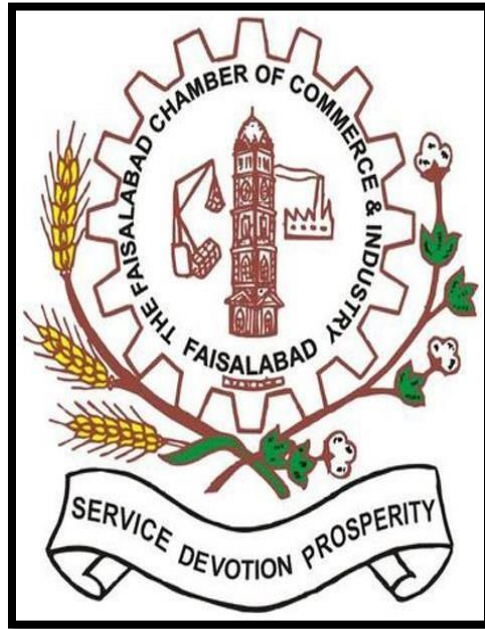


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Industrial and Domestic energy consumption in India and Pakistan

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Energy

The use of energy has increased significantly due to various inventions and innovations of common use made in the last century. Thus, almost all human activities have become more dependent on energy. For developing nations, there is a fundamental need for reliable and affordable energy. In these countries, energy demand has been increased due to expansion in industry, modernized agriculture, increased trade, and improved transportation. Pakistan is dependent on energy imports because there is a lack of investment in indigenous resources of hydro, natural gas, and lignite. Biomass is the largest energy source. The government has decided to stop building new coal-fired power plants because of environmental issues.

The public oil and gas companies are planned to be privatized for various concerns. Due to a significant increase in electricity demand, both state-owned companies and IPPs are actively engaged in producing electricity. However, fiscal sustainability has become a challenge due to the increase in energy payments. This energy deficiency began from a fuel mix transformation which was initiated two decades ago when power generation used to rely more on imported furnace oil than hydropower. The current energy crisis began to manifest itself by late 2007. The problem has evolved over the years from one of chronic power supply deficits to one where there is excess installed capacity but not enough cash flow in the system to run it.

The latter created a 'circular debt' issue. Specifically, the 'circular debt' in Pakistan's energy supply chain refers to the cash flow shortfall incurred in the power sector from the delayed/non-payment of obligations by consumers, distribution companies, and the government.

It has continued to grow over the years, rising from 1.6 percent of GDP (Rs161billion) in 2008 to 5.2 percent of GDP (Rs 2,150 billion) in June 2020. The present government has given prime importance to resolving this issue and working on various options to reduce circular debt. In terms of energy mix Pakistan's reliance on thermal which includes imported coal, local coal, RLNG and, natural gas has been decreasing over the last few years. Pakistan's dependence on

natural gas in the overall energy mix is on the decline and the reduction of its share in the energy mix is due to declining natural gas reserves and the introduction of LNG. The share of renewable energy has steadily increased over the years.

The government is also taking measures to increase the shares of Hydel and Nuclear in the energy mix. Energy systems around the world are going through rapid transitions that will bring significant changes to the way we fuel our cars, heat our houses, and power our industries. These trends will have widespread implications for businesses, governments, and individuals in the coming decades. In Pakistan, special measures have been taken to use these innovations for domestic usage of energy, such as Electrical Vehicle Policy 2020-25.

Energy Consumption in Pakistan

Pakistan's Electricity Generation Capacity and Energy Mix

The hydro share in total electricity generation has declined in FY2021 as compared to its share in FY2020. Currently, thermal has the largest share in electricity generation. Moreover, its percentage share in FY2021 has increased as compared to FY2020. Significant growth of RLNG usage in the energy mix has helped for improved supply to various power plants. RLNG is also supplied to fertilizer plants, industrial and transport sectors. The comparison of the share of different sources of electricity's installed and generation capacity is given below:

Table 14.1: Fuel-wise Installed Capacity Breakup

	Installed (MW)	Percentage Share
Hydel	9,874.0	26.00
RLNG	7,325.0	19.66
RFO	6,274.0	16.84
Coal	4,770.0	12.80
Gas	4,529.0	12.15
Nuclear	2,490.0	6.68
Wind	1,235.0	3.31
Solar	400.0	1.07
Bagasse	364.0	0.98

Total	37,261.0	100.00
Source: Ministry of Energy, (Power Division)		

