

# Trends in Energy Demand in India

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## Abstract

India is a one of the fastest developing country in the world which will see a huge transformation in the energy sector in future. The Demand for energy in India has grown many folds in the recent years which increased due to increase in the rate of urbanisation and the population. The Plans like Make in India and Smart cities project will further increase the demand for energy in the future so the government of India should recognise this fact and invest heavily in expansion of the different sources of the energy. The Paper aims to study the comparison of energy demand trends region wise and sector wise in order to review the present policies launched by the government in the energy sector.

**Keywords:** Bioenergy, LPG, OECD

## Introduction

India is a one of the fastest developing country in the world which will see a huge transformation in the energy sector in future. Given the issues of the energy security, India is in limelight of the global interaction on the issues related to the energy. India with its vibrant democracy a home of one –sixth of the world's population stands at number three on the basis of GDP measured on purchasing power parity. The modernisation of the Indian economy will depend upon how efficiently it utilises its energy resources and how it bargains with the rest of the world in order to get fuel for its industries and power plants. There are various opportunities but at the same time the size of the challenges are also making development difficult. However the incomes are rising and correspondingly living standards are also on rise but at the same time India is also a home to one third of the world's Poor and its GDP per capita is also below the international level. The Demand for energy in India has grown many folds in the recent years which increased due to increase in the rate of urbanisation and the population. The Plans like Make in India and Smart cities project will further increase the demand for energy in the future so the government of India should recognise this fact and invest heavily in expansion of the different sources of the energy. It is said that Energy resources of the country decides the pace of the development of an economy, so in order to grow fast India should look at the abundant energy resource rich countries which can provide Fuel at a cheaper cost . The Researchers and policymakers should recognise this challenge and make strenuous efforts in order to improve the investment environment and remove the bottlenecks in the supply of the energy resources. The analysis and findings in this Paper will disclose the multiple pressures and show where the demand in the energy market is heading. The policies introduced by the government of India will change the evolution of the energy sector which will help to realise the huge benefits that a well –managed expansion of energy provision will bring.

## Aim of the Study

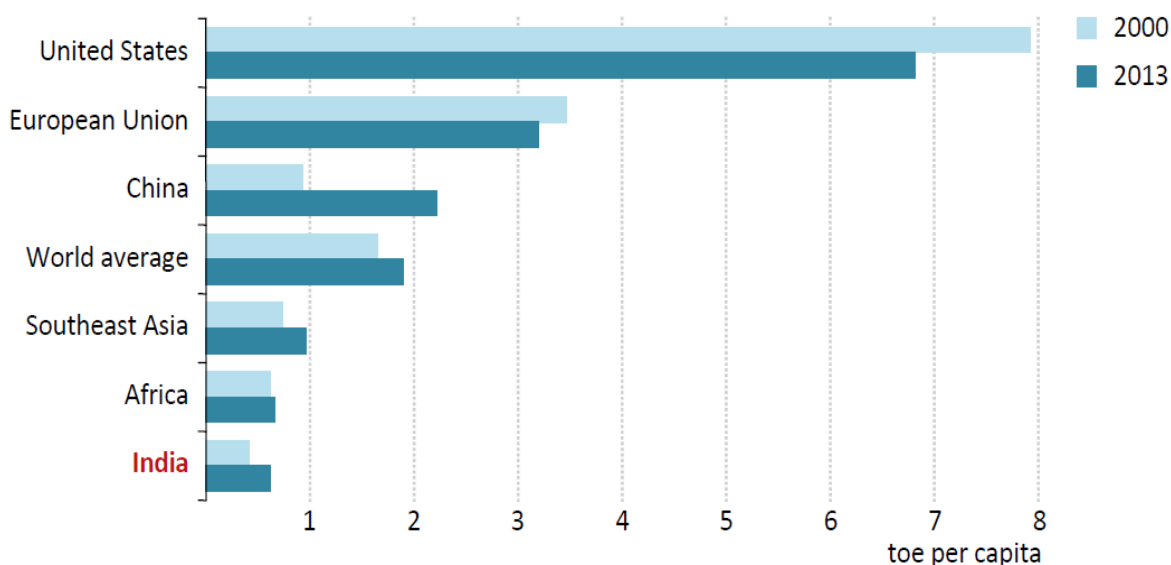
The Paper tries to bring out the sectors of the Economy which will see the huge rise in the demand for the energy. It also studies trends in the demand for the energy in India which can guide the policymakers to invest in optimum energy mix. However, No effort is made here to prescribe a path for India but there is an attempt to provide a coherent framework to contribute to the policy choices that India itself will make. The Paper aims to study the comparison of energy demand trends region wise and sector wise in order to review the present policies launched by the government in the energy sector.

