FIPI

Federation of Indian Petroleum Industry

Policy & Economic Report

Oil & Gas Market

November 2022

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Executive Summary

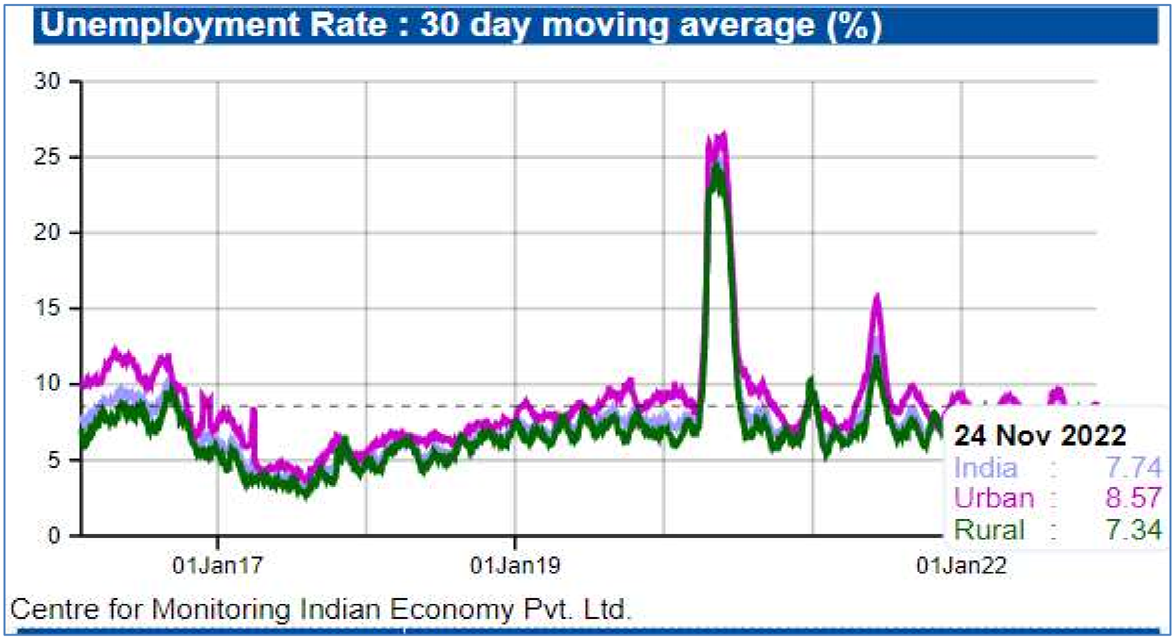
According to IMF's World Economic Outlook for 2022, the global growth is forecasted to grow at 3.2 % in 2022-23 and at 2.7 % in 2023-24. While the growth in United States is projected to decline from 5.7 % in 2021-22 to 1.6 % in 2022-23 and 1.0 % in 2023-24, in the EU area, the projected growth is 3.1 % in 2022-23 and 0.5 % in 2023-24. According to Asian Development Outlook for 2022, growth in developing Asia is forecasted at 4.3% in 2022-23 and at 4.9% in 2023-24. Various factors have affected the global growth since March 2022, viz- uncertainty amid Russia-Ukraine war, reinforced supply disruptions, rising energy and food prices thereby boosting inflation, aggressive tightening by US Federal Reserve and other Central Banks thus denting global financial markets.

Indian economy recorded growth at 6.3 % in the second quarter (Q2) of the current financial year (Q2FY23), according to the latest data released by the Ministry of Statistics and Programme Implementation on 30th November, 2022. Private consumption rose 9.7% in the second quarter, and investments, as reflected by gross fixed capital formation, by 10.4%, pointing to a continuing recovery in the economy. RBI has forecasted a growth rate of 7% for FY 2022-23, which includes growth at 4.6% for the next two quarters. The growth situation arises as the supply responses are expected to gain strength, with improvement in demand situation, and the banking system to grow rapidly, as per the RBI. Further, RBI's bulletin explained that Industrial production (IIP) grew 3.1% to 133.5 in September after a gap of two months. The growth in IIP data during September is led by all sectors.

According to Ministry of Statistics and Programme Implementation, the mining sector index rose 4.6 % year on-year to 99.5 in September, the manufacturing sector index witnessed a growth of 1.8 % to 134.3 and the electricity sector index grew 11.6 % to 187.4. Further, India's manufacturing industry remained robust and expanded at a faster pace in October indicating a strong improvement in the health of the sector. This is corroborated by the manufacturing purchasing managers' index (PMI) for October which rose to 55.3 from 55.1 In September. In the services sector, the PMI for October grew to 55.1 from 54.3 in September. The construction sector also saw a growth, while the contact-intensive services, in particular, hospitality, travel and recreation, are experiencing rapid growth.

The provisional data released by the National Statistical Office (NSO) on November 14, 2022, showed that inflation, measured by y-o-y changes in the all-India consumer price index (CPI), moderated to 6.8 % in October from 7.4 % in September. This was primarily driven by softening in food inflation. The government has mandated the RBI to maintain retail inflation at 4 % with a margin of 2 % on either side for a five-year period ending March 2026. The RBI has raised the key interest rate by 190 bps in a bid to reduce the rising inflation. The repo rate currently stands at 5.90%.

The CMIE data for November, 2022 suggest that the unemployment rate has been at 7.74% in the month of November 2022 with urban unemployment rate at 8.57 % and the rural unemployment rate is at 7.34 % in November 2022.



In 2022 so far, the Indian rupee has depreciated by around 10 %, hitting a low of 83.29 against the US dollar on October 20, 2022. Despite depreciating Indian Rupee, it has performed relatively well than many other emerging market currencies. India's foreign exchange reserves, which were at US$ 530.0 billion as on November 4, 2022, recorded a decline of US$ 77.3 billion in 2022-23, mainly on account of valuation loss due to the appreciation of US dollar against major currencies. The current level of reserves covers 8.6 months of imports projected for 2022-23.

Oil markets remain balanced owing to winter months, with OECD stocks trending at the all time low since 2004. Further, with the approaching EU embargoes on Russian crude and oil product imports and a ban on maritime services will supplement further pressure on global oil balances and especially on exceptionally tight diesel markets. Currently, the crude oil prices remain ~30% low as compared to their peak price in June 2022.

Brent's market structure indicates that the current demand is softening, with backwardation, defined by front-month prices trading above contracts for later delivery, having weakened markedly in recent sessions.

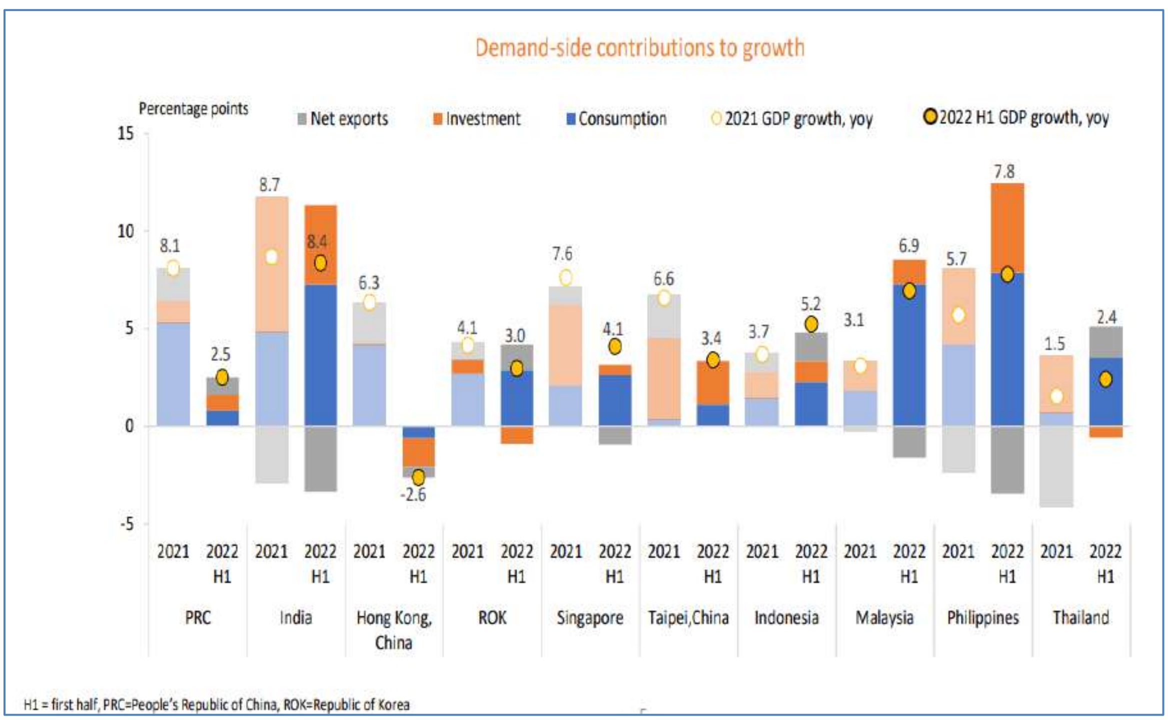
Global oil prices have fallen since June'22, as China, the world's top oil importer, reported a new daily record of COVID-19 infections, as cities across the country continued to enforce mobility measures and other curbs to control outbreaks, further some of the world's major economies have signaled, that they are heading toward a recession.

Natural gas spot prices at the U.S. Henry Hub benchmark averaged $5.66 per million British thermal units (MMBtu) in October 2022 following a period of strong dry natural gas production and several consecutive weeks of relatively large injections into natural gas storage. Despite lower Henry Hub spot prices since August, Energy Information Administration (EIA) expect natural gas prices to rise this winter as a result of seasonal demand for natural gas in space heating, which typically peaks in January and February.

