FIPI

Federation of Indian Petroleum Industry

POLICY & ECONOMIC REPORT

OIL & GAS MARKET

JUNE 2023

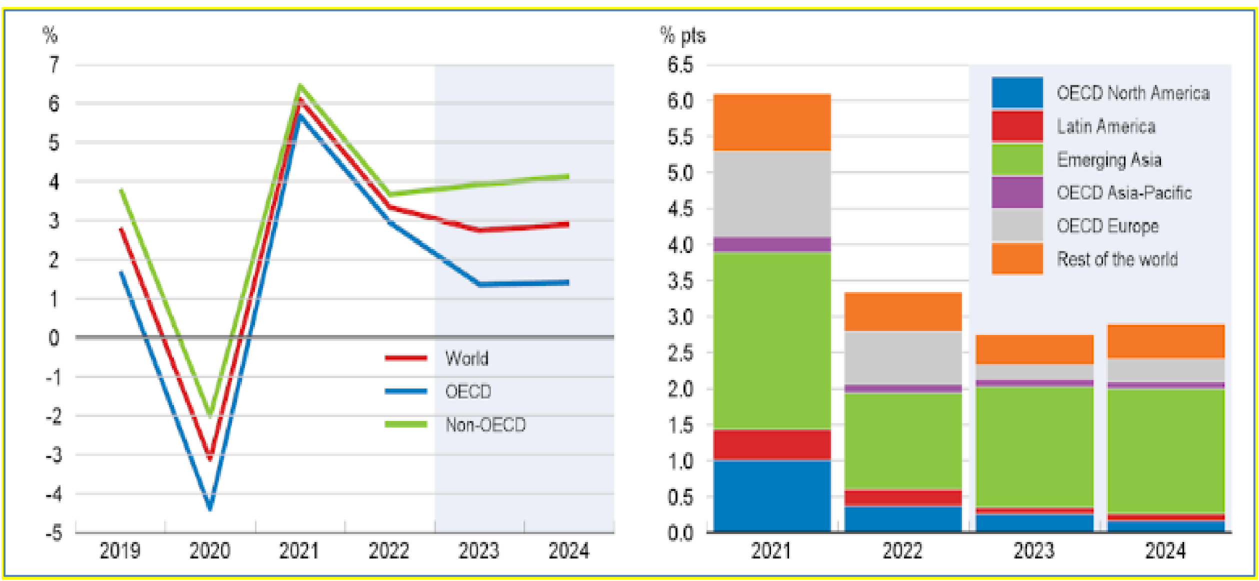
Table of Contents

Executive Summary

According to OECD, global GDP growth is projected to moderate from 3.3% in 2022 to 2.7% in 2023, and 2.9% in 2024. GDP growth in the United States is projected to be 1.6% in 2023, before slowing to 1.0% in 2024 in response to tight monetary and financial conditions. In the euro area, declining headline inflation will help to boost real incomes and contribute to a pick-up in GDP growth from 0.9% in 2023 to 1.5% in 2024. China is expected to see strong increases in GDP growth in 2023 (with 5.4%) and 2024 (with 5.1%), due to lifting of the government's zero-COVID policy. Growth is expected to rebound in Brazil, China, India, with GDP growth projected to be 1.7%, 5.4%, 6% respectively in 2023 and at 1.2%, 5.1% and 7% respectively in 2024.

The improvement in economic activity is driven by decline in energy prices and better prospects for China. Energy commodity prices have fallen sharply, with a particularly marked decline in the price of natural gas.

Figure- Global GDP growth



Source- OECD

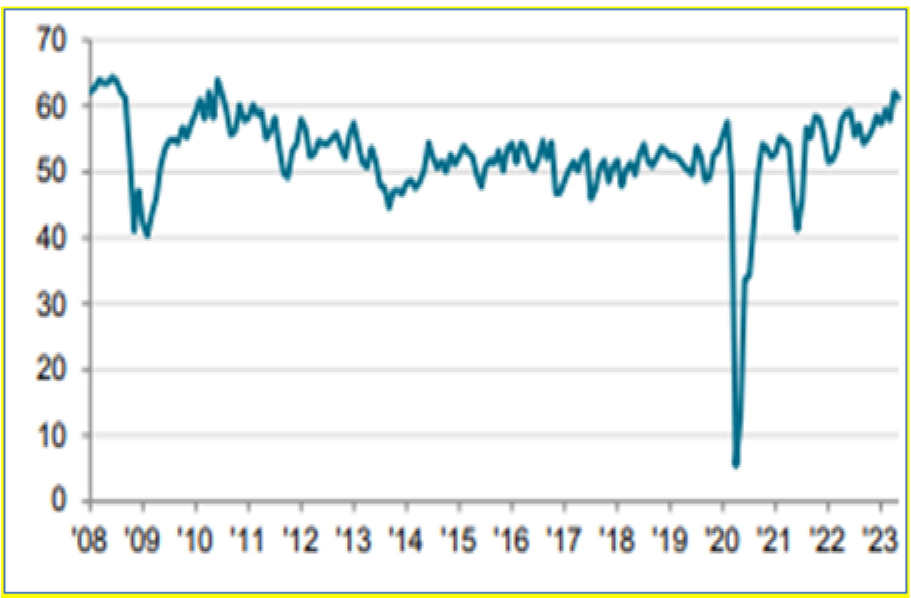
In case of India, according to RBI, India's 2023-24 GDP growth is expected to be projected at 6.5 %, with quarter Q1 at 8.0 %, Q2 at 6.5 %, Q3 at 6.0 %, and Q4 at 5.7 %. As per the provisional estimates released by the National Statistical Office (NSO) recently in May 2023, the real GDP growth for 2022-23 stood at 7.2 %, higher than the 7% projected.

OECD has projected India's GDP for the FY 2023-24 at 6%; owing to effect of monetary policy management and regain in household demand. Further headline inflation has fallen below 6% since March 2023, mostly due to lower food and energy prices; that has also resulted in growth in economic activity.

India’s retail inflation eased to a more than 2-year low of 4.25 % in May 2023 on an annual basis as against 4.70 % in April 2023. The consumer-price index (CPI) based inflation has remained within the Reserve Bank of India’s (RBI) tolerance band of 2-6% for the third consecutive month. The Reserve Bank of India (RBI) has lowered India’s inflation projection for 2023-24 to 5.1% against its April 2023 estimate of 5.2%. RBI’s monetary policy committee unanimously decided to keep the repo rate unchanged at 6.5 %. The repo rate is the rate of interest at which RBI lends to other banks.

India's factory output in May expanded at the quickest pace in the last 31 months owing to strong demand and output. The Manufacturing Purchasing Managers' Index, compiled by S&P Global, rose to over a 2-1/2 year high of 58.7 in May from April's 57.2. India's services sector growth eased slightly in May, but registered the second-strongest rate of growth in close to 13 years, on favorable demand conditions and new client entries. The seasonally adjusted S&P Global India Services PMI Business Activity Index fell from 62 in April to 61.2 in May. forecasts.

Figure- Services PMI



Source- S&P Global

The CMIE data for May, 2023 suggest that the India’s unemployment rate fell to 7.7% in May 2023, from 8.5% in the previous month. The unemployment rate inched down because of a fall in labor participation at 441.9 million, which implies a fall in the number of people who entered the labor market in search of work.

As far as India’s external position is concerned, India’s overall exports (Merchandise and Services combined) in May 2023 is estimated to be USD 60.29 Billion, exhibiting a negative growth of (-) 5.99 per cent over May 2022. Overall imports in May 2023 is estimated to be USD 70.64 Billion, exhibiting a negative growth of (-) 7.45 per cent over May 2022.

Oil markets are struggling for a proper direction as contradictory data points blurry the future situation. Bearish macroeconomic indicators and concerns over demand growth are clashing with resurgent oil use in key consuming countries. Oil prices appear to be taking their cue from the former, with benchmark North Sea Dated trading at $73/bbl, nearly half the high of 2022, despite a looming supply deficit. Crude oil futures prices extended their losses in May experiencing a heavy selloff. Market sentiment weakened due to renewed worries about an economic slowdown and re-emerging U.S. banking sector concerns. Investor sentiment also came under additional pressure after the U.S.

Hedge funds and other money managers heavily cut their bullish positions in May after they were net buyers in the previous month. This fueled price volatility and contributed to a drop in futures prices. Money managers turned bearish on the outlook for crude oil prices and rushed to close long positions that had been built in the previous month, amid weakness in the broader financial market and uncertainty about the U.S. debt ceiling talks, with a deal agreed in early June, and subdued Chinese economic data that weighed on investor sentiment.

Natural gas spot prices at the U.S. Henry Hub benchmark averaged $2.15 per million British thermal units (MMBtu) in May 2023. U.S. benchmark Henry Hub spot prices are expected to rise in the summer months due to rising natural gas use in the electric power sector and flattening production growth, which together contribute to storage injections that are less than the five-year average (2018-2022) in the coming months.

Economy in Focus

1. A snapshot of the global economy

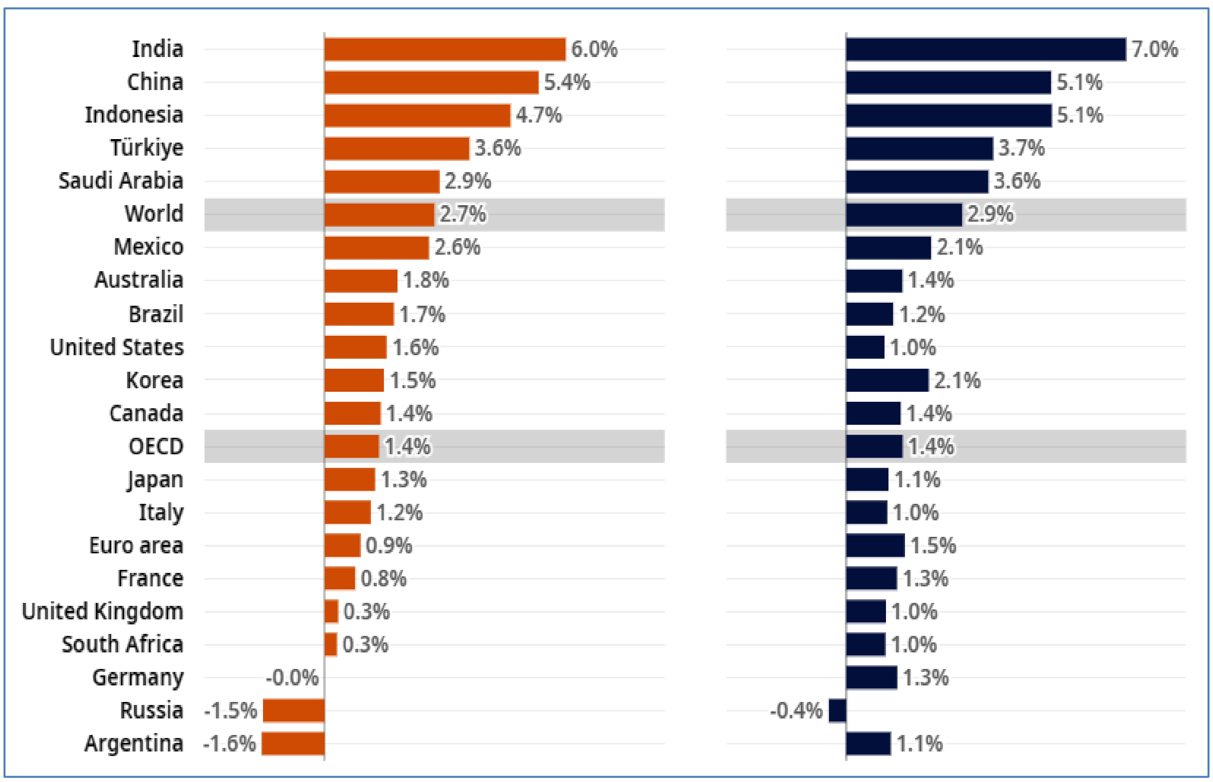
Global economic growth

- According to OECD, global GDP growth is projected to moderate from 3.3% in 2022 to 2.7% in 2023, and 2.9% in 2024.

- GDP growth in the United States is projected to be 1.6% in 2023, before slowing to 1.0% in 2024 in response to tight monetary and financial conditions. In the euro area, declining headline inflation will help to boost real incomes and contribute to a pick-up in GDP growth from 0.9% in 2023 to 1.5% in 2024. China is expected to see strong increases in GDP growth in 2023 (with 5.4%) and 2024 (with 5.1%), due to lifting of the government's zero-COVID policy.

- Growth is expected to rebound in Brazil, China, India, with GDP growth projected to be 1.7%, 5.4%, 6% respectively in 2023 and at 1.2%, 5.1% and 7% respectively in 2024.

Figure- Real GDP growth projections for 2023 and 2024



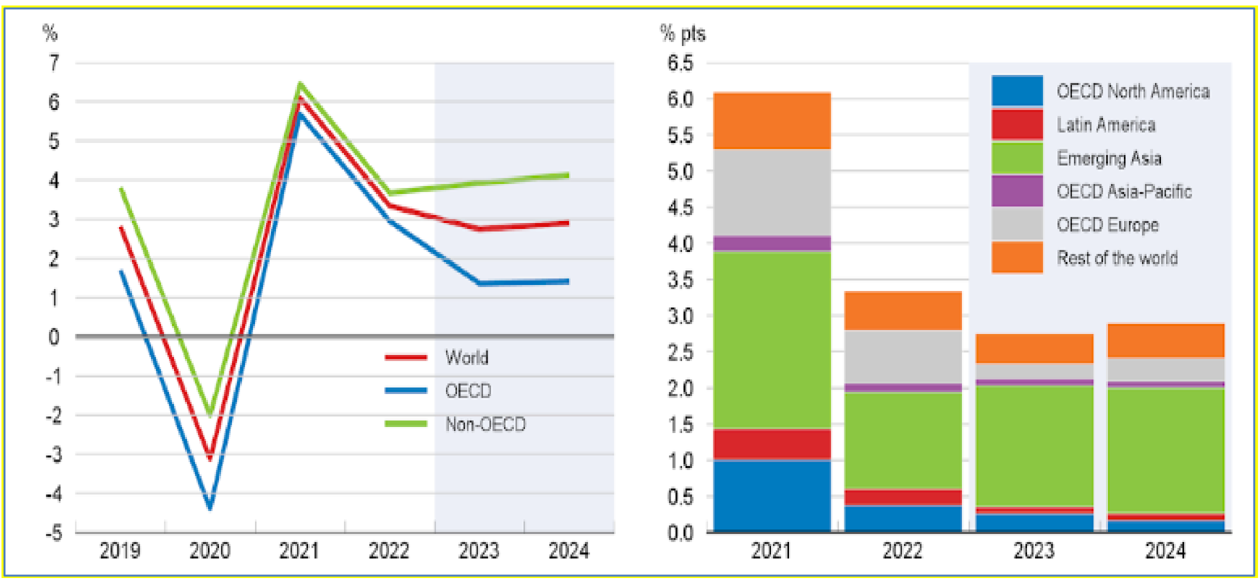
Source- OECD

- The improvement in economic activity is driven by decline in energy prices and better prospects for China. Energy commodity prices have fallen sharply, with a particularly marked decline in the price of natural gas.

