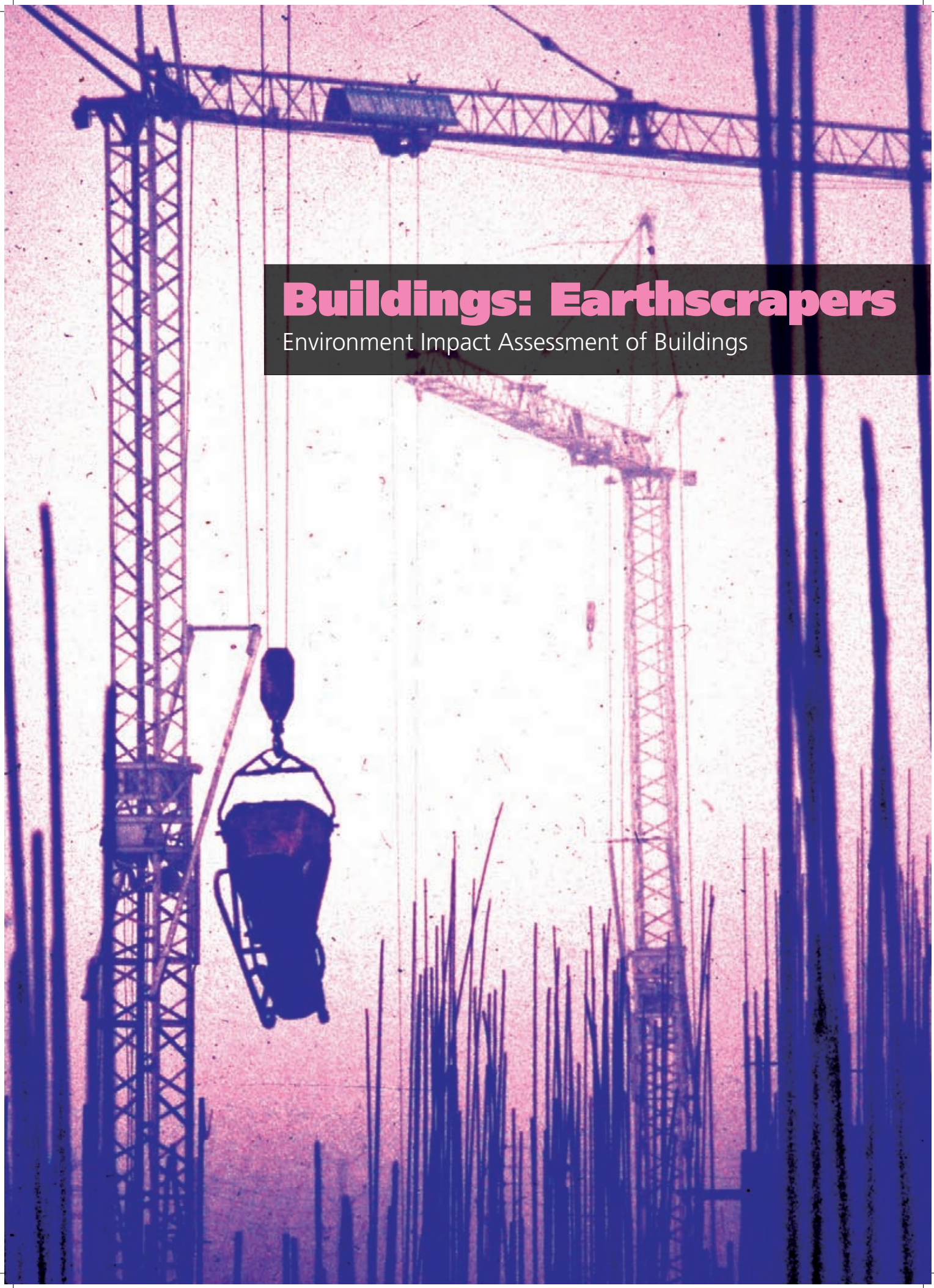

Buildings: Earthscrapers

Environment Impact Assessment of Buildings

The Centre for Science and Environment (CSE) is a public interest research and advocacy organisation based in New Delhi. The Centre researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable.

The scenario today demands using knowledge to bring about change. In other words, working India's democracy. This is what we aim to do.

The challenge, we see, is two-pronged. On the one hand, millions live within a biomass-based subsistence economy, at the margins of survival. The environment is their only natural asset. But a degraded environment means stress on land, water and forest resources for survival. It means increasing destitution and poverty.

Here, opportunity to bring about change is enormous. But it will need a commitment to reform — structural reform — in the way we do business with local communities.

On the other hand, rapid industrialisation is throwing up new problems: growing toxification and a costly disease burden. The answers will be in reinventing the growth model of the Western world for ourselves, so that we can leapfrog technology choices and find new ways of building wealth that will not cost us the earth. This is the challenge of the balance.

Our aim is to raise these concerns, participate in seeking answers and — more importantly — in pushing for answers and transforming these into policy and practice. We do this through our research and by communicating our understanding through our publications. We call this knowledge-based activism. We hope we will make a difference.

Buildings: Earthscrapers

Environment Impact Assessment of Buildings

SUSTAINABLE BUILDING PROGRAMME

2011

CENTRE FOR SCIENCE AND ENVIRONMENT, NEW DELHI

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Sustainable Building Programme

Our personal choices about the level of comfort we want and the means of getting that comfort decide sustainability of our lifestyle. Our small decisions -- how do we light and air condition our home, offices and shops, use water, dispose waste define livability. Buildings are the core of all our demand for water, energy and material. It also creates waste. But just by changing the design, material, and the operations of our buildings we can make enormous difference, avert environmental consequences and achieve green code of living. This demands strong public policy to promote efficient use of resources, give the right market signal to prevent guzzling and inefficiency, and promote building designs and structure that help to reduce demand for energy and water. Break the insidious link between resource use and building.

Centre for Science and Environment's' Sustainable Building Programme is designed to create policy and public awareness for aggressive steps to cut the resource imprint of the building sector.

This programme is designed to set the vision for resource efficiency in buildings and push and track policy development for effective implementation. Green building policies have begun to take shape in India. Science based direction, knowledge based activism, public support, and grass roots action can make a difference.

WHY THIS STUDY?

Buildings are waste creators as well as waste wasters.The urban building sector – our homes, offices, shops — are the end users of energy, water and a whole range of materials that influence the resource footprint of cities. Buildings — just not as structures but also as operational units have to be managed well to be able to cut their gregarious resource use and the waste they generate.

The built up area in Indian cities will expand phenomenally in the coming decade. The new construction will be several fold more than the current size of the built up area. This makes the sustainability assessment of buildings necessary at the early stages of planning – even before a commitment is made to construct the new buildings. With good architectural design, appropriate choice of materials and location and operational management it is possible to cut resource use and the environmental impacts of buildings significantly. But this presents a regulatory challenge that will have to be addressed urgently.

In India the only holistic regulatory instrument that is available to assess the composite environmental impact of the high impact segment of the building construction sector is the Environment Impact Assessment rules introduced under the Environment (Protection) Act, 1986. Though this tool is meant for only large construction projects with area more than 20,000 sq meters, a quick review of this strategy has become necessary to understand if India is geared and prepared to assess and mitigate the environmental impact of the urban building construction sector effectively. Understanding this learning curve is important to shape the future regulatory interventions for environmental management in the building sector.

This is the only legal instrument that holistically assesses water, energy, waste, and land impacts among others to reduce the overall damage caused by buildings. This tool also offers the opportunity to influence the design and planning of buildings to make them sustainable. A deeper policy understanding of the emerging challenges in the building sector and the potential and constraints of this instrument can provide the much needed insight into the future regulatory action.

Why this interest in the EIA tool? It is very clear that the scope and ambit of the EIA tool is much wider and deeper than the most other tools that are currently available to assess greening of buildings. No other legal instrument that directly and explicitly deals with all green aspects of buildings influence as large a built up area as those influenced by the EIA rules. Unfortunately, the comprehensive list of total number of buildings that have been assessed or cleared so far under the EIA nation-wide is not available in the public domain**.** But the partial data available only for a few states indicate that the buildings that come for EIA clearance runs into thousands a year with huge area coverage. But other specific building regulations that have a direct bearing on the resource use are mainly sectoral in scope and often singularly confined to only either water, or energy, or waste management and are mostly voluntary in nature. For instance, the Energy Conservation Building Code (ECBC)

administered by the Bureau of Energy Efficiency is designed to promote only energy efficiency in buildings. It is a voluntary programme and confined to only commercial buildings with a minimum of 100 KVA load. As an isolated and a voluntary measure its current scale is very limited.

An illustrative comparison of the scope of built up area influenced by the EIA and that by ECBC shows the extent of influence of EIA currently. Only in one state of Haryana, about 927 building projects have been reviewed for environmental clearance between 2008-2011. The area data is available for 446 of these buildings and that amounts to 8,29,89,836 square meters. If for all the 927 buildings a minimum area criteria of about 20,000 sqm each is assumed, a conservative minimum of 1,85,40,000 sq meter of land only in Haryana has been influenced by the environmental clearance process. In Delhi alone 75 building projects have received environmental clearance during 2009-11 that covers 35,22,797 square meter of built up area. On a nationwide basis therefore, the built up area that is expected to be influenced by the environmental clearance process is expected to be very substantial.

As of now ECBC which is a voluntary programme has influenced much less built up area. According to the BEE website the ECBC registered buildings nationwide accounted for 829,787 sq meter in 2010. Moreover, the voluntary star rating programme are aligned with the ECBC star rating have assessed about 119 buildings for GRIHA and 173 for LEED. May be the actual number of buildings adopting some part of ECBC could be higher but that has not been properly recorded. The scope of ECBC will widen only after it is made mandatory and is extended to include the residential sector as well.

The National Building Code that is the umbrella code for all buildings nation-wide and governs all aspects of buildings includes several elements of conservation and resource management. But it is not comprehensively designed to have adequate stringency. Therefore, its ability to address the composite environmental impacts of the buildings is still limited.

The EIA deals with the high impact buildings. It gives a cities a chance to decide if the proposed buildings are needed and if at all how must they be designed to mitigate their impacts.

Though well intended EIA tool can be both an opportunity or a wasted effort depending on how well it is governed and administered. This demands an assessment of the current practice as well as reform of the EIA rules to meet green building objectives. This assessment will be an opportunity to understand the key regulatory reforms needed to minimise the environmental impact of the building sector.

What are the green worries in the building sector?

Buildings and Urban Growth: The real estate sector is directly influenced by the scale and speed of urban growth. Though India's urbanisation is still modest at 30 per cent and is expected to be 40 per cent by 2030, in absolute numbers it is significantly substantial — more than the total population of the United States. Future urban growth will see more pronounced middle class with greater buying power in cities. The 2010 McKinsey study on urban infrastructure estimates that the so called seeker class (with household income of Rs 200,000 – 500,000 per annum) will be the most dominant income class and is expected to be half of all urban households by 2025. Other higher income categories will also see some increase.

The changing income levels in cities essentially points towards the fact that in the future cities will see more concentrated buying power, transformation of lifestyle and aspiration for high end resource intensive comfort level. Increasingly, cities will face the challenge of ensuring higher level of comforts to be balanced with resource efficient ways. Urban poverty and dominance of low cost housing has kept the baseline of resource use low in our cities though inequity is increasing sharply. Residential, commercial and institutional space will reflect this trend.

Trends in building spaces – how big is the problem? Data base on buildings and built up spaces is the weakest link in India. Data bases are fragmented and do not capture the detail trends in residential, commercial and office sectors in the country. Ministry of Housing and Poverty Alleviation tracks demand for housing units but not other built up areas. Planning Commission and other concerned departments assess the trends in the construction sector. But buildings are a small component of the overall construction industry which is an omnibus that includes all infrastructure related construction – industry and mining infrastructure, roads and highways, power, irrigation, etc. The actual trend in the urban building sector is not often clearly delineated. The overall contribution of the construction industry to the GDP is about 10 percent which is substantial.

Poor official estimates and statistical data for the real estate industry make rigorous impact assessment of the building sector difficult. Though the income tax, land revenue, urban development, environment and forestry department do have the data of all the applicants who have applied for respective approvals for building projects this data has not been centrally compiled in a composite data bank in the government. This sector is not recognized in the books of the government.

In the absence of official data the estimates available from some real estate service providers, investment banks, and research foundations have become the principal source of information for this sector. The organized real estate industry and the related consultant agencies maintain their respective databases that are often not comparable or even publicly available. Some of these sources are Green Building Council, CREDAI etc. This is a very opaque industry. There are a lot of variation in their estimation. Nonetheless, a rough jigsaw of the available data helps to reflect some trends in built up areas in the country.

According to the Environmental Design Solutions Pvt Ltd. (EDS), a New Delhi based consultancy agency that has compiled a report for the Climate Works the overall constructed area in 2005 has been estimated to be close to 21 billion square feet and is expected to swell to around 5 times of this size and reach to approximately 104 billion square feet by 2030. A sustained CAGR between 5 to 10 percent is likely to be achieved for the same duration across different building types. Hospitality and Retail, which have had a relatively overall smaller constructed area so far, shall achieve higher CAGRs in range of 8 percent – 10 percent and will become by 2030, 7 to 11 times of what they were in 2005. In terms of constructed area the maximum growth will be seen by residential and commercial sector reaching to a size of four to five times of 2005 figures.

There is another estimate on the trends in projected demand in real estate sector by different usage (See table 1: Estimated pan India RealEstate Demand). Estimated pan India real estate demand). Amongst the built up spaces by usage the demand for residential space dominates the demand at 63 per cent. Office and retail demand will also increase considerably. Additionally, according to the real estate consultant Cushman & Wakefield India is ranked number two in Global Retail

Development Index 2008. This indicates that the high end construction activities are expected to escalate in India. The construction industry in most states is growing fast at 10-17 percent annually. The states recording maximum urbanization rate in the range 50-30 percent (Maharashtra, Delhi NCR, Tamil Nadu, and Gujarat) have also recorded highest number of projects.

Table 1: Estimated pan India Real Estate Demand (Area in million sq feet)

Year	Residential	Commercial	Retail	Hospitality
2009	132	47	18	14
2010	136	48	19	14
2011	142	50	20	15
2012	152	54	22	16
Total	562	199	79	59

Source: Anon, 2008, The metamorphosis, changing dynamics of Indian realty sector, Cushman & Wakefield, May

Trend in Residential Space: Clearly, given the housing deficit in our cities the demand for residential buildings will continue to dominate. The Planning Commission has estimated that at the end of the eleventh five year plan the housing shortage is expected to be more than 26 million housing units for all income classes. So far government has been providing housing for different income groups – economically weaker section (EWS) less than Rs 3300 monthly income; Low income group (LIG) — Rs 3300 to 7308 per month, High income group (HIG) – more than Rs 14500 per month.

Many states governments have focused on providing housing for all these income categories. But in the future the government will concentrate more on EWS and LIG for the lower income group. For the rest the market forces are expected to take over. This means for high end houses the governments' role is going to diminish and that of the private construction industry will increase. Under the National Housing and Habitat Policy 1998 and 2006 the government is expected to build 2 million dwelling units a year. Under JNNURM it is a much smaller target 1-2 lakh units a year – one million units during eleventh plan – only 1 per cent of the housing shortage.

It is also important to note that urban poverty in India remains high at 25.7 percent as estimated by the Planning Commission in 2004-5 based on household consumer expenditure. 75 per cent of the urban population in India is in the bottom rung of income level. This has also escalated demand for low cost housing – from 25 million housing units in 2007 to 38 million affordable housing units by 2030 (Mackenzie 2010). Even though these are not expected to be resource guzzlers the new housing stocks even for low and moderate income groups have enormous potential for innovative housing designs to make it resource efficient for the poor and the government should shoulder that responsibility.

There is considerable scope of influencing the resource use parameters of the new housing stock – both at the government and private sector. The private sector real estate developers are expected to be very important players. For instance, CREDAI is the association of the builders and developers and have 3000 membership that covers 80 per cent of the real estate development in key 13 states of India. There are also small time developers who need to be influenced as well.

Retail and Commercial Space: Even though the retail and commercial space is comparatively smaller than the residential space and stock, this segment is expected to be an important driver for resource guzzling in cities. Yet again it is hard to get comparable and composite data for commercial space. Various estimates exist that provide the indicative trends. These disparate data do not allow

comprehensive assessment of the real estate development. According to the Indian Brand Equity Foundation the stock of commercial office space in India in 2006 was 45 million Sq ft and retail space was 19 million sq ft.

Cushman & Wakefield also estimates that the pan-India cumulative demand projection for real estate sector for 2008-2012 is 1,098 million sq. ft (built-up area). Alternatively, this sums up to 101.94 sq. kms which is nearly 3 times (36 sq km) of Panjim city of Goa. In fact McKinsey 2010 projects that with unlocking of growth India will require to build 700 million to 900 million sq meters of residential and commercial space a year in the 2030 timeframe which is equivalent to adding two new Mumbai.

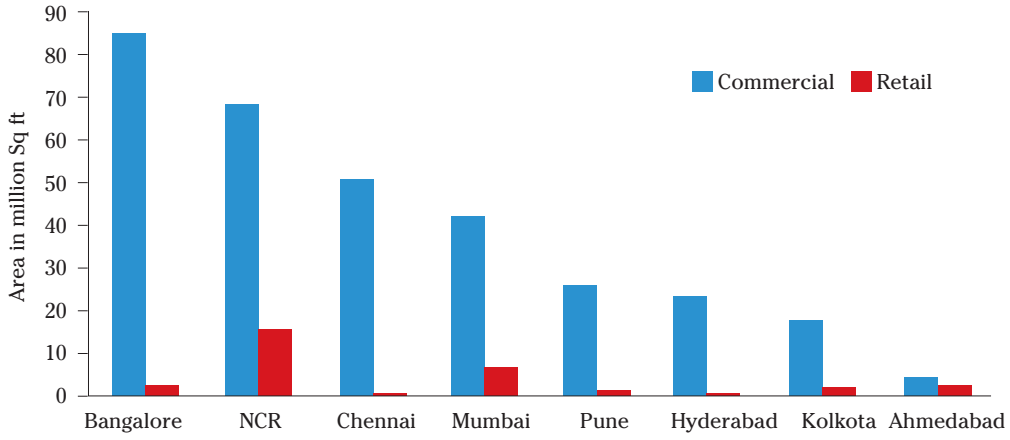
It has also been pointed out by Cushman & Wakefield that the real estate development during 2008-2012 will also be very concentrated in just a few mega cities of India. Almost 80 percent of the projected demand will be in 7 major cities in India that include National Capital Region of Delhi, Bangalore, Mumbai, Pune, Hyderabad, Chennai, and Kolkata.

The National Capital Region of Delhi (NCR) will lead the pack followed by Bangalore and other major cities. NCR will witness such gregarious growth largely because of the emergence of the business districts like Gurgaon, NOIDA and concentration of corporate firms. Pune is expected to be the third fastest growing city and Mumbai fourth. Besides other cities like Jaipur, Ahmedabad, Kochi and Goa too add a significant share of demand due to the governments' initiatives to promote tourism in these cities (see fig 1: Building stock in cities).

Retail sector will see prolific growth. With the share of organized retail likely to

Fig 1: Building Stock in Cities

Buildings stock of 353.3 million sq ft until 31st December 2008

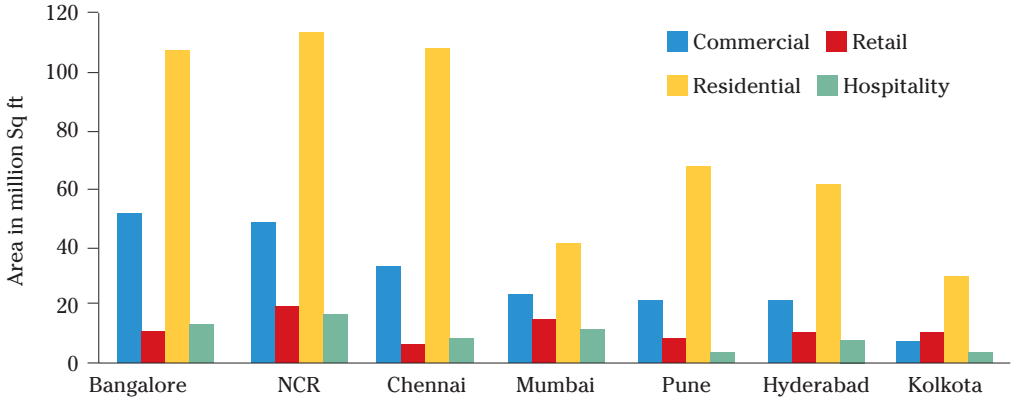


Source Anon, 2008, The metamorphosis, changing dynamics of Indian realty sector, Cushman & Wakefield, May

increase to USD 30 billion by 2010, as per the estimates of Ernst & Young, retail expansion will be phenomenal. In fact, NCR will hog 20 per cent of the future demand and Mumbai about 16 per cent (see fig 2: Cumulative real estate demand upto 2012). But the rate of increase will be very high in Hyderabad, Chennai and Bangalore.

Fig 2: Cumulative Real Estate Demand upto 2012

Cumulative real estate demand upto 2012 by sectors



Source Anon, 2008, The metamorphosis, changing dynamics of Indian realty sector, Cushman & Wakefield, May

Resource impacts of buildings

Environment impact assessment will have to address widely divergent environmental concerns that have centered on buildings – energy and water guzzling, waste and pollution, traffic related air pollution and congestion, and climate impacts. The aggregated impacts of buildings have not been estimated for India. There are disparate and fragmented indicative estimates of environmental impacts of buildings.

For any regulatory instrument dealing with mitigation of environmental impact of buildings to be successful will need clarity about the nature of these impacts. Buildings are complex ecosystems that have many aspects of resource use and waste generation – energy, water, land, bio diversity, air and so on. Limited evidence shows building can be responsible for 40 per cent of energy use, 30 per cent of raw material use, 20 per cent of water use and 20 per cent of land use. At the same time it causes 40 per cent of carbon emissions, 30 per cent of solid waste, and 20 per cent of water effluents. (Fig 3: Burden of Built Environment) Each of these will require clear assessment.

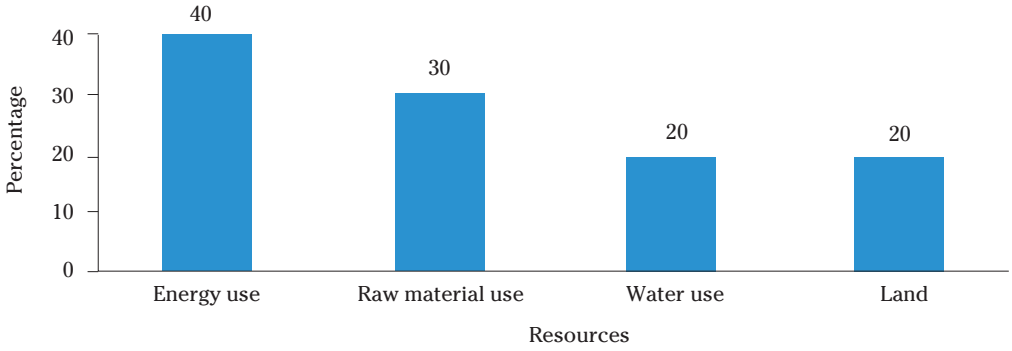
While we recognize that each of these aspects of buildings will require very careful impact assessment illustratively we have carried out a more detailed analysis of energy and water impacts of buildings to illustrate the regulatory challenge.

Buildings and Energy Linkages

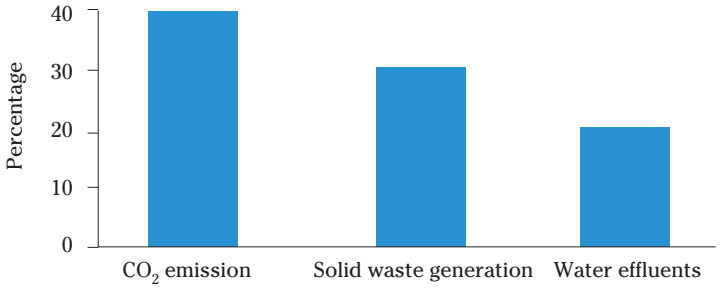
Building and energy linkages have drawn more attention given the raging global concerns over climate impacts of cities and energy security. Globally, energy demand is expected to grow more rapidly in cities due to growth in urban population, lifestyle changes, and increase in the level of economic activities. The World Energy Outlook 2009 states that already two-third of world's energy is consumed in cities – by half of world's population. By 2030 cities will be consuming 73 per cent of world energy. India mirrors this trend. There is still a big difference in CO_2 emissions between big and small cities in India which is a reflection of the difference in energy consumption pattern (see Fig 4: Total CO_2 Equivalent Emissions (million tons/ annum) classified according to different Population Classes of Cities). This difference will get further accentuated with the future development of the real estates in cities and concentration of household demand.

Fig 3: Burden of Built Environment

Share of built environment in resource use

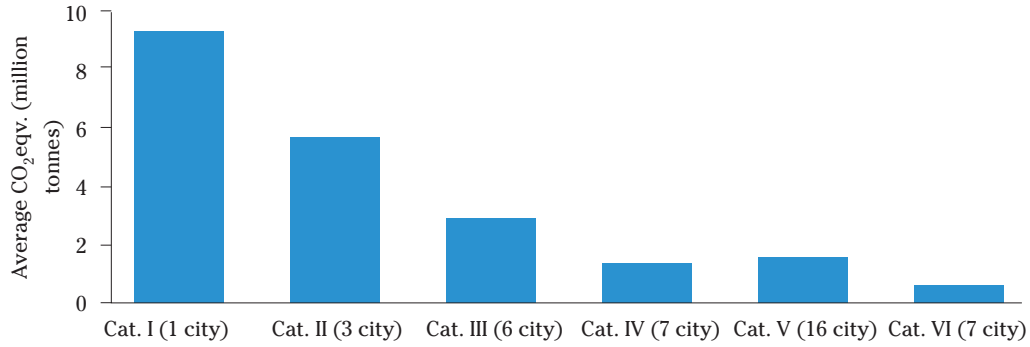


Share of built environment in pollution emission



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

Fig 4: Total CO_2 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

Pattern of energy use in Indian buildings: What is the general pattern of normal energy use in buildings in India? In India Bureau of Energy Efficiency that is responsible for energy regulations for buildings has come up with typical values for different climatic zones of the country and for different building usage. Climatic conditions have a strong bearing on the usage of energy and therefore it is important to consider these factors (See table 2: Typical energy consumption in buildings – climatic zone-wise and building-use-wise). The typical values show that office, retail and hotels are high end users of energy. BEE has not generated good data on residential buildings which is yet not in their regulatory focus. But residential buildings are expected to have a very broad bandwidth given the range

Table 2: Typical energy consumption in buildings – climatic zone-wise and building-use-wise

Building Category	Climatic Zone wise Typical Energy Consumption kWh/ft²/yr (In bracket in kWh/m²/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 (324)	30.13	NA	37.2 (400)
Hospital	NA	NA	NA	11.7 (126)
Residence	15-30			

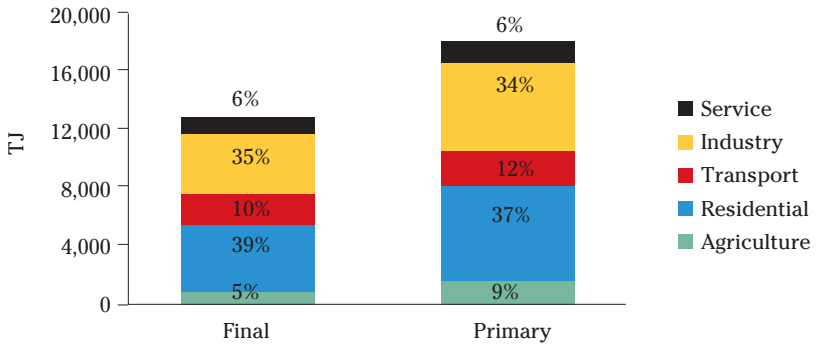
Note: a. IT Park in temperate and W&H zone were not fully functional
b. Shopping Mall is W&H zone was not full AC
N.A. No Building of category was available in the buildings surveyed
Source: Bureau of Energy Efficiency,

of low cost housing to high income housing.

The key challenge of energy management in buildings is how to minimise energy use at a higher comfort level. According to BEE most commercial buildings in India have Energy Performance Index (EPI) of 200 kwh/sqm/year or higher. BEE considers 180 kwh/sqm/year as the typical national average and states that the buildings in North America and Europe have EPI of less than 150 kwh/sqm/year due to overall efficiency gains. Therefore, energy inefficiency is getting locked up in Indian building sector.

Overall the residential sector in India is a significant user of primary energy. About the highest is consumed by the residential sector — 37 per cent (see fig 5: Primary Energy by User (including biomass) 2004).

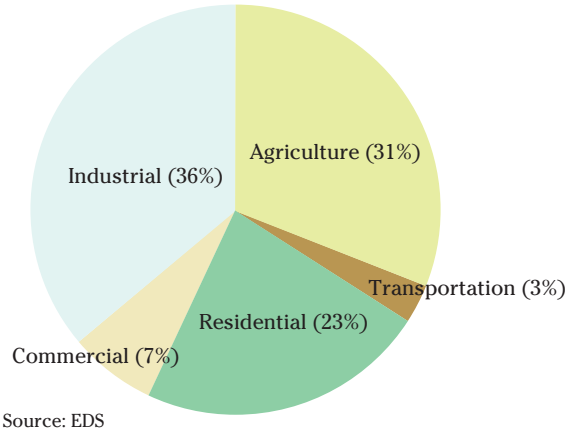
Fig 5: Primary Energy by User (including biomass) 2004



Primary electricity is equal to the electricity consumed directly and the indirect energy use that was necessary to produce the electricity.

If only electricity consumption is considered then the residential sector uses up 23 per cent of the electricity (see fig 6: India's Primary Electricity Consumption), and growing at the rate of 8 per cent per annum. Other estimates show that the share of residential sector can be as high as 33 per cent and the energy consumption may increase 10 percent annually in the future. This poses serious challenge for both energy and climate security. With such high share of electricity consumption unfettered energy consumption in the building sector can have serious implications.

Fig 6: India's Primary Electricity Consumption



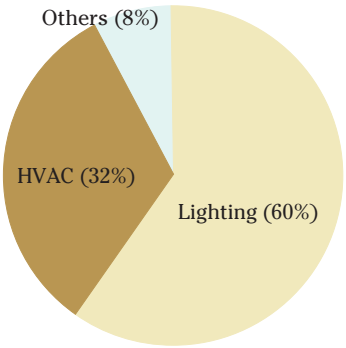
Source: EDS

What influences energy consumption in buildings?: Energy consumption in buildings needs to be understood in terms of embedded energy that varies according to the building material as well as direct use of energy during building construction and operations phases. It is possible to select materials and architectural designs that can help to improve thermal efficiency of the buildings and reduce energy use.

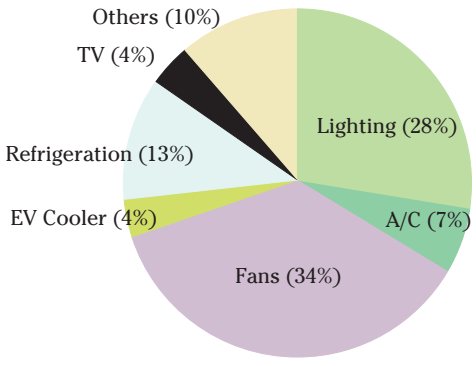
The direct use of energy in building operations for instance varies between residential and commercial buildings (see fig 7**:** Energy Consumption by Usage in Commercial and Residential Buildings). Range of use is more diverse in residential buildings. In commercial buildings lighting, heating, ventilation, and air conditioning dominate the energy consumption. Only lighting and air conditioning can account for 80 per cent of the energy consumption in typical commercial buildings. But in residential buildings more diverse use dominate – lighting, A/C, fans, cooler, refrigeration, TV etc. In fact, in residential buildings lighting and fans use up the maximum energy. Fans are the highest at 34 per cent followed by lighting at 28 per cent. A/C is still a small contributor given the modest lifestyle and

Fig 7: Energy Consumption by Usage in Commercial and Residential Buildings

Commercial Buildings 33 billion units



Residential Buildings 116 billion units



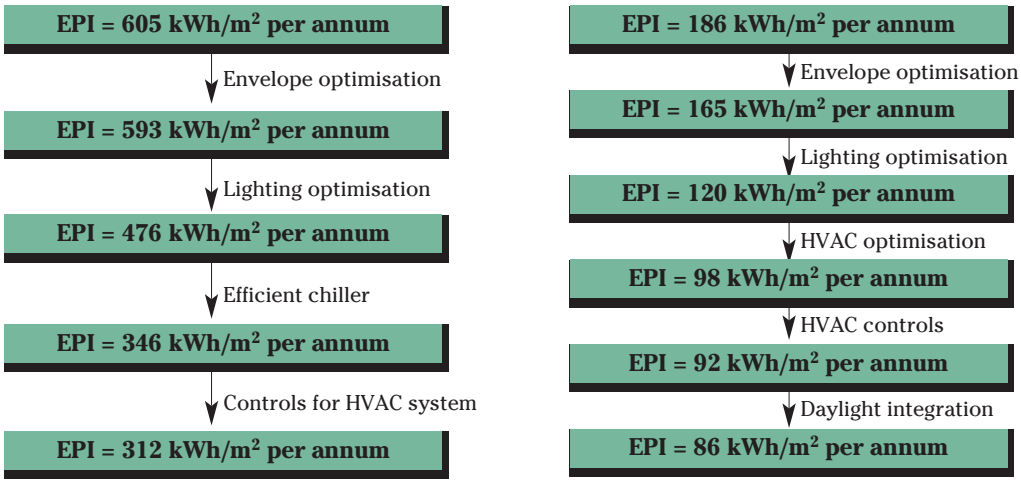
Source: Bureau of Energy Efficiency

dominance of low cost housing stock. But detailed mapping of energy use by nature of appliances and building design will demand regulations that will drive quick uptake of energy efficient appliances and building design.

