

A PRESENTATION ON

ENERGY CONSUMPTION & ECONOMIC WELL BEING



09/01/2005

Energy is an economic 'good'

- Capable of improving the living standards of billions of people,
 - in developing countries who lack access to service or whose consumption levels are far below those of people in industrialised countries.
- Energy supplies will need to be expanded to meet emerging demands if living standards are to be improved and developing countries are to achieve prosperity.

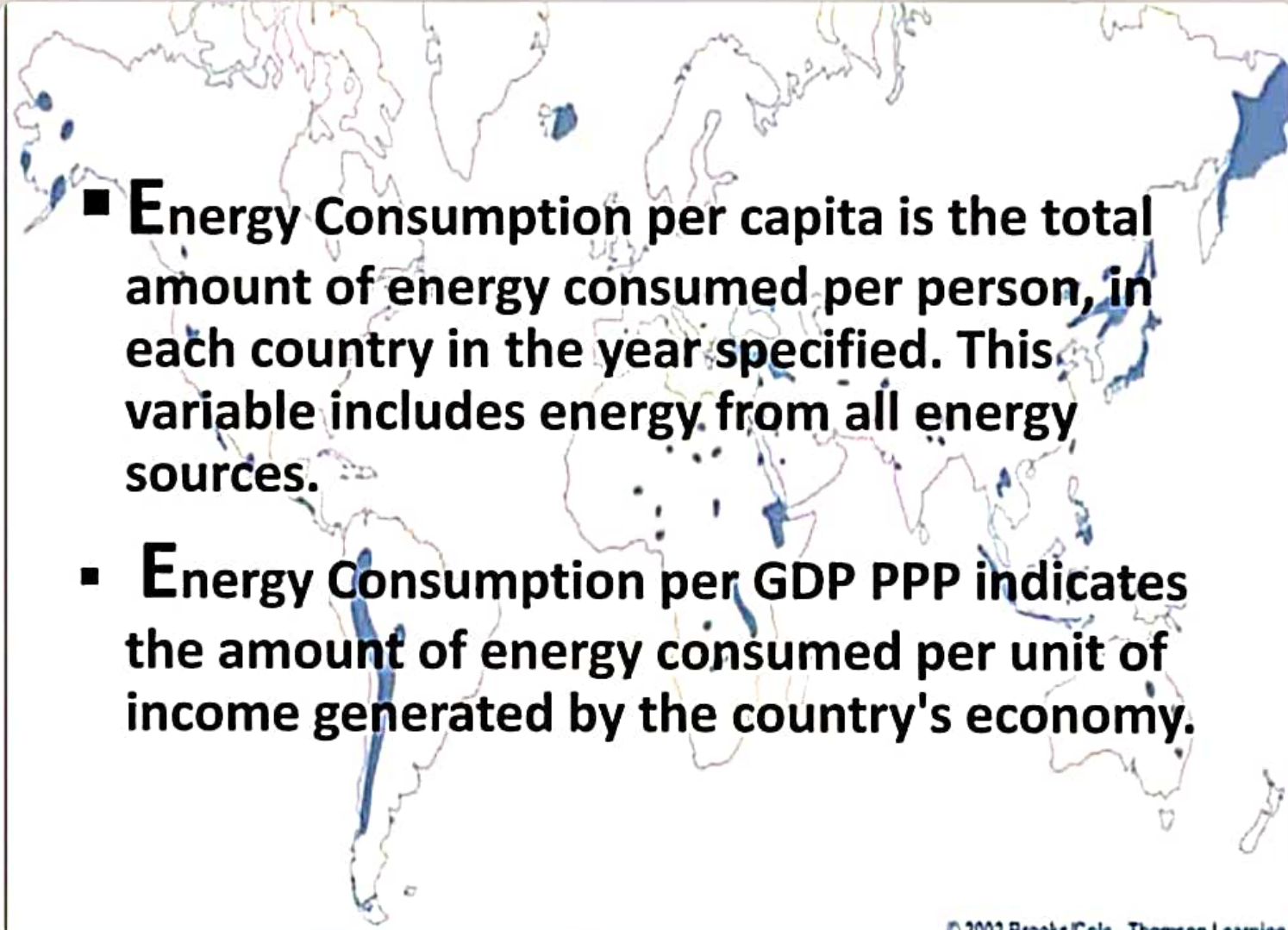
Total Energy Consumption

The total amount of primary energy consumed from all sources in the year specified.