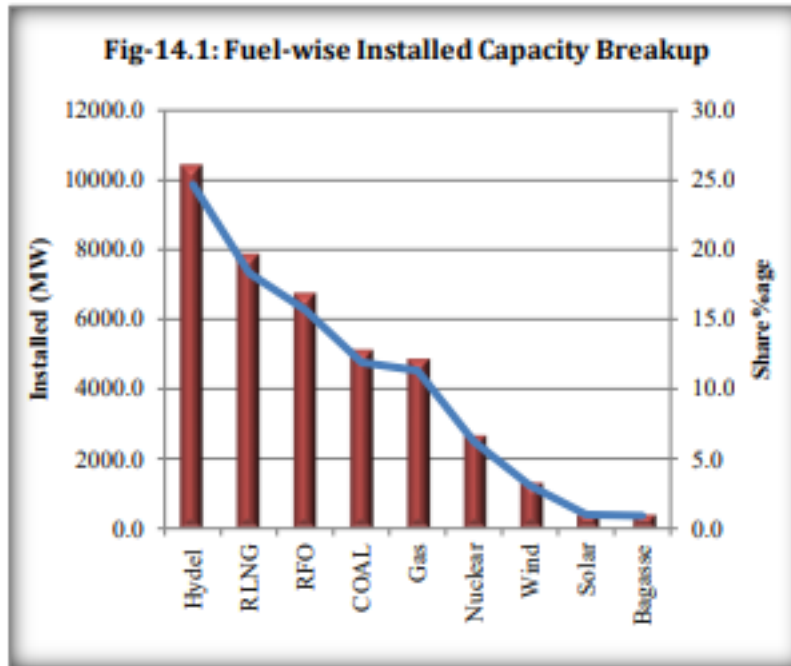


Table 14.2: Installed Capacity

	2019-20 (July-April)	2020-21 (July-April)
Installed Capacity (MW)	35,972	37,261
Source: Ministry of Energy, (Power Division)		

Till April, FY2021, the installed capacity of electricity has reached 37,261 MW, posting a growth of 3.6 percent.

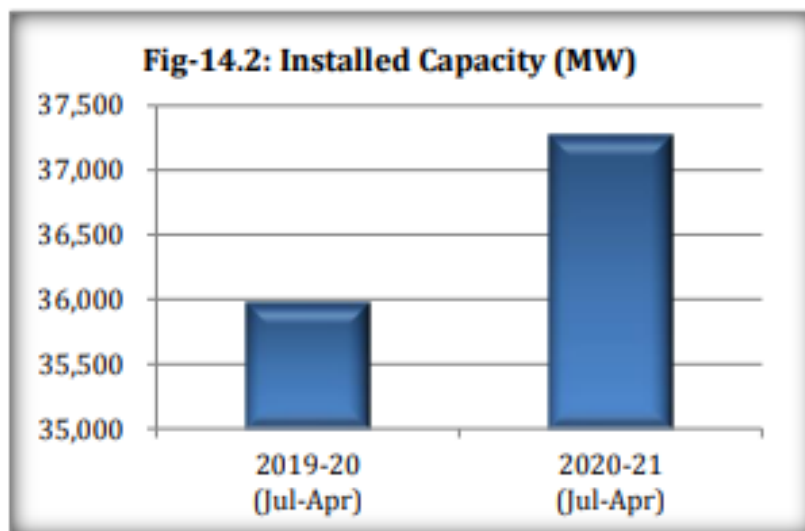
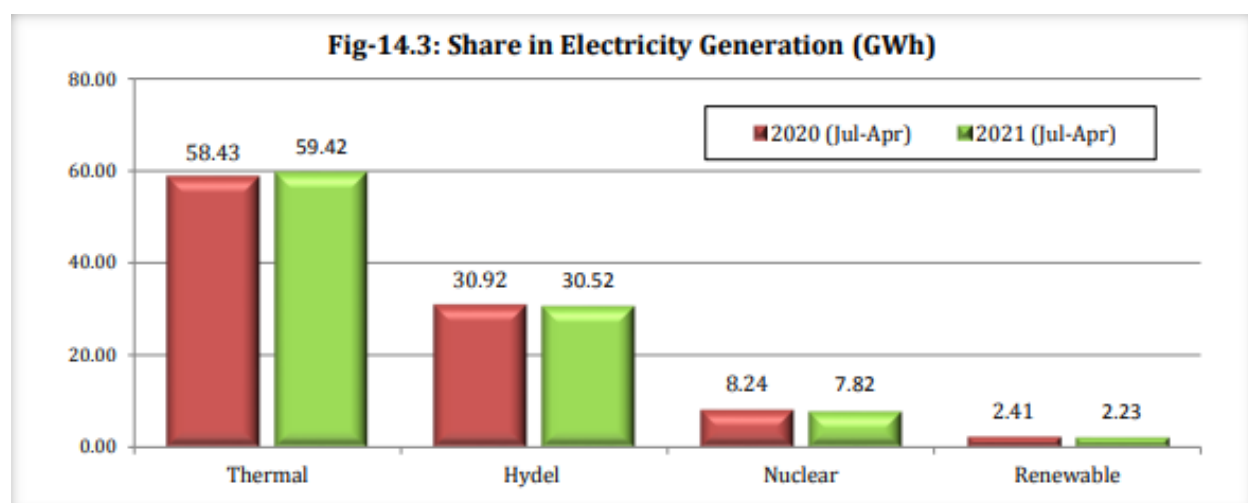