Energy saving potential in buildings: Regulatory tools need to maximize the energy savings potential of the buildings. It has now been fairly well demonstrated that significant energy saving is possible from building construction and operations. The energy audits of buildings so far carried out by the BEE shows that existing buildings have 30 to 50 percent energy savings potential. The energy use of buildings can be indicated by the Energy Performance Index (EPI) in terms of energy used per unit area per year (kWh/m2/Year). The BEE assessment shows that over 50 percent improvement is possible in commercial buildings. For example, BEE found that energy use at an EPI of 605 kWh/m2/year in a typical new hospital can be brought down to 312 kWH/m2/year. Similarly in a typical office building EPI can be reduced from 186 to 86 kWh/m2/Year.

More estimates from EDS shows significant potential of GHG savings from energy conservation measures in building usage – 24 per cent from lighting and 12 per cent from AC etc. Assessment of the BEE data shows that various energy efficiency measures will help to improve energy performance of buildings (see fig 8: Impact of Energy Efficiency Measures on the EPI of Commercial Buildings).

Fig 8: Impact of Energy Efficiency Measures on the EPI of Commercial Buildings (office and hospital buildings)



Source: EDS, 2010

Studies have also begun to appear on the potential GHG savings from energy efficiency improvement in the building sector in India. One of the recent 2010 McKinsey estimates shows that the national power demand can be reduced by as much as 25 per cent in 2030 by improving energy efficiency of buildings and operations. With improved and optimized insulation, highest efficiency electric appliances energy consumption for heating, ventilation and air conditioning, energy consumption can be reduced by 55 per cent – this can cut 150 million tonnes of CO_2 by 2030.

There are many ways a building can save energy – by adopting energy efficient building design and appropriate building material, innovative and energy saving operational features and energy efficient electrical appliances, in-situ renewable

energy and so on. But role of regulations becomes very important in ensuring adoption of these features to achieve best possible thermal efficiency to meet good energy performance index.

Regulations will have to ensure that energy saving action remains dynamic in post construction phase as well. Therefore, this paper will assess the effectiveness of the EIA regulations for the large buildings in achieving these objectives in alignment with the ECBC which is the energy saving law for the buildings.

This will give direction to the reforms of the environmental clearance process for the building sector.

Buildings and Water Linkages

Yet another key resource impact of buildings is water both as intake and waste. Regulations will have to be designed to ensure maximum water savings and waste minimization in buildings. Regulations need to target water usage both during the construction phase as well as operational phase.

Water deficit will be a serious constraint in Indian cities that will also constrain the urban building sector. Though a substantial number of households in major cities of India depend on the municipal water supply for their daily needs, this is not adequate and in many cases irregular. As surface water source is getting severely stressed dependence on ground water is increasing. National Institute of Urban Affairs (NIUA) study of 2005 concludes that 56 per cent of metropolitan, class-I and class-II cities are dependant on groundwater either fully or partially[1]. Majority of urban areas are increasingly using groundwater to meet their water requirement. In more water stressed cities of the south cities like Chennai have resorted to procure water from distant places. If this trend continues it can have severe environmental consequences. It is within this reality that the future building sector will take shape in Indian cities.

What influences water usage in buildings?
Water is intensely used during both construction as well as operational phase. Regulations will have to address both for maximum gains.

Building construction phase: Water is a very essential element in the construction phase of any building which uses concrete and brick as its building materials. Actual pattern of water use during construction phase will vary across building types. All stages in the construction industry starting from the foundation, brick-soaking, masonry, curing, concreting, whitewashing, to laying of roofs and flooring require intensive use of water. Water demand is generally 10 to 20 percent of the total volume of brick and concrete used in a building[2]. Similarly, water is primarily used in the concrete mix to start the hardening process through the hydration of cement. The quality of water used during this stage is vital as contaminated water can affect the lifespan of the structures. Also the quantity is an essential measure as excessive water can cause a loss of strength in the concrete. The total water requirement for the composition of concrete mix is dependent on the aggregate size and shapes, amount and quality of cement, well graded versus gap graded mixes of concrete and admixtures (Table 3: Water Requirement for Various Grades of Concrete).

Curing and mixing of concrete is one of the most water intensive phases in the building construction process[3]. This demand can also be further reduced with the use of modern technologies like membrane curing and sprinkler techniques. A

Table 3: Water Requirement for Various Grades of Concrete

Grade of Concrete	Total Quantity of Dry Aggregates by Mass per 50kg of cement, to be taken as the Sum of the Individual Masses of Fine and Coarse Aggregates, kg, Max	Proportion of Fine Aggregate to Coarse Aggregate (by mass)	Quantity of water in litres per 50 kg of Cement, Max
M5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5	60
M7.5	625		45
M10	480		34
M15	330		32
M20	250		30

Source: National Building Code of India 2005; Part 6, Section 5A, Page 19, Table 9, Bureau of Indian Standards, New Delhi

chemical application is done on all the exposed surfaces of concrete, as soon as it has set which traps the moisture in it and prevents the erosion of moisture, adding on to the strength of the structure. Instead of pouring water over concrete structures, sprinkler system can be used. Concrete structures can also be covered with thin cloth or gunny bags and then water should be sprayed on them. This would help prevent loss of water by evaporation and avoid water rebound[4]. Similar to concrete, bricks are soaked in water for some time before laying to make the walls for additional strength. Builders are advised to reuse and recycle the water in construction sites to reduce the fresh water use.

Clearly, regulations need to play an effective role in ensuring that sustainable water efficient practices are adopted in building construction.

Water use in building operation phase: A great part of water is used during the operational phase of the buildings as it is directly related with lifestyle of the occupants. Building regulations will have to address all types of water and wastewater categories in buildings — greywater, blackwater and stormwater. Potable water is the drinking water, while, greywater is the domestic wastewater from bathroom fixtures (taps, showers and baths), laundry fixtures (washing machines) and kitchen facilities (such as sinks and dishwashing machines). Blackwater contains 'waste discharges from the human body, which is collected through fixtures such as toilets and urinals, while stormwater refers to runoff due to rainfall collected from roofs, impervious surfaces and drainage systems[5].

But the fundamental element that requires monitoring and evaluation is the per capita water usage in building to ensure that there is no water guzzling and at the same time enough water is available to meet the essential hygienic standards.

Several organizations and agencies have attempted to estimate the average basic per capita water requirement per day for an individual. The average requirement has been calculated based on various parameters and for various categories, ranging from rural urban, size of the city, type of toilet, type of sewerage system etc. (see table 4**:** Norms and Standards of Water Supply in India).

Norms for water usage has evolved in India. At present, 135 lpcd (litres per capita per day) is considered a standard norm in India for average water consumption prescribed by the Central Public Health and Environmental Engineering Organisation (CPHEEO). It also provides a break up for 135 lpcd in a standard

Table 4: Norms and Standards of Water Supply in India

S. No	Agency	Physical Standard
1	Manual on water supply and Urban Deve lopment, Govt. of India, 1991	• Small cities: 70-100 lpcd" • Large cities: 150-200 lpcd • Public stand Posts (PSP): 40 lpcd
2	National Master Plan (NMP), India, International Water Supply and Sanitation Decade, 1981-90, MoUD, 1983	House connections: • 70-250 lpcd (average of 140 lpcd) • Public stand Posts: 25-70 lpcd (average 40 lpcd)
3	Basic Minimum Services Under Minimum Needs Programme, 9th Five Year Plan, Government of India, 1997-2002 (1999)	100 per cent coverage by safe drinking water in urban areas. • With Sewerage: 125 lpcd • Without Sewerage: 70 lpcd • With spot sources & public stand posts: 40 lpcd
4	Report on Norms and Space Standards for Planning Public Sector Project Towns, TCPO, Ministry of Works & Housing, Government of India, 1974	• 180 lpcd
5	Committee on Plan Projects for Industrial Townships (COPP), 1973	• 180-225 lpcd
6	Zakaria Committee (ZC on Augmentation of Financial Resources of Urban Local Bodies, 1963.	• Small: 45 lpcd • Medium: 67.5 - 112.5 lpcd • Large : 157.5-202.0 lpcd • Super metropolitan: 270 lpcd
7	Operations Research Group (ORG), Delivery and Financing of Urban Services, 1989	• Small: 80 lpcd • Medium: 80-150 lpcd • Large: 180 lpcd
8	National Institute of Urban Affairs (NIUA); Maintaining Gujarat Municipal Services - A Long Range Perspective, 1987	• Small: 95-125 lpcd • Medium: with Industrial base - 150 lpcd ▪ Problem areas: 90 lpcd; ▪ Average: 80-150 lpcd • Large: With Industrial base 170-210 lpcd ▪ Problem Areas: 120-125 lpcd ▪ Average: 115-210 lpcd
9.	World Health Organization (WHO), 2003	• no access (water available below 5 lpcd) • basic access (average approximately 20 lpcd) • inter-mediate access (average approximately 50 lpcd) • optimal access (average of 100-200 lpcd)

Source: Compiled from various sources

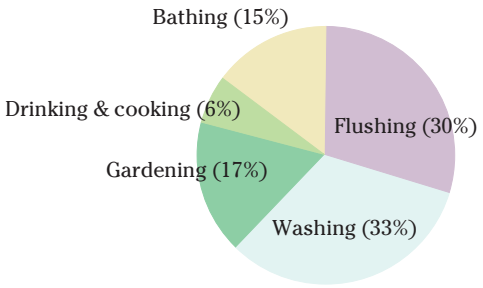
residential unit for various functions (see fig 9: Break-up of 135 lpcd Water Consumption).

But clearly, as global experience shows policies are designed to lower per capita usage of water without compromising the basic and hygienic requirements. In UK for instance 80-100 lpcd is seen as the desirable target in residential buildings. But in India often policy clarity on these targets is missing and policies often try to set higher consumption target contrary to goals of sustainability.

The environmental clearance process will have to take on board a decisive set of

norms to modify the water consumption patterns in Indian household especially as there is wide variability in the actual water consumption pattern in Indian cities. For example, a study, undertaken by researchers from Tata Consulting Engineering in Mumbai shows an average family of five in Mumbai consumes about 920 liters per day, which amounts to 184 LPCD[6]. The average was derived on the basis of a small survey conducted in sample households in a posh Mumbai locality and the breakup of the household consumption provides usage pattern for Basic Water Requirement (BWR) like showers, faucets, laundry, toilet and leaky fittings (see Fig 10: Daily Water Use for an Indian Household).

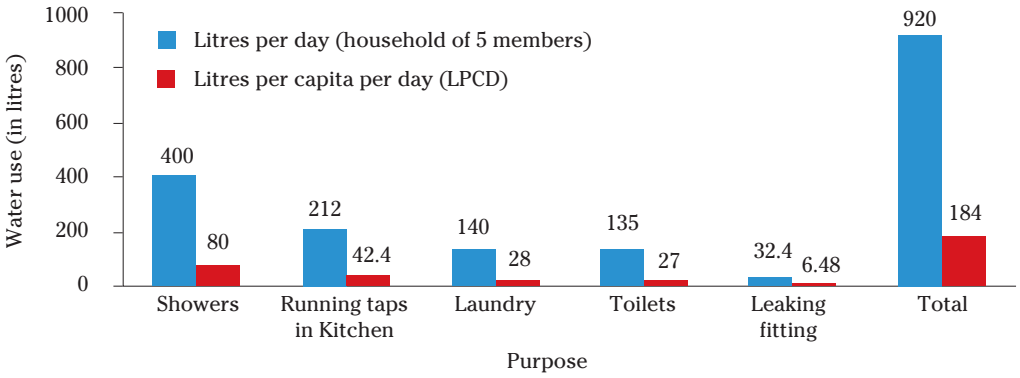
Fig 9: Break-up of 135 lpcd Water Consumption



Source: Anon, 1999, Manual on Water Supply and Treatment, Third Edition – Revised and Updated, Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, New Delhi

Fig 10: Daily Water Use for an Indian Household

Daily water use for an Indian household



Source: Shah. S, Thakar. D, and Panda. S, 2009, Water Audit – Need of the Hour, Tata Consulting Engineering, Mumbai, India

It is not easy to arrive at any clear baseline for per capita water consumption in Indian cities. There are varying estimates. But together they help to illustrate a range (See box 1: Varying Estimates of Per Capita Water Consumption in India). It also brings out starkly the challenge of two extremes – very low water availability at one level and also water guzzling at another. Regulations will have to control guzzling and ensure more equitable distribution of water amongst households. It is from this perspective that the environment impact assessment regulations for the high end buildings become important.

Pattern of water use in households: Regulations will have to address pattern of water usage by the nature of usage in households to promote water efficiency and conservation measures. To a great extent building related water management strategies will play an important role. Very few instutionalised attempts have been made to compile and analyse patterns of water use in buildings that can be brought within the policy focus. Broadly studies show that toilets and bathrooms are the biggest water guzzlers in a house, with flushes, taps and showers devouring more than 60-70 per cent of total water use.

BOX 1: VARYING ESTIMATES OF PER CAPITA WATER CONSUMPTION IN INDIA

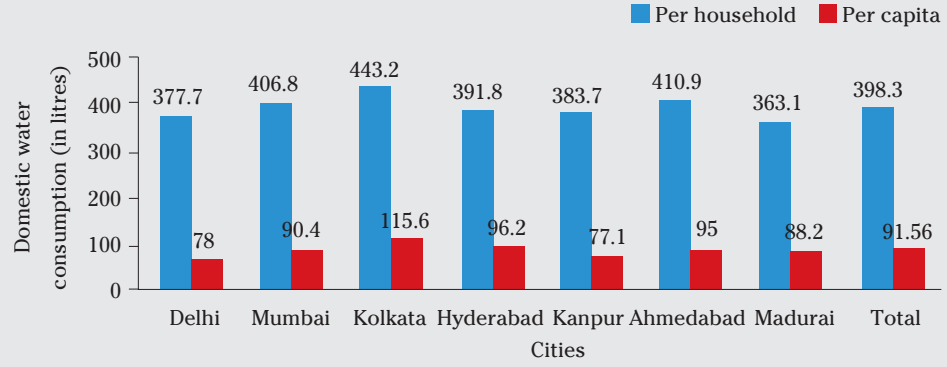
Many estimates exist on the average per capita water consumption across India. A 2007 survey conducted by the National Institute of Public Finance and Policy (NIPFP) shows that in a sizeable number of urban centers, the availability of water is even less than 100 liters per capita per day, as only 2.7 per cent of sample municipalities are reported to supply over 100 liters of water per capita per day[8].

According to Ministry of Urban Development (MoUD) and Asian Development Bank's (ADB) study titled, Benchmarking and Data Book of Water Utilities in India in 2007 states[9] that the average daily per capita water consumption is about 123 lpcd. The study further details the cities registering average per capita consumption as high as Jamshedpur (203 lpcd), Mumbai (191 lpcd), Vijaywada (158 lpcd) and Varanasi (147 lpcd). On the other hand, cities like Amristar, Indore, Chennai registered figures between 85-90 lpcd and Bhopal's per capita was lowest at 72 lpcd. The figure Per Capita Supply to the Total Population in Various Indian Cities reiterates that different estimates per capita water consumption are made by different agencies.

More data has come from individual research projects. According to the survey by Abdul Shaban of Jamia Millia Islamia in 2008, the average per capita water consumption in domestic households for seven cities – Delhi, Kolkata, Mumbai, Hyderabad, Kanpur, Ahmedabad, and Madurai, is about 92 lpcd. The highest consumption is in Kolkata (116 lpcd), followed by Hyderabad (96 lpcd), Ahmedabad (95 lpcd), Mumbai (90 lpcd), Madurai (88 lpcd), Delhi (78 lpcd), and Kanpur (77 lpcd) (see Fig 11: Domestic Water Consumption Per Household and Per Capita).

Fig 11: Domestic Water Consumption Per Household and Per Capita

Domestic water consumption per household and per capita



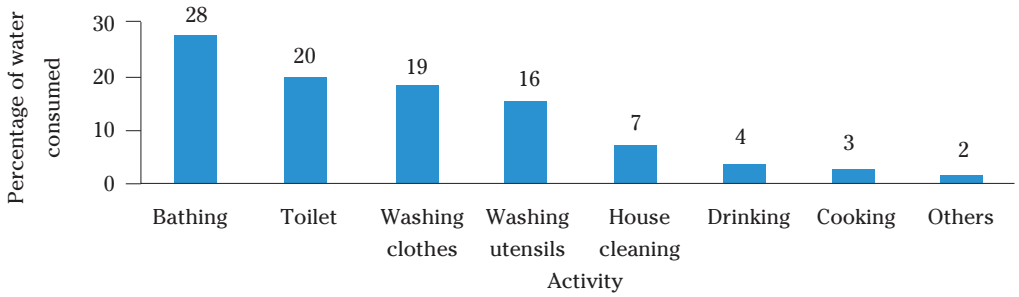
Source: Shaban. A, 2008, Water Poverty in Urban India: A Study of Major Cities, In: UGC-Summer Programme, June 30- July 19, 2008, Jamia Millia Islamia, New Delhi

A study on Water Poverty in Urban India in 2008 by Abdul Shaban from Tata Institute of Social Science (TISS), involved survey of over 2500 households across seven major cities, provides some sense of water use for various purposes, building types and total water consumption[7]. The study, categorized and surveyed the selected seven cities in five different areas, namely (i) high income group (HIG) areas with well planned buildings, (ii) middle income group (MIG) areas with well planned buildings, (iii) low income group (LIG) areas with well planned buildings, (iv) slum areas, and (v) the mixed areas.

It is very clear from the study that at the household level, bathing consumes highest amount of water. Together, in all the seven cities, it consumes about 28 per cent of the total water at household level (see fig 12: Average Domestic Water Consumption for Various Activities). Consumption in toilets (20 per cent), washing clothes (19

Fig 12 : Average Domestic Water Consumption for Various Activities

Water consumption in domestic activities



Source: Shaban. A, 2008, Water Poverty in Urban India: A Study of Major Cities, In: UGC-Summer Programme, June 30-July 19, 2008, Jamia Millia Islamia, New Delhi

per cent) and washing utensils (16 per cent) follow the consumption in bathing. On an average, less than 10 per cent of the total water in a household is used for drinking and cooking. This shows promotion of water efficiency standards for water appliances and the right pricing signals can help to reduce water usage.

Similarly, the study provides a cross section of activity wise water consumption across the seven surveyed cities (see Fig 13: Activity-wise Distribution of Water Consumption in Seven Indian Cities), which also displays a similar picture, with bathing, washing clothes, toilets and kitchen activities (excluding cooking) consuming the majority of water.

The variation in per capita household water usage also shows up as a pattern across cities and shows wide variation across cities (see Fig. 14: Per Capita Supply to the Total Population in Various Indian Cities). Local regulatory action in these cities will be critical in achieving targets.

The National Building Code (NBC) for India enlists the water supply requirement for various building types (see Table 5: Average Water Consumption by Various Building Types) – residential, institutional and commercial. The NBC prepared by BIS provides for water requirements for residential buildings (see Table 6: Water Requirement in Buildings (Residences)). These figures are crucial since NBC is followed across India for provision of basic amenities, though on a voluntary basis.

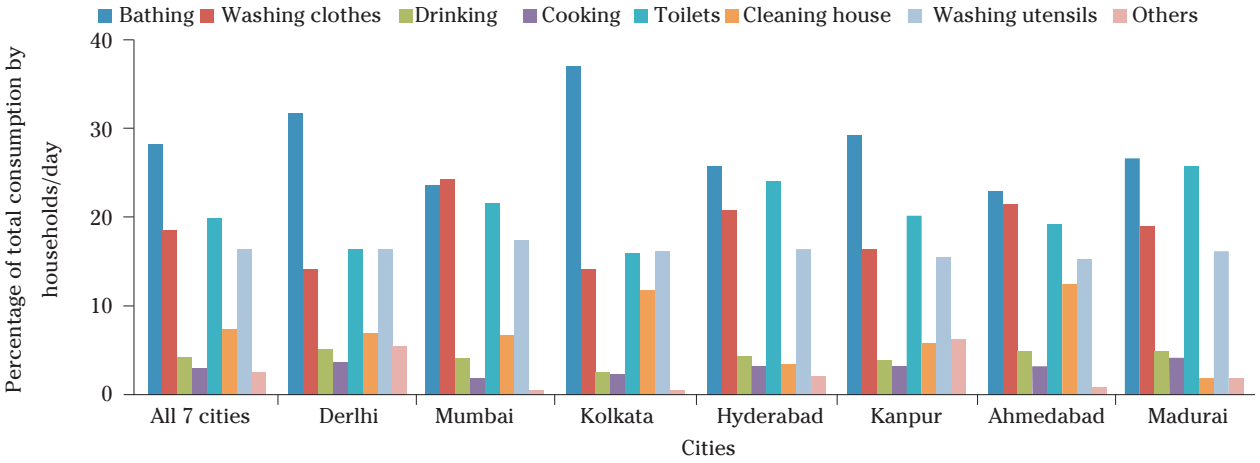
Type of building usage will also determine the nature of interventions. A case example from hotels, states that hotels use considerable quantity of the water drawing mainly from the deep tube wells or from municipal supply. The fig 15 demonstrates the nature of activities in building or building types (commercial, residential etc.) is central to the quantum and categories of water use[10] (see Fig 15: Water Consumption and Waste Generation in Hotels). Regulations will also have to respond to these diverse patterns to influence decision of water usage by type of buildings.

Water saving potential in buildings: There are very few studies on the potential of water use reduction and conservation in commercial, residential buildings in India. Countries like Australia, Singapore and USA have assessed water use and its patterns for effective strategies. This is important since information and data on total consumption, end use pattern and amount etc. helps to prioritise areas for subsequent actions and strategies required within the building.

In India there is considerable scope for efficiency improvement and conserving

Fig 13: Activity-wise Distribution of Water Consumption in Seven Indian Cities

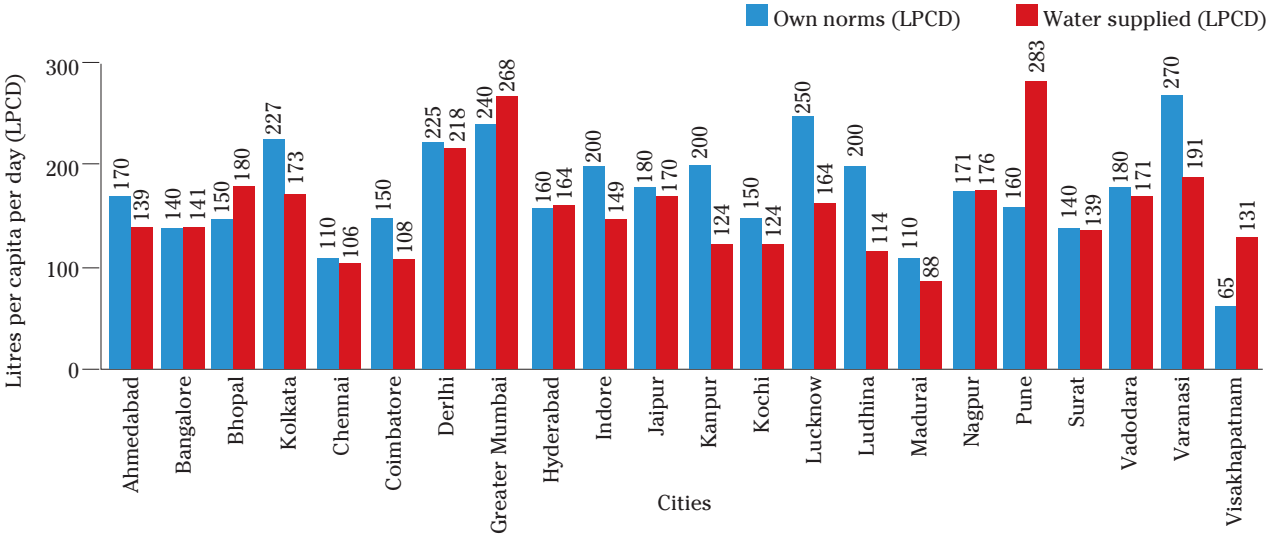
Activity wise distribution of water consumption in cities



Source: Shaban. A, 2008, Water Poverty in Urban India: A Study of Major Cities, In: UGC-Summer Programme, June 30- July 19, 2008, Jamia Millia Islamia, New Delhi

Fig 14: Per Capita Supply to the Total Population in Various Indian Cities

Water supply in cities



Source: Anon, 2005, Status of Water Supply, Sanitation and Solid Waste Management in Urban, National Institute of Urban Affairs for Central Public Health and Environmental Engineering Organisation (CPHEEO), Ministry of Urban Development, Government of India

water through efficiency measures in buildings. But each of these strategies will have to be clearly assessed to design interventions. For instance, water efficient appliances can play an important role. Commercial buildings with very high water usage in commercial laundry, dishwashing, cooling towers and landscape irrigation can reduce water consumption by installing water efficient fixtures. According to the American Water Works Association, households can reduce daily per capita water use by about 35 per cent by installing more efficient water fixtures and regularly checking them for leaks.

In the Indian context, TCE's household survey in Mumbai also provided a rough estimate of amount of water saving that can be achieved if simple replacement or installation of water efficient fixtures is adopted (see table 7: Average Water Savings in an Indian Household by Installing Water Efficient Fixtures).

Table 5: Average Water Consumption by Various Building Types

Category	Quantity (lpcd)
Residences (population)	
• <20000	70-100
• 20000 – 100000	100-150
• >100000	150-200
Hospitals	
• < 100 beds	340
• >100 beds	450
Hotels	180
Offices	45
Restaurants	70
Cinemas/ theatres/recreation Centre	15*
Schools	
Day school	45
Boarding school	135

* Indicates water consumption/ seat

Source- National Building Code of India 2005, Bureau of Indian Standards, New Delhi

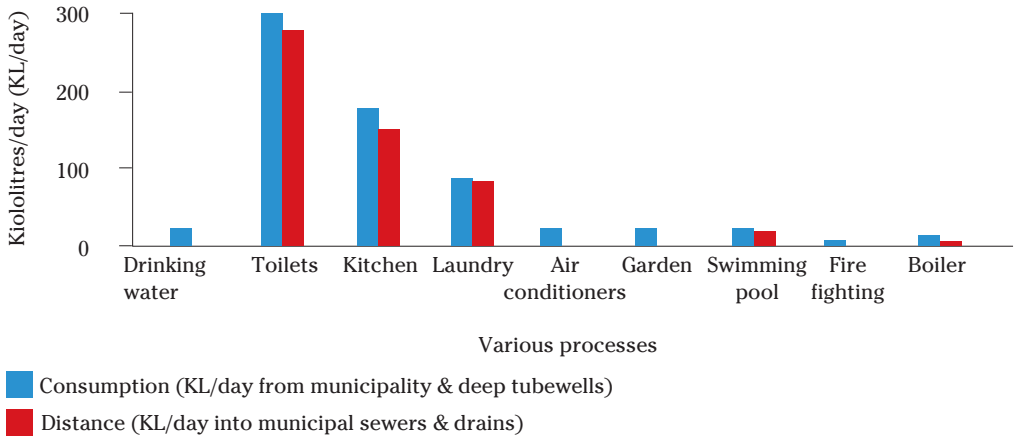
Table 6: Water Requirement in Buildings (Residences)

S.No.	Population	Water Supply
1	upto 20000 without flushing system	a) through stand post: 40 lphd, Min b) through hourly service connection : 70 to 100 lphd
2	population 20000 to 100000 together with full flushing system	100 – 150 lphd
3	for communities with population above 100000 together with full flushing system	150 – 200 lphd*

Note: * the value of water supply given as 150-299 LPHD (litres per head per day) may be reduced to 135 LPHD for LIG & EWS houses depending on the prevailing condition. Litres per head per day (lphd) can be equated to litres per capita per day (lpcd)

Source- National Building Code of India 2005, Bureau of Indian Standards, New Delhi

Fig 15: Water Consumption and Waste Generation in Hotels



Source: Imdaadullah. S, 2008, Environmental Management in Hotel Industry, Saleem India Blog

Table 7: Average Water Savings in an Indian Household by Installing Water Efficient Fixtures

Purpose	Water that can be saved in liters/day*	Water that can be saved in liters/Week
Showers	200	1400
Running taps	106	742.5
Laundry	14	100
Toilets	60	420
Fittings	32	226.8
Total	415	2889.3

Source: Tata Consulting Engineering 2009

* Family size considered is five

But, water efficient fixtures are just one of the many aspects in building's water conservation and efficiency improvement. Water efficiency also involves conserving water by operationalising water saving technologies and actions. A study on European water saving potential commissioned by the EU executive and published in August 2007 estimates that water efficiency could be improved by nearly 40 per cent via technological improvements alone, and that change in human behaviour or production patterns could increase those savings further. The benefits of implementing water efficiency initiatives in buildings may include, cost savings on water bills, water conservation and improving the image of the a business/building as a water efficient facility.

Regulations can also help to influence a range of decisions on water usage. Low availability of water or shrinking supplies is a strong determinant of water use in buildings. Several water uses may be discontinued or reduced in response to the declining supplies. For examples, waterscapes, fountains etc. in buildings may be suspended during summer months when water is in severe shortage. On the other hand, water consumption can be efficient if the building adopts water conservation and efficient designs. So essentially, building's water consumption can be greatly influenced with the help of demand management measures.

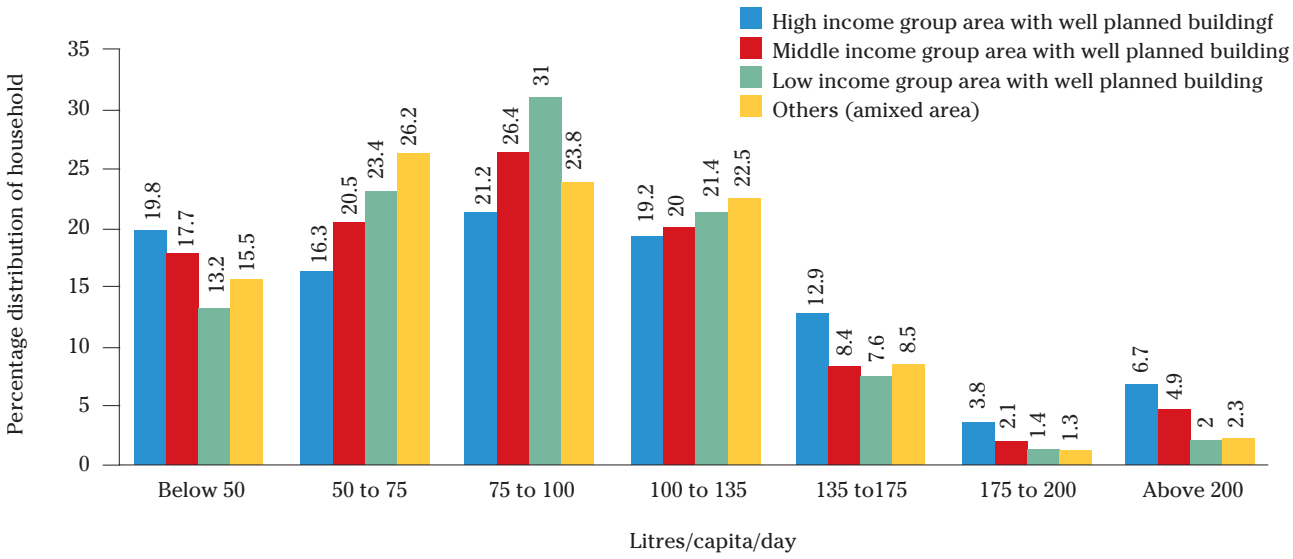
Fix leakages in buildings to cut losses: Another important component that is generally overlooked is fixing leakages in the buildings. Leakages generally occur in old fixtures and fittings due to aging, waning, faulty washers/handles, high pressure or corrosion. Often water loss due to leakage can be in the range of 10-30 per cent and may gradually increase over time. Often leakages go undetected either due to lack of maintenance, insensitivity or/and sheer ignorance. For example, a modest leak figure of 3 litres/hour on a 24x7 basis can lead to water loss in the tune of 26,000 litres annually, which is a very significant amount. This amount is equivalent to the average Canadian household water use for a month[11]. Certain areas in the building generally have high leakages which include cooling towers, taps, urinals, cistern flapper, hose reels, underground pipes and control valves.

Central to water conservation and efficiency improvement is doing more with less. Improve efficiency by installing and retrofitting water efficient fixtures. Augment the water supply through measures like rainwater harvesting and storm water management. Recycle and reuse wastewater for construction, horticulture, flushing etc. to reduce use of freshwater. Both technical and behaviourial approaches are needed.

Need efficiency signals for rich households: Another key big challenge for the regulators is to push for efficiency measures in rich households where life style is responsible for water guzzling. The TISS study on water in seven cities concludes that the richer households and households with higher education level have higher consumption of water. Some of the activities that become a way of life as individuals/households climb on the income level, includes multiple toilets with showers, bath tubs etc., washing machines, dishwashers, car washing, landscape irrigation, swimming pools etc. (see fig 16**:** Area and Water Consumption Category-wise Distribution of Household in Percentage). Per capita consumption of water is also dependent on the household size. With increase in family size, per capita water consumption tends to decline. Generally, household size of a slum and a low income family would be higher with lower levels of water supply and consumption due to basic lifestyle. The rapid review of the building and water linkage brings out the gamut of complexity that the environment impact assessment rules will have to address.

Fig 16: Area and Water Consumption Category-wise Distribution of Household in Percentage

Area and water consumption category-wise distribution of household



Source: Shaban. A, 2008, Water Poverty in Urban India: A Study of Major Cities, In: UGC-Summer Programme, June 30- July 19, 2008, Jamia Millia Islamia, New Delhi

ADDRESSING OTHER IMPACTS OF BUILDINGS

Buildings are now microcosm of the urban ecosystem. Their impact on urban environment is intense and complex. In addition to energy, water and waste, the impact on land, biodiversity, air quality and the surrounding neighbourhoods can be drastic if not modified with regulatory discipline.

