India ranks sixth in the world in terms of energy demand accounting for 3.5% of world commercial energy demand in 2001. With a gross product (GDP) growth of 8% set for the Tenth Five-Year Plan, the energy demand is expected to grow at 5.2%. Although, the commercial energy consumption has grown rapidly over the last two decades, a large portion of India's population does not have access to it. At 479 kg of oil equivalent (kgoe), the per capita energy consumption is also low even compared to some of the developing countries, like Thailand (1,319 kgoe), Brazil (1,051 kgoe) and China (907 kgoe). India is fortunate to be endowed with both the non-renewable (particularly coal) and renewable energy resources. Despite the resources potential and the significant rate of growth in energy supply over the last few decades, India faces serious energy shortages. This has led to reliance on increasing imports for meeting the demand of oil and coal. As per current projections, India's dependence on oil imports is expected to increase. The demand of natural gas also outpaces supply and efforts are being made to import natural gas in the form of liquefied natural gas (LNG) and piped gas. The power sector has also been experiencing severe shortages. The Tenth Plan strategy for the sector includes increasing the production of coal and electricity, accelerated exploration for hydrocarbons, equity oil abroad, introduction of reforms through restructuring/deregulation of the energy sector to increase efficiency, demand management through introduction of energy efficient technologies/processes and appliances.

The whole process of producing, transporting and consuming energy does have overwhelming on the physical impact on the environment. Pollution check process would form an important part of the development of energy sector. In order to have an integrated energy approach and to meet the policy goals of economic efficiency, energy security, energy access and environment, the establishment of institutional links and coordinating mechanisms has been proposed. India's energy use is mostly based on fossil fuels. Although the country has a vast coal and hydro resource potential, but it is relatively poor in oil and gas resources. Consequently, it has to depend on imports to meet its energy supplies. The geographical distribution of available primary commercial energy sources in India is quite skewed, with 77% of the hydro potential located in the northern and north-eastern region of the country. Similarly, about 70% of the total coal reserves are located in the eastern region while most of the hydrocarbon reserves lie in the west. The latest estimates indicate that India has around 0.4% of the world's proven reserves of crude oil. As against this, the domestic crude consumption is estimated at 2.8% of the world's consumption. The balance of recoverable reserves as estimated in the beginning of 2001 is placed at 733.70 million tonnes (mt) of crude and 749.65 billion cubic meters (BCM) of natural gas.
The share of hydrocarbons in the primary commercial energy consumption of the country has been increasing over the years and is presently estimated at 44.9% (36.05% for oil and 8.9% for natural gas). The demand for oil is likely to increase further during the next two decades. The transportation sector will be the main driver for the projected increase in oil demand. Consequently import dependence for oil, which is presently about 70%, is likely to increase further during the Tenth and Eleventh plans.

India has about 0.4% of world's natural gas reserves. Initially the gas reserves had been developed largely for use as petrochemical feedstock and in the production of fertilizers, but gas is increasingly being used for power generation, industrial application and more recently in the transport sector. Presently the share of power generation capacity based on gas is about 10% of the total installed capacity.

The India Hydrocarbon Vision 2025 of the Government identifies natural gas as the preferred fuel for the future and several options are being explored to increase its supply capacity including building facilities to handle imports of liquefied natural gas (LNG) and setting up of pipelines from major gas producing countries. India is also reported to have significant deposits of gas hydrates. However, the true extent of this resources and its potential for commercial exploitation is still being evaluated. India is gifted with abundant natural and renewable resources of energy viz., sun, wind and biomass. The country has been able to achieve significant capacity addition of 1,367 MW through wind farms and ranks fifth in the world after Germany, United States, Spain and Denmark in the generation of wind energy. The available renewable resources need to be exploited by giving a commercial orientation, wherever possible. It may be necessary to continue with subsidies in the case of socially oriented programme to meet the energy requirements of rural areas, particularly, remote villages, which may be difficult to service through the conventional power grid in the near future.

