Energy Intensities of buildings

Centre for Science and Environment

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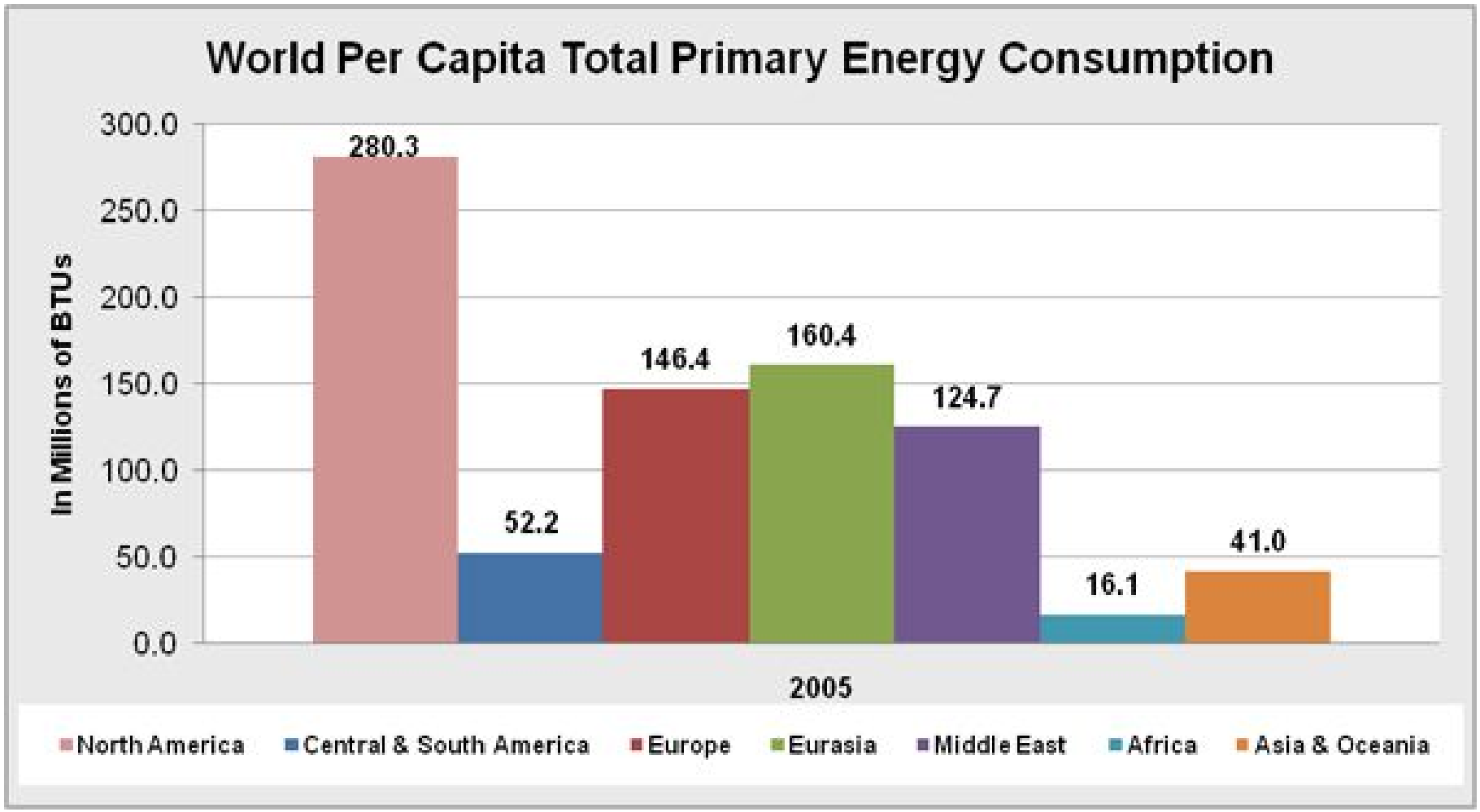
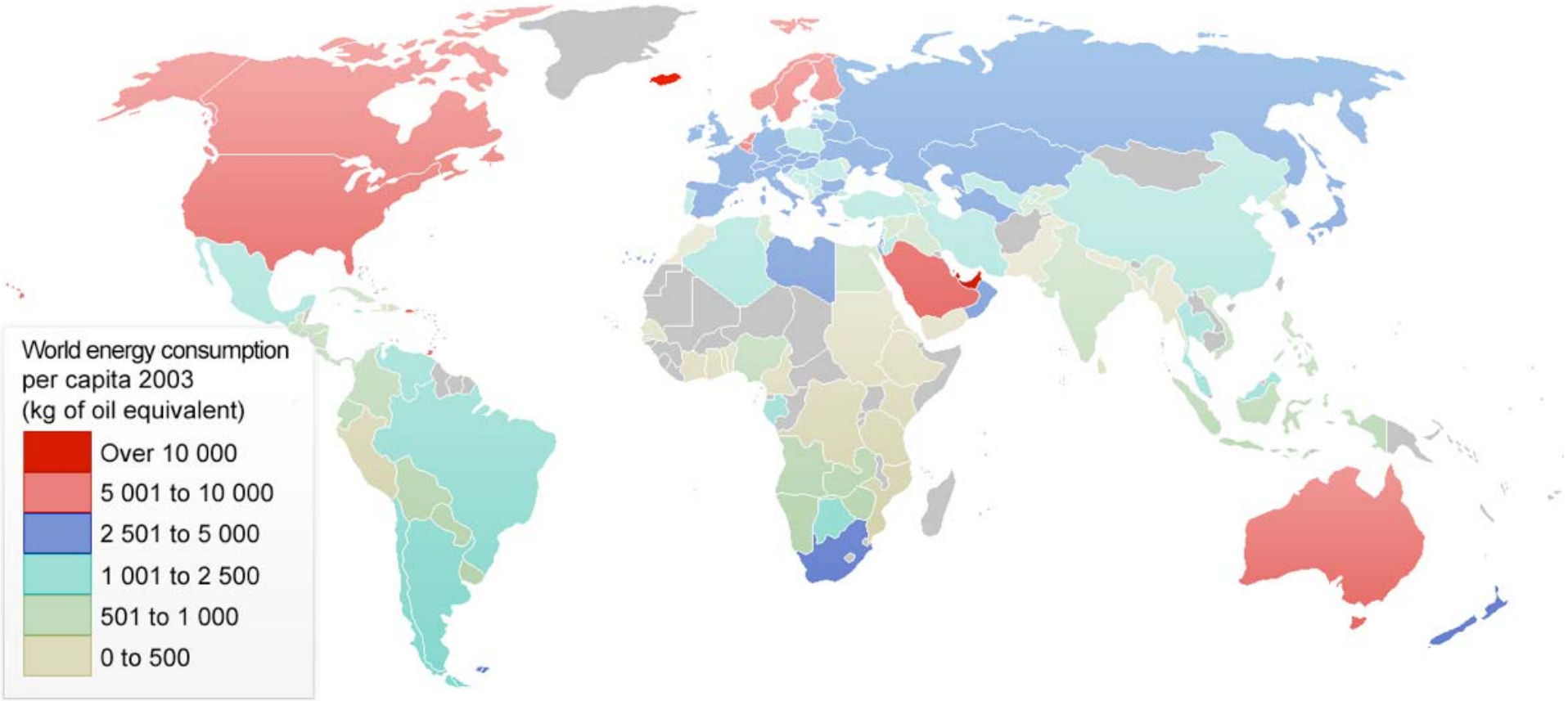