While all these aspects will require very diligent impact assessment this paper intends to highlight a very new area of impact that has not got much attention so far – traffic impacts of buildings. The growing motorization and the ever worsening mobility crisis in which personal vehicle usage is marginalizing the public transport, cycling and walking, and adding to congestion has added this very serious dimension to the impact assessment of buildings in cities. This is especially true for large commercial buildings that induce additional traffic in the

neighbourhood. This is already becoming a serious cause of tension in many localities of our cities.

The large commercial buildings especially the mega shopping malls induce and attract huge amount of traffic on its access roads that can have serious detrimental impact on the surrounding neighbourhoods and also contribute hugely to the local air pollution and congestion. This has already resulted in tension and conflicts. One illustrative case is the law suit filed by the resident welfare association of one of the posh colony in Delhi – Greater Kailash against the Savitri commercial complex on grounds of its congestion effect. Such conflicts and adverse consequences will only multiply in the future if not addressed with appropriate impact assessments tools.

Environment Impact Assessment for buildings: Is it delivering?

In view of the big picture challenge of the building sector an attempt has been made to assess the policy drivers that can influence resource use in buildings. Multiple policy tools have begun to take shape in different resource sectors of water, energy waste, and traffic for resource conservation and for reducing developmental impact on the environment, and are expected to influence a large part of the building sector (See Annex 1 on key green building regulations).

But this report examines only the Environment Impact Assessment (EIA) tool for the building sector. The EIA comprehensively addresses all aspects of resource use and waste generation in buildings and targets the most high end, high impact buildings that are more gregarious in their resource needs and use. This regulation is expected to internalize the country's resource management and development planning to reduce the impact on environment, substantially. EIA presents that opportunity, if designed well.

This report examines the key question if EIA is effectively addressing the concern? The EIA, introduced as an administrative measure in 1994 under the Environment (Protection) Act 1986, has been amended from time to time and in 2004 EIA ambit was extended to cover buildings, new townships and industrial estates[12]. After 2006 amendment all projects and activities covered under EIA are broadly categorized into two categories – category A and category B, based on the potential impacts on human health and natural and man made resources. Following this classification buildings have come under Category B that includes all building and township projects whereas Category A includes industry, mining and big infrastructure projects. Within Category B all building and construction projects equal to or more than 20,000 sq meters and less than 1,50,000 sqm of built up area are further classified as B1 and townships covering a area of 50 ha or more and or built up area of more than 1,50,000 sq meters are B2.

What ails EIA for buildings?

CSE has reviewed the overall environment clearance procedure for buildings with special reference to energy and water. It has also examined the official information for the buildings in the National Capital Region (NCR) that have undergone the EIA process. CSE has assessed available literature, officials minutes of meetings, carried out investigation, interacted with the key stakeholders and analyzed case studies to identify the key limiting factors that constrain the resource saving potential of this regulatory tool. This review of environmental clearance of buildings has also taken note of the appraisal of the overall EIA by other agencies .

The review of the EIA process for buildings expose systemic weaknesses as well as

specific concerns related to each sector that is appraised for the environmental clearance.

Environmental clearance for buildings is different and less rigorous: The requirements for environmental clearance for buildings is different from the EIA done for industrial, mining, port, thermal/nuclear plant projects. The requirements for buildings are not as rigorous and detailed as those required for the category A or industrial projects. Typically, the detailed EIA needed for industry and mining begins with screening, which determines whether the proposed project, requires an EIA and if it does, then the level of assessment required. The next stage of scoping identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study. The third stage involves consultations with the affected people and communities and integration of their concerns. The final stage is the appraisal stage which examines the adequacy and effectiveness of the EIA report and provides the information necessary for decision-making. The four stages namely screening, scoping, public consultation and appraisal instrumental in assessing and granting of environmental clearance to the A category projects, are not applied to the building sector.

The Buildings and township projects in category B have been exempted from the need of such detailed EIAs. These are required to be cleared on the basis of information to be furnished in Form 1/Form 1A prescribed under the EIA rules. The process for the grant of environmental clearance for these projects is relatively less intensive and rigorous than for category A projects. While the category A projects have to undergo all the four stages of EIA including screening, scoping, public consultation/hearing and appraisal, it is much simplified for the category B projects (see Annex 2, fig 3 and 4). The category B projects only have to undergo stage 1 of screening. This stage is basically is to differentiate between projects belonging to category B and further B1 or B2 to be cleared by State Environment Impact Assessment Authority (SEIAA). The screening procedure is also based on information provided by the applicant in an application (Form 1, 1A and conceptual plan in case of construction projects.). Thus, no public hearing is required for buildings.

However, there is a finer division in the category B projects. B1 refer to the township projects with more than 50 ha and B2 refer to the building construction within 20,000 sqm to 15,00,000 sqm. According to rules B1 projects – townships — may require detailed Environmental Impact Assessment report whereas 'B2' projects (buildings) will not. But for B1 projects the Ministry of Environment and Forests is expected to issue appropriate guidelines from time to time regarding which project may require EIA. But this has not been done so far.'

The environment ministry official explain that the buildings are not included in the detailed EIA process and are limited to form 1 and 1A, because their impact on the environment is low. They ignore the high local impact of large building projects and also the cumulative impact of the entire lot of buildings. The real estate development should be evaluated with respect to its cumulative impact on the environment.

The builders association and federation have argued that buildings are low impact and that the EIA process for building projects therefore should be lenient. In fact, Confederation of Real Estate Developers Association of India (CREDAI) an association comprising all big players of India including Reliance, Tata, Bharti, Godrej, DLF etc is against the EIA rules on buildings since the 2006 amendments that brought all projects between 20,000 sq. mts and 1,50,000 sq. mts within the ambit of EIA. The real estate industry supported the environment ministry proposal to relax the area criteria from 20,000 sq m to 50,000 sqm. The association has submitted

their memorandum to the Prime Minister's Office (PMO).

It is important to revisit the EIA process for buildings and construction projects to understand its adequacy and effectiveness. Currently, environmental clearance is the only process in which the regulator can put conditions on water and energy efficiency, water harvesting, waste management, wastewater treatment etc. on new projects. The municipal authorities/ town planning departments in most cities are ignoring these issues while granting the building/ site clearance. Instead of relaxing the conditions, strengthen the conditions and the clearance process to make it better and effective.

Weak mandate: Building industry is not required to conduct an extensive detailed EIA but fulfill certain requirements of furnishing basic information about their resource use according to the items listed in the Form 1 & Form 1A of the EIA rules for the clearance from the ministry or the ministry appointed state level authorities like the SEAC for each state.

Also the successive dilution of the EIA provision for buildings over time has further reduced the system to a mere formality of forms that requires submission of minimal details on resource consumption and conservation practices. The government and the developers in the past have made continuous attempts to dilute the already weak EIA process for building and construction projects.

A case in point is the MoEF's January 19, 2009 draft notification of Environment Impact Assessment rules which suggested exclusion of construction projects that includes the housing projects, commercial and retail construction that are less than 50,000 sq. mt. of built-up area from the ambit of the Environment Impact Assessment and the Environment Protection Act 1986. This was an attempt to extend the limit of 20,000 sq meters to more than 50,000 sq meters and thus make the EIA process ineffectual for buildings. Although in the face of strong public criticism and also protests from the state governments the environment ministry had to back track and eventually drop this recommendation. As there are very few projects that have area above 50,000 sq meter meant that virtually the entire building sector could move out of the pale of the EIA regulations. In fact, nearly 90 per cent of the building plans sanctioned could go off the list thus numbing the effect of the regulations.

While all this criticism helped to stop the amendment from going through the general provision on the buildings remained weak.

Loopholes in the EIA notification 2006 slackens scrutiny of buildings in townships: If township projects are effectively brought under the detailed EIA requirements like the industry and as originally envisaged this will have effective impact on the individual building projects within the township. But due to the current confusion and lack of proper guidelines from the ministry of environment and forests there is nothing yet in the notification or the Form 1 or 1A that could stop the SEIAA from transferring all township projects to category B 2 and therefore doing away with the need for EIAs and public hearings. The notification only vaguely states that the Ministry will issue guidelines from time to time for the categorization of B 1 and B 2 projects. In this case the EIA is to be done based on the terms of reference to be drawn up by the committee on a case by case basis. But this has not been done. If this loophole is plugged then individual building projects in new township areas can benefit from more robust and rigorous EIA.

Construction precedes consent and weakens the effect: Construction activities

cannot be initiated prior to environment clearance. But there is no effective mechanism with the Committee to ascertain whether actual construction has started before consent has been granted. This is not possible unless some secondary information source is available (local resident, NGOs etc.), who can expose the anomalies. The only source of information for environment clearance is the project proponent. Often builders and developers tend to hide the facts in order to receive the environmental clearance and prevent derailment of their projects. Only, if the committee has certain doubts or can sense foul with respect to the information provided by the project proponent and ground realities, the committee can ask for a site visit. But, this is rare.

In 2008 the Haryana State Pollution Control Board (HSPCB) has served notices on 147 builders for failing to get environmental clearance for their housing and commercial projects before executing them.

Weak appraisal: The indicators and norms for evaluating the projects have not been properly laid down for the State Expert Appraisal Committee to perform the task. The project appraisal has not been legally or explicitly aligned with the established norms in the respective resource sectors like the per capita water consumption norms or the energy code for buildings etc. Similarly, there is barely any attempt to get environment management plan for post construction monitoring. Even though a more decentralized institutional mechanism has been set up for evaluation of the projects the system is not rigorous enough to make a difference.

Despite EIA scrutiny therefore resource intensive construction projects are proliferating in the cities in complete disregard of the carrying capacity of the neighborhoods and often without the proper permissions from the regulatory authority. EIA in its current form is only a feeble check. Only basic and broad information are provided which are often not sufficient for rigorous evaluation. Also the important issue to be highlighted over here is that all the information in the application is primarily secondary data. This provision seems very superficial at the outset since it is purely resting on the information provided by the project proponent, with little scope for the SEACC to have detailed probing in the key areas.

Escape Route: The area criteria for the buildings are not sufficient to identify the high impact buildings besides it also creates loopholes for evasion. One of the most critiqued criteria of EIA 8 (a) is that buildings and construction projects with built up area of less than 20,000 sq.mtrs that are exempted from Environmental clearance may have several large capacity projects with potentially larger environmental impacts. But these are left out of the purview of environmental impact assessment process altogether.

This is a soft spot that is often exploited by the builders and developers who may manipulate the area or create parcels to avoid environmental clearance altogether. For example, the Vasant Kunj Square Mall, in Delhi required no clearance since in its report (June 2006 Rapid EIA report) the total built up area was shown to be 19021.108 sq mtrs[13]. There are no other criteria to establish the high impact of the buildings even with minor variation in area criteria. This needs to be addressed in the wake of unprecedented building and construction projects across India.

Land Acquisition– Prior or post environmental clearance? A serious weakness of the environmental clearance is that land is committed for the project even before the site assessment. Paragraph 2, the EIA notification -2006 requires prior environmental clearance," *before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity".*

A major flaw of this provision is that a project proponent can actually start the process of land acquisition, even when the project has not been cleared. It does not account for the fact that environmental assessment may bring out the unsuitability of the land and the site. Land acquisition should be permitted only after the environmental clearance has been obtained.

Paragraph 6 of the EIA notification -2006 states that *"prior environmental clearance in all cases shall be made …….after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant".* This is again particularly problematic in terms of the wording, the lack of clarity and the possible implications. This provision suggests that the applicant would have to identify 'prospective sites' for the project / activity before applying for prior environmental clearance. It thereby suggests that various project sites would be evaluated before one of the actually confirmed. The actual scope of this provision is grossly undermined because paragraph 2 of the notification categorically allows for land acquisition to commence through the use of the word 'securing the land', even when no application has been made for prior environmental clearance of the project[14].

Land acquisition in building and construction projects is generally between private parties therefore often off the purview of the land acquisition act. But the land acquired and proposed for development should be in accordance with the master plan and as per the zones prescribed under it. Technically Master Plan and Zonal Plan also require environmental clearance but this is rarely done. It is generally a prerogative of the land development authority but occasionally EC committee also refers it to the project proponents for doubts, with project proponents producing a certificate from the relevant land development authorities.

Monitoring- The weakest link: Without adequate provision and mechanism for monitoring and compliance the entire environmental clearance process is of little value. Thus, non adherence to proposed measures would be extremely detrimental to the environment and public health. The project proponents will have to be made liable to the stated targets for withdrawal of water, recharge and treatment as well as the proposals for energy conservation.

The project proponent is expected to submit bi annual compliance reports. A project proponent is not expected to report non compliance. There has to be an independent regulatory check. Monitoring seems to be a mere formality. Project proponents submit bi-annual compliance report based on self monitoring. This is the weakest link in the EIA process.

The powers with respect to monitoring are much diluted. In case of violation or non compliance, if any NGO, resident/s complainant register complain, it would not be directed to the committee but to the regulatory agencies or the regional MoEF offices. Therefore, once the environmental clearance is granted the project proponent is not accountable to the committee.

According to a member of the Delhi State Environment Appraisal Committee, the committee is only responsible for clearing or objecting to the projects. They are not responsible for monitoring it. Since the committee has been constituted only in 2008 the impact of monitoring (or rather its absence) is yet to be seen. The officials add that the regulatory authority should monitor compliance, not the EC committee. Agencies like Jal board should take the onus of regulating the project's water withdrawal and disposal quantities and quality. It is observed that regulatory authorities have their own limitations with regards to manpower, technical

resources and ever-increasing workloads. They are unable to carry out a purposeful monitoring. Weak enforcement adds to the woes.

Monitoring reports – poor track record: Very few project proponents/authorities actually submit the mandated bi-annual compliance reports. Non-compliance is rarely reported to avoid legal action, and show cause notices etc. The MoEF has six regional offices in Chandigarh (north), Shillong (north eastern), Lucknow (central), Bhopal (western), Bhubaneshwar (eastern) and Bangalore (south). The offices have to undertake site visits, maintain records of the violations and receive the six monthly compliance reports from the project proponents. It is evident that the monitoring of projects is dismal and very weak"[15].

Information obtained through RTI by Kalpvriksh show that there are wide gaps between what is reported and what exists on ground. The various EIA projects – including buildings – that have been granted clearance in 2003 and monitored by six regional offices, the extent of non compliance is considerable. About 23 projects in southern region have no monitoring report, in west only 16 of the 111 projects cleared have monitoring reports. South and west which have the maximum number of cleared projects have the least number of monitoring reports – 187 (monitoring reports as of 2008) of 1255 projects (cleared between 1986-2006) and 180 (number of MRs as of 2008) of 1219 (cleared between 1986-2006) respectively. On an average every regional office is able to monitor a project once in every three or four years. Immediately after the enforcement of the EIA notification 2006, over 2000 projects were granted clearance across India. This adds to the load of understaffed and under-resourced regional offices. There are also discrepancies in the information provided by the compliance reports.

Often, the project proponents instead of admitting to non-compliance with prescribed conditions, vaguely mention the status as 'agreed to comply' or 'will be complied'. This helps to avoid legalities, in case of violations and non compliance.

No follow up on compliance report: There is no mechanism to make project proponents submit compliance report to the regulatory body every six months. in fact periodicity is not specified for tests/readings needed for monitoring. It is also not commensurate with the consent to establish and consent to operate certificates. So there may be mismatch between the report prepared by the project proponents and the ground situation. CSE has assessed some of the cases in and around Delhi including the Jasola area and found very poor compliance and major deviation from the environmental conditions on the basis of which environmental clearance was obtained.

Quality of Information and disclosure: Good quality data is a major concern while preparing any EIA report. Lack of sampling networks and ill-defined sampling and analysis procedures also adds to the problem of inconsistency. There is no central data bank; therefore, data gathered through different agencies is not available to public. Quality assurance and quality control on existing data is also negligible.

The sub standard and inadequate information provided by the project proponents needs to be addressed since the information provided by them in the application is the basis for clearance. This needs a centralized repository of all EIA reports in the country to track the performance of the environmental clearance process in the long run; to improve decision-making; to improve public access and scrutiny; to enable research on regional and cumulative environmental impact and finally, to develop baseline data on environmental and social parameters for different parts of the country (since a good EIA report can be a good source of primary data). Also

ensure that all information regarding the process of EIA – from the time the application is made, till the final clearance, is available on a web-enabled system. The database must be centrally organized, even if the data is fed through state agencies. There should be increased public disclosure of all documents, proceedings of meetings; decisions and final decision and conditions/safeguards for granting clearance. All EIA documents must be available online.

Public Consultations: Public consultations, which are a crucial component of the EIA for category A projects (industry and mining projects) are not included in category B that include the building projects. The significance of public consultation is illustrated by the example of Vasant Kunj ridge case, wherein the local residents and civil society initiated a campaign against the malls and hotels that were constructed on the ridge. Since there is no formal procedure of public hearing and consultation in the case of EIA for building and construction process, citizen's perspective was ignored and mass scale construction was promoted and is continuing till date. There should be initiation of discussion on the inclusion of public consultation in the environmental clearance process for the building and construction projects. There have been rare and occasional cases as in Pader road Mumbai where public hearing has happened by default. The speed with which land acquisitions and development of building projects is gathering momentum across the country this needs public consultation on local needs and issues.

Post Facto clearances: It is nearly becoming a trend in which projects are being initiated without consent and then post facto environmental clearance after construction are being granted. Project proponents and the committees generally agree on a penalty amount and a bank guarantee that is expected to compensates for the environmental damages and impact caused by the projects. Post Facto clearance is not even included in the legal provision of the EIA. It is only an administrative action that has become common and is widely accepted. Post facto clearance is fast emerging as a convenient alternative for the offenders and violators.

This is clearly a worrying signal. In fact this matter came to a flash point in 2008 when it was found that more than 70 buildings in Delhi had started construction without consent to build. This trend needs to be halted. Such rule can only be an exception, if at all, rather than practice. The 2006 notification includes a provision (8.vi) that states action will be taken against the applicant for deliberate concealment and/or submission of false or misleading information. This provision is rarely implemented and is leading to fraudulent practices and delays in project clearances[16]. Some of these examples include Shopping Centre developed by Campion Properties Ltd, ex-Hotel Ranjit Site, Maharaja Ranjit Singh Marg, New Delhi; Jackson Buildwell developed by Jackson Buildwell Pvt. Ltd, V3S Ring Road Mall, at 1B-3, Sector -10, Rohini; Cross River Mall,_Location- 9B & 9 C, Central Business Shahdara, New Delhi

Irregular monitoring- The frequency of monitoring the building projects is also not uniform across all regional offices. The regional offices of the MoEF are increasingly coming under pressure pressured as the number of projects are galloping. This is further aggravated by the lack capacity and manpower. Unless and until, the regulatory capacity is strengthened, monitoring will not be effective in improving the compliance with the environmental conditions.

Cases filed to buy time: In case of non-compliance the regional offices issue show-cause notices. But the MoEF does not maintain records of show cause notices. Also the central ministry has not issued specific guidelines for the issuance of show-cause notices by regional offices. There are now growing incidences in which cases

are filed in the local courts against the project proponents who are caught violating environmental conditions. Since the cases drag on for long without final orders, much of official's time in regional offices is spent on these cases. This has also been confirmed by the senior MoEF officials.

No powers to regional offices: Even in cases where regional office take notice of violations and issue show cause notices, the regional offices do not have any authority to take punitive action against the violators, which provides impetus to the project proponents to continue with violations. The MoEF has also failed to initiate relevant action except in very few cases.

No protocol for Inspection- Proper protocol for inspection is also not in place. This had initially emerged from the review carried out by the Kalpvriskh. Even now the MoEF has not recommended norms and protocol for inspection of projects to monitor environmental compliance conditions. This is particularly acute in the northern and southern offices.

Validity of environment clearance is unlimited: The validity period for the environment clearance once issued is for a limited period for area development projects. It can be extended to another 5 years upon submission of application in Form-1 within the validity period. The Environment clearance is valid for five years and the project proponents should initiate construction within 5 years. In case there are changes in the conditions of environment clearance the project proponent has to come back to the committee. If the verification/ monitoring system is inefficient or weak, the project will go unchecked and will continue to operate as per the earlier agreed conditions with on-site changes (ranging from small to significant) without the knowledge of the committee.

Need stronger role for State Pollution Control Boards: The state pollution control boards are responsible for the issuance of consent certificates to the projects. It also prepares and enforces standards for the treatment of sewage and trade effluents etc. besides undertaking assessment of the quality of ambient water and air. Other functions include inspecting wastewater treatment installations, air pollution control equipment, and to take steps for the prevention, control and abatement of air and water pollution.

Ground realities however indicate that not everything is all right. Delhi Pollution Control Committee (DPCC) the prime authority responsible for controlling pollution in the national capital territory of Delhi agrees to large scale violations by various building projects. On its website (accessed in May 2011) it is mentioned that shopping malls and commercial complexes have violated environmental laws. As a result, DPCC has been forced to impose bank guarantees /penalties on shopping malls and construction projects. The website mentions that the 'construction work by most of these projects was undertaken in blatant violations of the environmental laws.' The DPCC claims that in order to set an example Consent Management Committee (CMC) has taken stringent action that include bank guarantees and environmental damages. An amount of Rs 12.60 crores in lieu of environmental damages and bank guarantees of Rs 17.62 crores have been realized until 2008. Further, 18 notices for closure/ stopping construction have been issued to shopping malls/ construction projects. In addition, directions for closure/stopping construction have been issued to 5 shopping malls/construction projects up till 2008.

But according to the DPCC officials the official inspection is not regular. There is no systematic manner in which inspection and checks are conducted. The shortage of

staff also creates problem in streamlining inspection. Although the units are often directed to submit six monthly monitoring reports, the record maintenance is poor. The project related reports by the proponent are poorly drafted and its management is also weak at the end of DPCC. The DPCC officials also agreed that there are discrepancies between the compliance reports and on site realities.

Inadequate resources and staff in regional offices: The organizational capacity and human resources available with the regional offices pose a big challenge to enforcement. From September 2006 – August 2008 MoEF has granted clearance to 2016 projects. This has placed huge burden on the regional offices to monitor these projects. At present, the six regional offices have about two to three scientists who have to monitor about total 6000 projects (including all types of projects) that are either under construction or in operational stage.

Coordination Missing: There are many authorities and agencies which do independent monitoring, grant NOC, grant environmental and other critical clearances. But their coordination leaves much to be desired. Violations and non-compliance go unattended due to poor coordination and sometimes even ignorance. There is obvious lack of communication between SEAC and the regulatory bodies, although there are some common areas of work and coordination. The concerned agencies sometime remain silent spectators.

Committee Complexities: The upper limit for members in the State Environmental Appraisal Committee (SEAC) is 15 but there is no mention of minimum members required for the committee to function. Often it is seen that a committee may have just 5-6 members not representing all the essential fields for environment clearance. Out of the total appointed members only a few may be present during the meetings. The key reasons for reduced membership are generally cost cutting, lack or non availability of experts amongst others. As a result, the small committees are more often than not over burdened with project clearance applications. They are required to meet atleast once a month. On an average 15-20 projects apply for environment clearance every month. Often the discussions do not reflect the real issues. There is little time for detailed appraisal. Infact, presentation by the proponent is probably the only effective time that the members are able to accord to each project. Hence, there could be a real possibility of project proponent taking advantage of the genuine time constraint and avoid discussion on key and significant issues.

The analyses of the number of projects that were reviewed and cleared shows that the committee reviews on an average 19 projects in each of its meetings, which scheduled for 2 days. In the 48 minutes of meetings reviewed a total of 927 projects were reviewed of which 267 projects were granted EC. On an average 6 projects are granted clearance in each meeting by the committee. There are significant variations in the number of projects that were discussed in the meetings. This ranged from 12 to 52 projects in the 48th and 15th meeting of Haryana SEAC respectively. However, to reduce the pressure on the committee members the member secretary of the Haryana SEAC in the 16th meeting decided that only six new projects for appraisal or twelve projects for grading or in combination can be taken in one sitting.

There may be significant variation in the average time spent by the committee members on reviewing the projects and granting environment clearance. The large number of projects and the pressure to review these projects in limited time frame is often a constraint for detailed discussions and comprehensive review, according to a few committee members that CSE met.

Environment Clearance Timing: The preamble of the Environment clearance given to the project proponents mentions the condition (e.g. for water withdrawal, disposal, etc.). Often procurement of certificates from various authorities may take time, which is generally a constraining factor for the committee that is stressed with multiple projects. In some cases committee may provide environmental clearance before project proposal receives NOCs from the relevant authorities. The monitoring and regulatory mechanisms (e.g. Jal boards or municipalities) need to become more rigorous and stringent. The regulators can book the project proponents as per the EPA act, air and water pollution act or other relevant state acts. Some states have also issued local guidelines to be adhered by the developers and builders.

Errors in Documentation: There are also glaring mistakes in the documentation of the minutes of the meeting by the SEAC and SEIAA. Since these minutes are the most crucial source of information for public, incorrect or unclear information needs to be eliminated as far as possible. For example in the 3rd meeting of Haryana SEAC held on 26 & 27 August 2008, a group of projects were shown as having absolutely similar water requirements and wastewater generation. Even their environmental conditions were exactly similar, nearly word to word. Their built up areas ranged from 19,000 to 1,48,000 sq meters. Some of these examples include: M/S M3M India Ltd. & Others (Construction of Commercial Complex at Sector 84, Gurgaon; M/S Martial Buildcon Pvt. Ltd. (Construction of Commercial complex at Sector 67, Gurgaon; M/S Lavish Build Mart Pvt. Ltd. (Construction of Commercial complex at sector 73, Gurgaon; M/S Gental Realtors Pvt. Ltd. (Construction of Commercial complex at sector 66, Gurgaon; Prompt Engineering Pvt. Ltd. (Construction of Commercial complex at Sector 74, Gurgaon; M/S Afresh Builders Pvt. Ltd. (Construction of Commercial Complex at Sector 66, Gurgaon; M/S R.S Infrastructure Pvt. Ltd. (Construction of Commercial complex at Sector 62, Gurgaon among others.

Subjective Rating for Proposals: The minutes of the meeting of the Haryana SEAC several projects show that the projects that are granted environmental clearance are also awarded ratings ranging from platinum, gold, silver etc. According to the MoEF official, these ratings are not for the project construction and operation process and performance. These are only indicative of the information provided and the quality of report (conceptual plan) submitted to the ministry. These ratings are not for the project as a whole.

The ratings are considered highly subjective and several SEAC's have discontinued this practice. But, some SEACs as in Haryana have continued to use it. The risk is that the project proponents begin to use the rating on the ground that claiming that the project as a whole is gold or platinum rated. They conveniently conceal the fact that the rating is only for project report/proposal submitted to SEAC and not for the project (construction and operation phase). Since the committee is reviewing very large number of projects in each meeting, there is hardly enough time spent on reviewing it in depth and to objectively awards points on each aspects which would contribute to the project report's overall rating. M/s Standard Farms Pvt. Ltd. (Group Housing Project "Raisina Residency, Sector-59, Vill. Ullahwas, Teh. Sohna, District Gurgaon"- has silver rating and environmental clearance granted. M/s Parsvnath Developers Limited, Proposed Parsvnath Mall Sector-8, NH-1, Near Tau Devilal Park, Sonepat, Haryana- has gold rating; DLF New Town Heights at Sec. 86, Gurgaon, Haryana- gold rating; etc

Environment is a low priority for builders: At present the industries are supposed to reserve 5 per cent of the project share for CSR according to MoEF. With builders/developers making huge profits in real estate this is an easy let off for activity 8A projects, with no compulsion of investing in environment management

and monitoring on a regular basis. For the builders any investment on environment management and conservation would imply increased costs.

Recently, the MoEF appointed committee has recommended making environmental violations a non-bailable offence. The ministry has accepted the committee's recommendation which was headed by the senior ministry official JM Mauskar. Other recommendations included increasing the penalty amount for the violators. At present, the punishment for violations is limited to three years' imprisonment and 1 lakh fine. The main objective behind these recommendations was to provide more powers to the environmental regulators. Some of its other recommendations included removing the ceiling from the penalty for the violators and strengthening of the central /state pollution boards and regional offices. These could lead to effective and improved monitoring of implementation of environmental clearance conditions[17].

Weak sectoral approaches on energy, water, waste and traffic: The review of the environmental clearance process has also brought out that the current mechanism of assessing the vital impacts on water, energy, waste and traffic are not guided by clear targets and benchmarks. These are also not aligned with the existing norms and standards. The fragmented approach towards managing environmental impacts of buildings has led to partial and segmented application of green elements in buildings. Adoption of any sustainable practices – rain water harvesting system, solar water heating systems, or energy efficiency measure, — in isolation and without clear benchmarks and targets can seriously compromise the process and delivery[18].

Even though guidelines have been prepared to minimize impacts in critical areas of energy, water, waste and traffic they are very loose, adhoc and not governed by clear targets and benchmarks. The review has also shown that in the same sectors norms and standards already exists in the country but the environment clearance rules remain vague about them and not take them on board explicitly to set the terms for clearance. This is unacceptable that one arm of the government should ignore what the other arm is doing. For instance, elaborate energy code for buildings (ECBC) has been adopted by the government for energy conservation in buildings but this is not integrated with the EIA tool. Same is the case with water.

This therefore demands setting of clear mechanism for each sectoral appraisal of buildings to assess the impacts and monitoring with clear benchmarks. The reforms must accompany stricter approaches in the targeted resource use areas.

No official assessment of the benefits of environment clearance for buildings: The CSE review also reveals that so far no official effort has been made to assess the resource savings from the EIA intervention in the building sector. It may be recalled that when BEE had introduced ECBC in 2007 it had estimated that with ECBC can save 1.7 billion units in the first year of code implementation in India. But after several years of EIA Notification 2006, applicable for new construction and area development activities, there are no sound provisions for assessment of resource savings potential of the new building stocks. Such exercise is critical to drive policy action and build public support.

WHAT OTHER GOVERNMENTS DO?

Even though the overall EIA regulations for all sectors in India are quite elaborate and robust, the rules that specially apply to the building sector are not as exacting. A quick review of the EIA in other countries show that they have included some critical parameters that improves the overall effectiveness of the system of appraisal.

United States: In the US under the National Environmental Policy Act 1970, if an environment assessment shows that the project would have a significant impact on the environment an environment impact statement is prepared which is a more detailed evaluation of action and alternatives. The public and other federal agencies may provide the input for the preparation of this statement. The concerned federal agency also prepares a public record of its decision showing how the findings of the statement including considerations and alternatives, were incorporated into the agency's decision making process. The Environment Protection Agency is also needed to review and publicly comment on the environmental aspects and impacts and action listed in environment impact statement (EIS). Moreover, public has an important role in the NEPA process. It includes public hearing and meetings.

A very important element in the building related NEPA process is the review of alternative site. This is in sharp contrast to the Indian practice where only one site is evaluated and even acquired even before the appraisal has been carried out. This restricts the option of minimising environmental damage in more sensitive sites. The EIS in the US reviews alternatives to indicate the preferred alternative in the project area. For example, in the redevelopment of the public housing community "Sunset terrace" in renton, Washington the US department of Housing and Urban development analysed three alternatives to determine the preferred alternative. This is not an individual building but a group of buildings. But the approach to its clearance brings out the key principle. The EIS in this case indicated areas with no action, moderate action and preferred action. The preferred alternative represents the neighbourhood in the planned action study area based on investment in the potential redevelopment sub-area with moderate number of dwellings developed[19].

United Kingdom: In the United Kingdom, the projects are divided in two schedules – one that require EIA mandatorily in all cases, and the second in which a pre-assesment of likely significant environmental effects and if EIA would be required. There are also exceptional powers that are exercised to demand EIA in scheduled 2 cases that are not located in sensitive areas but may have other serious impacts. The more environmentally sensitive an area the more likely that the effects of development will be significant and an EIA would be required. Developer gets a clear ruling on the need of the EIA well before they make formal application for EIA. This screening opinion is important. The developer ask the local planning authority for its formal opinion called scoping opinion, on the information to be included in the environmental statement. This helps to establish what are the aspects of environment that would be affected. All environmental statement should cover every conceivable aspect of a project's potential environmental effects at the same level of detail with factual description of the project. The developers are required to include in the environmental statement an outline of the main alternative approaches to the proposed development that they may have considered and the main reason for their choice[20].

Japan: Japan has introduced EIA rules in 1972 and for public works that also includes construction and building sector in 1980. Japan also decides the stringency of the EIA for projects based on classes of projects. Class 1 include the large scale projects that have serious impact on environment. Class 2 projects are judged individually to decide if these would require EIA. Building projects can fall in any of these categories depending on the scale and potential impact. There is also area classification for the building projects. New residential area development project with area more than 100 ha, land readjustment project with area more than 100 ha, industrial area development project more than 100 ha, new town infrastructure development project with more than 100 ha, residential or industrial land development with more than 100 ha fall in class 1 projects and require

detailed EIA. The same category of projects with area between 75-100 ha fall in class 2 category that are judged individually and on a case by case basis to decide if they will require EIA. .

In the Japanese approach public hearing and consultation have a very important role. Public consultation is carried out in two stages, during scoping and after the environment assessment. Local people are heard even before deciding the assessment method. In fact citizens' opinion is gathered at the very early stages to be able to identify the key issues for evaluation. This helps to make the environment assessment more site specific. Also the developers have to publicly notify their scoping of the project and the EIA assessment for a period of one month for public comments. Municipal Mayors are expected to provide their opinion that are taken into account while assessing the projects. People of project affected area as well as from other localities can comment on the document. Second round of public hearing happens after the EIA has been carried out. Results of the assessment are discussed with the local people.