Table 14.3: Share in Electricity Generation (GWh)			Percentage Share		
	2019 (July-April)	2020 (July-April)	2021 (July-April)	2020 (July-April)	2021 (July-April)
Thermal	61,003	56,320	61,052	58.43	59.42
Hydel	24,931	29,799	31,357	30.92	30.52
Nuclear	2,903	7,941	8,038	8.24	7.82
Renewable	7,955	2,322	2,294	2.41	2.23
Total	96,792	96,382	102,742	100.0	100.0

Source: Ministry of Energy, (Power Division)



Electricity Consumption

There is no considerable change in the consumption pattern of electricity. During July-April FY2021, the share of agriculture in electricity consumption is constant. However, the share of Industry in electricity consumption has increased which shows a revival of economic activities. The comparison between consumption patterns of electricity during July-March 2021 with the corresponding period last year is shown below:

Table 14.4: Share in Electricity Consumption

Sector	UNITS SOLD (GWh)		%Share	
	2019-20 (July-March)	2020-21 (July-March)	2019-20 (July-March)	2020-21 (July-March)
Household	39,461	41,508	49.2	49.1
Commercial	6,313	6,246	7.9	7.4
Industry	20,461	22,280	25.5	26.3
Agriculture	7,127	7,558	8.9	8.9
Others	6,825	7,008	8.5	8.3
Grand Total	80,187	84,600	100	100

Source: Hydrocarbon Development Index of Pakistan

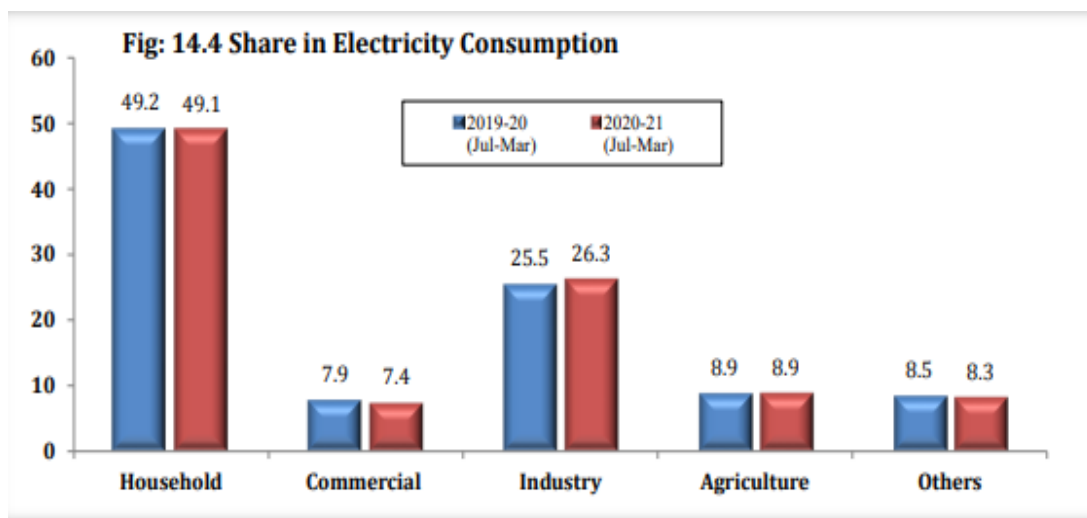


Table14.5: Sector Wise Natural Gas Consumption In million Cubic Feet Per Day (MMCFD)

Sector	Gas Consumption in MMCFD	RLNG (Bcfd)	Total
Power	610	578	1,188
Household	915	–	915
Commercial	65	8	73
Transport (CNG)	63	47	110
Fertilizer	687	37	724
General Industry	433	280	713
Total	2,773	950	3,723

Source: Ministry of Energy (Petroleum Division, Policy Wing)