**Trends of Energy Demand**

Since 2000 India has contributed a 10 % rise in the global energy demand which is a major chunk in the increase in the total energy demand. The Energy demand during this period has almost doubled which has pushed the nation's share in the global demand from 4.4 % at the beginning of the century to 5.7 % in 2013. These numbers are quite impressive but the proportion is still below if we see size of the population which is 18 % of the global population that is a strong indicator of the future growth. On the Per capita basis, the energy demand in India has grown by

a more than 46% since 2000 and remains only around one-third of the world average, which is slightly lower than the average for the African continent (Figure 1.1). This is because of the reason that a significant part of the Indian population remains without modern and reliable energy, despite a rapid expansion of the reach of the power grid in recent years it is estimated that around 240 million people in India lack access to electricity. The Figure 1.1 shows that the energy consumption in developing countries is showing an increasing trend where as the energy consumed by the developed world declined.

**Figure 1.1** ▶ Per-capita energy consumption in India and selected regions

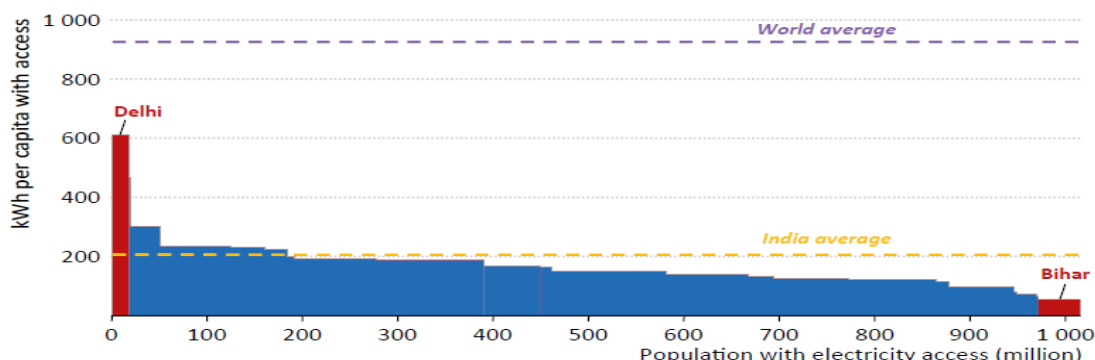


Note: toe = tonnes of oil equivalent.

The widespread differences between regions and states within India necessitate looking beyond national figures to fully understand the country's energy dynamics. This is true of all countries, but for the countries like India, it is particularly important because of its Size and the heterogeneity in terms of demographics, income levels, resource endowments and the federal structure that leaves many important responsibilities for energy with individual states. If we take the figures of the residential electricity consumption per capita (for those with access to electricity) which shows a wide range of deviation from the national average. In Delhi the electricity consumption is higher than non OECD countries average where as in other states (see Figure 1.2 ) The residential electricity consumption is far below the world average and nearly ten times lower than the OECD levels. As per IEA Report 2015, In the state of Bihar the Average residential consumption is at around 50 kilowatt-hours (kWh) per capita per year which is consistent with an average household use of a fan, a mobile telephone and two compact fluorescent light bulbs for less than five hours per day.

The Growth of demand for Energy has almost doubled since 2000, but at the same time it is slower than the rate of economic growth over the same period (Figure 1.3). This is because of the shift of the demand from bioenergy consumption in the residential sector, on the other side the rising importance of the services sector in the Indian economy and increased policy efforts directed at end-use energy efficiency. As a result, it took 12% less energy to create a unit of Indian GDP (calculated on the basis of purchasing power parity [PPP]) in 2013 than it was required in 1990. In India, the amount of energy required to generate a unit of GDP (PPP basis) is slightly lower than the global average. Much of the energy produced in India is lost because of the obsolete generation technologies used and the poor state of the transmission and distribution infrastructure. At the same time relatively low efficiency of the end-use equipment remains across the entire energy system which has hampered the further growth in the energy consumption.

