

MANAGEMENT'S DISCUSSION & ANALYSIS



A Year of Steadfast Resilience

The year 2021-2022 offered clear reminders that our world is more connected than ever and how events occurring elsewhere in the world could significantly affect other countries and people. It was a year full of monumental events with global repercussions, including extreme weather events, the ongoing pandemic and geopolitical upheavals. Navigating the year required fortitude, resilience, and unwavering dedication; all of which, thankfully, were amply displayed by humanity.

The Economic Backdrop

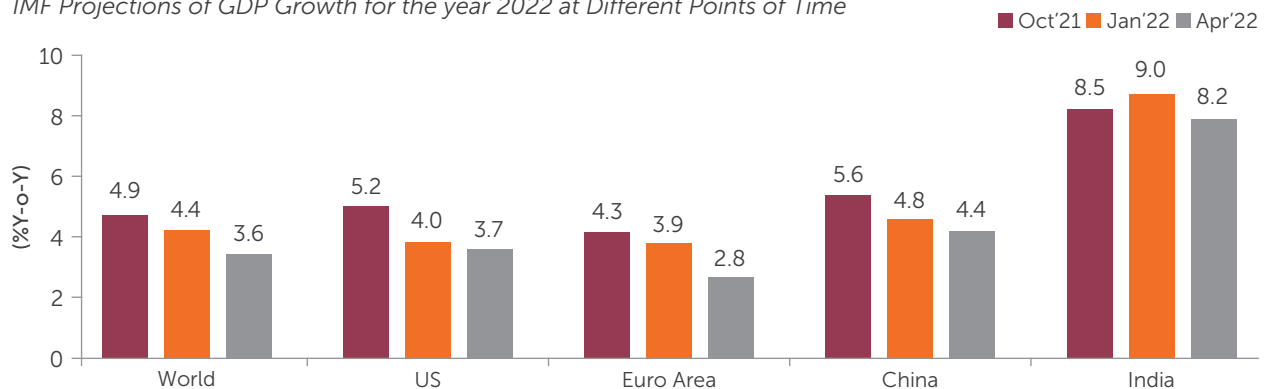
Global Economy

During the year 2021, the global economy recovered, posting 6.1% Y-o-Y growth, after having contracted by 3.2% in 2020. Large-scale vaccination and a more nuanced

approach toward restrictions, mitigated the trade-off between economic growth and Covid-19 prevention, despite the onslaught of the Delta wave in the early part of 2021 and the highly contagious Omicron wave in the later part. There has been a perceptible fall in Covid-19 stringency indices across most parts of the world, including lifting of the mask mandate, with most governments having adopted an approach of 'learning to live with the virus.' On the other hand, since March 2022, China has been facing its worst Covid-19 surge since the pandemic began, and its Zero Covid Policy has dented economic activity in the country. With the Russia-Ukraine conflict in late February, the narrative is shifting from 'Covid to Conflict' and global growth projections have since then been downgraded in view of the economic damage caused by the war, with concerns of a prolonged slowdown in China adding to the downside risks.

Shifting Global Economic Outlook

IMF Projections of GDP Growth for the year 2022 at Different Points of Time



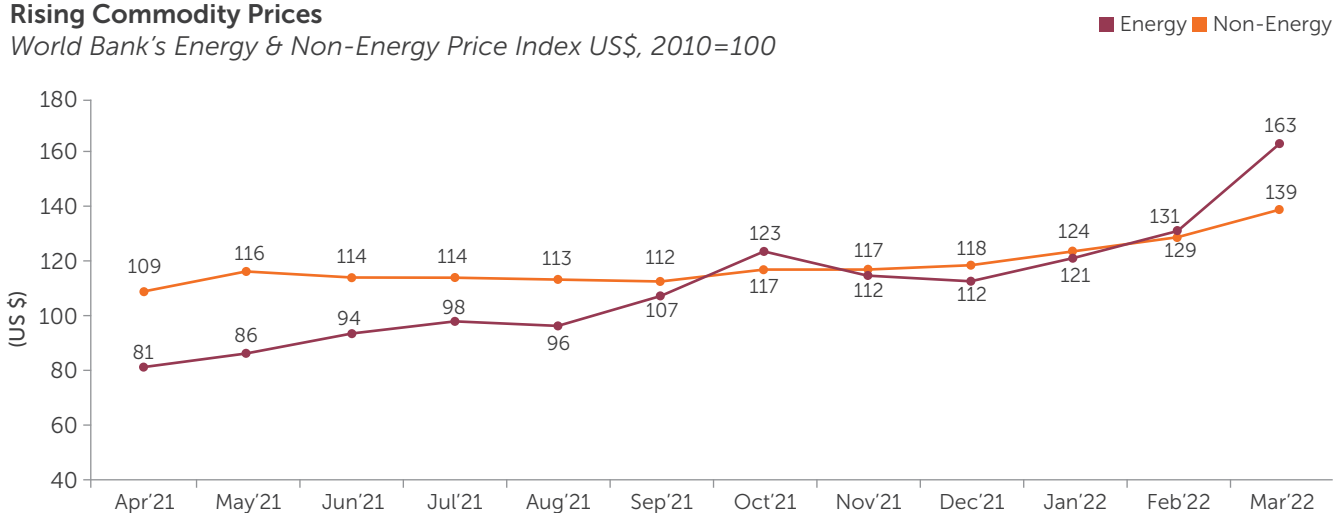
Source: International Monetary Fund (IMF)'s World Economic Outlook Reports, Note: 2022 for India refers to the year 2022-23

Inflation has emerged as the biggest macroeconomic worry for policy-makers across the globe, having risen to multi-decade highs, especially in advanced countries. Central banks have, therefore, started tightening their monetary policies and raising interest rates. The global economy witnessed severe supply chain bottlenecks and shortages (of semi-conductors, natural gas, coal etc.) as pent-up demand overlapped with disrupted production with shutting down of ports, and delays in orders for new shipping vessels.

Between April 2021 and March 2022, energy prices on an average doubled and non-energy prices rose by close to 30%. While the increase in prices was more or less steady through the year, it got exacerbated by the Russia-Ukraine conflict, as Russia and Ukraine are large exporters, particularly of energy, fertilisers, metals and grains such as wheat.

Rising Commodity Prices

World Bank's Energy & Non-Energy Price Index US\$, 2010=100



Source: World Bank

Indian Economy

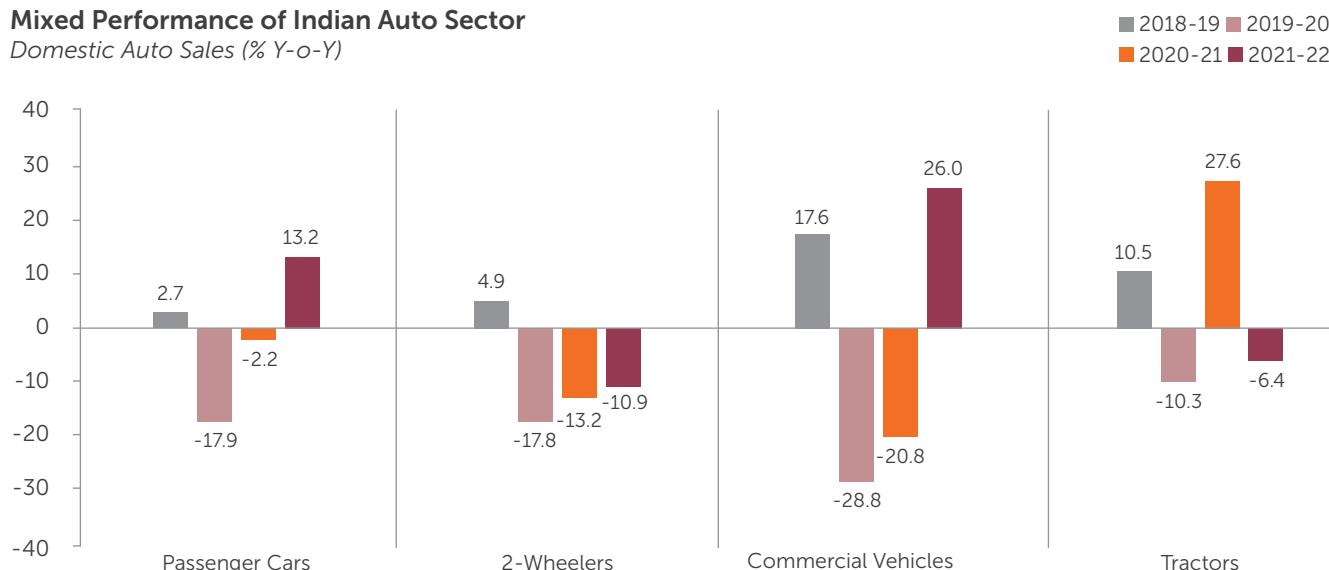
At home, the Indian economy recovered, with 8.7% growth in 2021-22, which mitigated the GDP loss experienced in 2020-21. Real GDP in 2021-22 (2011-12 prices) stood at ₹ 147.3 lakh crore surpassing 2019-20's real GDP (2011-12 prices) of ₹ 145 lakh crore. While growth in 2021-22 came on a low base, the economy was able to tide over the impact of the two pandemic waves during the year. The Delta wave in the first quarter of 2021-22 severely affected the services sector, after

which the sector rebounded with sequential opening up of high contact sectors. The services sector has been a key driver of India's turnaround, while the industrial sector witnessed a broad-based recovery. However, towards the end of the year, growth in industrial sector slowed down and became uneven, with demand for consumer goods particularly being sluggish.

On the agriculture front, the growth momentum was maintained, thereby providing support to overall economic activity. Transport activity recovered across the board in

Mixed Performance of Indian Auto Sector

Domestic Auto Sales (% Y-o-Y)



Source: Centre for Monitoring Indian Economy

railways, ports, aviation, and vehicular sales, barring two-wheeler sales. Moreover, towards the end of the year, mobility indicators shot past the pre-pandemic base line and continued the trajectory as educational institutions and offices opened. Consumer confidence continued to be on a recovery path, since the first quarter of 2021-22, however, it continues to remain below the pre-pandemic levels. Credit growth picked up towards the end of the year, with non-food credit growing by 8.7% in 2021-22 (up from 5.5% in 2020-21), which was the highest in the last five years. Further, during the year, investment climate also improved; as new investment projects worth ₹ 15.6 lakh crore were announced, an almost 100% jump from announcements made in 2020-21.