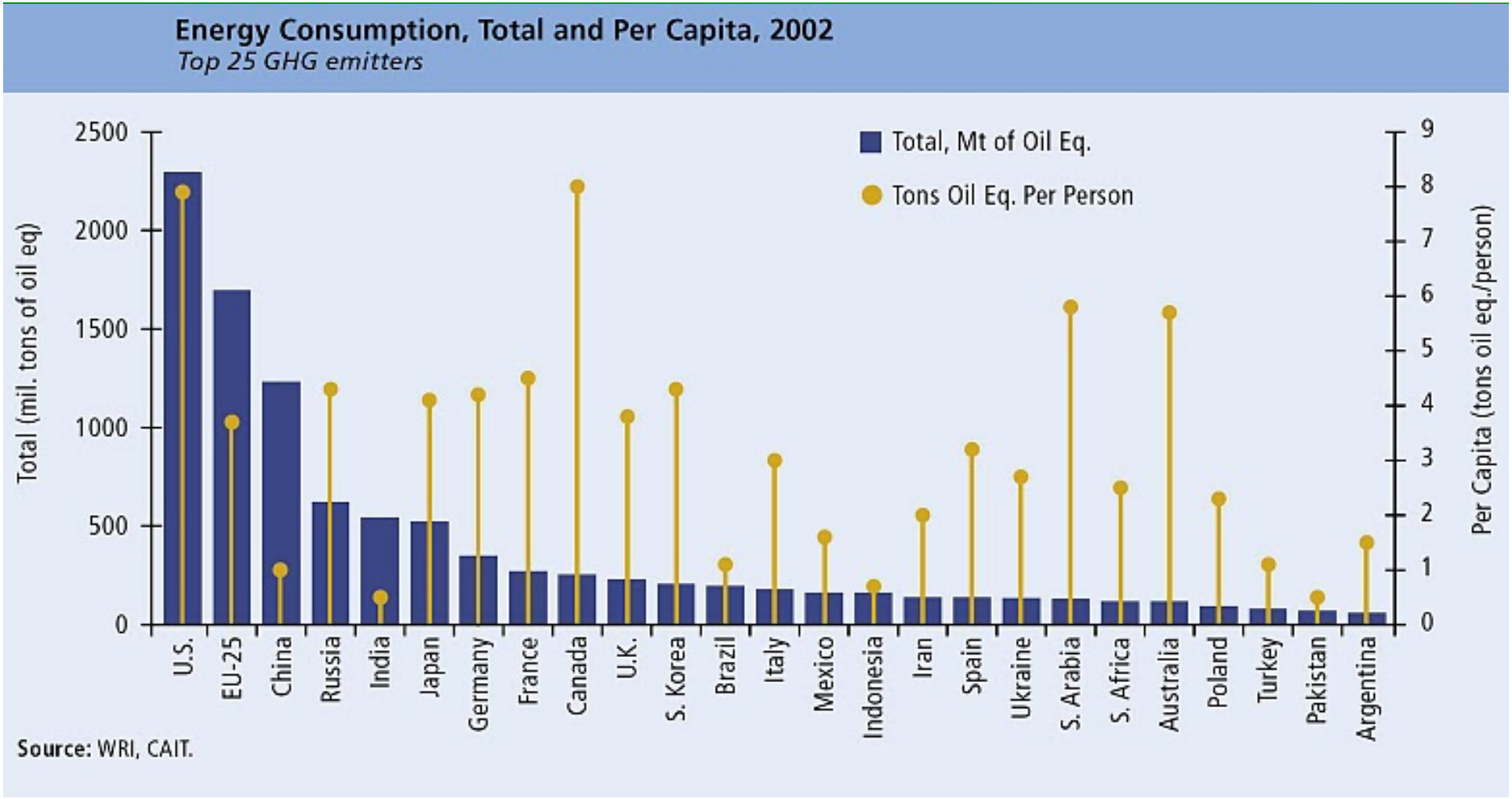
Inequity in energy consumption



