Buildings: Earthscrapers

Anumita Roychowdhury

Build them Green: Deconstructing building sector in India

Media workshop
Centre for Science and Environment
New Delhi, June 28-29, 2012

What is the story?

The summer rage…….

Power shock and water crisis……

Power shock: Tariffs rise 26% for city households

New Slabs Add To Misery Of Middle Class

Richi Verma | TNN

New Delhi: In the steepest hike in recent years, domestic consumers will have to pay almost 26% more for power from July 1, the city's electricity regulator said on Tuesday while announcing new tariff slabs.

This is the second tariff hike in 10 months, not taking into account the increase in power bills due to fuel surcharge. The Delhi Electricity

COMPARING PAYOUTS

	Old (₹)	New (₹)
Energy charges	2,130	2,560
Fixed charges	30	40
Fuel surcharge	95.2	304.8

TARIFF CHART

Units	Energy Charges (₹/unit) Old	New
0-200	3.00	3.70

Indian Express/ New Delhi/ June 27, 2012

POWER RATES UP BY 26%, STEEPEST RISE FOR NORTH

DOMESTIC USERS ■ Flat fuel surcharge of 8 per cent levied, fixed fee of goes up to by Rs 10 to Rs 40 per month, expect another revision of fuel surcharge after three months

SWETA DUTTA
NEW DELHI, JUNE 26

THE Delhi Electricity Regulatory Commission on Tuesday announced a 26 per cent increase in power tariff for all domestic consumers. The revised tariff will be applicable starting July 1.

The raise in tariff is 24.15 per cent for domestic consumers but another 8 per cent surcharge was added to this, taking the total to 26 per cent.

The power regulator also noted that a revised fuel surcharge will be added to the tariff after three months.

The consumers in North Delhi will see the steepest rise at 27.88 per cent, as the area distribution company (discom), Tata Power, till now had the lowest fuel surcharge at 4 per cent. With the surcharge being made uniform during revision, Tata Power consumers will have to shell out more.

Residents who were provided power by BSES Rajdhani, which till now levied a surcharge of 8 per cent, will face a hike of 25.47 per cent in their bills. Consumers under BSES Yamuna, who paid a surcharge of 7 per cent, will be least affected with a 24.29 per cent increase.

The fixed charge for domestic consumers, getting power of up to 2kW load, has been increased from Rs 30 per month to Rs 40 per month.

As for the cost per unit, consumers who earlier paid Rs 3 per unit for the first 200 units will now pay Rs 3.70 per unit. With the additional fuel surcharge, it will amount to Rs 3.997.

For the next 200 units, consumers paid Rs 4.8 per unit earlier and will continue to pay the same. With the fuel surcharge it will come to 5.18 per unit.

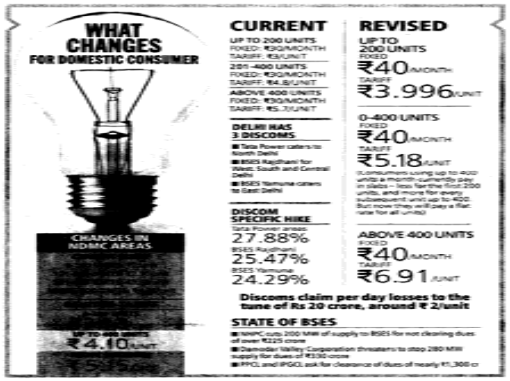
Above 400 units, consumers will have to pay Rs 6.4 per unit, which will come to Rs 6.91 per unit (including fuel surcharge) instead of the existing Rs 5.7 per unit.

The suggested slab for consumers using power up to 400 units has been removed, and a flat rate has been put into effect.

New Delhi district, which is provided power by NDMC, has the least increase in the power tariff. (See box)

DERC Chairman P D Sudhakar said: "The ultimate purpose of power reforms is to provide continuous power supply to consumers. If revenue requirements of discoms are not met, they cannot sustain by taking loans from the banks. The interest on the loans will finally become the consumers' burden."

Chief Minister Sheila Dikshit said the DERC is an independent entity and is authorised to decide power tariff. "The government has yet to receive an official communication on the new power tariff. We will look into it after we receive a copy."



CURRENT

UP TO 200 UNITS
FIXED: ₹30/MONTH
TARIFF: ₹3/UNIT

201-400 UNITS
FIXED: ₹30/MONTH
TARIFF: ₹4.8/UNIT

ABOVE 400 UNITS
FIXED: ₹30/MONTH
TARIFF: ₹5.7/UNIT

DELHI HAS 3 DISCOMS

- Tata Power caters to North Delhi
- BSES Rajdhani for West, South and Central Delhi
- BSES Yamuna caters to East Delhi

DISCOM SPECIFIC HIKE

Tata Power areas: 27.88%
BSES Rajdhani: 25.47%
BSES Yamuna: 24.29%

REVISED

UP TO 200 UNITS
FIXED ₹40/MONTH
TARIFF ₹3.996/UNIT

0-400 UNITS
FIXED ₹40/MONTH
TARIFF ₹5.18/UNIT
(Consumers consuming up to 400 units a month currently pay on slabs — less for the first 200 units, and more for every subsequent unit up to 400. But now they will pay a flat rate for all units)

ABOVE 400 UNITS
FIXED ₹40/MONTH
TARIFF ₹6.91/UNIT

Discoms claim per day losses to the tune of Rs 20 crore, around ₹ 2/unit

STATE OF BSES

- NDPC cuts 200 MW of supply to BSES for not clearing dues of over ₹225 crore
- Damodar Valley Corporation threatens to stop 280 MW supply for dues of ₹150 crore
- PPCL and IPGCL ask for clearance of dues of nearly ₹1,300 cr

"THE ULTIMATE purpose of power reforms is to provide continuous supply to consumers. If revenue requirements of discoms are not met, they cannot sustain by taking loans from the banks. The interest on the loans will finally become the consumers' burden."
P D SUDHAKAR
Chairman of DERC

"DERC IS AN independent entity and is authorised to decide power tariff. The government is yet to receive an official communication on the new power tariff. We will look into it after we receive a copy."
SHEILA DIKSHIT
Chief Minister

"THE GOVERNMENT has lent full support to power companies in their demand for tariff hike. We condemn this and will soon launch a state-wide agitation against this arbitrary increase."
V K MALHOTRA
Leader of Opposition in Assembly

"WE WANT A complete rollback. We are against any hike till the time a full CAG audit is done of the accounts of the power companies."
V N RAU
Delhi Secretariat, East Delhi

of Rs 4.80/unit will be calculated from zero, not 200 as

Hindu/ Delhi/ June 27, 2012

Another huge electric shock for Delhi

Smriti Kak Ramachandran

NEW DELHI: The Delhi Electricity Regulatory Commission delivered one more electric shock to the Capital's citizens on Tuesday, announcing an increase of about 26% in the monthly power bills beginning July 1.

Announcing the revised electricity tariff for 2012-13, the regulator gave the power distribution companies an overall raise of 20.87% across various categories. In addition, all consumers will have to pay a surcharge of 8% on the total bill.

Incidentally two of the discoms — BRPL and Tata Power — had sought an increase of less than 20% in their petitions to the DERC.

The overall hike in the energy charges will be 27.88% in the Tata Power areas, 25.47% in the BRPL areas and 24.29% in the BYPL area.

Consumer in all categories except in the New Delhi Municipal Council (NDMC) areas will also have to pay a surcharge of 8% on the bill. This surcharge is being levied to pay off purportedly accumulated debts which currently are as high as Rs.5,800 crore. The huge jump in rates has been attributed to the deficit accumulated by the discoms over the past few years. Consumers in the NDMC areas will not have to pay this 8% surcharge since the NDMC is the only discom with a surplus of Rs.400 crore.

As per the revised tariff order, the revised tariff in the domestic category is Rs.5.17 per kWh; for commercial category it is Rs.8.84 kWh; and for industrial consumers it is Rs.7.69 kWh. For the average consumer in the domestic category the average rate of power after the 8% surcharge will now be Rs.5.58. The DERC has also revised the unit slabs. Earlier the three slabs were 0-200, 200-400 and above 400. Now the slabs are 0-200, 0-400 and above 400, which will put an additional burden on consumers, because only those consumers who fall within the 0-200 unit slab will be able to benefit from the one-rupee subsidy that the Government offers in this slab.

Earlier, a consumer who used 300 units of energy was billed as per the per unit charge for the first slab of 0-200 units and for the additional 100 as per the second slab of 200-400, but now consumers will be charged uniformly as per the 0-400 slab which is higher than the first slab.

As per the revised tariff list, for consumers in the 2-kW connected load category who use between 0-200 units, the charges will be Rs.3.70 per kWh, between 0-400 Rs.4.80 per kWh, and for 400 and above Rs.6.40 per kWh. The fixed charges too have been increased by Rs.10 per month from Rs.30 to Rs.40 in this category.

The monthly fixed charges for consumers having a sanctioned load of up to 2 kW have been increased from Rs.30 to Rs.40, while consumers having sanctioned load between 2 kW to 5 kW will have to pay Rs.100 as fixed charges instead of current Rs.75.

The fixed charges for consumers having a sanctioned load of above 5 kW will have to pay Rs.20 instead of current Rs.15.

The DERC has abolished the existing quarterly fuel price adjustment (FPA) mechanism and replaced it with a quarterly purchase price adjustment (PPA), in which variations in the power purchase during any quarter will be recovered in the subsequent quarter as a percentage variation over the approved tariff.

DERC chairman P. D. Sudhakar said the average hike is 20.87% in all categories and domestic tariff has been hiked by 26%. "There was no hike in tariffs in the past several years which led to a huge deficit for all three discoms. After studying the tariff petitions, carrying out prudence checks and our own assessment we have allowed a hike of 20.87% overall. We have to take into account the rising price of fuel — coal and gas — and the rise in other overheads like salaries for the discom employees."

He said power tariff hikes in future will not be as high and will be aimed at meeting the past deficits and not current costs.

"With the 22% hike that was announced in August 2011, the discoms were able to lower the deficit by Rs.1,200 crore; with the hike of 20.87% this year, they will meet another Rs.700 crore, but since there will still be an outstanding of Rs.5800 crore, in future the tariff hike will be aimed at meeting this deficit," said DERC member J. P. Singh.

The DERC had in August last year hiked the tariff by 22% for all categories of consumers. That was followed by a 5% hike in February and another 2% in May on account of fuel price adjustment.

Spotlight: Cities

Cities: the central focus of discussion in the Rio+20 conference this time.

-- By 2025 around 65 per cent of the world's population is projected to live in cities – equal to the global population in 1986.

-- A billion more will be added over the next three decades in Asia – almost adding a whole new India. More than half of them will be living in cities

What about India?