On the macroeconomic front, inflation, on account of structural and domestic supply-side constraints, besides the global spillages, emerged as a major area of concern. After some softening towards the middle of 2022, retail inflation crossed the RBI's tolerance band and remained on an increasing trend. While the RBI kept the interest rates unchanged during the year, an out-of-cycle rate hike in May 2022 marked the beginning of its battle with inflation while talking about exchange rates, average Rupee/Dollar exchange rate depreciated moderately in 2021-22 to ₹ 74.51/US\$ from ₹ 74.20/US\$. However, the Rupee faced headwinds towards the end of the year with the Russia-Ukraine conflict exacerbating commodity prices and capital outflows from India and also putting pressure on the fiscal and balance-of-payment accounts.

The fundamentals of the Indian economy continue to be strong, and it is expected to gain from the Government of India's renewed focus on infrastructure creation and enhancement of manufacturing activity through various measures. The economy is gradually gaining momentum, as shown by high-frequency indicators such as GST collections, E-Way bills, railway freight, air traffic, power consumption and so on.

However, headwinds in the form of high inflation owing to surging commodity and energy prices and weakening of the Rupee may pose downside risks.

Energy Sector Developments

Global Energy Sector

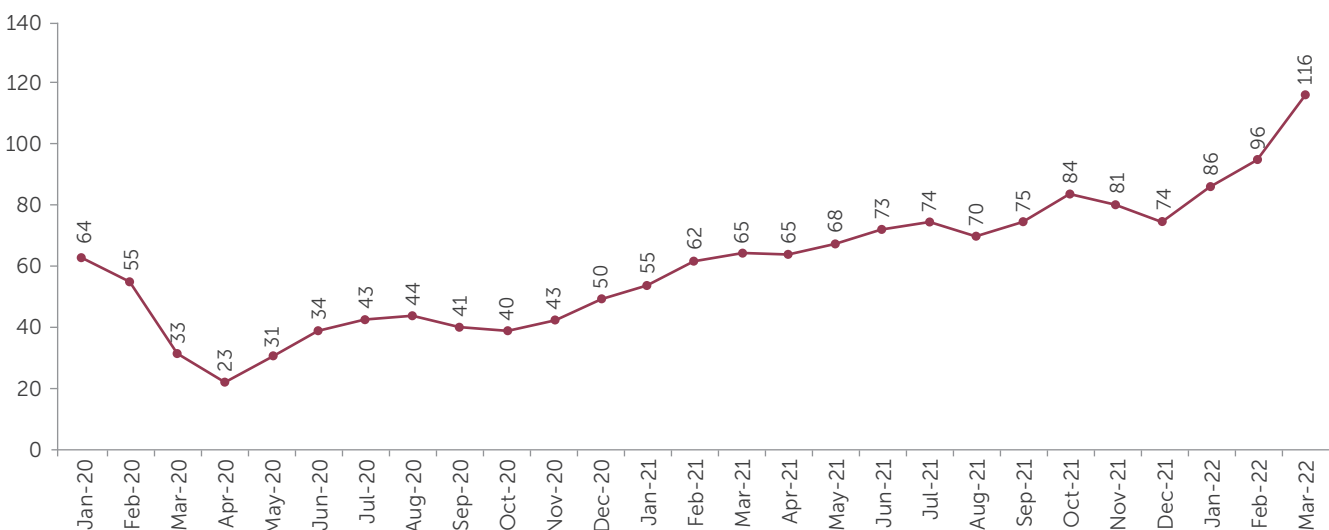
For the energy sector, the major theme during the year was Net Zero transition. Government representatives from nearly 200 countries reached a deal at the 26th United Nations Climate Change Conference of the Parties (COP26) called the Glasgow Climate Pact, under which, for the first time, nations were called upon to phase down unabated coal usage for power generation, besides inefficient subsidies for fossil fuels. Today, more than 130 countries have taken up Net Zero commitments, with India being a major new addition. On the other hand, while the world made commitments for greening its energy mix over the long term, it also came face to face with acute shortages of conventional energy.

In the latter half of 2021, prices of gas, coal and electricity soared to unprecedented levels, which saw Europe scrambling for gas supplies and power shortages in many provinces in China. The Russia-Ukraine conflict, that began towards the end of February 2022, came as a major shock to the energy sector. Global oil prices (Dated Brent) crossed US\$137/bbl in March 2022 (on March 8, 2022), a level unseen during last eight years. Overall, crude oil prices (Brent) increased from average US\$44.8/bbl in 2020-21 to US\$ 80.0/bbl in 2021-22. The World Bank Natural Gas Price Index increased from 45.5 in 2020 to 130.7 in 2021. In early March, gas prices shot up significantly with LNG West India Marker spiking to US\$ 84.4/MMbtu on March 7, 2022.

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International Oil Prices

Brent (US\$/bbl)



Source: World Bank

While, the Russia-Ukraine conflict has compounded the issue of price increase, the tension in the global energy markets has pre-dated this crisis. In April 2020, the OPEC+ had undertaken a historic production cut to the tune of 10 mbpd to bring in a balance in the markets in the face of shrinking demand, with many economies entering lockdowns. However, with the subsequent opening of economies, coupled with vaccinations, oil demand started recovering. In August 2021, the OPEC+ members, in view of the tightness in the oil market at that point, started injecting in more oil into the recovering global economy through monthly production increases of 400,000 b/d. However, this increase has struggled with poor compliances and the group resisted calls for increasing production coming in from western countries in the context of the Ukraine crisis.

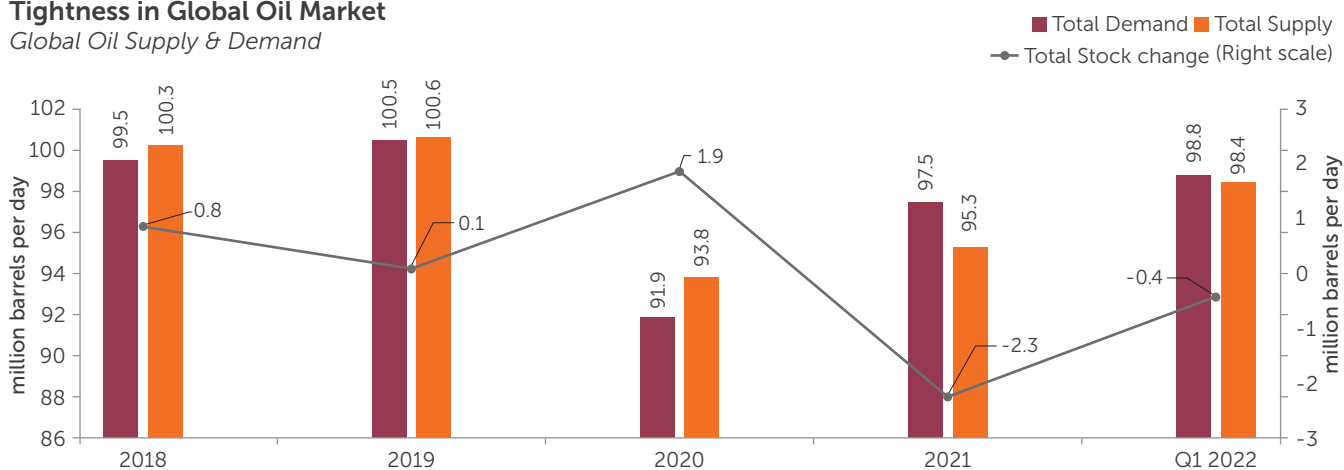
In 2021, the global oil demand recovered to 97.5 mbpd from 91.9 mbpd in 2020, but still fell short of the pre-pandemic levels of 100 mbpd. Similarly, supply at 95.3 mbpd had increased from 93.8 mbpd in 2020, but it was still below the demand number. This was further compounded by the Russia-

Ukraine conflict. Russia is the third largest producer and the second largest exporter of oil in the world and the European Union (EU) is highly dependent on Russian oil as it sources 45% of its crude oil and product imports from Russia. The US and European allies have imposed various sanctions on Russia, but as of now these sanctions do not restrict the purchase of oil by Asian countries like China and India.

Australia, Britain, Canada and the United States have imposed outright bans on Russian oil purchases, while the Group of Seven (G7) nations, including Japan, have committed to ban or phase out imports of Russian oil. The European Union on May 30, 2021 agreed to ban seaborne imports of Russian oil with a phase-in period of six months for crude oil and eight months for refined products. The ban excludes oil supplied via pipeline, thus allowing refineries in eastern Europe and Germany to continue imports. Poland and Germany, however, said they would phase out all purchases via the pipeline by the end of 2022. That would in total cover about 90% of Russian oil imports to the EU. The Russia-Ukraine conflict has, therefore, become a major factor affecting international oil prices and is also affecting the supply and trade movements of crude oil.

Tightness in Global Oil Market

Global Oil Supply & Demand



Source: International Energy Agency

The markets for refined products have been witnessing tightness in the face of growing demand for road, air and sea transportation as economies opened up on the one hand, and low inventories and refinery capacity bottlenecks magnified the issue on the other. As Russia is one of the biggest refiners in the world and a major exporter of Diesel, the Russia-Ukraine war jolted the products market. Product cracks improved significantly in 2021-22 from their depressed levels of 2020-21. Jet-Kero (ATF) after being in the negative zone in 2020-21 recovered to more than US\$ 7/bbl in 2021-22 and the turnaround in petrol and diesel cracks were impressive too. However, LPG cracks continued to be in the negative zone. During the year, diesel and petrol cracks continue to be high and above historical levels.

Global natural gas demand rose in 2021 on account of increased economic activity, adverse weather events, which increased the demand for natural gas for heating, and reduced

renewables output in some geographies, which further increased the need for natural gas as a substitute in electricity generation. While natural gas production also increased in 2021, it fell short of demand and since the first quarter of 2021, inventories of natural gas in Europe continued to be below their five-year average. Europe's high dependence on natural gas imports from Russia has become a major factor affecting the gas markets. Moves and decisions by Russia, such as cutting off gas supplies to nations like Poland, Bulgaria, Finland, Denmark, and Netherlands, besides the European Union's efforts to reduce dependence on Russian gas, are affecting gas prices and established gas trade patterns.

Even though coal came under direct fire at COP26, coal consumption increased in 2021 and production fell short of demand, resulting in shortages and soaring coal prices reaching record levels. In view of the domestic energy security concerns, coal production targets were increased in some

geographies, including India and with the Russia-Ukraine war, the EU is preparing itself to burn more coal this decade as it tries to reduce its dependence on Russian gas. The past year was also significant in terms of marking the comeback of nuclear energy. After a decade of being in oblivion, nuclear energy is gathering interest as both innovative and currently available technologies nuclear can support NetZero transition.