Electricity Consumption Share (%)

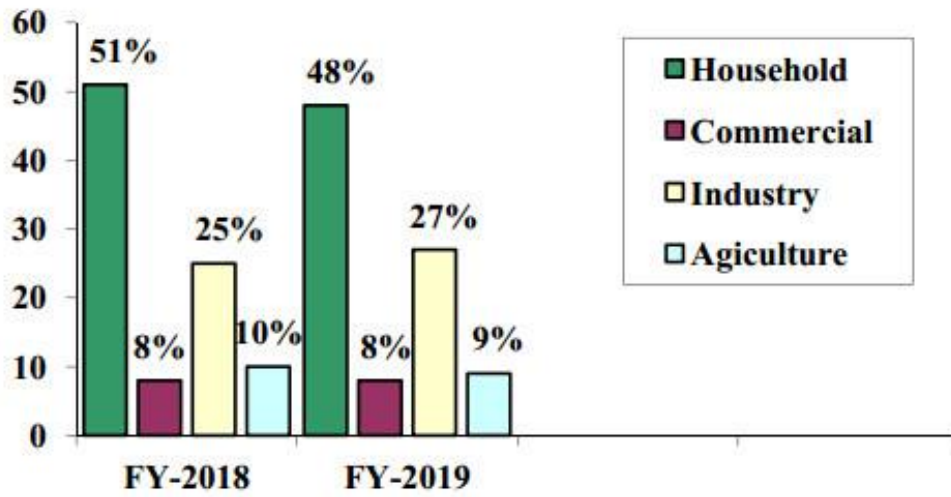


Figure 1. Share in electricity consumption

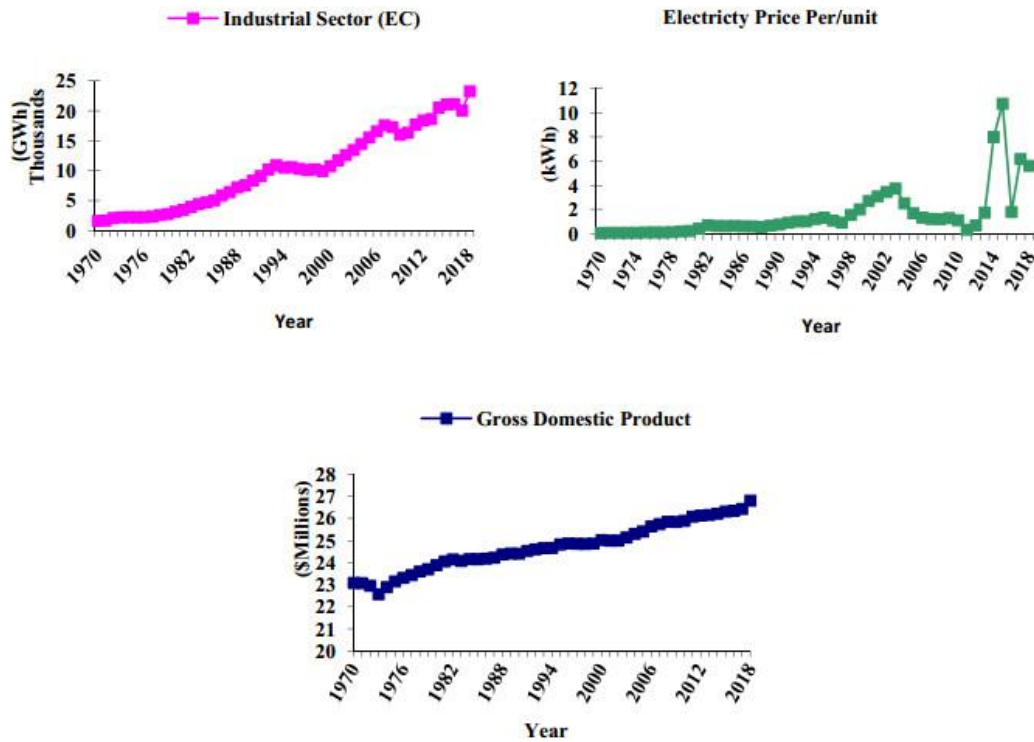


Figure 2. Electricity consumption of the industrial sector, price, and gross domestic product (GDP) in Pakistan.

Energy consumption in India

India's TFC increased by 50% in the decade from 2007 to 2017, with significant growth across all sectors (Figure 2.3). Half of the growth came from the industrial sector, which accounted for 42% of TFC in 2017, including non-energy consumption. India's TFC increased by 50% in the decade from 2007 to 2017, with significant growth across all sectors (Figure 2.3). Half of the growth came from the industrial sector, which accounted for 42% of TFC in 2017, including non-energy consumption.

