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India's Demand for Crude Oil: Projections Till 2035

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ABSTRACT

India's demand for crude oil is projected to rise substantially by 2035, driven by rapid economic growth, accelerated industrialization, increasing urbanization, and heightened energy requirements—especially within the transport and power sectors (IEA, 2021; MoPNG, 2022). Statistical analyses reveal a strong positive correlation (r = 0.92) between crude oil demand and real income levels, indicating that rising income significantly influences energy consumption patterns (Planning Commission, 2023). Over the period from 2013–14 to 2034–35, the compound annual growth rate (CAGR) of oil demand is estimated to be approximately 9.68 %, highlighting a sustained upward trajectory (TERI, 2023). Despite this projected growth, India faces critical challenges due to its heavy reliance on oil imports, which currently account for over 85 % of its crude oil consumption (MoPNG, 2022). This dependency exposes the country to risks associated with global price volatility and geopolitical supply disruptions, raising significant energy security concerns (BP Energy Outlook, 2023). To mitigate these risks and ensure long-term energy sustainability, the study recommends diversifying energy sources, investing in energy efficiency, and accelerating the deployment of renewable energy technologies such as solar and wind (NITI Aayog, 2022; IEA, 2021).

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INTRODUCTION

India, as the third-largest oil consumer globally, is witnessing a continuous rise in crude oil demand, driven by factors such as economic growth, industrialization, and increasing vehicle ownership (IEA, 2021). Between 2000 and 2020, India's oil demand grew more than twofold, and projections show that by 2035, this growth will intensify significantly (MoPNG, 2022). The transport and power generation sectors remain the primary drivers of consumption. India imports over 85% of its crude oil requirements, making it highly vulnerable to international price shocks and geopolitical tensions (BP Energy Outlook, 2023). The objective of this study is to forecast India's crude oil demand until 2035 and assess the implications for energy policy and national security.

Crude oil demand refers to the total quantity of crude oil required by a country for its domestic consumption across various sectors, including transportation, industry, electricity generation, and residential use. (International Energy Agency [IEA], 2021). India is currently witnessing a significant rise in demand for primary energy, mainly due to rising electricity demand. As per the U.S. Energy Information Administration (EIA), India ranked third in terms of energy consumer in the world, after China and the United States. It was also ranked third in consumption of petroleum products and other liquids, behind US and China.

IEA India is projected to be the primary driver of global oil demand growth by 2030, ahead of China. The report noted that India will contribute nearly 1.2 million barrels per day (mb/d) to the overall increase in global oil demand during this period, placing the country as a key player in shaping the future dynamics of the global energy market. It will be due to factors such as economic boom and demographic growth (IEA, 2024). Between 2013-14 and 2023-24, India's total electricity consumption rose to 1543 bu from 874 billion units (BU) between 2013-14 and 2023-24, growing at an annual rate of 5.8 percent. During the same period, India's peak electricity demand increased by 79 percent (from 136 GW to 243 GW), as per India Energy Scenario Report 2023-24. According to the National Electricity Plan (NEP) 2023 of India, it aims is to expand its transmission network for accommodating peak demand (estimated) of 458 gigawatts (GW) by 2032 (US EIA). However, India's per person energy consumption remained well below the world average (77 gigajoules (GJ) in 2023 and stood at 27.3 GJ. It was far lower than US (consuming 277.30 GJ) and China (120 GJ).

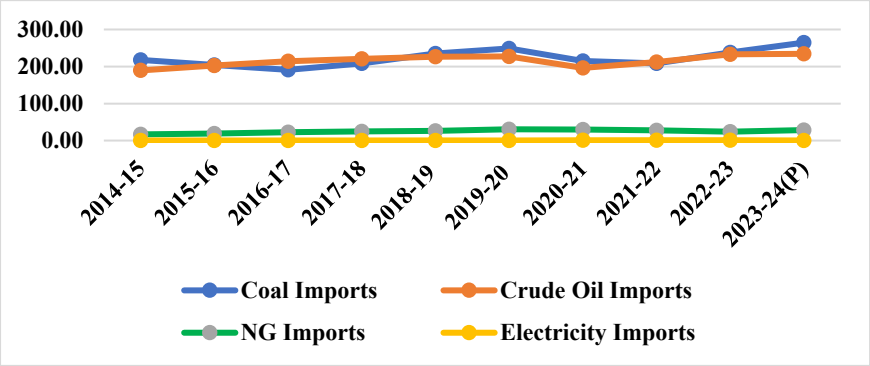
Following coal, crude oil and gas are the next most important sources of energy in India. Crude oil accounts for about 31 percent of India's total energy consumption in 2023-24, after coal, accounting for 57.6 percent (Table 1). The concerning fact is, India is a net importer of both crude oil and coal. To meet its domestic energy demands, the country imports significant quantities of these fuels. The exports for coal remain negligible for the coal and while non-existent for crude oil (Fig 1). Net imports of crude oil grew at a compound annual growth rate of 2.39 percent, as against coal, which grew at 2.18 percent between 2013-14 and 2023-24 (computed from *Energy Statistics, 2024*).