Prices of crucial energy transition metals such as aluminium, copper, nickel, lithium and cobalt rose to unprecedented levels in 2021 and continued to rise in 2022. Rising demand, disrupted supply chains and concerns around tightening

supply due to the current geopolitical condition accounted for the price rise. While the prices of copper, nickel and aluminium increased by around 25% to 40%, prices of lithium and cobalt more than doubled in 2021, marking these materials as crucial components of the future world order.

With India's high dependence on energy imports, especially of oil and gas, these developments in the international markets continued to affect the Indian energy sector and resultantly, IndianOil's business. Besides these, on the policy front, major headways were made in the context of the global net zero transition.

Long Term Energy Outlook

The ever-increasing pace of technological innovations leading to energy and material efficiency gains are expected to decrease the pace of global energy demand growth over the long term. With the ongoing energy transition and net zero commitments, the share of renewables in the energy mix is projected to rise over the long term, propelled by policy focus and falling costs. Role of fossil fuels is accordingly expected to come down, with shift away from coal being the most prominent. Global oil demand is projected by many agencies to peak by 2030, while some expect peaking by 2040 and some see no peaking even upto 2050. Rising vehicular efficiency, increasing adoption of electric vehicles and shift towards low carbon alternatives such as biofuels and Hydrogen are expected to affect growth prospects of oil demand going forward. While oil demand in the long term (2050) is expected to be lower than current levels, it is still expected to remain at a sizeable level as it helps meet energy access requirements of developing economies and serves energy requirements of hard to decarbonize sectors such as road freight, shipping, aviation, and industrial heat applications. Natural gas is expected to see growth in next decade and a half-driven by strong policy push in countries

like China and India. A slowdown in growth of natural gas demand at the global level could be seen beyond that in the context of Net Zero commitments, increasing ESG pressure and increased use of Green Hydrogen. Overall, global energy mix is expected to be more diverse with roles etched out for Hydrogen, bioenergy, and electric mobility.

India is set to drive long term growth in global energy demand underpinned by strong economic growth outlook, urbanization, and young population. India's energy demand is projected to grow at rates way above the global average. In India too, share of renewables is set to rise, as is the share of modern bioenergy, in line with global trends and on account of policy support as the Government works towards its Net Zero 2070 target. As regards oil, demand is set to grow in the next 10-15 years in India, driven by rising per capita income demand for personal vehicles, air travel and energy access. Oil demand could plateau thereafter on account of rising EV adoption, CNG & Biofuel penetration and rising vehicular efficiency. In India, Natural Gas demand is expected to grow robustly as policy impetus and rising domestic production coupled with LNG imports help the market expand from its current low levels.

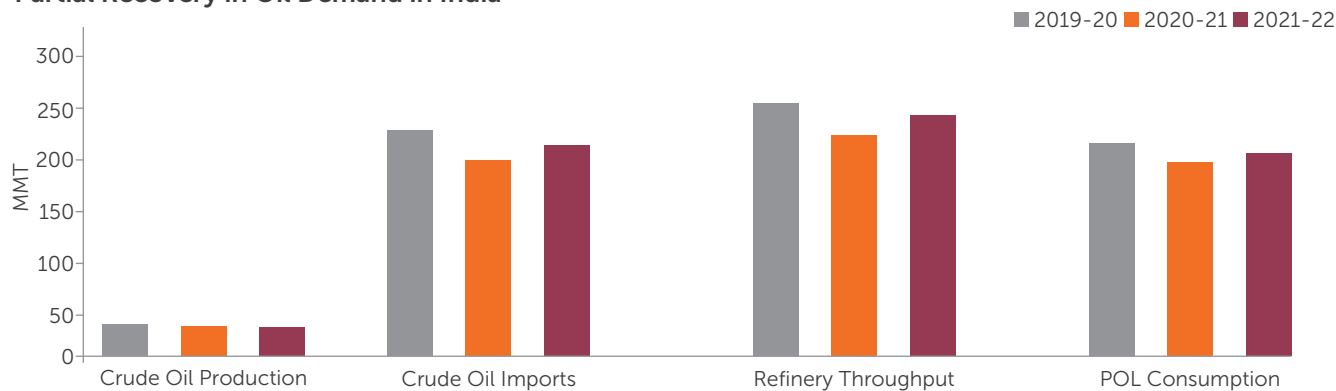
Indian Energy Sector

Significantly, at COP26 in November 2021, India announced its target of achieving Net Zero emissions by 2070. Prior to this, earlier in the year, India had targeted the goal of being energy Independent by 2047. In relation to this, significantly, during the year, the Government of India launched its National Hydrogen Mission, advanced its ethanol blending target and launched mega production-linked incentive schemes for Solar PV, Advanced Batteries and the automotive sectors. This was followed by the announcement of Green Hydrogen/ Green Ammonia Policy that aim to boost production of 'Green Hydrogen' to 5 million tonnes by 2030 and make India an export hub for the clean fuel. Additionally, in pursuit of the NetZero goal, the Government of India is aiming at transforming the transportation sector, which is a major source of emission. The Government of India's Gati Shakti framework that envisages a mega push to multimodal logistics parks and intermodal connectivity, can bring in major efficiency gains in India's logistics sector, besides making it less carbon intensive.

As economic activity picked up, so did energy demand. Electricity demand after falling 1.2% in 2020-21, rose by 8.2% in 2021-22. India added over 15 GW of Renewable Energy capacity in 2021-22 (of which 13.9 GW was solar) taking the total to 109.9 GW (excluding large hydro) at the end of the year. Including large hydro, India's Renewable Energy capacity stood at 160 GW at the end of 2021-22.

During 2021-22, petroleum products (POL) consumption rose by 5.1% y-o-y. However, POL consumption in 2021-22 was lower than the pre-pandemic levels, falling short by 4.6% or 10 MMT compared to 2019-20 levels. In view of the stagnant domestic crude oil production, crude oil imports rose by 8% y-o-y to meet the growing demand but were lower than the 2019-20 volumes. The surge in international oil prices during the year meant that India's crude oil import bill almost doubled to US\$120 billion from US\$62 billion in 2020-21 and was significantly higher than the oil import bill of US\$ 101 billion of 2019-20. Refinery capacity utilisation rates improved from the lows of 2020-21, with refinery throughput growing by 9% in 2021-22.

Partial Recovery in Oil Demand in India

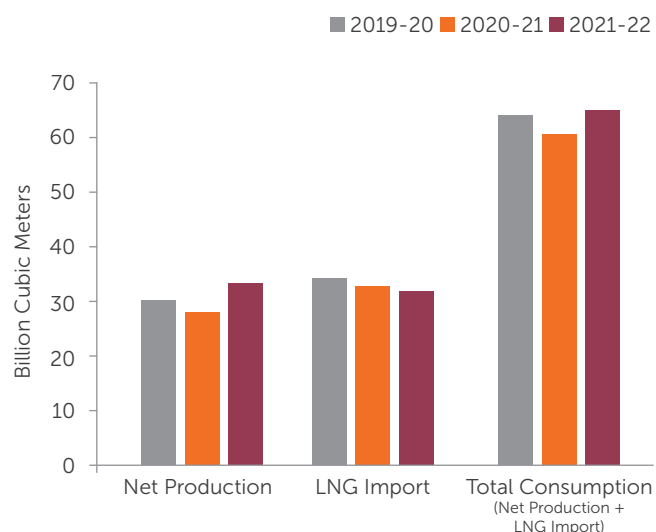


Source: Petroleum Planning & Analysis Cell (PPAC), Ministry of Petroleum & Natural Gas

Looking closely at categories of refined products, the recovery in demand was seen across most fuel types, barring SKO. Petrol consumption increased by 10.3% y-o-y and diesel increased by 5.5% y-o-y. ATF consumption staged a strong comeback with over 35% y-o-y growth. However, overall consumption is yet to reach the pre-pandemic levels, mainly on account of diesel and ATF, which were 7.1% and 37% below their pre-pandemic levels, respectively. On the other hand, recovery in petrol was encouraging, with consumption rising by 3% above the 2019-20 levels as passenger road mobility surpassed pre-pandemic levels. LPG, which grew even during the lockdown, continued with its consistent growth in 2021-22 as well.

During 2021-22, natural gas consumption in India increased by 6.9% after having declined by 5.2% in 2020-21. Domestic gas production rose by 19.2% during the year as new projects came on stream, leading to a reduction in LNG imports, which went down by 3.4%. High spot LNG prices were another deterrent for LNG imports. The LNG West India Marker in March 2022 was over US\$ 30/MMBtu, which was more than five times of March 2021 levels.

Recovery of Natural Gas Consumption in India



Source: Petroleum Planning & Analysis Cell (PPAC), Ministry of Petroleum & Natural Gas

The current geo-political conditions continue to be a source of worry and Net Zero transition will entail its own challenges as the beginning of the interest rate hike cycle globally could add to the capital costs. However, developments like the ongoing recovery in the Indian economy, the Government's push towards infrastructure and core sectors, among others, augur well for the company's business.

IndianOil – Standing Tall

Over the years, IndianOil has successfully combined its business offerings with its corporate social responsibility agenda, meeting the energy needs of millions of people every day, across every corner of the country. IndianOil has proven its stronghold over India's oil refining and marketing business time and again. Most recently, during the pandemic-induced lockdowns, the Company not only maintained its supply lines and served its customers amidst a raging pandemic, but also spearheaded initiatives like the Pradhan Mantri Ujjwala Yojana 2.0 (PMUY 2.0). On the other hand, keeping an eye on future business opportunities, the Company has been assiduously building its new businesses such as petrochemicals, natural gas marketing, alternate energy, cryogenics and explosives.

The Company's leading presence in India's downstream supply and distribution infrastructure is a key advantage in the context of India's longterm energy growth prospects. The Company has been backward integrating and increasing its upstream integration ratio. The synergy between its downstream and upstream businesses is making the petroleum supply chain more resilient and cost-effective. IndianOil's petrochemicals business has over the years emerged as a significant contributor to its bottom-line and is a major source of its competitive advantage over other oil marketing companies (OMCs) in the country.

IndianOil has been working to transform itself from being a national oil major to a holistic energy solutions provider, with a growing portfolio of futuristic Green Energy solutions such as, on-grid and off-grid renewable energy assets, natural gas, biofuels and hydrogen, while developing technologies for hydrogen storage, fuel cells, electric batteries, advanced bio-fuels and Carbon Capture, Utilisation & Storage (CCUS).

Another source of constant strength and competitive advantage for the Company has been its research & development (R&D)

set-up, which works hand-in-hand with its business verticals to create research-backed products and technologies.

Building on Competitive Strength through...