Per capita Energy Consumption



India and the world



Where is the energy being used?

Energy Outlook 2009 tracks cities for the first time

Already two-third of world's energy is consumed in cities – by half of world's population.

By 2030 cities will be consuming 73% of world energy.

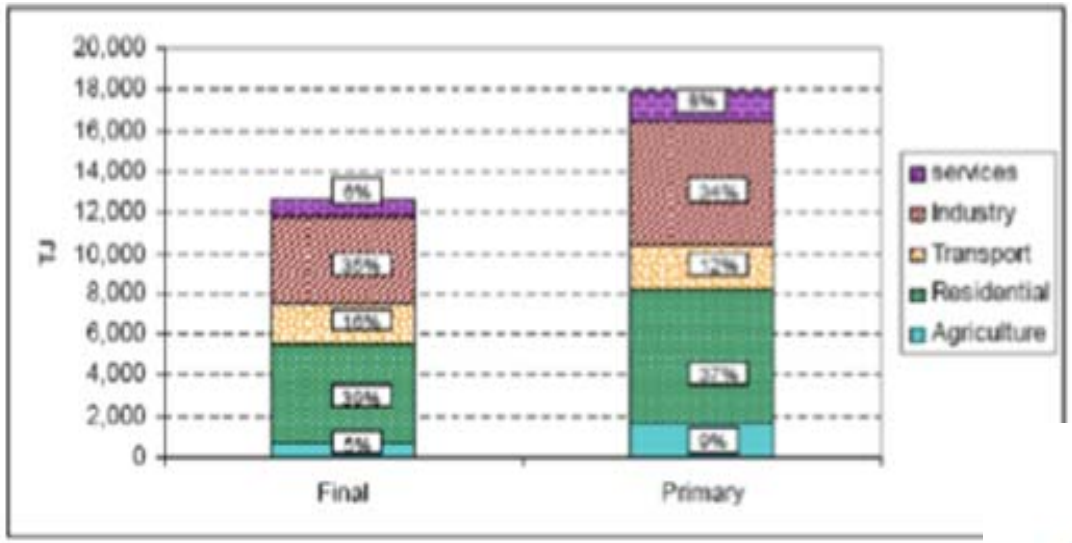
Globally cities account for 70% of CO2 emissions.

Big increase in global CO2 from increase in floor space in buildings of various types, -- especially in non-OECD countries.

Massive increase expected in ownership of household appliance

Who is using energy … how much?

Primary Energy by User (including biomass) 2004

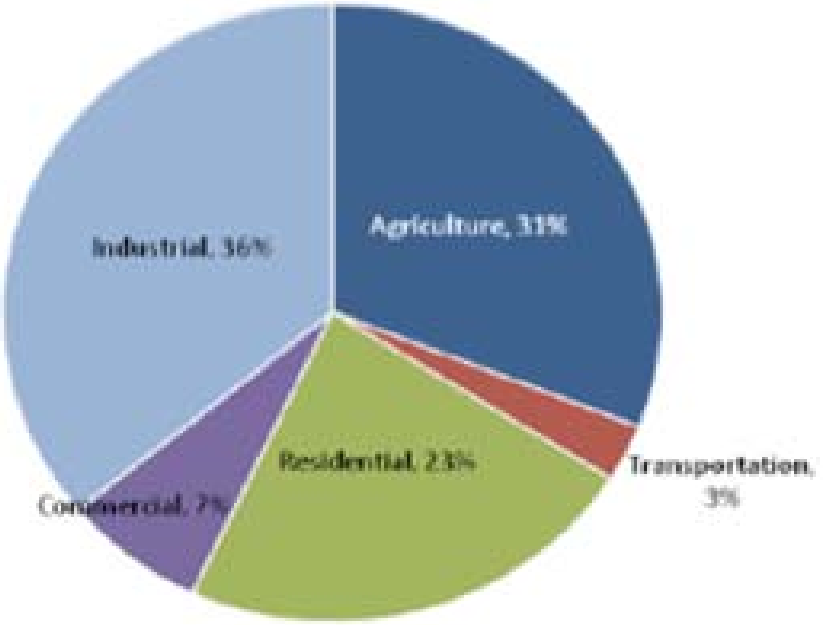


[1] Primary electricity is equal to the electricity consumed directly and the indirect energy use that wa necessary to produce the electricity.

