shrank by 2 percent before returning to growth. By the fourth quarter of 1954, the economy was growing at an 8 percent pace, well above the trend.

III. **U-shaped recession and economic recovery**
In this particular scenario, while an economy is expected to experience a sharp fall into a recession like the V-shaped scenario, the recovery is a more gradual and slower process as compared to pre-recession levels. This essentially means to say that the economy remains depressed for a longer period, possibly for several years, before growth starts to pick up again.

IV. **W-shaped recession and economic recovery**

Characterized by ‘double-dip’ recessions, “W” shaped recoveries are known for their surprises, wherein while it would seem that the economy is undergoing a V-shaped recovery, it plunges into a second but smaller contraction before fully recovering to pre-recession levels. In this case, markets are expected to be even more volatile and misleading, especially for investors and traders.

V. **L-shaped recession and economic recovery**

Considered the worst-case scenario, an L-shaped recession and economic recovery is when the economy returns to growth at a much lower base than pre-recession levels. This means that it takes much longer to fully recover. This tends to happen in economies with lackluster investment levels, low levels of economic growth and a slow revival in employment.

VI. **K Shaped Recovery**

Much recently coined, a K-shaped recovery is one where the post COVID era will see some segments of the economy do well such as technology, pharma and non-discretionary consumer goods, while others such as real estate, tourism hotels, airlines will not fare as well. Essentially, “K” is reflective of the performance of the stock market. It is usually characterized by a sharp decline, followed by sharply divergent pathways.

VII. **X Shaped Recovery**

A new letter in the mixture that has been added lately is ‘X.’ An “X’ shaped recovery is one where a nation is at crossroads since the crisis is resulting in a different set of economic impacts in different parts of the world, largely because the health situation is different and hence the extent to which the economies are able to combine saving lives and saving livelihoods is also different.

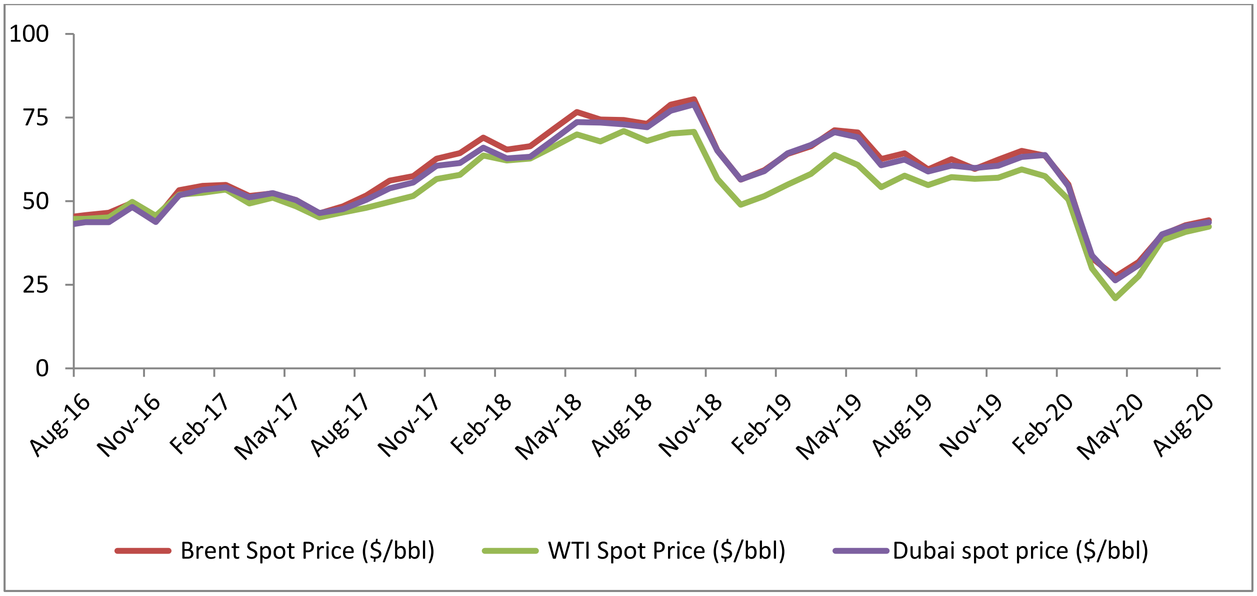
Oil Market

Crude oil price

In the month of August, top global crude benchmarks stabilized in the range of USD 40-45 per barrel due to slight demand recovery and gradual opening up of economies worldwide. Production cuts of 7.7 mbpd from August by OPEC plus allies led to tightening of the market. Recovery in Asian region led by China helped in managing the extra production resulted due to the relaxation of production cuts. Stricter production cut compliance is expected to hold the crude prices for near term.

Average Brent, WTI and Dubai basket crude prices in August went up by 3.5 %, 3.9% and 2.6 % respectively from their July prices.

Figure 1: Benchmark price of Brent, WTI and Dubai crude



Source: WORLD BANK

- Brent crude price averaged $ 44.30 per bbl in August 2020, up by 3.5 % on a month on month (MoM) but down by 25.5 % on year on year (YoY) basis, respectively.
- WTI crude price averaged $ 44.40 per bbl in August 2020, up by 3.9 % on a month on month (MoM) but down by 22.7 % on year on year (YoY) basis, respectively.
- Dubai crude price averaged $ 43.70 per bbl in August 2020, up by 2.6 % on a month on month (MoM) but down by 25.8 % on year on year (YoY) basis, respectively.

Table 1: Crude oil price in August, 2020

Crude oil	Price ($/bbl) in August 2020	MoM (%) change	YoY (%) change
Brent	44.30	3.5%	-25.5%
WTI	42.40	3.9%	-22.7%
Dubai	43.70	2.6%	-25.8%