Cutting Edge Technology

- Rich IP Portfolio over 1500 patents as of March 31, 2022
- Commercialised Refining Technologies: Indmax, IndeDiesel etc.
- i-Drive Initiatives
- Green Hydrogen Plants @ Mathura & Panipat Refinery
- CCUS Projects
- Aluminum Air Batteries
- Hydrogen Transport through Pipelines

Impeccable Service Delivery

- Indane Tatkal Seva
- Fully Automated Retail Outlets
- Fuel@Doorstep
- LNG at Doorstep
- New connection Registration facility through Missed call

Innovative Products



GREENMILE



To fortify its research capabilities in new niche technologies and to become a least cost supplier of Green Energy / advanced bio-fuels, a new R&D centre with world class infrastructure for research in renewable technologies is being developed. In addition, the Company is working towards leveraging digitalisation technologies like Big Data, the Internet of Things, Analytics, Artificial Intelligence (AI), AR/VR etc., to make its operations more efficient and agile.

The Company's HR strategies are also getting aligned to the imperatives of the ongoing Energy Transition. IndianOil's Joint Ventures with niche players in new energy areas are helping its workforce develop skills for the emerging non-core energy areas. IndianOil is collaborating with nationally and internationally renowned global institutes for building specialized skill sets and for nurturing managers with a new age perspective.

As the Company forges ahead aligning its growth path with the imperatives of energy transition, it will bank on its traditional core competencies while also building strengths in the emerging new areas and technologies.

IndianOil – Towards a Greener Horizon

As a responsible corporate, and in line with its spirit of "Pehle Indian Phir Oil", the Company has always stood up in service of the nation. When the country faced unprecedented Covid-19

challenges, true to this spirit, IndianOil rose to the occasion to align itself with the national priorities and helped India face the Covid-19 situation with fortitude and a spirit of self-reliance. As the leading energy supplier, the Company and its employees, delivery agents, drivers and various other stakeholders ensured that even during the worst of the pandemic, kitchen fires kept burning and fuel and energy solutions were available throughout the country.

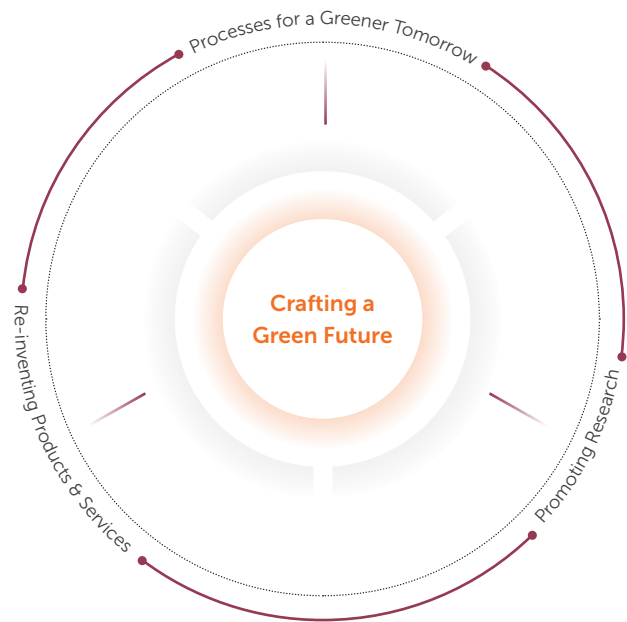
With the Covid-19 situation having eased and with the economy opening up, the country needed energy to meet the rising energy demand and to bring the economy back on track. The Company rose to the occasion to meet the energy challenges and to uncover the opportunities therein. While

The Company is working towards leveraging digitalisation technologies like **Big Data, the Internet of Things, Analytics, Artificial Intelligence (AI), AR/VR** etc., to make its operations more efficient and agile.

2020-21 was a year for standing with the nation in its fight with Covid-19, the year 2021-22 was one of planning the way forward for a 'Greener Future.'

The Company is fast transforming itself from being India's national oil company to a holistic energy solutions provider, in line with its vision to be 'the Energy of India'. In alignment with the nation's COP26 commitment, the Company is making significant strides in 'crafting a green future' by expanding its business portfolio for 'sustainable and affordable energy solutions for tomorrow'.

The Company is aligning itself and is moving towards the Net Zero future by re-inventing its products and services, re-engineering its processes for a greener tomorrow and promoting research in the field of cleaner technologies.



Re-Inventing Products & Services

The Company is working towards making its products greener, promoting environment friendly fuels like LPG and investing in low carbon/ carbon neutral energy sources like natural gas, bio-fuels, electric mobility, and renewable energy.

New Offerings

The Company has always had a customer-centric view and has been developing new products and services keeping in mind enhanced customer satisfaction. In its pursuit of becoming 'The Energy of India', it had previously launched several innovative energy solutions for catering to specific customer needs, such as XP100, (100 octane premium petrol), developed for customers who own high performance cars; XP-95, (a high-octane fuel) for vehicles designed to meet stringent BS-VI emission and efficiency norms through the latest engine technologies; XTRATEJ LPG, (which provides savings in LPG up to 7.5% consumption and saving in cooking time) and Chhotu, (a 5-kg free trade LPG cylinder), catering to the needs of a specific customer segment, who find it difficult to provide permanent address proofs, with low consumption levels and space constraints.

With the aim of 'Crafting a Green Future', the Company has now gone a step ahead and has been trying to make its conventional product offerings eco-friendly so as to reduce their carbon footprints. Continuing with the roll-out of innovative and environment friendly products, this year too, it added several new product offerings to its product basket like:

- **XTRAGREEN Diesel** – The environment-friendly fuel mitigates air pollution and improves fuel economy by about 5-7%. It is among the cleanest diesel fuels globally available and at present, XtraGreen diesel is available at 700 retail outlets across the country.
- **Green Combo Lubricants** – The Company launched two environmentally-safe lubricants -SERVO Greenmile and SERVO Raftar, which help in reducing emission levels thereby promoting IndianOil's vision of a sustainable future.
- **Methanol-blended Petrol (M-15)** - In its effort to reduce the consumption of fossil fuels and in its pursuit of a green future, IndianOil has launched methanol-blended petrol M-15 (15% methanol-blending). A pilot project has been launched at IndianOil's Digboi Terminal recently and is likely to be commercialised soon. The roll-out of the fuel will strengthen India's 'Energy Aatmanirbharta' on the one hand while also reducing the environmental pollution, on the other.
- **E-100 Fuel** – Pure ethanol as a standalone fuel (E-100) was launched during the year at a Retail Outlet in Pune City. This demonstrates the Company's commitment towards continuance of the ethanol-blending programme as well as a step towards import reduction and reduction of GHG emissions, apart from other benefits such as increasing farmers' income and generation of rural employment. With the flex fuel engines being developed, E-100 can be a game-changer for reducing crude imports and ensuring India's energy security.

LPG – Bridge to a Cleaner Future

Despite its fossil fuel origins, LPG stands out as a fuel that is a crucial bridge to the sustainable future, keeping in mind its alignment with the climate goals. LPG's clean combustion profile makes it a preferred choice for tackling indoor air pollution, caused by burning of biomass and kerosene. Moreover, an increasing body of evidence is showing LPG's role as a GHG emission mitigation fuel. Black carbon, a short-lived climate pollutant is primarily associated with the burning of biomass, and according to the Intergovernmental Panel on Climate Change (IPCC), reductions in emissions of black carbon by 35% or more by 2050, relative to 2010, will be required to help limit the rise in global temperature to 1.5° from pre-industrial times.

LPG's clean combustion profile means that it emits virtually no black carbon on combustion, comparable to the other clean fuels such as natural gas, biogas and ethanol. Additionally, while LPG does emit carbon-dioxide upon combustion, studies show that LPG emits 60% fewer GHGs than electric coil cooktops, 50% fewer emissions than some biomass stoves, and 19% fewer GHGs than kerosene stoves. LPG, used as an alternative to firewood, protects forests from being depleted for charcoal and firewood and hence contributes to preserving the environment and capturing CO₂ emissions.

LPG continues to be a focus area for the Company, with sizeable ongoing investments for LPG pipeline transportation and LPG import infrastructure. In addition, to make LPG more accessible, the Company launched 'Munna', a 2 Kg Free Trade LPG (FTL) cylinder variant, at the backdrop of success of 'Chhotu' 5 kg FTL. 'Chhotu' and 'Munna' offer easy LPG access to sections of the society that are not covered by the LPG distributor network such as migrant labourers, students who do not have an address proof and also people with lower LPG consumption, commercial establishments with less space such as food hawkers and daily wagers who are unable to make upfront payments.

On Track with India's Vision of Becoming a Gas-based Economy

The Company is expanding its natural gas business and promoting gas usage in India inline with the Government of India's plans to increase the share of natural gas in India's primary energy from about 7% to 15% by 2030. IndianOil is accordingly enhancing its gas infrastructure by putting up new LNG terminals, cross-country pipelines and City Gas Distribution (CGD) networks.

The Company is the lead implementation agency of **Sustainable Alternative Towards Affordable Transportation (SATAT)**, which targets production of **15 MMT of CBG by 2023**, from **5,000 plants** across the country.

The Company has plans to set up CNG facilities at around 2500 outlets within the next 10 years and is also setting up 20 LNG stations out of the 50 targeted by the Government of India. In the R-LNG space, the Company targets raising its share in the RLNG market from 19% at present to 40% by the end of this decade. In pursuit of this, it has booked capacities in the upcoming LNG terminals viz. Dhamra (3 MMTPA) and Jafrabad (1 MMTPA) and also intends doubling the capacity of its Ennore Terminal (from 5 MMTPA to 10 MMTPA). The Company is investing heavily in building the national gas pipeline grid, presently standalone projects with length of around 1800 km are under implementation in addition to JV pipelines such as North East Gas Grid and three other cross-country pipelines.

The Company has been aggressively expanding its CGD network both through its JV companies and on a standalone basis. Since the 9th PNGRB Bidding Round for CGD, the Company has significantly scaled up the geographical areas (GAs) under its fold with focus on standalone bidding. At present, the Company is developing CGD networks in 26 GAs on a standalone basis, which exhibits IndianOil's confidence in this growth sector as well as its growing technological expertise in the natural gas sector.