Yet another important element of the Japanese approach is to get the project proponent to set the performance targets according to different quality and emissions standards. During post project evaluation it is assessed if these targets are met. The project proponents also have to demonstrate if they have taken the best practice approach as only meeting standards may not be sufficient. They also have to give a clear plan to show their mitigation strategy[21]. The two critical elements that are important in these global practices is the emphasis on assessment of alternative sites and options as well as the role of public comments and hearing. In India the serious limitation is that the land is already allotted prior to assessment with no scope of selecting alternative sites to minimise impacts.

The way ahead

The review of the environment clearance process for buildings in India expose systemic weaknesses as well as specific concerns related to each aspect of building appraisal that blunt the effectiveness of the policy.

This review makes it very clear that in view of the emerging environmental concerns in the building sector, buildings cannot be treated as a low impact sector. While individually they can aggravate local pollution and resource impacts, cumulatively they can be a very heavy draw on key resources including energy and water in the country. They can also have severe local traffic and pollution impacts that would require targeted mitigation.

Given the plethora of problems and implementation challenges, as identified in this review, there are often doubts expressed about the merit of continuing with the current environment impact assessment of buildings. It is said that the practical problems associated with the composite evaluation of numerous individual buildings spread across the country makes the environmental clearance system ineffective. Should this be discontinued and the clearance process be tied only with the city based building clearances system that already exist with some modification to integrate the environmental indicators. But despite these reservations there is also a significant interest in retaining and reforming the environmental clearance system for buildings for the following reasons.

First of all the environmental clearance of buildings is a critical transition to a new generation of regulations and enforcement systems that shifts the focus from production based environmental management to consumption based management

practices. This is because buildings form the microcosm of consumption in cities.

Secondly, the demand for regulatory capacity for implementation of such a strategy is enormous. This truly requires scrutany of nearly all medium to high impact buildings and their consumption pattern to reduce resource impacts, emissions and wastes in cities. There are often doubts raised about the effficacy of such an approach. But this cannot be avoided in the future as all regulations be it for energy, water or waste in buildings will require direct monitoring of individual buildings. Already ECBC, the energy regulations for buidlings will require monitoring of energy consumption in a large number of individual buildings especially when it becomes mandatory. This means cities will have to develop skills and capacity to carry out the impact assessment and benchmarking of numerous individual buildings. In fact EIA is a our first generation experience with such a regulatory and implementation approach that requires monitoring of buildings on a case bv case basis.

Thirdly, should environment impact assessment be done by the environment ministry and its regional committees and SPCB/s or should this be fully decentralised and aligned with the existing building clearance process of the urbal local bodies in cities based on the voluntary National Building Code and local building byelaws? The answer to this that it is desirable to carry out the environment impact assessment and post construction monitoring under the Environment Protection Act for the simple reason that it provides strong legal mandate and legal back up for compliance. The National Building Code and the building bye laws that are implemented by the urban local bodies in cities do not have mandatory provision for all aspects of resource conservation in high impact buildings as is required by the EIA process. Also most part of NBC is voluntary and does not have the teeth. Even though the NBC and the local bye laws have some requirements related to energy, water and waste management these are not uniform across states and cities and do not have strong statutory back up to achieve environmental objectives. Therefore, environment assessment of high impact buildings may continue under the Environment Protection Act. As of now EIA is the only tool that requires holistic appraisal of the overall impact of the buildings.There is merit in keeping the high impact buildings within the scope of the Environment Protection Act to ensure compliance.

EIA is the only tool that requires holistic appraisal of the overall impact of the buildings. Such an assessment of the high impact buildings is important as is evident from the local protests against some of the commercial projects in Delhi. These projects have significant local impacts. Decision on their siting and mitigation strategies will have to be assessed on a case by case basis.

Fourthly, our review makes it clear that the current institutional mechanism for assessment and enforcement of environmental clearance for buildings is very weak. The committee based approach with very weak staff and technical back up is not conducive for proper assessment, enforcement and monitoring. It is therefore, recommended that the system of clearance and monitoring should work as a `plug and socket` with the other institutional arrangement of the urban local bodies and the other relevant institutions that are now shaping up in cities for enforcement.

It has to work synergistically with other relevant laws, benchmarks and standards for water, energy and waste and enforcement mechanism in the future. EIA should take them on board formally. For example, EIA should demand ECBC compliance for all EIA buildings. It makes eminent sense for the EIA to leverage and take ECBC on board for assessing energy consumption of the high impact buildings. Similar approach should be taken to align with water and waste audits etc. This is possible.

There should be a clear interface with these systems and also an oversight system for effective delivery. Align and harmonise with the institutional mechanism of the urban local bodies and other concerned departments for enforcement.

The environmental clearance therefore is an opportunity to bind all the key regulations related to resource efficiency together to bring greater precision in targets and action. It has to work synergistically with other relevant laws, benchmarks and standards and enforcement mechanism in the future. For example, detailed indicators of ECBC compliance is being developed for the urban local bodies under the National Habitat Mission. These will be widely used in cities. It makes eminent sense for the EIA to co-opt and leverage this process for assessing the high impact buildings. Similar approach should be taken to align with water and waste audits etc. Getting the template right is important. It should leverage the mechanism that are being put in place to implement energy and water audits and other waste management strategies.

Fifthly, the longer term and bigger reform should link up area/zonal planning in cities with the evaluation of the individual buildings. This will help a lot to mitigate the issues related to siting and locations of buildings. The integrated zonal and Master Plan that earmarks the prospective development by land-use should consider local area impact assessment in advance. This can help in quick and effective decision on siting of individual buildings. Even today Master Plans require environment impact assessment but are rarely done. It is essential for cities to develop integrated zonal and Master Plan for earmarking the prospective development by land-use types taking into account the carrying capacity of the targeted zone. This area or zonal planning will consider much of the local area impact assessment in advance that can enable quick and effective decision on individual buildings.

Clearly, therefore, EIA provides the opportunity to bind all regulations for resource efficiency together to bring greater precision in targets and action. But this tool will have to be strengthened substantially for effective improvement in energy savings in buildings. Keeping these imperatives in mind it is time to set the terms of the policy discussion and action on the ways to reform the environmental clearance process for the buildings.

STEPS TO STRENGTHEN THE OVERALL EIA APPROACH TO BUILDINGS

- **Zonal plan and EIA:** The longer term solution will be to carry out rigorous EIA of the integrated zonal plans or Master Plans for cities that earmark the land-use and indicate the land-use and development projects in the city. This blue print of the city planning will itself be assessed for environmental impact more holistically. Buildings can then be derived as sub-plans. This can make locational analysis and appraisal more effective, relevant to city specific planning on a case by case basis. But case by case appraisal cannot be eliminated for the simple reason that the resource impacts of buildings require continuous monitoring and compliance during the operational phase. Cities will have to build capacity to carry out water, energy and waste audits as future regulations for energy code and water efficiency are likely to become legally enforceable for a much larger number of buildings. To enable this it can align with the various institutional mechanism that are being created at the city level to assess buildings. This leveraging will make implementation effective. Zonal plans to be prepared by the urban planning departments should be the reference point for the committees for environmental clearance.

- **Reform EIA rules for buildings to include public consultation:** While it may not be practical for the building sector to adopt the detailed EIA prescribed for the industrial and mining sector given its numbers and scale, a few essential elements may be identified for inclusion in environmental clearance for buildings. One such crucial element is public consultation or prior informed consent and decision. As is evident from the cases in Vasant Kunj and Greater Kailash in Delhi, citizen's concern will have to be integrated. In Vasant Kunj ridge case, the local residents and civil society had campaigned against the malls and hotels that were constructed on the ridge. As there is no formal procedure of public consultation citizen's perspective was ignored and mass scale construction was promoted and is continuing till date. Even globally as we have seen in Japan and US public consultation is an important element. In the Japanese approach public hearing and consultation is carried out during scoping as well as after the environment assessment.

- **Strengthen screening of sites:** It is important to plug the major flaw that a project proponent can actually start the process of land acquisition, even when the project has not been cleared. Land should be acquired only after the suitability of the site has been established. Project proponent should indicate the options. Building plan needs an explicit link with an environmental plan. Even globally the common practice is to assess alternative locations to identify the most appropriate site. This needs to emerge from the master plan of a city. Both zonal plans and master plans require environmental clearance. But that is not followed. In most cases therefore land is already allotted to the developers without any environmental screening. But site clearance is needed to understand the boundaries of influence and sensitivity of the location. Site screening will also help in cumulative impact assessment. The cumulative impacts will have to be addressed not only through individual project clearance but also through zonal planning and cumulative impact assessment.

- **Need strong benchmarks:** The current environmental clearance process is not linked with effective benchmarks for resource consumption and waste management. Developers get away with very poor benchmarks. For instance, the clearance is not aligned with the regulatory requirements related to extraction of ground water and usage, urban water bodies, energy efficiency codes. The only legal instrument that is explicitly taken note of is the forest conservation act etc. The government of India is planning to make the energy code for buildings mandatory. It makes eminent sense to adopt the ECBC formally for EIA assessment and post construction monitoring. Similar synergy should be built with the water efficiency related guidelines and requirement.

- **Adopt enforceable post construction monitoring protocol, capacity and compliance strategy:** In addition to the self assessment and self reporting by the project proponent independent third party audits are essential to prevent escalation in resource use and neglect of waste management. Regional offices should be suitably empowered and aligned with other line departments to monitor the on ground reality and take corrective action. The central environment ministry should also be made liable for ensuring that independent monitoring is being carried out in a transparent manner. Also develop clear protocol for inspection by the regional offices and ensure that these are adhered to. This will help to address time delays in clearing projects. Enforce the proposal of the MoEF's appointed committee to make environmental violations a non bailable offence. Technically it is said that if compliance report is not submitted the project proponent is liable to be punished. All compliance reports are expected to be on the website of the project proponents. But this is

rarely done. Also the environmental clearance for buildings should not be for ever but be time bound. This will help to put brakes if the overall efficiency of the building deteriorates during the post construction phase. Plug into the enforcement mechanism of the urban local bodies for post construction monitoring.

- **Ensure strong enforcement to prevent post facto clearances:** Institutional reforms are needed to plug loopholes and discipline enforcement. Reforms are needed for stronger penalty and deterrents and more effective use of the closure clause permitted under the law. The current area criteria of 20,000 sq meter to 1,50,000 sq meter need additional indicators to identify the high impact buildings to address the deviation.

- **Quality of information and disclosure:** Develop and implement protocol for quality assurance and quality control on existing data. Also integrate the data generated by other concerned departments for performance assessment of the projects.To improve decision-making improve public access and scrutiny; enable research on regional and cumulative environmental impact and develop baseline data on environmental and social parameters for different parts of the country. There should be increased public disclosure of all documents, proceedings of meetings; decisions and final decision and conditions/safeguards for granting clearance. All EIA documents must be available online and for public comments.

- **Issue guidelines for EIA for township projects:** This ambiguity must be immediately resolved to ensure that the high impact township projects follow the EIA guidelines similar to those for category A projects. The current discretionary approach towards these projects is leading to a lot of adhocism. Reforms will ensure uptake of strong efficiency measures even for new individual buildings within the township and maximize benefits.

- **Build capacity for enforcement and also promote more coordinated action:** The organizational capacity and human resources available with the regional offices will have to be strengthened. Sheer number of projects place huge burden on the regional offices to monitor these projects. At the same time for effective appraisal and monitoring create institutional arrangement for better coordination with other authorities and agencies that do independent monitoring, grant NOC, grant environmental and other critical clearances, and responsible for allocation of resources. Improve communication between SEAC and the regulatory bodies.

STRENGTHEN SECTORAL INTERVENTIONS

Reform to reduce water and waste water impacts of buildings

- **Introduce benchmarking of water consumption for environmental clearance of buildings:** Currently, there are no mandatory norms to benchmark the per capita water consumption for environmental clearance.In practice for estimating water demand based on per capita consumption they mention the guidelines of the Bureau of Indian Standards/ CPHEEO/UDPFI. The project proponent often underestimates or randomly takes the per person water requirement to get the project cleared and to prove low impact of the projects on water resources in the area. Therefore, adopt and align with the standards and norms for water consumption and waste to bring clarity, parity and precision with regard to resource use. This is needed for benchmarking of the post-project monitoring as well.

- **Availability vs Allocation-** Even a cursory review of the project proposals show that the project proponents only mention the water needs of the buildings. They mention the guidelines of the Bureau of Indian Standards/ CPHEEO/UDPFI to estimate the water demand based on per capita consumption. But this is not backed up by any assessment from the water providers to show if they can supply the requirement. Therefore, often in water stressed areas authorities grant permission and allocate water based on the demand made by the project proponent without much reference to the water availability – both surface and ground water. Therefore, environmental clearance should be linked with assessments of resource availability. Often rain water harvesting is used as a panacea for all. Civil structures for rain water harvesting is made without any assessment of the existing water table and quality and the change possible with rain water harvesting. Licenses are being issued indiscriminately in Gurgaon without such checks in place.

- **Prevent undercover Exploitation:** It is important to tighten the provision regarding water use and to increase the vigilance and stricter action by the Central Groundwater Board/Authority in the clearances. Rainwater harvesting in buildings is currently being used as an excuse to exploit groundwater in critical areas. This is widely evident in Haryana. The CGWA needs to demand renewal of groundwater permission after two years. This would act as a check and regulate the developers exploiting groundwater resources. Currently, there is only one time permission that the developer has to seek and can continue to exploit the groundwater forever without its renewal.

- **Drive conservation methods and uptake of water efficient fixtures:** There is need to diversify and increase water conservation measures. Currently, water conservation measures that find mention in the proponent's reports are stereotypical and are there to satisfy the conditions. But, there are several other ways and measures that can be adopted to reduce water use and increase efficiency of water use in the buildings and construction projects. Only stricter benchmarking can force diverse and more innovative approaches. Moreover, there should be a special policy focus on rapid uptake of water efficient fixtures.

Reforms for reducing energy impacts of buildings:

- **Integrate ECBC with environmental clearance**: ECBC has already been adopted officially as the key regulatory tool for guiding energy conservation in buildings. It is expected to become mandatory soon. All EIA covered buildings will have to be ECBC compliant. This needs to be formally adopted and integrated with the EIA process. The current institutional and monitoring mechanisms in place for ECBC would then have to align with the monitoring process of the EC cleared building projects. The committees monitoring the EIA projects at the regional level would have to be aware and adequately trained and informed to understand the ECBC process and its monitoring requirements. At present the EIA clearance process in the Ministry of Environment and Forests does not have any representation from BEE for the energy impact assessment. Energy experts are needed who can vet the energy consumption data and ECBC compliance with the use of simple modelling tools to verify the claims of the project proponents. Or it should leverage similar technical capacity to be created in the urban local bodies.

- **Align with National Habitat Standards for energy efficiency:** Under the National Habitat Mission the Ministry of Urban Development along with the Bureau of Energy Efficiency is developing guidelines for energy efficiency that are to be integrated with the existing building bye-laws in cities. These

guidelines have been derived from ECBC and deal extensively with lighting, ventilation requirements, energy efficiency in lighting, heating, ventilation, and air conditioning systems, renewable energy utilization etc. These include guidance on thermo physical properties associated with various envelope elements such as wall, roof, windows, skylight etc. These extensive guidelines can be incorporated in the EIA rules for building to further streamline the ECBC requirements for optimum energy performance. Otherwise, the EIA tool the way it is currently designed for energy efficiency is not at all sufficient to address energy conservation in the high impact buildings.

- **Establish minimum energy benchmark for environmental clearance:** As of now there is no clear process or methodology for assessing or challenging the energy conservation data provided by the project proponents. It is often not clear how clearances are given based on the information provided and how the information and data sets are assessed and used by the EIA authorities. Currently, some development agencies like the Central Public Works Development voluntarily consider a minimum 3 star rating of ECBC as the minimum benchmark. BEE informs that in 2007 it had communicated to GRIHA and LEED that buildings rated by them would have to be minimum 3 star. A similar approach is needed for EIA compliant buildings. In fact in the case of EIA compliant buildings a higher star rating may be adopted as these are high impact capital intensive buildings.

- **Data management for proper impact assessment and monitoring mechanism**: Both data and methodology for energy efficiency in buildings should be made more transparent and composite. This data set should be properly reviewed. Validity of environment assessment will depend on quality of inputs and methodology. Sometime the discussion and assessment seem over simplified. The system will have to be revamped to create incentive for best practice models. There will always be a big dilemma between the modeled and actual energy performance of the buildings. But this demands clear indicators for projection as well as operating performance of the buildings. This will also require clear protocol for data generation, data quality, consistency and reliability and good modelling and simulation for assessment. The system will need specific benchmark that tracks building performance overtime, and changes in operations.

- **Energy audits:** The biggest challenge in any resource conservation effort in buildings will be to monitor resource use during the operational phase. Environment clearance will require supportive tools to be able to ensure that the intended objectives of environmental assessments are met. Energy audits must be made mandatory for the bi-annual compliance reports that the project proponents are expected to file. This will require institutional alignment to ensure that the EIA compliance. The urban local bodies are in any case expected to carry out resource audits as and when the cities adopt these strategies for mandatory enforcement. EIA compliance process should be linked with that. BEE has begun the system of creating a small group of certifiers for energy audits. But this will have to be formally broad based in urban local bodies. EIA monitoring should also be linked with this.

- **Harmonise Environmental Clearance with ECBC and National Building Code:** Another important opportunity is the voluntary National Building Code that is followed nationally with some variation and customisation at the city level for all buildings. The NBC 2005, include some aspects of energy and water conservation but it is not composite enough. If the National Building Code and

ECBC and other rules related to the resource conservation form "Plug and Socket" it can bring better results. The Bureau of Indian standards (BIS) that has framed NBC is now adding a detailed chapter focused on "sustainability" that is expected to consolidate the energy conservation and resource management approaches strewn across the NBC. BIS is coordinating this effort.

- **Make traffic related clearances from competent authorities mandatory**: Traffic impact assessment of buildings will have to be done more rigorously. The EIA authorities will have to accord priority to this and ensure that buildings obtain consent from the designated authorities in the city. The expansion in commercial and retail space in cities will induce heavy traffic and will require effective mitigation. The developers will have to be made accountable for improving public transport and non-motorised transport feeders and access to the building complex. They will have to develop and implement a traffic management and mitigation plan that obviates pressure on the neighbourhood, surrounding public spaces and roads. In Delhi for instance all projects should be routed through UTTIPEC and traffic police to clearly asses the traffic impacts of the proposed projects. These should fulfill the criteria of street design guidelines, guidelines for transit oriented development, fulfill the requirements of public transport connectivity, non-motorised transport approaches and so forth. These should also align with the parking policy of the city and prevent parking spill over on the public spaces surrounding the project area.

- **Leverage established legal systems and municipal system for enforcement:** It is very clear from the review of the current environmental clearance process for the buildings that enforcement and monitoring hinge on a very weak institutional framework with very poor technical back up. It is not possible for the loosely formed regional committees with very poor staff and technical backup to verify, monitor, enforce and check compliance based on various norms and benchmarks for resource efficiency and environmental performance of the buildings. This is one of the reasons why there is so much of reservations about the merit of continuing with environmental clearance for buildings. But this can be addressed if the environmental clearance process is aligned with the institutional mechanism that are now evolving at the city level for resource auditing in buildings. As mentioned earlier, this process is beginning with energy audits and ECBC compliance process and also water conservation efforts that will be spearheaded by the urban local bodies. The urban local bodies in each city are now expected to develop capacity and systems to enforce ECBC, as well as the reformed National Building Code and other regulations related to water and waste management.

  All developers and building owners have to come under the scrutiny of the urban local bodies. The municipal agencies or the concerned urban planning bodies that will be implementing these rules at the city level can build protocols along with the state pollution control boards and the EIA committees to verify, monitor and check compliance of high impact buildings as well. The environmental clearance process for the high impact buildings can align with this mechanism. This will help to bring rigour, skill and capacity. High impact buildings will require special scrutiny to minimise their impacts. Environmental clearance under the Environment Protection Act offers the opportunity to address the composite impacts of these buildings with strong legal back up.

—— Sustainable Building Programme Team

1. EIA: The Critical Path Tool

The regulatory action to reduce water, energy and material impacts of buildings has taken roots in India. But most of the action in cities is splintered and very sectoral -- water, energy, waste, land, biodiversity and traffic impacts of buildings. (See Annex 1: Key regulatory tools for resource conservation in buildings). A composite approach is needed to assess and minimise the combined effect of the buildings on the resource consumption in cities.

This is one of the reasons why there is growing interest in Environment Impact Assessment tool for buildings. This is an opportunity to address diverse impacts of high impact buildings comprehensively through a single regulatory framework. The environment clearance tool is also an opportunity to influence the planning and design of the projects to minimise the environmental impacts. Moreover, given the fact that the environmental clearance rules for buildings are meant for only resource intensive large and high impact buildings, the major resource guzzlers, making it stronger may reap significant environmental dividends. But getting the principles and the policy design right is crucial to make a difference.

There are however, concerns that a clearance process that involves numerous individual buildings across the country may have practical implementation challenges. It may fall victim to corrupt practices and become ineffective. It might therefore be more prudent to address this problem through a composite urban planning process in the city. But the emerging environmental concerns related to the building sector and especially high impact buildings has already led to a spate of reforms in specific resource sectors like the energy. This demands clearance and auditing of individual buildings. This means Indian cities will have to gear up to evolve institutional mechanism and capacity to deal with such an enmasse evaluation and monitoring system to deliver resource efficiency on ground.

Therefore, it is possible and even desirable to have composite environment assessment of high impact buildings with necessary institutional reforms. But what shape that must take will depend on the understanding of the current system and practice, what is working or not working to know the reforms needed.

How is the environment clearance designed for buildings?

To put it simply, Environment Impact Assessment (EIA) rules are expected to integrate the environmental concerns into project planning and decision making in a way that is consistent with ecologically sustainable development. This regulation has evolved through stages. Initially, the EIA was introduced as an administrative measure in 1994 under the Environment (Protection) Act[22]. The ambit of this provision was extended in 2004 to include large building construction projects, new townships and industrial estates[23]. Rules were amended once again in September

2006[24]. The Environmental clearance was redefined to formulate a '*transparent, decentralized and efficient regulatory mechanism to incorporate necessary environmental safeguards at planning stage and identify developmental projects based on impact potential instead of the investment criteria'*. The notification was further amended in December 2009. (see box 2: How EIA Provisions related to Buildings have Evolved?).

The EIA rules for buildings have evolved in stages. Seperate conditions have been laid down for the clearance of buildings and townships.

Under the EIA rules all projects and activities are broadly grouped into two categories – category A and category B, based on the potential impacts on human health and natural and man made resources (see table 8: List of Projects/Activities Requiring Prior Environmental Clearance). The environmental clearance rules have been separately defined for them.

Category A include mining, primary processing, materials production, materials processing- petroleum refining industry, coke oven plants, asbestos milling and asbestos based products, chlor-alkali industry, soda ash Industry, leather/skin/hide processing industry, service sectors, manufacturing/fabrication, physical infrastructure including environmental services. These require prior environmental clearance from the Central Government/ministry of environment and forests.

Category B includes building and township projects that require prior environmental clearance from the State/Union territory Environmental Impact Assessment Authority (SEIAA) based on the recommendations of State Level Expert Appraisal Committee (SEAC).

BOX 2: HOW EIA PROVISIONS FOR BUILDING HAVE EVOLVED?

Buildings were effectively brought within the ambit of the environmental clearance in 2004. Since then repeated attempts have been made to dilute the rules for buildings. The highlights of the key changes:

EIA NOTIFICATION 1994: It required new townships, industrial townships, settlement colonies, commercial complexes, hotel complexes, hospitals and office complexes, for 1000 persons or below with an investment of Rs 50,00,00,000 or below to get environmental clearance. But this notification was implemented only in 2004.

EIA NOTIFICATION 2004: While formalizing the provision of the 1994 on buildings it further stipulated that all those new construction projects should also be included that discharge sewage of 50,000 litres per day. With the inclusion of the sewage clause the EIA had tightened the grip on the most of the buildings that would render the maximum environmental damage.

EIA NOTIFICATION OF 2006: The rules were amended to include different criteria for buildings that would require environmental clearance. Building and construction projects with more than 20,000 sq meters to 150,000 m2 of built up area, and townships covering an area more than 150,000 m2 to 50 hectare or built up area will require environmental clearance. With this major change in the clauses a large number of smaller projects went out of the ambit of the EIA from SEIAA.

PROPOSED EIA AMENDMENT JANUARY 2009: Major efforts were made to further dilute the requirements. It was proposed to dilute the area criteria between state level and central ministerial level for EIA procedure. The Swaminathan Committee report on the EIA Notification 2009 recommended no change from the previously amended EIA Notification 2006.

OCTOBER 2009: The Committee set up to examine the amendments and the public submissions concluded that the proposed amendment may be dropped. Therefore, the attempt to dilute the criteria of building selection to 50,000 sq meter did not come through.

According to the listing of the Ministry of Environment and Forests (MoEF) the building sector cover a gamut of large construction and industrial estates projects including group housing complexes, commercial centres, shopping malls / multiplexes / hotels, hospitals, educational institutions / Socio cultural centres, recreational / entertainment complexes, area development projects / integrated townships, IT Parks / Software development complex, Industrial Parks / Complexes / EPZs / SEZs etc. Certain conditions have been laid down to classify projects as A and B (see box 3: General and Specific Conditions for Categorization of Projects for EIA).

The environmental clearance for buildings is expected to bring under its scrutiny a wide spectrum of impacts related to water and wastewater management, sewage disposal, storm water drainage, solid waste management, hazardous waste and bio-medical waste, e-waste, and building materials. The long list of impacts also cover

Environmental clearance of buildings covers a wide gamut of impacts including energy, water, sanitation, land, biodiversity and traffic impacts.

Table 8: List of Projects/Activities Requiring Prior Environmental Clearance

Project or Activity	Category with Threshold Limit	A	B	Conditions if any
8	Building / Construction projects / Area Development projects and Townships			
8(a)	Building and Construction Projects		≥ 20,000 sqm. and < 1,50,000 sqm. Of built up area #	#(built up area for covered constructions; in the case of facilities open to the sky, it will be the activity area)
8(b)	Townships and Area Development Projects		Covering an area > 50 ha. and or built up area > 1,50,000 sqm. ++	++ All projects under Item 8(b) shall be appraised as Category B1.

Source: EIA Notification 2006

BOX 3: GENERAL AND SPECIFIC CONDITIONS FOR CATEGORIZATION OF PROJECTS FOR EIA

The basis of categorizing projects as Category A and B are as follow:

GENERAL CONDITION: Any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of : (i) Protected Areas notified under the Wild Life (Protection) Act, 1972, (ii) Critically Polluted Areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.

SPECIFIC CONDITION (SC): If any Industrial Estate / Complex / Export Processing Zones / Special Economic Zones / Bio-tech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e), 5(f), or those Industrial estates with pre-defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates / complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate / complex are complied with (such estates / complexes must have a clearly identified management with the legal responsibility of ensuing adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the same throughout the life of the complex / estate).

Table 9: Work Profile of SEIAA and SEAC

State Level Environment Impact Assessment Authority (SEIAA)	State Level Expert Appraisal Committee (SEAC)
• SEIAA is an independent body, its members/ chairman have fixed term, can not be removed except for cause • Three (3) member SEIAA is to be notified by MOEF on receiving nominations from all concerned states and UTs • Chairman and other member shall be experts/ professionals fulfilling the eligibility criteria. • Chairman shall be an expert in EIA process. • Member Secretary shall be a serving officer of the State Government familiar with environmental laws. • MoEF to notify SEIAAs within 30 days from the date of receipt of nominations • Decision of the authority on the basis of consensus • No funding from MoEF	• MoEF notifies SEAC at state level on receiving nominations from the state government for screening, scoping and appraisal of projects as per composition and eligibility criteria. • MoEF considers the request of state governments, to constitute combined SEAC for more than one state/UT with concurrence of concerned State Governments. • SEAC may inspect sites (during screening, scoping and appraisal) SEAC shall not have more than 15 regular members. • Chairperson may co-opt an expert as a member in a relevant field for a particular meeting of the committee as per eligibility criteria. • Time period for Committees defined (3-years). • All members will be part-time and expenditure to be borne by the State Government.

Source: Subrahmanyam. G.V, 2009, Revised Environmental Clearance Process, presentation in the Ministry of Environment & Forests, New Delhi, 17th April

air quality, and noise levels. The rules are expected to promote energy saving measures and renewable sources of energy, horticulture, green belt development, parking and circulation. The projects are expected to have environmental management plan, environmental monitoring plan, risk assessment and disaster management plan.

The State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are the two key agencies that are designated to grant and reject ECs to the various projects at the state level (see table 9: Work Profile of SEIAA and SEAC).

The state level impact assessment committee and state level expert appraisal committee grant or reject projects at the state level

The normal environment impact assessment that are carried out for the industrial, mining and large industrial sectors consists of four key stages with each stage equally important in determining the overall performance of the project. Typically, the EIA process begins with screening, which determines whether the proposed project, requires an EIA and if it does, then the level of assessment required. The next stage of scoping identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study. The third stage involves consultations with the affected people and communities and integration of their concerns. The final stage is the appraisal stage which examines the adequacy and effectiveness of the EIA report and provides the information necessary for decision-making. The four stages namely screening, scoping, public consultation and appraisal instrumental in assessing and granting environmental clearance to the projects (see box 4: Stages of the EIA process). But the process of giving environmental clearance to buildings is different. This needs a deeper understanding.

Environment impact assessment of large industrial and mining projects are carried out in four stages. But the rules for buildings are different and simpler

BOX 4: STAGES OF THE EIA PROCESS

The environmental clearance process for new projects comprise of a maximum of four stages, all of which may not apply to particular case as set forth in notification. These four stages in sequential order are:

I. STAGE (1) - SCREENING: In case of Category 'B' projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1 by the concerned State level Expert Appraisal Committee (SEAC) for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance. It depends on the nature and location specificity of the project. The projects requiring an Environmental Impact Assessment report shall be termed category 'B1' and remaining projects shall be termed category 'B2' and will not require an Environment Impact Assessment report. For categorization of projects into B1 or B2 except item 8 (b), the Ministry of Environment and Forests shall issue appropriate guidelines from time to time.

II. STAGE (2) - SCOPING: All projects and activities listed as Category 'B' in item 8 of the Schedule (Construction/Township/Commercial Complexes /Housing) shall not require scoping and will be appraised on the basis of Form 1/ Form 1A and the conceptual plan "scoping" refers to the process by which the Expert Appraisal Committee (EAC) in the case of Category 'A' projects or activities, and State level Expert Appraisal Committee in the case of Category 'B1' projects or activities, including applications for expansion and/or modernization and/or change in product mix of existing projects or activities, determine detailed and comprehensive Terms Of Reference (TOR) addressing all relevant environmental concerns.

III. STAGE (3) - PUBLIC CONSULTATION: All projects and activities listed as category 'B' in Item 8 of the Schedule (Construction/Township/Commercial Complexes /Housing) shall not require public consultation. Public consultation refers to the process by which the concerns of locally affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

IV. STAGE (4) -APPRAISAL: Appraisal means the detailed scrutiny by the Expert Appraisal Committee or State Level Expert Appraisal Committee of the application and other documents like the final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of environmental clearance. This appraisal is made by Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

The applicant is invited for furnishing necessary clarifications in person or through an authorized representative. On conclusion of this proceeding, the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned make categorical recommendations on stipulated terms and conditions, or rejection of the application for prior environmental clearance, together with reasons for the same.

EIA ARE RULES FOR BUILDINGS ARE DIFFERENT FROM INDUSTRIAL EIA

The rules for buildings are different. The rules of the game also decide the relative stringency or lack of it.

How building projects are assessed? The rules for environmental clearance for buildings and townships are codified in the 2006 EIA notification. The building projects have been exempted from the need of a detailed EIAs. These can be cleared on the basis of information to be provided in the specified Form 1/Form 1A. The process is relatively simpler and rigorous than for category A or industrial projects that have to undergo all the four stages of EIA including screening, scoping, public

consultation/hearing and appraisal. It is much simplified for the category B building projects. These only have to undergo stage one screening. The screening procedure is also based on the information provided by the applicant in an application (See Box 5: Procedure for Environmental Clearance for Buildings).

According to the rules of environmental clearance for buildings:

- No public hearing is required for category B projects (except in some cases of B1 where SEAC ask for).
- No General Condition (GC) or Specific Condition (SC) shall apply to building / construction projects / Area development projects and Townships, Category 8(a) and 8(b).
- IT Parks/Complexes (SEZ) projects of the area below 500 ha. do not require clearance. However, the above projects should be appraised under Category 8(a) or 8(b) as the case may be.
- The application of the projects seeking EC are screened and scrutinized by SEAC for determining whether or not the project requires further environmental studies.
- Projects are classified as B1 (require EIA) and B2 (don't require EIA) based on the conditions specified by the 2006 notification. The notification also states that the MoEF shall issue appropriate guidelines from time to time for categorization of projects into B1 or B2.
- In cases where it disagrees with the recommendations of the Expert Committee (Central or State), the regulatory authority shall request reconsideration by the Central or State Expert Appraisal Committee.
- After reconsideration, irrespective of views of Expert Committee, decision of the regulatory authority concerned shall be final. If decision is not granted within stipulated time, the applicant may proceed as if the environment clearance sought for has been granted or denied by the regulatory authority in terms of the final recommendations of the Expert Committee concerned.
- Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection.
- Rejection of an application or cancellation of a prior environmental clearance already granted shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

Successive dilution of the EIA rules for buildings has reduced it to a mere formality of providing minimal information on resource conservation.

WHY EIA RULES FOR BUILDINGS INEFFECTIVE?