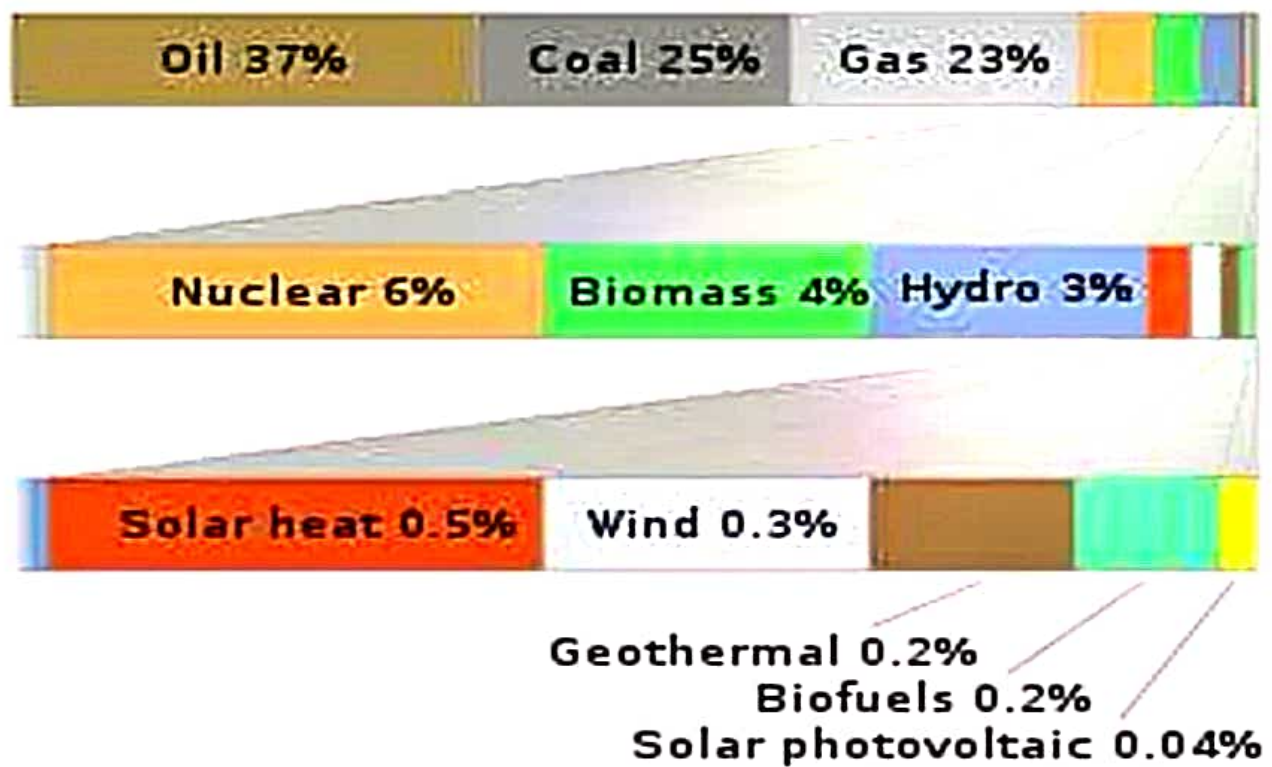
Primary energy includes losses from transportation, friction, heat loss and other inefficiencies.

Consumption = indigenous production +(imports and stock changes)-(exports and international marine bunkers)

The International Energy Agency (IEA) calls this value Total Primary Energy Supply (TPES)

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- **Energy Consumption per capita** is the total amount of energy consumed per person, in each country in the year specified. This variable includes energy from all energy sources.
 - **Energy Consumption per GDP PPP** indicates the amount of energy consumed per unit of income generated by the country's economy.