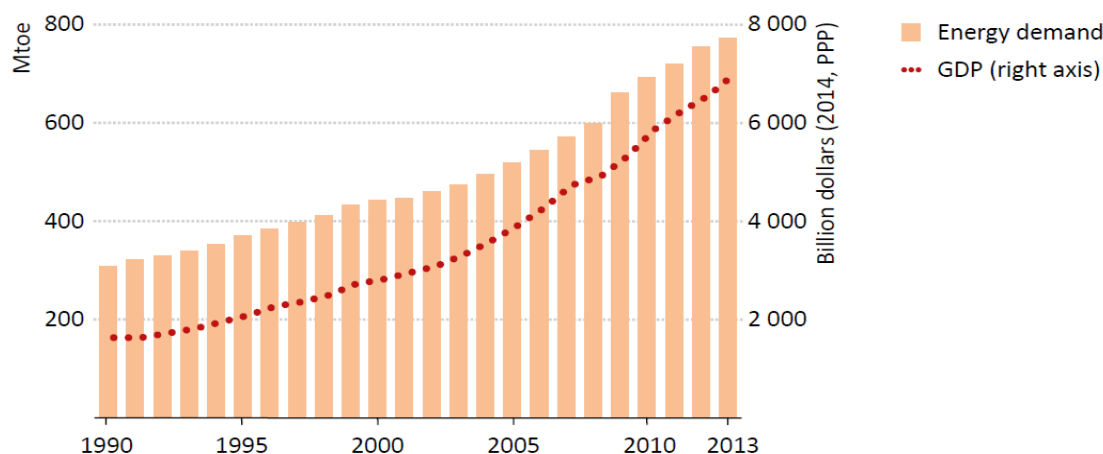
**Figure 1.2** ▷ Annual residential electricity consumption per capita by state in India (for those with access), 2013



Note: Annual residential electricity consumption per capita (for those with access) by state is estimated by dividing the annual residential electricity consumption by the number of people with electricity access for each state. This estimate is not comparable with the common “electricity consumption per capita” indicator, which takes into account electricity consumption of all sectors divided by total population.

Sources: National Sample Survey Office, (2014a); Central Electricity Authority, (2014a); IEA analysis.

**Figure 1.3** ▷ Primary energy demand and GDP in India

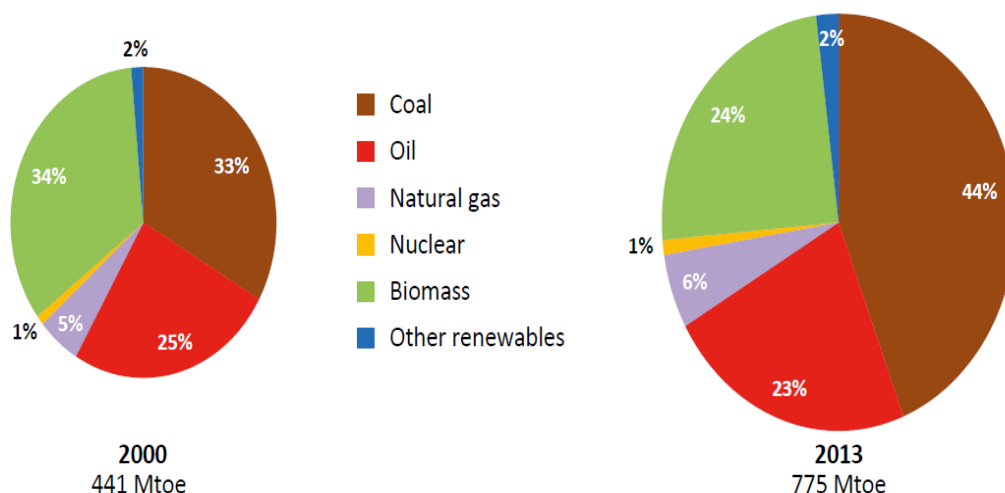


Note: Mtoe = million tonnes of oil equivalent.

Almost three-quarters of the demand for energy in India was met by fossil fuels whose share has increased since 2000 because of a rapid rise in coal consumption and a decreasing role for bioenergy. This is because of the households who are moving away from the traditional use of solid biomass for cooking (Figure 1.4). Coal now accounts for 44% of the primary energy mix (compared with under a third globally) which is mainly because of the expansion of the coal-fired power generation fleet, although increased use of coking coal in India’s steel industry

has also played a part. The availability and affordability of coal relation to other fossil fuels have contributed to its increase, specifically in the power sector. Demand for bioenergy which consists of solid biomass i.e. fuel wood, straw, charcoal or dung has grown in absolute terms, but its share in the total primary energy mix has declined by almost 10 percentage points since 2000, as households moved to other fuels for cooking, notably liquefied petroleum gas (LPG).