- Further, China's earlier-than-expected reversal of its zero-COVID policy in December 2022, combined with a loosening of both fiscal and monetary policy, has also boosted business sentiment and economic activity.

- In addition, a disproportionate share of global growth in 2023-24 is expected to continue to come from Asia.

Figure- Global GDP growth

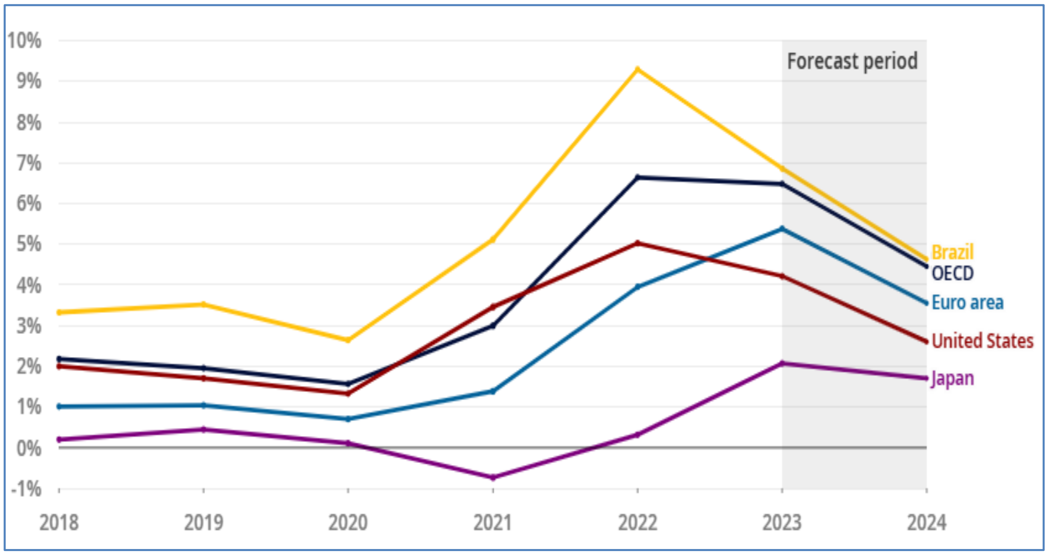


Source- OECD

Global inflation

- According to OECD, the annual headline price inflation in the G20 economies is projected to decline from 9.43% in 2022 to 6.6% in 2023 and 4.3% in 2024, mainly due to lower energy and food retail prices, moderating demand pressures and lower supply bottlenecks.

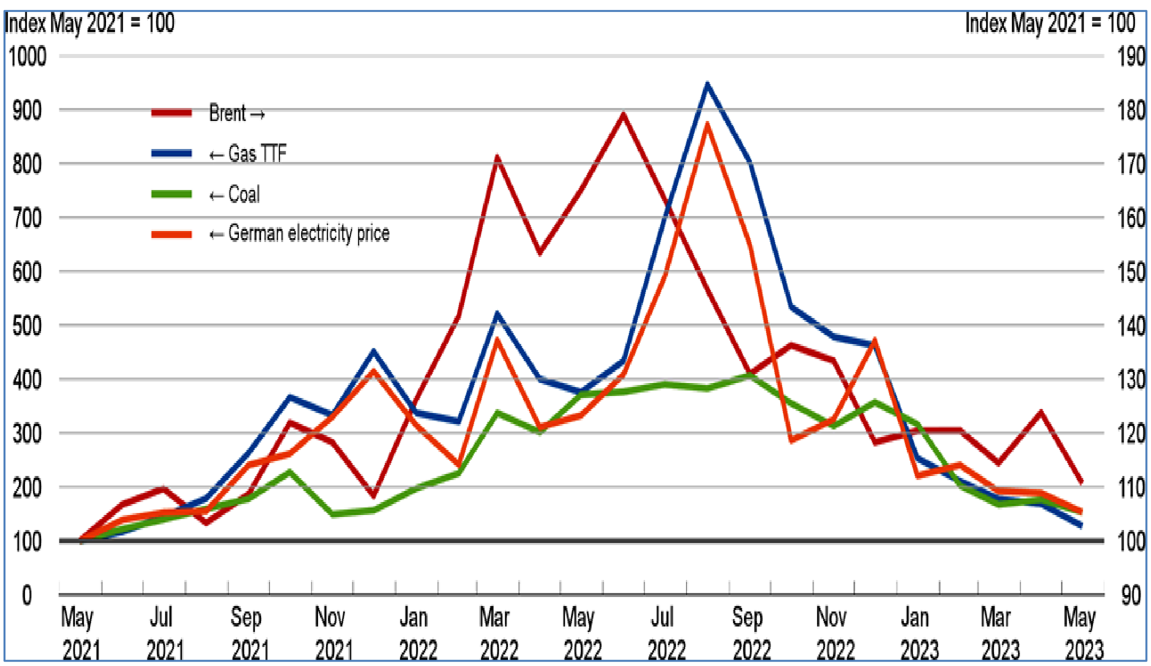
Figure- Global inflation levels



Source- OECD

Energy commodity prices have fallen sharply with a particularly marked decline in the price of natural gas. The spot prices of oil and coal have also reduced from the peaks reached after the invasion of Ukraine last year, easing pressures on households and companies.

Figure- Energy prices have fallen back to mid-2021 levels

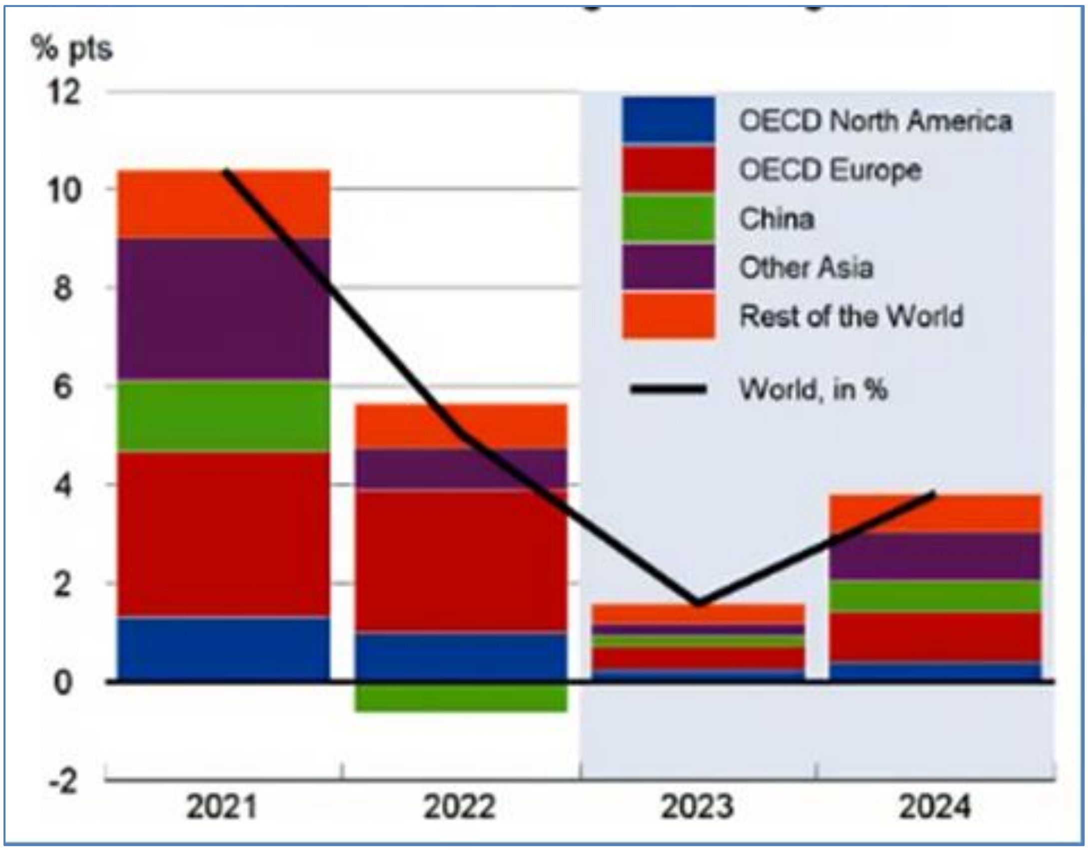


Source- OECD

Global Trade

Global trade growth is projected to slow to 1.6%, due to carryover effects from the weakness in late 2022, before recovering to 3.8% in 2024. The lagged effects of tight monetary policy will continue to be felt into 2024, particularly in the United States. The trade intensity of growth is set to decline in 2023, before recovering in 2024, as rising trade in OECD countries offsets the continued weakness in Chinese trade intensity.

Figure- Contributions to global trade growth



Source- OECD

2. Oil Demand Will Peak by Decade End as Countries Move Away from Fossil Fuels- International Energy Agency (IEA)

According to IEA, global demand for oil is set to hit a peak by the end of this decade, as volatile energy prices accelerate a shift to clean alternatives following the Covid-19 pandemic and Russia's invasion of Ukraine.

The following findings are observed from IEA report: -

- The IEA forecasts global oil demand will rise to 105.7 million barrels per day in 2028, an increase of around 6% compared with 2022. This growth is supported by strong demand from the petrochemical and aviation sectors.

- However, demand growth for oil will slump to just 400,000 barrels per day (0.4 million barrels per day) in 2028—compared with 2.4 million barrels per day in 2023.

- The global demand for oil used in transportation will begin declining in 2026, mainly due to a shift to electric vehicles and policy measures pushing for more efficiency.

- Demand growth for gasoline is set to reverse at the end of this year, while the rise in demand for combustible fossil fuels will peak at 81.6 million bpd in 2028. This shows pivot towards lower-emission sources.

- According to IEA, expansion in global oil demand will be powered by faster-growing economies in the developing world, especially Asia. Around three-quarters of the increase in the six-year period to 2028 will come from Asia, with India surpassing China as the main source of growth by 2027. Further, oil demand in North America and Europe, where energy transition policies and efficiency gains will be most pronounced, will be in contractionary mode for most of the period.

- According to IEA, the global petrochemical sector will remain the key driver of global oil demand growth, with liquified petroleum gas (LPG), ethane, and naphtha accounting for more than half of the increase between 2022 and 2028 and nearly 90 % of the increase compared with pre-pandemic levels. The aviation sector will also expand strongly as airline travel returns to normal following the reopening of borders.

- The oil-producing countries outside the OPEC+ alliance led by the USA, Brazil, and Guyana have plans for increasing global supply capacity in the medium term with a forecast increase of 5.1 million bpd by 2028.

- For OPEC+ member nations, the expected net capacity gain is 0.8 million bpd in the six-year period to 2028, led by the United Arab Emirates, Saudi Arabia, and Iraq.

3. Eurozone fell into recession in first quarter

According to Eurostat, a statistical agency, the euro zone economy fell into a technical recession in the first three months of 2023. Gross domestic product (GDP) for the 20-country euro zone fell by 0.1% in the first quarter compared with the final quarter of 2022, when GDP also slipped by 0.1%. Two successive quarters of contraction are commonly described as a technical recession.

The agency reported that first-quarter public spending saw the largest contraction on record except for during the first wave of coronavirus lockdowns in 2020. Going forward, growth will remain soft despite dropping wholesale energy prices, as monetary policy tightening dents investment and still-present inflationary pressures constrain consumption. Along with Germany and Ireland, GDP also declined quarter-on-quarter in Greece, Lithuania, Malta, and the Netherlands.

Eurostat said that household spending stripped 0.1 percentage point, public expenditure 0.3 points and inventory changes 0.4 points from quarterly GDP. Gross fixed capital formation added 0.1 point and net trade a further 0.7 points as imports declined.

Conversely, employment growth accelerated at the start of 2023, rising to 0.6% in the first quarter from 0.3% in the fourth quarter of 2022. On a quarterly basis, employment grew in every country except Greece, Lithuania, and Slovakia.