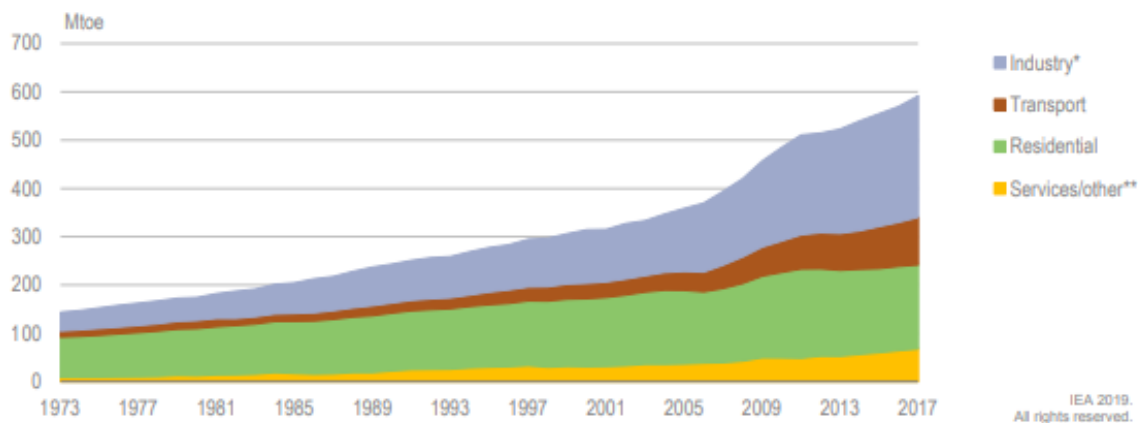


Figure 2.3 TFC by sector, 1973-2017

India's TFC has increased by 50% in the past decade, with growth across all sectors, but the largest increases in industry and transport.

Industry consumes a mix of coal, oil, natural gas, electricity, and biofuels, with fossil fuels together representing 56% of total consumption (not counting electricity production) (Figure 2.4). The residential sector is the second biggest energy consumer at 29% of TFC in 2017. Traditional use of biomass for heating and cooling accounts for the largest share of residential energy consumption, although the lack of sufficient data collection makes the numbers uncertain. The transport sector is the third-largest energy consumer at 17% of TFC in 2017, dominated by oil fuels. Transport energy demand has more than doubled in a decade, accounting for one-quarter of TFC growth. Finally, the service sector including agriculture consumed 12% of TFC in 2017, with electricity accounting for more than half.

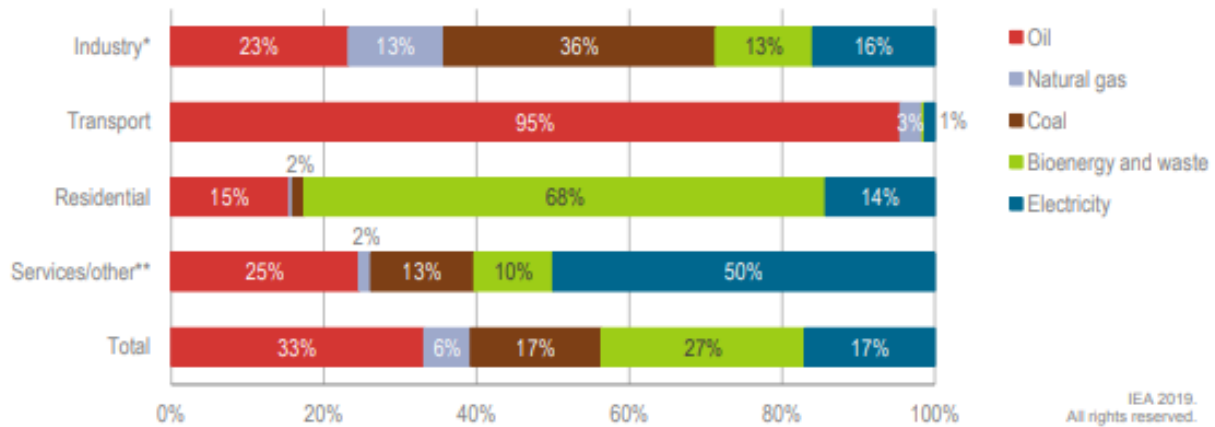


Figure 2.4 TFC by source and sector, 2017

India's sectors show large variations in energy sources, with a clear dominance of oil in transport, bioenergy in the residential sector, and electricity in commercial consumption.

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