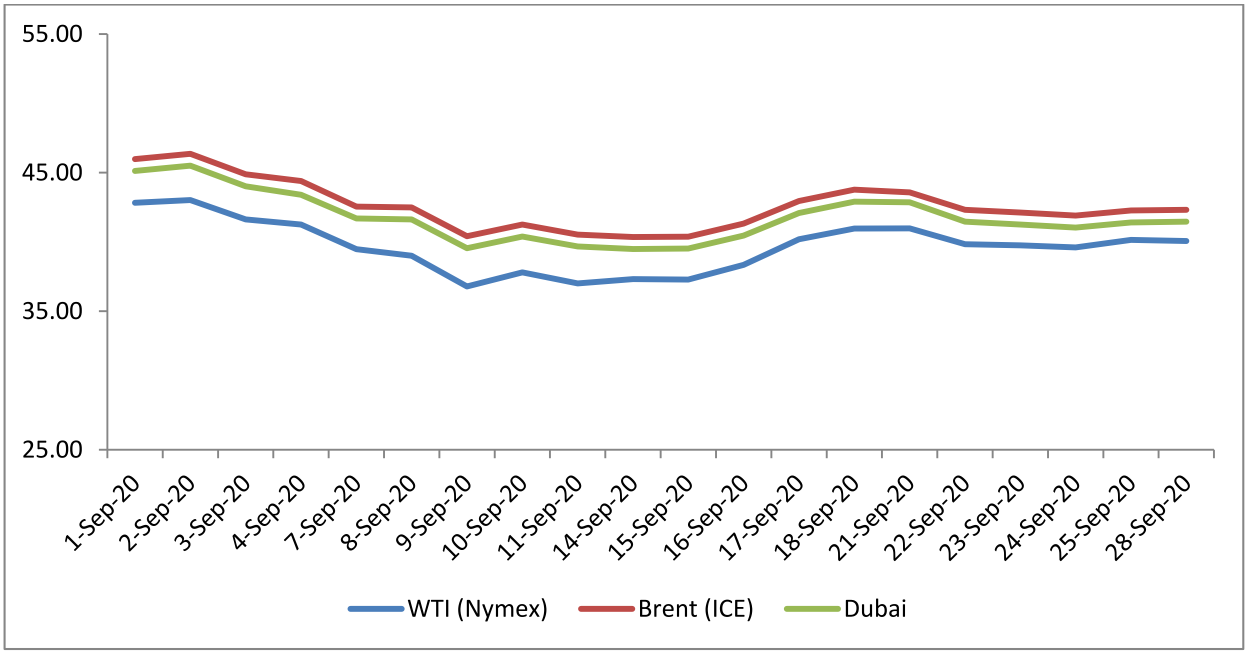
Source: WORLD BANK

Oil Prices Decline as Rising Covid-19 Cases Stalls Recovery

September month had two different phases for the crude oil benchmarks. First fortnight of the month saw a decline in crude benchmarks due to decline in demand for crude oil. Second half saw a minor recovery in the crude prices as the crude inventory draw went up. While demand recovery fared better against the estimated decline in OECD Americas and OECD Europe, it performed below expectations in other region. Slowdown in economic and industrial activity across the major markets led to downward assessment for crude demand forecast.

Recovery of demand for crude in Asian nations like India, Thailand, and Indonesia was poorer than the forecasted recovery. Average Brent, WTI and Dubai basket crude prices in September declined by 3.81 %, 6.44 % and 4.46 % respectively from their August prices.

Figure 2: Crude oil price in September 2020

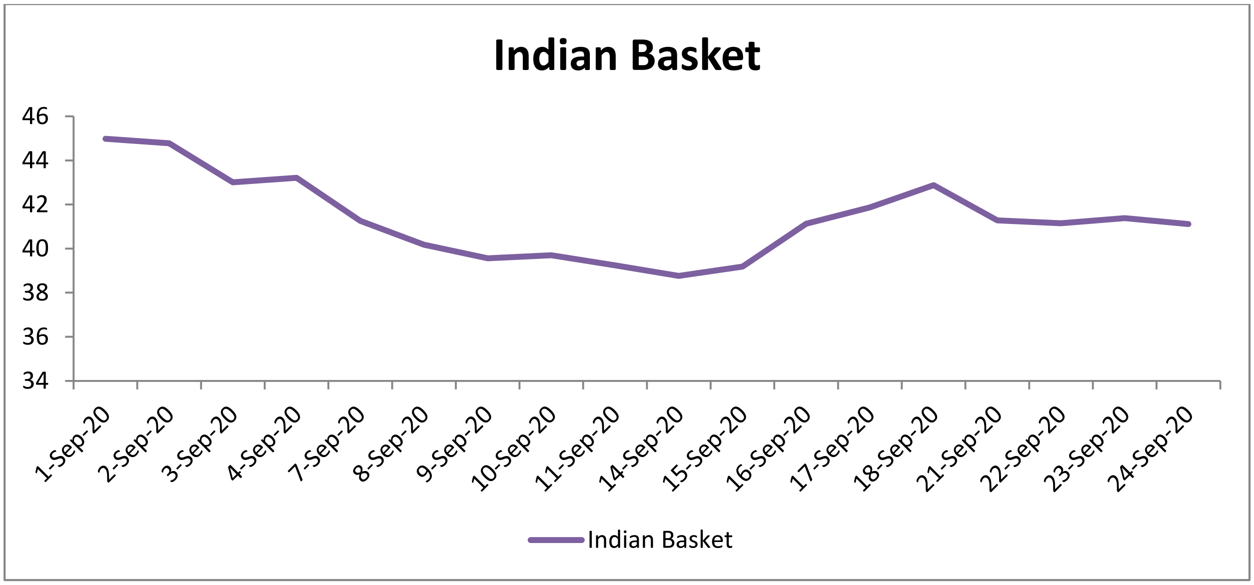


Source: EIA, Oilprice.com, PPAC

Indian Basket Crude oil price

- The Indian basket of Crude Oil represents a derived basket comprising of Sour grade (Oman & Dubai average) and Sweet grade (Brent Dated) of Crude oil processed in Indian refineries in the ratio of 74.77:25.23 during 2017-18.

Figure 3: Indian crude oil basket price in $ per bbl



Source: Petroleum Planning & Analysis Cell

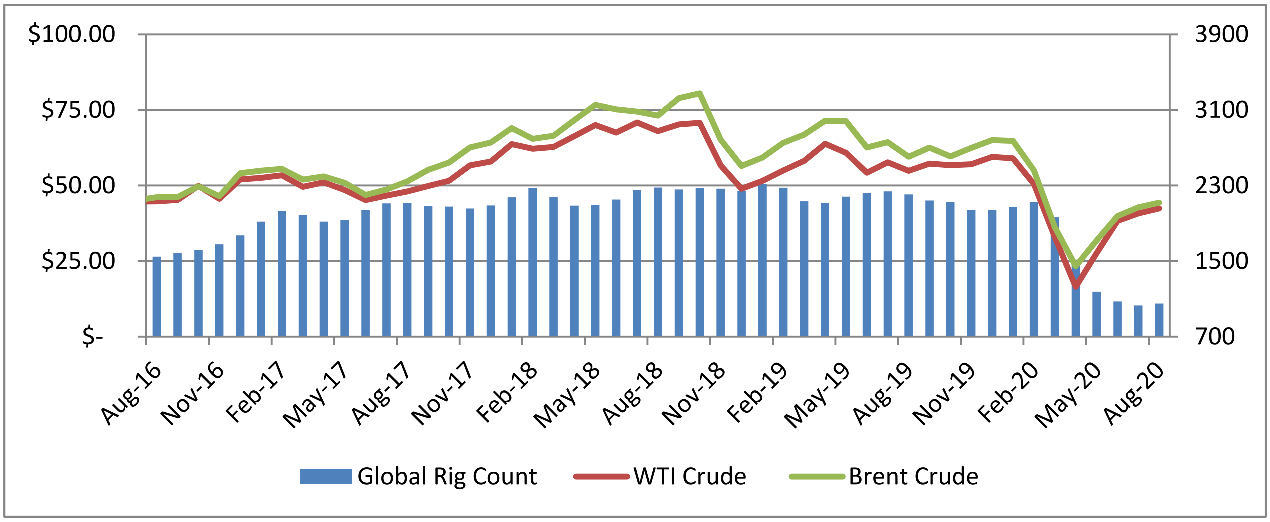
- Indian crude oil benchmark prices declined as the reference crude benchmarks declined.
- Indian crude basket price averaged $41.37 per barrel in September, down by 6.02 % on Month on Month (M-o-M) and 32.70 % on a year on year (Y-o-Y) basis, respectively.