Bio-fuels – The Need of the Hour

The Company is the lead implementation agency of Sustainable Alternative Towards Affordable Transportation (SATAT), which targets production of 15 MMT of CBG by 2023, from 5000 plants across the country. The Company has plans in place to meet the Government of India's mandate for increasing ethanol blending in petrol from around 10% at present to 20% by 2025. The Company is setting up a 100 kl/day 2G ethanol production plant at Panipat (Haryana), utilising paddy straw as feedstock based on technology of Praj Industries Ltd. This can be instrumental in solving the crop stubble burning issue in Punjab and Haryana. The Company is also setting up a third generation (3G) ethanol plant of 128 KL/day based on the gas fermentation technology of LanzaTech (LT), USA at Panipat, which would be the world's first refinery off-gas-to-ethanol production facility. With the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) entering its mandatory phase from 2027, biomass and waste-based Sustainable Aviation Fuel (SAF) adoption is gathering interest globally. In view of this, the Company is working on creating its capabilities in SAF production through collaboration with technology providers.

EVs and Battery-Swapping

EV adoption is gathering pace in India with the policy focus at both the Centre and the State levels, besides with the entry of global and domestic auto players, sales are picking up, especially in the two-wheeler segment. The Company has plans to provide electric mobility solutions through its vast network of retail outlets. The Company currently has over 2,000 charging stations and plans to scale this up to 10,000 within three years to capture the opportunities in the EV space. The Company is also exploring the much talked about **Battery or Energy as a Service** business model, with it already having established a few of battery-swapping stations.

In the domain of battery technology, the Company has a joint venture- 'IOC Phinergy Private Limited' (IOP) – which is working on Aluminium-Air Batteries, an upcoming battery technology with the potential to revolutionise the space, especially in Indian conditions, with plans to commercialise the technology in India.

Exploring Opportunities in Renewable Power

IndianOil is looking forward to significantly expand its footprint in the renewable power space from the present level of about 240 MW capacity. Plans are also underway to collaborate for developing large scale renewable energy capacities to cater to market demand and green hydrogen requirements.

Processes for a Greener Tomorrow

The refinery sector is an emissions-intensive sector, accounting for 3% of global carbon emissions. The Company, as a refining major, is working on making its processes more efficient and greening the fuel intake to reduce process emissions. Some of its ongoing and upcoming initiatives are:

Using Clean Energy Sources

Natural gas integration projects at the refineries are already in various stages of implementation. Three of the northern refineries are connected to the gas pipeline grid. Further, with expected commencement of LNG import facilities on the eastern coast (Dhamra), along with gas pipeline connectivity, the eastern refineries (Barauni, Haldia & Paradip) are also likely to get connected shortly. This is to be followed by connectivity through the North-east Gas Grid to the north-eastern refineries.

The Company's renewable energy plants currently produce electricity equivalent to 5% of its electricity consumption.

It plans to increase the use of green power in its refineries, for which the plans are already underway to establish nearly 5 GW scale RE capacities by 2025 in collaboration mode to cater to the incremental energy demand of refinery expansion projects.

Greening Refineries' Hydrogen Production

At present, the refineries are the major consumption centres for hydrogen, used for desulfurisation. The current dominant hydrogen production process is highly carbon-intensive being based on the Steam Methane Reforming process. On the other hand, Green Hydrogen i.e. hydrogen produced from electrolysis of water, using renewable energy, has a zero-carbon profile, making it the preferred form of hydrogen in the context of a carbon neutral future. The Company is venturing into Green Hydrogen production and is targeting 5% of hydrogen produced by it as Green Hydrogen by 2027-28 and 10% by 2029-30. It is gearing up for 5KTA and 2KTA Green Hydrogen plants at the Panipat and Mathura Refineries, respectively.

Further, recently, the Company has joined hands with Larsen & Toubro (L&T) and ReNew Power ('ReNew') for the formation of

a joint venture company to develop the Green Hydrogen sector in India. L&T and IndianOil plan to manufacture electrolyzers used in the production of Green Hydrogen.

In addition to this, the Company has started working towards integrating hydrogen production facilities with carbon capture and utilisation technology to produce Blue Hydrogen. It is setting up a carbon capture plant at its Gujarat Refinery for enhanced oil recovery (EOR) of crude at the Oil & Natural Gas Corporation Ltd. (ONGC) oilfields in Gujarat, leading to permanent sequestration of CO₂. Similarly, IndianOil and Oil India Ltd. (OIL) are also exploring the possibility of EOR application in the oil fields of OIL in the Assam region with CO₂ captured from IndianOil's Digboi Refinery. In addition, IndianOil is also setting up food and beverage grade CO₂ production facilities at its Panipat and Paradip refineries from atmospheric vent stream of MEG plants.

Adopting Digital Initiatives

Digitalising operations can boost refinery yields and throughputs. In transportation, digitisation can streamline the movement of crude and products to and from refineries by determining the timing and optimising the mode of transport (from pipeline to truck, rail, or ship). Refineries of the future will be a digitally connected facility with much improved process optimisation and operational reliability, minimising energy consumption and emissions, eliminating waste products and better water management. On the digitisation front, the project i-Drive at IndianOil is gaining momentum, with significant progress in the implementation of Integrated Production Planning Tool, a state-of-the-art technology for adapting quickly to changing market demand patterns.

The Refinery Production Scheduler is under installation, which will facilitate software-based refining scheduling in place of the existing excel-based scheduling and many other initiatives like online real time monitoring of critical equipment by OEM specialists. Various other digital initiatives are being taken across the organisation to optimise the processes, reduce costs and bring synergy between the divisions of IndianOil.

Optimising Resource Utilisation

The Company is pursuing opportunities in improving the efficiency of its core businesses by enhancing the ability of its refineries to process a wider array of opportunity crudes, reducing fresh-water intake into refineries, sharing of intermediate streams between refineries and reverse pumping flexibility among others.

The Company renewable energy plants currently produce electricity equivalent to 5% of its electricity consumption.

Making Energy Networks Future Ready

Over the years, there has been a conscious effort to focus more on low-carbon transportation modes, such as coastal shipping and pipelines. In addition to this, as energy systems

work towards greening, it is pertinent to make energy networks ready for this. The Company has introduced ethanol transportation in its product pipelines, CBG in the gas pipeline network and is working to introduce hydrogen into its gas pipeline network.

Optimising Processes for a Greener Tomorrow



Promoting Research to meet Green Aspirations

Innovation has a vital role in the road to decarbonisation. For instance, IEA's landmark Net Zero Report that came out last year pointed out that in its Net Zero Trajectory, the required emissions reduction during the period 2030-2050 would depend on technologies which are not commercialised as yet. CCUS and hydrogen are two focus areas of the Company, which are critical to Net Zero and closely connected to the hydrocarbon sector.

Building a Hydrogen Economy

During 2021 Independence Day speech, the Hon'ble Prime Minister of India announced the launch of the **National Hydrogen Mission**. The plan is to make India a global hub of Green Hydrogen production and import, which will make India an energy independent nation and transform it from an energy importer to an energy exporter.

The Company has recently launched a project of ₹ 200 crore to assess multiple hydrogen production pathways, based on indigenously available resources focusing on technologies like solar electrolysis, biomass gasification and bio-methanation

with a total Green Hydrogen production capacity of around 1 tonne per day. The technology will be demonstrated in 15 fuel cell buses for establishing the efficacy, efficiency and sustainability of the production processes and the fuel cell technology.

R&D in Alternate Energy & CCUS

The Company is undertaking research in CCUS through chemical, bio-chemical and electro bio-catalytic routes. It has developed a patented enzyme and solvent combination for enhancing CO₂ capture. This synergetic combination of solvent and enzyme/bio-mimetic complex can capture CO₂ at a faster rate than that of other conventional amine-based methods. The captured CO₂ can be further utilised for an enhanced oil recovery process, conversion to chemicals and fuel molecules etc. The Digboi refinery has been identified for technology implementation, where the captured CO₂ will be used for EOR application in oil fields of Oil India Limited (OIL).

The Company has been researching in the areas of alternate energy, such as 2G & 3G bio-fuels, waste-to-energy, electric batteries and solar, among others. The new upcoming R&D campus will have a Centre for Alternative & Renewable Energy

(i-CARE) as one of the four centres of excellence. The research infrastructure of i-CARE would include laboratories in the areas of fuel cell, hydrogen, gasification and solar energy research, sophisticated research facilities in nanotechnology, batteries, biotechnology, materials and other related areas.

Supporting Start-ups

Globally, the start-up ecosystem has become a powerhouse of innovation. In the energy sector, start-ups are playing a crucial role in advancing climate and consumer friendly technologies and business models. IndianOil's start-up scheme has onboarded 24 projects which already have 42 joint patents to their credit. In the recently-concluded 3rd round of the revolving start-up fund of IndianOil, the Company has received interesting proposals, such as high power density fuel cell stacks for drones; reduction of CO₂ emissions from stack by micro-algae based industrial CO₂ capture and recycling; early detection of leakage and pilferage from the pipeline; use of robotics for internal tank cleaning and inspection; intensified reactors for efficient, safer, smaller and cost-effective chemical processes, development of Nano-porous silicon-based anode for Li-Ion battery; minimising the use of fossil fuel by introduction of hydrogen in running of generators, among others.

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Opportunities and Challenges

The Core

Despite India's long-term Net Zero commitment, the role of petroleum products continues to be significant in India's growth and development story. Through the path-breaking Ujjwala Scheme, LPG has been deployed as the key agent for meeting a major developmental goal of access to clean cooking energy in India. Moreover, as India urbanises, its per capita income rises, standards of living of common man improves, and its villages thrive, the demand for road transportation fuels - petrol and diesel - is also set to grow, albeit at slower rates, as vehicular efficiency improves, and alternatives get a foothold. Notwithstanding this, there is consensus that demand for oil in the Indian economy will be on the rise in this decade and beyond and grow at rates way above the global average. In fact, over the long term India is seen as the key driver of global oil demand.

Refining

The projected growth in petroleum products demand forms the basis for the need to go for refinery infrastructure expansions in India. IndianOil has planned for expansion of

its existing crude refining capacity to 87.5 MMT in the next 10 years, for increasing production of petroleum products, in line with the demand. The mega projects of capacity expansion, which are likely to come in the next couple of years, include the expansion of the Panipat refinery from 15 to 25MMTPA, expansion of the Barauni refinery from 6 to 9 MMTPA, the expansion of the Gujarat refinery from 13.7 to 18MMTPA and that of the Guwahati refinery from 1 to 1.2 MMTPA.

With the development of road infrastructure in the country getting a major boost through the PM Gatishakti – National Master Plan for Multi-modal Connectivity, the demand for bitumen is expected to receive a major fillip. The current production rate of bitumen would result in a deficit in the face of the growing demand, leading to increase in imports. This presents a unique growth opportunity to the Company, as its refineries have the capability to convert a part of its HSD production capacity to bitumen. This could be a win-win strategy, which on the one hand would help it capture the growing bitumen demand, while also addressing the slowing growth in HSD demand.