Economy in Focus

Global economic situation

- According to IMF's World Economic Outlook for 2022, the global growth is forecasted to grow at 3.2 % in 2022-23 and at 2.7 % in 2023-24.
- GDP of United States is projected to grow at 1.6 % in 2022-23 and 1.0 % in 2023-24, while in the EU, the projected growth is 3.1 % in 2022-23 and 0.5 % in 2023-24.
- According to Asian Development Outlook for 2022, growth in developing Asia is forecasted at 4.3% in 2022-23 and at 4.9% in 2023-24. Developing Asia includes Central Asia, East Asia (Hong Kong, China, Korea etc.), South Asia (Afghanistan, Bangladesh, Bhutan, India, Sri Lanka, Maldives, Nepal & Pakistan), South east Asia (Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand) and the Pacific (Fiji, Tonga etc.).
- Various factors have affected the global growth since March 2022, viz- uncertainty amid Russia-Ukraine war, reinforced supply disruptions, rising energy and food prices thereby boosting inflation, aggressive tightening by US Federal Reserve and other Central Banks thus denting global financial markets.
- Despite the above adversities, the reopening and increased mobility have led to recovery in consumption and investment, particularly in developing Asia, which have been the main reasons to drive economic growth in the first half of the year from April to September 2022.



Source- Asian Development Bank

Global Inflation

- Inflation in US stands at 7.7% in October 2022, with energy cost increased to 17.6%, food prices at 10.9%. The US Federal Reserve increased its monetary tightening policy and lifted its key policy rate by 75 bp in November, pushing it to 4%. The trend of further monetary tightening is likely to continue in December, as indicated by the Fed.

- Inflation in Euro Zone continued to rise, reaching a record-high 10.7% y-o-y in October 2022. The ECB's accommodative monetary policy has led to a continued expansion of debt-related financing to the private sector thus boosting demand and further culminating into rising inflation.

- The common factor explaining the rise in inflation was unexpected adverse shocks from the disruption of supply chains and the rise in energy prices.

- Further, the Russia-Ukraine war and reduction in supplies of gas to Europe have driven the natural gas prices higher.

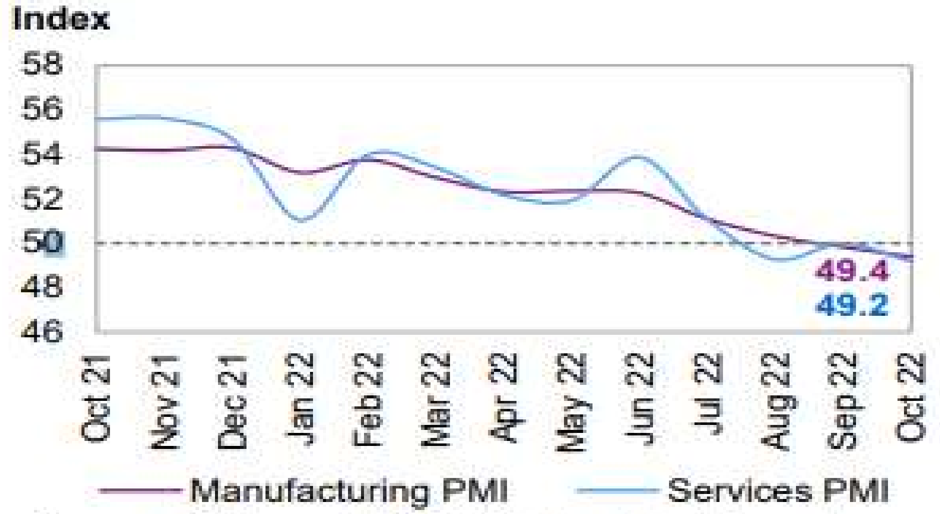
- To prevent inflation from becoming entrenched, central banks have rapidly lifted nominal policy rates. The Federal Reserve has increased its benchmark short-term rate six times this year, to a range of 3.75% to 4% and has communicated that further rises are likely. The Bank of England has raised its policy rate by 0.75 % to reach at 3% in November 2022. The European Central Bank has raised its policy rate by 0.75 % points in October 2022. Accordingly, the interest rate for Euro area on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility have increased to 2.00%, 2.25% and 1.50% respectively.

Global Purchasing Managers Indices (PMIs)

- The global manufacturing PMI stand at 49.4 in October, from 49.8 in September, remaining below the growth-indicating level of 50.

- The global services sector PMI fell to 49.2 in October, compared with 50 in September.

- The decline was attributed to lower business orders and service activity, fueled by rising cost of living and tightening financial conditions.



Sources: JP Morgan, IHS Markit, Haver Analytics and OPEC.

OPEC cuts oil demand growth forecast again as economic challenges mount

- OPEC cut its forecast for 2022 global oil demand growth for a fifth time since April, citing mounting economic challenges including high inflation and rising interest rates.
- Oil demand in 2022 will increase by 2.55 million barrels per day (bpd), or 2.6%, down 100,000 bpd from the previous forecast.
- OPEC cites downside risks include high inflation, monetary tightening by major central banks, high sovereign debt levels in many regions, tightening labour markets and persisting supply chain constraints to be the main factors leading to decline in oil demand.

Global trade growth to slow in the last months of 2022 and into 2023: WTO

- According to World Trade Organization (WTO) Goods Trade Barometer, global trade growth is likely to slow down in the closing months of 2022 and into 2023. The reasons cited are shocks related to the Russia-Ukraine crisis, high energy prices, inflation, and monetary tightening in major economies.
- The Goods Trade Barometer provides real-time information on the trajectory of world trade relative to recent trends. Its latest estimates showed a reading of 96.2, below both the baseline value for the index and the previous reading of 100, reflecting a cooling of demand for traded goods.
- A reading of 100 indicates growth in line with medium-term trends, while readings greater than and below 100 indicate above-trend and below-trend growth, respectively.

- The barometer index was weighed down by negative readings in sub-indices representing export orders at 91.7, air freight at 93.3 and electronic components at 91 – an indication of cooling business sentiment and weaker global import demand.

- Container shipping and raw materials index finished below the trend, losing its momentum at 99.3 and 97.6, respectively.

- Automotive products were an exception, with the index at 103.8, rising above the trend due to stronger vehicle sales in the United States and increased exports from Japan as supply conditions improved and the yen continued to depreciate.

Food prices eased but risks remain elevated- World Bank

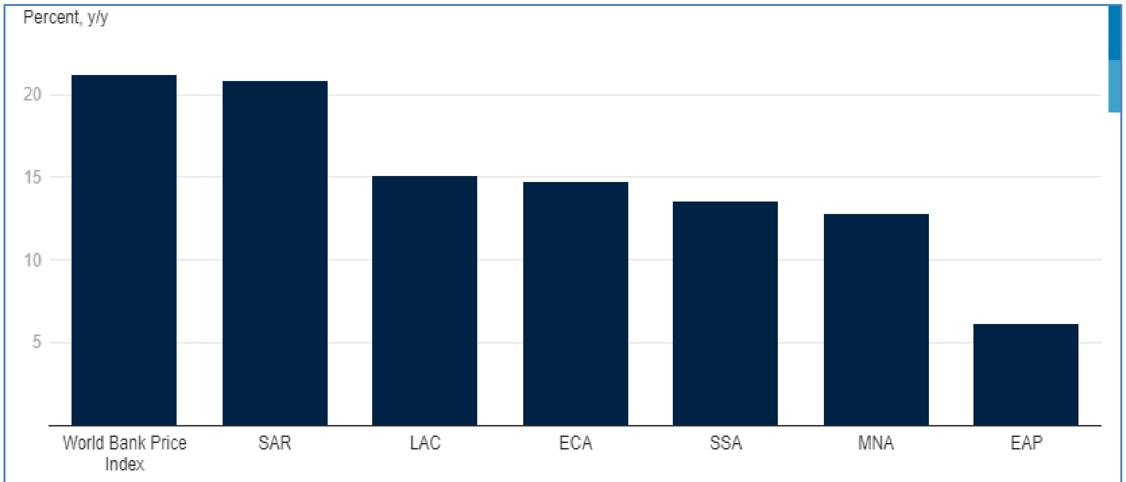
- Food prices eased in 2022Q3 but are expected to remain high by historical standards.

- The World Bank's Food Price Index declined 12% in the third quarter of 2022 after reaching an all-time high in April. The index remains almost 20% higher than a year ago.

- In domestic currency terms, however, food prices remain elevated due to currency deprecations. Food prices are expected to fall 5% in 2023 before stabilizing in 2024.

Source- World Bank

- Domestic food price inflation persists in many countries. Supply disruptions, increasing production costs, and appreciation of the U.S. dollar have exerted upward pressure on domestic food price inflation in most countries. Food price inflation in South Asia averaged 20% in the first three quarters of 2022. The exception was the East Asia and the Pacific region where food price inflation averaged just 6%, in part due to stable rice prices, a key staple in the region.



Note: EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa; Food inflation for each country is based on the latest month from January to September 2022 for which the food component of the Consumer Price Index (CPI) and overall CPI data are available.

Source- World Bank

India

RBI cuts FY23 GDP growth forecast to 7%

Indian economy recorded growth at 6.3 % in the second quarter (Q2) of the current financial year (Q2FY23), according to the latest data released by the Ministry of Statistics and Programme Implementation on 30th November, 2022. Private consumption rose 9.7% in the second quarter, and investments, as reflected by gross fixed capital formation, by 10.4%, pointing to a continuing recovery in the economy. RBI has forecasted a growth rate of 7% for FY 2022-23, which includes growth at 4.6% for the next two quarters. The growth situation arises as the supply responses are expected to gain strength, with improvement in demand situation, and the banking system to grow rapidly, as per the RBI.

Further, RBI's bulletin explained that Industrial production (IIP) grew 3.1% to 133.5 in September after a gap of two months. The growth in IIP data during September is led by all sectors. According to Ministry of Statistics and Programme Implementation, the mining sector rose 4.6 % year on-year to 99.5 in September, the manufacturing sector witnessed a growth of 1.8 % to 134.3 and the electricity sector grew 11.6 % to 187.4. Further, India's manufacturing industry remained robust and expanded at a faster pace in October indicating a strong improvement in the health of the sector. This is corroborated by the manufacturing purchasing managers' index (PMI) for October which rose to 55.3 from 55.1 In September. In the services sector, the PMI for October grew to 55.1 from 54.3 in September. The construction sector also saw a growth, while the contact-intensive services, in particular, hospitality, travel and recreation, are experiencing rapid growth.