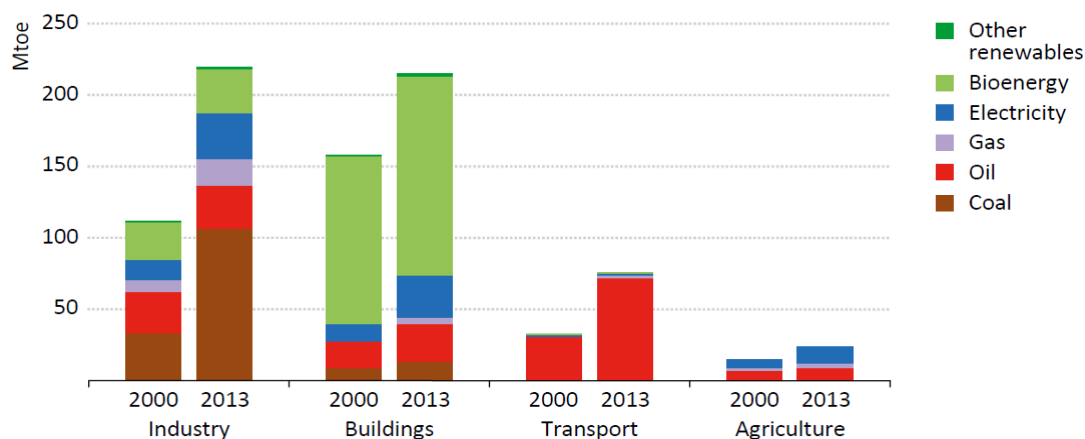
**Figure 1.4** ▷ Primary energy demand in India by fuel



In 2014, Oil consumption of India stood at 3.8 million barrels per day (Mb/d), in which 40% is used in the transportation sector. On the other hand the Demand for diesel has been particularly strong which accounts for some 70% of road transport fuel use. It is due to the high share of road freight traffic which is majorly diesel-powered which has also contributed in the relatively lower prices of diesel even after the curtailment of the diesel at the end of 2014. On the same lines the gasoline prices were also deregulated in 2010 whose price is now determined by the market forces. The use of LPG has increased rapidly since 2000 which went over 0.5 Mb/d in 2013 (The consumption of LPG is second after diesel among the oil products, which has pushed gasoline down into an unusually low third place). The rise in LPG consumption also shows increasing urbanisation and subsidies. The Natural gas which is source of clean fuel makes up a minute share of the energy mix (In 2013 it was 6% compared with 21% globally). Natural gas is used for power generation,

production of fertilizers, cooking in residential sector and transportation fuel. On the other hand Nuclear power, Hydropower and other modern renewables like solar & wind are expected to increase their share in the total energy mix in the coming years. Energy demand was majorly dominated by the buildings sector (Figure 1.5). The Energy Demand in industries has grown more rapidly as compared to building sector since 2000 which has also overtaken building sector as the main energy user in 2013. The key driver of consumption in the buildings sector in both the rural and urban areas is rising levels of appliance ownership which includes fans and televisions where as in urban areas it increased due to higher sales in refrigerators and air conditioners since 2000. This resulted in the increase in the electricity demand in the buildings sector growing at a rate of 8% per year during 2000-2013. In the buildings sector, the share of bioenergy which includes traditional use of biomass for cooking and heating has decreased from 75% to 66% in 2013.

**Figure 1.5** ▷ Energy demand by fuel in selected end-use sectors in India



Notes: Other renewables includes solar photovoltaics (PV) and wind. Industry includes energy demand from blast furnaces, coke ovens and petrochemical feedstocks.

The energy demand in the Industrial Sector has increased two times over the period 2000-2013 which is due to strong growth in coal and electricity. The Industries like steel which is considered to be a energy-intensive sectorsaw a tripling in steel production. The consumption of cement and steel in India are relatively low considering India's size and income levels. India's consumption level of cement is 220 kg per capita which is well below the levels seen in China in recent years whose consumption is 1770 kilograms per capita. The Primary sectors like Agriculture and allied activities have a small share in the total energy demand however this sector is a key source of employment .The Agriculture sector has accounted for roughly 15% of the increase in total final power demand since 2000 because now more farmers have obtained electric pumps for irrigation.

#### **Conclusion**

India is in the early stages of a major transformation, which will bring new opportunities to its 1.28 billion people that will move thenation towards the epicentre in many areas of international affairs. The energy sector is expanding quickly but is set to face further challenges as India's economy is moving towards modernisation which will decide its policy priorities. As per IEA Report (2015) Energy use has almost doubled since 2000, and economic growth and targeted policy interventions have lifted millions out of extreme poverty; but energy consumption per capita is still only around one-third of the global average and some 240 million people have no access to electricity. The circumstances shows that the India's energy

demand will increase in the future and it will tackle it by achieving efficient energy generation and reforming the subsidy in the energy sector.

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