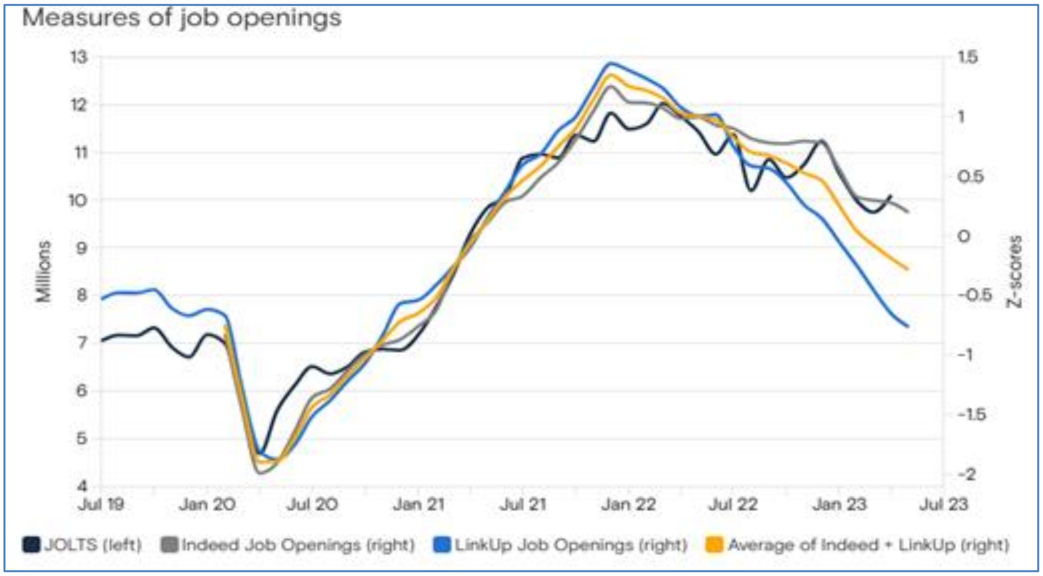
4. Probability of a US recession in the next 12 months has fallen to 25% - Goldman Sachs

According to Goldman Sachs Research, there is a 25% chance of recession in the next 12 months, down from their earlier projection of 35% shortly following the failure of Silicon Valley Bank in March. The U.S.'s agreement to raise the nation's debt limit will result in small spending cuts that are expected to leave the economy's trajectory unchanged over the next two years.

Goldman Sachs has forecasted annual average growth this year at 1.8% as a sizable boost is expected from a recovery in real disposable income and stabilization in the housing market.

In case of employment in US, although nonfarm payrolls grew 339,000 in May, the unemployment rate edged up slightly to 3.7% because of a decline in self-employment. The U.S. economy has found ways of creating large numbers of jobs while keeping the unemployment rate very close to its pre-pandemic level of 3.5%.

Figure- Job openings



While the Job Openings and Labor Turnover Survey (JOLTS) showed a surprise increase to 10.1 million in April, the private-sector measures from LinkUp and Indeed declined further in April and May.

In case of inflation, while the inflation is on deceleration trend, the Goldman Sachs Research analysts forecast core PCE inflation to come down to 3.7% by December 2023, with sequential rates averaging 2.9% in the second half of the year.

5. UNCTAD launches new index for countries to better measure economic potential- Productive Capacities Index (PCI)

On 20th June, 2023, UNCTAD launched a new generation Productive Capacities Index (PCI) to help countries make more accurate diagnostics and measurements of their economic performance. The PCI measures countries' abilities to produce goods and deliver services, which are critical for international trade and global production value chains.

The PCI is available through a dedicated online portal with publications, manuals, resources, and tools. It maps the productive capacities of 194 economies and provides a better measure of development than other traditional benchmarks such as gross domestic product (GDP). It is multidimensional and measures economic inputs and potential as opposed to outputs.

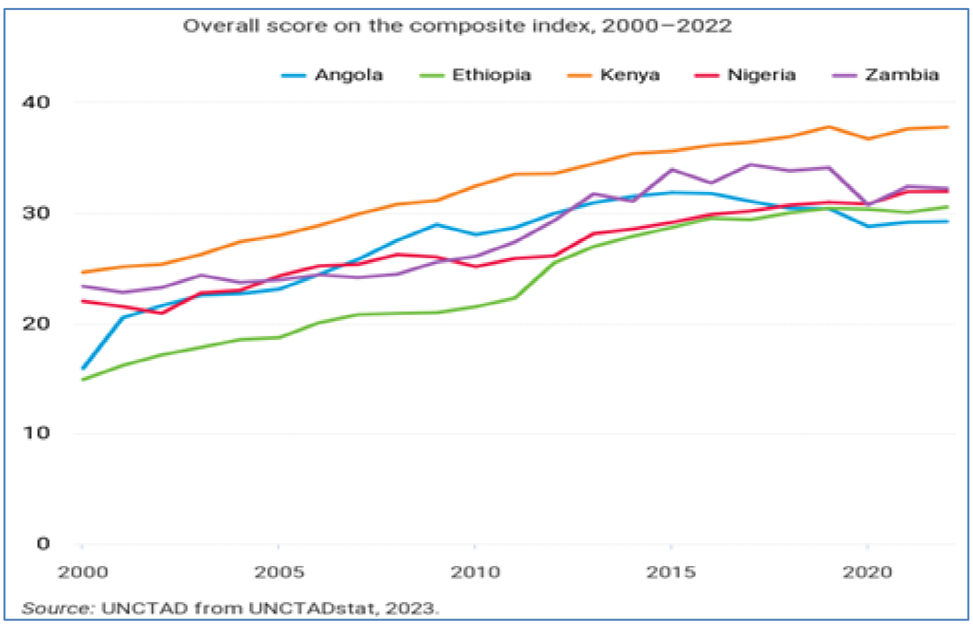
For governments, the PCI is a powerful and practical tool to track progress over time and forge informed policies to plug development gaps. It can help countries respond to a call by UN

Secretary-General António Guterres to move beyond GDP and measure the things that really matter to people and their communities.

The PCI shows that developed economies have higher productive capacity scores, with economies such as Denmark, Australia and the United States leading the pack with an average score of 70 out of 100 on the composite index.

Among developing regions, Asia, and Latin America, overall, perform better than the African region. Some economies like Chile, China and Qatar gradually converge towards the performance of developed countries with the average score of 61. On the other extreme are African economies such as Chad, Malawi, and Niger, which each register an overall PCI score of below 20. UNCTAD defines productive capacities as “the productive resources, entrepreneurial capabilities and production linkages that together determine the capacity of a country to produce goods and services and enable it to grow and develop.”

Figure- Countries with policies based on productive capacitates index and their progress



Originally released by UNCTAD in 2021, the newly updated index is an enhanced data-driven tool to help countries improve their development policies. It follows a robust, revised methodology and updates the data for the period 2000 to 2022.

The PCI has helped several developing countries to assess their productive capacities and develop programmes to plug gaps. Angola, Ethiopia, Kenya, Nigeria, and Zambia have used the PCI to put in place data-driven and evidence-based policies. Cambodia, El Salvador, Malawi, Mongolia, Mozambique, Senegal, and Zimbabwe are following suit with UNCTAD's support.

By measuring the economy from an input perspective across eight core components of productive capacities, the PCI more fully captures economic potential and highlights key areas for development policy focus. These are natural capital, human capital, energy (electricity), ICTs, structural change, transport, private sector, and institutions, which are mapped using 42 indicators.

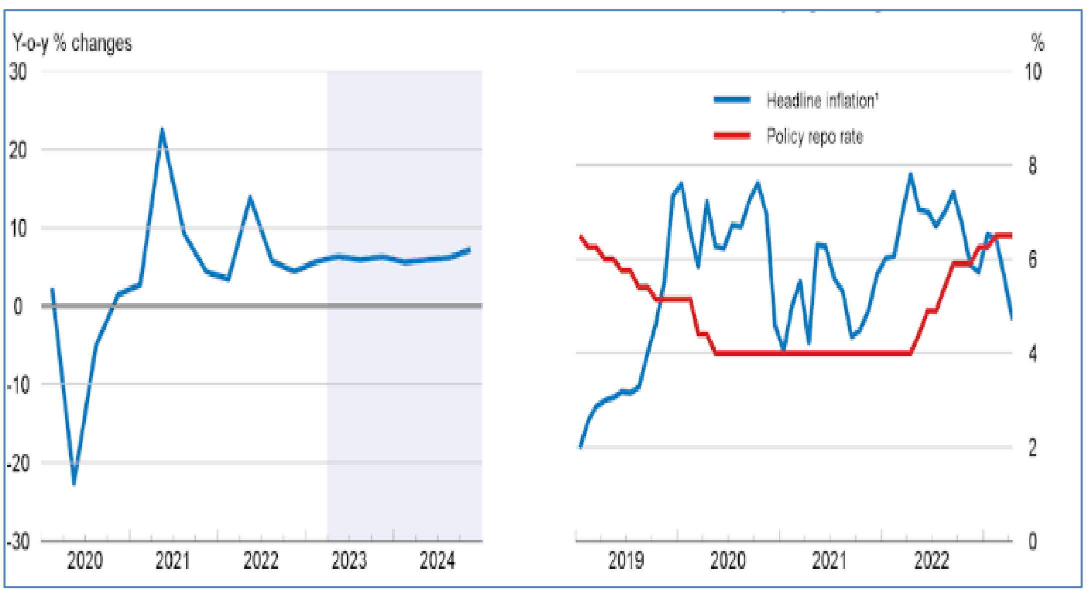
6. Indian Economy

India's economic growth

According to RBI, India's 2023-24 GDP growth is expected to be projected at 6.5 %, with quarter Q1 at 8.0 %, Q2 at 6.5 %, Q3 at 6.0 %, and Q4 at 5.7 %. As per the provisional estimates released by the National Statistical Office (NSO) recently in May 2023, the real GDP growth for 2022-23 stood at 7.2 %, higher than the 7% projected.

OECD has projected India's GDP for the FY 2023-24 at 6%; owing to effect of monetary policy management and regain in household demand. Further headline inflation has fallen below 6% since March 2023, mostly due to lower food and energy prices; that has also resulted in growth in economic activity.

Figure- India economic growth and inflation



Source- OECD

Inflation in India

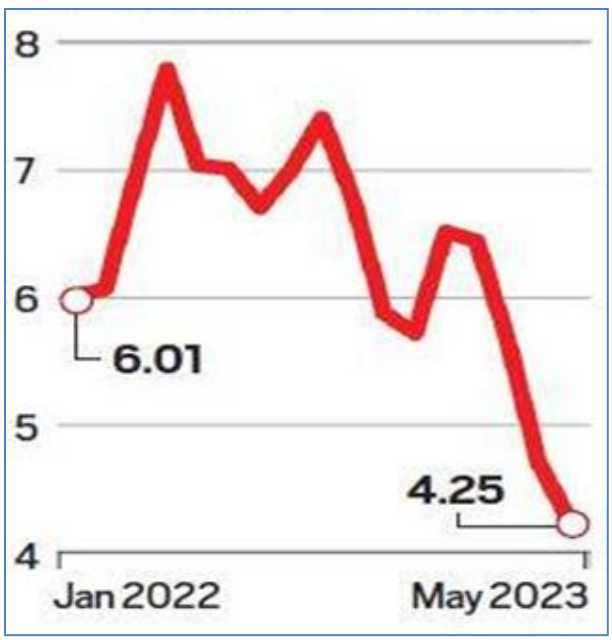
- India's retail inflation eased to a more than 2-year low of 4.25 % in May 2023 on an annual basis as against 4.70 % in April 2023.

- The consumer-price index (CPI) based inflation has remained within the Reserve Bank of India's (RBI) tolerance band of 2-6% for the third consecutive month.

- The consumer food price index (CFPI) eased to 2.91 % in May from 3.84 % in April. Rural inflation stood at 4.17% while urban inflation stood at 4.27%.

- A sharp fall in international prices of LPG and kerosene can also be linked with the lower fuel inflation in May. Thus, the easing price of cereals and vegetables in addition with lower energy prices have also pulled back the inflationary levels.

Figure- Retail inflation in India



Source- NSO

RBI stance on inflation: -

- The Reserve Bank of India (RBI) has lowered India's inflation projection for 2023-24 to 5.1% against its April 2023 estimate of 5.2%.

- According to RBI, on a quarterly basis, retail inflation (or Consumer Price Index) in Q1 is seen at 4.6%, Q2 at 5.2 %, Q3 at 5.4 %, and Q4 at 5.2%. India's headline inflation has come down during March-April 2023 to 4.7 % in April, the lowest since November 2021.

- RBI's monetary policy committee unanimously decided to keep the repo rate unchanged at 6.5 %. The repo rate is the rate of interest at which RBI lends to other banks.

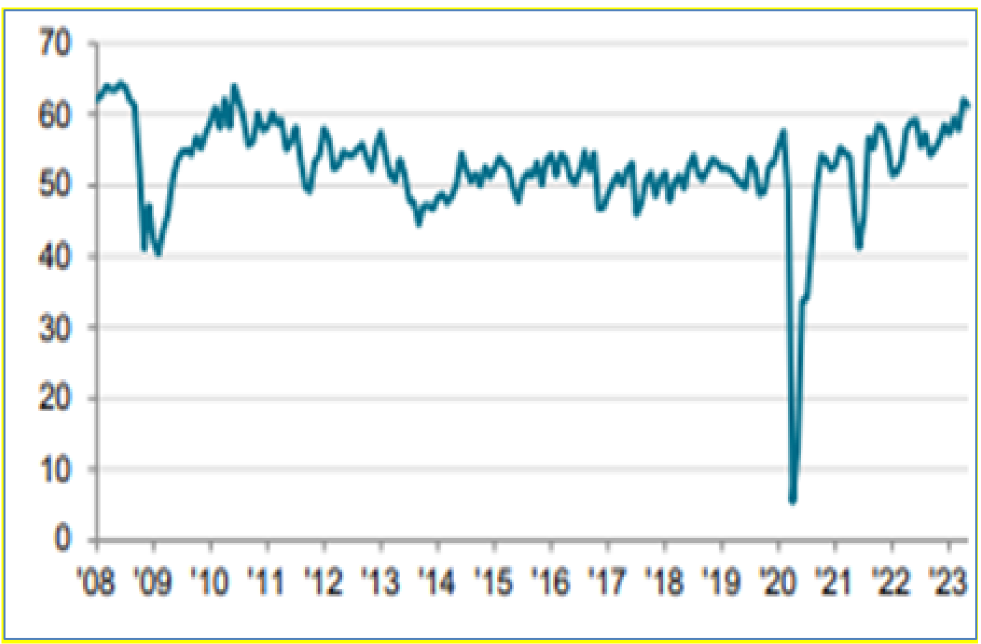
- The RBI in its April meeting, had paused the repo rate. Barring this, the RBI raised the repo rate by 250 basis points cumulatively to 6.5 % since May 2022 in the fight against inflation.