Inflation in India

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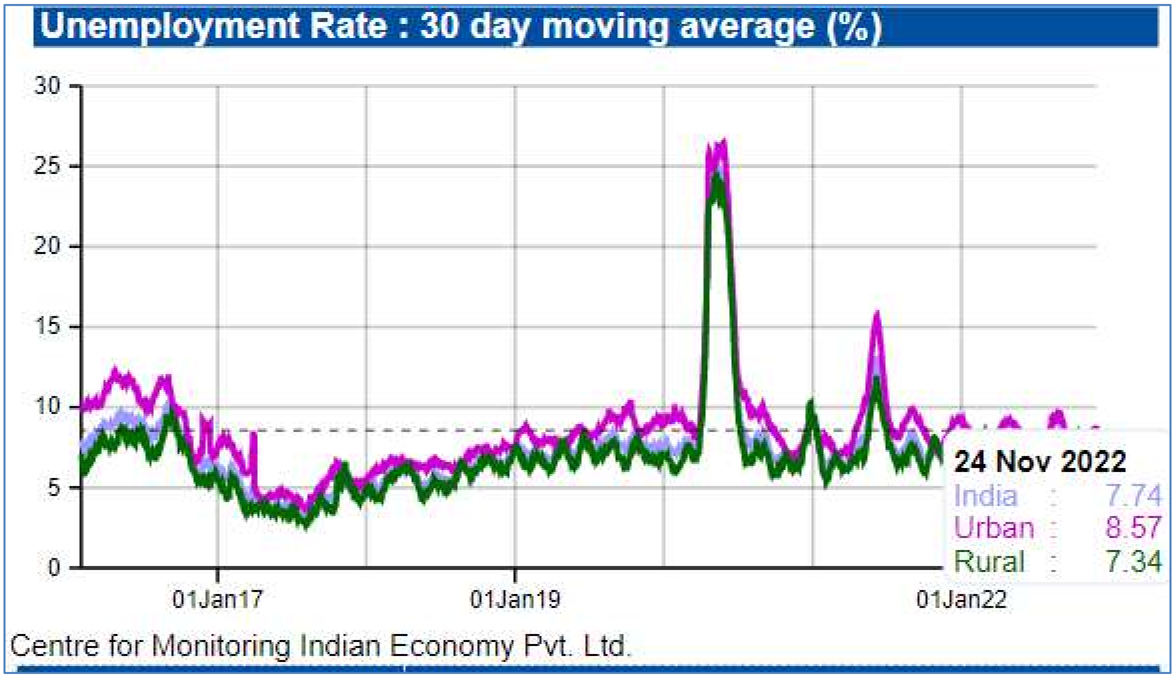
    - Positive price momentum was witnessed in all three major groups viz., food, fuel and core (excluding food and fuel). The m-o-m increase in prices was of the order of 96 bps for the food and beverages group, 56 bps for the fuel group and 68 bps for the core CPI category. Among major sub-groups, vegetables prices increased 4.1 % m-o-m.
    - Inflation in the fuel and light category moderated to 9.9 % in October from 10.4 % in September, largely on account of favorable base effects.
- The annual rate of inflation based on all India Wholesale Price Index (WPI) number dropped to a 19-month low of 8.39% for the month of October, 2022 against 10.70% recorded in September, 2022. The WPI has dropped below the double-digit mark for the first time since March 2021.
    - Decline in the rate of inflation in October, 2022 is primarily contributed by fall in the price of mineral oils, basic metals, fabricated metal products, except machinery and equipment; textiles; other non-metallic mineral products; minerals etc.

RBI stance on inflation

- The government has mandated the RBI to maintain retail inflation at 4 % with a margin of 2 % on either side for a five-year period ending March 2026.
- The RBI has raised the key interest rate by 190 bps over the past few months in a bid to reduce the rising inflation. The repo rate currently stands at 5.90%.
- The standing deposit facility (SDF) rate stands adjusted to 5.65 % and the marginal standing facility (MSF) rate and the Bank Rate to 6.15 %.

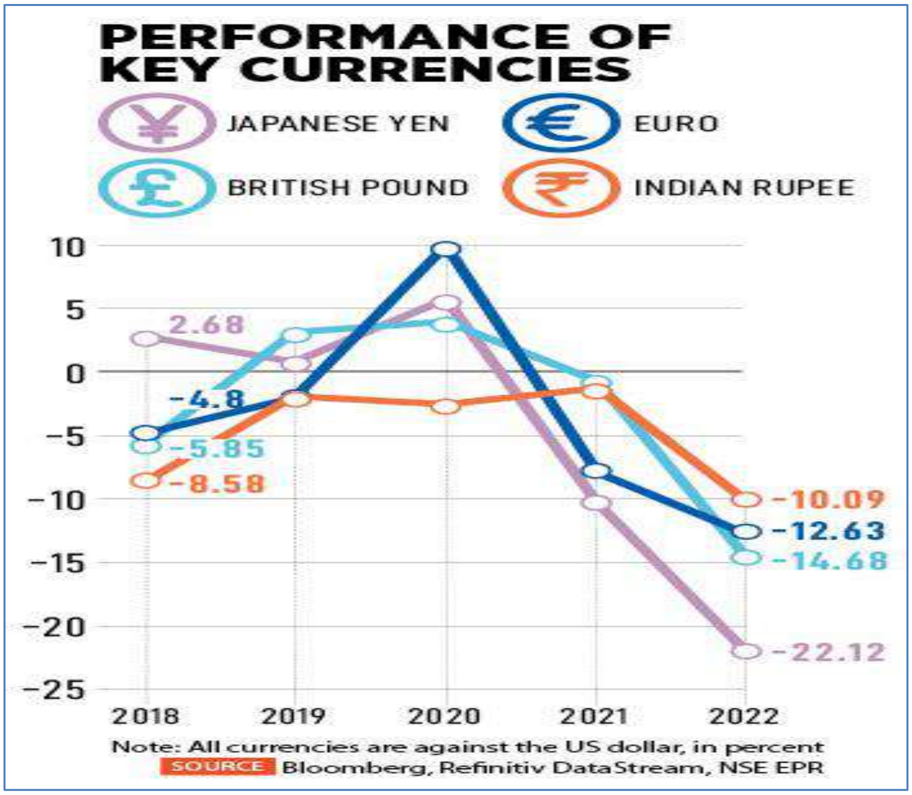
Unemployment in India

The CMIE data for November, 2022 suggest that the unemployment rate has been at 7.74% in the month of November 2022 with urban unemployment rate at 8.57 % and the rural unemployment rate is at 7.34 % in November 2022.



India's external position

- In 2022 so far, the Indian rupee has depreciated by around 10 %, hitting a low of 83.29 against the US dollar on October 20, 2022. Despite depreciating Indian Rupee, it has performed relatively well than many other emerging market currencies. In 2022, so far, major currencies such as the pound, euro, and yen have also significantly weakened against the dollar: The yen has dropped 22 percent, the pound 14.68 percent, and the euro 12.63 percent.
- The dollar is expected to continue deriving support from aggressive pricing in form of interest rate hikes in the US along with quantitative tightening apart from geopolitical-led risk aversion.
- According to IMF, the appreciation of dollar is causing acute challenges like tightening financial markets, and increasing cost of imported goods for many emerging markets including India.



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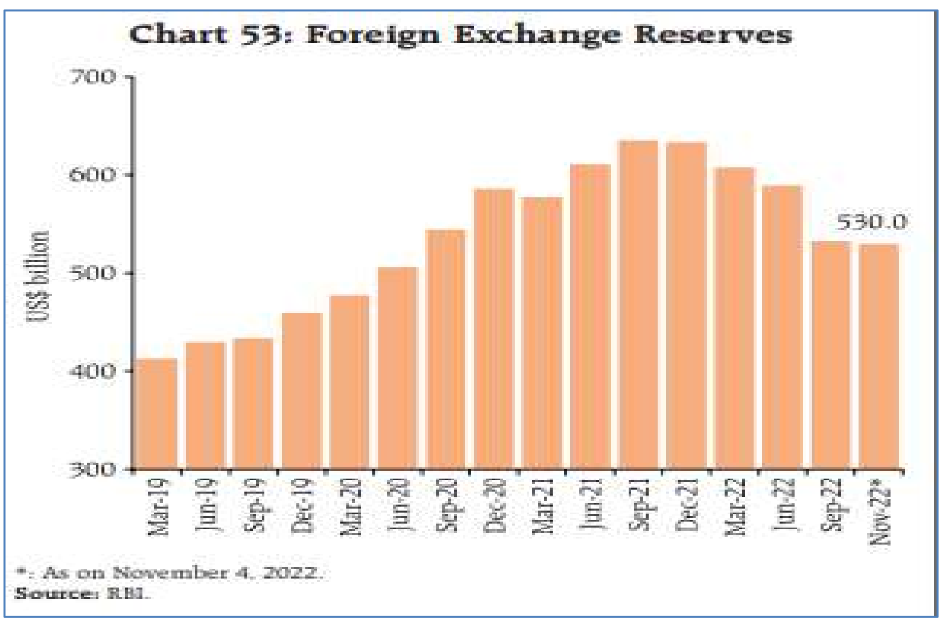


India's October trade deficit widens to $26.91 billion as exports decline 17%

- India's October merchandise trade deficit widened to $26.91 billion from $25.71 billion in September, based on export and import data released by the government in November 2022.
- India's merchandise exports fell to $29.78 billion in October from $35.45 billion in September. Merchandise imports increased to $56.69 billion from $53.48 billion in September, the data showed.
- The merchandise trade deficit for April-October 2022 was estimated at USD 173.46 billion as against USD 94.16 billion in April-October 2021, as per the data.
- India's exports in October have fallen below USD 30 billion for the first time in nearly 20 months. Federation of Indian Export Organizations (FIEO) said that slowdown in merchandise exports is a reflection of toughening global trade conditions amid demand slowdown on account of high inventories, rising inflation, economies entering recession, high volatility in currencies and geopolitical tensions.
- Key export sectors, including gems and jewelry, engineering, petroleum products, ready-made garments of all textiles, chemicals, pharma, marine products, and leather, recorded negative growth during October.
- Imports during the month under review rose by about 6 per cent to USD 56.69 billion on account of increase in the inbound shipments of crude oil and certain raw materials such as cotton, fertilizer and machinery.