Upstream activity & Rig count

Global rig count

Rig count represents the total number of active drilling rigs in the world. Demand for drilling rig is highly dependent on crude oil price. When the oil price increases, demand for exploration activity increases, resulting in the increase in rig count. A lower oil price could trim the exploration budget of the oil companies, thereby reducing the demand for drilling rig.

Figure 4 Global Rig Count vs. Crude Prices



Source: Baker Hughes

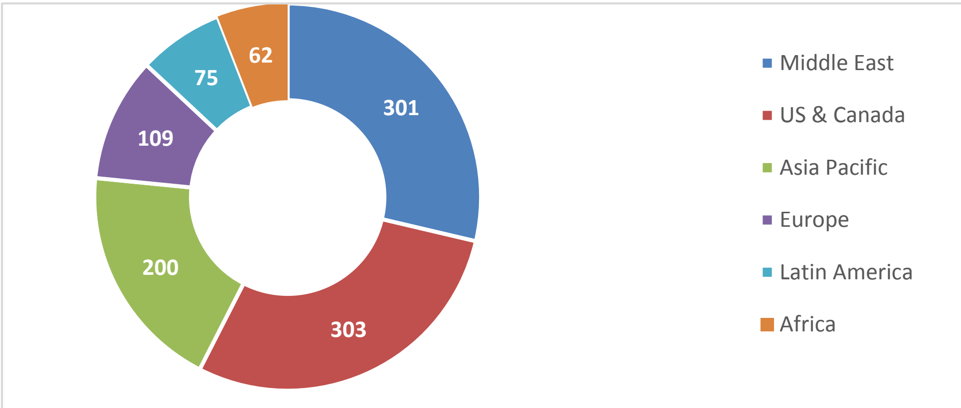
August saw a reversal in trend for rig counts, as the number of active rigs went up in the month for the first time in last six months. August rig count stood at 1,050, which is 20 higher than the July count of 1,030. Rig count started declining from the March of 2020 due to the outbreak Covid-19 as companies responded to the low oil price by reducing the new drilling activity. In August, rig count went up in regions namely, North America, Latin America, Europe, Africa, and in Asia Pacific. Middle East region and the US saw a marginal decline in rig count. Share of Middle East and US rig count is down to 52%, the lowest in recent years. Onshore rig went up by 17 and offshore rigs went up by 3. The average US rig count was 250, down 5 from 255 in July and down 678 from 926 in August 2019.

Table 2 : Global Drilling Rig Count

Rig Type	Count in August 2020	MoM (%) change	YoY (%) change
Land	851	2.04%	-55.98%
Offshore	199	1.53%	-27.11%
Total	1,050	1.94%	-52.40%

Source: Baker Hughes

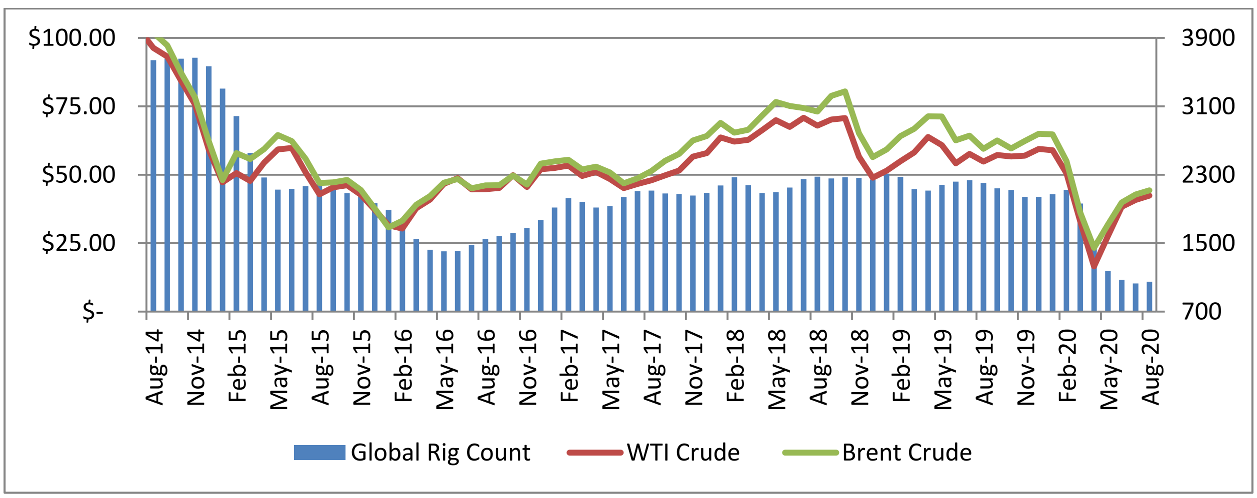
Figure 5 Geography-wise Rig count -August 2020



Source: Baker Hughes

Indian Drilling Rig Count

Figure 6 Indian Rig Count vs. Indian Basket Crude Price



Indian drilling market saw an increase in rig count by 1. Onshore rig count went up by 3, while offshore rig count declined by 2. Indian rig count increased by 0.95 % on M-o-M basis but down by -1.85% on Y-O-Y basis. 72 were onshore rigs and the rest 34 were offshore rigs.

Table 3 : Indian Rig Count

Rig Type	Count in August 2020	MoM (%) change	YoY (%) change
Land	72	4.35%	-6.49%
Offshore	34	-5.56%	9.68%
Total	106	0.95%	-1.85%

Source: Baker Hughes

Oil Demand & Supply

Preliminary data indicates that global oil supply increased in August by 1.32 mb/d m-o-m to average 89.88 mb/d, down by 10.01 mb/d Y-o-Y. Non-OPEC supply (including OPEC NGLs) increased by 0.6 mb/d compared to July to average 65.83 mb/d in August 2020. On Y-o-Y basis, it was lower by 4.8 mb/d. Preliminary increase in production was mainly driven by Russia and Canada. In August, share of OPEC crude oil in total global production increased by 0.5pp % to reach 26.8%.

Estimates are based on preliminary data from direct communication for non-OPEC supply, OPEC NGLs and non-conventional oil, while estimates for OPEC crude production are based on secondary sources.

World oil demand in 2020 is estimated to decline by 9.5 mb/d in 2020, a downwards change by 0.4 mb/d as compared to July month's assessment. Revised demand stands at 90.2 mb/d. In the OECS, demand forecast was adjusted by an increase of 0.1 mb/d in 2020 due to demand decline falling by less than the forecasted decline in the sub regions for 2Q20. Stable petrochemical feedstock demand and increase in heating fuel restocking eased the demand in OECD Americas and OECD Europe respectively. In Asia Pacific, better than expected performance in South Korea eased the demand supported by steady industrial activities.

In the non-OECD nations, the oil demand for 2020 was lowered by 0.5 mb/d down as compared to July 2020. Major downward revision came from the Asian region due to the slowdown in economic activity due to the rising Covid-19 cases. Oil demand in India, Indonesia, Thailand and Philippines was lower than the forecasted decline. China being an exception in the region saw an upward adjustment due to better recovery in demand.

Total global oil demand is estimated to be 90.23 mb/d in 2020. Oil demand forecast for Q3 2020 was revised to 91.45 mb/d, with a downward revision of 0.65 mb/d. Similarly forecast for Q4 2020 is estimated to be 95.09 mb/d with a downward revision of 0.75 mb/d.