India PMI

- India's factory output in May expanded at the quickest pace in the last 31 months owing to strong demand and output. The Manufacturing Purchasing Managers' Index, compiled by S&P Global, rose to over a 2-1/2 year high of 58.7 in May from April's 57.2.

- India's services sector growth eased slightly in May, but registered the second-strongest rate of growth in close to 13 years, on favorable demand conditions and new client entries. The seasonally adjusted S&P Global India Services PMI Business Activity Index fell from 62 in April to 61.2 in May. Despite falling from April, the latest reading indicated that output increased at the second-quickest pace since July 2010. Advertising, demand strength, and favorable market conditions were among the reasons cited for optimistic forecasts.

Figure- Services PMI



Source- S&P Global

- On the price front, Indian service providers reported higher food, input, transportation, and wage costs in May. Amid reports of rising cost burdens, firms charged more for their services in May.

Unemployment in India

The CMIE data for May, 2023 suggest that the India's unemployment rate fell to 7.7% in May 2023, from 8.5% in the previous month. The unemployment rate inched down because of a fall in labor participation at 441.9 million, which implies a fall in the number of people who entered the labor market in search of work.

According to the CMIE data, the urban labor market recorded a fall in the number of employed as well as unemployed people. The decline of 4.5 million people in the urban labor force in May was the result of a combination of a decline in jobs by around 2.4 million, and a fall in the number of unemployed in urban India by 2.1 million.

Rural India also displayed a similar trend, posting a fall in both employment and unemployment numbers. The rural labor force reduced to 299.4 million in May from 306.5 million in the previous month.

India's external position

India's FPI position

Net foreign portfolio investment (FPI) inflows for the current fiscal year as of June 6 were $8.4 billion, compared to net outflows for the two preceding years of $14.1 billion and $5.9 billion. Net FPI flows to India were $28 billion in 2022-23 compared to $38.6 billion in the previous year. FPIs are likely to continue their investment in India in June as well with the strong macroeconomic fundamentals and high frequency indicators reflect a robust economy gaining further strength.

India's forex position

According to Reserve Bank of India, India's foreign exchange reserves saw a rise of $5.929 billion and stood at $595.067 billion as on June 2, 2023. India's foreign currency assets, the biggest component of the forex reserves, rose by $5.270 billion to $526.201 billion. The changes in foreign currency assets, expressed in dollar terms, include the effects of appreciation or depreciation of other currencies held in the RBI's reserves. India's gold reserves rose by $655 million, taking the overall levels to $45.557 billion. Meanwhile, SDRs fell by $6 million, to $18.186 billion. India's reserve position in the IMF improved by $10 million to $5.123 billion.

India's foreign trade position

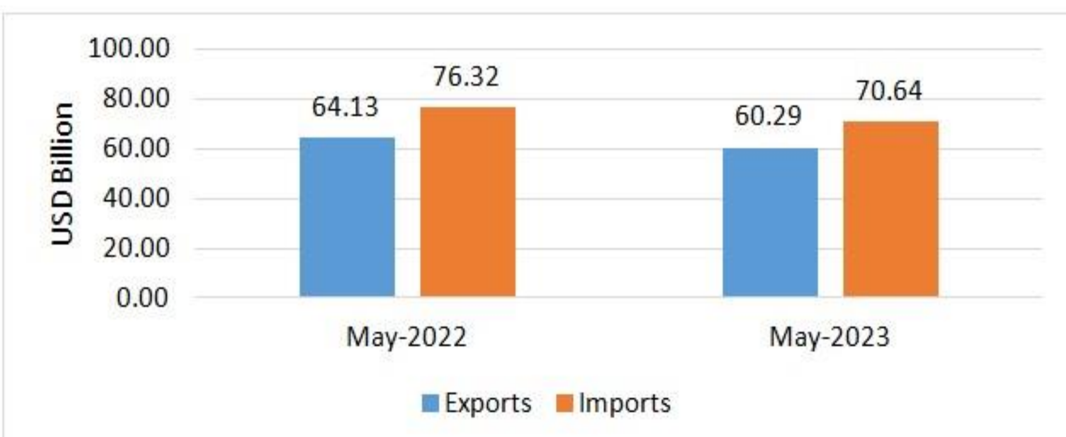
- India's overall exports (Merchandise and Services combined) in May 2023 is estimated to be USD 60.29 Billion, exhibiting a negative growth of (-) 5.99 per cent over May 2022.
- Overall imports in May 2023* is estimated to be USD 70.64 Billion, exhibiting a negative growth of (-) 7.45 per cent over May 2022.

Table- Trade during May 2023

		May 2023 (USD Billion)	May 2022 (USD Billion)
Merchandise	Exports	34.98	39.00
	Imports	57.10	61.13
Services*	Exports	25.30	25.13
	Imports	13.53	15.20
Overall Trade (Merchandise +Services) *	Exports	60.29	64.13
	Imports	70.64	76.32
	Trade Balance	-10.35	-12.20

Source- RBI

Figure- Overall trade during May 2023



Source- RBI

- For the month of May 2023, under merchandise exports, 13 of the 30 key sectors exhibited growth in May 2023 as compared to same period last year (May 2022). These include Electronic Goods (73.96%), Other Cereals (67.96%), Oil Meals (52.91%), Spices (49.84%), Iron Ore (48.26%), Oil Seeds (25.02%), Fruits & Vegetables (19.91%), Ceramic Products & Glassware (17.36%), Rice (14.27%), Tea (8.81%), Cashew (2.81%), Coffee (1.71%) and Drugs & Pharmaceuticals (0.78%).

- Under merchandise imports, 16 out of 30 key sectors exhibited negative growth in May 2023. These include Silver (-93.92%), Sulphur & Unroasted Iron Pyrites (-81.88%), Cotton Raw & Waste (-39.81%), Gold (-38.71%), Vegetable Oil (-33.02%), Pearls, Precious & Semi-Precious Stones (-31.62%), Organic & Inorganic Chemicals (-20.26%), Coal, Coke & Briquettes, Etc. (-16.88%), Transport Equipment (-12.85%), Textile Yarn Fabric, Made-Up Articles (-11.93%), Artificial Resins, Plastic Materials, Etc. (-9.17%), Pulp And Waste Paper (-8.4%), Project Goods (-6.04%), Petroleum, Crude & Products (-5.97%), Wood & Wood Products (-3.4%) and Metalliferous Ores & Other Minerals (-0.58%).

- India's trade deficit has shown considerable decline in April-May 2023. Overall trade deficit for April-May 2023 is estimated at USD 13.28 Billion as compared to the deficit of USD 20.56 Billion during April-May 2022, registering a decline of (-) 35.41 percent. The merchandise trade deficit during April-May 2023 was USD 37.26 Billion compared to USD 40.48 Billion during April-May 2022, registering a decline of (-) 7.95 percent.

7. India's GDP is now $3.75 trillion, says Finance Minister

India's gross domestic product (GDP) has touched the $3.75 trillion-mark in 2023 so far from around $2 trillion in 2014, according to Finance Minister Nirmala Sitharaman. FM Sitharaman has called India a 'bright spot' in the global economy, moving from 10th largest to 5th largest economy in the world. At current prices, India's GDP ranks above the UK ($3,159 billion), France ($2,924 billion), Canada ($2,089 billion), Russia ($1,840 billion), and Australia ($1,550 billion) at current prices.

The Finance Ministry further stated that India is the fifth largest economy in the world. India's GDP stood, lower than the USA ($26,854), China ($19,374 billion), Japan ($4,410) and Germany ($4,309 billion).

8. Moody's Projects India's GDP Growth at 6-6.3% in Q1, lower than RBI's Forecast

The global credit ratings major Moody's expects India's economy to achieve a growth rate of 6-6.3% in the ongoing June 2023 quarter, which is lower than the Reserve Bank of India's projection of 8% for the same period.

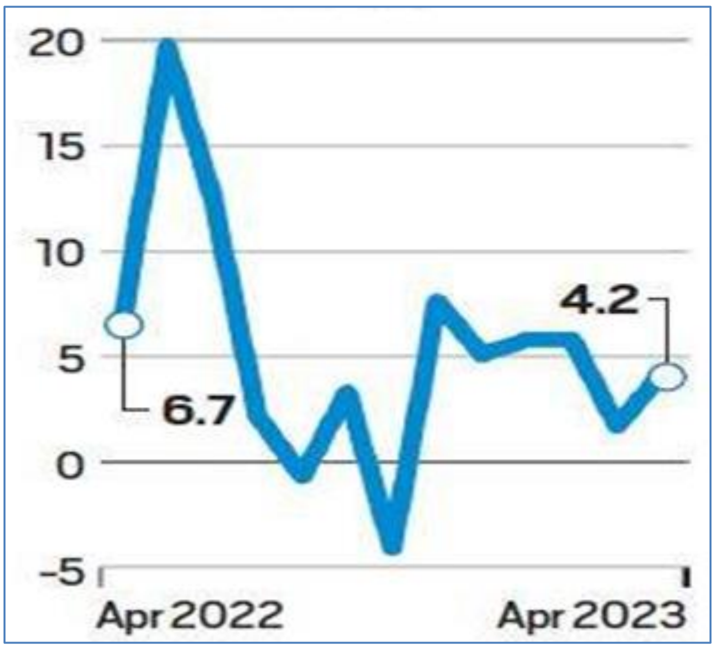
According to Moddy's, India's general government debt is relatively high at around 81.8% of GDP for FY23. Further, Moody highlights the risks of fiscal slippage stemming from lower than estimated government revenues, and projects the domestic growth rates at 6.1% and 6.3% for FY24 and FY25, respectively.

Moody’s sees several credit strengths possessed by India, as it benefits from a stable domestic financing base for government debt, a large and diverse economy, a sound external position, and high growth potential. Moody's has a 'Baa3' sovereign credit rating on India with a stable outlook.

9. India’s industrial production up 4.2% in April from 1.1% in March- National Statistical Office (NSO)

According to the data released by NSO on 12th June 2023, the index of industrial production grew by 4.2% in the month of April 2023. The number has now been revised to 1.7% in April; up significantly from 1.1% in March 2023. IIP growth was 6.7% in April 2022. This was primarily driven by a low base effect and a pick-up in manufacturing (rose by 4.9%) and mining (rose by 5.1%) sectors.

Figure- IIP (%)



Source- NSO

Output of the manufacturing sector accounts for more than three-fourth of the IIP. The category which saw a huge turnaround in April was consumer non-durable goods, whose output surged by 10.7 % after having contracted by 2.7 % in March. Growth in production of infrastructure goods was also in double-digit territory 12.8 % as against 7 % in March.

10. India's Oil & Gas production to achieve mid-decade peak in 2027: S&P Global

According to the S&P Global Commodity Insights report, the growth in the production of oil and gas in India is expected to achieve a mid-decade peak between 2023-32, around 2027. The growth will primarily be driven by the Krishna Godavari (KG)-Basin projects being operated by Reliance Industries Limited (RIL) and the State-run energy major Oil and Natural Gas Corporation (ONGC). These projects include Cluster 2A in KG-DWN-98/2 and the Dhirubhai 55 (MJ) field. The major growth area is gas, led by KG Basin discoveries being operationalized.

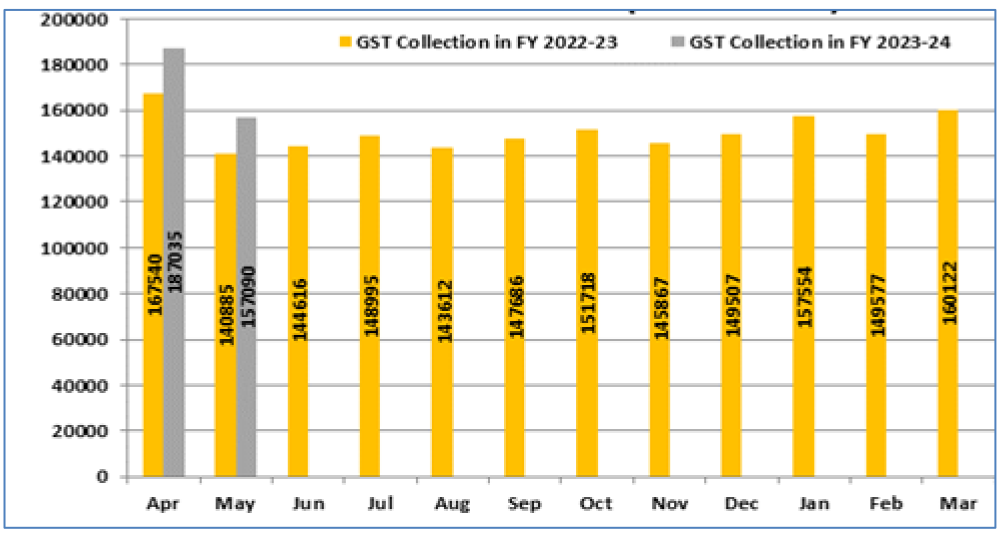
11. ₹1,57,090 crore gross GST revenue collected for May 2023; clocks 12% Year-on-Year growth

The gross Good & Services Tax (GST) revenue collected in the month of May, 2023 is ₹1,57,090 crore of which CGST is ₹28,411 crore, SGST is ₹35,828 crore, IGST is ₹81,363 crore (including ₹41,772 crore collected on import of goods) and cess is ₹11,489 crore (including ₹1,057 crore collected on import of goods).

The government has settled ₹35,369 crore to CGST and ₹29,769 crore to SGST from IGST. The total revenue of Centre and the States in the month of May 2023 after regular settlement is ₹63,780 crore for CGST and ₹65,597 crore for the SGST.

The revenues for the month of May 2023 are 12% higher than the GST revenues in the same month last year. During the month, revenue from import of goods was 12% higher and the revenues from domestic transactions (including import of services) are 11% higher than the revenues from these sources during the same month last year.

The chart below shows trends in monthly gross GST revenues during the current year.