Lessons from Economics

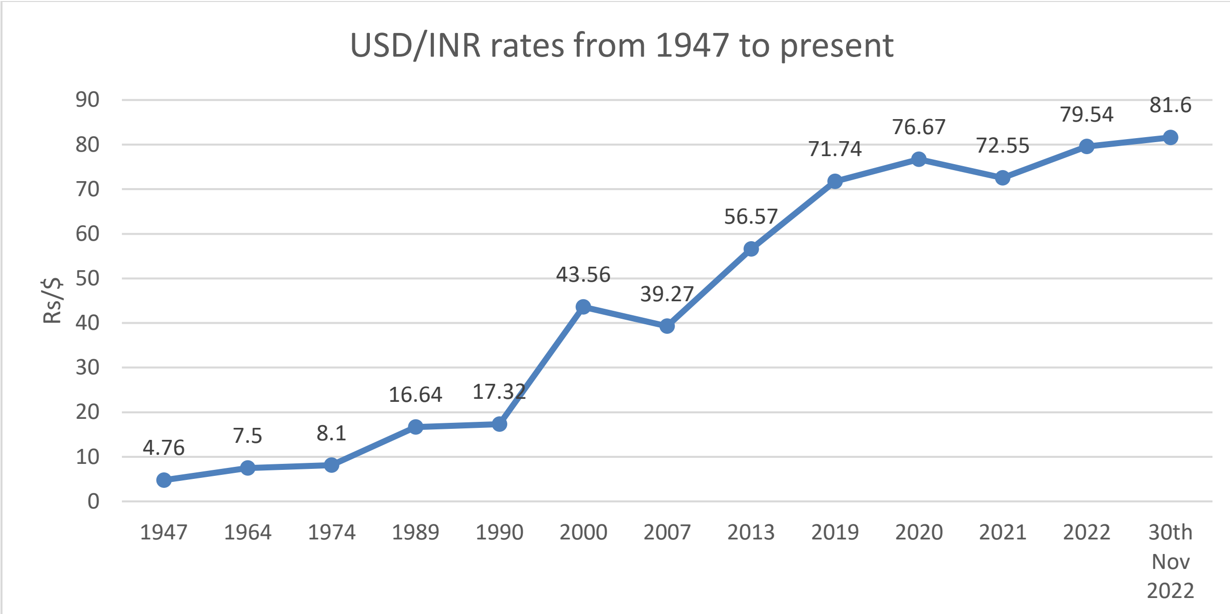
Depreciation Vs Devaluation

- A **depreciation** is when there is a fall in the value of a currency in a floating exchange rate. This is not due to a government's decision, but due to supply and demand-side factors.

- A **devaluation** is when a country makes a conscious decision to lower its exchange rate in a fixed or semi-fixed exchange rate. One reason a country may devalue its currency is to combat a trade imbalance. Devaluation reduces the cost of a country's exports, rendering them more competitive in the global market, which, in turn, increases the cost of imports. India used to follow the administered or fixed rate of exchange until 1993, when it moved to a market-determined process or floating exchange rate.

- While the process is different for depreciation and devaluation, there is no difference in terms of impact.
  - Weakening of Indian Rupee Vs dollar give a boost to India's exports.
  - At the same time, India meets more than two-thirds of its domestic oil requirements through imports and costly imports poses risk of imported inflation.

- A rise in the price of imports will further expand the country's current account deficit (CAD)



Source- RBI

Indian Rupee devalued by Indian Government

In 1991, India found itself in a serious economic crisis as the country was not in a position to pay for its imports and service its external debt obligations. To negate the crisis, the Reserve Bank of India reportedly devalued the rupee in two sharp tranches - 9 % and 11 %, respectively. Post the devaluation, the value of the rupee against the US dollar was around 26.

Indian Rupee has depreciated by 8% in 2022

The Indian rupee has lost 8% in 2022 breaching the 82-level mark against US dollar. The dollar is expected to gather support from the ongoing interest rate hikes by US Federal Reserve. Further, RBI has intervened by selling dollars to arrest the fall of the rupee, as India's forex reserves depleted the most among all emerging economies. Since the beginning of 2022, India's reserves have fallen from 633.6 billion US dollars to 530 billion US dollars as of November 2022. Also, the interest rate hike by 190 basis points by RBI since May 2022 has been aimed at reducing the bond yield differences between US and India which is, in turn, triggered by the 275 basis points hike in the interest rate by the US.

Oil Market

Crude oil price – Monthly Review

Oil markets remain balanced owing to winter months, with OECD stocks trending at the all-time low since 2004. Further, with the approaching EU embargoes on Russian crude and oil product imports and a ban on maritime services will supplement further pressure on global oil balances and especially on exceptionally tight diesel markets. Currently, the crude oil prices remain ~30% low as compared to their peak price in June 2022.

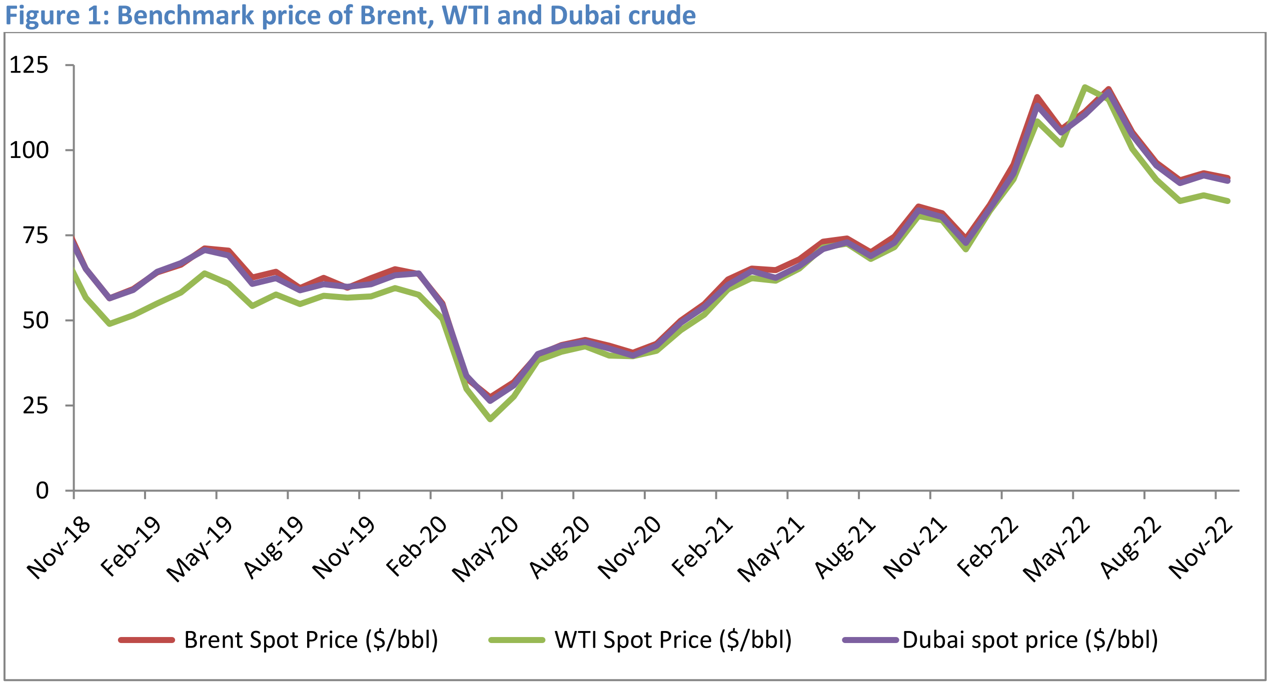
Brent's market structure indicates that the current demand is softening, with backwardation, defined by front-month prices trading above contracts for later delivery, having weakened markedly in recent sessions.

Global oil prices have fallen since June'22, as China, the world's top oil importer, reported a new daily record of COVID-19 infections, as cities across the country continued to enforce mobility measures and other curbs to control outbreaks, further some of the world's major economies have signaled, that they are heading toward a recession.

Oil prices are expected to increase in 2023 once China ends lockdowns and if the war in Ukraine were to escalate.

Brent crude ranged an average to $91.85 a barrel and WTI ranged to $85.04 per barrel in the month of November.

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



Source: World Bank

- Brent crude price averaged $91.85 per bbl in November 2022, down by 1.5% on a month on month (MoM) and up by 12.7% on year on year (YoY) basis, respectively.
- WTI crude price averaged $85.04 per bbl in November 2022, down by 1.9% on a month on month (MoM) and up by 7.1% on year on year (YoY) basis, respectively.
- Dubai crude price averaged $90.97 per bbl in November 2022, down by 1.7% on a month on month (MoM) and up by 13.1% on year on year (YoY) basis, respectively.

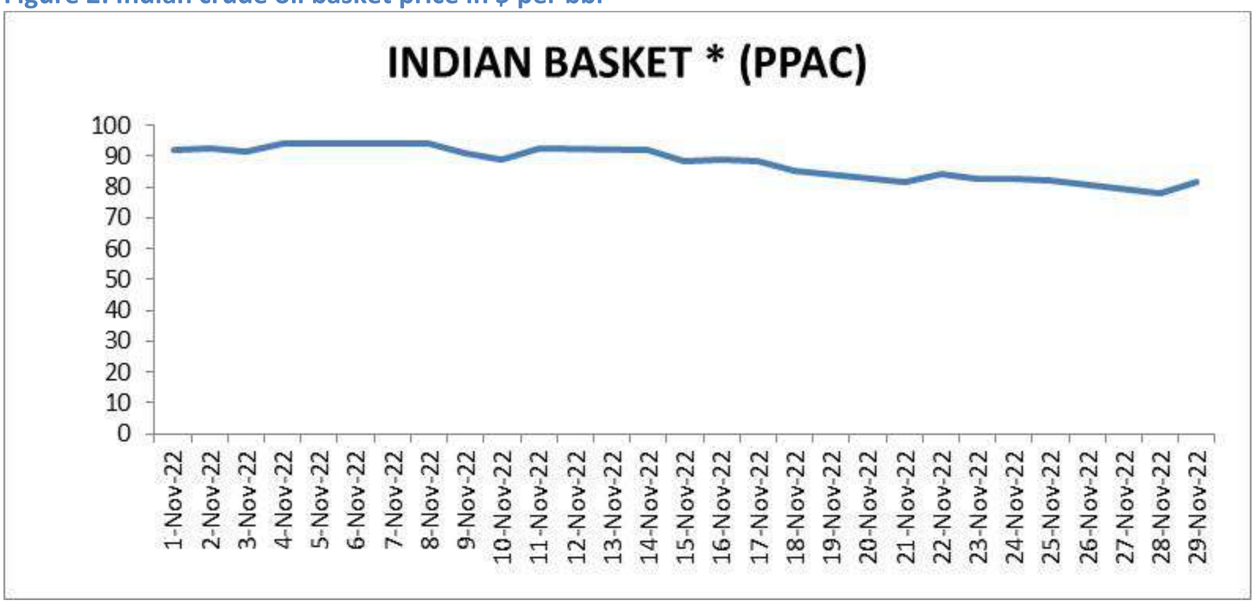
Table 1: Crude oil price in November, 2022

Crude oil	Price ($/bbl)	MoM (%) change	YoY (%) change
Brent	91.85	-1.5%	12.7%
WTI	85.04	-1.9%	7.1%
Dubai	90.97	-1.7%	13.1%

Source: World Bank

Indian Basket Crude oil price

Figure 2: Indian crude oil basket price in $ per bbl



Source: PPAC

- Indian crude basket price averaged $89.50 per barrel in November 2022, down by 2.4% on Month on Month (M-o-M) and up by 10.0% on a year on year (Y-o-Y) basis, respectively.