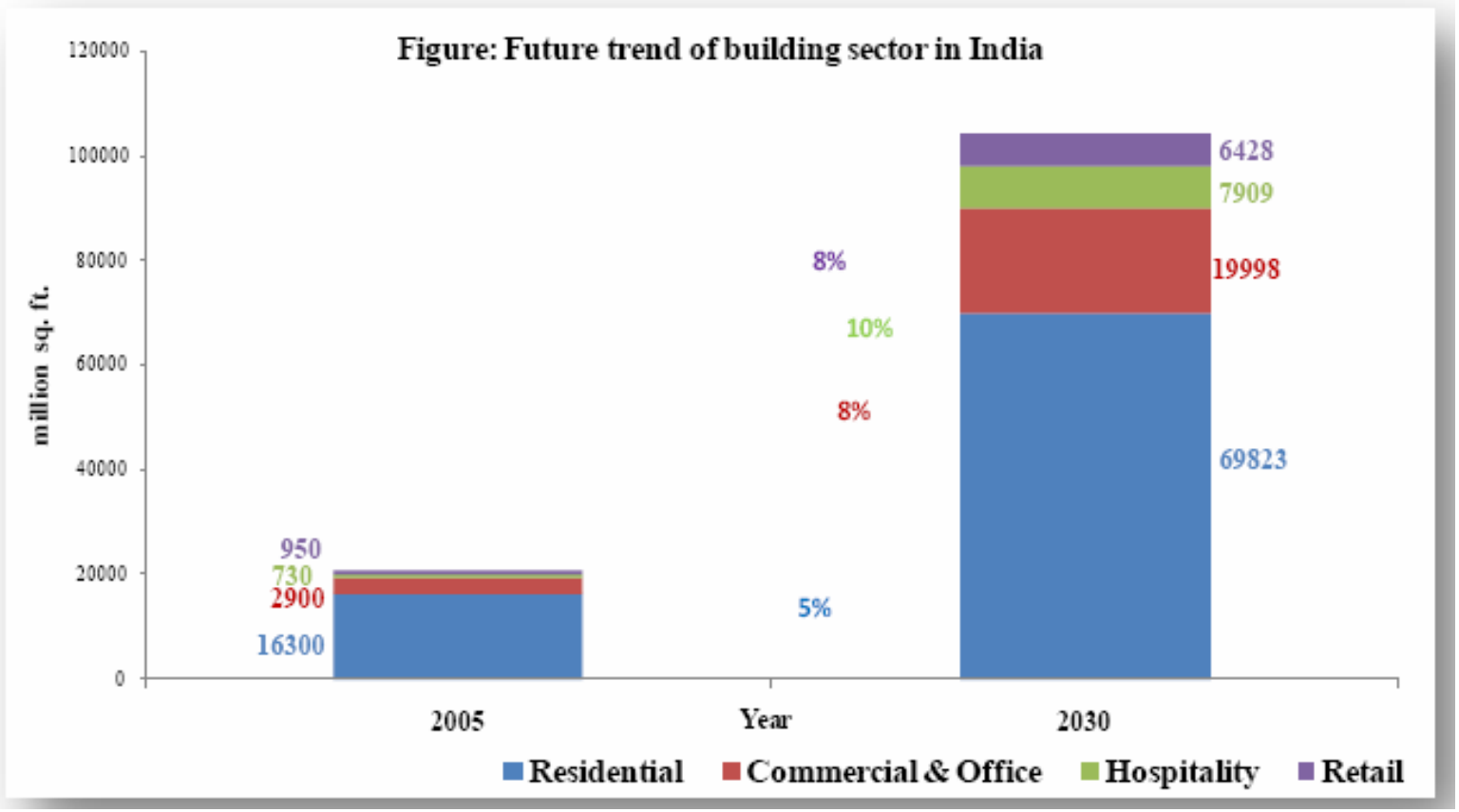
Buildings consume a third of the power

Source: Environmental Design solutions 2010

India's Primary Electricity Consumption