India's urbanisation is still modest at 30 per cent and is expected to be 40 per cent by 2030. But this is more than the population of the United States.

India's urban mosaic

Skewed growth: 70% of urban population are in about 400 cities. The rest in about 4000 towns and cities. About one third of the total urban population in the megacities..

Shadow growth: Top rung cities show strong trend towards suburbanisation.

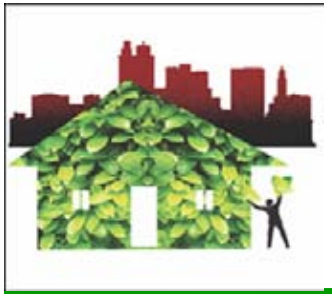
Slow growth at the bottom: Lower rung towns stagnating. Some have grown due to infrastructure investments and rural to urban migration.

The Hindu/New Delhi/June 27, 2012

Greening the urban jungle

Urbanisation took centre-stage at last week's Rio+20 conference for good reasons. Cities collectively consume 75 per cent of world's natural resources, generate 50 per cent of waste and emit about 70 per cent of the greenhouse gas. With no slowing down of urbanisation in sight, this consumption is bound to increase. It is now abundantly clear — as UNEP's recent report on sustainable cities convincingly demonstrates — that unless cities become resource efficient and reduce waste generation, national and global sustainable development would be impossible to achieve. This is a warning bell to Indian policymakers, who have so far focused on the economic growth of cities and ignored their environmental performance. Consuming 40 billion tonnes of raw material every year has its consequences. The first visible challenge is the staggering waste cities produce. Conventional wisdom has been to find more landfill sites. This approach would demand more land over time and cities cannot endlessly appropriate the resources of their region. It would lead to potential conflicts and the loss of productive agricultural land would partly offset the economic benefits provided by the cities. Pursuing standard solutions and treading the beaten path of town planning would not help. Only a radical change in course will create zero-carbon, zero-waste habitats, which is imperative.

It would be impractical to cap the growth of cities. Neither is it the objective of the current debate. The question is how to transform them. Certain cities have taken the lead and shown a way forward. For instance, Copenhagen recycles most of the waste it generates and lets only 3 per cent go to the landfill. Extending the idea of recycling, Kitgum town in Uganda traps used water from houses and utilises it to grow food in grey-water gardens. Cities in Malta have opted for a smart bi-directional grid system to regulate their power consumption. There are more inspiring examples. With the Central government dithering on commitments to reduce emission levels and the National Mission on Sustainable Habitats failing to offer anything substantial, Indian cities can no more rely on centrally directed policies and projects. They have to adopt best practices on their own and launch projects with clear green benchmarks. A good beginning would be to promote non-motorised transport. Even in larger cities such as Chennai, the share of bicycle trips, despite poor arrangement, is as high as 12.5 per cent of the total trips. Building dedicated bicycle tracks would significantly reduce transport related emissions. If Indian cities are keen to improve the quality of life and remain economically competitive, they have to leapfrog to become desirable green places to live in.



City: The focal point of climate mitigation and energy security discussions

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.

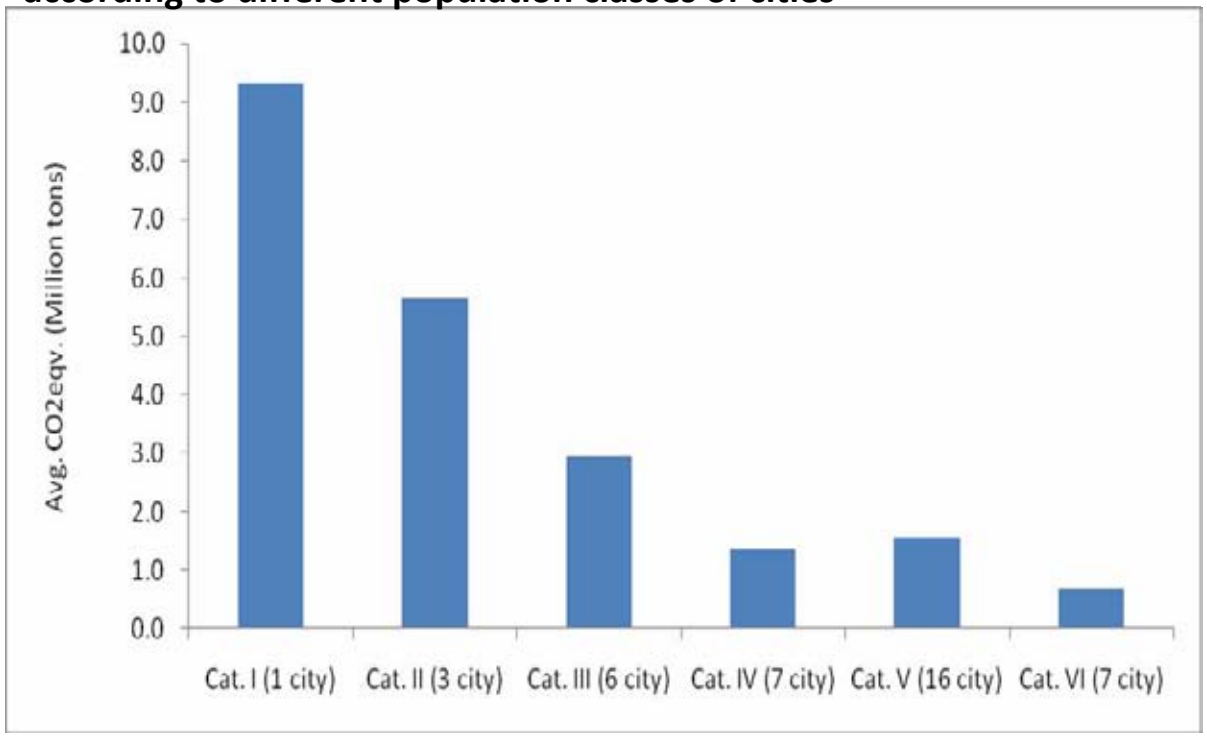
Massive increase expected in ownership of household appliance

Cities collectively consume 75% of world natural resources, generates 50% of waste, and emits 70% of greenhouse gases.

Cities: Energy guzzlers

Bigger Indian cities guzzle more fuel

Total CO2 equivalent emissions (million tons/ annum) classified according to different population classes of cities



Source: Based on data provided in 'Energy and Carbon Emission Profile of 53 South Asian Cities', published by ICLEI, British High Commission and Census of India 2001 for city population data

Global cities under pressure to mitigate setting targets and deadlines for CO2 reduction……

London – 60% by 2025

Paris: -- 25% by 2020

Toronto – 30% by 2020; 80% by 2050 from 1990 level

Tokyo – 25% by 2020 from 2000 levels

Indian cities expected to come up with climate mitigation plan and targets

- Reduce energy imprints of urban consumption – buildings represent the microcosm of urban demand

Trends in building spaces – how big is the problem?

We don't know enough……. Real estate sector lacks transparency

Very poor data base on trends in building spaces in India:

Ministry of housing and poverty alleviation tracks demand for housing but not other built up areas. Planning commission and others on trends in the construction sector. But buildings are a very small component of the construction industry…..

Real estate service providers, investment banks, and research foundations are the principal source of information……But very opaque and not verifiable……

A few cities – Hyderabad, Bangalore, Chennai, Delhi, Mumbai have a little better data due to new growth etc.

Disparate estimates make a curious jigsaw ….. But indicative of an explosive trend: Eg.

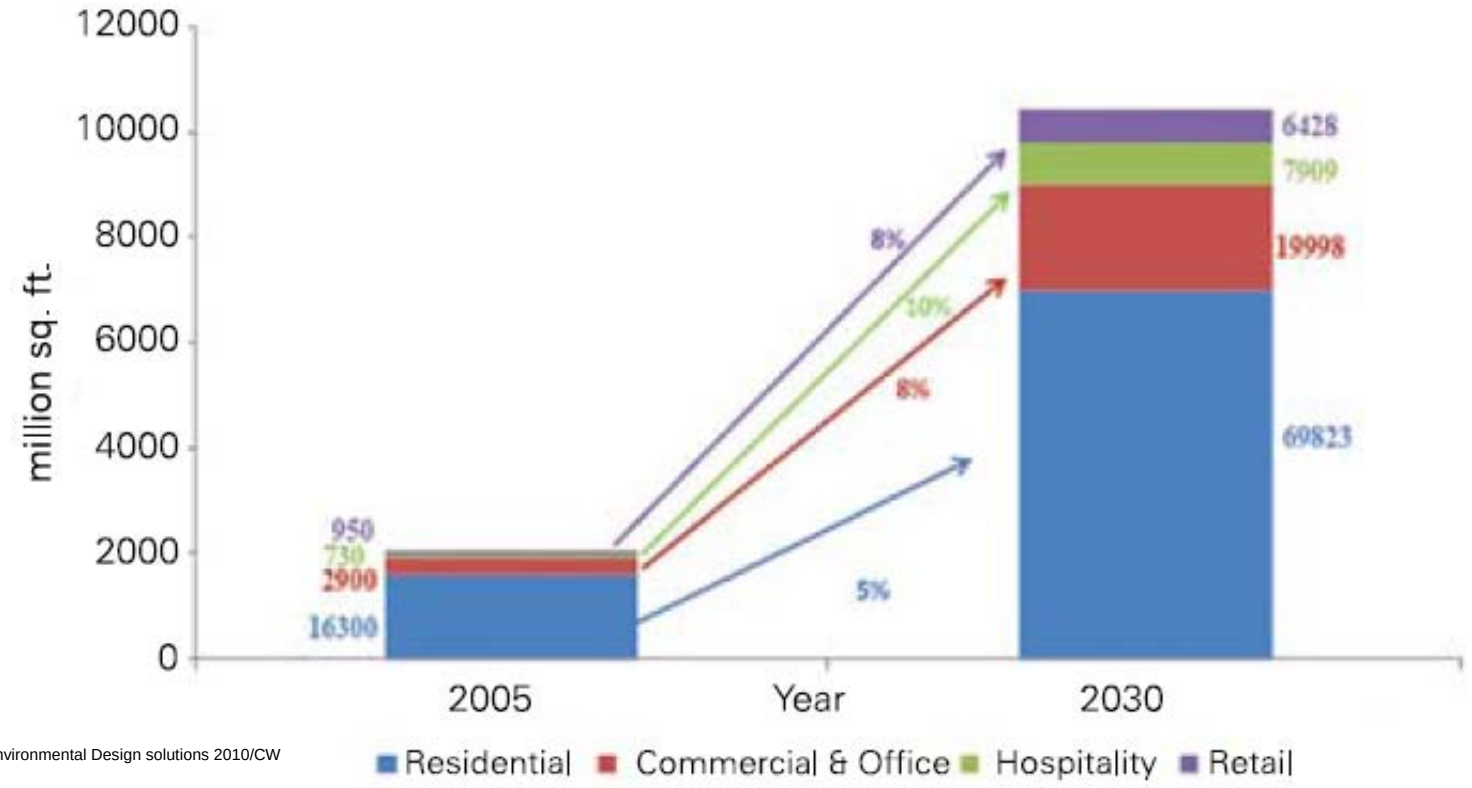
Constructed area in 2005: close to 21 billion square feet.