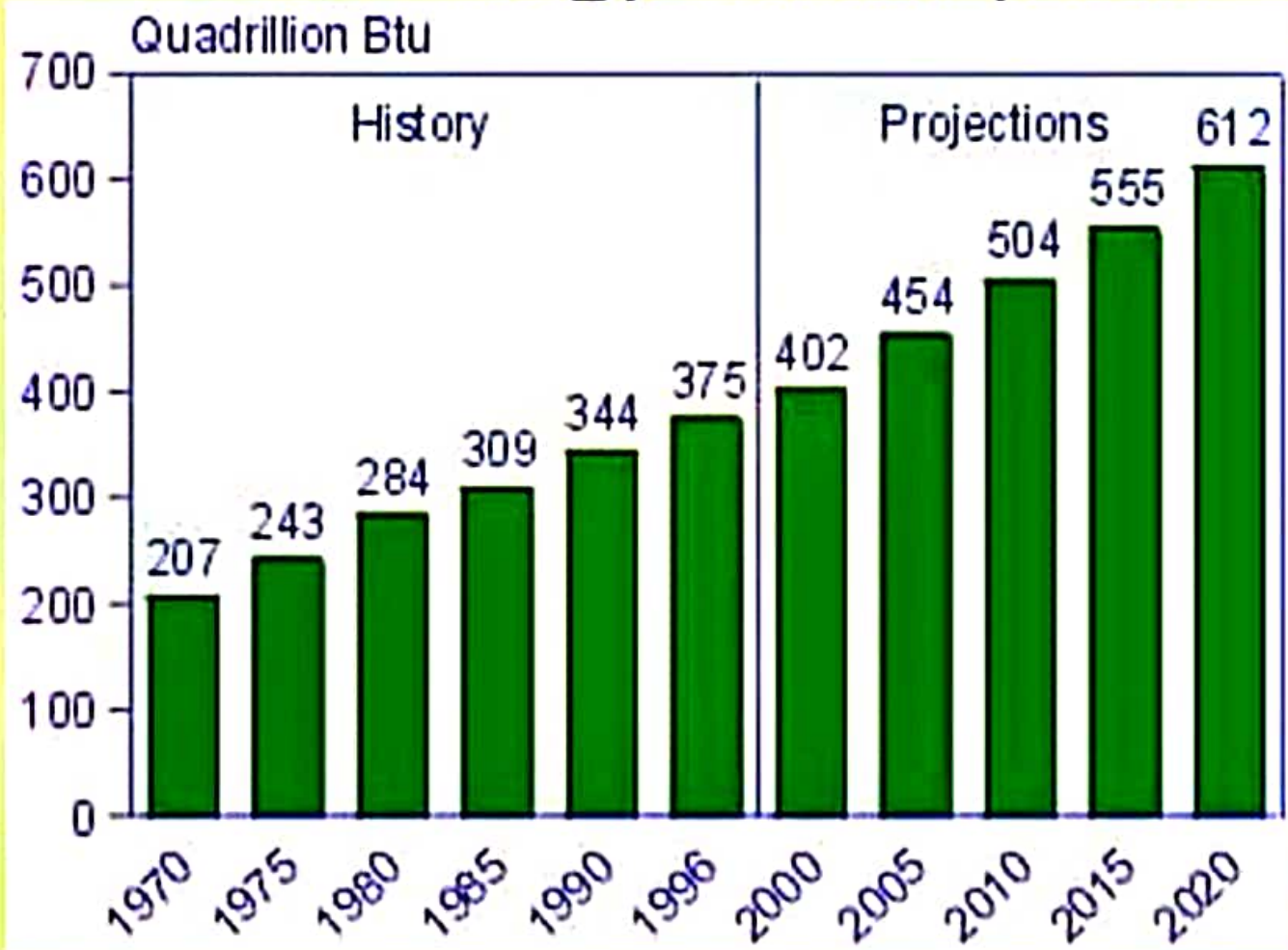
Rate of world energy usage in terawatts (TW),
1965-2005



World Total Energy Consumption 1990 - 2020 (Quadrillion Btu)