Due to India's high dependence on oil imports, the energy security remains highly vulnerable to volatile international crude oil prices and various supply disruptions (Naeem et al., 2022; Raheem, 2022). The figure stood 55.3 percent from Middle East in the year 2022-23 followed by Eurasia (26.3 percent); 7.6 and 7.4 percent from Africa and North America respectively (Standing Committee on Petroleum & Natural Gas 2023). The relative dependence is still highest on the Middle East nations.

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Figure 1: Year-wise India's Energy Net Imports



Source: Energy Statistics 2023 Ministry of Statistics and Programme Implementation, Govt. of India.

Table 1: Share of Different Fuels in Final Consumption of Primary Energy in India (2013-14 to 2022-23) (%)

Year	Coal	Lignite	Crude Oil	Natural Gas	Electricity
2013-14	53.0	1.6	35.5	7.5	2.4
2014-15	55.6	1.6	33.6	6.9	2.3
2015-16	55.2	1.4	34.3	7.0	2.2
2016-17	53.8	1.4	35.3	7.2	2.3
2017-18	54.0	1.4	34.8	7.4	2.4
2018-19	55.2	1.3	33.6	7.2	2.6
2019-20	54.7	1.2	33.4	7.6	3.0
2020-21	55.7	1.2	31.8	7.9	3.3
2021-22	56.5	1.4	31.3	7.5	3.3
2022-23 *(P)*	57.6	1.3	31.1	6.6	3.4

Source: Computed from Energy Statistics 2024, Ministry of Statistics and Programme Implementation, Govt. of India. P: Provisional

On the pricing front, with the onset of global recession, crude oil prices increased by nearly 35 percent between 2007 and 2013, reaching to US $ 76.17 per barrel in 2011 to US $ 102.63 in 2013 (World Development Indicators, 2024). However, from 2014 onwards, the prices experienced a sharp decline of over 60 percent reaching as low as US $ 44 per barrel by 2016—marking the most significant downturn in the oil industry since the 2005. India will surpass the China as a world's major source of oil, as Chinese economy is transitioning towards less energy-intensive phase. This will have significant implications for strengthening India's energy security (World Energy Outlook 2024).

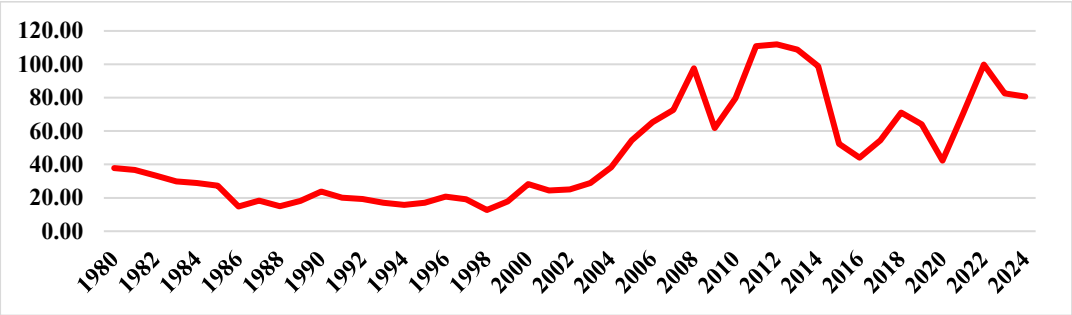
This steep drop in prices fueled greater oil consumption, thereby increasing the country's reliance on imports. Prices rose further for next two years and plummeted to US $ 42 per barrel in 2020, lowest ever since 2005. But a sharp increase followed later in the year 2022. Events like COVID-19 and the Russia-Ukraine War were responsible for high volatility

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in crude oil prices (Zhang et al. 2023). Prices easing out again later post 2022 as war conflict and supply disruptions fears alleviated, driving prices down·

(Fig 2). These falling prices can increase appetency for oil, making country more relying on the imports.

Figure 2: International Crude Oil Prices, UK Brent ($/bbl)



Source: *Energy Statistics 2024, Ministry of Statistics and Programme Implementation, Govt. of India.*

Healthy economic growth, dynamic population, urbanization and industrialization growth, India is expected to play pivotal role in world oil markets in terms of both production and consumption, implying it will remain a dominant energy resource globally until 2030.

SUPPORTING STUDIES

The World Energy Outlook 2024 report has forecasted that for the period 2023-2030, India will account for more than 1/3rd of global oil demand growth. The report has noted that India will surpass many nations in oil consumption at a faster pace the country is still developing and in initial stages of economic development. Just like any another commodity or service, the energy growth and country's GDP are also positively related and Indian GDP per capita is also on increasing trajectory.