Successive dilution of the EIA provision for buildings to a mere formality of forms (Forms 1&1A) that requires submission of minimal details on resource consumption and conservation practices renders it ineffective and weak. Briefly, Form 1 is the tabulated version that requires basic information on project's location, impacts in the locality, and use of natural resources (land, water, materials and energy). It also demands information on the use, storage, handling and transportation of materials that are harmful to human and environmental health; production of waste, air pollution, noise, risks of contamination, risk of accidents and environmental sensitivity of the area.The Form 1A requires complete information and notes along with environment management plan and monitoring programme.

The government and the developers in the past have made continuous attempts to dilute the already weak EIA process for building and construction projects.

To understand the effectiveness of this tool this report has reviewed the cases from the National Capital Region of Delhi (NCR) based on the official information available in the minutes of the state environment appraisal committee meetings and

BOX 5: PROCEDURE FOR ENVIRONMENTAL CLEARANCE FOR BUILDINGS

PROCEDURE FOR APPLICATION: The procedure for applying for environmental clearance includes submitting an application seeking prior environmental clearance for category B projects located in the state. This is done through the form 1 and supplementary form 1A, after the identification of prospective site(s). The application has to be submitted and EC received, before commencing any construction activity, or preparation of land, at the site by the applicant.

PROCESS OF PROJECT APPRAISAL: The projects are registered on the basis of date of submission followed by the listing of projects on the state or central environmental ministry's website. The office of the Secretary SEAC examines the project proposal received from MS-SEIAA and any shortcomings. A checklist is prepared on the information in Form 1/Form 1A and Conceptual Plan. In case the information is incomplete the application is sent back to the project proponent. This is followed by the preparation of agenda in chronological order based on the date of submission/receipt of the project. This is generally done atleast 2-3 weeks prior to the date of the meeting and is generally posted on the website. Meanwhile, the project proponents along with their consultants are invited to make presentation of their projects before the SEAC.

In the meeting, the SEAC appraises all Category B projects or activities on the basis of Form 1, Form 1A and conceptual plan. The committee then stipulates the conditions for Environmental Clearance for the project proponent. The minutes of the meeting are sent to the chairman, SEAC for approval and circulated amongst the committee members, for approval within the seven days of the meeting.

Thereafter, whenever the proponent submits the approved scheme/building plans complying with the stipulated EC conditions with all other necessary statutory approvals, the SEAC recommends the project to SEIAA for the grant of Environmental Clearance. The SEAC's decision on approval or rejection of the projects is then forwarded to SEIAA for final approval and orders. The SEAC has to however clearly state the reasons in case the projects are recommended for rejection. The SEAC's member secretary also has to communicate the observations of the deferred projects to the project proponent. The approved minutes of the meetings have to be uploaded on the website for public awareness by SEAC.

However the member secretary SEIAA has to post the environmental clearance/rejections letters on the website. In addition the status of the projects on the website should be updated every fortnight by the member secretary of SEAC/SEIAA. For the projects applying for expansion and modernization projects & change in product mix, have to apply to the EAC/SEAC in Form 1. The EAC/ SEAC decide the necessity of EIA / public consultation within 60 days for prior environmental clearance. There after, process would be followed for category A or B as relevant, in the case if EIA/PH needed.

POST PROJECT MONITORING AND EC VALIDITY: After the grant of environmental clearance, the project proponent is required to submit half yearly compliance report to MoEF, SEIAA, designated regional offices (6) and the respective state/central pollution control boards on 1 June and 1 December. Infact, compliance reports are public documents and are required to be displayed on the SEIAA websites. The EC validity is for a limited period for area development projects/construction projects till the developer is responsible, subject to maximum of 5 years. The validity could be extended to another 5 years subject to the submission of application in Form-1/Form 1A within validity period. Validity of EC is implies the period from the date on which prior EC is granted.

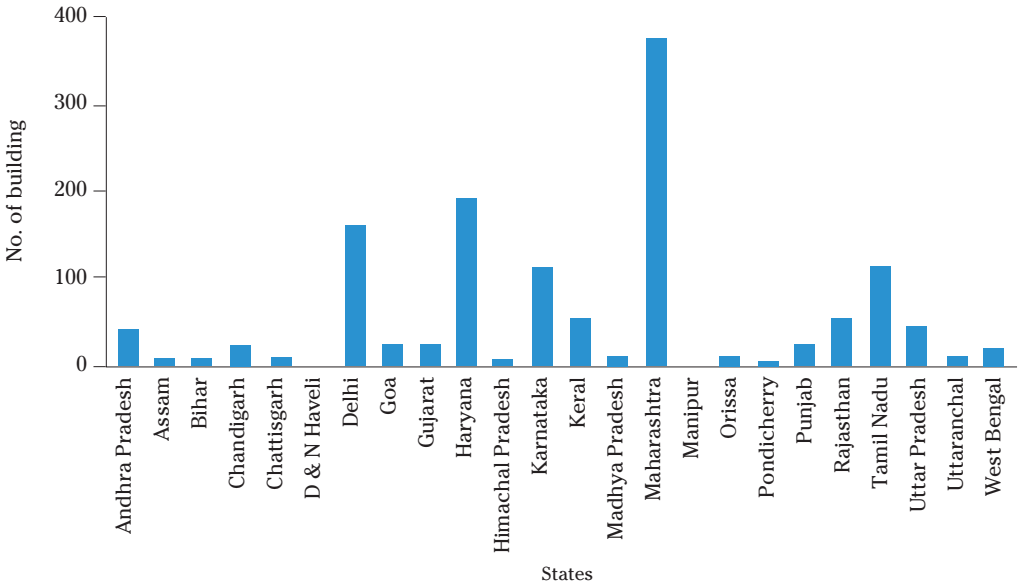
TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE: A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written "no objection" by the transferor on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period.

The most important step in the process of obtaining environmental clearance under the EIA notification is for the project proponent to conduct an environmental impact assessment. For this purpose the project proponent usually engages an environmental consultant to prepare an EIA report who have accreditation.

The MoEF has developed a Manual on Norms and Standards for Environment Clearance of large construction projects, which is available on its website (www.envfor.nic.in). According to the manual, it is a guidance document which aims to support the project proponent/consultant in the preparation of the EIA report. It also helps the regulatory authority to review the report as well as the public to become aware of the related environmental issues.

the minutes of the Delhi Pollution control committee's consent management committee's meetings for Haryana and Delhi respectively. A few on ground assessment has also been carried out to check out the monitoring and compliance practices. In fact, these minutes are amongst the very few sources available in the public domain which documents the official process, timeline and circumstances

Fig 17: EC Granted for New Construction Projects as per EIA 2006 (Till Nov. 2010)



Source: Ministry of Environment and Forests

under which the projects are granted clearance and are monitored. In some cases site visits have also been undertaken to verify the ground situation.

This report has reviewed 25 minutes of the meeting for Haryana State Environment Appraisal Committee (SEAC) from January 2008 to November 2009. For Delhi, 158 minutes of the meeting from December 2006 to March 2011 of the Consent Management Committee of the Delhi pollution control Committee (DPCC) have been reviewed. The analysis of the minutes raises several questions on the entire process of environmental clearance, monitoring, violations, quality of documentation etc. The SEAC's and pollution control board committee's minutes represent two different levels of review and clearances. While SEAC grants environmental clearance to the projects at the state level and is also the first level filter, environmental clearance from SEAC and SEIAA is a pre requisite for construction and operation of the building for the next level of clearances.

The criteria of exempting buildings with less than 20,000 sq meters of built up area has created a loophole. With under reporting of area several high impact buildings escape scrutiny

The pollution control committee/board represents the second level of clearances after environmental clearances. The pollution boards/committees grant consent to establish and operate to the projects and also monitor their compliance. Besides pollution boards/committees also receive the mandatory bi-annual monitoring reports from the project proponents. MoEF also receives a copy. The pollution boards/committees monitor compliance with the water, air and noise norms and conditions and have statuary powers to take action against the violators.

The review highlights that there are systemic flaws and limitations that come in the way of rigorous and effective assessment of the buildings' impact.

Escape Routes in the rules: There are serious concerns about the area criteria of built up area of not less than 20,000 sq.mtrs that are exempted from environmental clearance. This has created loopholes. Several large capacity projects with potentially larger environmental impacts are left out of the purview of environmental impact assessment. For example, the Vasant Kunj Square Mall, in Delhi required no clearance since in its report (June 2006 Rapid EIA report) the total

built up area was shown as 19021.108 sq mtrs[25]. The benchmark of 20, 000 sq. meters is based on the architects declaration and interpretation of this figure (see box 6: 19991 sqmeters...).

There are no other criteria to capture the high impact nature of the buildings with some variation in built up area. It is an intriguing question that needs to be

BOX 6: 19991 SQ METERS...

Case 1: Aditya Infracon (P) Ltd , located on Plot no 5 Jasola District New Delhi, This project has a built up area of 19991 sq mt and its name is not included in the list of ECs accorded/pending with MOEF. It has stated that its water use would be conjunctive; with MCD providing 110 KLD and rest 120 KLD would be from groundwater extraction. The wastewater discharge would be only 80 KLD and the total project cost is 63 crores.

The unit applied for Consent to Establish on 1 October 2007 and claims that built up area less than 20000 sqm. The committee in the minutes has reiterated that there is a lack of clarity of the built up area, as reported by the unit and requires reconfirmation. The unit was also asked to provide permission for groundwater, STP installation along with adequacy report for waste water discharge and noise monitoring of D.G. sets. Inspection conducted by IIT surveyors on 18 June 2008 found that the total built up area is 20323.92 sq mt and implying that that the unit had tried to mislead in order to avoid applicability of Environmental Clearance. However, the unit is defiant that the total built up area is less than 20,000 sq mt. Further the unit has been involved in other violations. For example its Consent to Establish application indicates ground water drawl of 120 KLD without CGWA clearance. The total water consumption recorded in the CTE is 230 KLD for which 80 per cent should be the waste water generation i.e. about 180 KLD. The unit however has installed an STP of only 80 KLD. The committee had asked the unit to file for adequacy report along with a noise monitoring report of the D.G. set(s).

Source: Minutes of the 75th meeting of the DPCC's Consent Management Committee Constituted for Deciding the Consent under Orange Category, held on 03.09.2008 in the Conference Room of Chairman, DPCC

Case 2: City Square Mall, MGF Developers Ltd, Plot No -8, Shivaji Place, Rajouri Garden, Delhi
According to Delhi Pollution Control Committee (DPCC) the unit was asked to apply for environmental clearance, since the same unit is setting up two adjacent malls which will be construed as one mall unless otherwise clearly justified. The DPCC requested for Affidavit for date of construction and completion, architectural drawing & completion certificate by 25 March 2008. The unit has filed two applications for CTE on two different plots i.e. plot no. 7 & 8 through different companies but through same authorized person. Letters were issued to both the units by DPCC. The DPCC found that the mall is built on both plots as single entity. The same is reflected in the letter head of the mall. Unit stated that as the built-up area of the plot no 7 is approx. 15,826.90 m2, and plot no 8 is 11, 791.66 sqm hence the project does not fall under the purview of EIA notification 2006. If calculated together the total built up area would be above 26,000 sq mts. The unit tried to cover up by stating that only basement is being utilised for services and car parking has been integrated, for which DDA has approved the map. The start of construction is May 2004 and date of completion certificate is July 2005. While the unit applied for Consent to Establish on March 7, 2008.

In the 81st minutes of Consent Management Committee in DPCC, it came to light that the mall's name was not included in the list of Environmental Clearances accorded/pending with MOEF. There was no other reference to this mall in the subsequent minutes of the meetings (checked till latest 16 March 2011 meeting on DPCC website). The mall is operational at present.

Source: Minutes of the 48th meeting of the DPCC's Consent Management Committee Constituted for Deciding the Consent under Orange Category, held on 03.4.2008 in the Conference Room of Chairman, DPCC and Minutes of the 81st meeting of the DPCC's Consent Management Committee Constituted for Deciding the Consent under Orange Category, held on 15.10.2008 in the Conference Room of Chairman, DPCC.

addressed in the wake of unprecedented building and construction projects that are being announced and undertaken across India.

Land Acquisition – prior or post environmental clearance: The effectiveness of the environmental clearance rules get grossly blunt as the project proponents are expected to acquire the land for the project to obtain environmental clearance. The paragraph 2 of the EIA notification - 2006 requires prior environmental clearance, *"before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity".* A major flaw of this provision is that a project proponent can actually start the process of land acquisition, even when the project has not been cleared. This gives no scope for assessing the adequacy of the site that is a very critical component. Land and location should be permitted only after the environmental clearance has been obtained.

There is another provision in the paragraph 6 of the EIA notification -2006 states that *"prior environmental clearance in all cases shall be made …….after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant."*

But this does not have clarity on possible implications. This provision suggests that the applicant would have to identify 'prospective sites' for the project / activity before applying for prior environmental clearance. It thereby suggests that in processing the application for the grant of clearances, various project sites would be evaluated before one is actually confirmed. The actual scope of this provision is grossly undermined because of paragraph 2 of the notification that categorically allows for land acquisition to commence, even when no application has been made for prior environmental clearance of the project[26].

Land acquisition in building and construction projects is generally between private parties therefore often off the purview of the land acquisition act. But the land acquired and proposed development should be in accordance with the master plan and as per the zones prescribed under it. It is generally a prerogative of the land development authority. Occasionally, the environment clearance committee in case of doubts ask the project proponents to produce a certificate from the relevant land development authorities.

Build without consent: There are no effective mechanisms available with the environmental clearance committee to ascertain whether actual construction has started prior to the environmental clearance (see box 7: Big Developers Big Violations). There is no official mechanism to keep vigil. Unless some secondary information source is available (local resident, local authorities, NGOs etc.) to focus on anomalies, it is difficult for the committee to even know. In the entire EIA process the project proponent is the only direct source of information for the committee. Only, if the committee has certain doubts or can sense foul play with respect to the information provided, the committee can ask for a site visit. But, this rarely happens.

In several cases construction of buildings has started even before obtaining the environmental clearance

Post Facto clearances: It is emerging as a trend in which the projects that have not obtained environmental clearance before the project initiation are being granted post facto environmental clearance. Project proponents and the committees generally agree on a penalty amount and a bank guarantee that according to the committee compensates for the environmental damages and impact caused by the projects. Post Facto clearance is not even part of the legal provision in the EIA. This

BOX 7: BIG DEVELOPER BIG VIOLATIONS

It was reported in 2008 that the Haryana State Pollution Control Board (HSPCB) had served notices to 147 builders for failing to get environmental clearance for their housing and commercial projects before executing them. Of the 147 projects 120 were being constructed post 2005 in Faridabad and Gurgaon. Infact, the violators included all major developers like TDI, Ansals, Omaxe and DLF. They were accused by the board of starting construction before getting environmental clearance under the Environment Impact Assessment. In fact, according to the board project developers started work simply after applying for clearance. As a result the developers were prosecuted under section 15 of Environment (Protection) Act, 1986, which stipulates that whoever fails to comply with or contravenes any of the provisions of this Act, is punishable with imprisonment for a term which may extend to five years with fine which may extend to Rs one lakh. Clearly, such penalty has no deterrent effect.

Source: Saini. Manveer, 2008, 47 builders on HSPCB notice for violations, The Times of India, Chandigarh, 11 December

is only an administrative action that has become common and is widely accepted (see box 8: Build Now, get EC Later). This makes a mockery of the environmental clearance process.

Public Consultations: Public consultations, which are a crucial component of the EIA for category A projects are not considered important in category B. But, according to MoEF official, the 2005 draft notification which was put up by MoEF on the website for inviting suggestion and comments had included a clause on public hearing for projects above 100 ha. Projects above 100000 sq meters were to be treated as category A projects requiring EIA and public hearing. But this was never implemented.

The significance of public consultation is illustrated by a case of Vasant Kunj ridge case, wherein the local residents and civil society initiated a campaign against the malls and hotels that were constructed on the ridge (see box 9: Ravaging the Ridge). Since there is no formal procedure of public hearing and consultation in the case of EIA for building and construction process, citizen's perspective was ignored and mass scale construction was promoted and is continuing till date.

Importance of public consultation is illustrated by the Vasant Kunj ridge case wherein the local residents and civil society campaigned against the malls and hotels

Loophole in project classification: There is a lot of ambiguity about the requirements of the B1 and B2 projects or in other words between individual buildings and township projects. According to the notification, all township projects require EIA. But there is also a provision, that SEAC can decide to transferred projects from B1 to B2 and demand EIA based on guidelines from MoEF. But in the absence of such guidelines, even large projects that may qualify for a proper EIA are treated as category B1 projects and exempted from EIA. There are several cases whereby, large projects (exceeding 1,50,000 sq. meters) have been treated as B2 projects. For example, DLF Cyber city Developers Ltd. (Construction of "Building No. 14" (IT & ITES at DLF Cyber city, DLF City Phase-III, Sector 25-A, Gurgaon, Haryana). According to project proponents the proposed built up area is 2,30,060.1 sq. mt., which is above 1,50,000 sq meters, therefore should be treated as B1 project. Similarly, in the 16th meeting of SEAC of Haryana a proposed township project of Uppal housing limited at sector 99, village Dhankot, Gurgaon has a built up area of 3,10,000 sq. mt. The project was reviewed a B2 project, even though its built up is above 1,50,000 sq. meters. These are only a few examples, but there are several more cases that have also been granted environmental clearance even though they are above the stated figure.

BOX 8: BUILD NOW, GET EC LATER

Case 1- Shopping Centre developed by Campion Properties Ltd, ex-Hotel Ranjit Site, Maharaja Ranjit Singh Marg, New Delhi The unit has a built up area of 30,556 sq mt and has a water requirement of 145KLD. It discharges 58.8 KLD. The project cost is stated to be 80 crores. The 30 April 2008 DPCC minutes state that the unit has admittedly completed 70 per cent of the structure in terms of built up area. This is significant violation since the unit was directed to stop construction by MOEF in February 2008. It was only after this that the unit got Environmental Clearance in April, 2008. The minutes state that 'the unit appears to have scant regard for environmental laws as it started its construction even before applying for Consent to Establish and Environmental Clearance.' Infact, MOEF while granting the Environmental Clearance had directed the unit to take Consent to Establish from DPCC, file it before MOEF and only then they will get permission for starting construction. The unit was directed by DPCC to pay Rs. 25 lakhs as cash penalty and Rs. 25 lakhs as Bank Guarantee by 1 May 2008.

Source: Minutes of the 75th meeting of the DPCC's Consent Management Committee Constituted for Deciding the Consent under Orange Category held on 03.09.2008.

Case 2- Jackson Buildwell developed by Jackson Buildwell Pvt. Ltd, V3S Ring Road Mall, at 1B-3, Sector -10, Rohini. According to the committee, the unit had started construction in January, 2006, applied for CTE on 23 October 2007 after the completion of construction on 4 October 2007. EC was obtained on 29 February 2008 and the total built up area is over 23,000 sq mt. The total project cost is Rs. 55 crores. MOEF in its letter dated 14 January 2008 had directed Secretary, Department of Environment, GNCTD to initiate necessary action under Environment (Protection) Act, 1986 for violation of EPA. The committee deliberated on the facts and stated that in cases where construction was started without CTE and EC and completed thereafter, DPCC should follow the directions of MOEF and close down the unit.

However, in the personal hearing, the unit gave a written undertaking that it is willing to abide by paying the cash penalty of 0.5 per cent of the project cost and bank guarantee of 0.5 per cent of the project cost. Interestingly the unit mentioned that the committee should grant them this option as has been granted in another case of the same group. The committee stated that the unit could not be given this option because of complete violation of provisions of EPA and Air & Water Acts. But, after repeated appeals the committee agreed on the penalty option. In the meeting on 6 May 2009, the committee stated that the six monthly monitoring report submitted by the unit is without the test reports from recognized/empanelled laboratory of DPCC.

Source: Minutes of the 48th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 03.4.2008 in the Conference Room of Chairman, DPCC and Minutes of the 119th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 12.06.2009 in the Conference Room of Chairman, DPCC.

Case 3- Cross River Mall, Location- 9B & 9 C, Central Business Shahdara, New Delhi-95

In the meeting held on 10 March 2008, the unit claimed that it is not covered by the 2004 EIA notification, but did not produce any proof of such exemption. Another key violation by the unit was that it started construction in 2004 and did not bother to apply for CTE till 7 January 2008. The unit was directed to file an affidavit providing proof of its assertion and reasons for not filing CTE application. In the same affidavit unit may be asked to explain how and why it has failed to file the CTE application. The DDA document states that the construction work of the unit started when they inspected on 13 July 2004 and therefore imposed the penalty of Rs. 1.17 lakhs. This penalty was for the offence of starting the construction without sanction of building plan. But the unit was not able to provide any documentary proof to suggest that the unit had come beyond the plinth level on 7 July 2004 and was therefore not covered by 2004 EIA notification. The total built up area of the unit is 36109.67 sq mts and till 12 June 2009, the STP for the unit was not completed, which was to treat 71 KLD of wastewater generated from the unit.

Source: Minutes of the 48th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 03.4.2008 in the Conference Room of Chairman, DPCC and Minutes of the 54th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 01.05.2008 in the Conference Room of Chairman, DPCC

A senior environment official confirmed the inconsistency within the EIA 2006 notification. The section 7(i), I. Stage (1)- Screening, states that, 'The projects requiring an Environmental Impact Assessment report shall be termed Category 'B1' and remaining projects shall be termed as Category 'B2' and will not require an Environment Impact Assessment report. For categorization of projects into B1 or B2 except item 8 (b), the Ministry of Environment and Forests shall issue appropriate

BOX 9: RAVAGING THE RIDGE: NO ROOM FOR PUBLIC CONSULTATION

The Delhi Development Authority (DDA) had allotted large areas of land, prior to 1996 falling under the Delhi Ridge, to private developers for construction of institutions, hotel, shopping mall etc. DDA had allotted 330 ha. of land to Indian Army, 92 ha. of land for construction of a hotel, various institutions, residential apartments and shopping mall. In 1996 DDA was in the process of allotting further 223 ha. of land for the international hotel complex. Although based on the findings of the Loveraj Kumar Committee in 1994 the Delhi government had notified the ridge area (identified by the committee) as reserved forest but excluded the area in question without any basis.

In response to the petition filed in the Supreme Court in 1996 by Kuldeep Nayyar, the court stayed all the construction activity in the area comprising of 223 ha. and 92 ha. (taking it as one composite area of 315 ha.). The Court also directed the Central Government to constitute an Environment Impact Assessment Authority (EIAA) under the EP Act 1986. EIAA was later replaced by Environment & Pollution Control Authority (EPCA) in 1998.

In 1997 the Geological Survey of India in its report to EIAA stated that the land under question is a part of the Delhi ridge. Same year, similar claims were made by Delhi's Environment Department and Forests department about the land being a forest and a part of the ridge. But, in the same year Unison Hotels limited, one of the allottees in the 92 ha. area filed a petition in the Court. The Court stated that its earlier order did not include the 92 ha., but concerns the rest 223 ha. of land for the International Hotel Complex. The court granted conditional permission to the allottees of 92 ha., that they would have to obtain all requisite environmental and pollution clearances from the authorities in compliance of relevant laws.

In 1999 EPCA found that the entire 315 ha. of land area is a part of ridge. It further stated that in the 223 ha. the environment factors are not in favour of any urban use of this 223 ha. land and the entire parcel of land should be developed as green area. EPCA also noted in its report that the there is acute shortage of water in the area and the available ground water is not sufficient for the large project as envisaged. The project will deplete the ground water resources of the area and will create serious water problem for the area. According to the petitioners the area had 14 water bodies, protected by Government notification but all have gone dry due to dumping of malba and illegal extraction of water by the Grand Hotel, Army and the DDA.

EPCA stated that even though the court has granted conditional permission to construct in the 92 ha. referred as Constrained Area, only one of the many allottees has obtained deemed air and water pollution clearances in 2000. According to EPCA the deemed clearances were granted in a very suspicious manner. Meanwhile, DDA went ahead, ignoring all findings and announced auction of the remaining land in 92 ha. in 2003. A few other writ petitions were filed in the next few years challenging the land auction in 92 ha, violations of environmental laws and requisite clearances. But, most of them were dismissed or suppressed.

A report by CGWA again highlighted the environmental value the land possesses. According to the report, the area is a 'Recharge Area' for the underline aquifers in the vicinity. It mentioned that the development activities may adversely affect the ground water regime in the area. The CEC in its report to the court recommended that the entire area of 223 ha. and the 330ha. under the occupation of army be notified as reserved forest area under Section 4 of the Indian Forest Act. It further recommended that no construction of any type should be permitted. The court asked DDA to respond to the issues raised regarding required approvals in the CEC's report. In 2005 DDA responded opposed the ridge aspect of the report but was unable to provide any response on the question of requisite approvals/ clearances and compliances by the allotees.

NGO CPQLW and Ridge Bachao Andolan approached Supreme Court, but the court granted stay only in 2006. This stay order came almost two years of court fight. By this time three out of five malls had been constructed to a large extent and in the meantime MoEF's expert committee also confirmed that the construction happened on the ridge. The committee although stated that the construction was illegal and environmentally damaging but agreed that giving clearance was the only option since construction was complete to a large extent. The court's order was also on the same lines.

Source: letters and resource material from Ridge Bachao Andolan and Report on the International Hotels Complex, Vasant Vihar, Environment Pollution (Prevention & Control) Authority

guidelines from time to time.' Also the Stage (2) on Scoping, the paragraph mentions, All projects and activities listed as Category 'B' in Item 8 of the Schedule (Construction/Township/Commercial Complexes /Housing) shall not require Scoping and will be appraised on the basis of Form 1/ Form 1A and the conceptual plan.'

It is now reported that the townships and area development projects are taking advantage of this. The reason is that till date the MoEF has not issued guidelines to state on what circumstances such transfers are possible. So the projects continue to be transferred on an *adhoc* basis and based on the discretion of the state committee[27]. The ministry officials admit that there are no guidelines for deciding whether the project is B1 or B2. The ministry places its hope on the state authorities to use their expertise to finalize parameters for issuance of guidance. The officials however claim that the environment ministry would make amendment.

In the meantime, this creates scope for ample confusion and corruption. But this also means that the individual buildings in the townships that could have been brought within the ambit of more rigorous assessment if the detailed EIA were carried out, are now left out of the scope.

Monitoring - the weakest link: The MoEF has six regional offices in Chandigarh (north), Shillong (north eastern), Lucknow (central), Bhopal (western), Bhubaneshwar (eastern) and Bangalore (south). The offices have to undertake site visits, maintain records of the violations by the projects and receive the bi-annual compliance reports from the project proponents. But the track record of monitoring is very poor.

The requirement of bi-annual compliance reports is very poorly enforced. Monitoring seems to be a simple formality in which the responsibility rests on the project proponents who are expected to submit bi- annual compliance report based on self assessment. But, overall this seems to be the weakest link in the EIA process.

Environmental clearance committee has little control when it comes to monitoring. The powers with respect to monitoring are much diluted once the clearance is given by the committee. In case of violation or non compliance, if any NGO, resident/s complainant register complain, it would not be directed to the committee but the regulatory agencies or the regional MoEF offices. Once the environment clearance is granted the project proponent is least liable.

Regional offices do not have adequate authority to take punitive action against the violators. Often the project proponents prefer to state compliance as 'agree to comply' or 'will be complied'.

Also for the bi-annual report there is no time specified to govern the tests/readings for monitoring. It is also not commensurate with the consent of establish and consent to operate certificates. So there may be mismatch between the report prepared by the project proponents and the ground situation. No periodicity is mentioned to ascertain the actual ground realities. In fact, there is no mention of environmental monitoring program in the EC. For example, project proponents may avoid data reading during the time when site clearance in ongoing. It is observed that regulatory authorities have their own limitations with regard to manpower, technical resources and ever-increasing workloads, to carry out a purposeful monitoring.

There are very few reviews of the current EIA processes. But the existing reviews of different categories of projects in both categories bring out the systemic problems. If not addressed this will also have bearing on the building and construction projects. For instance, according to Kanchi Kohli and Manju Menon's report titled 'Calling the Bluff—Revealing the State of Monitoring and Compliance of environmental Clearance Conditions' monitoring of projects is dismal and very weak[28]. The report looked at projects from various categories, spread over different regions and provided an over view of the existing state of post environment clearance and monitoring process.

Monitoring reports – a mere formality: The review of different types of projects – just not buildings – by the Kalpvriksha shows that very few projects proponents /authorities actually submit the mandated six monthly compliance reports. And, as most of it is self reporting, more often than not they do it in their favour to escape legal action, show cause notices etc. But RTI filed by the Kalpvriksh has exposed wide gaps between what is reported and what exists on ground. Of all the projects that have been granted clearance in 2003 and monitored by six regional offices, the extent of non compliance is considerable. Of the total 223, only 91 could be assessed for non compliance since only those had monitoring reports.

The requirement of bi-annual compliance report from project proponents is poorly enforced.

The Kalpvriksh report states that on an average every regional office is able to monitor a project once in every three or four years. This is mainly because of the understaffed and under-resourced regional offices. There are also discrepancies between the information provided in the monitoring and compliance reports. Often, the project proponents instead of reporting non-compliance, prefer to state it as 'agreed to comply' or 'will be complied' to dodge the conditions.

Questions over reliability of information/data: Good quality data is a major concern in preparation of the reports. Lack of sampling networks and ill-defined sampling and analysis procedures also adds to the problem of inconsistency. There is no central data bank; therefore, data gathered through different agencies is not available to public. Quality assurance and quality control on existing data is also negligible.

Lack of consolidated monitoring information- MoEF doesn't maintain a centralized comprehensive data base on compliance. It only has a record of projects granted clearance. This is a serious gap, since the MoEF would find it difficult to ascertain the extent of compliance or non compliance either category wise, region wise etc.

Regional offices are not adequately empowered: Where regional offices take notice of violations and issue show cause notices, the regional offices do not have any authority to take punitive action against the violators, which provides impetus to the project proponents to continue with violations. MoEF has also over the years failed to initiate relevant action except in very few cases. The norms and for inspection of projects to monitor environmental compliance conditions are very poor.

Irregular monitoring- The frequency of monitoring the projects is also not uniform across all regional offices. Like the central regional offices monitors depending on the nature of project, while there is no fixed frequency followed for project monitoring in southern regional offices.

Role of State Pollution Control Boards The state pollution control boards are responsible for the issuance of consent certificates. In Delhi the Delhi Pollution Control Committee has a consent management committee that looks into the matter concerning grant of consent to establish and consent to operate. Consent applications and applications of authorizations are processed for decision by two separate Consent Management Committees constituted for grant /renew/refuse/ revoke the applications of consent to establish/operate, and authorization.

According to DPCC, the consent committees have to meet at least thrice a month and the decisions taken by the committee are implemented by the consent management cell. Following which inspections are conducted on the direction of the committee. The committee also functions as the state EIA authority as well as

the State Appraisal Committee formed under EIA notification. All issues related to environment impact assessment as per the 2006 EIA notification are dealt by this cell. The chairman DPCC decides on the constitution of CMC and the securitizing of the application.

Ground realities however, indicate large scale violations by various building projects. Its website mentions that shopping malls and commercial complexes have violated environmental laws. As a result, DPCC has been forced to impose bank guarantees and penalties on shopping malls and construction projects. The website further mentions that the 'construction work by most of these projects was undertaken in blatant violations of the environmental laws.' According to DPCC, the consent committee has taken stringent action including imposition of bank guarantees and environmental damages. An amount of Rs 12.60 crores in lieu of environmental damages and bank guarantees of Rs 17.62 crores have been realized till 2008. Further, 18 notices for closure/ stopping construction have been issued to shopping malls/ construction projects. In addition, directions for closure/stopping construction have been issued to 5 shopping malls/construction projects up till 2008.

According to the officials from DPCC the inspection by the officials are not regular but rather random. Shortage of staff adds to the problem in streamlining inspection. The degree of compliance in the reports and on site is also questionable and not to the desired level (see box 10: Jail for Violators, Soon...)

Inadequate resources and staff in regional offices: The organizational capacity and human resources available with the regional offices pose a big challenge to environmental compliance. From September 2006 – August 2008 MoEF has granted clearance to 2016 projects. This has placed huge burden on the regional offices to monitor these projects. At present, the six regional offices have about two to three scientists who have to monitor about 6000 projects that are either in construction or operational stage.

There could be a real possibility of project proponents taking advantage of the genuine time constraint and avoid discussion on key and significant issues in the committee meetings.

Cases filed to buy time: In case of non compliance the regional offices issue show-cause notices. But the MoEF does not even maintain records of show cause notices and no specific guidelines have been issued by central ministry for issuance of show-cause notices by regional offices. Also there are growing incidences where cases are filed against the company caught violating environmental conditions in the local courts. Since the cases drag on for long without final orders, much of

BOX 10: JAIL FOR VIOLATORS, SOON....

According to reports the MoEF's has appointed committee recommended making environmental violations as a non bailable offence. The ministry has accepted the committee's recommendation which was headed by the senior ministry official JM Mauskar. Other recommendations included increasing the penalty amount for the violators. At present, the punishment for violations is limited to three years' imprisonment and 1 lakh fine.

The main objective behind these recommendations was the large scale violations of the environment protection act and to provide more powers to the environmental laws and regulators. The entire process of amending the act could take over a year. Some of its other recommendations included removing the ceiling from the penalty for the violators and strengthening the central /state pollution boards and regional offices. These steps according to the committee would lead to effective and improved monitoring of implementation of environmental clearance conditions.

Source table 10: Anon, 2011, Environmental Violation may become Non-Bailable Offence, Economic Times, New Delhi, March 12

official's time in regional offices is spent on the cases. This was also confirmed by the senior MoEF official.

Coordination Missing: There is an obvious lack of communication between SEAC and the other regulatory bodies and departmental authorities, although there are some common areas of work and coordination. The bi-annual compliance report goes to MoEF or regional offices and not the environment clearance committee, since monitoring is not environment clearance committee's responsibility. But importantly, if changes are made in the conditions for environment clearance, the project proponents have to come back to committee for clearance. But there is a serious need for coordination. If the regulatory agencies are unable to do the monitoring to check compliance, the EC committee's hands are tied. They remain silent spectators to the project proponents not complying with the environment clearance.