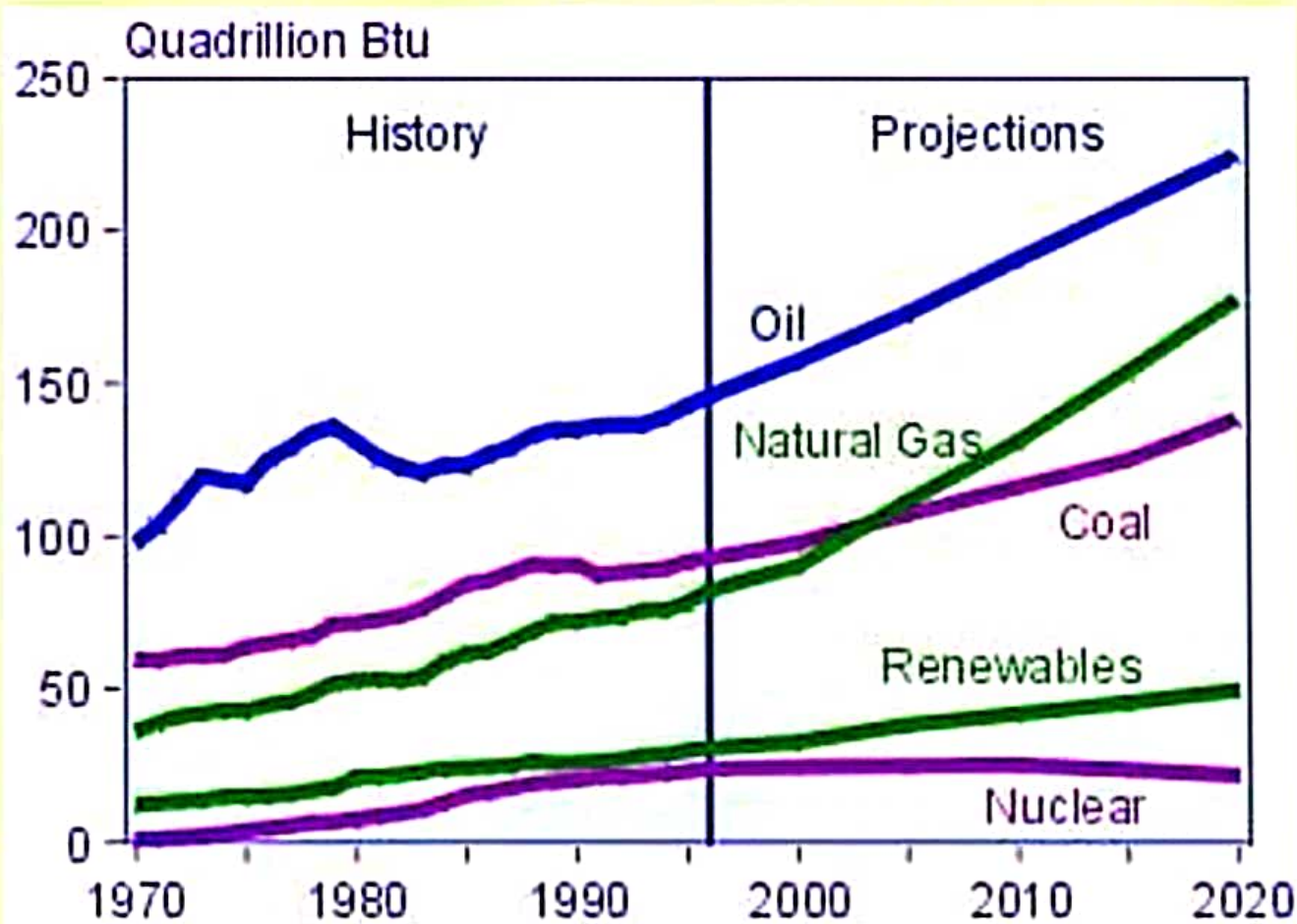
Region/Country	1990	1997	2020
United States	84.0	94.2	120.9
Western Europe	59.9	64.0	78.4
Japan	18.1	21.3	25.4
China	27.0	36.7	97.3
Former Soviet Union	61.0	40.8	57.3
Total World	346.7	379.9	607.7

World Energy Consumption



Sources: History: Energy Information Administration (EIA)

World Energy Consumption by Fuel Type



Total energy consumption per capita

	2003	2000	1990
Developed Countries	4,623.10	4,576.80 ..	
Developing Countries	910.1	840.1	705.7

	2003	2000	1990
Brazil	1,067.60	1,068.10	896.6
<u>China</u>	1,138.30	946.4	791.7
France	4,518.40	4,345.10	4,005.90
Germany	4,203.10	4,173.00	4,484.50
India	512.4	501.4	425.7
Mexico	1,533.20	1,502.40	1,475.00
United Kingdom	3,918.10	3,970.20	3,738.10
United States	7,794.80	8,109.00	7,543.40

Kilograms of oil equivalent (kgoe) per person

http://earthtrends.wri.org/searchable_db/results.php?years=1990-1990,2000-2000,2003-2003&variable_ID=351&theme=6&clD=26,38,63,70,85,122,189,190&ccID=0,9,10

**POPULATIONS SIZE AND ESTIMATED PER CAPITA
CONSUMPTION OF COMMERCIAL ENERGY
BY COUNTRY GROUP, 1998**

Energy form and country group	Estimated commercial energy consumption	Population (millions)
Primary energy	gigajoules per person	
• OECD	230	900
• Countries of the former Soviet Union	125	300
• Developing countries	23	4,800
Peak electricity demand	killowatt hours per person	
• OECD	1.8	900
• Countries of the former Soviet Union	0.9	300
• Developing countries	0.2	4,800

Note: Consumption estimates are based on statistics for 1992 and OED projections, assuming a 55 percent load factor for electricity demands. Population estimates are based on World Bank projections from 1992.

Source: OECD, 1995, for consumption; World Bank, 1992, for population.

Predicted energy consumption world-wide by geographic area:

Region	2003	2010	2015	2020	2025	2030	Average Annual Percent Change, 2003-2030
OECD	234.3	256.1	269.9	281.6	294.5	308.8	1.0
North America	118.3	131.4	139.9	148.4	157.0	166.2	1.3
Europe	78.9	84.4	87.2	88.7	91.3	94.5	0.7
Non-OECD	186.4	253.6	293.5	331.5	371.0	412.8	3.0
Europe and Eurasia	48.5	56.5	62.8	68.7	74.0	79.0	1.8
Asia	83.1	126.2	149.4	172.8	197.1	223.6	3.7
Middle East	19.6	25.0	28.2	31.2	34.3	37.7	2.4
Africa	13.3	17.7	20.5	22.3	24.3	26.8	2.6
Central and South America	21.9	28.2	32.5	36.5	41.2	45.7	2.8
Total World	420.7	509.7	563.4	613.0	665.4	721.6	2.0



Bangladesh

- ❖ Per capita energy consumption : 136 kWh (one of the lowest in the world)
- ❖ Commercial energy consumption is mostly natural gas (around 66%), followed by oil, hydropower and coal.
- ❖ Bangladesh's installed electric generation capacity was 4.7 GW in 2009; only three-fourth of which is considered to be 'available'.
- ❖ Only 40% of the population has access to electricity with a per capita availability of 136 kWh per annum.