Source- Ministry of Finance

Lessons from Economics

Government Incentives

The Government of India has taken several administrative, legal, fiscal, export, investment incentives/ measures to promote start-ups, MSME units, large units, thrust sector units (IT, healthcare, media, aviation etc.) for various sectors, in order to enhance productivity, generate employment and promote sustainable economic growth.

Some of the incentives are listed below: -

- **Monetary/Fiscal Policy**- Governments have the capacity to make broad changes to monetary and fiscal policy, including raising or lowering interest rates, which has a huge impact on business.

- **Foreign Exchange management**- They can boost the currency, which temporarily lifts corporate profits and share prices, and ultimately spikes interest rates.

- **Bailouts**- Governments can intervene when companies or entire segments of the economy are failing, or threatening to undermine the whole economic system, by providing bailouts.

- **Subsidies & tariffs** - Governments can create subsidies by taxing the general public and giving the incentive to a particular industry to make it more profitable. In the case of a tariff, the government applies taxes to foreign products to make them more expensive, allowing the domestic suppliers to charge more for their products. Both actions have a direct impact on the market.

- **Production Incentive Scheme (PLI)**- PLI schemes laid down by the Government of India are financial incentives to boost manufacturing of technology products and attract investments in a particular sector. The government has already rolled out the scheme with an outlay of about Rs 2 lakh crore for as many as 14 sectors, including automobiles and auto components, white goods, pharma, textiles, food products, high-efficiency solar PV modules, advance chemistry cell and specialty steel.

- **Fiscal incentives**- like tax holidays/regulatory concessions/capital grants

- **Investment incentives**- **FDI**; influence the locational decisions of investors and thus to reap the positive effects of foreign direct investment (FDI). Also, investment incentives may refer to grants to locally based companies for investing in advanced technologies or to subsidies to foreign firms investing in the locality.

Government Incentives lead to economic growth of any country

- Countries can adopt technology, increasing technological development and hence overall productivity.
- International trade increases competition in the domestic markets, compelling companies to produce improved products, enhance productivity, and keep prices low.
- Allows sectors/units to utilize economies of scale and increase the potential reward from successful innovation.
- Countries can allocate resources to more profitable industries thereby, increasing productivity employment, and economic growth.

Oil Market

Crude oil price – Monthly Review

Oil markets are struggling for a proper direction as contradictory data points blurry the future situation. Bearish macroeconomic indicators and concerns over demand growth are clashing with resurgent oil use in key consuming countries. Oil prices appear to be taking their cue from the former, with benchmark North Sea Dated trading at $73/bbl, nearly half the high of 2022, despite a looming supply deficit. Crude spot prices fell sharply in May erasing all of the previous month's gains, with the North Sea Dated benchmark dropping the most. On an average, it was nearly 11% lower m-o-m. Selloffs in futures markets, high crude oil supply availability in Northwest Europe, an uncertain demand outlook and mixed refining margins weighed on the value of North Sea Dated.

Crude oil futures prices extended their losses in May experiencing a heavy selloff. Market sentiment weakened due to renewed worries about an economic slowdown and re-emerging U.S. banking sector concerns. Investor sentiment also came under additional pressure after the U.S. Federal Reserve increased its key interest rate again. Selloffs from hedge funds and other money managers cut net long positions thereby fuelling the price decline.

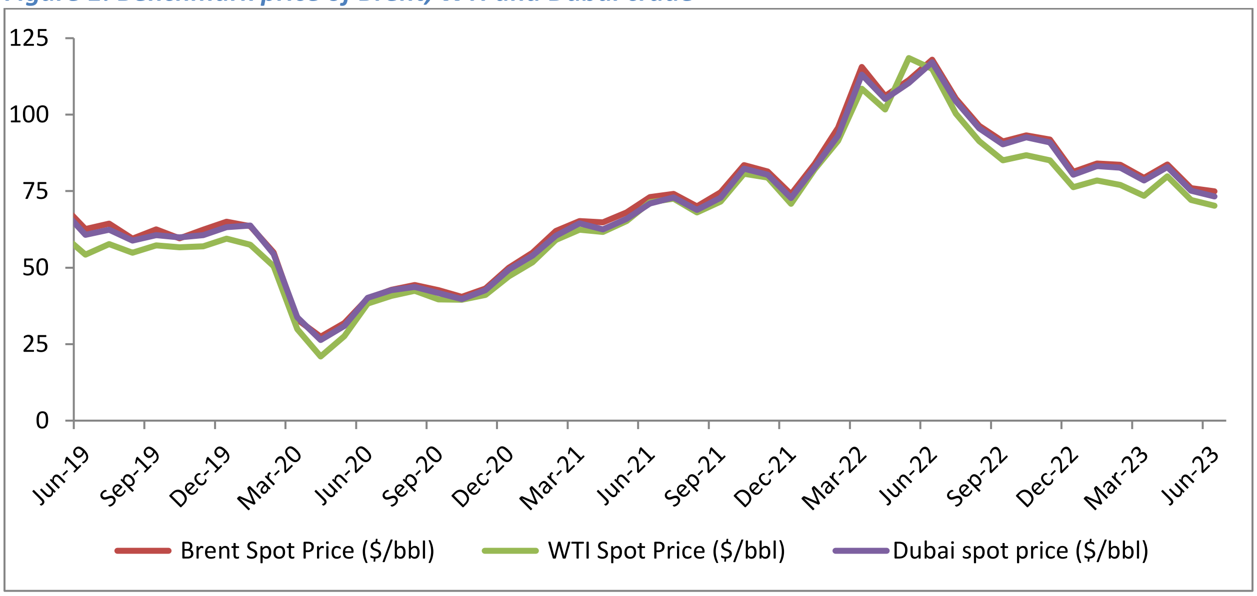
Hedge funds and other money managers heavily cut their bullish positions in May after they were net buyers in the previous month. This fueled price volatility and contributed to a drop in futures prices. Money managers turned bearish on the outlook for crude oil prices and rushed to close long positions that had been built in the previous month, amid weakness in the broader financial market and uncertainty about the U.S. debt ceiling talks, with a deal agreed in early June, and subdued Chinese economic data that weighed on investor sentiment. Over the month, money managers cut their futures and options net long positions by 23,245 lots, between the weeks of 2 and 30 May, or 7.9% of the total net long positions.

The front end of major futures contracts ICE Brent, NYMEX WTI and DME Oman weakened in May compared with April, signaling a deteriorating economic and oil demand outlook.

The OPEC Reference Basket (ORB) value declined in May, dropping by $8.31/b, or 9.9%, to stand at $75.82/bbl. All ORB component values declined alongside their respective crude oil benchmarks, which largely offset a rise in most official selling prices in all regions.

Brent crude ranged an average to $75.10 a barrel and WTI ranged to $70.52 per barrel in the month of June.

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



Source: World Bank

- Brent crude price averaged $74.90 per bbl in June 2023, down by 1.5% on a month on month (MoM) and 36.5% on year on year (YoY) basis, respectively.
- WTI crude price averaged $70.28 per bbl in June 2023, down by 2.5% on a month on month (MoM) and 38.9% on year on year (YoY) basis, respectively.
- Dubai crude price averaged $73.28 per bbl in June 2023, down by 2.5% on a month on month (MoM) and 37.4% on year on year (YoY) basis, respectively.

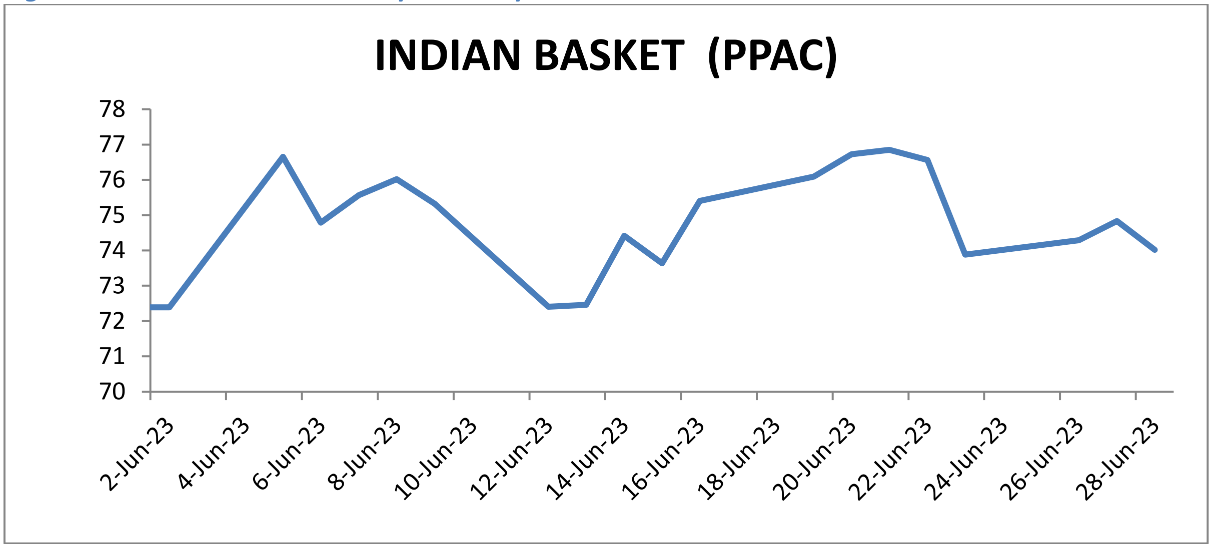
Table 1: Crude oil price in June, 2023

Crude oil	Price ($/bbl)	MoM (%) change	YoY (%) change
Brent	74.90	-1.5%	-36.5%
WTI	70.28	-2.5%	-38.9%
Dubai	73.28	-2.5%	-37.4%

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 $74.80 per barrel in June 2023, down by 0.5% on Month on Month (M-o-M) and 35.5% on a year on year (Y-o-Y) basis, respectively.

Oil production situation

- Non-OPEC+ leads world supply growth through next year, adding 1.9 mb/d in 2023 and 1.2 mb/d in 2024. As for OPEC+, total oil output in 2024 is set to decline by 200 kb/d as production curbs are carried through the year. Total oil supply is anticipated to reach high levels of 101.3 mb/d this year and 102.3 mb/d next year. In May, world oil supply fell by 660 kb/d to 100.6 mb/d after extra cuts from some OPEC+ producers kicked-in. Also, Saudi Arabia has promised to curb output by a further 1 mb/d in July.
- In May, Russian oil exports dropped by 260 kb/d to 7.8 mb/d, largely remain unchanged from a year ago. Crude oil exports rose by 90 kb/d to 5.2 mb/d while product exports slumped by 350 kb/d to 2.6 mb/d. Developing economies such as China and India accounted for at least 56% of total Russian exports, while shipments to Africa, the Middle East and Latin America made up another 12%. Estimated export revenues fell by $1.4 bn to $13.3 bn, down 36% on a year ago, with average crude prices easing from $60/bbl in April to $55/bbl in May.

Table 2: Non-OPEC liquids production in 2023, mb/d

Non-OPEC liquids production	2022	1Q23	2Q23	3Q23	4Q23	2023
Americas	26.84	27.87	27.90	28.21	28.44	28.11
of which US	*19.21*	*20.07*	*20.18*	*20.34*	*20.47*	*20.26*
Europe	3.57	3.66	3.69	3.80	3.94	3.77
Asia Pacific	0.48	0.46	0.48	0.49	0.48	0.48
Total OECD	**30.89**	**32.00**	**32.06**	**32.50**	**32.85**	**32.36**
China	4.48	4.63	4.59	4.50	4.50	4.56
India	0.77	0.76	0.78	0.78	0.78	0.78
Other Asia	2.31	2.33	2.35	2.34	2.37	2.35
Latin America	6.34	6.70	6.67	6.70	6.79	6.72
Middle East	3.29	3.27	3.29	3.30	3.30	3.29
Africa	1.30	1.26	1.32	1.32	1.31	1.31
Russia	11.03	11.23	10.38	9.76	9.78	10.28
Other Eurasia	2.83	2.99	2.98	2.94	2.98	2.97
Other Europe	0.11	0.10	0.10	0.10	0.10	0.10
Total Non-OECD	**32.45**	**33.28**	**32.46**	**31.75**	**31.92**	**32.35**
Total Non-OPEC production	63.34	65.28	64.52	64.26	64.77	64.70
Processing gains	2.40	2.47	2.47	2.47	2.47	2.47
Total Non-OPEC liquids production	**65.74**	**67.75**	**66.99**	**66.73**	**67.24**	**67.17**
Previous estimate	**65.76**	**67.62**	**66.90**	**66.82**	**67.44**	**67.19**
Revision	-0.02	0.12	0.10	-0.10	-0.20	-0.02

Source: OPEC

- From the above table, it can be inferred, that the total non-OPEC liquids production is expected to reach 67.17 mb/d by 2023.
- OPEC NGLs and non-conventional liquids production in 2022 is forecast to have grown by 0.1 mb/d to average 5.4 mb/d, and is expected to increase by 50 tb/d to average 5.4 mb/d in 2023.
- OPEC-13 crude oil production averaged 28.06 mb/d in May 2023, lower by 464 tb/d m-o-m.

Oil demand situation

- World oil demand will grow by 2.4 mb/d in 2023 to 102.3 mb/d. China's rebound continues unabated, with its oil demand reaching an all-time high of 16.3 mb/d in April. The non-OECD accounts for 90% of gains this year, as OECD demand remains lacklustre amid the current manufacturing slump. An increasingly adverse macroeconomic climate to act as a headwind in 2024, and as the post-pandemic recovery will largely have run its course, oil demand growth is set to slow to 860 kb/d.
- Global oil demand continues to defy the challenging macroeconomic climate and is set to rise by 2.4 mb/d in 2023, outpacing last year's 2.3 mb/d increase as well as earlier expectations. China accounts for 60% of the gains, with soaring transport and petrochemical use propelling apparent demand in

April to an all-time high of 16.3 mb/d. Indian demand is equally robust with the latest readings for May showing both gasoline and diesel reaching heights.