Table 4: World Oil demand in mbpd	2019	1Q2020	2Q2020	3Q2020	4Q2020	2020	Growth	%
Total OECD	**47.68**	**45.41**	**36.64**	**43.93**	**45.57**	**42.90**	**-4.78**	**-10.02**
Dev. Countries	**33.11**	**31.36**	**27.58**	**30.01**	**30.83**	**29.95**	**-3.16**	**-9.56**
~ of which India	*4.84*	*4.77*	*3.50*	*3.55*	*4.34*	*4.04*	*-0.80*	*-16.59*
Other regions	**18.91**	**15.91**	**17.42**	**17.52**	**18.69**	**17.39**	**-1.52**	**-8.03**
~ of which China	13.30	10.70	12.85	12.67	13.58	12.45	-0.85	-6.36
Total world	**99.69**	**92.68**	**81.64**	**91.45**	**95.08**	**90.23**	**-9.46**	**-9.49**

Source: OPEC monthly report, August 2020

*Note: *2019 = Estimate and 2020 Forecast*

Global Petroleum Product Prices

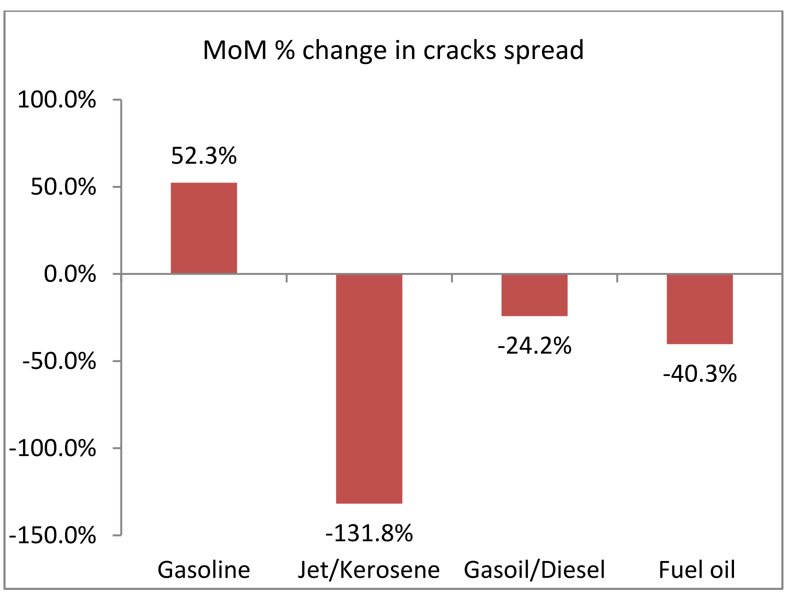
In Asia refinery margin declined in August despite to the smallest extent compared with other region, and losing the recovery made in July 2020. Weakness came from the middle of the barrel amid a continued shortfall in gasoil consumption due to covid restrictions. Refinery margins for Oman in Asia gained 39 ȼ on m-o-m to average minus 87 ȼ /b in August and were lower by $3.03 on y-o-y basis. Refinery utilization rates in July averaged 86.04 % in selected Asian markets comprising of Japan, China, India and Singapore.

Asian gasoline 92 cracks spreads against Dubai strengthened due to the pick-up in demand from China as consumptions recovered from the decline witnessed in July 2020. Singapore Gasoline cracks averaged $3.07/b against Oman in August, up by $1.52 m-o-m, but lower by $4.60 y-o-y.

Jet/kerosene cracks spread against the Oman lost the gains made in the previous month as the limited air travel activities further weakened the demand. The Singapore jet/kerosene crack spread against Oman averaged minus 61 ȼ /b, down by $1.34 m-o-m and $16.30 y-o-y.

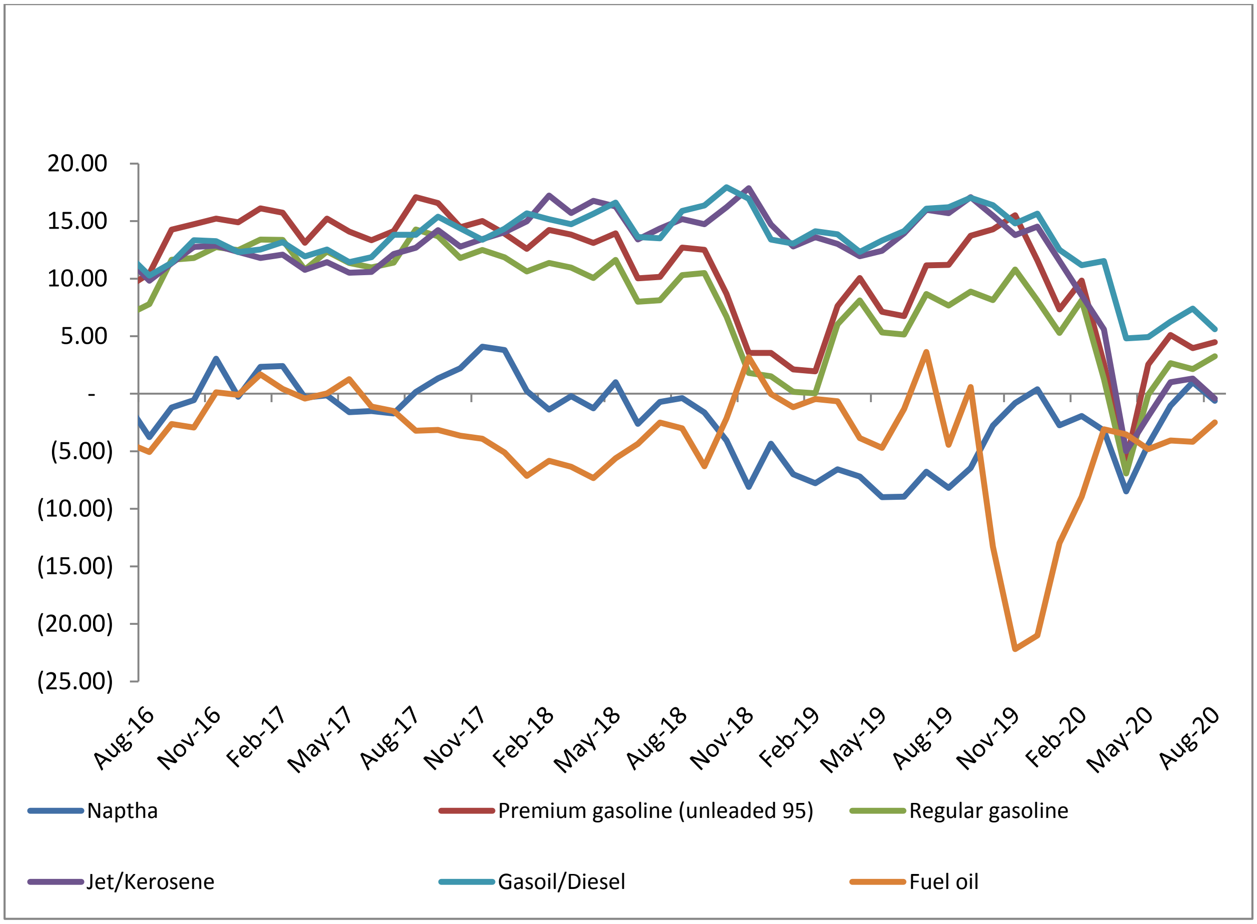
The Singapore gasoil crack spread weakened as gasoil inventories in Asia's oil trading hub reached a record high due to higher output by key players India and South Korea with an increase by 37% and 22%. Singapore gasoil crack spread against Oman averaged $4.21/b, down by $2.42 m-o-m and by $11.99 y-o-y.