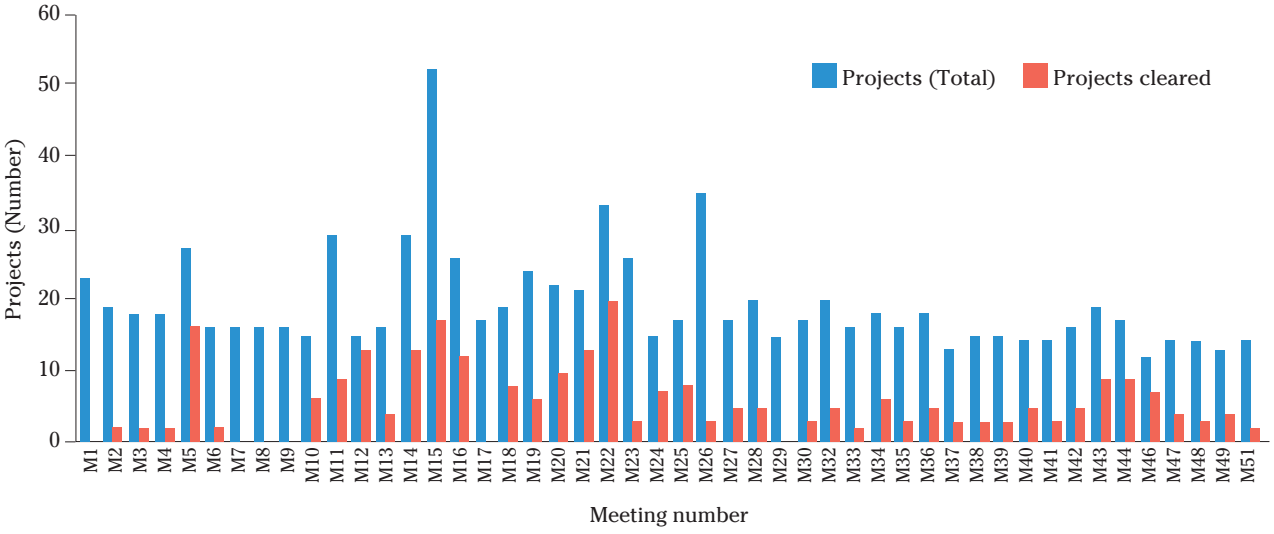
The environmental clearance is valid for five years. If there is any delay or change in the conditions for clearance the project proponent has to come back to the committee.

Committee Complexities: The upper limit for members in the State Environmental Appraisal Committee (SEAC) is 15 but there is no mention of minimum members required for the committee to function. Often it is seen that a committee may have just 5-6 members not representing all the essential fields for environment clearance. Only a few may be present during the meetings. The key reasons for reduced membership are generally cost cutting, lack or non availability of experts amongst others. As a result, these small committees are over burdened with project clearance applications and EIA process. They are required to meet atleast once a month and with an average of 15-20 projects applying for EC every month. Therefore, generally the discussions may not reflect the real issues and leaving less or no time for detailed appraisal on the key project components. Infact, presentation by the proponent is probably the only effective time that the members are able to give to each project. Hence, there could be a real possibility of project proponents taking advantage of the genuine time constraint and avoid discussion on key and significant issues.

The committee may review on an average 19 projects in each of its meetings, which scheduled for 2 days. In the 48 minutes of meetings reviewed a total of 927 projects of which 267 projects were granted environmental clearance (see fig 18: Number of Projects Reviewed and Cleared in Haryana SEAC Meetings). On an average 6 projects

Fig 18: Number of Projects Reviewed and Cleared in Haryana SEAC Meetings

927 buildings under review. Of these 267 have been cleared between 2008-2011



Source: Derived from the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

are granted clearance in each meeting. However, to reduce the pressure on the committee members the member secretary of the Haryana SEAC in the 16th meeting decided that only six new projects for appraisal or twelve projects for grading or in combination thereof will be done in one sitting.

There may be significant variation in the average time spent by the committee members on reviewing the projects and granting them environmental clearance. The large number of projects and the pressure to review these projects in limited time is often a constraint in detailed discussions and its comprehensive review, according to a few committee members that CSE met.

EC's Validity – Unlimited: The validity of environmental clearance is for a limited period for area development projects. It can be extended to another 5 years upon submission of application within validity period. The environment clearance is valid for five years and the project proponents should initiate construction within 5 years. But if there are any changes in the conditions for environment clearance the project proponents has to come back to the committee. If monitoring is weak then the project will go unchecked and will continue to operate as per the earlier agreed conditions .

SEZ-Real Estate- Weak Areas: According to environmental policy analyst Kanchi Kohli SEZs and real estates are making the most of the weak spots within the EIA regulation. The Environment Impact Assessment (EIA) notification, 2006 deals with SEZ and construction projects separately as a whole unit requiring environmental clearance after public hearing and preparation of EIA reports. But the individual units within the SEZs are exempted if they are for the same purpose for which the SEZ was first granted approval. Real Estate and construction projects are listed as Items 8 (a) and 8 (b) in Appendix 1 of the EIA notification. EIA notification places the building and township related projects in the B1 category wherein, EIA or a public consultation is not required, and environment clearance is granted on the basis of the information provided in form-1A.

RTI applications of the Kalpvriksh revealed the murky clearances that have been accorded to real estate or construction projects which also enjoy an SEZ status. According to the EIA expert Kanchi Kohli, building, construction and township projects have managed to circumvent the EIA notification in such a way that despite being SEZs, they are treated differently by the environmental regulation.

Some projects have suspiciously similar water and waste water estimation. Even their environment conditions are exactly similar and match word to word.

Erroneous documentation: As far as documentation of the discussion in minutes of the meeting are concerned there are glaring gaps and mistakes. Since these minutes are the most crucial source of information and basis of decisions, incorrect or unclear information must be eliminated as far as possible. For example in the 3rd meeting of Haryana SEAC held on 26 & 27 August 2008, the following projects have absolute similar water requirements and wastewater generation. Even their environmental conditions are exactly similar and match word to word. Even though their built up areas are different ranging from 19,000 to 1,48,000 sq meters.

These projects include – M/S M3M India Ltd. & Others (Construction of Commercial Complex at Sector 84, Gurgaon; M/S Martial Buildcon Pvt. Ltd. (Construction of Commercial complex at Sector 67, Gurgaon; M/S Lavish Build Mart Pvt. Ltd. (Construction of Commercial complex at sector 73,. Gurgaon; M/S Gental Realotors Pvt. Ltd. (Construction of Commercial complex at sector 66, Gurgaon; Prompt Engineering Pvt. Ltd. (Construction of Commercial complex at Sector 74, Gurgaon; M/S Afresh Builders Pvt. Ltd. (Construction of Commercial Complex at Sector 66,

Gurgaon; M/S R.S Infrastructure Pvt. Ltd. (Construction of Commercial complex at Sector 62, Gurgaon.

Subjective rating of proposals of project proponents: In the minutes of the meetings several project proposals have been awarded ratings ranging from platinum, gold, silver etc. According to the MoEF official, these ratings are not on the project construction and operation process and performance. But are only indicative of the information provided and the quality of the reports (conceptual plan) submitted. The ratings of the projects are on the basis of environmental information and inputs incorporated in the project proposal and not for benchmarking of the projects. But these ratings were highly subjective and misleading. Several SEAC's have discontinued its use. But, some SEACs like Haryana have continued to use this. The concern is that the project proponents may use these ratings for promoting their building projects..

Building and construction projects are prone to corruption and violations because of weak regulations and monitoring.

Some of the examples are:

- M/s Standard Farms Pvt. Ltd. (Group Housing Project "Raisina Residency, Sector-59, Vill. Ullahwas, Teh. Sohna, District Gurgaon"- silver rating and environmental clearance granted[29]
- M/s Parsvnath Developers Limited, Proposed Parsvnath Mall Sector-8, NH-1, Near Tau Devilal Park, Sonepat, Haryana- gold rating
- Environmental Clearance for construction of 29.663 acres group housing (DLF New Town Heights at Sec. 86, Gurgaon, Haryana- gold rating[30]
- EC for Proposed Group Housing Project at Village Medhawas, Sector-65, District: Gurgaon, Haryana by M/S Mangalam Multiplex Pvt. Ltd.- gold rating
- EC for Commercial Complex Project at Sector- 62, Gurgaon, Haryana by M/S RS Infrastructure Pvt. Ltd.- gold rating[31]
- Environment Clearance for "City Centre (Towers 2,3,4,5 & 6)" in Zone-6, DLF City Phase-V, Sector-43, Gurgaon, Haryana. by M/S DLF Ltd.- gold rating
- EC for proposed Group Housing Project ("Sai/ Vatika Housing")at village Unchagaon, Sector – 63, Faridabad. by M/S ZNR Builders & Developers Pvt. Ltd.- gold rating[32]

Weak clause on corporate social responsibility: The industry is expected to reserve 5 percent of the project share to CSR according to MoEF. With builders/developers making huge profits in real estate this is an easy let off for the projects, with no compulsion on investing in environment management and monitoring on a regular basis. According to several EIA experts building and construction projects are prone to corruption and violations because of weak regulations and monitoring. For builders any investment on environment management and conservation would imply increased cost and more importantly capital cost.

The attempt to water down and increase the built up area requirement by the MoEF was welcomed by the real estate industry. In fact, CREDAI (Confederation of Real Estate Developers Association of India) an association comprising all big players of India like Reliance, Tata, Bharti, Godrej, DLF etc had taken up cudgels against EIA rules on buildings after the 2006 amendments when all the projects in the range of 20,000 sq. mts to 1,50,000 sq. mts were brought within the net of EIA. The association had submitted their memorandum to the Prime Minister's Office which was the direct authority to monitor the MoEF. (See box 11: Builders agenda: Self rule)

Incomplete information on website- Several projects granted environment clearance on the MoEF website do not even have environmental conditions and

BOX 11: BUILDER'S AGENDA: SELF RULE

Confederation of Real Estate Developers Association of India (CREDAI) has approached key ministers and the prime ministers in 2011 on the issue of environmental and other clearances process for building and construction projects. Back in 2009 too, CREDAI had taken up cudgels against EIA rules on buildings since the 2006 amendments when all the projects which were between the range of 20,000 sq. mts to 1,50,000 sq. mts were brought within the net of EIA. The association had submitted their memorandum to the Prime Minister's Office (PMO) which was the direct authority to monitor the MoEF.

This time too they have repeated their demands by portraying themselves as a victim of the system. They have voiced their dissatisfaction with the EIA process in its current form and have suggested changes and omissions of certain process altogether. The following have been suggested by the association in their memorandum. But this again raises grave concerns at their intentions. CSE analysis what's alarming with their recommendations.

Builders Recommendation 1- It is proposed that regional/state offices should be set up in under MoEF to facilitate the process and reduce delays. The ideal situation would be to have a planning authority enabled and empowered to take care of these aspects at the planning approval stage. This would lead to reduction in the number of windows.

Comment- the Ministry in order to decentralize the process and to reduce the delay in the EC process has already set up SEACs at the state level to screen, review and grant environmental clearances to the building and construction projects. Besides there already are six MoEF regional offices which monitor the compliances based on the submission of the six monthly monitoring reports by the builders.

The EC process for the building and construction projects that is category B is already minimal as compared to the EIA process followed by the category A projects. Reducing this process any further will diminish its limited stringency and make it redundant. Replacing the central and state committees' role of reviewing and granting EC, with planning authority would reduce the process to adhoc guidelines that will be enforced by the local municipal authorities of states. In addition the capacity and the experience of planning authorities in undertaking this role are also questionable and rather impractical. Though, improved integration between the various agencies and policies could be a valid recommendation, but certainly not this.

Builders Recommendation 2- the 6 monthly monitoring reports of environmental clearances should be removed in all states wherever presently applicable as this doesn't serve any purpose.

Comment- if this provision is removed, there would absolutely be no way to monitor the compliances and detect violations to the clearance conditions. Presently with the existing monitoring which too is inadequate and irregular, severe violations and non compliances are often detected. It is usually seen that builders make tall claims and commit to reducing environmental impacts at the time of grant of environmental clearance. But, the real intentions and commitments are demonstrated thereafter, which can be captured from these monitoring and compliance reports, which according to the builders don't serve any purpose.

Removing this altogether would translate into confiscating the regulatory authorities of any control and awarding builders with complete autonomy to exploit and pollute. When on the one hand efforts are being pursued with the government to strengthen the EIA and monitoring process for the building projects, builders are demanding watering it down even further.

Builders Recommendation 3- the EC both by state and central governments causes huge delay in the projects. The government must realize that the only waste produced by purely residential, commercial retail and such other projects on an ongoing basis is human waste. And as such, having cumbersome clearances for such projects is highly unjustified and needs to be discontinued with immediate effect. Environment requirements followed shall be that as per the conditions appearing in the bye law of the nearest city.

Comment- the delay allegation has been often used to malign the EC process by the builders and the developers. In 2009, CSE's preliminary review of the entire clearance process shows clearly that most of the time delays are caused because of incomplete information provided by the developers themselves and for not following the rules completely at the time of making applications. The EIA regulation states that environmental clearance for any construction is deemed approved after 60 days if the developer does not hear from the EC granting committee since the date of submission. It is also evident that if the acceptable documentation and evidences are submitted to the EC granting committee the time taken to process should not take more than 3 to 4 months. Earlier when the cases were considered only by the MoEF i.e. before the formation of SEAC & SEIAA the time taken to consider a project could take 6-8 months. This has been considerably reduced after the regional authorities were created.

The impact generated by the buildings on the local environment also cannot be underplayed. Real estate development in an area works like a magnet attracting massive development and investments within a short span. Thus the cumulative impact that the building clusters and real estate development (including residential, commercial and institutional) is massive, which requires considerable attention and regulation to ensure sustainable resource use

and adequate pollution abatement measures.

Builders Recommendation 4- The clearances and NOC's from the state pollution board and local water supply are cumbersome, causes huge delays and are meaningless because their specific requirements would have been taken into account while drafting the master plan for the local area by the respective planning body.

Comment- EIA is a process to estimate each area's water stress and pollution, energy use, waste management, air pollution level and ascertain that they are not at loggerheads with the possible construction's emissions. The EIA process also accounts for resource use by the building both during construction and operational stage along with its demand and availability in adjoining and other areas in the city.

Therefore, different areas would have varying resource availability and carrying capacity and it would be rather impractical for setting an established set of standards for such projects. Although master plan provides a roadmap for the future development, but EIA for individual projects is critical since resource demand and impacts of one project would vary widely from another. Further, this recommendation is also attempting to alter the basic provision in the EP Act 1986, which accords regulatory powers to the SPCBs to control pollution and penalize the polluters. The water supply authority's mandate will also be downplayed and reduced to a supplier instead of a regulator. The outcomes could be catastrophic leading to conflicts amongst the projects which although have been accounted in the master plan but are fighting over ownership of scarce resource and accountability, thus leading to corruption.

grant letter. The information that is supposed to be in public domain is not even available for several projects on the MoEF website.

- Project No: 21-136/2007-IA.III ; Project Name: Environmental Clearance for construction of General Pool office Accommodation (GPOA) Phase-II, Pushpa Bhawan, Pushpa Vihar, New Delhi
- Project No: 21-135/2007-IA.III ; Project Name: Environmental Clearance for proposed IGIB South Extension Campus at CRRI Campus, Mathura Road, New Delhi
- Project No: 21-135/2007-IA.III ; Project Name: Environmental Clearance for proposed IGIB South Extension Campus at CRRI Campus, Mathura Road, New Delhi
- Project No: 21-819/2007-IA.III; Project Name: EC for construction of CBI, Head office building in pocket 5-B, CGO complex, Lodhi Road, New Delhi
- Project No: 21-641/2006-IA.III; Project Name: Environment clearance for construction of Victoria Garden - A residential complex at Ring Road, Azadpur, New Delhi

The notion that buildings are low impact projects is misplaced and must be corrected for bringing in greater degree of stringency. It is important that environment clearance process is based on effective monitorable approaches and benchmarks. This report reviews the nature of interventions in the including energy, water and waste and traffic related interventions in the buildings to highlight the weaknesses of the current process. There is a serious risk of environmental clearance rules for buildings becoming a mere ineffectual formality (see box 12: History of Violations).

BOX 12: HISTORY OF VIOLATIONS....

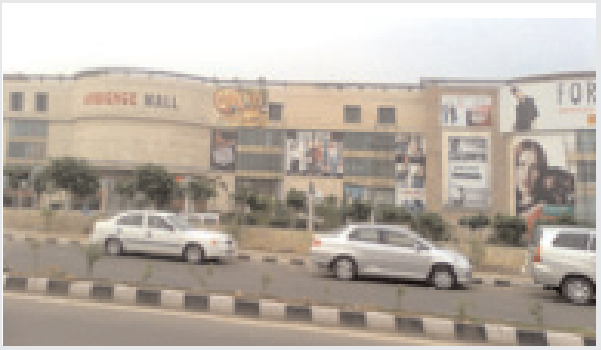
The Ambiance Mall developed by the Ambience Developers Pvt. Ltd., Plot No.2, Vasant Kunj, Ph-II, New Delhi

On 20 Mach 2006, the Supreme Court gave directions in the matter of PIL Ridge Bachao Andolan vs. Union of India & others. As per the directions MoEF was to take decision in two weeks on the developer's stance that no permission / EIA is necessary. MoEF responded through an affidavit dated 26th April 2006 that developers need to file fresh EIA report and prior environmental clearance is required by the projects. Subsequently, Supreme Court directed MoEF vide its order dated 1st May 2006 that matter should be heard within 2 months, but on the condition that there would be no further construction. Thereafter, on MoEF's order on 8th May 2006, DPCC was to conduct public hearing and directed project proponents to submit relevant documents by 15th May 2006. Thereafter, Ambience developers applied for consent / NOC with 20 sets of EIA reports on 12th May 2006.

On 17th August 2006, Supreme Court again heard the matter and passed an order dated 17th October 2006 that MoEF should take a decision on Environmental clearance within 2 months. Subsequently, MoEF has accorded Environmental clearance to the project on 27th November 2006. As the project is also required to obtain Consent to establish under Air & Water Act, a notice was issued on 3rd January 2007. Infact, Ambience developers applied for consent under the Air & Water Acts in terms of EIA notification in 2005. But despite repeated requests and show cause notices by CMC during 2006, the Ambience Developers failed to submit the EIA report. Since the PP did not produce any EIA report on 23rd March 2006, the CMC refused the consent application in terms of EIA notification. The Ambience developers filed an appeal against consent refusal order dated 23rd March 2006 before Appellate Authorities under Air & Water Act. On inspection of the site by DPCC officials on 8th September 2007, it was found that the developer has committed several violations, namely.

The work was in progress even though the mall activities have not been commissioned. The mall had seven floors including two basements and approximately 95per cent of super structure (civil) work and 40per cent of services work i.e. plumbing, fire fighting, air condition etc. were completed. Infact, the mal was undergoing finishing work. 2 DG sets of 375 KVA and 160 KVA were already installed for power backup and placed in acoustic enclosure. Although a STP was proposed but work on it was still not initiated. The mall was scheduled to open between May-June 2008.

The mall's built up area is 44000 sq meters and has stated that it would receive 77 KLD of water from MCD and would not draw groundwater. The wastewater discharge is mentioned as 152.4 kg/day. The SIT report indicates several deficiencies with regards to the compliance of EIA



conditions. According to SIT laid conditions have not been fulfilled. The PP has not filed the six monthly monitoring reports required vide Environmental Clearance conditions. Further, the adequacy reports that the unit has submitted are not from an empanelled consultant of DPCC. In response to the queries and in the personal hearing dated 3rd September 2008, the unit said that 'that it does not consider itself to be a willful defaulter, and it does not feel that it should pay any damages and that it has invested a large amount in the project.'

In a written submission to DPCC the unit has stated that 'its case may be considered leniently and sympathetically and omissions if any are un-intentional due to ignorance of law.' In response to the submission of funds for environmental damages and bank guarantee, the unit stated liquidity crunch and financial constraints. The CMC in response reduced the environmental damages to Rs. 2 crores and levied a bank guarantee of Rs. 3 crores valid for three years to be compiled by 23rd December 2008.

As against the deadline set by DPCC of 23rd December 2008, the PP did not submit the environmental damages and bank guarantee. The PP also stated to on 23rd December 2008, that it has provided an STP with dual piping system of 225 KLD with intention to increase it to 450 KLD. The unit has also stated that it has a plan to install Rain Water Harvesting system. In the Minutes of 108th meeting of the Consent Management Committee held on 2nd April 2009 the built up area also changed from 44000 sq meter to 127046 sqm. Apart from that the water requirement also increased from 77 MLD to 185 KLD. But in the 91st minutes of the meeting the built up area stated as 42000 sq meters and the water requirement was 77 KLD. In the 2nd April's meeting the SIT report stated that no flow measuring device was installed. The unit had no response to SIT's query on where they will get more than 300 KLD of waste water for utilizing its STP capacity of 500 KLD. The unit had no composting facility.

In the 12 June 2009 meeting, the committee asked the developer to provide water balance chart, a letter from DDA indicating that they will get nearly 300 KLD of waste

water from the Vasant Kunj STP. And, a certification from Delhi College of Engineering that STP is fully functional and operational and the entire waste water is treated and reused. Unit has submitted the Environmental Damages and Bank Guarantee on 2 August 2010 in compliance of earlier CMC decision. But, till 21 January 2011, the unit had not submitted the Water and Air test report.

Source:

- Minutes of the 31st meeting of the DPCC's committee constituted for deciding the Consent under Orange Category, held on 07.12.2007 in the Conference Room of Chairman, DPCC
- Minutes of the 75th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 03.09.2008 in the Conference Room of Chairman, DPCC
- Minutes of the 85th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 06.11.2008 in the Conference Room of Chairman, DPCC
- Minutes of the 91st meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 23.12.2008 in the Conference Room of Chairman, DPCC
- Minutes of the 108th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 02.04.2009 in the Conference Room of Chairman, DPCC
- Minutes of the 119th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 12.06.2009 in the Conference Room of Chairman, DPCC.
- Minutes of the 132nd meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 06.01.2010 in the Conference Room of Chairman, DPCC
- Minutes of the 143rd meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 16.06.2010 in the Conference Room of Chairman, DPCC
- Minutes of the 157th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 21.01.2011 in the Conference Room of Chairman, DPCC

Case 2: Jackson Buildwell developed by Jackson Buildwell Pvt. Ltd, V3S Ring Road Mall, at 1B-3, Sector -10, Rohini.

According to the committee, the unit had started construction in January, 2006, applied for CTE on 23 October 2007 after the completion of construction on 4 October 2007. EC was obtained on 29 February 2008 and the total built up area is over 23,000 sq mt. The total project cost is Rs. 55 crores. MOEF in its letter dated 14 January 2008 had directed Secretary, Department of Environment, GNCTD to initiate necessary action under Environment (Protection) Act, 1986 for violation of EPA. The committee deliberated on the facts and stated that in cases where construction was started without CTE & EC and completed, DPCC should follow the directions of MOEF and close down the unit.

However, in the personal hearing, the unit gave a written undertaking that it is willing to abide by paying the cash penalty of 0.5 per cent of the project cost and bank guarantee of 0.5 per cent of the project cost. Interestingly the unit mentioned that the committee should grant them this option as has been granted in another case of the same group. The committee stated that the unit could not be given this option because of complete violation of provisions of EPA and Air & Water Acts. But, after repeated appeals the committee agreed on the penalty option.

In the meeting on 6 May 2009, the committee stated that the six monthly monitoring report submitted by the unit is without the test reports from recognized/empanelled laboratory of DPCC.

Source:

- Minutes of the 48th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 03.4.2008 in the Conference Room of Chairman, DPCC.
- Minutes of the 119th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 12.06.2009 in the Conference Room of Chairman, DPCC.

2. EIA and Energy

Given the fact that EIA deals with the high end resource intensive large building projects there is strong interest in this regulatory tool to maximize the energy saving potential of these buildings. But the current practice of issuing environmental clearance to buildings show that it is not effectively designed to realize the energy saving potential.

The current practice of furnishing information based on the stipulated form 1 and form 2 is a passive approach that is not driven by any clear benchmark or target, or best practice model to set the terms for energy performance of the buildings. As a result, it cannot effectively influence rapid uptake of technology and design measures for maximizing energy savings.

What EIA demands to know about the energy savings?

The present environmental clearance process for the building and construction projects has a dedicated section to assess the energy impact of building construction activities and its energy consumption during construction and operational stages. Form 1 and especially the form 1A, demands project proponents to furnish details on some key parameters that include power requirement, source of energy supply, lighting, some details on heating and ventilation, and details on some energy saving applications among others. (See Box 13: Key energy parameters for furnishing details). The project proponents are expected to furnish details on each of these parameters.

It is always not possible to judge the adequacy of the information sought and that of the proposed measures as there is no clear reference point or benchmark for comparison.

The quantifiable benchmarking process that has evolved under the ECBC is not aligned with the environmental clearance of buildings to allow greater precision in targets and holistic application.

Even though Indian government has adopted energy code for buildings under the Energy Conservation Act that is administered by the Ministry of Power and is a composite regulation to address energy conservation in buildings, there is no explicit attempt to align the environmental clearance with ECBC requirements. ECBC is the key official system for assessing energy conservation in buildings administered by the Bureau of Energy Efficiency (BEE). ECBC gives guidelines on energy savings techniques on different aspects of the buildings – building material, building design, heating, ventilation and air conditioning systems and operational aspects to reduce energy requirements. In operational buildings the ECBC is further applied to assess the energy performance of the buildings in relation to the benchmark developed for different climatic zones. The quantifiable benchmarking process that has evolved under the ECBC is not applied to the environmental clearance of buildings to allow greater precision in targets and holistic application.

This has emerged from the quick review of the key indicators and questions that the project developers have to answer on energy conservation under the EIA. This makes the exercise very generic in nature, and does not lend itself to definitive judgment of the actual energy performance of the buildings. To understand the nature and stringency of interventions and approaches to energy conservation for environmental clearance CSE has analyzed the measures proposed in the project documents.

CSE has reviewed several forms (1 and 1A) for the building projects to analyse the nature, quality and the detail of the information provided by the project proponents

BOX 13: KEY ENERGY PARAMETERS FOR FURNISHING DETAILS

The key parameters based on which the project proponents is required to furnish the details in form 1/1A regarding energy.

On Power requirement

- **Give details of the power requirements, source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?**
- **What type of, and capacity of, power back-up do you plan to provide?**

Application of glasses in buildings

- **What is the window size and glass type you are planning to use for openings? Provide specifications of its thermal characteristics related to both short wave and long wave radiation due to solar energy?**
- **Provide construction details and material specifications of building insulation including R-values and U-values, level of thickness etc.**
- **If you are using glass as wall material provides details and specifications including emissivity and thermal characteristics.**

Renewable energy application

- **What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.**
- **Does the layout of streets & buildings maximize the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.**
- **To what extent the non-conventional energy technologies are utilized in the overall energy consumption? Provide details of the renewable energy technologies used.**

Lighting, ventilation, space conditioning etc

- **Do the structures use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide specifications.**
- **Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of walls on the east and the west and the roof? How much energy saving has been effected?**
- **Is there use of Green Roof to minimize the cooling of built environment? Provide detail landscape construction and structural drawing details with specification of Grass species used for shading roof/ terraces.**
- **What are the thermal characteristics of the building envelope? (a) roof; (b) external walls; and (c) fenestration? Give details of the material used and the U-values or the R values of the individual components.**
- **What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration??**

Impact on micro climate:

- **What are the likely effects of the building activity in altering the micro-climates? Provide a self assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects noticeable change in the surrounding ecology?**

Safety

- **What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.**

on energy saving measures. Each question in the energy section in the form 1A has been reviewed to assess the information provided by the project proponent. The details of the forms for the following projects were analyzed (See box 14: Highlights of the information from the projects on energy saving strategies):

- SBP South City, Proposed Group Housing Project in Mohali Punjab by South City promoters and Developers private limited.
- Amritsar- I, proposed group housing project in Amritsar, Punjab by ATM estates private limited.
- Celebration mall, Proposed Shopping Complex in Jalandhar Punjab, by Francolin Infrastructure
- City Centre including mall, hotel and residential area in Patna, Bihar by Utkarsh Sfatik limited
- Residential Complex in Bagharbori Satgaon, Assam by Shine Realtors
- Indian School of Business at Mohali Punjab, by ISB Administration

BOX 14: HIGHLIGHTS OF THE INFORMATION FROM THE PROJECTS ON ENERGY SAVING STRATEGIES

1. On power requirements, source of supply, backup source etc; Energy consumption assumed per square foot of built-up area; How have they tried to minimize energy consumption.

The most common information is the total power requirement, back up source and the source of power supply. CSE have also found some projects even failing to provide complete information on backup source, benchmarking of energy consumption per day (kWh/day), use of alternative source of energy etc.

In response to the part of the question on how the project proponents would minimize its energy consumption, most of the projects have provided subjective and generalistic responses like provisions of power saving light, maximizing natural light etc.

2. On type of and capacity of, power back-up
DG sets are the common source of back up. None of the reviewed forms have mentioned solar power as a back up in addition to DG sets

In some cases the project proponents did not provide the capacity of the power back up which is demanded in the form. Details on the location of DG sets, stack heights, sections or services in the buildings that would have power back up etc. are also not given.

3. On the characteristics of the glass to be used; specifications of its characteristics related to both short wave and long wave radiation

Several forms mentioned that the glass used would be of low emissivity and low U value meeting ECBC code. Even though the question clearly demands the glass's specifications on its characteristics related to both short wave and long wave radiation, the specific response on the same was not given. Details on the ECBC compliance were also not provided either in the main form or in the annexures. Thus proof of the component's ECBC compliance was not provided by the projects though claimed in the form.

4. On passive solar architectural features in the building. Illustrate the applications made in the proposed project.

The response was not very specific. A few of the reviewed forms responded in a line stating that, 'all relevant features like orientation of building, shading effect would be incorporated.' Not specifying any details about the relevant solar features including on its specific benefits to the proposed building. While some other projects just stated orientation of the building as the only measure in response to the question on passive solar architecture.

5. On the layout of streets & buildings maximize the potential for solar energy devices. Use of street lighting, emergency lighting and solar hot water systems for use in the building complex;

Some projects mentioned use of solar photovoltaic in partial street lighting. The issue with such responses is that partial being a subjective term and does not indicate in any way the extent or percentage of its usage when compared total street lighting. Besides the other two sub components related to emergency lighting and solar hot water system were completely ignored in the responses reviewed. Infact, a few forms just mentioned 'yes' as a response, avoiding any mention of potential use, safety details and quality of solar energy devices in the proposed buildings.

6. Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of walls on the east and the west and the roof? How much energy saving has been effected?

The projects as in the case of other questions continue respond to questions in a very vague manner. In response to the shading issue in form 1A, several projects attempted to assure the committee that all relevant features have been incorporated, but fail to mention the nature of these features.

The question very clearly demands principles used to maximize the shading of walls on the east and the west and the roof and amount of energy saving that would be effected. But, only a few described the details of measures and the energy savings. Further several projects also did not mention the areas within the buildings that would be shaded and what type of shading materials would be used for the same. Most of the projects that were analyzed did not furnish complete information.

7. On the structures using energy-efficient space conditioning, lighting and mechanical systems; Technical details; Details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions; CFC and HCFC free chillers along with specifications.

In this crucial question too the responses avoided providing key information on product's efficiency, load assumption. The question clearly asks for efficiencies of transformers, motors which have been conveniently dodged by the project proponents.

The easy and relatively common measures like use of CFL's and LED lamps have been mentioned. Details like efficiency, numbers of hours of operation etc. on the efficiency of chillers, pumps, cooling towers are not part of most of the

proposed project forms. The project proponent also completely, avoided details on the other sub parts of the questions.

8. Likely effects of the building activity in altering the micro-climates. Self assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects

Almost all the projects reviewed, stated that no or least heat island effect and impact of micro climate would be generated from the proposed building. The question it seems is not very specific and provides ample room for the project proponent to discard or underplay it. In some cases steps like green belt development, terrace gardens, ample ventilation were stated as potential mitigation strategies.

9. On the thermal characteristics of the building envelope. (a) roof; (b) external walls; and (c) fenestration. The material used and the U-values or the R values of the individual components.

Inspite of the question been very specific demanding the thermal characteristics of roof, walls and fenestrations, U and R values of individual components of building material use, the response again was very general. Building materials and their R and U values were mostly ignored and not mentioned. A few proposed projects stated that the components are in accordance with the ECBC norms but the project report carried no annexed information on the compliance.

10. If using glass as wall material; technical design details and specifications including SHGC, U-value and VLT of complete fenestration product.

The details on the glass's Solar Heat Gain Coefficient, U-value and Visual Light Transmittance, as per ECBC requirements, that determines the glass efficiency under given climatic conditions, is made unavailable by project proponents in the appraisal process. It is significantly important to furnish details of glass insulating properties and complete window design (fenestration product), since the inappropriate design and window insulation usually implies considerable leakage in the energy loss during heating and cooling of buildings.

11. The rate of air infiltration into the building? Details of how you are mitigating the effects of infiltration.

One of the PP provided a text book definition of the infiltration and its effects, but did not mention the demanded rate of air infiltration into the building or any details of the steps that the project would be taking to mitigate its effect on infiltration. Though some projects stated that NBC and ECBC guidelines/ specifications would be adhered, but no supporting documents were provided.

12. Extent the non-conventional energy technologies to be utilized in the overall energy consumption. Provide details of the renewable energy technologies used.

The three most common features and sometimes the only ones, that found repeated mention in the forms in response to this question included use of solar street lights, use of CFl/LED and natural ventilation and light.