RIVERS OF BANGLADESH

LEGEND
Main Rivers
Other Rivers
Dams and Docks
District HQ

- Energy consumption is loosely correlated with gross national product and climate.
- Japan and Germany with 6 kW per person and United States with 11.4 kW per person.
- In developing countries such as India the per person energy use is closer to 0.7 kW.
- Bangladesh has the lowest consumption with 0.2 kW per person.

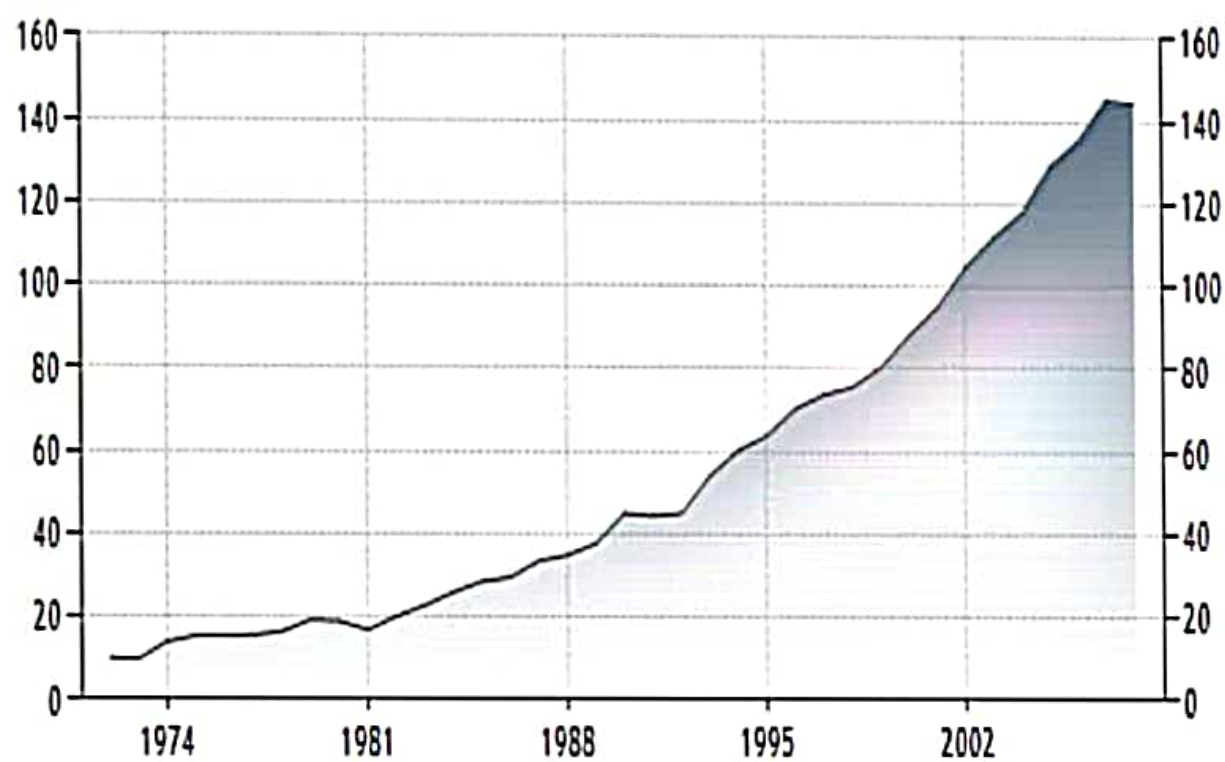
BAY OF BENGAL

Energy consumption for various sectors

Industry	28.000 %
Transportation	8.000 %
Agriculture	3.000 %
Commercial and public services	1.000 %
Residential	60.000 %
Other purposes	0.000 %
Total oil production	3581.000 bbl/day



BANGLADESH - ELECTRIC POWER CONSUMPTION (KWH PER CAPITA)