The Singapore fuel oil crack spread increased, supported by healthy container ship trading activity in the region amid the declining supply as refineries continued to convert more high sulphur fuel oil barrels into very low sulphur fuel oil. Singapore fuel oil cracks against Oman averaged minus $2.68, up by $2.68 m-o-m and $1.76 y-o-y.



Source: OPEC monthly report

Figure 7: Product crack spreads vs. Dubai crude



Source: OPEC, FIPI

Table 5: Singapore FOB, refined product prices ($/bbl)

Products	Price ($/b) in August 2020	MoM (%) change	YoY (%) change
Naptha	**43.08**	-1.2%	-15.0%
Premium gasoline (unleaded 95)	**48.18**	3.5%	-31.3%
Regular gasoline (unleaded 92)	**46.96**	5.0%	-29.4%
Jet/Kerosene	**43.28**	-1.5%	-42.0%
Gasoil/Diesel (50 ppm)	**49.31**	-1.4%	-34.3%
Fuel oil (180 cst 2.0% S)	**41.21**	7.2%	-24.3%
Fuel oil (380 cst 3.5% S)	**40.6**	5.6%	-24.4%

Source: OPEC

Petroleum Products Consumption in India

- In August 2020, overall petroleum products consumption saw a decline by 8.2 % as rising Covid-19 cases impacted the industrial and economic activities across the nations
- Slowdown in economic activities was vivid from the decline in consumption of Diesel, primarily used for trucking and long haul transportation.
- Petrol consumption was up by 5.2% as more relaxations came in for inter-state transports. ATF consumption went up by 9.9% as the airlines pushed their aircraft utilization rate little higher than the previous month.
- LPG consumption saw an increase by 9.3 % M-o-M basis in July 2020 as more cylinders were issued under PMUY scheme.
- Decline in industrial activity was reflected from the consumption pattern for the month as key products like Lubricants & Greases, Bitumen, and Petroleum Coke saw a double digit decline.
- On yearly basis, petroleum product consumption was down by 15.6%.

Table 6: Petroleum products consumption in India, August 2020

Petroleum products	Consumption in '000 MT August 2020	MoM (%) change	YoY (%) change
LPG	2,275	0.2%	-5.0%
Naphtha	1,073	-16.5%	-6.6%
MS	2,381	5.2%	-7.5%
ATF	256	9.9%	-62.4%
HSD	4,849	-12.2%	-20.7%
LDO	60	2.0%	-5.1%
Lubricants & Greases	309	-17.2%	-2.2%
FO & LSHS	499	0.4%	0.6%
Bitumen	316	-18.8%	21.5%
Petroleum coke	1,376	-15.7%	-23.0%
Others	863	-13.0%	-11.5%
TOTAL	14,391	-8.2%	-15.6%

Source: PPAC

Natural Gas Market

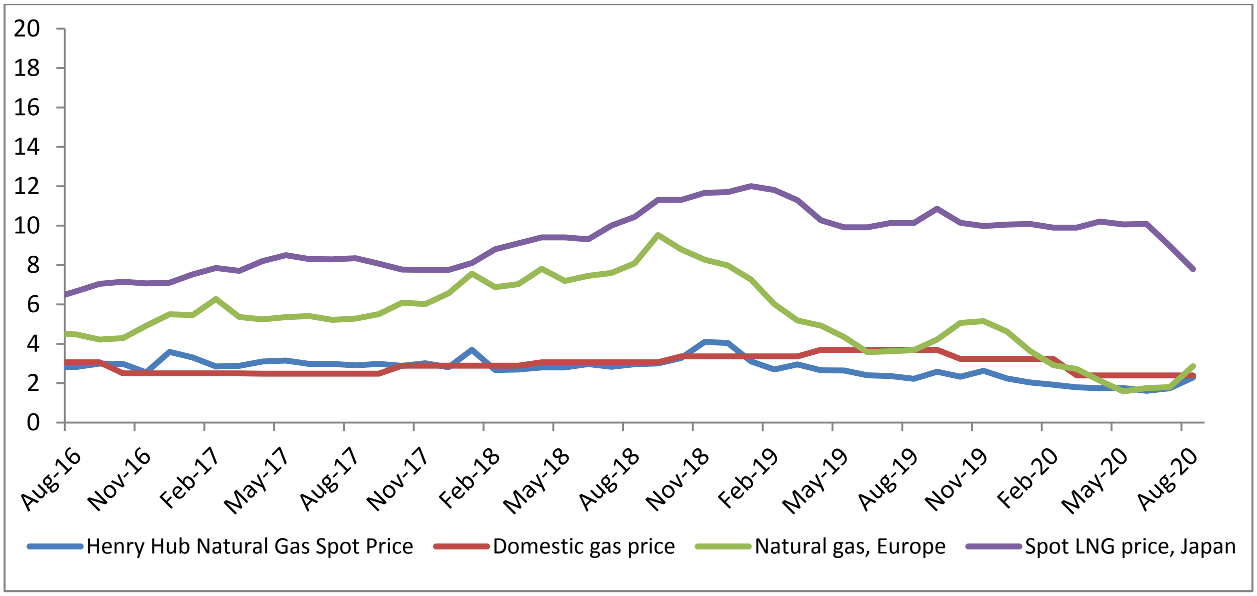
Natural Gas Price

Global gas market saw different trends across different geographies. Gas price in the Henry hub went up by 31.6% to reach $2.29/MMBtu. Rationalization of gas production to match the gas demand and increase in consumption of Natural Gas by industrial users helped the Henry hub price to increase in the month of August. With winter approaching, the demand is likely to shoot up and could increase the gas prices further up in US.

Natural gas prices in Europe went up by 58.9% in the month of August. With industrial activities performing better than the expectation, demand for Natural gas picked up in the month as helped in recovery of the gas price. Average gas price in the Europe stood at USD 2.86 .MMBtu.

Asian LNG prices jumped to a more than four-month high to reach $3.10 per MMBtu. September deliveries in the region stood close to $3 per MMBtu across all the major producers in the region. October delivery is estimated to be $3.50 per MMBtu due the bullish behavior from the market. Japan LNG benchmarks decline by 13.2 % due to rise in imports of LNG cargoes leading to market surplus situation.