Oil production situation

- World oil supply rose 410 kb/d in October to 101.7 mb/d but is forecast to fall by 1 mb/d for the remainder of the year as OPEC+ cuts and an EU ban on Russian crude come into effect. Annual growth of 4.6 mb/d this year is set to boost global production to 99.9 mb/d. Modest gains of just 740 kb/d in 2023 will push supply to 100.7 mb/d.

- EU countries had reduced Russian crude oil imports by 1.1 mb/d to 1.4 mb/d, and diesel flows by 50 kb/d to 560 kb/d. When the crude and product embargoes come into full force in December and February, respectively, an additional 1.1 mb/d of crude and 1 mb/d of diesel, naphtha and fuel oil will have to be replaced. For crude oil, no significant buying from Russia outside China, India, and Turkey has appeared despite massive discounts. A further rerouting of trade should help ease pressures but a shortage of tankers is a major concern, especially for ice-class vessels required to load out of Baltic ports during winter.

Table 2: Non-OPEC liquids production in 2022, mb/d

Non-OPEC liquids production	2021	1Q22	2Q22	3Q22	4Q22	2022
Americas	*25.25*	*25.86*	*26.27*	*26.93*	*27.99*	*26.59*
of which US	17.85	18.27	18.83	19.19	19.44	18.93
Europe	*3.76*	*3.73*	*3.43*	*3.51*	*3.87*	*3.64*
Asia Pacific	0.51	0.49	0.51	0.43	0.53	0.49
Total OECD	**29.52**	**30.08**	**30.22**	**30.88**	**31.69**	**30.72**
China	4.31	4.51	4.52	4.38	4.43	4.46
India	0.78	0.78	0.77	0.75	0.80	0.78
Other Asia	2.41	2.35	2.30	2.25	2.38	2.32
Latin America	5.95	6.11	6.18	6.44	6.56	6.32
Middle East	3.24	3.29	3.33	3.37	3.37	3.34
Africa	1.35	1.33	1.31	1.33	1.32	1.32
Russia	10.80	11.33	10.63	11.01	10.77	10.93
Other Eurasia	2.93	3.05	2.77	2.62	3.08	2.88
Other Europe	0.11	0.11	0.11	0.10	0.10	0.11
Total Non-OECD	**31.87**	**32.85**	**31.92**	**32.25**	**32.81**	**32.46**
Total Non-OPEC production	61.39	62.93	62.14	63.13	64.50	63.18
Processing gains	2.29	2.40	2.40	2.40	2.40	2.40
Total Non-OPEC liquids production	**63.68**	**65.33**	**64.54**	**65.53**	**66.90**	**65.58**
Previous estimate	**63.67**	**65.34**	**64.51**	**65.77**	**66.78**	**65.60**
Revision	0.01	0.00	0.03	-0.24	0.12	-0.02

Source: OPEC

- From the above table, it can be inferred, that the total non-OPEC liquids production is expected to reach 65.58 mb/d by 2022.
- OPEC NGLs and non-conventional liquids production in 2022 is forecasted (as per OPEC monthly report) to grow by 0.1 mb/d to average 5.4 mb/d.
- OPEC-13 crude oil production averaged 29.49 mb/d in October 2022, lower by 210 tb/d m-o-m.

Oil demand situation

- Demand growth will slow to 1.6 mb/d in 2023, down from 2.1 mb/d this year, as mounting economic headwinds impede gains. The GDP outlook has worsened and 4Q22 global oil use will contract (-240 kb/d) compared with last year. China's persistently weak economy, Europe's energy crisis, burgeoning product cracks and the strong US dollar are all weighing heavily on consumption.

- High diesel prices are fuelling inflation, adding pressure on the global economy, and thereby leading to decrease in world oil demand.

Table 3: World Oil demand, mb/d

	2021	1Q2022	2Q2022	3Q2022	4Q2022	2022	Growth	%
Total OECD	**44.84**	**45.78**	**45.40**	**46.37**	**46.92**	**46.12**	**1.28**	**2.85**
~ of which US	*20.03*	*20.38*	*20.41*	*20.58*	*20.74*	*20.53*	*0.49*	*2.46*
Total Non-OECD	**52.18**	**53.58**	**52.95**	**52.94**	**54.33**	**53.45**	**1.27**	**2.43**
~ of which India#	*4.77*	*5.18*	*5.16*	*4.95*	*5.35*	*5.16*	*0.39*	*8.11*
~ of which China	14.97	14.74	14.56	14.69	15.44	14.86	-0.11	-0.73
Total world	**97.03**	**99.36**	**98.35**	**99.32**	**101.25**	**99.57**	**2.55**	**2.62**

Source: OPEC monthly report, November 2022

 # During 2022 rising oil demand will be supported by increasing requirements in all main petroleum product categories, however, some downside risks pertain relating to rising COVID-19 cases, new variants and their associated containment measures, as well as fuel substitution.

Note: 2022 = Forecast. Totals may not add up due to independent rounding

India set to be the largest contributor to incremental oil demand: OPEC

- Global oil demand is projected to reach almost 107 million barrels a day (mb/d) in 2027, representing a robust increase of 10 mb/d compared to 2021, OPEC said in its 2022 World Oil Outlook.
- OECD oil demand is on a declining trajectory after 2024, falling to 34 mb/d by the end of the forecast period. This represents an overall demand decline of almost 11 mb/d between 2021 and 2045.
- In contrast, long-term non-OECD demand is expected to increase by 24 mb/d, driven by an expanding middle class, high population growth and stronger economic growth potential.
- India will take the leading role with demand growth in China slowing significantly and even turning to a marginal decline over the last five years of the forecast period. This will result in respective demand increases of around 1.4 mb/d, 0.8 mb/d and 0.7 mb/d, for India, Africa and Other Asia, during the 2040-2045 period.

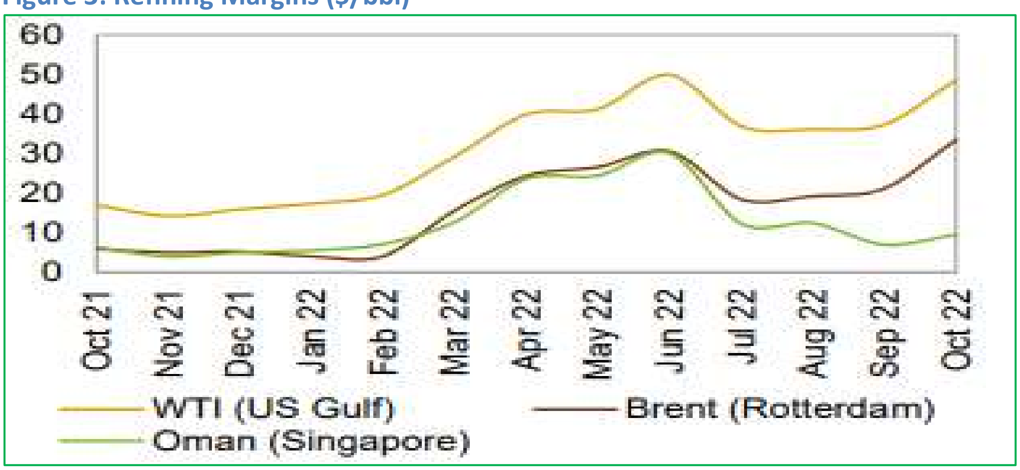
Global petroleum product prices

USGC refining margins against WTI jumped to settle at just $1.3 /barrel, below the record-breaking high level registered in June. This represented the second highest mark, y-t-d. The notable improvement in US refining economics is attributed to a significant decline in product output levels as refineries in the country dropped due to heavy maintenance works. As a result, product balances contracted further and strengthened product prices, with the exception of fuel oil. According to preliminary estimates, refinery intake in the US extended its downward trend in October and lost 380 tb/d m-o-m to average 15.98 mb/d in October. However, going forward, intakes are expected to reverse course and begin to recover, which should help limit the product balance contraction in the coming months.

Refinery margins in Rotterdam against Brent rallied in October to show the largest monthly gain compared with other main trading hubs. The onset of the maintenance season in Europe and the subsequent reduction in processing rates and product output further weighed on regional product availability. Furthermore, the impact of the strike in France’s refining sector, which started on September 20, had a more pronounced effect on European throughputs in October compared with the previous month. With the loss of nearly 45% of the country’s refining capacity due to the strike, France's refinery intakes declined in October by nearly 300 tb/d m-o-m and contributed to product shortages at refuelling stations in parts of the country. Although the strike ended at three refineries as of the end of October and runs are gradually being restored, a considerable amount of capacity remained offline. Consequently, product imports into Europe, particularly that of diesel and gasoil, soared in October to a multi-year record high on a wide arbitrage window with flows from East of Suez. This led to a reflection of the strength in European product markets on to product markets in other regions as well.

Refinery throughput in Europe declined by 450 tb/d due to planned and unplanned outages, to average 9.42 mb/d according to preliminary data. Refinery margins against Brent in Europe averaged $33.50/b in October, up by $12.28/b compared with a month earlier and higher by $27.60 y-o-y.