Only a few project forms mentioned details and the benefits that would be accrued from undertaking such measures. Only a few projects mentioned the use of energy efficient appliances (but without any mention of their star ratings for energy efficiency) solar power as a back up source, solar water heating, etc. Other non conventional energy technologies like energy efficient building material, recycled materials have been completely ignored.

In response to most of the questions very generic information is offered without clear and specific numbers or specifications. The EIA authorities only look at the information furnished but do not have a system to drive the practice with clear best practice guidelines and targets.

For example, passive cooling features of building design though mentioned widely are not documented properly; neither is it proactively reflected in committee's documentation. Passive cooling is an architectural design that reduces the need for mechanical heating or cooling for thermal comfort and artificial lighting. The active cooling components and system level energy auditing is also found missing leading to broad or vague estimation for energy performance of buildings. It was observed that in some cases the committee may recommended adoption of ECBC, or project proponents may make cross reference to ECBC, but this is not taken as the basis of the evaluation or post project monitoring.

No clear system for benchmarking energy performance

Even though the energy professionals related to the building sector impact assessment inform that ECBC related approaches are normally taken on board by the developers for project development and for environmental clearance, this has not been formally included in the EIA rules. Nowhere in the EIA notification 2006, ECBC compliance is explicitly mentioned or detailed.

The sum total of action and its range that are listed in the requisite forms may help to save some energy but it is not possible to judge the adequacy of the action. As the form 1 and 1 A of EIA are not fully and comprehensively aligned with ECBC the project proponents continue to provide part and generic information to the EC committees. The piece meal approach is only making the entire exercise of assessing and managing the energy consumption and use in buildings a futile one. There is no instance in which the EIA authorities have challenged the energy consumption figures submitted by the project proponents.

The explicit harmonization with ECBC is crucial in view of the fact that BEE that administers ECBC plans to compulsorily mandate ECBC for commercial buildings in eight states, including Delhi and Maharashtra, from 2012. The Governments of Uttar Pradesh, Haryana, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal will also have to make ECBC mandatory for any new construction of commercial buildings coming up in their states from April 2011 onwards. These eight states will have to implement the ECBC norms in all the new commercial constructions[33]. This will bring all the EIA related buildings within the ECBC ambit. Under section 14 (p) of the Energy Conservation Act, 2001, Central Government has powers to prescribe ECBC for commercial buildings or building complex for efficient use of energy and its conservation. The state governments have the flexibility to modify ECBC to suit local or regional needs. The Central Government is also empowered to include such commercial buildings in the list of designated consumers under section 14 (e). But, the progress has been very slow and not very encouraging since 2007 when ECBC was launched. ECBC would be made mandatory after increasing awareness and also creating the required capacity addition. In addition, provisions of penalty were also mentioned for those found not complying with it.

It makes eminent sense to harmonise ECBC with the EIA. Otherwise, there is no reference scale for benchmarking and target setting for energy savings in buildings.

The upshot of the argument is that if ECBC is going to be mandatory for the high end large buildings in any case. It makes eminent sense to harmonise this with the EIA which deals with this category of the buildings. Clearly therefore there is a strong case for immediate formal alignment of the EIA and ECBC rules for these high end resource intensive buildings.

EIA and energy performance: red herring

The additional benefit of aligning EIA with ECBC will enable more transparent and precise estimation of the energy consumption as well as energy performance index of the buildings. Discussions with the concerned authorities indicate that there is no established method for assessing and benchmarking the stated energy consumption of buildings that are proposed for environmental clearance. As a result, there is no reference scale for benchmarking or target setting for energy savings for monitoring.

There is considerable merit in adopting the ECBC system of ranking the energy performance of buildings for both designing and monitoring. End use energy benchmarks are normally expressed as Energy Performance Index (EPI), which is useful when comparing the energy performance of similar buildings in different

climatic zones. At the time of project design building energy performance can be worked out based on ECBC requirements and computer simulation. This requires an energy modeling of the proposed design of the whole building, factoring in all the proposed energy conservation measures (termed as Energy Efficiency Measures in ECBC User guide prepared by BEE) to arrive at the projected overall annual energy consumption of the building. A building shall comply with the whole building performance method. The EPI will become the basis of monitoring and compliance.

There is no official system to assess the adequacy of the EIA tool for energy savings in buildings.

EPI is calculated by dividing the annual energy consumption by total built-up area of the building. This energy consumption benchmark is crucial in assessing the current status in of terms energy performance on the basis of which decisions can be taken to make further improvements. Energy Performance Index (EPI) in kWh / sq m/ year is the purchased and generated electricity divided by built up area in sq m excluding basement and parking areas. ECBC has prescribed EPI range for different level of star rated performance for different climatic zones[34] .

For the ECBC programme the BEE has developed a star rating program for buildings based on their energy performance index. This star rating program for buildings is based on actual performance of the building in terms of specific energy usage (kWh/sq m/year) after the buildings become operational. According to BEE, this programme aims to rate office buildings on a 1-5 star scale with 5 star labeled buildings being the most efficient. Presently five categories of buildings -office buildings, hotels, hospitals, retail malls, and IT Parks in five climate zones in the country have been identified. The office buildings are classified as for air-conditioned and non-air-conditioned for five climatic zones. The office buildings categorized as having less than or more than 50% air-conditioned space under five distinct climatic zones, namely Hot and Humid; Composite; Hot and Dry; Moderate; and Cold. Once the buildings become operational this assessment is carried out to monitor the thermal performance of the buildings.

In fact as a practice some of the building agencies have started to adopt the ECBC and its EPI as the basis to design the buildings. The Central Public Works Department (CPWD) has already stated that all the buildings that would be constructed by them would be minimum 3 star ratings prescribed by BEE. This also indicates that it is possible to explore the possibility of linking up EIA clearance with the EPIs developed by BEE to drive aggressive energy saving measures. Similar linkage is needed between ECBC and EIA. At the moment for environmental clearance the project proponents are not needed to provide the anticipated EPI for buildings.

The Form I and 1A ask for information in the form of total power requirement and also energy consumption per square foot of built-up area. The project proponents provide the information on the total sanctioned load needed keeping in mind the maximum usage but not the actual consumption estimates. As a result, it is not possible to estimate and judge the EPI. The way the data is furnished is not compatible with the method for assessment of EPI.

CSE has reviewed the energy estimates provided by 85 buildings located in Haryana that have applied for EIA clearance and have provided details on their total anticipated energy requirement and the total built up area. There is a wide variation in these requirement estimates and no conclusion can be drawn. Illustratively even the contract load vary between 42 Kwh/sq m/year in one building to 954 Kwh/sq m/year.

This clearly brings out that the EIA authorities have not considered any method to

assess the energy performance of the buildings to understand the adequacy of the energy saving measures proposed by the project proponents. This is unacceptable keeping in view that these are capital intensive buildings. There is a need for a mechanism in which the project proponents are asked to commit in advance to comply with a minimum EPI of a 3 or 4 star rank. There is need to benchmark energy performance target at the time of project development as well as for monitoring after the building becomes operational. But lack of precision and scientific scrutiny is allowing locking in of excessive energy in these high end buildings in cities.

Currently, there is no official system to assess the adequacy of the EIA tool for energy savings in buildings. But a parallel and an independent effort made by the BEE to assess government buildings as well as MOEF cleared buildings shows there is considerable room for tightening of the energy savings (see box 15: Energy Flab in Buildings). Comparing the range of energy consumption levels of governmental buildings and MOEF cleared buildings (from 5 to 70 units/sq.ft) with the average energy consumption level of GBC certified buildings (12.8 units/sq.ft), it states that there is significant potential for energy savings in governmental buildings alone. Working towards a target of approximately 12 units/sq.ft, there is a potential to save over 1,200,000 mWh in electricity consumed. This is a significant opportunity to target.

Lack of scientific scrutiny of energy saving measures allows locking in of excessive energy and carbon in high-end buildings.

The study has stated that estimating energy consumption for buildings under EIA procedure is an important step to recognize the buildings energy impact. Basically, EIA suggests the requirement of information on energy consumption that characterizes the proposed buildings operations. In a way, the information helps informed decision making of the projects performed by Expert Appraisal Committee (EAC) or State Expert Appraisal Committee (SEAC) setup under MoEF.

There is clearly a strong case for aligning ECBC with the EIA process. This will require harmonization of both the regulations and institutional arrangement between the regulatory agencies to enable implementation. According to a senior BEE official, at this stage there is no official communication or interaction between BEE and the EIA clearance committees on the energy related matters in EIA buildings. Till date BEE has had no clear communication from MoEF for BEE representation in the assessment process. It is not mandatory for BEE

BOX 15: ENERGY FLAB IN BUILDINGS

There is no official assessment of the effectiveness of the EIA tool in promoting energy savings in building. The only broad assessment that is publicly available is the BEE funded study 'Situational Analysis of Commercial Buildings in India' in 2008. This has among others assessed 314 MoEF cleared buildings in four climatic zones. The purpose of this study is to analyze the emerging trend in energy benchmark for the buildings, conservation measures and their potential impact.

The study observed that information on energy consumption in the sampled buildings could not be uniformly benchmarked to units/sq.ft as desirable due to the absence of information on energy consumption by given "built-up area" for most buildings coming under EIA notification..

In general, project proponents usually make an indirect estimation of contract demand by multiplying covered area of building with demand of 5 watt per sq.ft. The thumb rule is practiced for most power estimation applied for new buildings.

The anticipated energy consumption of the buildings cleared by MoEF presented the dynamic range. This was seen in most cases where the information on energy consumption being limited to data on "sanctioned load", and not actual "connected load" in buildings. Comparisons between variations in estimated energy consumption levels of governmental buildings (from 5 to 70 kWh units/ sq.ft) with the average energy consumption level of certified green buildings (12.8 kWh units/sq.ft), showed significant potential for energy savings in governmental buildings alone.

representative to be present in the committee discussions. It is further stated that, many SEACs are not even aware of BEE's potential role or significance in the building clearance.

According to energy experts, decentralization of the environmental clearance process and the formation of the state committees and authorities, the engagement with ECBC experts have declined. During the time when the projects were reviewed by the central committee the engagement with the ECBC experts was better. Now there is a definite absence of ECBC experts on board the state committees reviewing and recommending EC to the building projects.

The energy efficiency in buildings have also been brought within the ambit of the National Habitat Mission under the National Climate Action Plan. This means there should be clear assessment of the energy savings and carbon savings from policy interventions. But such estimates are hard to come by as these have not been included for regulatory impact assessment.

The information on use of standards and labelled appliances as per BEE norms is unclear from the information furnished by the project proponents.

Buildings in energy stressed cities

More robust EIA for buildings is essential keeping in view the energy stress in Indian cities and energy security challenges. The mega cities that attract significantly high number of building construction projects will require very effective approaches to minimize the energy impacts of the buildings. There are disparate and incomplete estimates of number of buildings that have come for environmental clearance from time to time.

Building construction will pace up in Delhi and other mega cities and add to the energy demand. This development as in Delhi will take place in a very energy deficit scenario.

According to the Economic Survey of Delhi 2008-09, Delhi has one of the highest per capita power consumption among the states and union territories. The per capita consumption of electricity in Delhi has increased from 1259 units per annum in 2000-01 to 1615 units in 2007-08. The national average stood at 606 KWH in 2007-08. Infact, in 2008-09, the peak demand met was 4034 MW, which was only slightly higher than 4030 MW of demand reported in 2007-08. The share of domestic consumption has increased from about 29 per cent in 1980-81 to 45 per cent in 2007-08. Delhi's energy requirement is growing at about 7-8 per cent per annum. Commercial demand will increase significantly.

This essentially means that all new big construction projects will require substantial power backup. EIA does not require any assessment of energy deficit of the location and the neighbourhood as it is assumed that the deficit will be met by in-situ and captive power generation. It is mandatory for project proponent to provide additional power back up for emergency areas, lighting in common areas of large commercial and residential buildings in case of any emergency or grid power supply failure.

According to the estimated connected energy load for particular building, it is mandatory for project proponent to furnish information on sanctioned load and requirement of additional power back up for emergency areas, lighting in common areas of large commercial and residential buildings in case of grid power supply failure. Of all the buildings that received environmental clearance between 2004 and 2010 great party of the buildings have mentioned DG sets as major source of power back up. A review of the Saket malls in 2009 showed that the mall ran on diesel

generators 24 hours as they did not have electricity connection from the local electrical supply authority.

Clearly, therefore, the EIA authorities are only interested to know if the project proponents have obtained sanction for the proposed load from the local electricity provider while submitting for the environmental clearance. (See box 16: How is Energy Sanctioned to Buildings?). The supply code and performance standard guidelines issued by Delhi Electricity Regulatory Commission, defines "connected load" as an aggregate of the manufacture's rating of all energy consuming devices in the consumer's premises/ buildings, which can be simultaneously used. It works out the total end-use energy consumption in the installed appliances present in consumer's building. The utility have to examine the technical feasibility of the connection requested to sanction the load and raise a demand note. If the connection is not found technically feasible, it shall intimate to the applicant/ consumer in writing giving reason for the same. The Electrical Contractor Certificate is an important document ensuring the total circuit points, energy

BOX 16: HOW IS ENERGY SANCTIONED TO BUILDINGS?

In Delhi the project proponent provides the details on the anticipated energy consumption of new buildings as per Delhi Electricity Regulatory Commission's (DERC) Supply Code and Performance Standards Regulations, 2007. An Inspection Report is prepared by the wiring contractor that includes the energy auditing of the proposed building and based on the energy estimation validated by wiring contractor, the copy of same is submitted to electricity utilities for new connection. The new connection from private utility companies is processed within 30 days after checking the technical feasibility of connection for new location verified by utility and demand note is issued.

Inspection Report for Energy Demand Estimation for a Typical Building

No. of circuits left to right on distribution	Size of conductor	Lamps		Fans		Plugs (5 amp)		Plugs (15 amp)		Other domestic appliances		Total KW
		No.	Watt	No.	Watt	No.	Watt	No.	Watt	Description	Watt	
Circuit No. 1												
Circuit No. 2												
Circuit No. 3												
Circuit No. 4												
Circuit No. 5												
Circuit No. 6												
											Total	

Source: DERC, Supply Code and Performance Standard Regulations, 2007

Utilities sanctions the load and raise a demand note in accordance with the provisions of regulations prescribed by DERC, under proper receipt to the applicant, giving breakup of the estimate of applicable charges including security deposit for providing such connection. The licensee or utility company issues the demand note within seven days of acceptance of application. Once a demand note is raised, the licensee/utility shall be under obligation to energize the connection. The licensee shall pay interest to the consumer at the rate of 6 per cent per annum, or any other rate prescribed by the commission payable annually on such deposit w.e.f. date of such deposit in cases of new connection energized after the date of this notification.

Source: Delhi Electricity Regulatory Commission website

EIA does not require any assessment of energy deficit of the location as it is assumed that the deficit will be met by the in-situ and captive power generation

appliances used in the buildings and tentative energy audit base is submitted to the utility to determine the connected load.

The actual consumption from other energy supply sources such as DG/GG set for these commercial areas are substantially higher. Utilities are now increasingly coming under pressure from increased demand for electricity (See box 17: Demand Exceeds Load). This just goes to show how aggressive the EIA tool will have to be to minimize the energy impacts of the high end buildings.

Also, the information on use of Standard and Labeled appliances in proposed buildings as per BEE norms is unclear from the information furnished by the project proponents given the Energy Conservation Act encourages use of such appliances.

A small and a miniscule share in buildings comes from the renewable solar applications. MOEF says it is as small as 1.2 percent. As evident from the review of case studies discussed later its application is still very cosmetic.

The information on use of standard and labelled appliances in proposed buildings as per BEE norms is unclear from the information furnished by the project proponents.

BOX 17: DEMAND EXCEEDS LOAD

A petition was filed by New Delhi Power Ltd. (NDPL) with Delhi Electricity Regulatory Commission (DERC) on March 2010, to permit the NDPL to increase the sanctioned load for the consumers because of increasing demand. The NDPL representatives submitted that the consumption pattern of consumers in Delhi has registered a sharp change in the past few years and energy demand has soared enormously and has surpassed all expected scenario.

The petitioner admitted that in order to meet all consumers demands for electricity in the area of NDPL, it has made arrangements of electricity based on parameters including past consumption pattern of its consumers, load growth studies, weather conditions, etc. NDPL also stated that the majority of consumers across tariff categories are using load in excess of sanctioned load in utter violation of terms and conditions of supply.

Such excess loads and the sanctioned load figures are not connected by the consumers to the grid network of the petitioner temporarily but in most of the cases it is being permanently consumed. The petition was submitted on the issue pertaining to enhancement of load for consumers based on advance consumption deposit (ACD) which was also raised before the DERC. NDPL pointed out that the Commission did not address this issue in the Supply Code and Performance Standards issued in 2007.

Source: http://www.derc.gov.in/ordersPetitions/orders/Misc/2010/NDPL Suomoto%20increase%20the%20sanctioned%20load%20.pdf

Commercial buildings with EC's have no insulation to wall and windows in buildings in Jasola, Delhi

MONITORING – COMPLIANCE AND VIOLATIONS

The way EIA for buildings is designed today it does not prescribe clear indicators for post construction monitoring of the buildings. As of now there is no information in the public domain on how actual monitoring of EC compliant buildings is carried out. It is therefore very difficult to assess the deviation from the conditions of the environmental clearance, or the actual energy savings obtained from the various energy saving measures proposed at the time of environmental clearance and also the compliance levels with those measures.

This is the weakest link in the EIA process. It has not been possible to to trace any clear monitoring strategy for the post construction phase. To check out the ground reality a couple of buildings were reviewed in the Jasola area of Delhi — the commercial hub of south Delhi. (see Section 6: Reality Check: Case Studies)

Jasola received maximum 6 high-end commercial projects of total built up area of 200,000 m^2 alone with average built up area construction ranging between 22,000 m^2 to 100,000 m^2. Some case studies of construction of Office cum Shopping Mall, M6, at Plot No.7, Jasola Delhi explains the inadequacy of implementation of energy conservation measures in buildings. Total power requirement is 57600 kVA/ day supplied by utilities BSES, and DG sets of 1 x 500 kVA + 1 x 750 kVA + 1x 1500 kVA are included for power backup as per EC documentation. Based on the meeting minutes and the information furnished, presentation made and discussions held by the State Level Expert Appraisal Committee (SEAC) on 20-04-09, committee recommendation on the proposal was asked to make available documents on energy conservation measures (ECM).

Post operation phase of construction, it has been observed the unrated window product having U, SHGC, and Visual Light Transmittance values of 7.1 W/m2- K, 0.70, and 0.58 respectively as compared to the standard specification in ECBC User Guide, Table 4.7. It suggests the high level of heat transmittance in buildings due to poor quality of window product that unable to retain the cooling effects. On site, the building manager informed us about tinted glass is used fixed with aluminum frame and coated with oil paint. The entire fenestration system responsible for increasing air-condition load due to heating of unprotected frame from outside sun.

Even after project proponents have agreed to use renewable and non-polluting energy sources such as solar, information of their actual usage is not known.

In the background of the SEAC recommendations and EIA guidelines for the similar projects operational in Jasola, represents interesting case of non-compliance of energy conservation measures suggested by committee. On site observation reveals the non compliances of committee recommendations, poor building maintenance and some operational aspects. It has been found, based on the meeting minutes of the State Expert Appraisal Committee (SEAC) discussions on 20-04-09, the project proponent was asked to furnish the documents on energy conservation measures for some the projects located in Jasola. It seems somehow the project got the nod, but unable to implement the actual recommendations mentioned in EC reports.

Some of the regulatory lessons learned in such case studies signals a clear message about establishing robust EIA guidelines for energy efficiency in buildings. The energy conservation measures in lighting by CFL use in most buildings in Jasola were observed. However, the use of captive power generation from DG sets and other guidelines are not followed in strict compliance according to the manual on norms and standards for environment clearance of large construction projects. Several buildings were using captive power generation for more than 12 hours of the

day through DG set. The associated net carbon emission by burning diesel is expected to be higher. It has been found that the cost of power from DG set Rs. 12 to Rs. 14 per unit which is even higher than grid supplied power (Rs. 5/ unit) for commercial building occupants. The carbon emission due to DG sets and associated health impact has a potential significance to be addressed in the EIA process. Some of the major concerns emerging out of these case studies reflect upon challenges to energy conservation efforts witnessed due to rapid construction activities and energy consumption drive in commercial buildings. Further, areas like Jasola, exemplifies the nature of growth paradigm remained unnoticed due to feeble EIA regulations leading to maximum energy consumption trends in the region.

The criteria of estimating water demand in building do not follow any standardised benchmark.

Pollution fall out of the back up power generation: In Delhi, commercial buildings account for more than 55per cent of total EC buildings, which also represents maximum backup power requirement. The 17per cent power back up coming from diesel generation is very clearly associated with substantially high local air emission especially if they are being used for more than 8 hours of operation of commercial buildings.

The Ministry of Environment and Forests manual on 'Norms and Standards for Environment Clearance of Large Construction Projects', in its chapter on managing transport including noise and air, highlights the concern over the estimated emission of DG sets used in buildings. Additionally, the guidelines for reduction of pollution during construction and demolition activities states that, in the absence of good technologies to avoid the noise, air, land pollution, and water contamination leading to excessive use of mechanical systems such as DG set for on-site construction activities. Eventually, the fuel-usage in such available technologies is inevitably increasing in buildings, resulting significant change in the total energy-mix supply.

The manual also states that, in the absence of good technologies the fuel usage is inevitably increasing in buildings total energy-mix supply. The expected level of emissions and aggregated impact on the public health in the neighborhood areas of proposed high end commercial buildings is definitely major concern but not assessed adequately.

There is also a concern that even after project proponent have agreed to use renewable and non polluting energy source such as solar in buildings, information on their actual implementation is not known.

The EIA needs reform to take on board clear benchmarks to achieve targeted energy savings and enable post construction monitoring. It would need to align with the established energy conservation norms to set the terms of action.

3. EIA and Water

Reducing water foot print of buildings will be a critical path tool for environmental clearance. Is environmental clearance tool designed effectively to promote water efficiency and waste water management?.

CSE has analysed the information and responses provided by the project proponents in the form 1 and 1 A. The two forms provide some amount of information but are not as detailed or rigorous as the A category projects. (see Box 19: List of information sought on water and waste water).

REVIEW OF INFORMATION FURNISHED BY THE PROJECT PROPONENTS

To understand the nature and the kind of information demanded from the project proponents, several form 1 and 1A for various projects were reviewed. These forms provide an insight into the kind and quality of information sought and information provided to the clearance committee and if it is rigorous enough to make a difference. The review brings out systemic weaknesses in the approach.

Criteria for resource estimates not clear: The approaches to water management in buildings hinge on the fundamental premise of water demand estimation. But the criteria of estimating this demand is not always clear. The per capita water consumption is generally taken to calculate the total water requirement for the building along with the occupancy. Although there are various norms and guidelines that provide benchmarks for the per capita per day water consumption, there is no single norm that is considered either as mandatory or as guidelines in the environmental clearance process.

The proposed SBP South City group housing project in Mohali, Punjab is being developed by the South city promoters and developers private limited. The project has nearly 60,000 square meters of built up area. The project's total daily water consumption is stated as 221.41 KL. The water is expected to be sourced from public supply, groundwater and through recycling of treated effluent. The project report do not provide any details of the basis of calculating the domestic water consumption. It just provides a total figure in terms of KLD and there is no mention of the litre per capita per day (lpcd) water demand and water demand for other individual uses.

These details are missing in the documents, in water balance diagram and in the environment management plan. Similarly, in the documents for the proposed Indian School of Business in sector 81 Mohali Punjab, the total water requirement is given as 971 KLD, but does not provide any lpcd figures or criteria on the basis of which domestic demand has been estimated.

In yet another proposed project for group Housing 'Amritsar –I' in Amritsar, Punjab, the form 1A just states the total water consumption as 217 KLD. It does not state the lpcd benchmark that are taken to calculate the total amount, while, the wastewater is calculated based on the assumption that almost 80 per cent of water consumed would be released as wastewater.

In reality the actual water use could be higher or lower than the stated norms.

It is clear that different building types have varying water requirement which in turn affects the per capita water consumption. Thus, the per capita daily water consumption is calculated for residential, commercial, mixed use and institutional buildings.

BOX 19: LIST OF INFORMATION SOUGHT ON WATER AND WASTE WATER

The EIA forms have listed the parameters on which the project proponents are expected to provide information. In the form 1 which is common for all project categories the following information is requested for water and wastewater:

- **Any impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?**
- **Any Stream crossings?**
- **Any Abstraction or transfers of water form ground or surface waters?**
- **Changes in water bodies or the land surface affecting drainage or run-off?**
- **Water (expected source & competing users) unit in KLD**
- **Production of solid wastes during construction or operation or decommissioning (MT/month) Sewage sludge or other sludge from effluent treatment**
- **Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea from discharge of sewage or other effluents to water or the land (expected mode and place of discharge)**

The form 1-A which is mandatory for only construction projects listed under item 8 of the Schedule. Under the water section, the form requires explanatory responses. The questions that are listed under the section include:

- **The total quantity of water requirement for the proposed project with the breakup of requirements for various uses. Ways in which water requirement would be met and the sources & quantities along with a water balance statement.**
- **The capacity (dependable flow or yield) of the proposed source of water.**
- **The quality of water required, in case, the supply is not from a municipal source. (Provide physical, chemical, biological characteristics with class of water quality)**
- **Quantity of water requirement that can be met from the recycling of treated**
- **Wastewater. (details of quantities, sources and usage)**
- **Any diversion of water from other users? (Assess the impacts of the project on other existing uses and quantities of consumption).**
- **The incremental pollution load from wastewater generated from the proposed activity. (details of the quantities and composition of wastewater generated from the proposed activity)**
- **Details of the water requirements met from water harvesting and the facilities created.**
- **The impact of the land use changes occurring due to the proposed project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long term basis. Would it aggravate the problems of flooding or water logging in any way?**
- **The impacts of the proposal on the ground water. (tapping of ground water; details of ground water table, recharging capacity, and approvals obtained from competent authority, if any)**
- **Precautions/measures taken to prevent the run-off from construction activities polluting land & aquifers. (details of quantities and the measures taken to avoid the adverse impacts)**
- **Details of storm water management on site. (the provisions made to avoid flooding of the area, details of the drainage facilities provided along with a site layout indication contour levels)**
- **Will the deployment of construction labourers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation)?**
- **The on-site facilities provided for the collection, treatment & safe disposal of sewage. (details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal)**
- **Details of dual plumbing system if treated waste used is used for flushing of toilets or any other use.**

Scrutiny of the per capita water consumption: CSE has therefore assessed the actual per capita water consumption as well as water consumption per unit of area from the information provided by the project proponents. For this estimation minutes of the meetings of Haryana's State Level Expert Appraisal Committee has been reviewed. In total 51 meetings have been organized between 2008 and 2009. However, the minutes of 31st, 45th and the 50th meeting were not available on the website of Haryana State Environment Impact Assessment Authority (SEIAA) and hence have not been included in this analysis. Total water consumption and total occupancy mentioned have been taken to calculate per capita water consumption in lpcd.

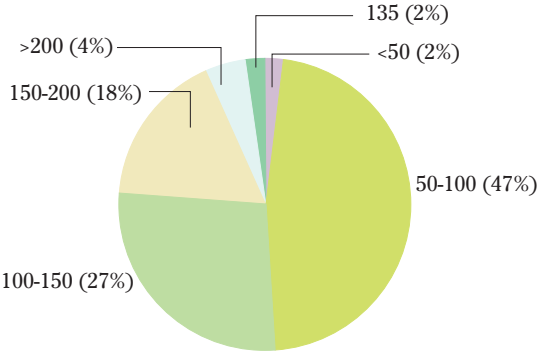
The review shows that only 2 per cent of the total projects had actually 135 lpcd consumption -- considered to be the norm -- while 22 per cent projects had per capita water consumption above 150 lpcd (see table 10 and fig 19: Per Capita water Consumption categories for Residential Buildings). Some estimations like 119 lpcd per capita water consumption for residential buildings are below the acceptable norm of 135 lpcd for large and metro cities. But there is a wide variation in the maximum and minimum figures -- as widely different as 226 lpcd and 48 lpcd respectively (see fig 20: Comparison of Per Capita Water Consumption for Residential Buildings). Close to half of the total projects -- 47per cent have per capita water consumption between 50-100 lpcd. Either these buildings are attempting to be highly water efficient or these are unsubstantiated estimates to receive environmental clearance.

Table 10: Per Capita Water Consumption categories for Residential Buildings in Haryana

Per Capita Water Consumption (lpcd)	Residential Building Projects	
	No. of buildings	Percentage
<50	1	2
50 -100	21	47
100 -150	12	27
150-200	8	18
> 200	2	4
135	1	2
Total	45	100

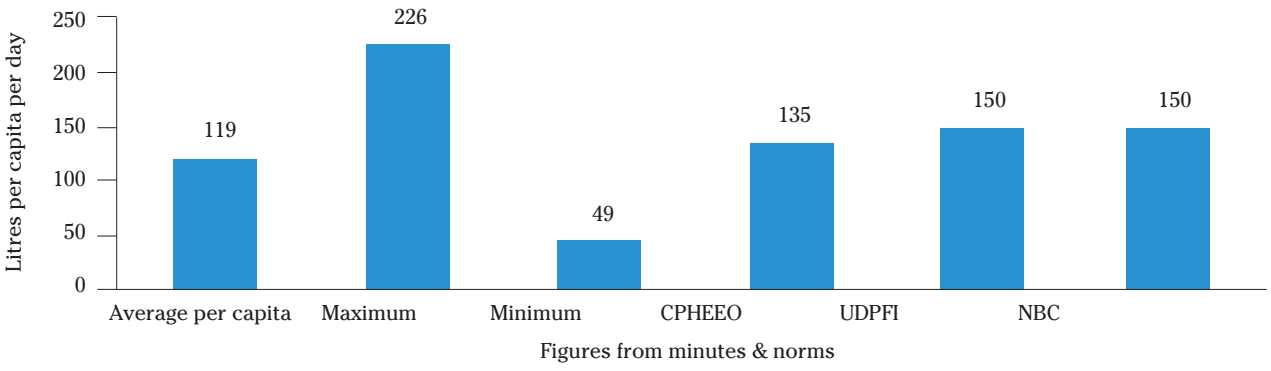
Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meeting

Fig 19: Per Capita Water Consumption Categories for Residential Buildings in Haryana (in percentage)



Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

Fig 20: Comparison of Per Capita Water Consumption for Residential Buildings



Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

There is a marked variation in the stated water consumption. There are also various norms for per capita water consumption (see box 20: Benchmark Norms for Per Capita Water Consumption in India). There is lack of conformity and uniformity in estimation of per capita water use.

In reality the actual water use could be higher or lower than the stated norms. Since the monitoring is weak and there is no 100per cent metering, the water consumption can vary from the stated estimates.

Similarly, the assessment of the commercial, institutional and mixed use projects show a wide variation in the per capita figures (see table 11: Range of lpcd for Buildings in Different Categories and see fig: 22, 23, 24 and 25) Depending on the building type e.g office, restaurants, cinema, hospitals etc. the National building Code 2005 has specified per capita water consumption. The benchmarks like 45 lpcd for office and 340 lpcd for hospitals is not comparable in the institutional category. Similar variation is possible in residential buildings for all the commercial, institutional and mixed use buildings.

Table 11: Range of lpcd for Buildings in Different Categories

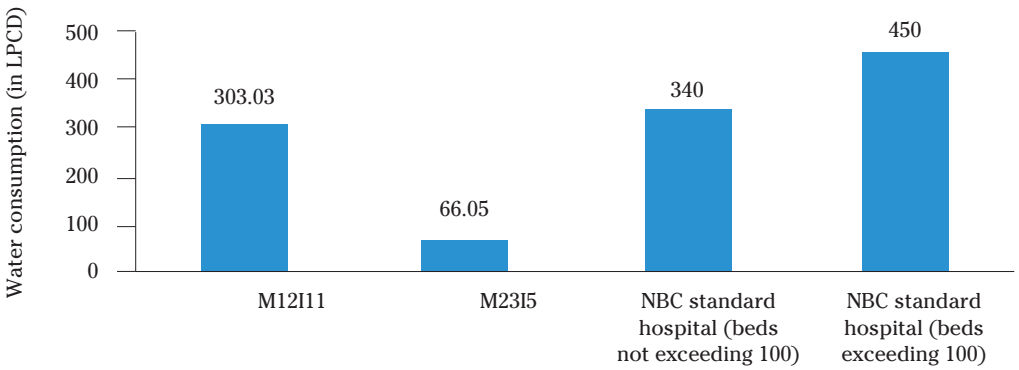
Category	Minimum (lpcd)	Maximum (lpcd)	Average (lpcd)
Residential	48	226	119
Commercial	18	97	54
Mixed use	22	226	100
Institutional	57	303	104

Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

It seems the EIA rules acknowledge the importance of assessing water deficit in areas where new projects are likely to come up . But in reality these clearances remain a mere formality.

An attempt has been made to compare the per capita water use in institutional buildings, a case of two hospitals is taken (see fig 21: Comparison between the Per Capita Water Consumption for Hospitals). Amongst the two hospitals hospital 1 is located in Plot NO. 2, Sector-5, IMT Manesar Gurgaon, Haryana (coded M12i11). It is a 250 bedded hospital with a total water requirement of 430 KLD. As the total occupancy is 1419 persons the per capita water requirement is 303 lpcd. The hospital 2 is a medical college & teaching hospital project at village Nalhar in Mewat, Haryana (coded M23i15) is a 404 bedded hospital. Its per capita water requirement is 66 lpcd based on the stated total water requirement of 827 KLD and 12527 as total occupancy. In comparison to the NBC standards for per capita water consumption for hospitals with more than 100 beds, they are well below the mark. Are they actually super water efficient or are understating the requirement, especially hospital 2 (M23i15)?