India's aviation market has a high growth potential, given the current low penetration of air travel in the country. India ranks relatively low (133rd) in terms of airport density (the number of airports per million of population) and 108th for the number of departures per 1000 population. Considering the rising standard of living in the country and supportive Government policies, ATF demand is projected to grow at a good pace. The Company's refineries have swing capabilities and are fully equipped to reduce HSD production by 10% from the normal level and maximise ATF production.

Additionally, the naphtha cracker capacity revamp is on the cards which can absorb surplus naphtha.

Bio-fuel integration in refineries is a trend that is picking up globally. Bio-fuels, which have low carbon footprint, are an indigenous resource and their production can be dovetailed with refineries and can be integrated with refinery production. Policy support for bio-fuels in India, provides a special opportunity for IndianOil to make its refineries centres for generation of advanced 2G/3G bio-fuels. At present, the Company's refineries are acting not only as centres of production of Advanced Bio-fuels but also, as hubs for ethanol-blending in MS and transportation to distribution centres through pipelines and railway wagons. This not only reduces the operational cost of ethanol blending, but also helps its refineries meet the Quality Control norms for octane number with greater ease. In future, this strategy will provide advantages to the Company for positioning ethanol-blended MS at its retail outlets at a lower cost, as the blending increases from present 10% to 20% by 2025.

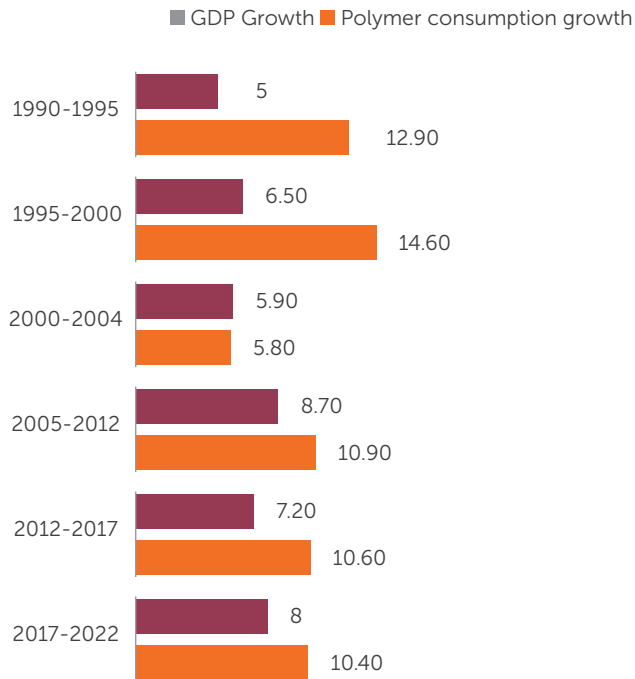
Petrochemicals

The Petrochemical business is synergetic with the core refining business and has been a major bottom-line driver. The role of downward integration into petrochemicals assumes even more importance in the context of the ongoing energy transition. While a slowdown in road transportation fuel demand growth over the long-term is expected, the demand

for petrochemicals is set to grow at robust rate over the long-term. Petrochemical integration, therefore, can enable

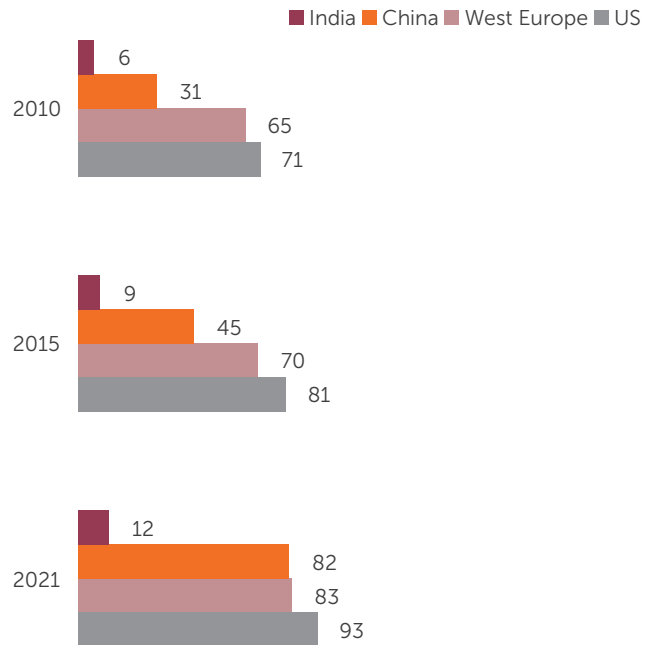
capturing of both volume and value growth and also allow better refinery utilisation when the fuel demand reduces.

India's Polymer demand growth vs GDP growth (%)



GDP growth is an indication of polymer demand growth

Per capita Polymer consumption (kg)



Factors to increase per capita consumption

Urbanization	Quality of life	Govt. Policies
Rising disposable income	Population demographic	New technology and business innovation

The Company's future refinery expansion plans are inextricably linked with petrochemicals expansion and integration. IndianOil has a petrochemicals capacity of nearly 3200 KTA, which translates to a Petrochemical Intensity Index of about 5%. As a long-term strategy IndianOil is targeting a 15% Petrochemicals Intensity Index. Currently, IndianOil is in the process of implementing petrochemical projects worth ₹ 35,000 crore for enhancing its production capacity by 3200 KTA, which would take its Petrochemicals Intensity Index to about 7.1%, by 2025.

Plastic Waste Management

In the recent UN Environment Assembly in Nairobi, it was proposed to create the first-ever global plastic pollution treaty. This is being seen as the most important multilateral climate deal in the making since the landmark 2015 Paris Accord. The Government of India has also put in place a ban on single use plastics from July 1, 2022 and laid down stringent Extended Producer Responsibility targets for the producers, importers and brand owners. These developments pose inherent challenges to IndianOil's petrochemical business, while also throwing up several opportunities.

The Company is thus developing a resilient petrochemical supply chain and has already sensitised the plastic processors on the Plastic Waste Management (PWM) Rules 2016, while also indicating that IndianOil's petrochemical products shall not be directly or indirectly used in production of banned single-use plastic items. Further, through its 'Plastics Neutrality' initiative, the Company plans to enhance the recycles quality in participative mode with the MSME sector, to target recycling/up-cycling of 5 MTPA of plastic waste.

The Company envisions the **plastics-neutrality initiative** as a common objective programme of the stakeholders viz. waste-aggregation/segregation, recycling/up-cycling, by acting as **the pivot of the eco-system**, and by providing **the market access of recycles to plastics processors/brand-owners** through its extensive supply chain.

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Pipelines

Pipeline projects worth around ₹ 30,000 crore are under various stages of implementation. In addition to this, the Company is participating in implementation of projects costing over ₹ 40,000 crore through JV mode in the segments of CGD, natural gas pipelines and LPG pipelines, along with the development of gas grid through Indradhanush Gas Grid Limited (IGGL), a joint venture company for implementation of the prestigious North-East Gas Grid (NEGG) project.

Investments in natural gas pipelines stand out as a priority as the country pursues its target of doubling the share of natural gas in the energy mix. However, as the country inches close to its Net Zero goals, an expected challenge of transition from gas-based economy to a hydrogen-based economy is likely towards the middle of the century. The Company's R&D Centre has taken up this challenge and has developed a transient solution that leads to a hydrogen economy. Blending of natural gas with hydrogen is an option that offers the benefit of reduced carbon emissions while using the existing natural gas pipeline infrastructure. The Company's hydrogen-spiked (18%) CNG (H-CNG) demonstration project trial came out with quite promising results. The Company is also exploring the possibility of hydrogen transportation through its pipelines so as to be future ready for a smooth transition from gas to hydrogen in the Net Zero world.

Marketing

The Company has the largest network of Retail Outlets (ROs) in the country to meet the energy needs. Earlier, the primary focus of the OMCs in India, including IndianOil, was on the sale of conventional and branded fuels through these ROs. But, now as India moves towards a greener future, bio-fuels and EVs shall be playing a vital role in the energy transition process. The Company has aligned itself with the Net Zero aspirations of the country, and is ensuring the addition of one 'alternate fuel', apart from the traditional fuels being sold for all the new ROs being commissioned. The company is also adding EV charging stations as well as battery-swapping stations, to convert the ROs as Energy Centres and provide holistic energy solutions for a greener future.

The customer needs are continuously evolving. To cater to these ever-evolving customer needs and to provide them with elevated customer experience beyond re-fuelling and convenience, the Company today is not only offering differentiated products to the customers but also digitising its

RO operations for flawless service delivery. For ensuring safe RO operations, even in the remotest parts of the country, e-RO inspections are being carried out and actions taken are being digitally recorded.

To boost the penetration of cashless payment methods at ROs, the Company has tied up with e-wallet and UPI service providers. With the help of data analytics, spending and usage patterns of the customers are being used to develop customised services/offerings. To further enhance its capabilities in the field of analytics and improving customer acquisition and customer satisfaction, a state-of-the-art Control and Command Centre is being setup at Mumbai, which will be run by a dedicated team of analysts and IndianOil officers.

In its quest for embracing new technologies in the fuel retailing business, IndianOil is in the process of installing Robotic Dispensing Units (DUs) in Hi-Tech City, Hyderabad. These specially-designed machines will help reduce manpower costs, eliminate chances of close contact with fuel and unhealthy vapour and will make the fuelling experience more convenient and faster for the customer.

The Company is also solarising its ROs to reduce their energy demand, reduce carbon footprints and improve dealer profitability as well as focusing on generation of non-fuel revenue through strategic tie-ups with business partners under both 'Store' and 'Non-Store' categories, so as to remain profitable even when the growth in sale of traditional fuels slows down during the energy transition.

The Company is the market leader in ATF, with a market share of 62.5% during 2021-22. To maintain its pole position, the Company is expanding its operations in new locations in view of the Government of India's plans of starting flights in new airports under the UDAAN scheme and added nine Aviation Fuelling Stations during 2021-22. It is now fuelling ATF at 126 locations across India (as of March 31, 2022). In line with the Net Zero commitment of the Government of India and in compliance of the global Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) mandate, the company has signed a MoU with Praj Industries to mutually explore cleaner and greener sources of energy, including Sustainable Aviation Fuels. It intends to put up a demo plant near Mumbai or Pune, which shall be commercialised later. The Company is also in discussion with LanzaJet to come up with a SAF production plant using ethanol as feedstock at Panipat.

Catering to the evolving customer needs, while also meeting the energy transition challenges to produce innovative products constantly, may require huge R&D and marketing infrastructure expenditure. Thus, to gain the competitive edge, latest technological interventions such as CRM, AI/VR in marketing etc., will be the required tools as the Company transforms from selling commodities such as MS and HSD to customer-centric energy offerings and solutions.