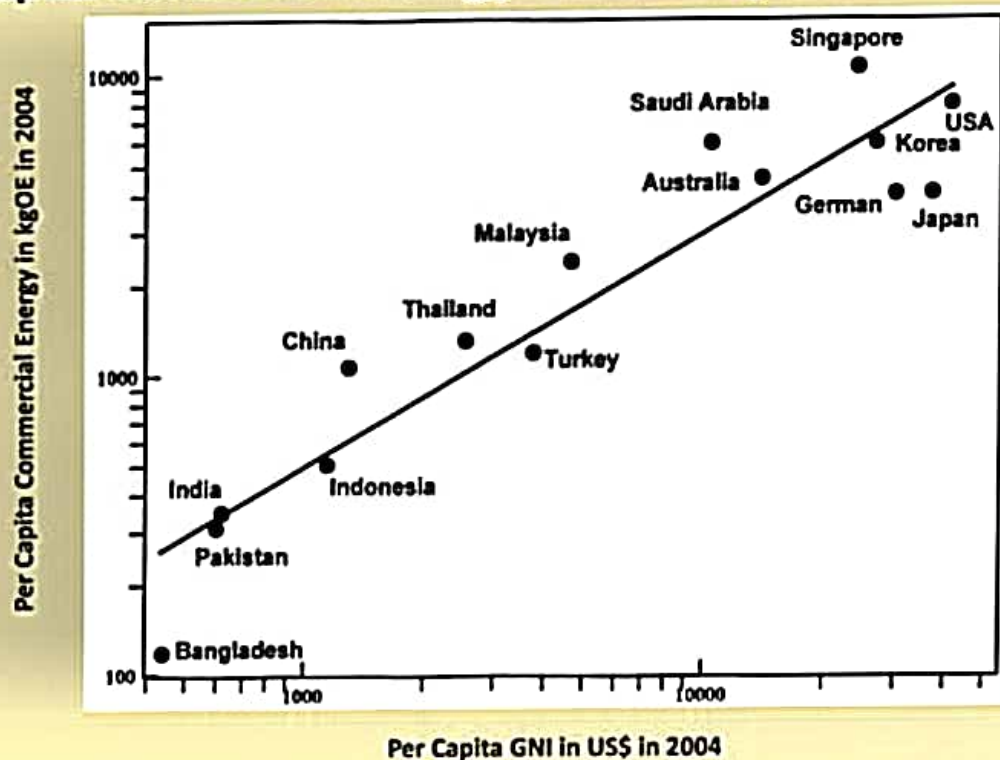
Source: TradingEconomics.com

1974: 15.31
1981: 20.11
1981: 20.11
1995: 70.34
2002: 111.75
2007: 144.38

Commercial energy consumption of Bangladesh

- **Commercial energy consumption is around 66% natural gas,**
- **Remainder mostly oil (plus limited amounts of hydropower and coal).**
- **Only around 20% of the population (25% in urban areas and 10% in rural areas) has access to electricity**
- **Oil consumption 71000.000 bbl/day**

Per Capita Commercial Energy and Per Capita GNI



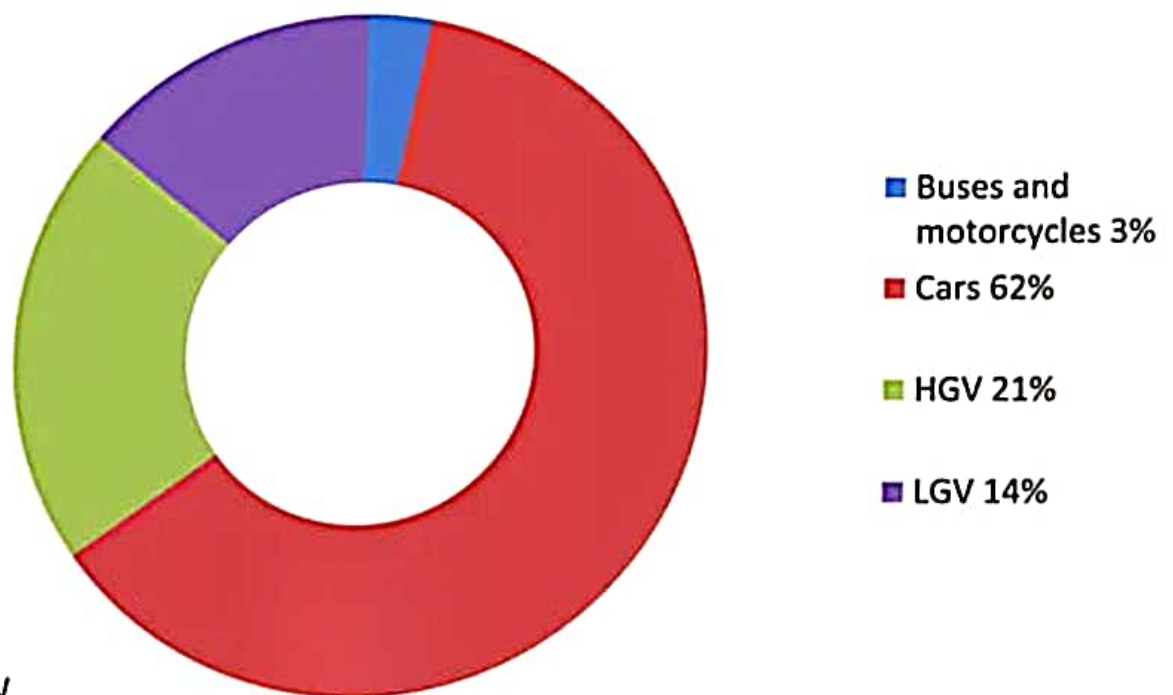
- Per Capita Commercial Energy Consumption of Bangladesh is Very Low. Due to Dependence on Non-commercial Energy the Position of Bangladesh is Off the Correlation Curve.
- Increase in Per Capita Commercial Energy Consumption is Necessary to Increase Per Capita GNI.