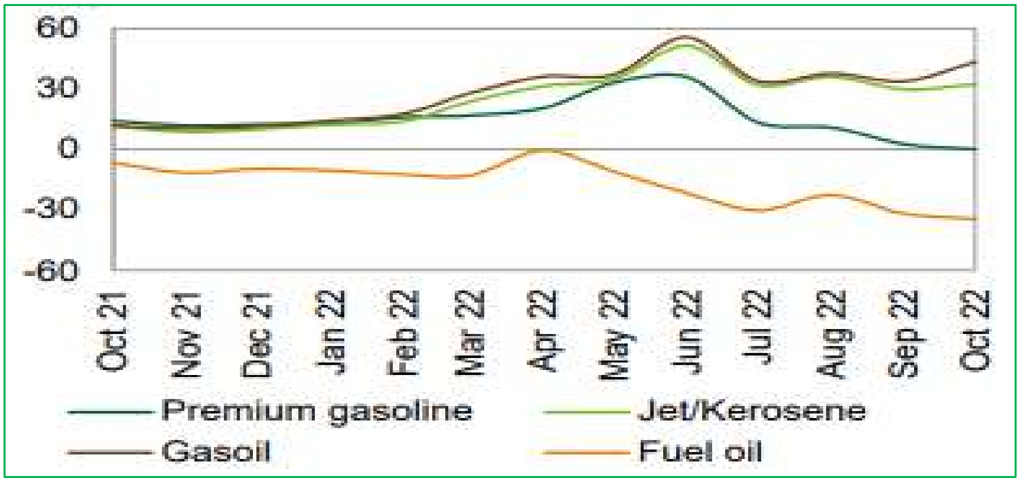
Figure 3: Refining Margins ($/bbl)



Source: Argus and OPEC

The Asian gasoline 92 crack spread fell over the month, mainly impacted by growing gasoline availability in the region. The Singapore gasoline crack spread against Oman in September averaged $12/b, down by $2.69 m-o-m and $14.13 y-o-y.

Figure 4: Singapore crack Spreads vs. Dubai ($/bbl)



Source: Argus and OPEC

The Singapore gasoil crack spread reversed course from the losses seen in the previous month to show solid gains. The Singapore gasoil crack spread against Oman averaged $43.57/b, up by $9.68 m-o-m and by $31.65 y-o-y.

Table 4: Singapore FOB, refined product prices ($/bbl)

Singapore product prices	Price ($/b) in October 2022	MoM (%) change	YoY (%) change
Naphtha	71.86	5.5%	-14.9%
Premium gasoline (unleaded 95)	94.78	-2.7%	-3.8%
Regular gasoline (unleaded 92)	91.16	-2.8%	-4.8%
Jet/Kerosene	123.40	2.1%	32.6%
Gasoil/Diesel (50 ppm)	136.76	6.4%	43.8%
Fuel oil (180 cst 2.0% S)	133.96	7.6%	43.9%
Fuel oil (380 cst 3.5% S)	56.57	-4.4%	-24.4%

Source: OPEC

Petroleum products consumption in India

Monthly Review:

- Overall consumption of all petroleum products in October 2022 with a volume of 18.4 MMT registered a growth of 2.78% on volume of 17.9 MMT in October 2021.

- MS (Petrol) consumption during the month of October 2022 with a volume of 2.99 MMT recorded a growth of 8.84% on volume of 2.75 MMT in October 2021.

- HSD (Diesel) consumption during the month of October 2022 with a volume of 6.98 MMT recorded a growth of to 5.56% on volume of 6.61 MMT in the month of October 2021.

- LPG consumption during the month of October 2022 with a volume of 2.40 MMT registered a de-growth of 3.50% over the volume of 2.49 MMT in the month of October 2021.

- ATF consumption during October 2022 with a volume of 0.615 MMT registered a growth of 28.46% over the volume of 0.479 MMT in October 2021.

- Bitumen consumption during October 2022 with a volume of 0.587 MMT registered a de-growth 11.56% over volume of 0.664 MMT in the month of October 2021.

- Kerosene consumption registered de-growth of 73.03% during the month of October 2022 as compared to October 2021.

Table 5: Petroleum products consumption in India, October 2022

CONSUMPTION OF PETROLEUM PRODUCTS (P)	Consumption in '000 MT	MoM (%) change	YoY (%) change
LPG	2,400	-1.9%	-3.5%
Naphtha	958	-10.9%	-25.0%
MS	2,993	5.9%	8.8%
ATF	615	3.9%	28.5%
SKO	34	-18.1%	-73.0%
HSD	6,980	11.6%	5.6%
LDO	67	6.6%	-25.9%
Lubricants & Greases	410	6.4%	5.3%
FO & LSHS	564	-4.8%	7.8%
Bitumen	587	24.1%	-11.6%
Petroleum coke	1,344	1.9%	-0.1%
Others	1,418	27.9%	25.3%
TOTAL	**18,369**	**6.9%**	**2.8%**

Source: PPAC

Natural Gas Market

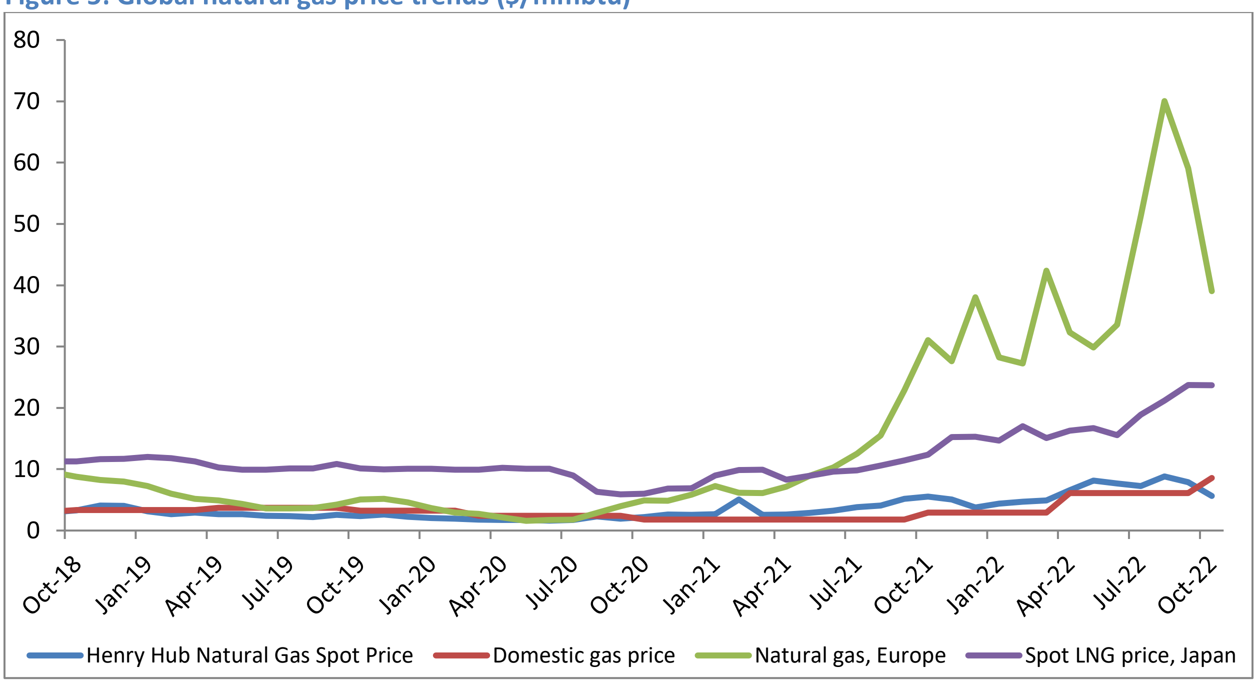
Natural Gas Price – Monthly Review

- Natural gas spot prices at the U.S. Henry Hub benchmark averaged $5.66 per million British thermal units (MMBtu) in October 2022 following a period of strong dry natural gas production and several consecutive weeks of relatively large injections into natural gas storage. Throughout September and October, high volumes of natural gas injections into underground storage reduced the storage deficit to the five-year (2017–21) average from 11% at the end of August to 4% as of October 28. Despite lower Henry Hub spot prices since August, EIA expect natural gas prices to rise this winter as a result of seasonal demand for natural gas in space heating, which typically peaks in January and February.

- The natural gas spot price at the Title Transfer Facility (TTF) in the Netherlands in Europe has been trading at averaged $39.02 per MMBtu. Gas prices in EU have fallen since August due to demand reduction, mandatory storage filing, diversification of supplies and various other measures proposed by Commission in the recent months.

- Japan Liquefied Natural Gas Import Price is averaging at $23.69 per MMBtu for October 2022, down from $23.73 per MMBtu last month. Japan plans to introduce a new framework to allow the industry ministry to help redirect liquefied natural gas supplies in the event of an emergency so that gas and power companies do not run short. The move comes amid growing uncertainty over LNG supplies given the risk of supply disruptions from Russia due to the war in Ukraine.
- The price of domestically produced natural gas is $8.57 per million British thermal unit (MMBtu) from October 1, 2022 to March 31, 2023. The price of domestic gas price has been hiked by 40% from the previous revision which was $6.1 per MMBtu for April 1, 2022, to September 30, 2022. The domestic gas price increase was driven by the significant run-up in the prices of gas at global gas hubs. Further, the maximum sale price allowed to natural gas production from deep-water, ultra-deep-water, high pressure and high-temperature discoveries was increased from $9.92 per MMBtu to $12.46 per MMBtu.