The world energy consumption pattern has been changing over the years. Presently, the share of oil in the world energy mix is 40% and that of gas is 23%. The international energy outlook projections indicate that the hydrocarbons will continue to cater to 68% of the total commercial world energy demand over the next two decades. The share of oil remain the same whereas that of natural gas may go up as the latter is emerging as the preferred feedstock and fuel since it is more environment friendly. Against a 63% supply of primary commercial energy through hydrocarbons in the world, in the case of India it is 44.9%. There is limited scope for the increased use of gas in India, unless some large reserves are discovered or there is large-scale import. The demand for oil in the country over the next five years is expected to grow at an annual average rate of 3.6%, which will be higher than the average growth of around 2% in the world energy demand. Import of LNG is on open general license (OGL). A number of projects for setting up of LNG terminals have been approved by the Government and three terminals are under construction. The fate of other terminals is uncertain because statutory clearances and other
agreements/guarantee are yet to be finalized. Another terminal at Kochi may also immature during the Tenth Plan. Considering that four terminals will be commissioned during the Tenth Plan, the overall extent of imports by the terminal year will be commissioned during the terminal year could be in the range of 40-50 million standard cubic metres per day (MMSCMD). Pipeline gas imports are economically superior to LNG imports. However, the success of transnational gas pipeline projects critically hinges on various geopolitical considerations involving security of supply, transit and importing countries etc. initiatives have been taken for pipeline gas imports from various countries and some gas supplies may commence in latter part of the Tenth Plan.

The increasing imports of crude oil and the proposed LNG imports during the Tenth Plan, high price volatility in the international markets and disruption of supplies due to war etc. raise the issue of oil security. The strategy to address the oil security concerns involves diversification of sources for crude supplies, strategic storage and globalization measures to bring equity oil and gas/LNG from abroad. In view of this, the following issues would be given priority during the Tenth Plan. In view of the stagnating domestic production of crude and the widening gap between demand and supply of oil and gas, there is a need to diversify oil supply sources, and acquire equity oil and gas abroad. This would be an important component of the strategy to achieve oil security. The Government would encourage oil PSUs/private sector companies to tap opportunities available abroad for acquiring exploration acreages, either on their own or through strategic alliances. During the Tenth Plan, ONGC envisages 5.2 mt of oil and 4.94 BCM of gas production from Russia (Sakhalin-I) and Vietnam. The need for strategic storage arises from the lack of self-sufficiency in meeting the crude oil requirements. Crude oil inventories in the country are low, and are expected to go down further in the competitive market regime. Under the APM, the storage of crude oil and petroleum products and the strategic requirements were being taken care by the oil PSUs. However, in the deregulated scenario, the oil companies will optimize their inventories to meet their operating requirements in order to take advantage of competitive pricing and enhance their margins. Thus, a mechanism for creating strategic storage would need to be evolved in the Tenth Plan. Another step towards ensuring oil security is development of non-conventional energy sources such as CBM and gas hydrates. Further, blending of ethanol with motor spirit and diesel is to be pursued.

Since the refinery sector has been de-licensed, it is not possible to correctly assess the future plans of refining capacity additions. The projection of total refining capacity materialization during the Tenth Plan would depend upon several factors including its effect on import and export possibilities and refining margins. The hydrocarbon sector would be developed as a globally competitive industry, which could be benchmark against the best in the world through technology upgradation and capacity building in all facets of the industry. Oil conservation through efficient utilization can be looked upon as
a quicker, efficient and economic source of new energy. Any reduction in oil demand due to efficient utilization would allow the diversion of this scarce resource to other pressing needs and new economic activities. Thus, there is an urgent need to establish a system framework and approach to realize the overall conservation potential. However, the existences of market imperfection limit their effectiveness. This calls for a regulatory approach, which includes setting of minimum standards and the labeling for all types of efficient equipment and appliances. In India, the emphasis has always been on supply side management. However, demand side management needs to be pursued so as to minimize the overall cost. Demand side management in the oil sector implies minimizing the oil intensity of the economy without compromising on the pace of economic development. The demand for petroleum products has increased rapidly during the last two decades. Since the transport sector consumes about 45% of oil in the country, demand management measures should, primarily be directed at this sector. These would involve shift of traffic from road to rail, introduction of mass transport and other public transport in metropolitan cities and mandating fuel efficiency levels in transport vehicles. Presently, the product quality requirements in India are ahead of most of the countries in the Asia-Pacific and Persian Gulf regions. In order to enable adoption of Bharat Stage-II vehicular emissions standards throughout the country and Euro III equivalent emission norms in seven mega cities from April 2005, the quality of petrol and diesel would need to be further improved. For this purpose, measures such as further reduction of sulphur content need to be taken in a time-bound manner. Accordingly, Indian refineries would need to invest in secondary and tertiary processing facilities to ensure that the quality of products conforms to the appropriate specifications.