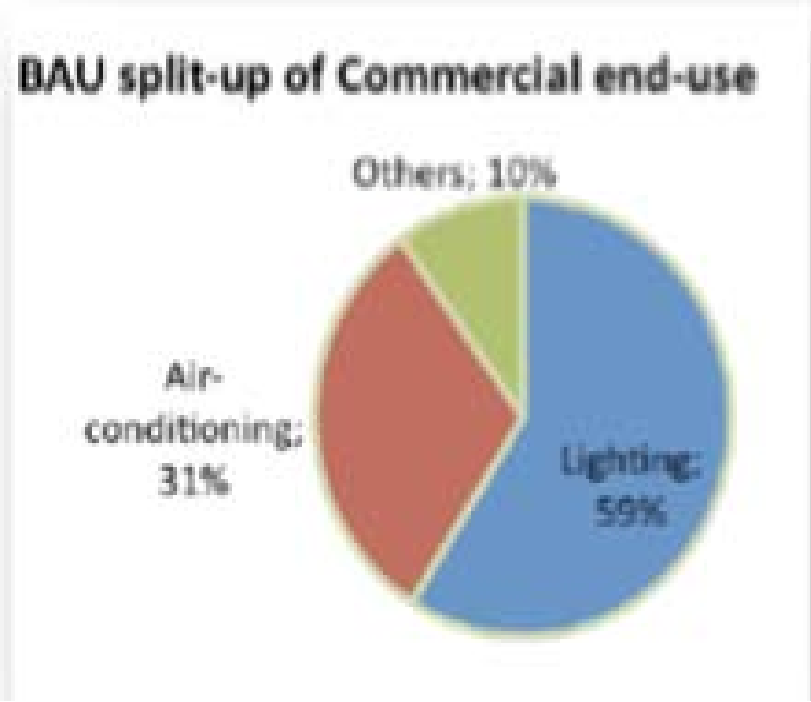
Building sector: explosive growth



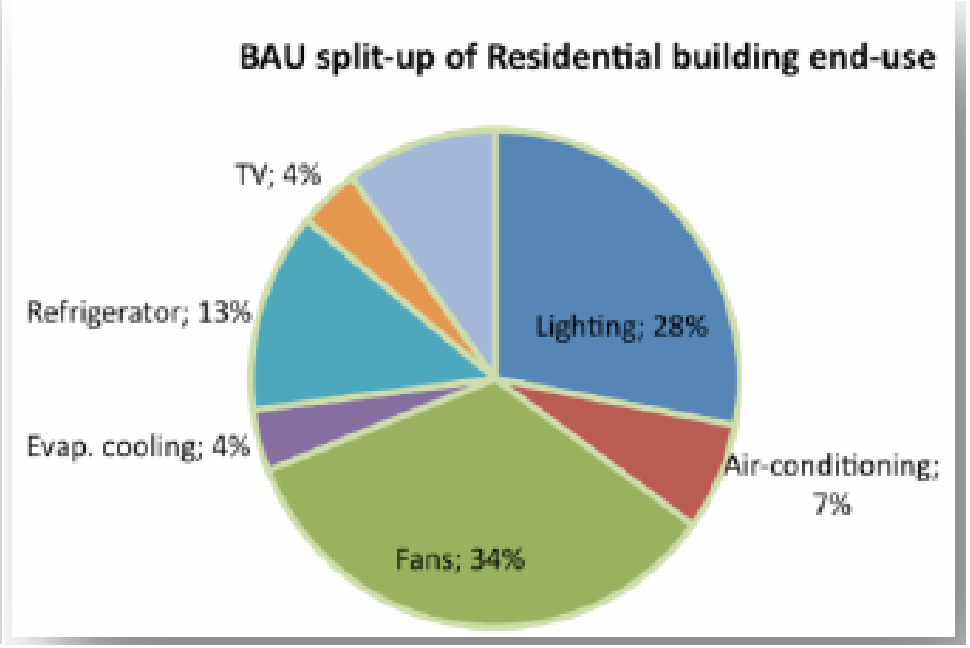
Source: Environmental Design solutions
2010/CW

How we use energy in buildings?