Expected to be 5 times and reach to approximately 104 billion square feet by 2030. A CAGR between 5 to 10 percent to be achieved …..

Hospitality and Retail to achieve higher CAGRs -- 8– 10%. By 2030, -- 7 to 11 times of the level in 2005.

Maximum growth in residential and commercial sector -- four to five times of 2005 figures. (EDF)

Building sector: explosive growth



Source: Planning Commission - Environmental Design solutions 2010/CW

India's challenge: The ECO-III forecasts - 70% of building stock that will be there in 2030 is yet to come up in the country.

In developed countries, a very small addition is made to the building stock each year. In the UK, for eg, at least 80% of the homes that will be standing in 2050 have already been built.

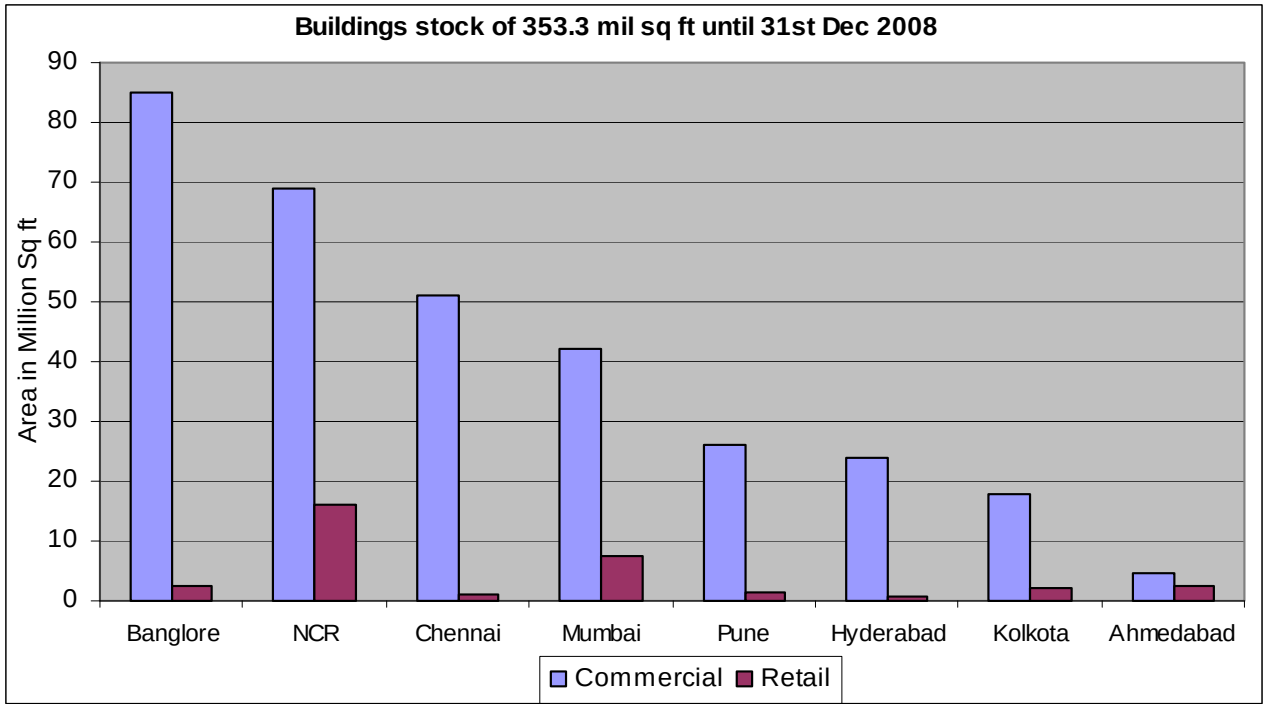
Trends in metro cities explosive. Suburbs under pressure

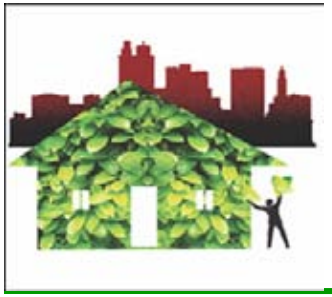
Office stock must increase nearly 20 million sf/ year in New Delhi, Mumbai, Bangalore to keep pace with growing demand; Space of shopping malls 79 million sf in 257 centers are estimated in 15 largest cities of India (BEE)

Suburbs: **the new growth and resource conflict areas**

- 95% of new residential projects in suburbs
- 60% of operational office spaces in metro cities in suburbs
- More than half of retail spaces in suburbs (J Lange)

Commercial and retail stock in cities





Lifestyle pressure amidst poverty

Middle class growing rapidly:

The 2010 McKinsey study on urban infrastructure estimates that the seeker class (with household income of 200,000 – 500,000 per annum) will be the most dominating income class and is expected to be half of all urban households by 2025

Cities will see more concentrated buying power, transformation of lifestyle and aspiration for high end resource intensive comfort level.

Urban poverty remains high

Nearly 21% of urban population -- but 40% to half in Delhi and Mumbai, live in slums. All low income groups are not necessarily in the slums. 75% of the urban population in the bottom rung of income level – Rs 80/day (USD 1.8). (Mckinsey 2010)

19% households cannot afford any housing (Jones Lange 2010)

Trends in building spaces – residential and commercial space

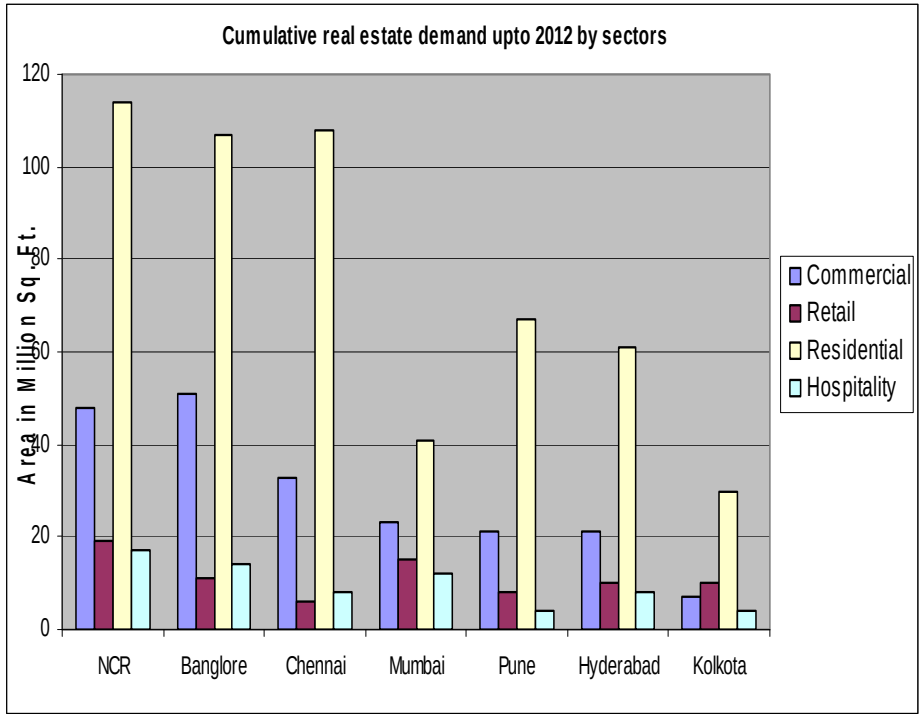
Massive housing deficit: Planning Commission: At the end of the eleventh five year plan the housing shortage is more than 26 million housing units for all income classes

Who will build in the future?

The government to focus on EWS and LIG: These are not resource guzzlers but need innovative housing designs for improved comfort and efficiency

Private players largely on middle and high income housing: Eg. CREDAI is the association of the builders and developers who cover 80% of the real estate development in key 13 states of India.

Scope of corporate social responsibility and resource efficiency.



Towns: Made to order

A report by McKinsey states that there is a need to build around 20-25 new townships closer to 20 metros and cities across the country.

IDFC's India Infrastructure report 2009 states -- the size of private 'integrated' townships ranges from 100 to over 1000 acres and more than 200 such townships covering more than 200,000 acres are under approval for planning and construction especially around the four metros.

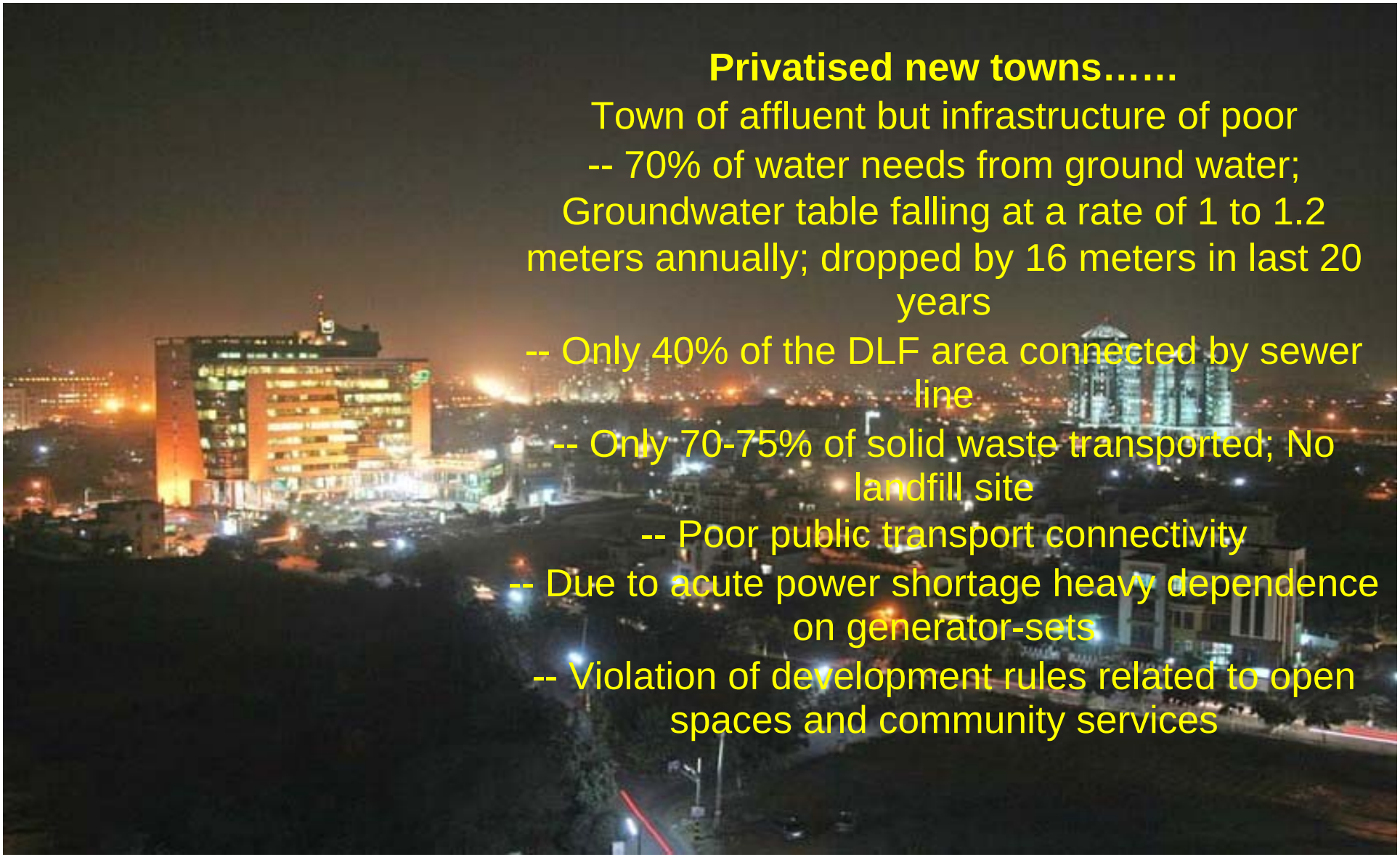
Around 32 townships coming up around the major metros with an aerial coverage between 30000-40000 acres alone. This is increasing.