Figure 8: Global natural gas price trends



Source: EIA, WORLD BANK

Table 7: Gas price

Natural Gas	Price ($/MMBTU) in August 2020	MoM (%) change	YoY (%) change
India, Domestic gas price (Apr 20)	2.39	00.00 %	-35.23%
India, Gas price ceiling – difficult areas (Apr 20)	5.61	00.00 %	-39.8%
Henry Hub	2.29	31.6%	3.2%
Natural Gas, Europe	2.86	58.9%	-22.3%
Liquefied Natural Gas, Japan	7.79	-13.2%	-23.1%

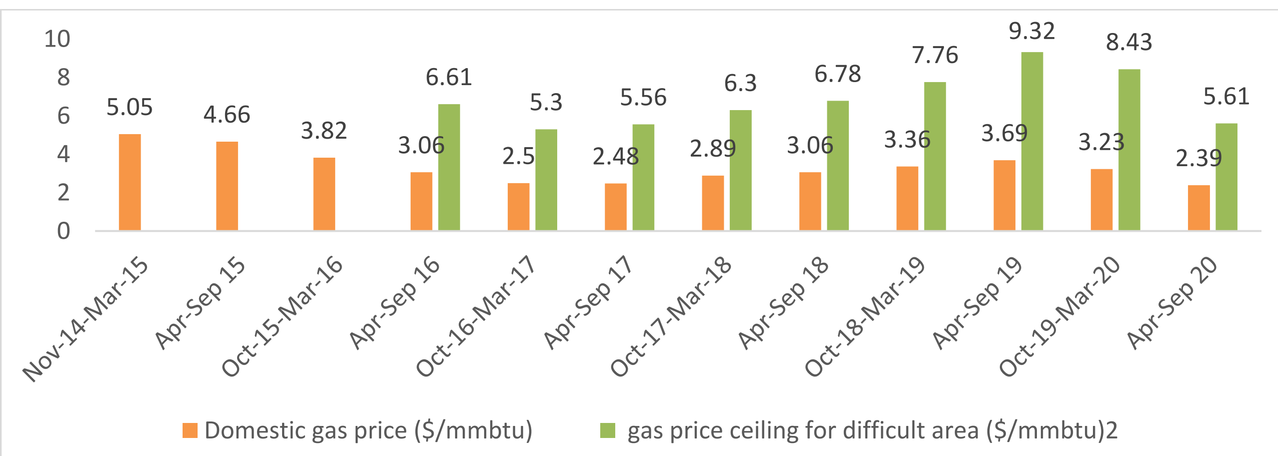
Source: EIA, PPAC, World Bank

Indian Gas Market

Domestic natural gas price which takes into account international benchmarks including Henry Hub, Alberta hub, Russia and UK National Balancing Point. With global gas price declining, India's latest gas price revision saw significant decline, thus capturing the international gas price trends. Domestic gas price for April 2020 to September 2020 is $2.39 per MMBTU has decreased around 35.23 % as compared to 2019. Gas price for difficult area has declined by 33.45 % on M-o-M basis and by 39.8% on Y-o-Y basis.

A notification was issued by MoP&NG on 21st March 2016, for marketing including pricing freedom for gas to be produced from discoveries in deep water, ultra-deep water, and high-pressure high temperature areas. For the April 2020 to September 2020 period, the price of gas from such areas has been notified at $5.61 per MMBTU, 33.45% down as compared to the last year.

Figure 9: Domestic natural gas price



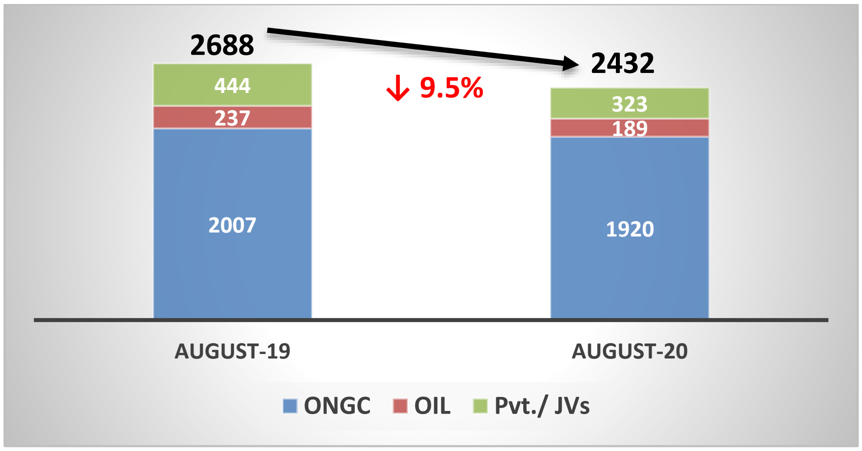
Source: PPAC

Monthly Report on Natural Gas Production, Imports and Consumption – August 2020

1. Domestic Natural Gas Gross Production:

Domestic natural gas gross production for the month of August 2020 was 2432 MMSCM (decrease of 9.5% over the corresponding month of the previous year which was 2688 MMSCM)

Figure 10: Domestic natural gas Gross production (Qty in MMSCM)

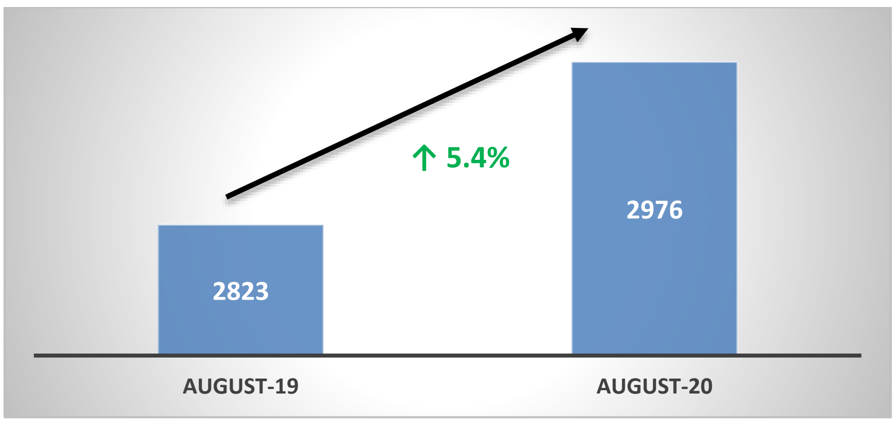


Source: PPAC

2. LNG imports:

Total imports of LNG (provisional) during the month of August 2020 were 2976 MMSCM (increase of 5.4% over the corresponding month of the previous year which was 2823 MMSCM).

Figure 11: LNG imports (Qty in MMSCM)