Lighting and AC use up 80 per cent of the energy in a building. AC market is growing at 25% a year



Fans and refrigerators constitute maximum energy use



Source: Environmental Design solutions 2010/CW

Design and build better

About 30-70% of energy savings is possible

End use	Technical saving potential (%)
Lighting	20-50
Air conditioning	20-60
Ventilation	20-50
Heating	20-70
Refrigerator	15-40

Embodied Energy in Buildings

Serial No.	Category	Energy Intensity	Examples
1	Low	< 0.5 Giga Joules / ton	Stabilised Earth Blocks, Straw bale, Stone, Sand, Stone chips, Fly-ash
2	Medium	0.5 - 5 Giga Joules / ton	Lime, Gypsum, Fired Bricks, Medium Density Fiber boards (MDF), Timber Products, Concrete blocks, Cellulose Insulation
3	High	> 5 Giga Joules / ton	Glass, Aluminium, Stainless Steel, Plastic, Copper, Zinc, Cement, Plasterboard, Steel, Bitumen, Solvents, Readymix concrete, Cardboard and Paper, Lead.

Low-rise, Low-energy

High-rise, High energy

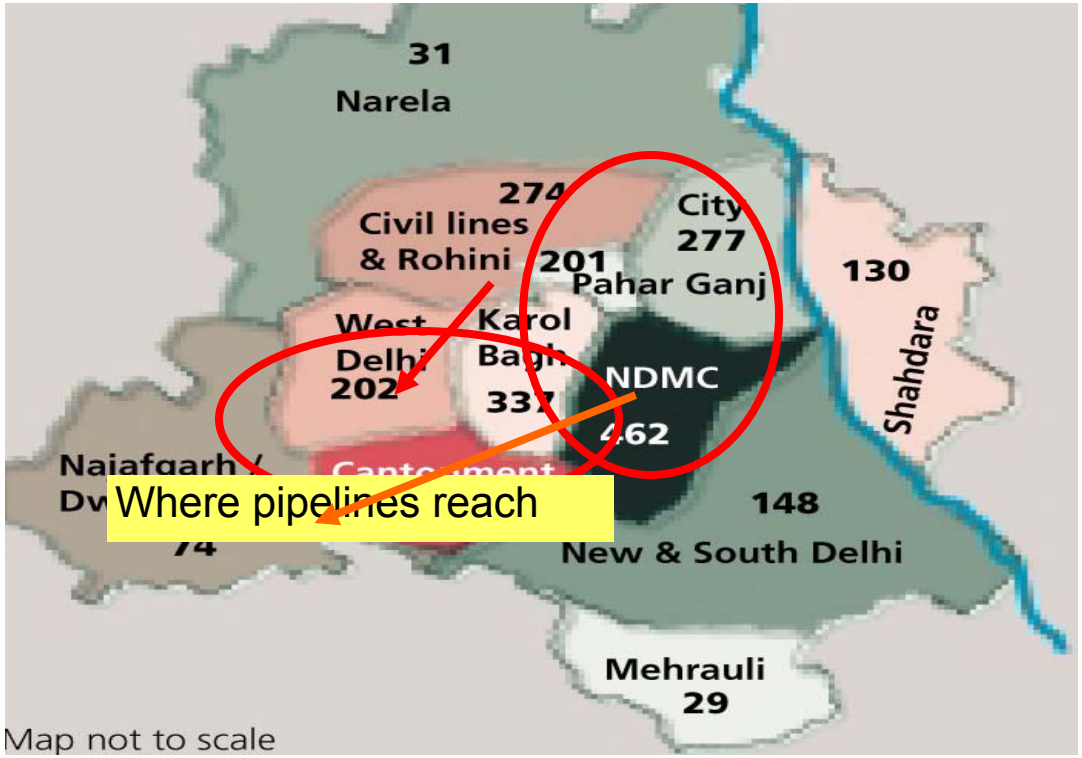
Buildings have close link to other urban issues

…… an increasing share of our daily trips are being made by cars that occupy more road space, carry fewer people, pollute more, guzzle more fuel. They edge out pedestrians, bicycles, cycle rickshaws and buses……..High vehicular pollution…