On Delhi Mumbai Industrial Corridor (DMIC), several private towns and cities are on the cards.

Reliable government estimates on actual number of townships and their actual aerial coverage are still scarce.

Touted as Walk to Work Green Towns – without green benchmark

Glitzy towns in dark shadows…..



Privatised new towns……

Town of affluent but infrastructure of poor

-- 70% of water needs from ground water; Groundwater table falling at a rate of 1 to 1.2 meters annually; dropped by 16 meters in last 20 years

-- Only 40% of the DLF area connected by sewer line

-- Only 70-75% of solid waste transported; No landfill site

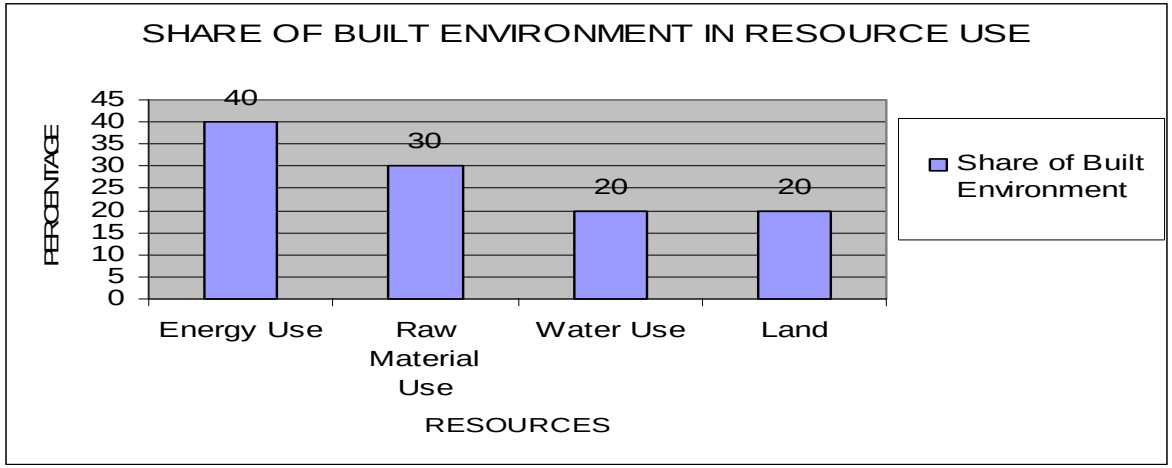
-- Poor public transport connectivity

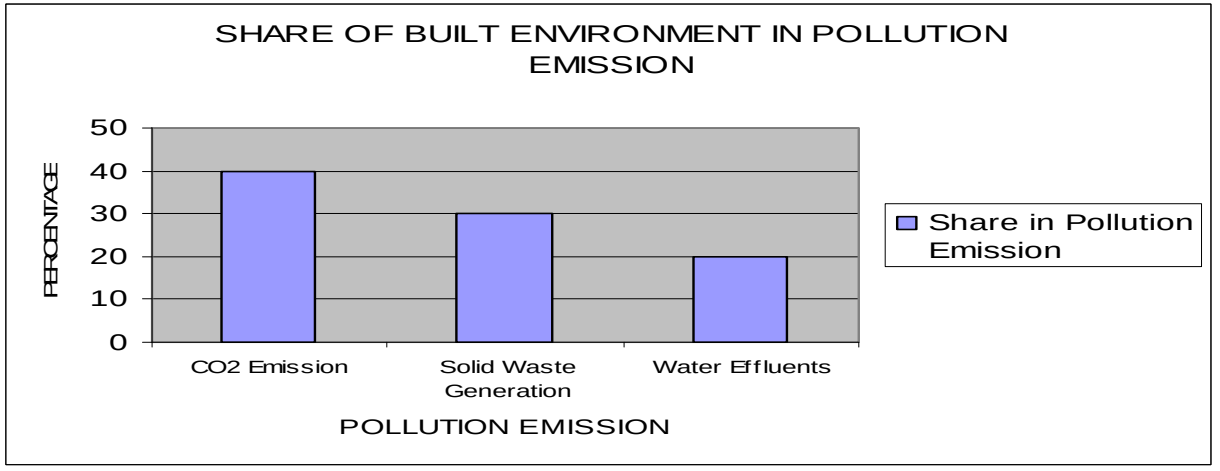
-- Due to acute power shortage heavy dependence on generator-sets

-- Violation of development rules related to open spaces and community services

Buildings: earthscrapers

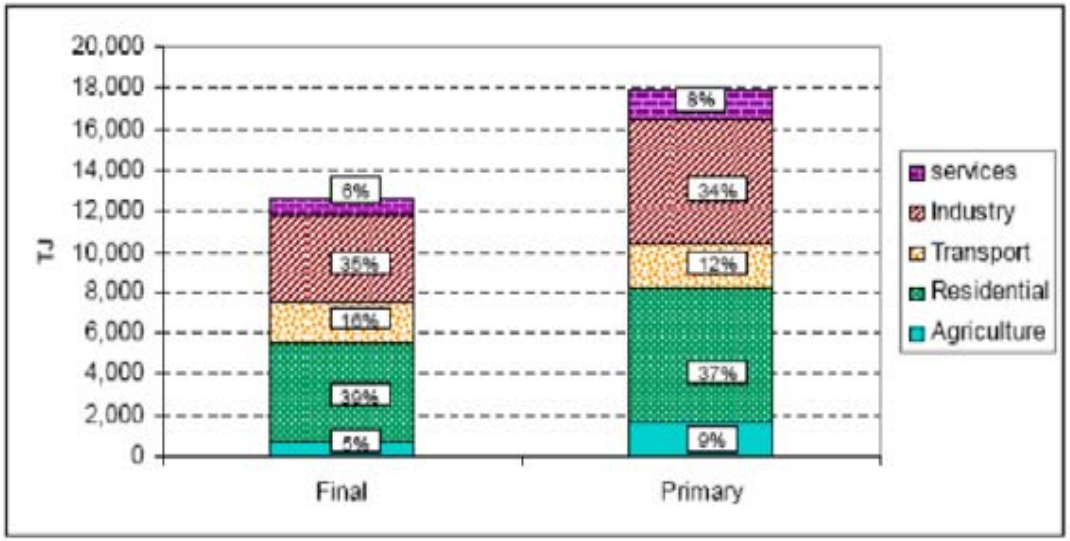
Burden of Built Environment





Source: Anon, 2008, Green Buildings – an overview, Capacity Building Series (2008-2009), June 2009, TARA Nirman Kendra, New Delhi

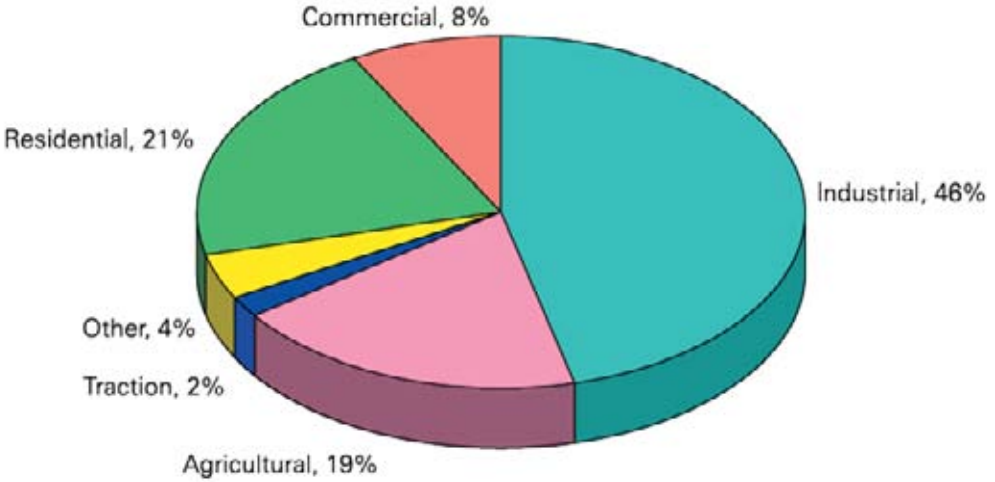
Primary Energy by User (including biomass) 2004



[1] Primary electricity is equal to the electricity consumed directly and the indir necessary to produce the electricity.