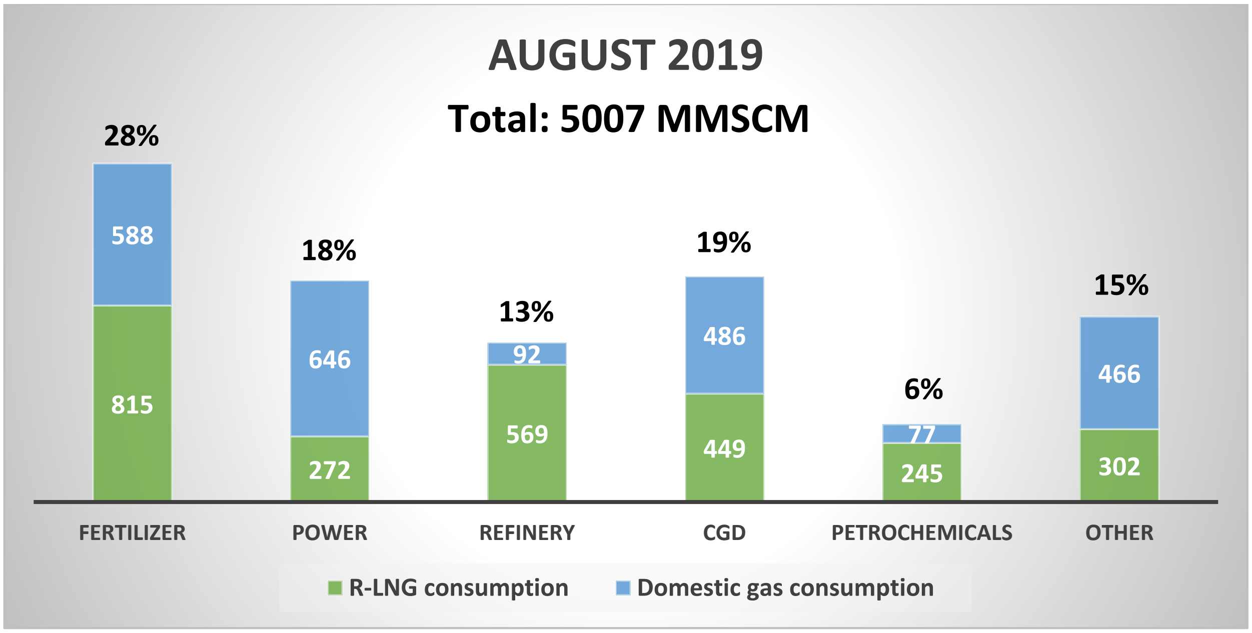


Source: PPAC

3. Sectoral Consumption of Natural Gas:

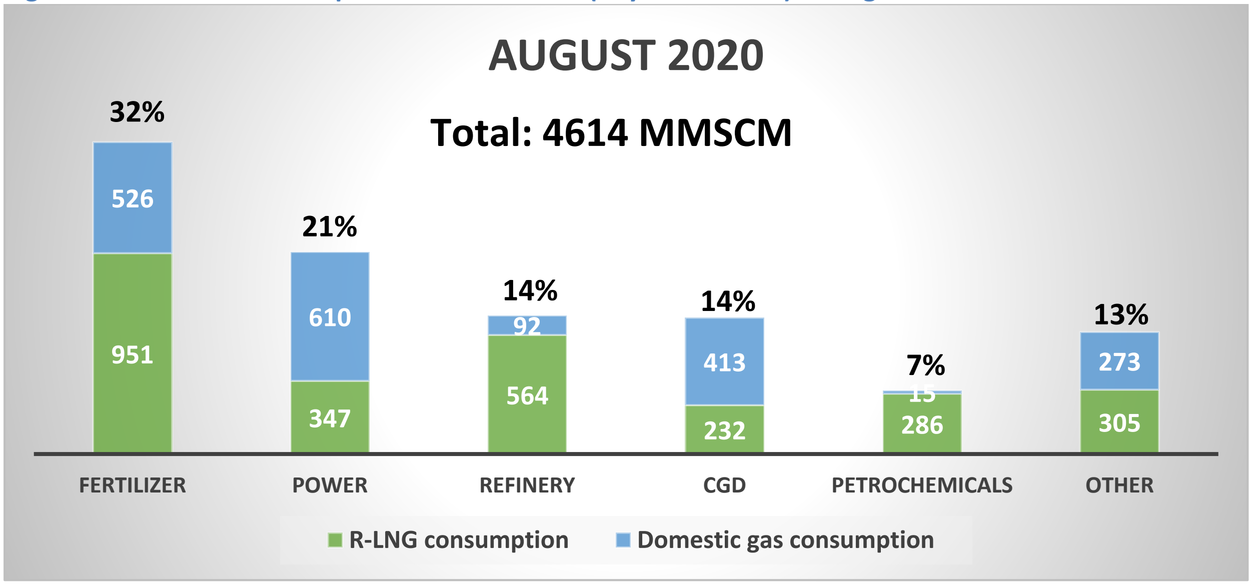
Total consumption of natural gas during August 2020 was 4614 MMSCM (decrease of 7.8% over the corresponding month of the previous year which was 5007 MMSCM). Major consumers were fertilizer (32%), power (21%), refinery (14%), City Gas Distribution (CGD) (14%) and petrochemicals (7%).

Figure 12: Sectoral Consumption of Natural Gas (Qty in MMSCM) in August 2019



Source: PPAC

Figure 13: Sectoral Consumption of Natural Gas (Qty in MMSCM) in August 2020



Source: PPAC

Key Developments in Oil & Gas Sector during September 2020

- **Monthly Production Report for August,2020**

Crude oil production during August, 2020 was 2577.49 TMT which is 6.72% lower than target and 6.27% lower when compared with August 2019. Cumulative crude oil production during April-August, 2020 was 12886.26 TMT which is 4.19% and 6.11% lower than target for the period and production during corresponding period of last year respectively.

Natural gas production during August, 2020 was 2431.69 MMSCM which is 14.24% lower than the monthly target and 9.54% lower when compared with August, 2019. Cumulative natural gas production during April-August, 2020 was 11660.15 MMSCM which is 12.06% and 13.22% lower than target for the period and production during corresponding period of last year respectively.

Crude Oil Processed during August, 2020 was 16149.67 TMT which is 25.59% lower than the target for the month and 26.43% lower when compared with August, 2019. Cumulative crude throughput during April-August, 2020 was 82459.21 TMT which is 19.82% and 22.44% lower than target for the period and crude throughput during corresponding period of last year respectively

- **Shri Dharmendra Pradhan calls for Switching to 100% Clean Fuels for Prime Tourist Cities**

On the occasion of the World Tourism Day, Minister of Petroleum and Natural Gas & Steel Shri Dharmendra Pradhan addressed a virtual meet on 27th September on the theme of “Tourism and rural development”, along with Minister of State (I/c) for Tourism Shri Prahlad Singh Patel. Minister Pradhan commended the Ministry of Tourism for its novel initiative ‘DekhoApnaDesh’ that promotes and encourages local heritage and tourist sites. He spoke about India's rich culture, history and ancient architectural marvels which offer immense scope for the growth of tourism industry. Talking about Internet’s role in making the world a global village, Shri Pradhan called for effective use of technology to further strengthen India's position as a global tourist hotspot.

Shri Pradhan said that tourism industry offers unprecedented potential for employment generation and empowerment of our youth, also in the rural areas. He said that every district of our country has a historic story to share or a legend to narrate, and as India celebrates 75 years of independence in 2022, we must work on creating more tourism sites around the heroism of our freedom fighters. Minister Pradhan called for weaving sustainability with tourism and collaborating to switch prime tourist cities to 100% clean fuels, which will further help protect our monuments and ensure a cleaner environment for the tourists.

- **Shri Dharmendra Pradhan addresses USISPF-3rd annual leadership summit; Invites US companies to partner in Aatmanirbhar Bharat campaign**

On 2nd September, Minister of Petroleum and Natural Gas and Steel, Shri Dharmendra Pradhan participated in the USISPF- 3rd Annual Leadership Summit on the theme of “Navigating New Challenges.” Minister Pradhan talked about the unprecedented impact of the Covid-19 pandemic on the global

economy and the consequent energy demand contraction. He added that with the gradual pick up of economic activity in India; energy consumption is anticipated to reach pre-Covid levels soon.
Speaking about Aatmanirbhar Bharat campaign, Shri Pradhan said the campaign launched under the leadership of Prime Minister Modi calls for a self-reliant India, seeking to convert Covid-19 challenges into an opportunity, to merge domestic production and consumption with global supply chains, and aims to transform India into a global manufacturing hub of the 21st century. The Minister underlined the importance of energy infrastructure as a key to transformation in India and invited US industry leaders to take advantage of the opportunities being created in Indian energy sector. Shri Pradhan talked about the growing bilateral hydrocarbon trade between India and the US, which touched above US$ 9 billion during FY 2019-20 and is expected to increase further as companies are looking to source more crude oil and LNG from the US at competitive rates.