Figure 5: Global natural gas price trends ($/mmbtu)



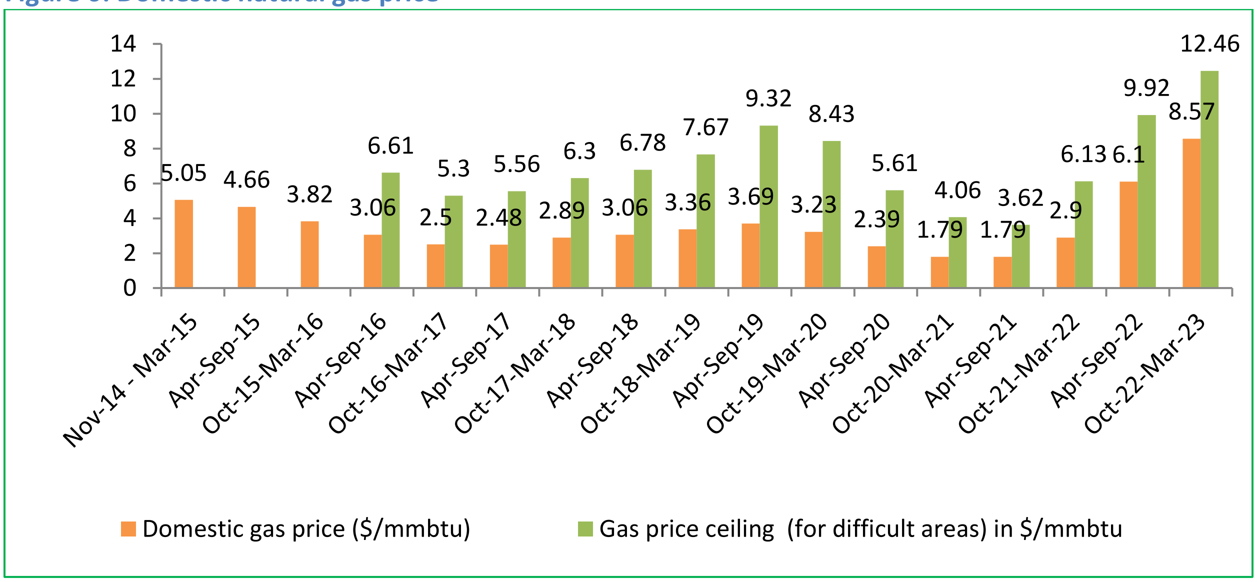
Source: EIA, World Bank

Table 6: Gas price

Natural Gas	Price ($/MMBTU) in October 2022	MoM (%) change	YoY (%) change
India, Domestic gas price	8.57	40.5%	195.5%
India, Gas price ceiling – difficult areas	12.46	25.6%	103.3%
Henry Hub	5.66	-28.2%	2.7%
Natural Gas, Europe	39.02	-34.0%	25.7%
Liquefied Natural Gas, Japan	23.69	-0.2%	91.5%

Source: EIA, PPAC, World Bank

Figure 6: Domestic natural gas price



Source: PPAC

Indian Gas Market

- Gross production of natural gas for the month of October 2022 was 2893 MMSCM (decrease of 4.1% over the corresponding month of the previous year).
- Total imports of LNG (provisional) during the month of October 2022 were 2411 MMSCM (decrease of 0.8% over the corresponding month of the previous year).
- Natural gas available for sale during October 2022 was 4789 MMSCM (decrease of 1.9% over the corresponding month of the previous year).

- Total consumption during October 2022 was 4702 MMSCM (provisional). Major consumers were fertilizer (37%), City Gas Distribution (CGD) (20%), Power (13%), Refinery (5%) and Petrochemicals (2%).

Monthly Report on Natural gas production, imports and consumption – October 2022

1. Domestic Natural Gas Gross Production:

Domestic natural gas gross production for the month of October 2022 was 2893 MMSCM (decrease of 4.1% over the corresponding month of the previous year).

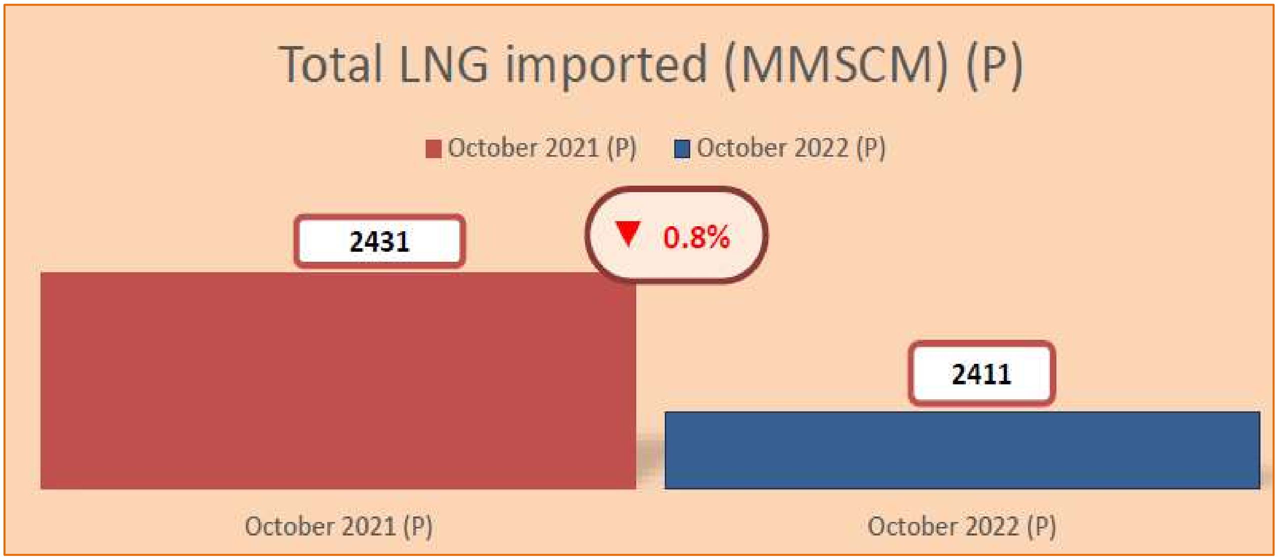
Figure 7: Domestic natural gas Gross production (Qty in MMSCM)

Source: PPAC

2. LNG imports:

Total imports of LNG (provisional) during the month of October 2022 were 2411 MMSCM (decrease of 0.8% over the corresponding month of the previous year 2431 (MMSCM).

Figure 8: LNG imports (Qty in MMSCM)

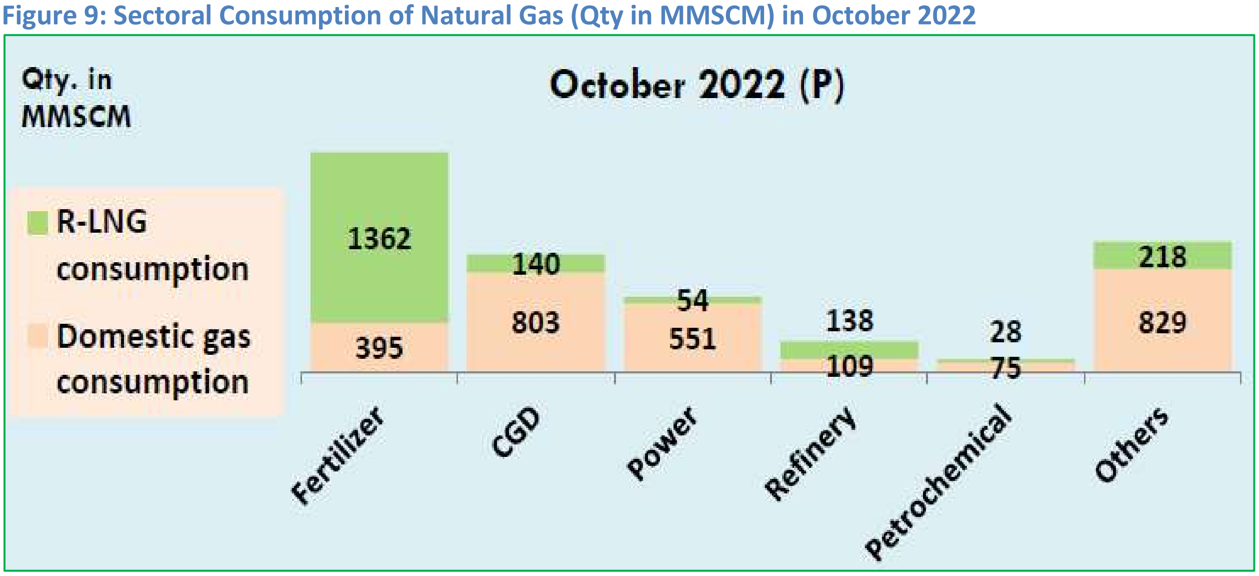


Source: PPAC

3. Sectoral Consumption of Natural Gas:

Major consumers were fertilizer, CGD, power, refinery, petrochemicals among others.

Figure 9: Sectoral Consumption of Natural Gas (Qty in MMSCM) in October 2022



Source: PPAC

Key developments in Oil & Gas sector

- **Monthly Production Report for October, 2022**

1. Production of Crude Oil

Indigenous crude oil and condensate production during October 2022 was down by 2.2% than that of October 2021 as compared to a de-growth of 2.3% during September 2022. OIL registered a growth of 5.2% and ONGC registered a degrowth of 0.004% during October 2022 as compared to October 2021. PSC registered de-growth of 11.1% during October 2022 as compared to October 2021. De-growth of 1.4% was registered in the total crude oil and condensate production during April - October 2022 over the corresponding period of the previous year.

2. Production of Natural Gas

Gross production of natural gas for the month of October 2022 (P) was 2892 MMSCM which was lower by 4.1% compared with the corresponding month of the previous year. The cumulative gross production of natural gas of 20076 MMSCM for the current financial year till October 2022 was higher by 0.8% compared with the corresponding period of the previous year.

3. Crude Oil Processed (Crude Throughput)

Crude oil processed during October 2022 was 20.4 MMT, which was 2.6% lower than October 2021 as compared to a growth of 7.3% during September 2022. Growth of 9.3% was registered in the total crude oil processing during April-October 2022 over the corresponding period of the previous year.

4. Production of Petroleum Products

Production of petroleum products saw a de-growth of 3.1% during October 2022 over October 2021 as compared to a growth of 6.6% during September 2022. Growth of 8.1% was registered in the total POL production during April-October 2022 over the corresponding period of the previous year.

- **Petroleum and Natural Gas Regulatory Board Amends Natural Gas Tariff, Authorization and Capacity Regulations**

To accelerate the development of the natural gas infrastructure and usher rapid growth of natural gas market in the country, Petroleum and Natural Gas Regulatory Board (PNGRB) has brought out amendments in its three regulations namely Natural Gas Pipeline Tariff, Authorisation and Capacity Regulations. These amendments will act as stepping stone for implementation of Unified Tariff regulations which will be effective from 1st April 2023. To address the settlement issues for implementation of Unified tariff, industry committee has been constituted.