Exploration & Production

The Company has achieved the upstream integration ratio of ~5% and aspires to achieve an integration ratio of 10% by 2030, by raising its production of oil and gas equivalents to 7 MMTPA by 2023-24 and 11 MMTPA by 2029-30.

Integration into the upstream business serves as a powerful tool for maintaining profitability in the highly volatile international oil prices scenario. Further, in the current geopolitical situation, securing oil and gas supplies has become evidently significant in addressing national energy security concerns. The current crisis is a reminder that reliable energy supply is critical to the system and price stability.

Moreover, with growing Net Zero pressure, upstream investments are facing challenges from financiers, shareholders and investors. In fact, structural under-investment in hydrocarbons started since the middle of the last decade (which reached its nadir with investment cuts of 2020) as energy prices fell, bringing the project returns down, in tandem with a rising investor focus on ESG.

However, it is estimated that to maintain the global oil production at the current levels by offsetting natural field declines, the global oil and gas industry will still need to make an annual investment of over US\$ 400 billion. This underscores the importance of investment in upstream hydrocarbons, even in a world geared for long term Net Zero. The recent spiralling of energy prices corroborates this.

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New Businesses

Green business

Net Zero targets have an inherent technological challenge. Across pathways and agencies, what is amply clear is that radical technological transformation will be fundamental to meet the Net Zero targets. In addition to established technologies like energy efficiency and renewable, many new technologies such as advanced batteries, CCUS, hydrogen, Carbon Dioxide Removal (CDR), geo-engineering, which have not been commercialised yet, will be critical in achieving the Net Zero targets.

Net Zero is a double-edged sword as any country contemplating it should understand the economic structure at a sectoral level to make informed choices about technology, costs and time horizons for the transition. In India's perspective, although the Green Energy technologies have been constantly gaining

traction through investor attention and adoption of newer and more efficient technologies, energy security and energy independence are the two areas of concern. India lacks domestic resources, raw materials (like strategic metals, silicon wafers etc.) and technological know-how for developing new technologies such as manufacturing of electrolyzers, solar panels and batteries, etc.

For India to achieve its Net Zero target, technology transfer and collaboration in areas such as CCUS, hydrogen will be fundamental. For instance, CCUS is clearly an area which can bring in sizeable emission reductions from heavy energy-intensive units such as refineries. However, while such a big role is etched out for CCUS, there are only 20 or so commercial CCUS plants globally. IndianOil is already carrying out R&D in CCUS. Funding support to make the cost economics work and collaboration seem to be the most important elements for scaling it.

The Company has been steadily investing in these upcoming technologies by collaborating with Indian as well as global technology partners through the JV mode and is also promoting start-ups, which have emerged as powerhouses of innovation in recent years in many areas, including energy. The Government of India is also scouting for opportunities under the Quad alliance to procure key metals and technologies from its partner countries to reduce dependence on raw materials from China. Recently, the Government of India has also imposed an import duty on the import of China-made solar panels to promote manufacturing in India. With the Government of India's support and investments in these upcoming technologies, IndianOil is confident to become a major Green Energy supplier in India.

The cost of Lithium has surged and is continuously increasing because of the exponential rise in the number of EVs requiring lithium-ion batteries globally. To provide a viable low-cost alternative for EV battery, the Company has invested in a joint venture with Phinergy of Israel to create Al-Air batteries. These would be developed on cheaper and abundantly available aluminium. It is expected that these Al-Air batteries can disrupt the EV battery market and can present a feasible low-cost solution compared to lithium-ion batteries used in EVs.

While IndianOil is geared up to meeting the Government's mandate of 20% Ethanol Blending Program (EBP) by 2025, there are a couple of challenges in this pursuit. First, meeting the target entails heavy capital expenditure for making the infrastructure ready for supply and storage of higher blended levels of MS. There are also apprehensions regarding readiness of the auto sector for making available E20-compliant engines by 2025. The auto industry has, in addition, been pressing for supply of E10 and E20 separately to ensure fuel compatibility with both older as well as new engine types. This again could have a huge cost implication for the OMCs as they will need to create two separate supply chains for catering to this differentiated supply. In the Union Budget for 2022-23, a proposal for imposing an additional excise duty of ₹ 2/litre on unblended MS was made. It could have cost implications for the OMCs as they would be required to supply EBP even in the remotest and logistically-challenging terrains.

Gas Business

Increasing the share of gas in the energy mix is crucial to decarbonisation of the Indian economy. A supportive policy environment and bold reforms have invigorated investment in this sector and the Company has taken a leading position in pursuit of the same. Un-bundling of the transportation and marketing of gas is required to ensure open and transparent access to the gas pipelines and levelling the playing field amongst all gas marketing companies.

In fact, third-party access (TPA) to the infrastructure has been seen globally as a vital enabler of market liberalisation and thriving gas markets. The Government of India is contemplating setting up of a central Transmission System Operator (TSO) which takes care of the adequate availability of capacity-related data and will thereby facilitate and enhance a fair and transparent access to the gas pipeline infrastructure in the country, thus enabling seamless movement towards competitive gas markets.

Other Areas

Cryogenics

IndianOil is leveraging its competence in the cryogenics business and in developing cryogenic containers. The cryogenic business is synergetic with the green business

initiatives in areas of LNG and hydrogen. This also presents an opportunity to the Company for export of Cryocans and Cryovessels to Bangladesh, Nepal, Sri Lanka, and to various European and African countries.

Explosives

Due to continued growth in the mining and construction sectors, the demand for explosives in the country is surging. The Company is the only OMC which has presence in this growing business segment and is undertaking capacity expansion projects at different locations to cater to this growing demand segment. It is also working towards obtaining long term supply agreements with anchor customers for business stability.

Opportunities in International Markets

In line with the Company's Vision to be 'A Globally Admired Company,' IndianOil has been exploring business opportunities outside India by leveraging its core competencies to export its product and services. To enhance the geo-strategic reach, the Company plans to develop Regional Hubs to coordinate and monitor Global Business Development Activities. The Company plans to focus on the market in African countries such as South Africa, Kenya, Tanzania, Mozambique, Uganda, Angola, Egypt and Ghana, besides the currently catered sub-continent and Indian Ocean markets.

IndianOil: Future Ready

<p>Reducing Carbon Emissions in Operations & Products</p> <ul style="list-style-type: none"> Natural Gas as refinery fuel & Solar at installations RE from grid Energy efficient Fuels and Lubricants: Advanced chemistries & nano technology Green Products: EBP, CBG, CNG, SAF, EV Charging Energy efficient operations: Digitization 	<p>Research & innovation</p> <ul style="list-style-type: none"> Green & Blue Hydrogen, Fuel Cells CCUS Advanced Biofuels Battery Technology 	<p>PC Integration for capturing volume & value growth</p> <ul style="list-style-type: none"> Opportunities in hygiene, green energy, tyres, textiles, infrastructure-piping, super absorbent polymers Plastic Neutrality
<p>Integration of New Fuels in Operations</p> <ul style="list-style-type: none"> Refineries Biofuel integration: 1G/2G/2G Ethanol & Hydrogen in pipelines Waste to energy 	<p>Focus on growth markets & products</p> <ul style="list-style-type: none"> Bitumen, ATF, LPG Infra push, Energy Access, Economic Growth Export markets 	<p>Digitalization</p> <ul style="list-style-type: none"> Customer experience: holistic experience, leverage CRM details for making customised offerings Digital Offerings: IOT, Cloud, AI
	<p>Partnering in Gas Economy</p> <ul style="list-style-type: none"> CGD, LNG Terminal, Cross country pipelines, LNG as a fuel 	<p>Skill Development</p> <ul style="list-style-type: none"> Re-skilling & upskilling Collaborations

Risks & Concerns

The Covid-19 pandemic impacted the demand, supply and distribution and challenged businesses in every possible way. This, coupled with the current flux in the global macroeconomic and geopolitical environment, has made the risk landscape in current times particularly challenging for organisations across the board.

The major risks identified by the businesses and functions are systematically addressed through mitigating action plans on a continuing basis. Risks are assessed and managed at various levels with a top-down and bottom-up approach, covering the enterprise, the business units, the functions, the market share and projects. The Company is committed to effectively managing the risk matrix it faces with ever-growing resilience and proactiveness.

The risks identified inter-alia include:

- Competition risks arising from competitors within the existing businesses and from new businesses such as alternative energy sources, electric mobility
- Financial risks such as foreign exchange rate fluctuations, exposure to borrowings;
- Economic risks arising from international crude oil and products market fluctuations;
- Operational risks such as pilferages, labour unrest, unplanned shutdown of refineries;
- Security and fraud risks, including cyber-security, data leakage and physical security risks;
- Reputational risks such as brand value risk;
- Environmental risk arising from impact on environment from our business activities and increase in compliance cost in view emerging regulations

The Company has also recorded the **highest ever profit of ₹ 24184.10 crore** since its inception. During the year, the Company recorded its **best ever annual Gross Refinery Margin of US\$ 11.25 per barrel**. The physical performance of the Company has reached near the pre-pandemic levels. **The demand for various transportation and domestic fuels edged up to the pre-pandemic levels**, except for aviation fuel.

- Compliance risks such as tax disputes and litigation; and
- Change in Government policies impacting profitability and ability to do business

In addition to these, with ESG scrutiny on the rise, globally and in India, the Company has broadened its coverage of identified risks to include environmental Impact in terms of GHG emissions impact (SCOPE 1 & 2) and water footprint.

Financial Review

During 2021-22, IndianOil posted the highest ever revenue by any Indian corporate at ₹ 7.28 lakh crore. The Company has also recorded the highest ever profit of ₹ 24184.10 crore since its inception. During the year, the Company recorded its best ever annual Gross Refinery Margin of US\$ 11.25 per barrel. The physical performance of the Company reached near the pre-pandemic levels. The demand for various transportation and domestic fuels edged up to the pre-pandemic levels, except for aviation fuel.

The Standalone financial performance of the Company and the various Segments is as under:

Particulars	₹ in crore		
	2021-22	2020-21	Variation
Revenue from Operations	7,28,460	5,14,890	2,13,570
EBITDA	47,568	42,614	4,954
PBT	31,733	29,716	2,017
Net Profit	24,184	21,836	2,348
Cash Profit	35,190	31,640	3,550
Borrowings	1,10,799	94,413	16,386
Revenue from Operations (Segment Wise)			
Petroleum	6,79,426	4,84,610	1,94,816
Petrochemicals	28,091	19,150	8,941
Other Businesses*	20,943	11,130	9,813
EBIT (Segment Wise)			
Petroleum	26,934	23,854	3,080
Petrochemicals	4,685	5,218	(533)
Other Businesses*	1,329	(123)	1,452
Other un-allocable (expenditure)/Income-net	3,614	3,861	(247)

*Other Business comprises Sale of Natural Gas, Explosives, Cryogenics, Wind & Solar Power and Oil & Gas E&P activities.