Soni (2014) has investigated the trends and dynamics of oil shocks by focusing on India's susceptibleness to variability in global and domestic oil prices and stocks/supplies. For assessing the vulnerability, the study analyzed various factors such as, including India's growing reliance on oil, role of oil in the overall energy mix and the impact of crude oil and other petroleum products on the trade balances. The findings suggest that India's exposure to oil shocks is likely to intensify in the future, attributed to anticipated increase in the dependence on imported oil. His paper has rightly predicted the same.

OBJECTIVES OF THE STUDY

1. To project India's crude oil demand for the years 2030 and 2035 using quantitative forecasting techniques.
2. To evaluate the impact of alternative economic growth scenarios—specifically, annual GDP growth rates of 8%, 9%, and 10%—on projected crude oil demand.
3. To compare and analyze the variation in crude oil demand under each economic growth trajectory in order to inform energy planning and policy formulation.

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HYPOTHESES OF THE STUDY

H_1: India's crude oil demand will significantly increase by 2030 and 2035 across all economic growth scenarios (8%, 9%, and 10%).

H_2: Higher GDP growth rates (9% and 10%) will result in proportionately higher crude oil demand compared to the 8% growth scenario.

H_3: There will be a statistically significant difference in crude oil demand between the three projected economic growth scenarios by 2035.

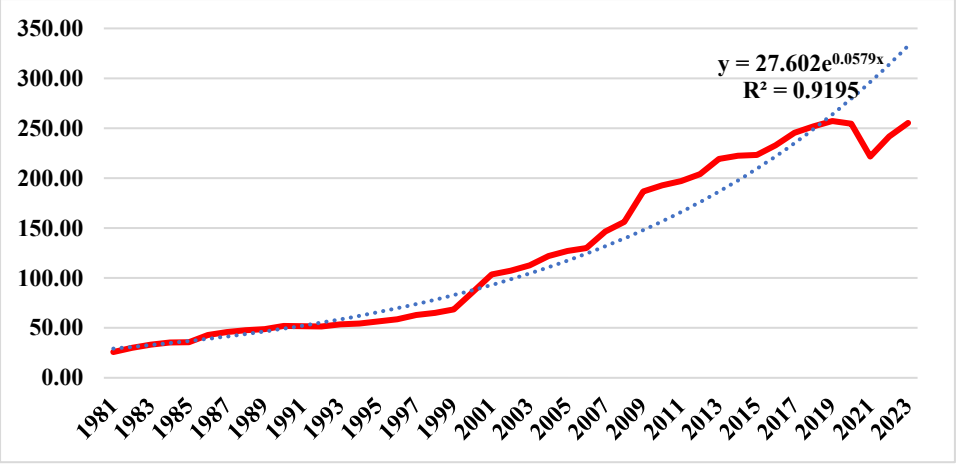
METHODS

The data on India's crude oil consumption has been sourced from the *Energy Statistics 2024* published by the Ministry of Statistics and Programme Implementation and real GDP, which is used as a proxy for real national income, from the *World Development Indicators* database of the World Bank (2024). The analysis employs a simple trend projection method. Time series data from 1980 has been complied for the analysis. The crude oil consumption is measured in metric million tones and real GDP is expressed in local currency unit, rupees crores.

RESULTS AND FINDINGS

As shown in table 2, India's crude oil consumption is projected to continue its exponential growth in the coming years. These estimates were derived by applying simple statistical forecasting methods grounded in the historical trend depicted in Figure 3. The projection model is built on the assumption that real income remains the primary driver of demand, while all other influencing factors are held constant. Accordingly, no additional control variables were introduced. The resulting projections reflect anticipated consumption levels under this assumption and serve as a simplified outlook of future energy demand**.**

Figure 3: Trend of Crude Oil Consumption in India (million tones)



Source: *Energy Statistics 2024, Ministry of Statistics and Programme Implementation, Govt. of India.*

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Table 2: Demand Projections for Crude Oil in India (million tonnes)