Overall energy consumption

- **Transport energy consumption**
- **Domestic energy consumption**
- **Industrial energy consumption**
- **Service sector energy consumption**

Road transport energy consumption by type of road vehicle, 2000



Source: NETCEN

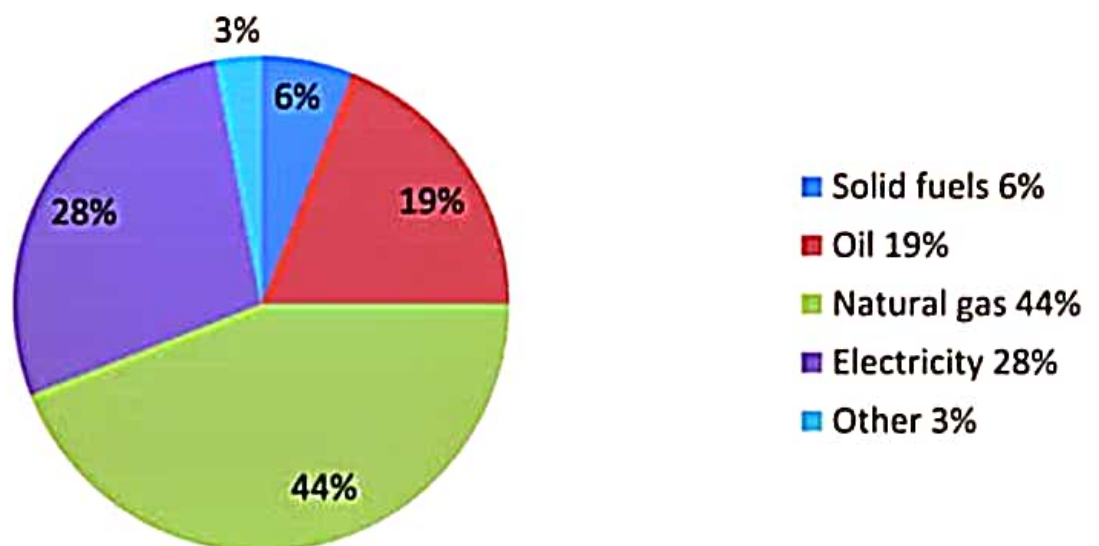
- Cars accounted for nearly two thirds of all road transport energy consumption.
- Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) accounted for a further 35 per cent of the total



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Industrial energy consumption by fuel, 2001