The objective of these changes is to provide access of natural gas in the far-flung areas at the competitive and affordable rates to achieve the long-cherished objective of one nation one grid and one tariff.

To simplify the implementation of unified tariff, entity level Integrated natural gas pipeline tariff has been introduced in the said regulations which will act as a building block for unified tariff at national level. Further to protect the overall interest of consumers in different regions number of unified tariff zones have been increased from two to three.

In addition, other amendments like allowing unaccounted gas, moratorium period, ramp up in capacity, etc., have been incorporated.

Key Policy developments in Energy sector

- **Cabinet approved mechanism for procurement of ethanol by Public Sector Oil Marketing Companies (OMCs) under Ethanol Blending Petrol (EBP) Programme**

The Cabinet Committee on Economic Affairs chaired by Hon'ble Prime Minister Shri Narendra Modi has approved higher ethanol price derived from different sugarcane based raw materials under the EBP Programme for the forthcoming sugar season 2022-23 during Ethanol Supply Year (ESY) 2022-23 from 1st December 2022 to 31st October, 2023:

  - The price of ethanol from C heavy molasses route be increased from Rs.46.66 per litre to Rs.49.41 per litre
  - The price of ethanol from B heavy molasses route be increased from Rs.59.08 per litre to Rs.60.73 per litre
  - The price of ethanol from sugarcane juice/sugar/sugar syrup route be increased from Rs.63.45 per litre to Rs.65.61 per litre
  - Additionally, GST and transportation charges will also be payable

All distilleries will be able to take benefit of the scheme and large number of them are expected to supply ethanol for the EBP programme. Remunerative price to ethanol suppliers will help in early payment to cane farmers, in the process contributing to minimize difficulty of sugarcane farmers.

Government has been implementing Ethanol Blended Petrol (EBP) Programme wherein OMCs sell petrol blended with ethanol up to 10%. This programme has been extended to whole of India except Union Territories of Andaman Nicobar and Lakshadweep islands with effect from 01st April, 2019 to promote the use of alternative and environment friendly fuels. This intervention also seeks to reduce import dependence for energy requirements and give boost to agriculture sector.

Government has notified administered price of ethanol since 2014. For the first time during 2018, differential price of ethanol based on feed stock utilized for ethanol production was announced by the Government. These decisions have significantly improved the supply of ethanol, consequently ethanol procurement by Public Sector OMCs has increased from 38 crore litre in Ethanol Supply Year 2013-14 (ESY - currently defined as ethanol supply period from 1st December of a year to 30th November of the following year) to contracts of over 452 crore litre in ongoing ESY 2021-22. The target of achieving average 10% blending has been achieved in June, 2022, much ahead of the target date of November, 2022.

Government has advanced the target of 20% ethanol blending in petrol from earlier 2030 to ESY 2025-26 and a "Roadmap for ethanol blending in India 2020-25" has been put in public domain. Other recent enablers include: enhancement of ethanol distillation capacity to 923 crore litre per annum; Long Term Off-take Agreements (LTOAs) to encourage setting up of 431 crore litre per annum capacity of Dedicated Ethanol Plants (DEPs) in ethanol deficit States by private players which is expected to bring in investments of Rs.25,000-Rs.30,000 crores in coming years; multimodal transportation of ethanol and ethanol blended petrol by railways and pipelines. All these steps add in facilitating ease of doing business and achieving the objectives of Atmanirbhar Bharat.

Government has taken many decisions for reduction of cane farmer's dues including diversion of sugar and sugar-based feedstock for production of ethanol. Now, as, large quantity of ethanol is available right from the beginning of sugar season due to conversion of sugarcane juice and B heavy molasses to ethanol, it has been decided to redefine Ethanol Supply Year as a period of ethanol supply from 1st November of a year to 31st October of the following year from 1st November, 2023 onwards. Moreover, as the Fair and Remunerative Price (FRP) of sugarcane & ex-mill price of sugar have undergone changes, there is a need to revise the ex-mill price of ethanol derived from different sugarcane-based feed stocks.

- **Union Ministry of Power & New and Renewable Energy launched the Green Energy Open Access Portal**

In continuation of several initiatives to promote clean and green energy by Government of India, the Union Minister of Power and New & Renewable Energy, Shri R K Singh launched the Green Energy Open Access Portal through Video Conferencing. The Minister of State for Power, Shri Krishan Pal, also graced the occasion. Secretary (Power), Chairperson, CEA and CMD, POSOCO along with other senior officers were also present on the occasion. About 500 participants from the States, Regulatory Commissions, RE developers and other stakeholders joined the event.

Any consumer with a connected load of 100 kW or above can get Renewable Energy through open access from any Renewable Energy generating plant set up by himself; or by any developer. The open access has to be granted within 15 days. The application for open access can be made on this portal.

The portal can be accessed at https://greenopenaccess.in/ for processing of applications related to green energy open access by the stakeholders including open access participants, traders, Power Exchanges, National / Regional / State Load Despatch Centres, Central/State transmission utilities. The portal provides a transparent, simplified, uniform and streamlined procedure for granting open access to green energy that will be key to facilitating deepening of electricity markets and enabling integration of Renewable Energy (RE) resources into the grid.

Ministry of Power notified the Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022 on 06th June 2022. These rules aim at promotion of generation, purchase and consumption of green energy including the energy from waste-to-energy plants.

The Nodal agencies shall post progress reports related to green energy open access to stakeholders through the portal. The approval for Green Energy Open Access will be granted in 15 days or else it will be deemed to have been granted, subject to the fulfilment of technical requirements through the portal.

The move is aimed at ensuring affordable, reliable, sustainable, and green energy for all. The consumers can now get access to RE power easily.

- **Prime Minister Shri Narendra Modi dedicated the 600 MW Kameng Hydro Power Station to the nation, the biggest Hydro Power Project implemented by NEEPCO Ltd., a Mini Ratna Power PSU under Ministry of Power**

  Commissioning of the sixth hydro power plant in the North East i.e., 600 MW Kameng Hydro Power Station in Arunachal Pradesh will be a major step towards fulfilling Nationally Determined Contribution (NDC) of the Government of India pledged under Paris Agreement 2015. The project will form part of projected hydro capacity addition of 30000 MW by 2030.

  The project stretches over more than 80 kilometers in West Kameng District of Arunachal Pradesh at a cost of approximately Rs 8200 Crore.

  The Project has two dams and a powerhouse having 4 units of 150 MW to generate 3353 million units of electricity. Generation of 3353 million units annually from the project will make Arunachal Pradesh a power surplus state with huge benefits to the National Grid in terms of grid stability and integration and balancing of solar and wind energy sources in the grid.

  While most of the infrastructure projects world over got severely impacted by Covid-19 pandemic, this mega project was successfully commissioned by NEEPCO Ltd (A Govt. of India enterprise and a wholly owned subsidiary of the Maharatna, NTPC Ltd) progressively during June, 2020 to February, 2021 despite all odds.

- **NETRA NTPC, NITI Aayog, and the National Centre of Excellence in Carbon Capture & Utilisation (NCoE-CCU), IIT Bombay launched the assessment of 'CO2 Geological Storage Potential'**

  Under the aegis of NITI Aayog, NETRA NTPC and the National Centre of Excellence in Carbon Capture & Utilisation (NCoE-CCU), IIT Bombay has launched the assessment of 'CO2 Geological Storage Potential' in India at NITI Aayog.

  As a part of this initiative, an assessment of CO2 storage potential in select Coalbed Methane (CBM) rich coalfields in India shall be carried out including those available with NTPC. This initiative is envisaged to be completed in 12 months' time.

This will culminate into a 'CO2 Storage Atlas' for select coalfields of India and is part of NTPC's commitment to play a key role in India's energy transition journey as the country marches ahead to achieve the 'Net-Zero' target and other climate goals.

Carbon Capture Utilisation & Storage (CCUS) is one of the key components of India's CO2 mitigation strategy to facilitate the transition towards a low-carbon energy economy and subsequently to a 'Net-Zero' emission level.

Dr V. K. Saraswat, Member NITI Aayog, Shri Ujjwal Kanti Bhattacharya, Director (Projects) NTPC, Prof. Vikram Vishal, Convener NCoE CCU, and other senior officials of NITI Aayog and NTPC Ltd. were present during the occasion.

- **MNRE notified the National Bioenergy Programme**

The Ministry of New and Renewable Energy (MNRE), Government of India has notified the National Bioenergy Programme on November 2, 2022. MNRE has continued the National Bioenergy Programme for the period from FY 2021-22 to 2025-26. The Programme has been recommended for implementation in two Phases. The Phase-I of the Programme has been approved with a budget outlay of Rs. 858 crore.

The National Bioenergy Programme will comprises of the following sub-schemes:

- **Waste to Energy *Programme*** *(Programme on Energy from Urban, Industrial and Agricultural Wastes /Residues)* to support setting up of large Biogas, BioCNG and Power plants (excluding MSW to Power projects)
- **Biomass Programme** *(Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse)* based cogeneration in Industries) to support setting up of pellets and briquettes for use in power generation and non-bagasse based power generation projects.
- **Biogas Programme** to support setting up of family and medium size Biogas in rural areas.

To utilize huge surplus biomass, cattle dung, industrial and urban biowaste available in the country for recovery of energy, the MNRE has been promoting bioenergy in India since 1980s. One major support extended by MNRE has been Central Financial Assistance provided for setting up of Bioenergy projects such as Biogas, BioCNG, Power from urban, Industrial and Agricultural Waste / Residues for reducing their capital cost/ interest on loan therefore increase project viability.

- **Power Ministry issues Amendment in Charging Infrastructure for Electric Vehicles (EV)- the revised consolidated Guidelines & Standards. Key amendments are:**

  - Public charging stations shall have the feature of prepaid collection of service charges with the time of the day rates and discount for solar hours
  - A Committee under Central Electricity Authority (CEA) to recommend to the State Government the ceiling limit of service charges to be levied.
  - This Committee shall also recommend "time of the day rate " for service charges as well as the discount to be given for charging during solar hours

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