The Minister talked about the importance of gas sector in the Strategic Energy Partnership as India is working to transform itself into a gas based economy by increasing the share of gas from 6% to 15% in the energy mix by 2030, with an estimated investment of $60 billion lined up in the sector, developing a "One Nation, One Gas Grid." He also expressed happiness at global oil & gas majors like BP, Shell, Total, and Exxon Mobil expanding their footprints in India and invited the US companies to take advantage of reforms in the exploration and production sector and participate in the next oil and gas block bidding rounds. Minister Pradhan also added that India and the US have been working in close collaboration, including in stabilizing global energy markets and it is reassuring that despite the Covid-19 induced challenges, the industry leaders are quite optimistic about reinvigorating the energy linkages between the two countries.

- **Reduction in Import of Oil**

During 2019-20, consumption of petroleum products was 213.7 MMT and percentage of import dependency of oil and oil equivalent gas was 77.9%. Currently, the Central Government levies Excise duty on petrol and diesel, whereas State Governments levy VAT/Sales Tax. Excise duty is levied on specific basis (fixed amount per litre) and VAT/Sales tax (by most of the states) is levied on an ad-valorem basis. Details of Excise duty on non GST goods and the rates of products under GST are annexed. Ministry of Petroleum and Natural Gas has identified a basket of strategies inter-alia including primarily increasing domestic production of oil and gas and promoting biofuels/alternate fuels with a view to achieve reduction in import of crude oil. Government has also taken a number of initiatives to encourage the use of alternative fuels like ethanol and bio-diesel through Ethanol Blending in Petrol (EBP) Programme and Bio-diesel blending in diesel. Government has formulated a National Bio Fuel Policy 2018 to boost availability of biofuels in country. To give a major thrust to Ethanol Blending Programme, Oil CPSEs are establishing twelve 2G Ethanol plants across 11 States of the country.

As per resolution dated 08.11.2019 regarding authorization to market transportation fuel, the authorized entities, in addition to conventional fuels, are required to install facilities for marketing at least one new generation alternate fuels like Compressed Natural Gas (CNG), bio-fuels, Liquefied Natural Gas (LNG), electric vehicle charging points etc. at their proposed retail outlets (RO) within three years of operationalization of the said outlet subject to the entity complying with various other statutory guidelines. Also, as on 31.08.2020, PSU Oil Marketing Companies have set up Electric Charging facilities at 110 retail outlets and Battery Swapping Stations at 17 retail outlets in the country.

- **Purchase of Crude Oil from International Market**

Taking advantage of the low crude oil prices in international market, India purchased 16.71 million barrels (mbbl) of crude in April – May, 2020 and filled all the three Strategic Petroleum Reserves created at Vishakhapatnam, Mangalore and Padur. The average cost of procurement of crude oil was US $ 19 per bbl as compared to US $ 60 per bbl prevailing during January2020, thus resulting in saving of US $ 685.11 million, which amounts to Rs. 5069 crores (at 1US $= Rs.74).

Prices of petrol and diesel have been made market-determined by the Government with effect from 26.06.2010 and 19.10.2014 respectively. Since then, the Public Sector Oil Marketing Companies (OMCs) take appropriate decision on pricing of petrol and diesel in line with international product prices and other market conditions. Oil Marketing Companies take a decision on retail selling price after considering various aspects including international product prices, exchange rate, tax structure, inland freight and other cost elements. Petrol and Diesel prices are market-determined and increase or decrease according to market trends. The weightage of petrol and diesel in the Wholesale Price Index (WPI) is 1.60% and 3.10% respectively.

- **Scientists have developed a neural-based (machine learning based) practical approach for automatic interpretation of 3D seismic data**

Scientists struggling with the manual interpretation of growing seismic data to explore causes of earthquake, particularly when the area is geologically complex, are now armed with a machine learning-based solution that can help in automatic interpretation of this data. Effective detection of subsurface geologic features from surface seismic data is very important for understanding the geotectonic, basin evolution, resource exploration, and process that causes earthquakes (seismogenesis) of an area. For this, acquisition of seismic data keeps on growing, making the processing computationally intensive and interpretation tedious. Thanks to high-performance computing systems, that have allowed analysis of such voluminous data within a reasonable time after receiving guidance and inputs from interpreters. However, human analysts struggle for manual interpretation, particularly when the area is geologically complex and data is copious.

To automate the process and accelerate the interpretation, Scientists from Wadia Institute of Himalayan Geology (WIHG), an autonomous Institute under the Department of Science & Technology, Govt. of India, have developed a neural-based (machine learning-based) practical approach for automatic interpretation of 3D seismic data. This first of its kind approach has been developed by computing a new attribute called meta-attribute.

The tabular sheet intrusions between older layers of sedimentary rock or beds of volcanic lava (sill complexes) significantly contribute to the transport and storage of hot magma, and leading to overburden. This acts as plausible structural traps for hydrocarbon accumulations in sedimentary basin. The petroliferous (petroleum containing) Canterbury basin off New Zealand is a classic example, where saucer-shaped magmatic sills are embedded within the Cretaceous to Eocene (geological period that lasted from about 145 to 33.9 million years ago) succession resulting into forced folds and hydrothermal vents above the sill terminations.

Scientists from WIHG captured this scenario by designing a workflow and computing Sill Cube (SC) and Fluid Cube (FC) meta-attributes. These are hybrid attributes that are generated by amalgamating a number of seismic attributes (associated with the geologic targets) using a neural-based approach. This study is published in the research journal 'Tectonophysics'. The WIHG team prepared the meta-attributes following supervised neural learning (machine learning), where computing systems are trained under the guidance of a human analyst.

According to the findings of this study, individual sills cover from 1.5 km2 to17 km2 areas, respectively. Moreover, the fluxed-out magmatic fluids from the tip of the principal sills vertically rise to a height of around 800 m through hydrothermal vents and uplift the overburden. Such an interpretational approach is automated and effectively narrates subsurface magmatic activities from 3D seismic data.

This work is an important step forward towards application of machine learning to address geological problems and looks promising in understanding complex geological processes in an active mountain belt such as the Himalaya.

- **Road transport ministry notifies H-CNG as automotive fuel**

The Road Transport and Highways Ministry has notified regulations for various alternative fuels to further promote sustainable transportation, Union Minister Nitin Gadkari said. "After testing use of H-CNG (18 per cent mix of hydrogen) as compared to neat CNG for emission reduction, the Bureau of Indian Standards has developed specifications of hydrogen-enriched compressed natural gas (H-CNG) for automotive purposes as a fuel," the Road Transport, Highways and MSME Minister said in a tweet.

The notification for amendments to the Central Motor Vehicles Rules 1989, for inclusion of H-CNG as an automotive fuel has been published, it is a step toward an alternative clean fuel for transportation, he added.

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