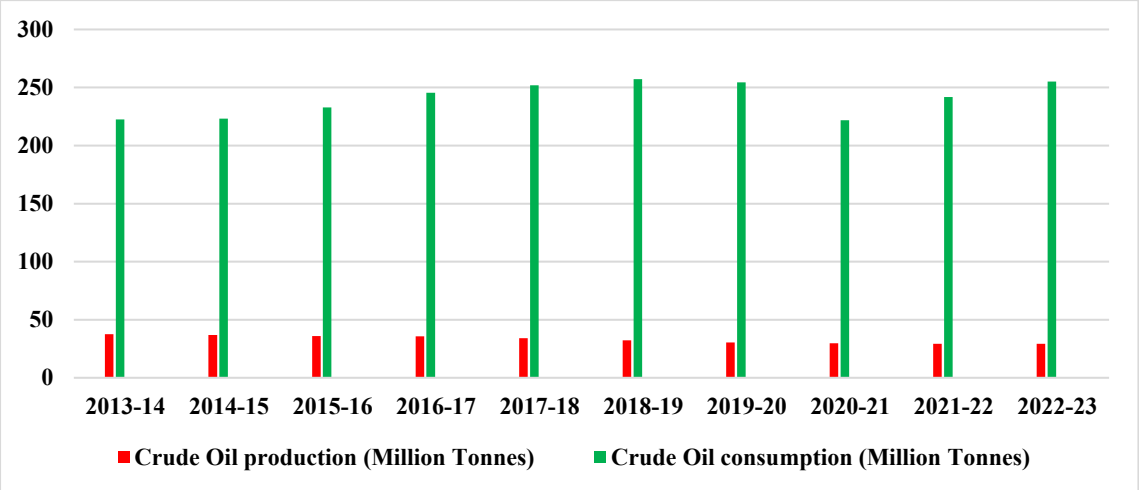
	GDP growth		
Year	**8 percent**	**9 percent**	**10 percent**
2030	515	543	573
2035	749	827	913
CAGR (2024/25-2034/35	7.73	8.70	9.68

***Source**: Self Computed*

The table 2 depicts the calculations show that demand for oil is expected to increase at a compound annual growth rate of 7.73 percent, 8.70 percent and 9.68 percent if GDP grows at 8 percent, 9 percent and 10 percent respectively, which is quite significant. The coefficient of correlation was also computed and suggesting a very strong linear association between crude oil demand and income are highly correlated. The coefficient was found to be 0.92. Agrawal (2012) empirically estimated demand for crude oil (also the diesel and petrol demand for India) for the period between 1970/71 and 2010/11 using the Auto Regressive Distributed Lag co-integration econometric procedure. He also computed projections for the period 2025 under varied scenarios of GDP growth (with a mean of 7 per cent) and oil prices. His analysis also considered only two variables, like the present study - crude oil consumption and oil prices. While the present study has taken income instead.

Given the strong positive correlation between crude oil demand and GDP, it is quite evident that India's economic growth is linked to its rising energy demands. However, the domestic demand and supply imbalances indicates the urgency to explore the other energy resources (fig 4). This will also mitigate excessive reliance on crude oil imports, as also the vulnerabilities and fluctuating global crude oil prices.

Figure 4: Demand and Supply Imbalances of Crude Oil in India (in million tonnes)



Source: Energy Statistics 2024, Ministry of Statistics and Programme Implementation, Govt. of India

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Literary work by the scholars have recommended to reduce the oil dependency in imports, India has to go for the reduction in electricity prices would lead to crude oil dependency. from electricity generation and transportation; resorting to other alternative energy sources like as nuclear, hydro and solar; moving toward gas based technologies (Press Information Bureau, 2024; Mishra et al. 2023; Sethi and Bansal, 2016; Aggarwal 2012). As per the International Energy Agency estimates, the country will be requiring investments close to US$ 600 billion during the years 2011–2030 across various segments of its hydrocarbon chain to boost energy supply and infrastructure improvement. Aggarwal (2012) in his paper suggested that for improving efficiency in petroleum products usage and supplies, production sharing agreements by Indian oil companies with other nations should be explored.

CONCLUSION

1. **India's Strategic Role in the Global Energy Landscape**

   India is recognized as a major player in the global energy sector, both in terms of consumption and emerging production capacities (Sokołowski, 2019). As one of the fastest-growing economies, India's energy strategy significantly influences global energy markets.

2. **Energy Efficiency as a Core Component of National Policy**
   Energy efficiency has become central to India's energy planning frameworks, with initiatives like the Perform, Achieve, and Trade (PAT) scheme and the Unnat Jyoti by Affordable LEDs for All (UJALA) program showing measurable reductions in energy intensity (BEE, 2022; IEA, 2021).

3. **Need for a Balanced and Diversified Policy Mix**
   A wise combination of policies is essential to address rising crude oil demand. This includes enhancing domestic oil exploration, supporting electric mobility, and incentivizing research in biofuels and hydrogen (NITI Aayog, 2022).

4. **Renewable Energy and Technological Investment Are Key**
   Investments in solar, wind, and other renewable energy sources, along with adoption of energy-efficient technologies, are crucial in transitioning away from crude oil dependency (TERI, 2023; IRENA, 2022).

5. **Sustainability Through Integrated Energy Policy**
   Ultimately, the right mix of renewable energy, infrastructure development, and import reduction strategies will enable India to balance economic growth with environmental goals (IEA, 2021; BP Energy Outlook, 2023). Government policies like the National Hydrogen Mission and Green Energy Corridor are indicative of a proactive shift.

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