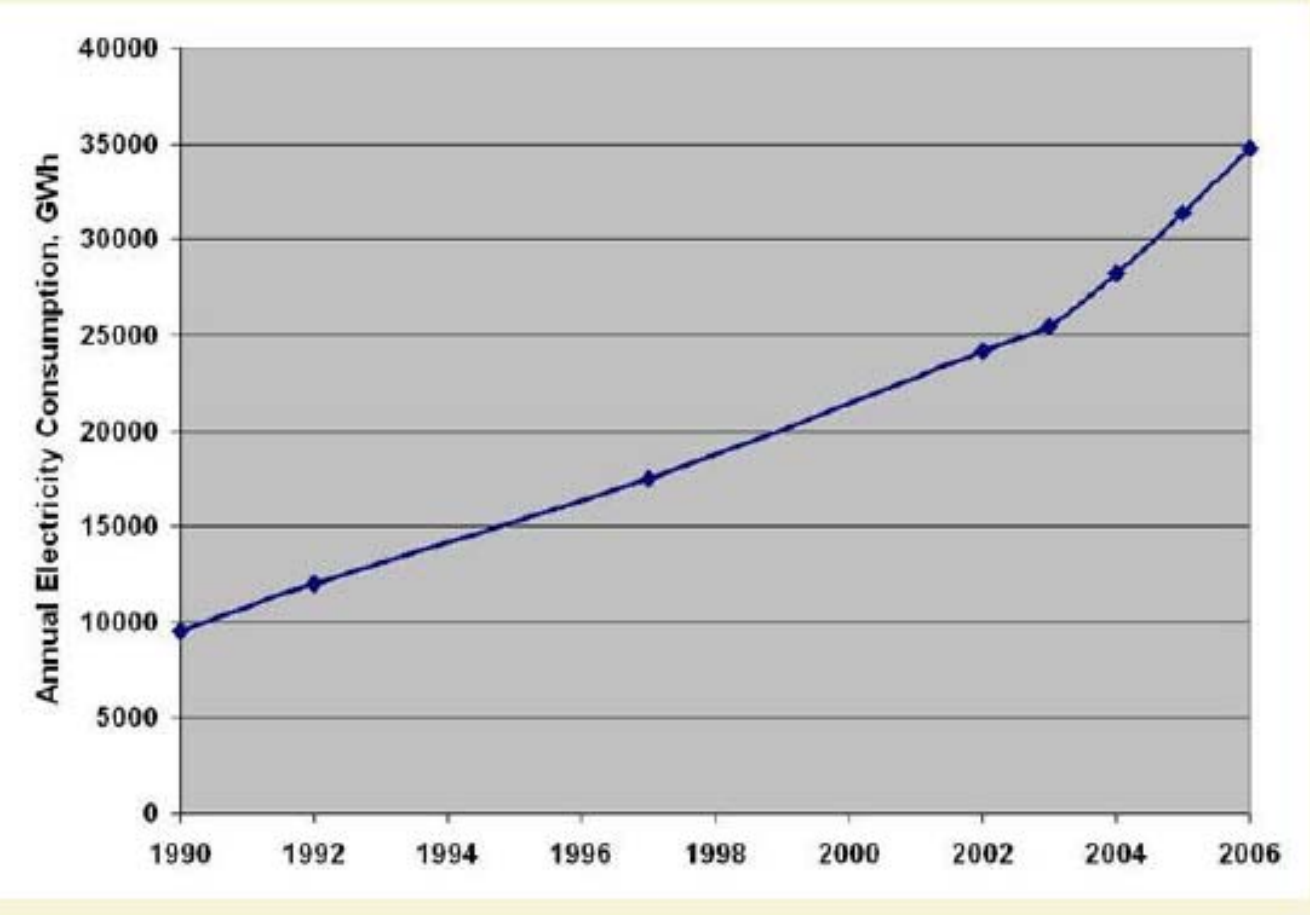
Residential sector consume nearly the highest

India's Primary Electricity Consumption



Electricity Use in the Commercial Sector is exploding

climatic zone-wise and building-use-wise



Source: Bureau of Energy Efficiency,

Typical energy consumption in buildings

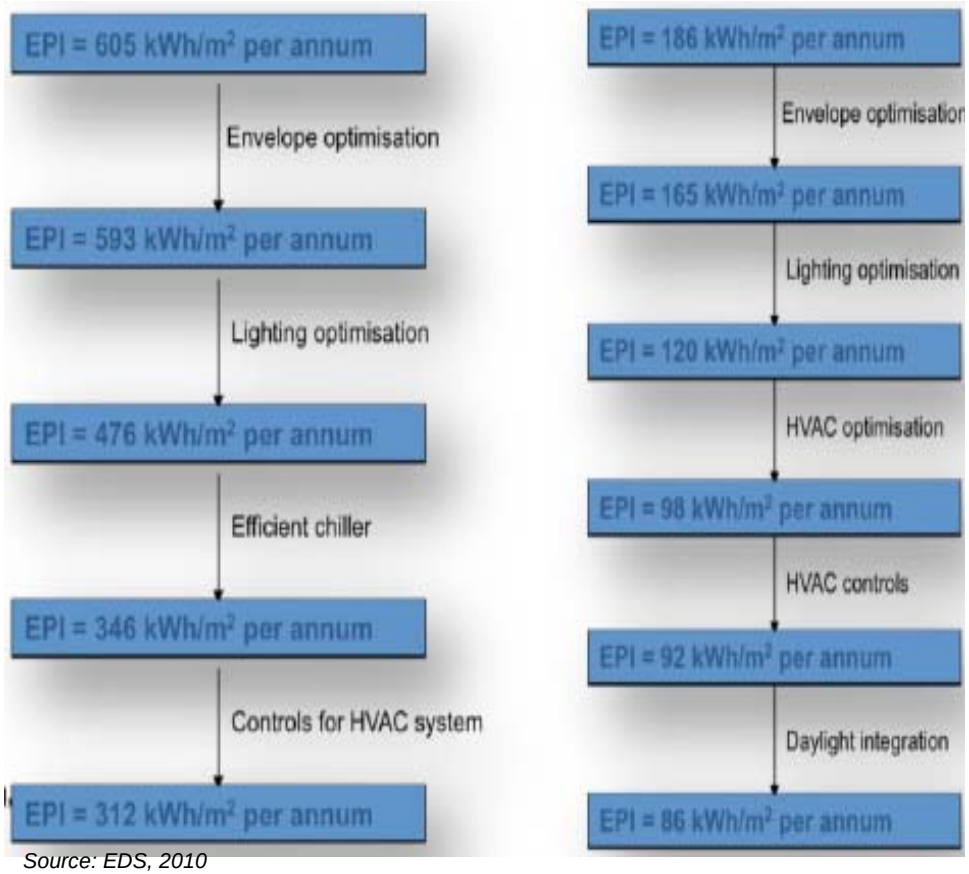
climatic zone-wise and building-use-wise

Building Category	Climatic Zone wise Typical Energy Consumption kWh/ft$^{2/}$/yr (In bracket in *kWh/m^2/yr*)			
	Temperate	Warm & Humid	Composite	Hot & Dry
Office	18.55 (*199*)	15.36 (*165*)	8.68 (*93.39*)	8.14 (*87*)
Shopping Mall	28.43 (*306*)	15.31 (*164*)	27.96 (*301*)	11.87 (*128*)
IT Park	10.08 (*108*)	3.62 (*39*)	45.14 (*485*)	NA
Hotel	NA	30.13 (*324*)	NA	37.2 (*400*)
Hospital	NA	NA	NA	11.7 (*126*)
Residence				15-30

Note: a. IT Park in temperate and W&H zone were not fully functional
b. Shopping Mall is W&H zone was not full AC
N.A. No Building of category was available in the buildings surveyed

So many steps to influence energy consumption in buildings

Impact of energy efficiency measures on the EPI of commercial buildings (office and hospital buildings)



Source: EDS, 2010

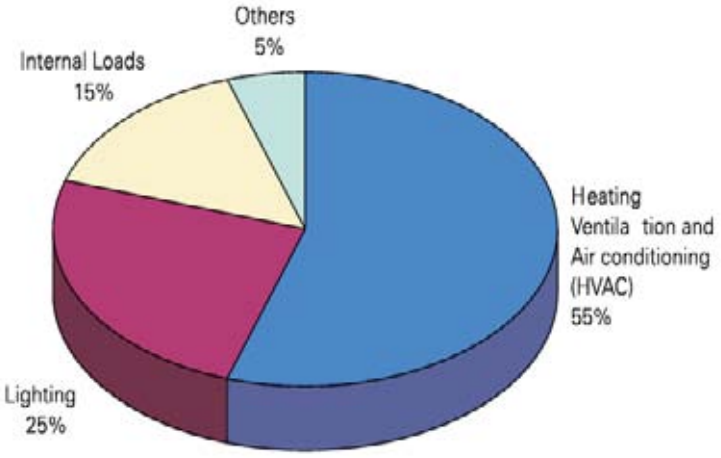
The energy audits of buildings by the BEE shows that existing buildings have 30 to 50 percent energy savings potential.

Low carbon strategy of the Planning Commission: It is possible to abate about 60 Mt and 122 Mt of CO2 per year by 2020 in aggressiveness scenario. The annual savings by 2030, from the commercial buildings sector can be 400 Mt to 440 Mt of CO2.

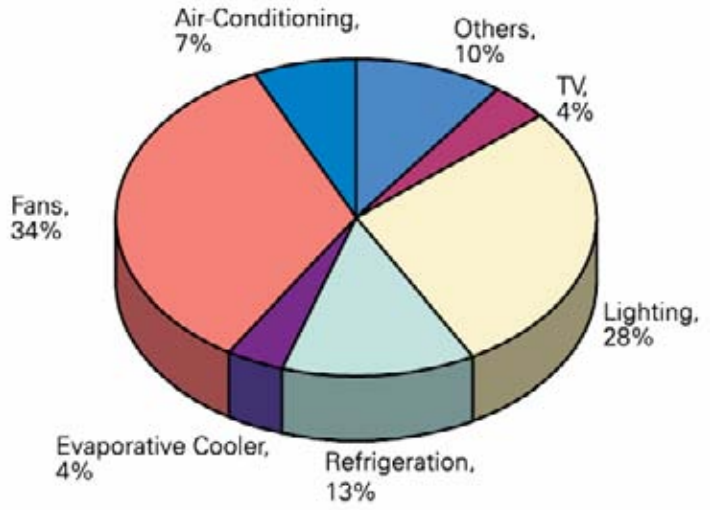
Energy Conservation Building Code (ECBC) can reduce energy demand by nearly a quarter compared to new standard buildings. But its mandatory implementation a non starter.

What affects energy consumption in buildings?