Table 3: World Oil demand, mb/d

	2022	1Q23	2Q23	3Q23	4Q23	2023	Growth	%
Total OECD	**45.95**	**45.44**	**45.52**	**46.87**	**46.15**	**46.00**	**0.05**	**0.10**
~ of which US	*20.43*	*20.16*	*20.43*	*20.75*	*20.37*	*20.43*	*0.00*	*-0.01*
Total Non-OECD	**53.62**	**56.12**	**55.29**	**55.16**	**57.10**	**55.92**	**2.30**	**4.29**
~ of which India#	*5.14*	*5.40*	*5.41*	*5.21*	*5.50*	*5.38*	*0.24*	*4.75*
~ of which China	14.85	15.63	15.56	15.43	16.16	15.70	0.84	5.69
Total world	**99.57**	**101.55**	**100.80**	**102.03**	**103.25**	**101.91**	**2.35**	**2.36**

Source: OPEC monthly report, June 2023

Note: 2023 = Forecast. Totals may not add up due to independent rounding*

Global petroleum product prices

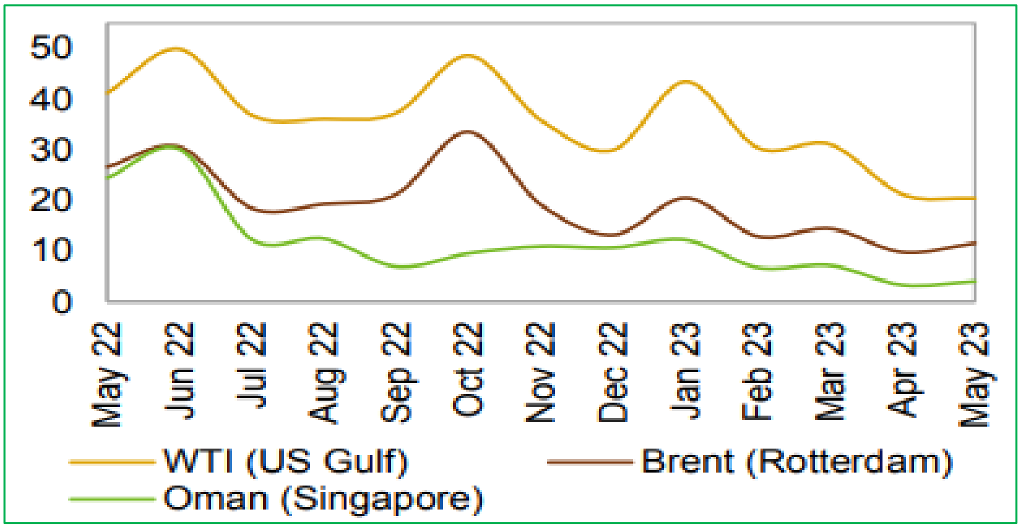
USGC refining margins against WTI eased to reach their lowest level this year. This reflects the expansion of U.S. transport fuel balances as refineries continue to ramp up processing rates following the recent heavy maintenance season. The weakness derived from the middle and top sections of the barrel, but was much more pronounced on the gasoline side. An upward trend in USGC total gasoline inventories up to mid-May exerted pressure on USGC gasoline crack spreads. Although on a wider spectrum gasoline inventory declined slightly nationwide, and markets for the fuel remain bullish given the onset of the summer season.

In terms of operations, U.S. refinery intake continued to increase and gained 240 tb/d m-o-m to an average of 16.61 mb/d in May. USGC margins against WTI averaged $20.46/b, down by 74 cents m-o-m and $20.77 y-o-y.

Refinery margins in Rotterdam against Brent strengthened, outperforming those seen in the USGC and Singapore, as lower feedstock prices, and strong gasoline exports to the U.S. backed European product markets. In addition, significant high sulphur fuel oil stock draws led to three consecutive weeks of inventory declines in Amsterdam-Rotterdam-Antwerp as a result of strong exports to Asia. Tightening HSFO availability in NWE provided support to the products markets and enabled fuel oil crack spreads to post solid m-o-m gains, contributing to the positive product market performance in NWE. Ongoing maintenance in Germany and Russia over May, likely kept European refinery processing rates capped, but this is expected to subside going forward, unlocking some upside potential for European refinery throughputs in the near term.

Refinery throughput in Europe continued to rise in May. According to preliminary data, it was 200 tb/d higher at an average of 9.84 mb/d. Refinery margins against Brent in Europe averaged $11.55/b in May, $1.80 higher compared with a month earlier, but $15.05 lower y-o-y.

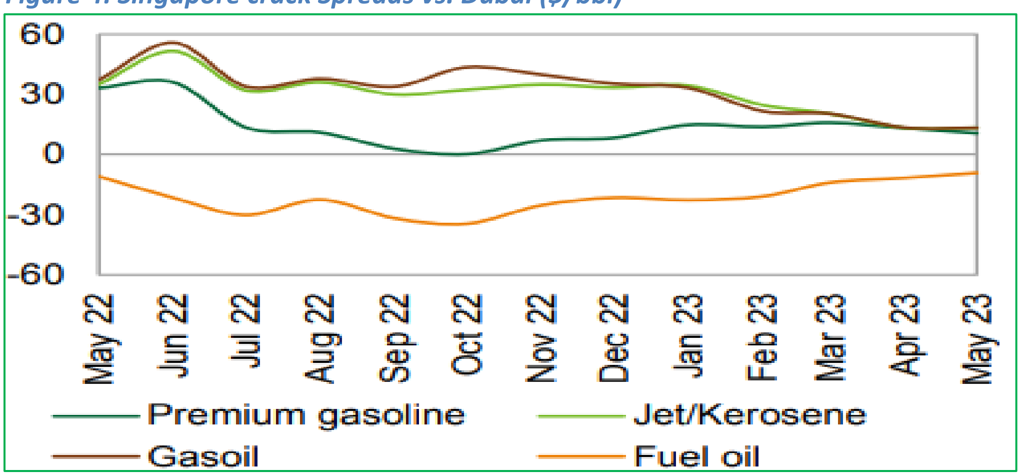
Figure 3: Refining Margins ($/bbl)



Source: Argus and OPEC

The Asian gasoline 92 crack weakened and was the strongest negative performer compared to all other key products reflecting the strong production levels within the region. Despite the region's ongoing refinery maintenance season, offline capacities have remained very low, indicating stability in regional product output levels. The Singapore gasoline crack spread against Dubai in May averaged $10.56/b. This was down $2.56 m-o-m and $22.60 y-o-y.

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



Source: Argus and OPEC

The Singapore gasoil crack spread lost some ground, and was the second largest source of weakness in the Asian product market, following gasoline. Pressures from strong volume arrivals from the Middle East amid declining import requirements from Europe, with global inventories showing signs of recovery, affected the regional gasoil market. The Singapore gasoil crack spread against Oman averaged $13.38/b, down 13 cents m-o-m and $23.87 y-o-y.

Table 4: Singapore FOB, refined product prices ($/bbl) in May 2023

Singapore product prices	Price ($/b)	MoM (%) change	YoY (%) change
Naphtha	62.25	-13.0%	-35.0%
Premium gasoline (unleaded 95)	90.29	-9.8%	-38.5%
Regular gasoline (unleaded 92)	85.69	-11.2%	-39.2%
Jet/Kerosene	88.59	-8.5%	-38.0%
Gasoil/Diesel (50 ppm)	88.75	-9.7%	-42.0%
Fuel oil (180 cst 2.0% S)	86.37	-7.0%	-40.0%
Fuel oil (380 cst 3.5% S)	65.98	-8.0%	-31.9%

Source: OPEC

Petroleum products consumption in India

Monthly Review:

- Overall consumption of all petroleum products in May 2023 with a volume of 20.02 MMT registered a growth of 9.64% on volume of 18.27 MMT in May 2022.
- MS (Petrol) consumption during the month of May 2023 with a volume of 3.35 MMT recorded a growth of 10.98% on volume of 3.02 MMT in May 2022.
- HSD (Diesel) consumption during the month of May 2023 with a volume of 8.22 MMT recorded a growth of 12.79% on volume of 7.23 MMT in the month of May 2022.
- LPG consumption during the month of May 2023 with a volume of 2.35 MMT registered growth of 8.41% over the volume of 2.17 MMT in the month of May 2022.
- ATF consumption during May 2023 with a volume of 0.670 MMT registered a growth of 11.99% over the volume of 0.598 MMT in May 2022.
- Bitumen consumption during May 2023 with a volume of 0.732 MMT registered growth of 4.17% over volume of 0.703 MMT in the month of May 2022.
- Kerosene consumption registered de-growth of 38% during the month of May 2023 as compared to May 2022.

Table 5: Petroleum products consumption in India, May 2023

CONSUMPTION OF PETROLEUM PRODUCTS (P)	Consumption in '000 MT	MoM (%) change	YoY (%) change
LPG	2,347	9.0%	8.4%
Naphtha	1,145	6.1%	26.1%
MS	3,348	16.4%	11.0%
ATF	670	2.1%	12.0%
SKO	42	40.0%	-38.0%
HSD	8,217	5.0%	12.8%
LDO	69	13.1%	27.3%
Lubricants & Greases	296	5.7%	-15.8%
FO & LSHS	574	-2.5%	7.2%
Bitumen	732	-2.5%	4.2%
Petroleum coke	1,435	-0.7%	16.2%
Others	1,154	44.3%	-14.4%
TOTAL	**20,029**	**8.0%**	**9.6%**

Source: PPAC

Natural Gas Market

Natural Gas Price – Monthly Review

- Natural gas spot prices at the U.S. Henry Hub benchmark averaged $2.15 per million British thermal units (MMBtu) in May 2023. U.S. benchmark Henry Hub spot prices are expected to rise in the summer months due to rising natural gas use in the electric power sector and flattening production growth, which together contribute to storage injections that are less than the five-year average (2018-2022) in the coming months. The flat production reflects reduced natural gas-directed drilling in response to the drop in natural gas prices being offset by increasing associated natural gas production in the Permian Basin.

- The natural gas spot price at the Title Transfer Facility (TTF) in the Netherlands in Europe traded at an average of $10.11 per MMBtu. Natural gas prices have fallen to the lowest due to rising stockpiles and lower demand. According to Gas Infrastructure Europe, gas reserves in Europe are about ~70% full, which is significantly higher than the five-year average. Another factor that has resulted in lowering down of gas demand is unusual warm winter that decreases the electricity demand in the region.

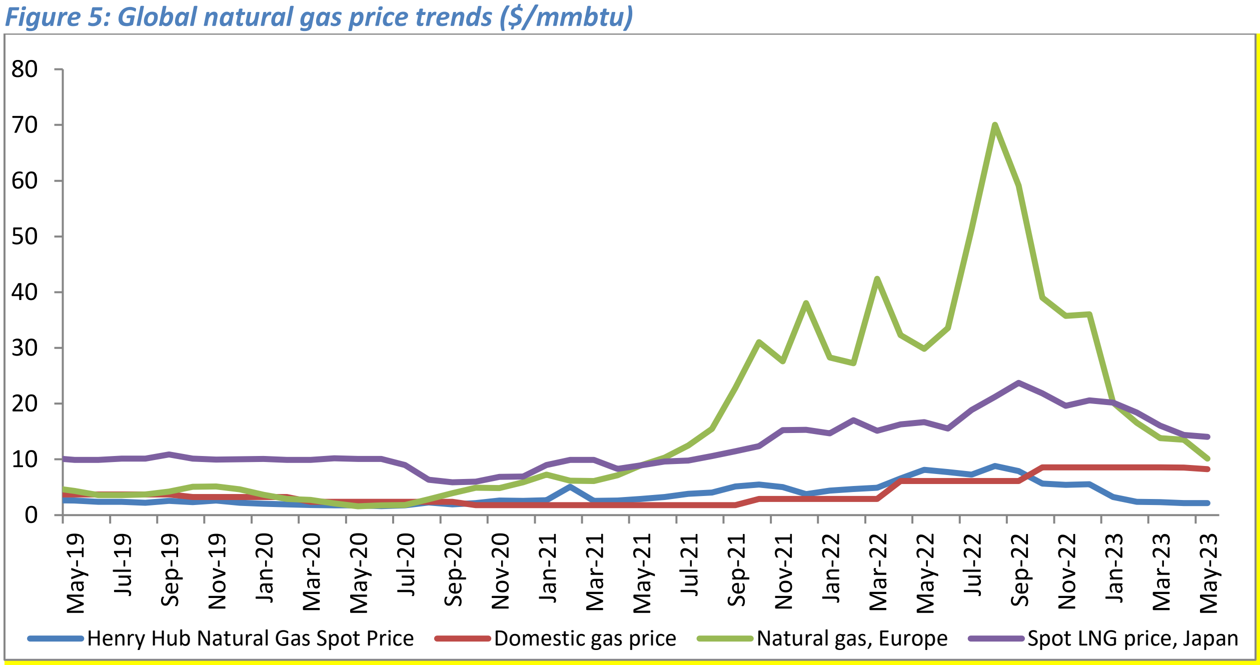
- Japan Liquefied Natural Gas Import Price averaged at $14.04 per MMBtu for May 2023, down from $14.37 per MMBtu in April 2023. Japan's LNG imports fell to the lowest in more than 20 years as efforts to save energy and boost nuclear power, thereby reducing the need for the fossil fuel. Deliveries declined to ~4 million tons in May, about a 30% drop on the same month a year ago and the least since 2002, according to ship-tracking and government data.

- The Union Cabinet has approved a new formula for pricing of natural gas and imposed cap or ceiling price on the same. Natural gas produced from legacy or old fields, known as APM gas, will now be indexed to crude oil prices. From April 1 2023, APM gas will be priced at 10 per cent of the price of basket of crude oil that India imports. The rate such arrived at however will be capped at USD 6.5 per MMBTU. The price such arrived at will also have a floor of USD 4 per MMBTU.