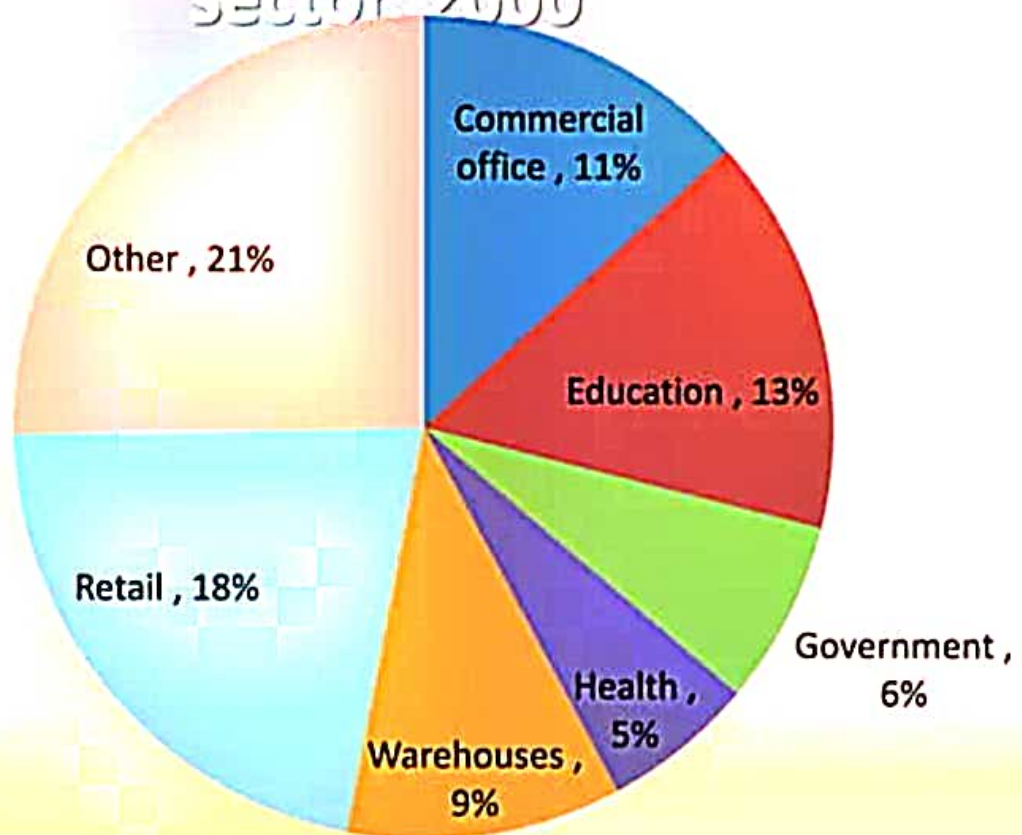


Source: DTI

1. Renewables, waste and heat.

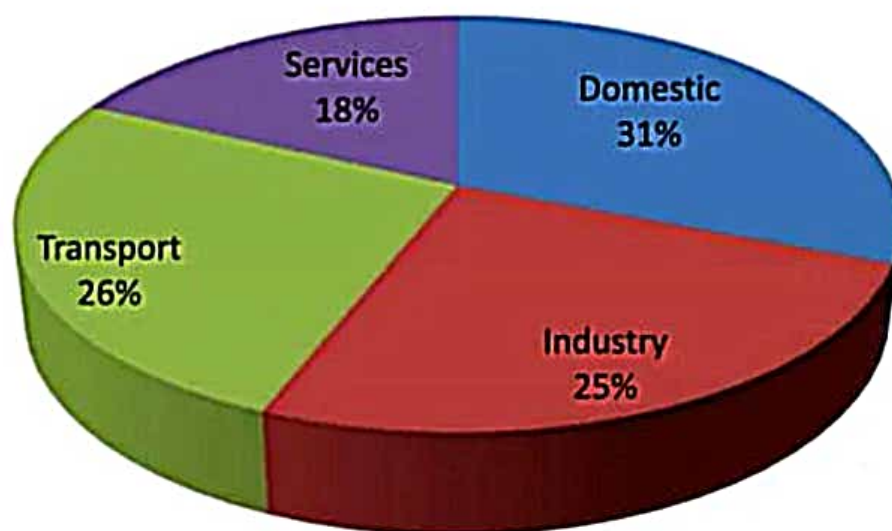
- Natural gas contributed towards 44 per cent of total industrial energy consumption in 2001.
- Electricity contributed towards 28 per cent of total industrial energy consumption in 2001.

Service sector energy consumption by sub-sector 2000



Final energy consumption, by sector, in primary energy equivalents, 2001

237.7 million tonnes of oil equivalent



What about economic well being?



Energy consumption and income

- A transition process whereby households gradually ascend an energy ladder.
- The ladder begins with biomass fuels (firewood and charcoal), moves to modern commercial fuels (kerosene and LPG), and culminates with electricity.



The transition from traditional to modern energy sources

- **Technical progress and lower costs.**
- **The importance of per capita income growth.**
- **The benefits of service extension**
 - Savings in time and labor in the home
 - Reductions in pollution and improvements in health.
 - Reductions in environmental damage
 - Gains in energy efficiency.

Energy and economic prosperity

- **Energy demand in developing countries will rise enormously as per capita incomes and populations grow.**
- **No country has been able to raise per capita incomes from low levels without increasing its use of commercial energy.**

Two points...

1. Higher incomes enable a transition to better forms of energy use.
 - “Electrification causes economic development”
 - Many aspects of modern development are not possible without electricity
 - Lack of suitable forms of energy can be a constraint to development
2. Better energy provision leads to increased incomes and economic development.
 - “Renewable energy creates jobs”

National Saving



Energy intensity

- **Energy intensity is a measure of the energy efficiency of a nation's economy. It is calculated as units of energy per unit of GDP.**
- **High energy intensities indicate a high price or cost of converting energy into GDP.**
- **Low energy intensity indicates a lower price or cost of converting energy into GDP.**

Ultimately

SAVE ENERGY = SAVE MONEY