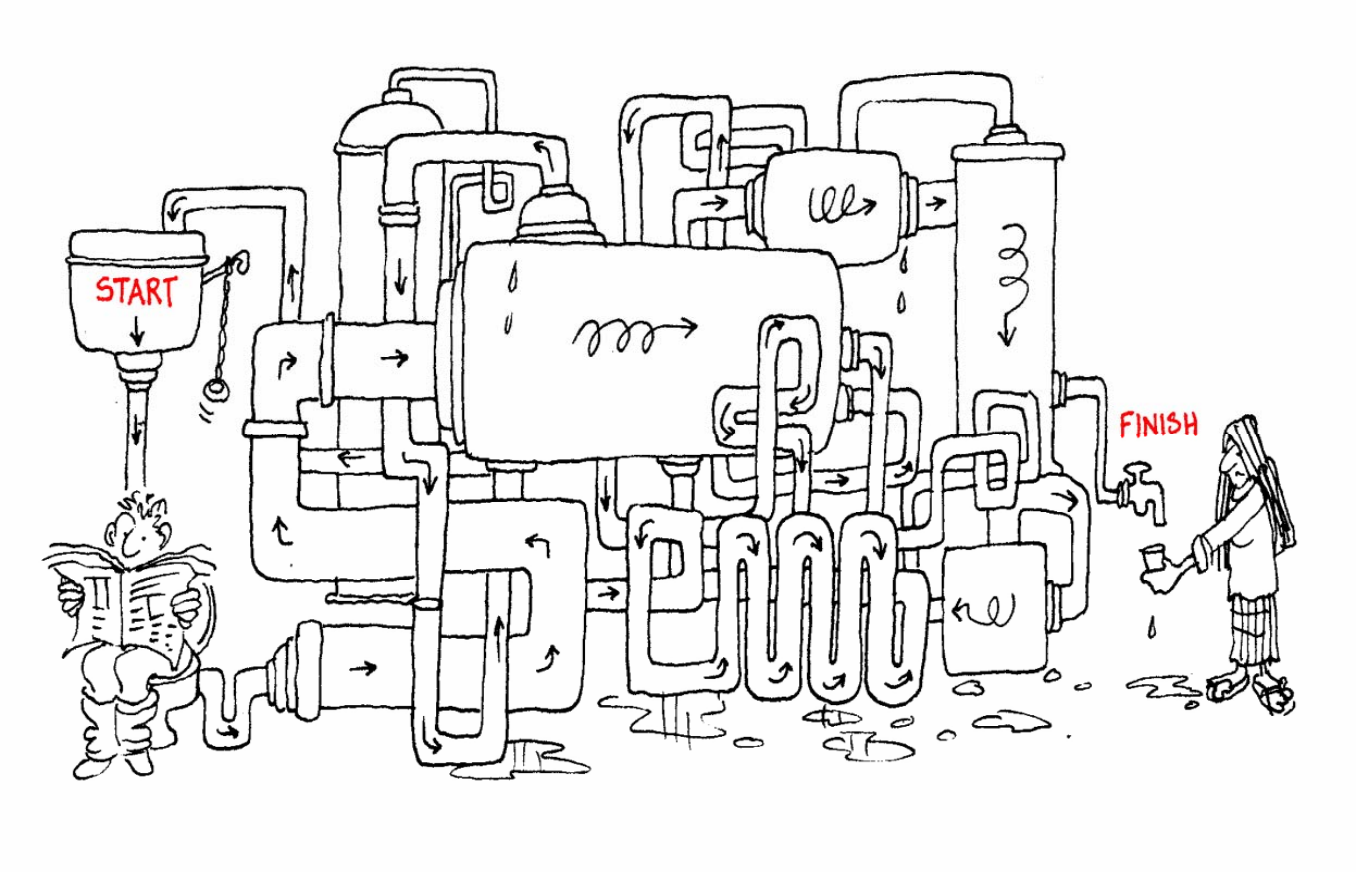
The water carriage system of sanitation

New Delhi: Per capita availability of water is 209 litres/capita/day.

Transportation costs are high.
Distribution costs high.
Cannot be recovered.
Subsidy to some. Water inequity ….
We looked at buildings once again……..



Managing the wastes from buildings



The issue is the city, but emerges from the buildings...