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

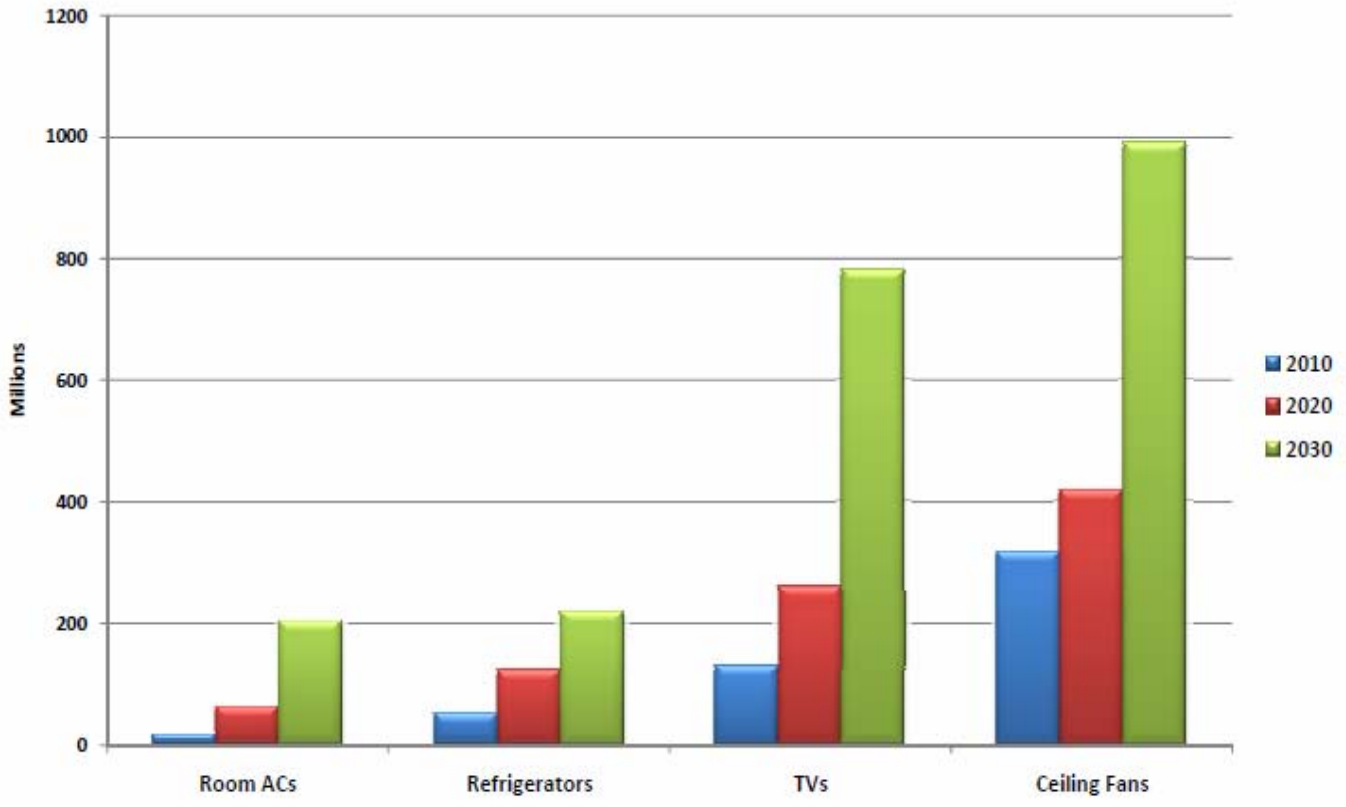


Fans and refrigerators constitute maximum energy use in residential sector



Source: Bureau of Energy Efficiency

Ownership of Appliances in India Growing Rapidly

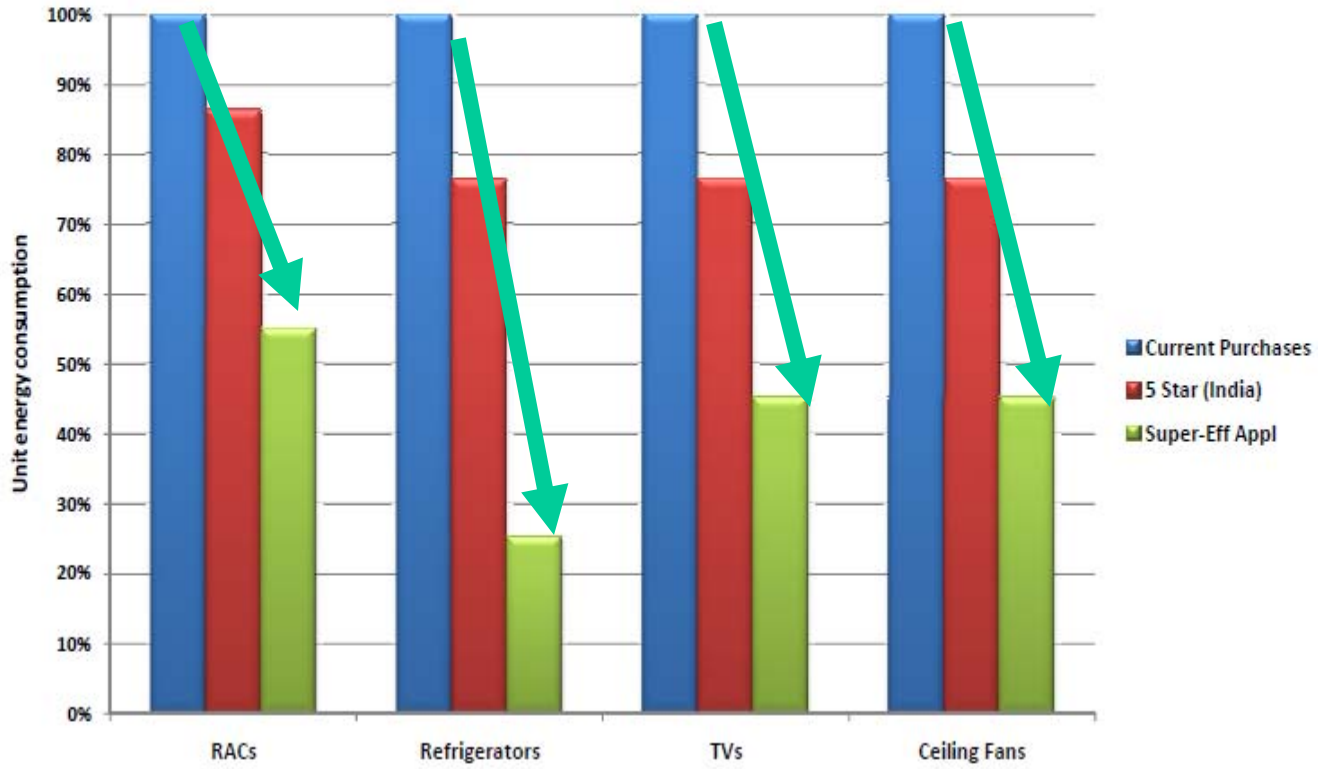


Estimates From Daljit Singh 2011, Prayas

By 2030, more than 70% of the stock of appliances will have been added just after

Can we have energy prudent society?

Comparison of Consumption of Current Purchases and Highest Rated in India with Best World-Wide



Large gap between average current purchase and highest rated model (5-Star), and even larger gap between highest rated and best commercially available world-wide.

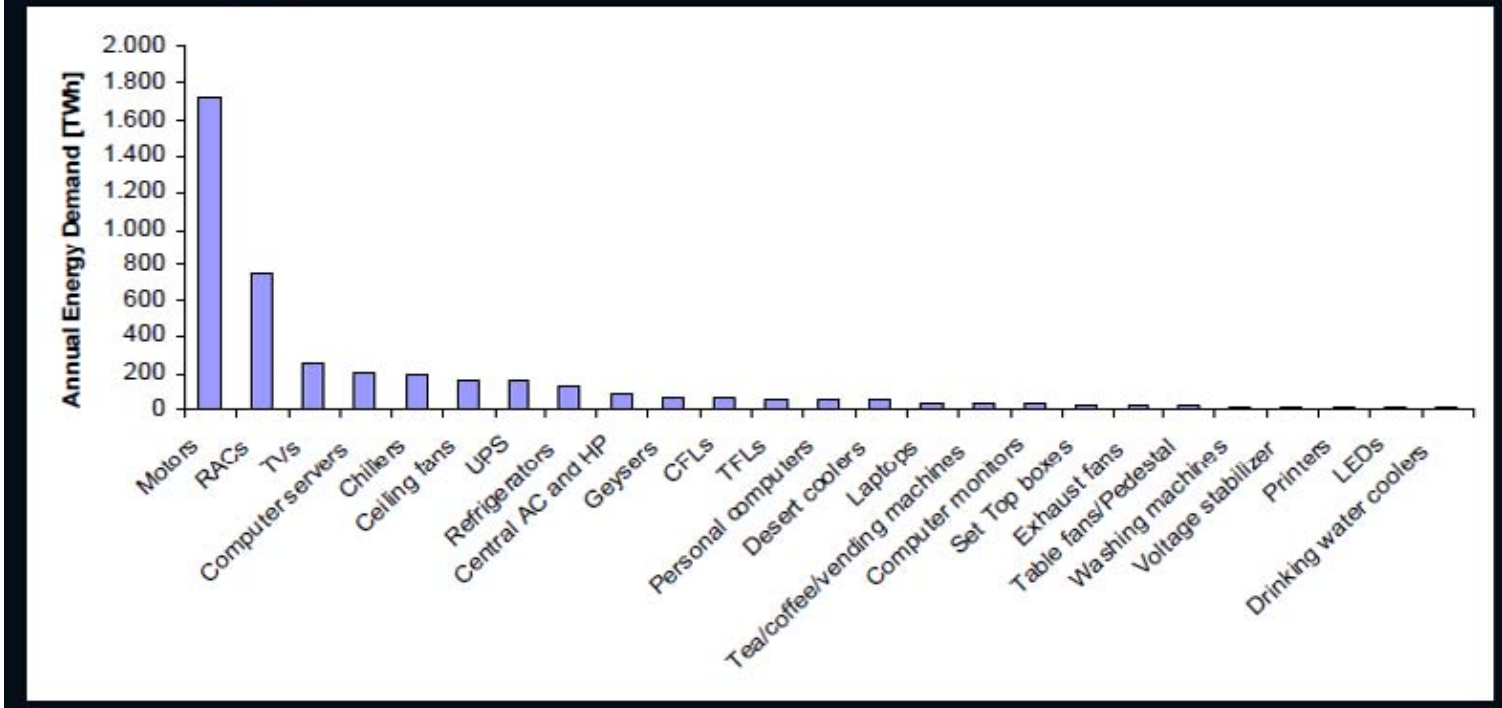
Estimates From Daljit Singh 2011, Prayas

Change the practice

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

Top 25 products with the Highest Annual Energy Use



Total annual energy demand for top 25 appliances is 4.2 GWh
Motors and RACs are top 2 appliances, annual energy demand is 2.5 GWh

Estimates From Tanmay Tathagat 2011, Environment Design Solution Guidelines

How can buildings change the water paradigm

Build water prudent buildings

- **Rainwater harvesting** – tanks, ponds, rooftop rain harvesting -- to rebuild local water aquifers.