- Further, in accordance with MoP&NG, Govt. of India, pricing freedom for gas being produced from discoveries in Deepwater, Ultra Deepwater and High Pressure-High Temperature areas, the gas price ceiling for the period 1st April, 2023 - 30th September, 2023 was notified as US$ 12.12/MMBTU on Gross Calorific Value (GCV) basis as per notification dated 31st March, 2023. However, on 7th April, 2023, the price of domestic natural gas for the period 1st April 2023 to 7th April 2023 was notified as US$ 9.16/MMBTU on GCV basis. Further, the price of domestic natural gas for the period 8th April 2023 to 30th April 2023 was notified as US$ 7.92/MMBTU.

- On 30th April 2023, in accordance with MoP&NG 's notification, the price of domestic natural gas for the period 1st May 2023 to 31st May 2023 was notified as US$ 8.27/MMBTU on GCV basis. Subsequently, on 31st May 2023, in accordance with MoP&NG 's notification, the price of domestic natural gas for the period 1st June 2023 to 30th June 2023 was notified as US$ 7.58/MMBTU on GCV basis.

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



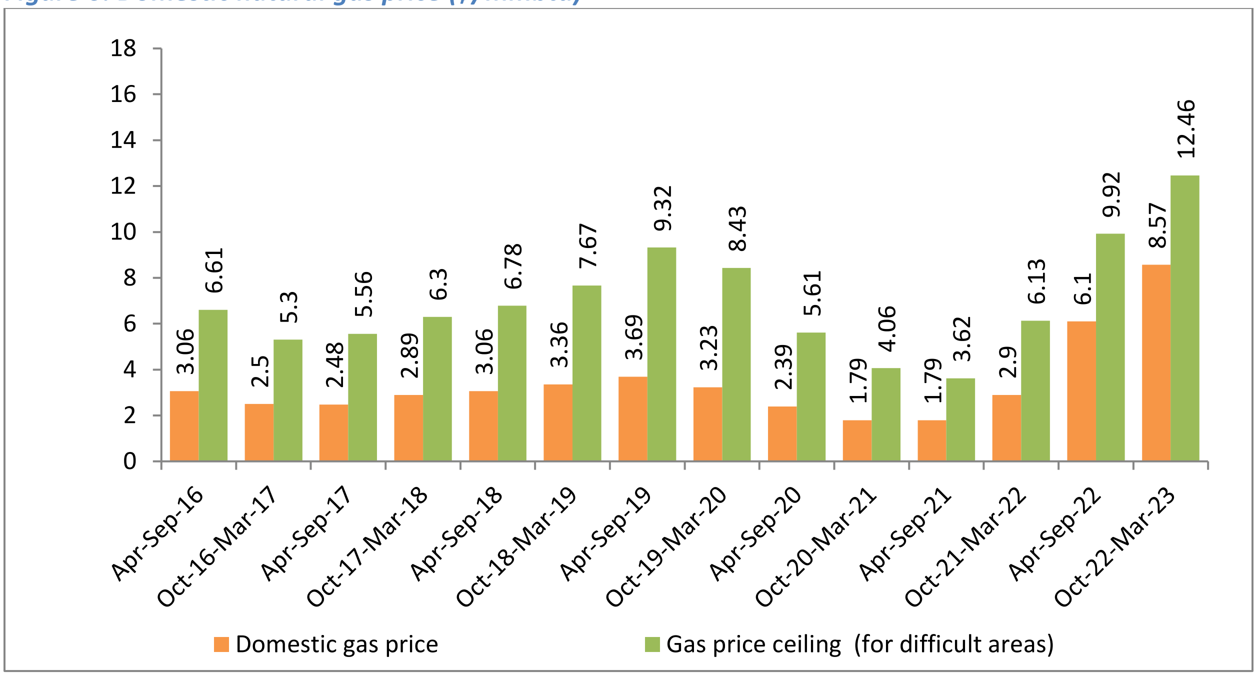
Source: EIA, World Bank

Table 6: Gas price, May 2023

Natural Gas	Price ($/MMBTU)	MoM (%) change	YoY (%) change
India, Domestic gas price (May'23)	8.27	-3.2%	35.6%
India, Gas price ceiling – difficult areas (Apr-Sep-23)	12.12	-2.7%	22.2%
Henry Hub	2.15	-0.5%	-73.6%
Natural Gas, Europe	10.11	-25.2%	-66.1%
Liquefied Natural Gas, Japan	14.04	-2.3%	-15.8%

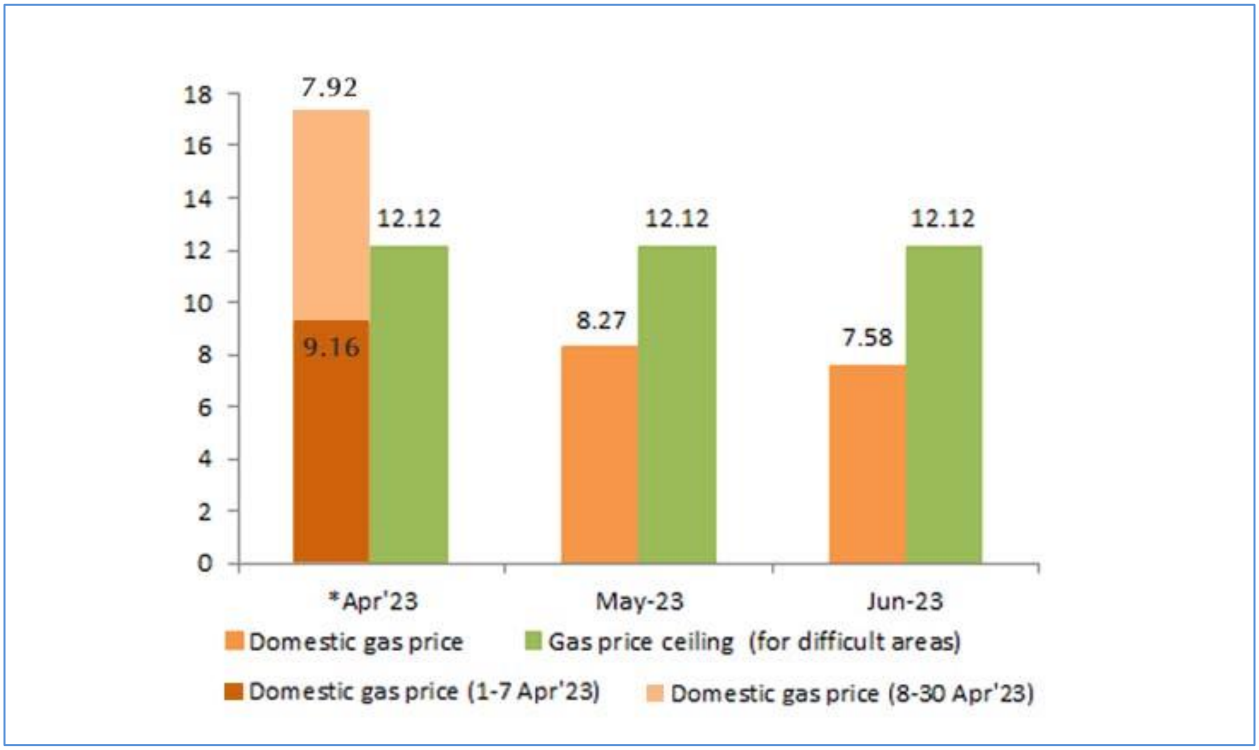
Source: EIA, PPAC, World Bank

Figure 6: Domestic natural gas price ($/mmbtu)



Source: PPAC

Figure 7: Domestic natural gas price April – June 2023 ($/mmbtu)



Source: PPAC

Indian Gas Market

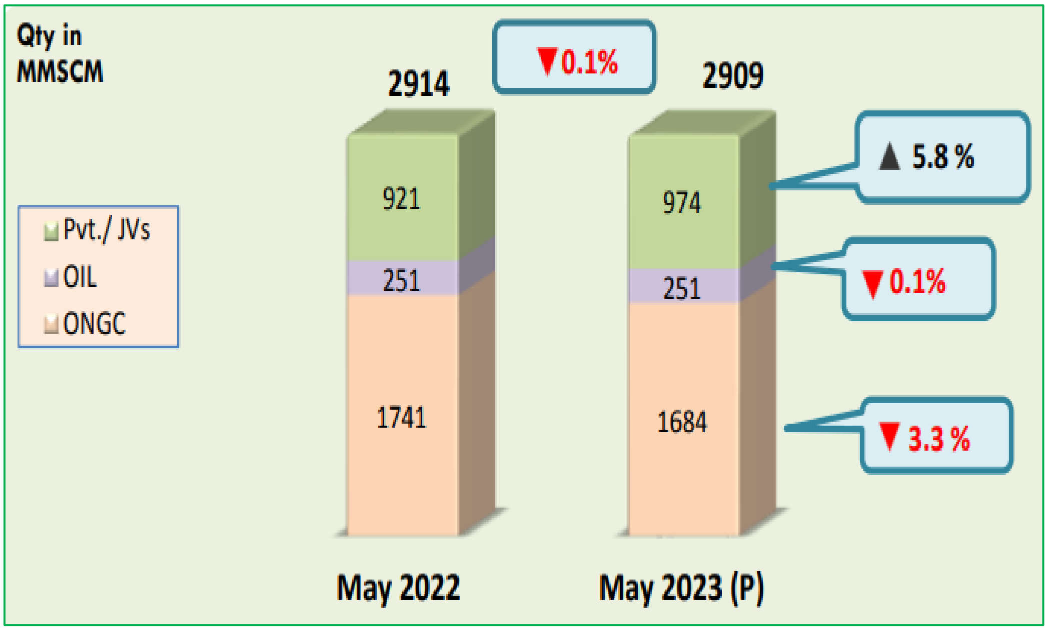
- Gross production of natural gas for the month of May 2023 was 2,909 MMSCM (decrease of 0.1% over the corresponding month of the previous year).
- Total imports of LNG (provisional) during the month of May 2023 were 2,228 MMSCM (P) (decrease of 24.1% over the corresponding month of the previous year).
- Natural gas available for sale during May 2023 was 4,600 MMSCM (decrease of 13.1% over the corresponding month of the previous year).
- Total consumption during May 2023 was 5,468 MMSCM (provisional). Major consumers were fertilizer (33%), City Gas Distribution (CGD) (20%), Power (14%), Refinery (9%) and Petrochemicals (5%).

Monthly Report on Natural gas production, imports and consumption – May 2023

1. Domestic Natural Gas Gross Production:

Domestic natural gas gross production for the month of May 2023 was 2,909 MMSCM (decrease of 0.1% over the corresponding month of the previous year).

Figure 8: Domestic natural gas Gross production (Qty in MMSCM)

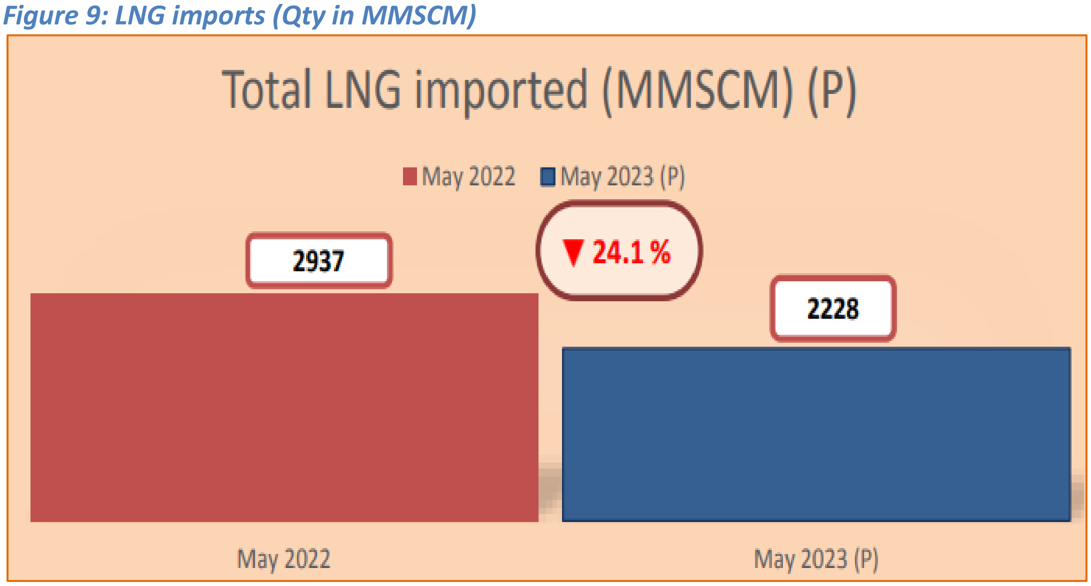


Source: PPAC

2. LNG imports:

Total imports of LNG (provisional) during the month of May 2023 were 2,228 MMSCM (decrease of24.1%) over the corresponding month of the previous year 2,937 MMSCM.

Figure 9: LNG imports (Qty in MMSCM)

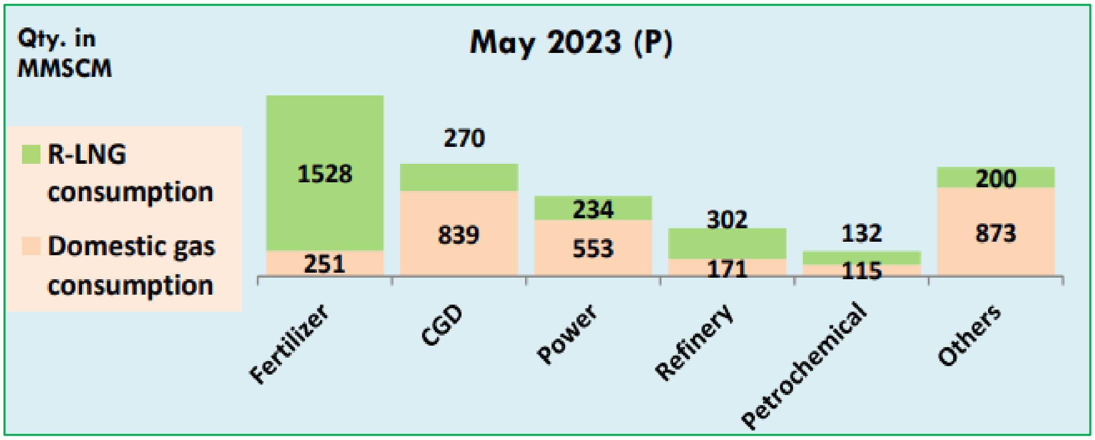


Source: PPAC

3. Sectoral Consumption of Natural Gas:

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

Figure 10: Sectoral Consumption of Natural Gas (Qty in MMSCM) in May 2023



Source: PPAC

Key developments in Oil & Gas sector

- **Monthly Production Report for May, 2023**

1. Production of Crude Oil

Indigenous crude oil and condensate production during May 2023 was 2.50 MMT. OIL registered a production of 0.28 MMT, ONGC registered a production of 1.66 MMT whereas PSC registered production of 0.57 MMT during May 2023.