Standalone Financial Performance

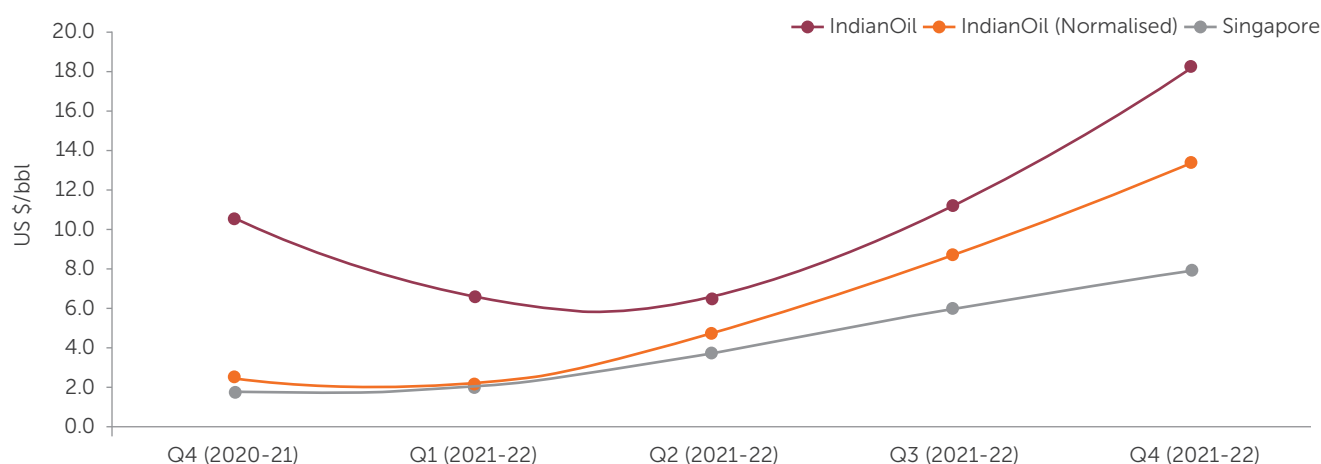
The Revenue from Operations increased by about 41% during the year (from ₹ 5,14,890 crore during 2020-21 to ₹ 7,28,460 crore during 2021-22). Nearly 80% of this growth was mainly on account of the increase in product price and the remaining was primarily due to the increase in sales volumes. Average crude price of the Indian Basket for 2021-22 registered an increase of 76% from US\$ 44.84/bbl in the previous year to US\$ 79.00/bbl in the current year.

The Company's EBITDA, Operating Profit and Net Profit margin for the current year were at 6.53%, 4.43% and 3.32% respectively, compared to 8.28%, 5.49% and 4.24% in the previous year. However, in gross terms the Company's EBITDA and Net Profit have gone up from ₹ 42,614 crore to ₹ 47,568 crore and from ₹ 21,836 crore to ₹ 24,184 crore respectively in the current year compared to 2020-21. The increase in

EBITDA, operating profit and net profit is mainly on account of inventory gains and better refinery margins in the current year. Riding on these factors, the Company's return on average capital employed and efficiency to deploy its assets to produce the revenue has improved from 15.20% to 15.44% and from 1.61 times to 2.03 times respectively in the current year compared to the previous year 2020-21.

At the beginning of the year, crude prices (Indian Crude Basket) were about US\$ 62/bbl, which went up to US\$ 128/bbl in March 2022 and closed at US\$ 108/bbl. The average HSD crack spread increased from about US\$ 3/bbl in the previous year to US\$ 10/bbl during the year with high volatility and even touched a high of US\$ 49/bbl in March 2022. Similarly, MS crack spread, which was about US\$ 3/bbl in the previous year, improved to US\$ 11/bbl during the year and even touched a high of US\$ 22/bbl in March 2022.

Quarter-wise movement in refining margins



As can be seen from the graph above, the Singapore benchmark for the Refining Margin improved during the year on account of the higher spread between international prices of petroleum products and crude. IndianOil's current price refining margin (i.e. normalised) during the year has moved in tandem with the international margins. The inventory holding by IndianOil is high on account of inland refineries, due to which, inventory gain/loss becomes significant during the fluctuating prices scenario and greater volatility is seen in reported margins. Normalised GRM of IndianOil increased from US\$ 2.31/bbl in 2020-21 to US\$ 7.61/bbl in 2021-22 compared to the increase in the Singapore GRM from US\$ 0.54/bbl to US\$ 4.99/bbl.

The ratio of Current Assets to Current Liabilities and the Debt:Equity ratio continues to remain at the same levels as that of previous year. Interest coverage ratio has deteriorated to the levels of 8.25 times compared to 11.24 times in the previous year, mainly on account of the exchange variation. The inventory-holding period is about 46 days and the Company's average collection period is 8 days. The details of significant changes in key financial ratios alongwith explanations thereof is provided in note no. 48 of the Financial Statements.

The Company has paid a total dividend of ₹ 9,640 crore during 2021-22. The EPS of the Company for 2021-22 is ₹ 26.34 and interim dividend paid during the year translates to ₹ 9.00 per share. In addition, a final dividend of ₹ 2.40 per share (post bonus) and issue of bonus equity shares in the ratio of one equity share for every two equity shares has been recommended by the Board. Detailed financial indicators and ratios for the last five years are provided in the section - 'Performance at a Glance' - forming a part of the Annual Report.

Group Financial Performance

The Group's Revenue from Operations was at ₹ 7,36,731 crore during the year, highest for any Indian company, compared to ₹ 5,20,237 crore in the previous year and the Net Profit was ₹ 25,102 crore compared to ₹ 21,638 crore in the previous year. The detailed profit walk-through from Standalone to Group is provided in Note 46 of the Consolidated Financial Statements.

The details of major subsidiaries and joint ventures are provided in Note 33A and 33B to Consolidated Financial Statements. During the year subsidiaries Chennai Petroleum

Corporation Limited, reported a profit of ₹ 1,352.03 crore and total Comprehensive Income of ₹ 1,375.53 crore, and Lanka IOC PLC, reported a profit of Sri Lankan ₹ 481.85 crore and a total Comprehensive Income of Sri Lankan ₹ 481.49 crore, which translated to a loss of ₹ (104.86) crore with a total Comprehensive Income of ₹ (169.19) crore, after adjustments, as per IndAS. Under Joint Ventures, Indian Oiltanking Limited reported a profit of ₹ 115.83 crore and a total Comprehensive Income of ₹ 115.75 crore and IndianOil Petronas Private Limited reported a profit of ₹ 189.77 crore and a total Comprehensive Income of ₹ 189.81 crore.

Internal Control Systems

The Company has put in place an internal control system comprising rules, policies and procedures that provide direction and increase efficiency but also strengthen the adherence to policies, while ensuring smooth and efficient business processes. The Company has laid down various policies as well as detailed manuals, which cover almost all the aspects of the business.

The internal processes and policies are reviewed from time to time to align them with the changing business requirements. Organisation-level controls, operational-level controls, anti-fraud controls and general IT controls have been put in place to ensure that business operations are carried out efficiently and effectively and chances of errors/frauds are minimised. The internal control systems are commensurate with the size and operations of the Company. It has an independent internal audit department, headed by a Chief General Manager, who reports to the Chairman. The department has officers from finance as well as other various technical functions. The audit assignments are carried out as per the annual audit programme, approved by the Chairman and the Audit Committee. The internal audit carries out extensive audits throughout the year covering every business process. The statutory auditors are also required to issue the independent auditor's report on the internal financial controls over financial reporting for the Company under clause (i) of Sub-Section 3 of Section 143 of the Companies Act, 2013. The report issued thereupon is attached to the standalone and consolidated financial statements respectively. The Audit Committee carries out a detailed review of the financial statements and deliberations with the internal auditors and statutory auditors before the same is recommended to the Board for approval.

Human Resources

IndianOil believes in holistic and meaningful employee engagements and the development of its human resources. The Company engages with the employees to tap their highest potential for the growth of its business. The Company assigns great importance to develop its human resources with a focus on its core values of Care, Innovation, Passion and Trust in building a cohesive workforce. It believes that the challenges surrounding the business environment can be mitigated by a workforce that is motivated, adaptive to change, innovative and fast in learning. Integrated HR practices through focused

recruitment, career path and learning and development have contributed to the future readiness of the workforce. The Company has a structured and robust succession planning framework for the identification and development of talent for the leadership pipeline. IndianOil has not only groomed several visionary leaders who led and transformed the Company over the years but also groomed leaders for both the public and the private sectors. During the ongoing Covid-19 pandemic, the Company took several initiatives to ensure the safety and well-being of its employees as well as its frontline workers engaged with its business partners.

IR Climate – Collaborative Value

The industrial relations (IR) climate in the Company has traditionally been harmonious. A collaborative IR climate has been maintained in the Company over the years to always be ready for the challenges. This has been reflected by the tireless efforts of the employees as well as its business partners during the Covid-19 pandemic, to ensure the supply of petroleum products across the country even during the lockdowns. The Company constantly shares the changes in its business environment, the consequent changes required in strategy and business models, the resultant impact on the current business and the people, along with future plans with the collectives and takes their views and suggestions into consideration. Regular structured meetings are held between the management and the collectives to discuss and deliberate on issues like productivity, welfare and the need to build a responsive and responsible organisation. The collectives have always steadfastly supported the management in overcoming challenges faced by the Company.

As of March 31, 2022, the employee strength of the Company was at 31,254, which comprised 17,929 executives and 13,325 non-executives, including 2,718 women employees.

Other Information

The details regarding the Company's CSR programmes, environment protection and conservation initiatives, technology absorption and adoption efforts, forays into renewable energy and foreign exchange conservation, etc., are provided in the Directors' Report and the Annexure.

Cautionary Statement

The information and statements in the Management's Discussion & Analysis regarding the objectives, expectations or anticipations may be forward-looking within the meaning of applicable securities, laws and regulations. The actual results may differ materially from the expectations. The various critical factors that could influence the operations of the Company include global and domestic demand and supply conditions affecting the selling price of products, input availability and prices, changes in Government of India regulations/tax laws, economic developments within the country and factors such as litigation and industrial relations.