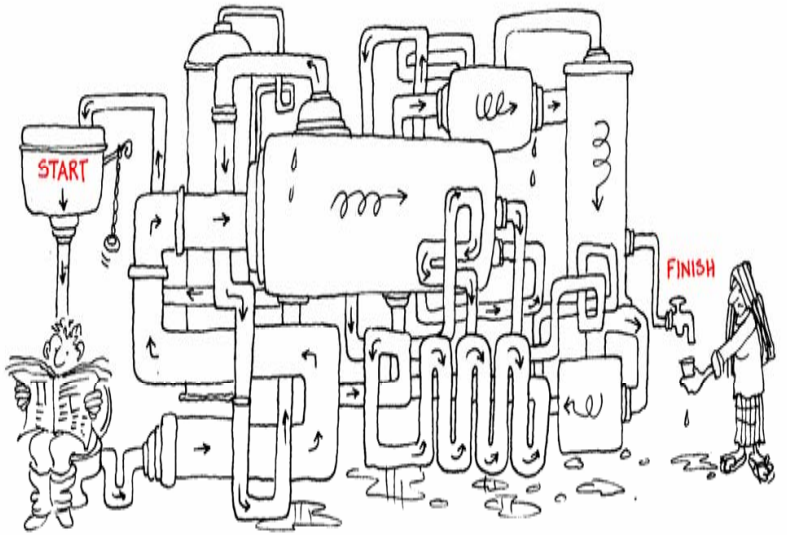
  Be water efficient.

  Change flush toilet paradigm: 80% of treated water flushed down that destroy hydrological systems; that that are hygienic and inequitous.

  Reuse and recycle all waste water.

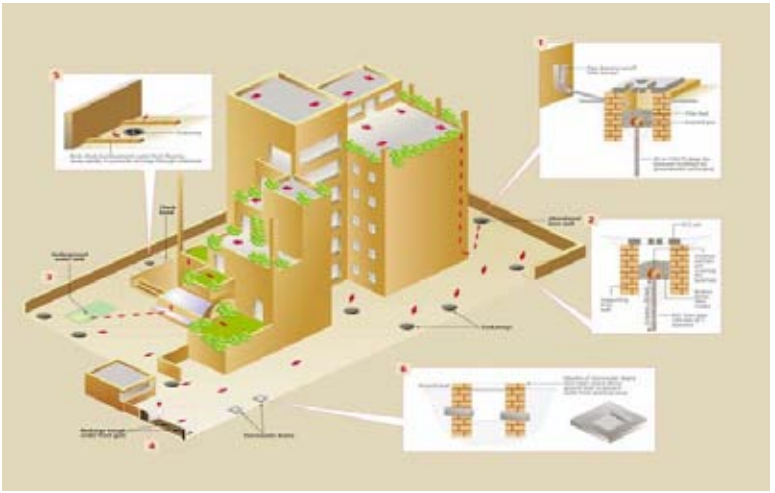
  Promote water efficient fixtures

  Assess carrying capacity of ground water



City needs to change the planning approach

- New Delhi: Per capita availability of water is 209 litres/capita/day.
- Copenhagen: Per capita water consumption in 1990 was 190 litres/capita/day. But their target was to bring it down to 111 litres/capita/day in 2002.
- Delhi will increase per capita availability to 360 litres/capita/day by 2005. A grand idea. A mindless idea.



Emerging policy opportunities…..

Integrated Energy Policy 2006: Demand side management in buildings to reduce electricity demand
NBC should be amended to facilitate efficient buildings
Publicise innovative approaches
Make energy audits compulsory for all load above 1 MW
Initiate benchmarking
Amend building byelaws to enable solar water heaters

ECBC: Sets minimum energy performance standards. Has legal back up from the Energy Conservation Act; Voluntary, to become mandatory

National Habitat Standard Mission: Acknowledges Building energy consumption increasing from a low of 14% in 1970 to 33% in 2004-05. That mandatory ECBC can save 1.7 billion units of electricity per year….

National Habitat Standards: In the making to guide action in cities

National building code adding a chapter on and sustainability

Policies on water and waste – norms and regulations for ground water etc

Environment Impact Assessment (EIA)……..

EIA for buildings -- A major check point: Is it working?

Only comprehensive legal instrument that addresses environmental and resource impacts of **high impact buildings** comprehensively – land, water, energy, waste, pollution, etc

Legally binding under the Environment Protection Act

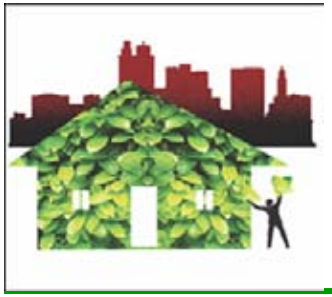
Influence much larger built up area than any other: Eg -- from energy stand point compare -- EIA and ECBC.

Only in Haryana, -- about 927 buildings reviewed for environmental clearance between 2008-2011. The area data for 446 buildings shows -- 8,29,89,836 square meters.

In contrast, according to the BEE website the ECBC registered buildings nationwide accounted for 829,787 sq meter until 2010.

This helps to decide the project design and development for resource efficiency…. Affects all aspects of resource use…..

How can we realise the full potential of this instrument?



Promising tool… but a blunt tool……..

Why EIA is not working effectively for buildings?

Form 1 and 1A are not as exacting as the detailed EIA for industrial and mining projects

Construction can precede consent … blunts the edge

Escape routes … the phenomenon of 19,999 sq mt……

No clear siting policy ……. Very weak post construction monitoring

No follow up on compliance reports

No public consultation

Post facto clearance possible

No power to regional office

Inadequate resources and staff ……. and many more….

Weakens sectoral interventions……

Water, energy, waste, land resource, pollution, traffic impacts……

For each sector Form 1 and Form 1A demand some information……

Eg – on Energy it demands to know --

-- Power requirement
-- Application of glass in buildings
-- Renewable energy application
-- Passive solar architectural features
-- Lighting, ventilation, space conditioning
-- Thermal characteristics of the building envelop
-- Impact on micro climate
-- safety etc

No formal linkage with ECBC

Similar check list for other sectors….water, waste….

But can this make a difference?…….

Very generic information offered; Without clear numbers and benchmark; Sometime response as generic as – “All relevant features like orientation of building, shading effect will be incorporated…” On thermal characteristics of buildings — “in accordance of ECBC,,,

Reform EIA for buildings

Cumulative impact of buildings can be significant.

Reform EIA for more effective impact. Move beyond the mere formality of Form 1 And 1A…Need some essential elements of EIA – public consultation etc.

Strong post-construction monitoring…site selection and acquisition after environmental clearance….

Establish clear benchmarks for assessment: Link with ECBC which is expected to become mandatory. Institutional and monitoring mechanism for ECBC to align with environmental clearance process

Establish minimum energy performance requirement for environmental clearance

Align with water norms and other regulations. Link with uptake of water efficient appliances

Quality of information and disclosure. Build capacity for enforcement and monitoring. Data and methodology to be more transparent. Need protocol for data generation, data quality, consistency, and reliability.

Energy audits should be mandatory for bi-annual reports.

Harmonise EIA-ECBC-NBC – plug and socket for better results….

Green rating of buildings

Voluntary green rating schemes growing in popularity in globally.

Country	Rating system
United States	Leadership in Energy & Environmental Design (LEED-United States)
	The Green Globe Rating System
	Energy Star (United States Environment Protection Agency)
Canada	Leadership in Energy & Environmental Design — Canada (LEED-Canada)
Australia	Green Star
	Australia Greenhouse Building Rating (AGBR)
United Kingdom	Building Research Environment Assessment Method Consultancy (BREEAM)
Europe	European Environment Agency rating
Hong Kong	Building Environment Assessment Method- Hong Kong (HK-BEAM)
Japan (CASBEE)	Comprehensive Assessment System for Building Environment Efficiency
Taiwan	Ecology, Energy Saving, Waste Reduction and Health (EEWH) (Taiwan)
Singapore	BCA Green Mark
Philippine	Philippine Green Building Council
South Korea	Green Building Council (Korea)
India	GRIHA
	Indian Green Building Council

Greening of building spaces

Details on green rating systems in India

Heads	LEED/IGBC	GRIHA-NRS
Inception Year	2001	2007
Total buildings registered	1505	179
Total Buildings rated	223	8
Square ft registered	1.09 billion sq.ft	Not provided
Square ft rated	Not provided	Not provided

Source: IGBC and GRIHA website

Yet another estimate shows that about 730 million sq ft. have been rated. That is a mere 3 per cent of the existing built up area of 25 billion sq ft. Miniscule!

The challenge in green building is not to have a small number of highly sustainable buildings, but to raise the sustainability of the entire stock of buildings in active use.

Why voluntary green rating under scrutiny today?

Voluntary rating schemes work on reputation advantage. It stimulates market and speeds up market uptake of green features. But as private voluntary schemes these remain outside the pale of regulations.

But now the voluntary rating programmes are getting linked with official incentive programmes.

Maharashtra government: Increased floor space index; reduced consent fee; rationalisation of property tax; reduction in state taxes etc. Pimpri Chinchwad

NOIDA: NOIDA authority awards 1 per cent extra FAR (floor area ratio – extra built up area) to projects which commits for LEED gold rating.

Ministry of Renewal Energy incentives for on-site renewal system

Union Environment Ministry allows separate queues for environmental clearance for fast track clearance to buildings that are pre-certified for GRIHA and LEED.

This demands performance monitoring

CSE review of the rating system

Opaque system: There is no data and information on the performance of the green rated buildings. Even in cases where rating systems have been promoted with government back up and incentives there is no record of the actual performance of the buildings.

No performance monitoring and reporting: The Government of India as well as state/ local governments are beginning to give incentives for rated buildings. But no official system for regular monitoring, reporting of information on actual performance of buildings.

No strategy to improve public acceptance of the green rating systems: Documentation of the efficiency measures in buildings and their performance is essential to build public support and acceptance of these programmes. But there is very poor level of information on the applications, costs and pay backs in the public domain.

Why voluntary green rating under scrutiny today?

CSE review of the experience with the global systems has shown that without proper performance monitoring green rated buildings perform sub-optimally and sometimes worse than the standard buildings.

Eg. In the US the US Green Building Council -New Buildings Institute study of 2008 show that the average LEED energy use was 25–30 per cent better than the national average but there was also a wide variability in LEED energy performance which was a cause for concern.

In Canada study by the National Research Council Canada, in 2009 shows that on average, LEED buildings used 18-39 per cent less energy per floor area than their conventional counterparts. But, 28-35 per cent of LEED buildings used more energy than their conventional counterparts.

This demands performance based green rating

Greening of poor people's home

Not just resource efficiency in rich person's home

Green measures to improve comfort and efficiency of poor peoples' home

Eg. SAM-BKL project of IGSS: In 2008 'Micro Home Solutions' designed comfortable shelter with canvas, chicken mesh, bamboo and ropes.