2. Production of Natural Gas

Gross production of natural gas for the month of May 2023 (P) was 2909 MMSCM which was lower by 0.1% compared with the corresponding month of the previous year.

3. Crude Oil Processed (Crude Throughput)

Total Crude oil processed during May 2023 was 22.7 MMT which is 0.4% higher than May 2022. Where PSU/JV Refiners processed 15.3 MMT and PVT Refiners Processed 7.4 MMT of Crude Oil. Total Indigenous Crude Oil processed was 2.2 MMT and total Imported Crude oil processed was 20.5 by all Indian Refineries (PSU+JV+PVT).

4. Production of Petroleum Products

Production of petroleum products was 23.9 MMT during May 2023 which is 2.8% higher than May 2022, where 23.6 MMT was from Refinery production & 0.3 MMT was from Fractionator. There was 0.7 % growth in Production of petroleum products in Apr May FY 2023 – 24 as compared to same period of FY 2022 – 23. Out of total POL production, in May 2023, HSD has 42.2% share, MS 16.0%, Naphtha 6.8%, ATF 6.0%, Pet Coke 5.8% and LPG 4.8% which are of major products and rest are shared by Bitumen, FO/LSHS, LDO, Lubes & others.

Key Policy developments in Energy sector

Windfall tax on petroleum crude, ATF, diesel retained at zero

Government has decided to continue with nil windfall tax for the month of June 2023. The Government continues with May 16 windfall tax rates. The May 16 windfall tax notification had reduced the special additional excise duty on petroleum crude to nil from ₹4,100/tonne.

India first imposed windfall profit taxes on July 1, joining a growing number of nations that tax super normal profits of energy companies. At that time, export duties of ₹6 per litre ($12 per barrel) each were levied on petrol and ATF and ₹13 a litre ($26 a barrel) on diesel. A ₹23,250 per tonne ($40 per barrel) windfall profit tax on domestic crude production was also levied. The export tax on petrol has since been scrapped. The tax rates are reviewed every fortnight based on average oil prices in the country.

HPCL Undertakes Successful Pilot Study on E27 Fuel and Ethanol Blended Diesel Fuel

Hindustan Petroleum Corporation Limited (HPCL) has successful launched groundbreaking pilot study on vehicles using E27 fuel and Ethanol Blended Diesel Fuel. Under the aegis of MoP&NG, HPCL has become the first Oil Marketing Company in India to initiate such a comprehensive research program, in line with the "Roadmap for Ethanol Blending in India by 2025," which aims to promote the adoption of Ethanol Blending in gasoline.

The roadmap, designed to usher in a greener and more sustainable future, outlines a phased rollout plan for achieving 20% Ethanol Blended Gasoline (E20) by April 2023 and ensuring its widespread availability by April 2025. It further emphasizes the introduction of E20 material-compliant and E10 engine-tuned vehicles starting from April 2023, followed by the production of E20-tuned engine vehicles from April 2025.

Dedicated efforts are underway at HPCL state-of-the-art R&D Centre in Devanagunthi, Bengaluru for conducting comprehensive research on biofuels. The center's proficient team is evaluating the effects and performance of different blends of ethanol-gasoline, ranging from 10% to 27%, as well as various blends of ethanol-diesel, on different categories of test vehicles at the Engine Research laboratory.

The pilot study of E27 fuel will focus on assessing its performance and emissions in engines and vehicles through extended mileage accumulation. Mileage accumulation of up to 10,000 km for two-wheelers and 20,000 km for passenger cars using E27 fuel is planned for this phase. Ethanol trials, in accordance with IS 1460:2017 fuel specifications, will also be conducted in conjunction with biodiesel-diesel.

HPCL successfully launched E20 fuel on February 6th, 2023, at 23 retail outlets (ROs) across the country. The current number of E20 ROs is 350, spread across 21 states in the country. The company has already reduced approximately 3000 MT of greenhouse gas (GHG) emissions to date. It is projected that by 2025, the use of E20 fuel will contribute to the reduction of more than 200 lakh MT of GHG emissions.

NTPC Green Energy Ltd. (NGEL) and Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL) to collaborate for development of Renewable Energy Power Parks and Projects

NTPC Green Energy Limited (NGEL) and Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL) signed a Memorandum of Understanding (MoU) with an aim to collaborate in the development of Renewable Energy Parks and Projects and to facilitate in Government of India's efforts towards energy transition.

The MoU envisages the two organizations to collaborate through setting up of floating and ground mounted Solar Projects in the Rihand reservoir, other water bodies and any available vacant land, development of solar PV Project dedicated for solarization of Ayodhya city and setting up of Renewable energy Parks and Projects wherever land is made available. NGEL and UPRVUNL shall jointly work for formation of Joint Venture Company (JVC) to meet the Renewable Generation Obligation, Flexibility in Generation and Scheduling of Thermal/Hydro Power Stations through bundling with Renewable Energy and Energy Storage.

NHPC and VUCL, Nepal sign MoU for development of Phukot Karnali Hydro Electric Project (480MW) in Nepal

NHPC Limited and Vidhyut Utpadan Company Limited (VUCL), Nepal signed a Memorandum of Understanding (MoU) in for development of Phukot Karnali Hydro Electric Project (480MW) in Nepal. The MoU was signed in the presence of Prime Minister of India Shri Narendra Modi and Prime Minister of Nepal Shri Pushpa Kamal Dahal 'Prachanda' at Hyderabad House in New Delhi.

Signing of this MOU is a landmark step towards India-Nepal Joint Vision on Power Sector Cooperation.

The project will use the flow from the Karnali River for power generation and the generated power will be fed into integrated power system of Nepal. The installed capacity of the project shall be 480 MW with average annual generation of about 2448 GWh. The key features of the project are a 109-metre high RCC dam and an underground power house where the 06 turbines of 79 MW each shall be housed. Additionally, to utilize minimum environmental release one Surface Power House of 6 MW capacity i.e., two machines of 3 MW each is also planned. This project is conceived as a Peaking Run-of-River (PRoR) type scheme.

Mission on Advanced and High-Impact Research (MAHIR) launched to leverage Emerging Technologies in Power Sector

The Ministry of Power and the Ministry of New and Renewable Energy jointly launched a National Mission to quickly identify emerging technologies in the power sector and develop them indigenously, at scale, for deployment within and outside India. The National Mission, titled “Mission on Advanced and High-Impact Research (MAHIR)” aims to facilitate indigenous research, development and demonstration of the latest and emerging technologies in the power sector. By identifying emerging technologies and taking them to the implementation stage, the Mission seeks to leverage them as the main fuel for future economic growth and thus make India a manufacturing hub of the world.

The Mission will be funded by pooling financial resources of the Ministry of Power, Ministry of New and Renewable Energy and the Central Public Sector Enterprises under the two Ministries. Any additional funding needed will be mobilized from Government of India's budgetary resources.

Mission will serve as a catalyst for national priorities such as achieving Net Zero emissions and promoting initiatives like Make in India and Start-up India. He said that it will also contribute towards achieving the United Nation’s Sustainable Development Goals (SDGs). The Minister added: “In last nine years, the Indian Power Sector has transformed into a vibrant and a financially viable sector. Given that India is going to grow at more than 7% in coming years, the electricity demand is going to increase at close to 10%. In addition, India is aiming for energy transition following Prime Minister’s vision of LiFE. This requires not only massive investment but also a transformational approach driven by research & innovation.”

Mission Objectives

The key objectives of the Mission are as follows:

- To identify emerging technologies and areas of future relevance for the Global Power Sector and take up indigenous end-to-end development of relevant technologies
- To provide a common platform for Power Sector Stakeholders for collective brainstorming, synergetic technology development and devise pathways for smooth transfer of technology
- To support pilot projects of indigenous technologies (developed especially by Indian Start-ups) and facilitate their commercialization
- To leverage foreign alliances and partnerships to accelerate research & development of advanced technologies and to build competencies, capabilities and access to advanced technologies through bilateral or multilateral collaborations, thereby facilitating exchange of knowhow and Technology Transfer.
- To seed, nurture and scale up scientific and industrial R&D and to create vibrant & innovative ecosystem in the Power Sector of the country
- To make our Nation among the leading Countries in Power System related Technologies & Applications development

Areas Identified for Research

The following eight areas are identified for research:

I. Alternatives to Lithium-Ion storage batteries
II. Modifying electric cookers / pans to suit Indian cooking methods
III. Green hydrogen for mobility (High Efficiency Fuel Cell)
IV. Carbon capture
V. Geo-thermal energy
VI. Solid state refrigeration.
VII. Nano technology for EV battery
VIII. Indigenous CRGO technology

NHPC inks Memorandum of Understanding (MoU) with Department of Energy, Govt. of Maharashtra for Pumped Storage Schemes and Other Renewable Energy Source Projects

A Memorandum of Understanding was signed between NHPC Limited and Department of Energy, Government of Maharashtra for the development of Pumped Storage schemes and other Renewable Energy Source projects in the state of Maharashtra.

The MoU envisages development of four Pumped Storage Projects aggregating to a total capacity of 7,350 MW, namely Kalu – 1,150 MW, Savitri – 2,250 MW, Jalond – 2,400 MW and Kengadi -1,550 MW. Other Renewable Energy Source Projects too will be developed in the state under the agreement.

The MoU entails harnessing the Pump Storage Projects as Energy Storage Solutions to help achieve the national objective of Energy Transition, i.e., installed capacity of 500 GW of renewable energy by 2030 and Net Zero by 2070.

Pumped Storage System utilizes surplus grid power available from thermal power stations or other sources to pump up water from lower to upper reservoir and reproduces power during peak demand when there is scarcity of power.

NHPC signed Memorandum of Understanding (MoU) with GRIDCO Odisha, for developing 2 GW Pumped Storage Projects and 1 GW Solar Energy Projects in Odisha

NHPC Limited, the largest hydropower development organization in India, has signed a Memorandum of Understanding with GRIDCO Odisha, Government of Odisha, for "Development of Pumped Storage Projects (PSPs) and Renewable Energy in the State of Odisha". The MoU envisages setting up Self-identified Pumped Storage Projects of at least 2,000 MW and Renewable Energy Projects (Ground-Mounted Solar Projects / Floating Solar Projects) of at least 1,000 MW in the state.

Ministry of Power Revises Biomass Co-Firing Policy for enabling purchase of biomass pellets by Power Plants at benchmark price

Ministry of Power (MoP) has decided to benchmark the prices of biomass pellets used for co-firing in Thermal Power Plants (TPPs). The decision comes in view of evolving market conditions for biomass pellets and requests received from stakeholders including thermal power plants, pellet manufactures, farmers, bankers etc.

The benchmarked price shall take into account the business viability, impact on electricity tariff and efficient & faster pellet procurement by power utilities. Price Benchmarking of pellets will enable the TPPs as well as Pellet Vendors to establish a sustainable supply mechanism for co-firing of pellets. The benchmarked price, as finalised by the committee under CEA, will be effective from 1st January, 2024.

Shri R.K. Singh, Union Power Minister said that co-firing of biomass in coal-based power plants is a key policy of the Government towards energy security, reduced use of fossil fuels and at the same time to increase income of farmers. Revised policy shall help in achieving these goals faster.

Explaining the decision, Shri Alok Kumar, Secretary, Power said that the decision would encourage farmers, entrepreneurs as well as thermal power utilities to strive to establish a sustainable biomass ecosystem, achieve the targets for co-firing, reduce stubble burning and help to ensure a cleaner and greener future for the citizens of India.

Central Government issues Guidelines for Resource Adequacy Planning Framework for Power Sector: DISCOMs to have statutory obligation to ensure procurement of sufficient capacity to meet demand in their area

The Central Government has issued Guidelines for Resource Adequacy Planning Framework for India, in consultation with Central Electricity Authority (CEA). The Guidelines, issued by the Union Ministry of Power, have been framed under the Rule 16 of Electricity (Amendment) Rules, 2022 which were notified on 29th December, 2022.

The guidelines will ensure that sufficient electricity is made available to power the country's growth, by putting in place a framework for advance procurement of resources by DISCOMs to meet the electricity demand in a cost-effective manner. Guidelines provide for an institutional mechanism for Resource Adequacy ranging from National level to Discom level such that the availability of resources to meet the demand is ensured at each level. The new generation capacities, energy storage and other flexible resources, needed to reliably meet future demand growth at optimal cost, will be assessed well in advance.

The guidelines also suggest share of at least 75 % of long-term contracts in total capacity required by Discoms as per long-term National Resource Adequacy Plan (LT-NRAP) or as specified by respective SERC. The medium–term contracts are suggested to be in range of 10-20%, while the rest of the power demand can be met through short-term contracts. The National Load Dispatch Centre (NLDC) will also carry out bids to procure any shortfall in the capacity required to meet the Short term Distribution Resource Adequacy Plans (ST-DRAP), after aggregating the individual plans of DISCOMs.

The guidelines also provide for the number of years before which the procurement process by DISCOMs must be completed for each type of generation, so that the procured capacity becomes available when it is required to serve the projected load.

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