- Double layer wall made of canvas cloth stretched over a bamboo frame. The air trapped in the 'envelope' formed by the canvas insulates the interior from the cold.
- The inclined roof made of waterproof sheet on bamboo frame also has a provision on the side to open windwards to allow ventilation when necessary.

- The roof height of 5.5m allows for three tier bunk beds and still leaves enough head room for fresh air, particularly during the summer.

Building and the neighbourhood……

EIA provides for traffic impact assessment. But rarely assessed….

What EC process demands to know?

-- Will proposal create shortage of parking space? Propose traffic management at the entry and exit point of the project.

-- Provide details of the internal roads, bicycle track, pedestrian pathways

---Will there be significant increase in traffic noise and vibration?

There is no provision for demand management to mitigate traffic impact in the surrounding areas. Cumulative impact of the construction on the carrying capacity of the surrounding areas not addressed.

Self reported plans provided by the project proponents are not cleared by any assigned authority

Make traffic related clearances from competent authorities mandatory

Why TIA will become important for buildings?

Our cities are built differently ……

Delhi Kolkata **Bangalore**

Mumbai

London

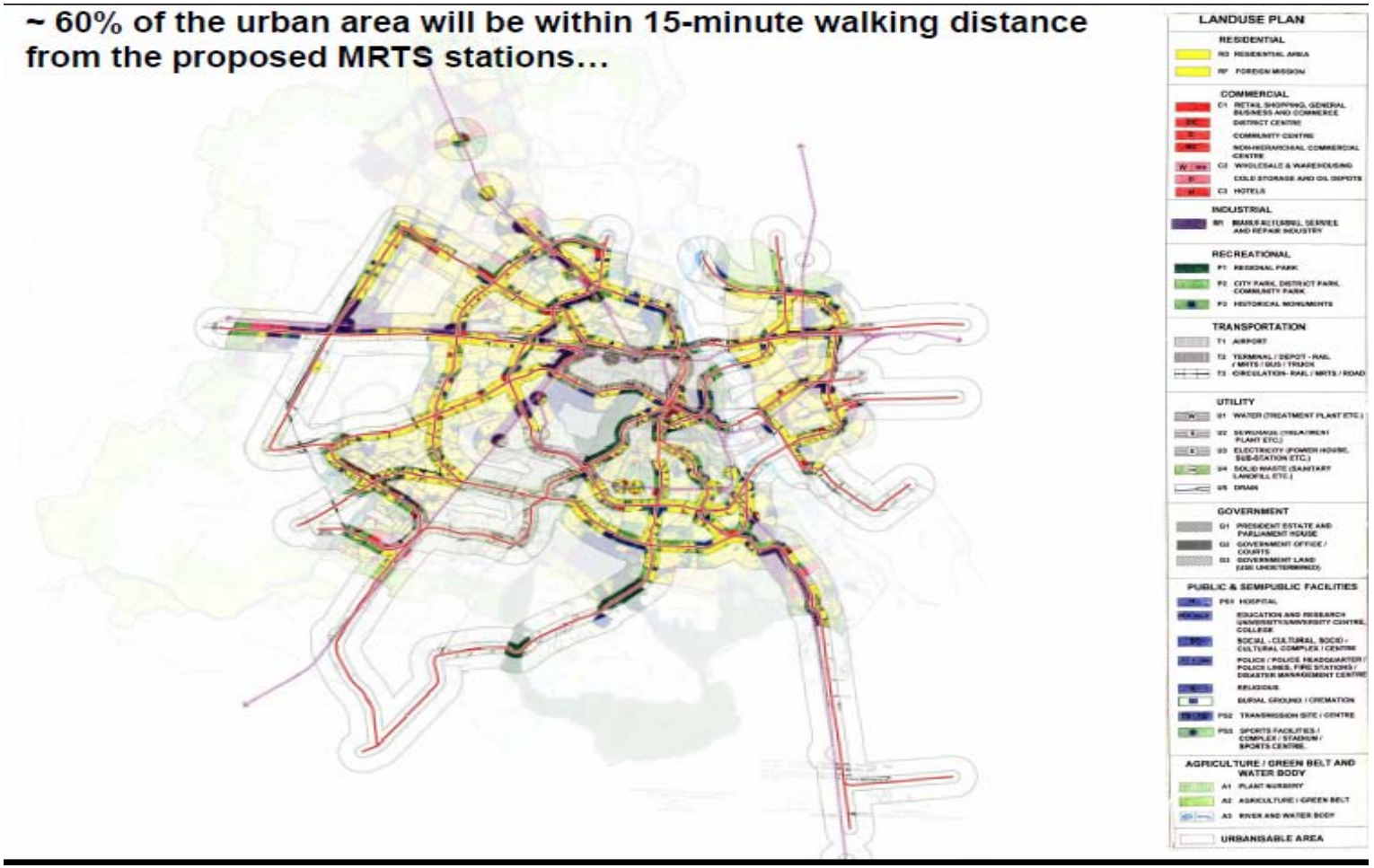
Source: Urban age

Densification and mixed land use for compact cities to reduce travel distances, reduce fuel use, improve efficient use of public transport, reduce car use, make cities walkable, improve efficiency of infrastructure…….

If cities grow big, its scale and density make waste treatment, recycling facilities, and public transport more efficient.

Set the terms for densification…..

IEP, NUTP-JNNURM reforms etc – increase permissible built up area, give FSI bonus – auction right to build… This will unleash new spate of construction…

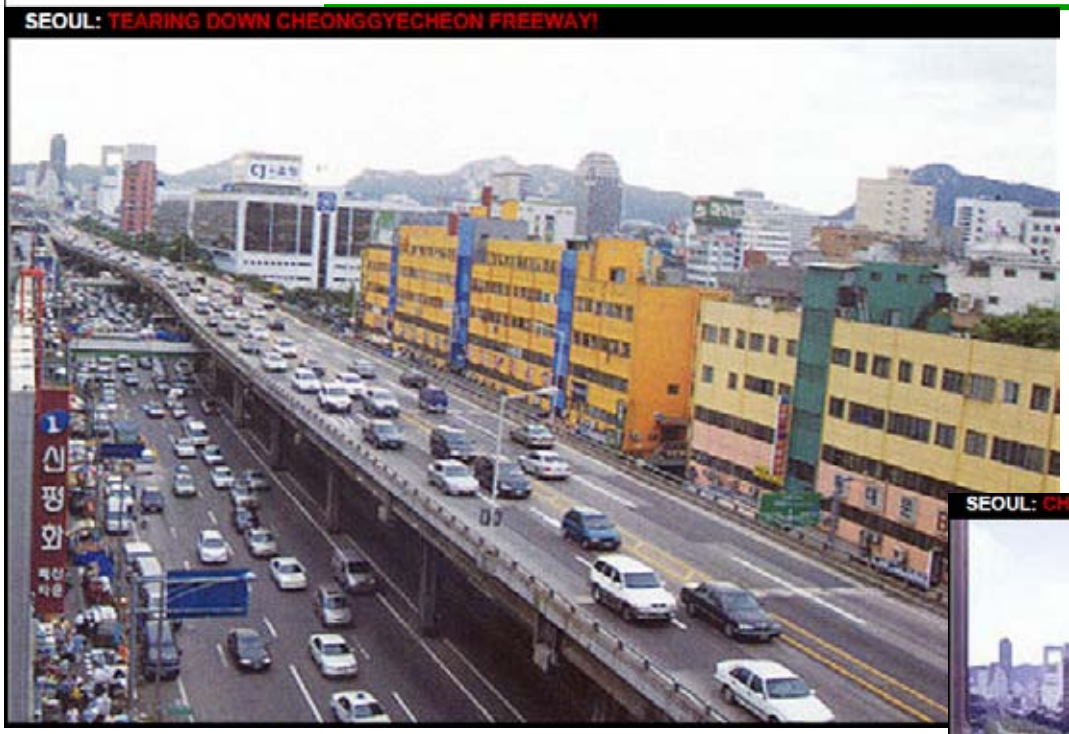


a) High Density Mixed Use within 5-min walk of stations…

Reason for success of BRT in Curitiba:

Maximum people Live, Work & Play
within 5 min walk of *RAPID TRANSIT* Stations

Why it is important to think beyond the building structure?



Street design and transit oriented guidelines in Delhi

This will have impact on building sector

Transit oriented guidelines must guide impact assessment of buildings

Discourage use of cars as feeder

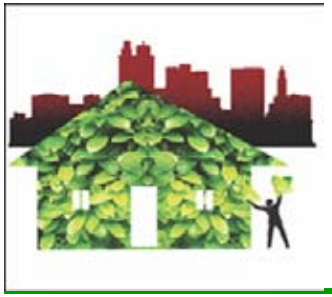
Park and ride at terminal

Parking caps near metro etc

Remove setbacks to make streets safe, walkable…..

Day light regulations… etc

To ensure Safety of Pedestrians:



Lessons from first generation action…..

Cities need clear roadmap and targets.

Large number of cost effective measures in India….. In developed countries baseline includes many low cost opportunities due to programme and policies in place. In India they are an opportunity….

New governance reforms --- Building permits requirements. Metering policies, energy efficient rules for rental markets, transparent information on resource efficiency, energy bills based on individual uses and GHG emissions etc.

Need measurable results from post-occupancy valuation of buildings to go as feedback to developers and users

Policies to prevent rebound effects of energy efficiency – energy efficiency leads to higher demand for energy services…

Need integrated design approach and participation of all stakeholders – architects, engineers and others – for best results and avoid sub-optimal approaches.

Performance based monitoring and compliance. **Education and training**

Need integrated approach to zoning laws and green building rules and peoples' participation in planning (eg. Global best practices -- Friedburg, Germany).

Deepen public and policy understanding for the big change

Need people as partners

Tell people what “works” and what “doesn’t work” in terms of energy-efficient and water-saving strategies for homes.

Tell them about the rate of return on costs for energy-efficiency and water-conservation products and appliances.

Deepen understanding -- how individual decisions to conserve water and energy add up to overall savings that benefit the community.

Resource efficient city development without compromising economic growth (eg. Global best practices -- Vaxjo, Sweden – 30% decline in city GHG but 20% increase in regional GDP).

Buildings	City	Area (Sq ft)	Hike in cost (in%)	Payback on cost premium (in years)
CII Sobrabji Godrej GBC	Hyderabad	20,000	18	7
ITC Green centre	Gurgaon	170,000	15	6
Spectral Services	NOIDA	150,000	8	4
WIPRO	Gurgaon	175,000	8	5
Technopolis	Kolkata	72,000	6	3

Let’s begin the discussions…