Fig 21: Comparison between the Per Capita Water Consumption for Hospitals



Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

BOX 20: BENCHMARK NORMS FOR PER CAPITA WATER CONSUMPTION IN INDIA

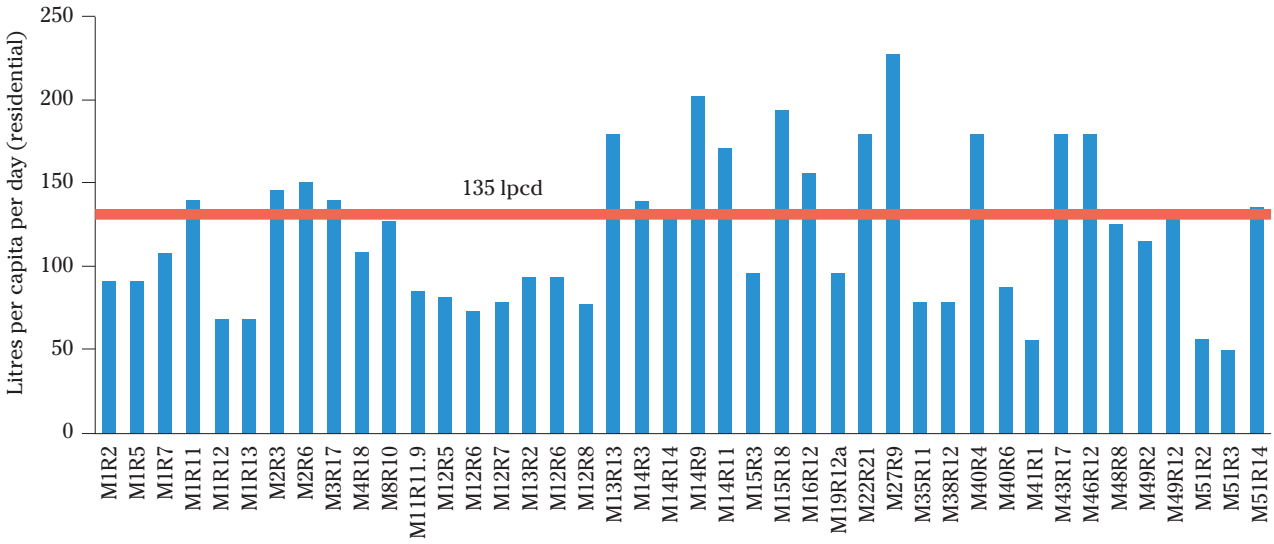
The criterion on which environmental clearance is granted to the projects is also not very clear. There are three major guidelines and norms which have recommended benchmarks for per capita water consumptions. The benchmarks are varied and there is no unanimity in the choice of benchmarks. They include UDPFI, CPHEEO and NBC standards for per capita water consumption. They range from 70- 200 lpcd depending on the size of the urban area in addition to type of water supply and sanitary system. 135 lpcd is generally accepted as an acceptable figure for calculating total water demand for a building and construction projects. But since there are no defined benchmark that is mandatory for calculating the water consumption.

Average Per Capita per Day Water Consumption Benchmarks

Norms/ Guidelines	Urban Development Plans Formulation & Implementation (UDPFI) Guidelines	Central Public Health & Environmental Engineering Organization (CPHEEO) Norms	National Building Code (NBC) standards
Water Consumption in Litres Per Capita Per Day (lpcd)	• 100 lpcd (Small towns) • 135-170 lpcd (medium towns) • 135-150 lpcd (Large & metro towns)	• 70 lpcd (towns with piped WS but without sewerage system) • 135 lpcd (Cities with piped WS with existing/ contemplated sewerage system) • 150 lpcd (Metropolitan & Mega cities with piped WS with existing/ contemplated sewerage system)	• 70-100 lpcd (For population upto 20,000 without flushing system) • 100 - 150 lpcd (population 20,000- 1,00,000 together with full flushing system) • 150 – 200 lpcd* (for communities with population above 1,00,000 together with full flushing system)

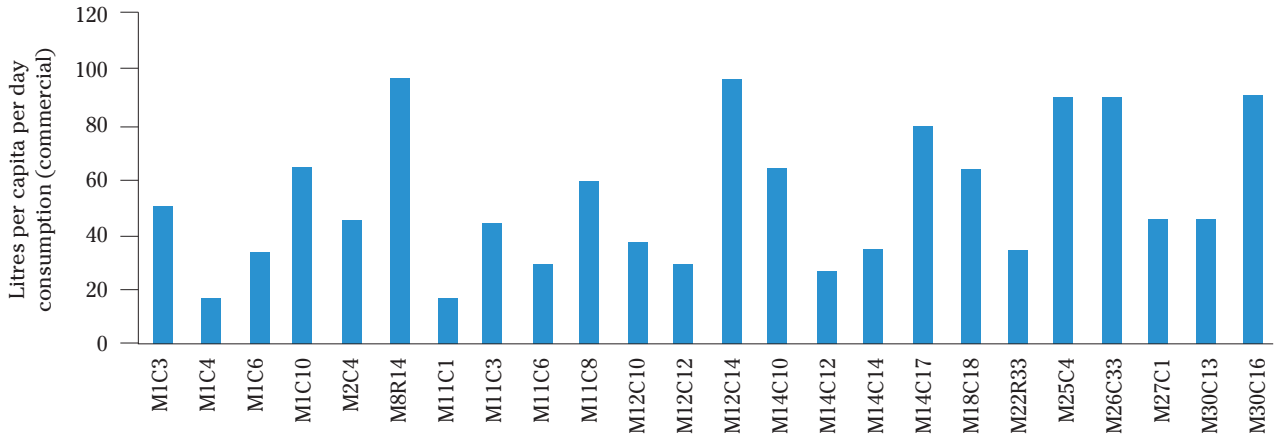
Note: * the value of water supply given as 150-299 LPHD (litres per head per day) may be reduced to 135 LPHD for LIG & EWS houses depending on the prevailing condition. Litres per head per day (lphd) can be equated to litres per capita per day (lpcd)
Source: UDPFI- UDPFI Guidelines, Ministry of Urban Affairs and Employment, Government of India, August 1996, http://mhupa.gov.in/w_new/SummaryUDPFI.pdf
CPHEEO - Ministry of Urban Development, Central Public Health and Environmental Engineering Organisation Manual on Water Supply and Treatment, Third Edition – Revised and Updated (May 1999), New Delhi
NBC- Source- National Building Code, 2005 by Bureau of Indian Standards (BIS)

Fig 22: Per Capita Water Consumption for Residential Projects



Source: Minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

Fig 23: Per Capita Water Consumption for Commercial Projects



Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

Fig 24: Per Capita Water Consumption for Institutional Projects

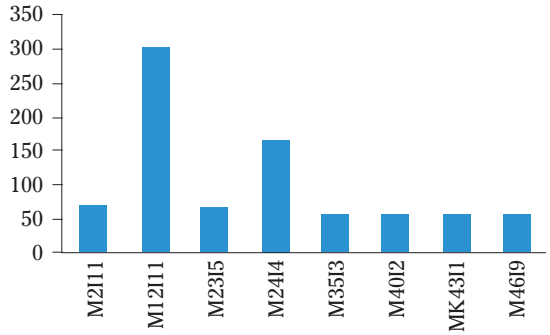
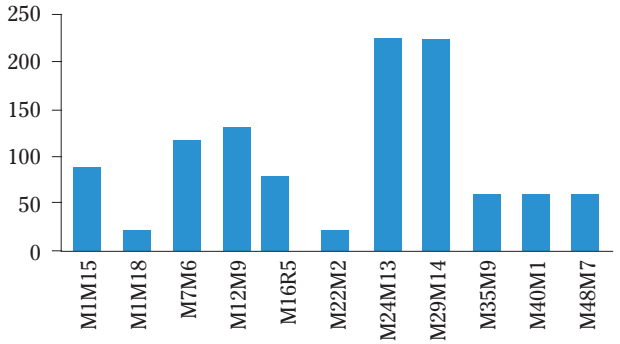


Fig 25: Per Capita Water Consumption for Mixed Use Projects



Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

Water consumption is not benchmarked against any known benchmark.

Water consumption per unit of area: Normally, water consumption is estimated per person per day keeping in view the individual consumption for drinking, cooking, bathing flushing etc. But, for certain uses like landscape, cleaning, cooling etc. water consumption per built up area of the building become important. (See box 21: Assessing water consumption per capita and per square meter). For the estimation of water consumption per unit of area, the total built up area is taken along with the total water consumption to arrive at water use per square meter. A total of 399 building projects from the minutes were analyzed, that include 143 residential, 147 commercial, 54 institutional and 55 mixed use building. The area wise water consumption has been calculated for all the four types of buildings based on the following formula, *Water consumption (liters per square meter) = total water requirement / total built up area.*

BOX 21: ASSESSING WATER CONSUMPTION PER CAPITA & PER SQUARE METER

Water consumption (Liters per capita per day): All the projects have been classified into 4 categories: residential, commercial, institutional and mixed use and their per capita water consumptions levels calculated. The projects relevant details like total water consumption, total occupants, total built up area from the minutes were listed and analysed. For calculating the per capita per day water consumption expressed in lpcd, the following formula was used,
Water consumption (liters per capita per day) = total water requirement / total occupancy

From all the projects listed in the minutes, 42 residential buildings were analysed since the total occupancy and water consumption was stated for them as opposed to the rest. Similarly, 24 commercial, 11 mixed use and 8 institutional entries have been assessed to calculate their per capita per day water consumption with the same formula (see fig 31). In total 85 entries have been analyzed for the calculations of water consumption (lpcd) from the Haryana SEAC's minutes of the meeting.

The various projects which have been considered in the meetings have been analyzed for the following:
- **water consumption in liters per capita per day (lpcd)**
- **water consumption in liters per square meter (lspm)**

Project Categories
A total of 927 entries in the 51 meetings have been assessed. All the projects have been grouped into the following five categories:
- **Residential which include group housing and plotted residences etc.**
- **Commercial which include shopping malls, commercial complexes, retail and offices etc.**
- **Mixed use which include SEZs, townships, IT parks, area development projects.**
- **Institutional which includes schools, colleges and hospitals etc.**
- **Industrial**

(Note: The industrial category has not been included in the analysis of water and wastewater, but only in the last sub-section on project clearance)

Project Coding
- **The projects were coded for the purpose of representing them on the graphs. Following is an example to explain how a project code is to be understood. For example, a project coded M1C2, implies that M1 is the meeting number, C denotes commercial while 2 stands for the project number in the meeting.**
- **Similarly R denotes Residential, M denotes Mixed use and I denotes institutional in the graphs.**
- **Some projects have been repeated during the course of the 51 meetings as they have been taken up more than once for assessment. Hence the term 'entries' has been used to define the total number of projects (with the repetitions) being reviewed by the panel.**

There are no benchmarks or norm for water consumption per unit of area. The purpose is to assess the nature and extent of variations in the per square meter water use for the same types of buildings as this includes common area usage. There is a huge variation in the lspm for all the types of building categories – ranging from 0.2 to 26 lspm for residential buildings (see table 12: Area wise Per Capita Water Consumption categories for Various Building). The average litre per square meter for commercial, institutional and mixed use buildings is much higher than the residential buildings. The maximum is 88 per cent, 73 per cent, 70 per cent and 78 per cent of all residential, commercial, institutional and mixed use buildings have water consumption between 0-6 lspm respectively (see table 13: Range of lpsm for various categories of buildings). It is possible to consider water consumption benchmarks for per unit of area as an indicator of water consumption at the building level.

Table 12: Area wise Per Capita Water Consumption categories for Various Buildings

Category	Minimum (lpsm)	Maximum (lpsm)	Average (lpsm)
Residential	0.02	26.5	3.9
Commercial	0.3	15.3	4.8
Mixed use	0.3	23.1	6
Institutional	0.9	28.5	6.3

Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

Table 13: Range of lpsm for various categories of buildings

Water Consumption in litres per square meter (lspm)	Residential		Commercial		Institutional		Mixed Use	
	No. of buildings	per cent	No. of buildings	per cent	No. of buildings	per cent	No. of buildings	per cent
<0	2	1	2	1	0	0	1	
0-6	125	88	111	73	40	70	38	
6-12	11	8	28	18	7	12	7	
12-18	0	0	7	5	6	11	1	
18-24	3	2	0	0	0	0	2	
>24	1	1	4	3	4	7	0	
Total	142	100	152	100	57	100	49	

Source: Review of the minutes of the Haryana State Expert Appraisal Committee (SEAC) Meetings

How environmental clearance and NOCs are given in water stressed areas?

Yet another emerging policy issue is how new buildings are sanctioned in water stressed areas. All project proponents are required to obtain no objection certificates (NOC) from the Haryana Urban Development Authority (HUDA), and Central Ground Water Board (CGWA) as in the case of Haryana and the concerned agencies in other states. It seems the EIA rules acknowledge the principle of assessing water deficit in areas where new projects are likely to come up. But in reality these clearances remain a mere formality.

Why projects are being cleared in areas where water situation is already dismal

Apriori approvals without consent: In several cases it has been noted that environmental clearance has been accorded to projects even prior to them receiving NOC and permission for water supply from water utilities (HUDA) or permission to extract groundwater from CGWA. The official from MoEF mentioned

that it is very difficult to set or implement a pre condition of NoC or permission for water supply or ground water extraction for granting environmental clearance. With the load of projects and the procedural time of acquiring a NOC would lead to delays especially for the project proponent. Therefore, on trust basis environmental clearance is granted to the projects with an assurance from the project proponents that the required permissions would be received from the water supply boards or CGWA or both, as per the requirement mentioned in the form. But due to weak post-project monitoring it is difficult to verify. Thus, the EIA process loses the opportunity of assessing the carrying capacity of the locality/neighbourhood to sustain the new project.

The 16th meeting of Haryana State Level Expert Appraisal Committee held on 12 and 13 April, 2009 illustrates an example from the proposed commercial complex "Legend Heights" at village Naurangpur, Sector-80, Gurgaon, Haryana. This has been developed by innovative infrastructure developers private limited. The SEAC rated this project with "Gold Rating" and granted it environmental clearance.

One of the conditions in the construction stage states that, -- "Permission from competent Authority for supply of water shall be obtained prior to construction/operation of the project." In the same meeting EC was granted with gold rating to the proposed 'Township Project" at Sector 99, village Dhankot, Gurgaon of M/s Uppal Housing Limited. The conditions for the operational stage mentions that the project will be operationalized only after commissioning of the infrastructure for supply of water by HUDA or with permission of the CGWA for using ground water from the tubewell/ borewells. Also in no case except as provided by the CGWA, the ground water will be exploited and developed. But the concern is over the weak monitoring system and poor check and control system. How it could be ensured that project proponent is following the conditions regarding permission for water supply and extraction. There is no evidence of such monitoring.

Environmental Clearance in Water Stressed Areas: It is therefore emerging quite clearly from the minutes of the meeting that environmental clearances are being granted to big projects that are in water distress areas. The minutes clearly mention that these areas presently and in the near future will not have any water supply from utility. Further, they are also in the notified zone as per Central Ground Water Authority (CGWA) with respect to groundwater extraction. So, the question is why are these projects being given environmental go ahead when the water situation is already dismal and would only decline if similar projects continue to come up. Example in the 5th meeting of the Haryana SEAC held on 23-24th March 2009 have granted EC to 3 projects from DLF despite recognizing that water scarcity in the respective areas.

Weak scrutiny of information provided by the project proponents compromises the system.

- M/S DLF New Gurgaon Home Developers Pvt. Ltd.- EC for Group Housing Project " DLF New town Height" at Sector-90, Village- Hayatpur & Wazirpur, Gurgaon.
- M/S DLF New Gurgaon Home Developers Pvt. Ltd.- EC for Group Housing Project " DLF New town Height" at Sector-86, Village- Nawada Fatepur, Gurgaon
- M/S DLF New Gurgaon Home Developers Pvt. Ltd.- EC for Group Housing Project " DLF New town Height" at Sector-91, Village:- Meoka, Gurgaon

The minutes state that, '*The SEAC has recommended the grant of EC subject to certain conditions. It was found that this project falls in the 24 villages notified by the CGWA for regulation of ground water. In such areas no exploitation or development of ground water is permissible except with prior approval of CGWA. HUDA will not be able to supply water to this project in 3 years, nor the project proponent has given any scheme*

of arrangement of water for construction as well as operational phase.' Therefore, the approval or clearance from CGWA for abstraction of ground water will be required before the environmental clearance could be given by SEIAA.

The estimation of waste water and its treatment are critical for proper planning and monitoring.

Similarly, several other projects in the same meeting have been granted environmental clearance, even though it is clearly mentioned that Haryana Urban Development Authority (HUDA) would be able to supply water only after 3-5 years. But, with the current state of affairs the assurance is questionable. In case the HUDA is not able to keep its commitment after three years then the projects which have been granted environmental clearance would be constructed and operate without piped water. This would obviously put even greater pressure on the groundwater sources (especially in the groundwater notified zones) which would be the only source of water for all the new and upcoming development. Some examples of this from the 5th SEAC meeting areas follows,

- M/S Raheja Developers Pvt. Ltd.- EC for Commercial Complex Raheja Mall, at Sector-47, Gurgaon.
- M/S DLF Retail Developers Pvt. Ltd. - EC for Construction of "DLF Corporate Green" (IT Office-Cum- Retail Complex) at Sector-74A, Gurgaon, Haryana.
- M/S Parsvnath Developers Ltd.- EC for proposed Parsvnath Mall, Commercial Complex project at Sector-8, near Tau Devi Lal Park, Sonipat. Haryana

This issue will have to looked at seriously as ground water situation is reaching a crisis in cities and especially in the NCR region. It has been reported that in Noida, Greater Noida and Ghaziabad, water table has sunk by 60 ft in the last five years due to frenzied construction activities. In the three cities the water table has sunk to 130 ft from 70ft in 2004, depleting, on an average, by 12ft every year. The sudden boom of construction of apartments, commercial centres, malls etc. has led to the rapid decline of water table. The powerful builder lobby uses powerful pumps to extract water, without any permission from the CGWA. In areas where multi storied buildings have been constructed water table has plunged further due to the deep foundation of the buildings. The water table stands at about 118ft in these areas.

Inconsistent information - contradictions in form1 and 1 A: Yet another lacunae in the environmental clearance process is weak scrutiny of information provided by the project proponents. The project forms (1 and 1A) for the proposed residential colony 'estate one' located at village Rakpura /Hussainpora and Bhatin, Ludhiana Punjab have several contradictions. The project in form 1 states the total domestic water requirement as 902 KLD on complete occupancy which is to be met by borewells. But the water requirement in the form 1A changes, twice. In the table on daily water requirement calculation the total water requirement is stated as 1321 KLD including domestic and horticultural water requirement. But in the next page wherein water balance diagram is give the total water requirement mentioned under domestic totals to 1330 KLD. In the diagram horticultural uses are included in domestic uses along with HVAC, flushing and recreational.

Similarly, in the form 1 and form 1A for a proposed city centre in Patna, there are several anomalies. The form 1A mentions that of the 565 KLD of water requirement, 340 KLD would be fresh water which will be sourced from 2 borewells. Patna Municipal Corporation tankers would be called in only in cases of emergency. However, in the same form on question pertaining to impact on groundwater, the project proponent states that 'groundwater will be abstracted in case of failure of municipal water supply'. Further, in the same form the water requirement is calculated per person for hotels as124 lpcd which includes domestic and flushing uses of upto 44.6 KLD. However, this excludes water requirement for kitchens, laundry, health clubs, employee uses, public toilets, and HVAC. Residential water

use is calculated on the basis of 200 lpcd, when the norm is 135 lpcd. Thus, 200 lpcd in this case includes only domestic and flushing use.

The figures also deviate hugely from the stated norms. The hotel water requirement is stated as 224 lpcd excluding kitchens, laundry, health clubs, employee uses, public toilets, and HVAC uses. But in the National Building Code 2005, the hotel water requirement is mentioned as 180 lpcd. There is a difference of almost 100 KLD in the water requirement stated for malls and multiplexes in the two documents. The form 1A mentions 273.3 KLD whereas the other related document states water requirement as 368.3 KLD.

In yet another case – the form 1 and 1A for a mixed land use development in Mohali, the total water requirement is based on residential water consumption norm of 135 lpcd. The project with 31,21,478 square meters to be built at a cost of 1311 crores has stated the total requirement of 10551 KLD. But in another place of the report it mentions the total water requirement for residential use as 17958 KLD. This includes water for domestic and non domestic water use including flushing and horticulture. Even the wastewater estimation of 8968 KLD does not corroborate with either 10550 KLD or 17958 KLD based on 80per cent principle.

In several forms that were reviewed for the buildings and construction projects it was observed that the projects proponent provides objective answers and tends to avoid reasons, explanations and detailed calculations.

Error in waste water estimation: The estimation of actual generation of waste water and its treatment are critical for proper planning and monitoring. Error or inconsistency in these estimations can create loopholes. Capacity of in-situ treatment facilities will also depend on these estimation. This needs attention as these estimations are one of the key bases for granting environmental clearances. Accuracy and transparency are important.

Reports are poorly drafted. Details of water efficient fixtures, water efficient landscaping, irrigation methods, STP technology are often not mentioned. Water audits are also omitted.

Wastewater generation calculation is generally based on a thumb-rule that, amount of wastewater generated in a building is generally 80 per cent of total water intake. By this calculation if a building is consuming 100 litres of water the wastewater generation would be around 80 litres. But, several cases in the minutes had put forth their amount of wastewater generation and its reuse which are conflicting and unclear.

For example, in the 2 meeting of Haryana SEAC held on 19-20 August 2008, M/S Uppal Knowledge Park Pvt. Ltd (Construction of School Complex "VEEDAAN VALLEY" Sector 49, Sohna Road, Gurgaon came up for discussion. The project states that 'The total water requirement will be 165 KLD out of which 90 KLD for domestic use and 75 KLD of treated waste water will be used to meet with the balance demand after treatment in the 90 KLD of STP. The project proponent further informed that 75 KLD of waste water will be generated which will be treated in the STP halving 90 KLD capacity. It is not clear the nature of reuse for 75 KLD of treated wastewater. In case if it is only for consumable uses like irrigation, watering of playgrounds etc. then the wastewater generation and STP capacity is justified. Otherwise, there is excess wastewater and the STP seem to be of lower capacity.

Similarly, in another case from the same meeting of the same builder there are other concerns. The project proponent is Uppal Hotels Pvt. Ltd for the construction of shopping mall- cum-multiplex, at Jagadhri-Chhachharauli road, Jagadhri district in Yamuna Nagar, Haryana. The project proponent states that, 'The total water requirement will be 250 KLD out of which 160 KLD of fresh water which will be met

from municipal supply/borewell and 90 KLD of treated water will be recycled to meet with the balance demand for flushing, mopping/cooling, gardening and system backwash. The total waste water generation from the unit will be 213 KLD which will be treated in the STP having capacity of 255 KLD and treated waste water will be recycled for HVAC cooling resulting into zero discharge.' It is mentioned that project proponent will generate 213 KLD of wastewater and treat it for reuse in HVAC cooling. If the entire amount is used for HVAC cooling, what is the source of 90 KLD of treated wastewater being reused for flushing, mopping/cooling, gardening and system backwash? Therefore, the distribution is not adequately clear in this case.

Large building projects rarely install groundwater withdrawal meters to scientifically assess and monitor water withdrawal.

In the third meeting dated 26- 27, August, 2008, the project proponent Bestech India Pvt. Limited has proposed for the construction of IT Complex, Parkview Business Tower, Village Badshahpur & Fagilput Jhassa, in Gurgaon. The project proponent has proposed, 'the total water requirement at 1048 KLD to be supplied by HUDA. The total waste water generation will be 330 KLD which will be treated in the STP having capacity of 400 KLD. The whole treated water i.e. 330 KLD will be recycled/ reused for HVAC cooling, DG cooling make up, flushing, horticulture etc. But, by the thumb rule of 80 per cent the wastewater should be around 838 KLD. Accordingly their STP is also of very low capacity.

Similar problems of wastewater calculation are noticed in the case of Ansal property and Infrastructure Ltd. construction of commercial complex at Ansal Palam Vihar Block C-2, District Gurgaon. The total water requirement will be 250 KLD which will be supplied by HUDA. It was also informed that the total wastewater generation will be 104 KLD which will be treated in the STP having capacity of 125 KLD. The whole treated water i.e. 90 KLD will be recycled/reused for cooling, DG, flushing, horticulture resulting into zero discharge. According to the calculation the wastewater generation should be around 200 KLD. There are also doubts that with about 200 KLD of wastewater and only 125 KLD STP, how the project is going to achieve zero discharge? Also the major water using activities in a building like cooling DG, flushing, horticulture would be met by 90 KLD of treated water. Then what are the other activities for which 250 KLD of freshwater from HUDA will be used?

NATURE AND QUALITY OF INTERVENTIONS FOR CONSERVATION PROPOSED BY THE PROJECT PROPONENT

The water conservation component in the EIA process definitely leaves much to be desired. Although certain important steps like rainwater harvesting, wastewater treatment, stormwater management etc. are mandated but aggressive action, innovation and diversity in conservation steps is definitely missing. The most commonly quoted conservation steps include reuse of treated wastewater for flushing, landscaping and Heating, Ventilating, and Air Conditioning (HVAC) system and installation of dual plumbing system to transport recycled water for reuse purposes (see table 14 : Nature of Proposed Water Conservation in the EIA process).

But, a few reports and forms analysed by CSE mention or indicate other critical measures that could be useful in assessing the effectiveness of the system. For example water audit is not mentioned as a conservation measure to progressively assess water use and reduce water wastage and use. In addition, details of water efficient fixtures, water efficient landscaping, irrigation methods, STP technology is often given amiss. It is also observed that builders promote their projects with features like swimming pools, club house, ornamental water bodies, but their details like water use, source is conveniently ignored.

Although the project proponent claims that the project would be water conserving

Table 14: Nature of Proposed Water Conservation measures in the EIA process

Water/wastewater related interventions in the construction stage	Major conservation measures that are mandatory in operational stage	Most commonly quoted conservation measures	Other conservation measures rarely mentioned
• Drinking water facility for the laborers • Onsite toilet and sanitation facilities for laborers • Onsite sanitation facilities to handle sewage of the laborers • Storm water and surface run off management	• Rainwater harvesting and groundwater recharge • Treatment of wastewater • Stormwater management • Water quality checks	• Reuse of treated waste-water in horticulture, flushing and HVAC • Dual plumbing system	• Water audit • Nature of unpaved areas for improved recharging • Details of water efficient fixtures • Water efficient landscaping • Irrigation methods • Technology of the STP • Metering of water sources and use • Precautions for handling and reusing treated wastewater • Details of any proposed swimming pool or ornamental water body/use for beautification of the landscape • Seasonal water requirement, waste generation and disposal • Total water savings • Details of the sanitation facilities during construction stage • Details of water purification system e.g RO and its discharge

total water savings from the proposed measures adopted is rarely mentioned as is the seasonal variations in water use and wastewater disposal details. The declining water quality has led to builders installing apartment level large RO systems, details like water discharge, quality and use of discharged water is never mentioned.

It is reasons like this that water conservation measures appear to be cosmetic and less effective to reduce impacts on the environment.

Monitoring — Compliance and Violations

Non compliance in Critical Environmental Clearance Conditions: There are a few reviews of the entire EIA process by other agencies not necessarily focused on the building sector. But these reviews have exposed larger systemic problems with the overall process that also has bearing on the EIA for buildings.

As cities will plan more densification the local traffic impact of new development and built up spaces will be severe.

Kalpvriksh's report 'Calling the bluff' highlights that several critical conditions mentioned in the environmental clearance letter under the heads specific and general are not usually complied. If these social and environmental conditions are not complied with then it defeats the purpose of environmental safeguards. Assessment of the past projects with respect to their conditions and monitoring reports show a variance especially with respect to effluent treatment, green belt, solid waste disposal etc. In terms of groundwater quality, 23 projects across India had conditions related to groundwater quality, but just eight non-compliances were tracked from the monitoring reports. Similarly, in terms of rainwater harvesting, of the 94 projects with the conditions only 30 stated non compliance in the monitoring reports.

CSE in its analysis also found these inconsistencies and non compliances (see box 22: Compliance, What Compliance?).

BOX 22: COMPLIANCE, WHAT COMPLIANCE?

This is a quick review of a few cases to demonstrate poor state of monitoring and compliance.

Case 1: Select City Walk developed by Galleria Properties Management Services Pvt Ltd, - Plot No. A-3 & P-1B, District Center, Saket, Delhi

According to the minutes of the 75th meeting of the Committee held on 3rd September 2008, the built up area of the mall is 24174.66 sq. mtr. It was accorded Environmental clearance by MoEF on 14 February 2007. It is stated that the project would source 697 KLD, require no groundwater and discharges 300 KLD of wastewater. But, even though the unit was given Environmental Clearance on 14 February 2007 but DPCC was directed by MOEF to take legal action against the unit for starting construction before obtaining Environmental Clearance. The unit has also filed an affidavit which does not give an item-wise compliance of all the Environmental Clearance conditions. According to DPCC the unit was found to be violating the environmental laws and the letter has been issued by MoEF to Chairman, DPCC on 14th March 2007 to initiate legal action against the unit under the provisions of EPA.

The unit was also pulled up by DPCC in 2011, for not filing details like architectural drawing, adequacy report of ETP, for authorization under HWM Rules and not installing solar water heating. In 2010, the DPCC raised a serious issue with the developer. It stated that the developer Select Infrastructure Pvt. Ltd. has not applied for any consent for a separate identity of the hotel. It has applied for consent to establish for shopping mall cum commercial complex. DPCC has filed the prosecution against the project proponent as per the provisions of environmental laws. In addition, a writ has also been filed by the applicant in the High Court against the filing of prosecution. The unit was asked to clarify whether the hotel is a part of the shopping mall / multiplex. In case they are part of the same complex the unit had got its consent application, project report and adequacy report amended by incorporating the details of the hotel. DPCC also sent a letter asking the developer to clarify about the activity of the existing complex and reason for not disclosing the hotel activity in the environmental clearance and consent to establish application.

Source: Minutes of the 53rd meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 30.4.2008, Minutes of the 58th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 28.5.2008 and Minutes of the 75th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 3rd September 2008

Case 2: Brightways Housing & Land Development, Construction of Office Cum Shopping Mall, Plot no 7 District Centre Jasola New Delhi

The unit's built up area is 21096.513 sq m and the minutes state that it has not mentioned any source of water. The unit's wastewater generation is mentioned as 70 KLD. The list of violations of environmental laws by the unit is substantial. The unit applied for Consent to establish on 1 November 2007, but did not reply to DPCC's letter to file environmental clearance. The SIT on inspection in July 2008 found that the unit had one borewell without permission from CGWA. The team also found that the unit had waste water generation of 70 KLD, but STP of only 60 KLD was under construction.

The MoEF had also postponed the hearing for its environmental clearance which was indicated on the MoEF website. Since the unit has a total built up area of more than 20,000 sq.mts it requires EC as per the EIA notification of 2006. The SIT report indicates that the unit has completed its construction by June, 2007 and was awaiting the completion certificate. SIT also indicates that the unit is drawing water from the ground and the total consumption of water as per the CTE is 206 KLD. According to the inspection report the unit was showing a discharge of 70 KLD vide its CTE application. But, for consumption of 206 KLD as per the norms, the discharge should be in the range of 160 KLD. The unit has not provided any facility for treatment of waste water so far and claims to be constructing an STP of 60 KLD which is any case would be grossly insufficient to treat the waste water. The report also claimed that the stack height of D.G. Set of 1500 KVA should be higher as per appropriate norms.

In terms of the project cost also the unit understated. The project cost is claimed to be Rs. 66 crores whereas MOEF has adjudged it to be Rs. 100 crores. All the shops have been sold by the developer in the premises according to the developer. In July 2008, the unit was de-listed unit for violating and continuous violation of EPA d by MOEF. But MoEF was contemplating the delisting decision and proposed action against the unit for repeated violations. On 21 August 2008 the unit claimed in a personal hearing in DPCC that it had paid penalty of Rs. 28 Lakhs to DDA as compounding fees for construction without sanction. The unit pleaded for a lenient view in the matter. The committee after deliberations reduced the damages as cash penalty to 1 per cent of the project cost and Bank Guarantee of 2 per cent of the project cost as in similar cases. The unit was thereafter asked to file damages of Rs. 1 crores and Bank Guarantee of Rs. 2 crores valid for three years by 17 September 2008. The MoEF also directed the PP to apply fresh application for environmental clearance.

Till October 2008 the unit had not complied with the orders of the CMC. In December 2008, the unit requested the committee that in the event of economic meltdown it was finding it difficult to pay penalty and bank guarantee money. Further, the unit stated that it has only a small portion of the mall is operational which sums up to 50 per cent of the total area. It therefore sought a lenient view on this account. The committee also acknowledged that the unit had already paid Rs. 28 lakhs to DDA as a compounding

fee and thus the environmental damages may be reduced to Rs. 72 Lakhs and the Bank Guarantee be reduced to Rs. 1.5 crores valid for three years.

However on 4 May 2009 during the inspection the team found that the unit is continuing to violate the environmental laws. The unit was withdrawing 100 KLD groundwater from the borewell which was their only source of water, without CGWA permission. The DPCC directed the unit to file for permission from CGWA for borewell and comply with all the deficiencies observed during the inspection. The unit had also not submitted the compliance report regarding bank guarantee of environmental damages by 7 October 2009.

Source: Minutes of the 75th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 03.09.2008, Minutes of the 81st meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 15.10.2008, Minutes of the 89th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 11.12.2008 and Minutes of the 128th meeting of the Committee Constituted for Deciding the Consent under Orange Category, held on 07.10.2009

BOX 23: HARYANA HAVEN FOR DEVELOPERS

Proximity to Delhi, aggressive real estate development, established commercial and business hub etc. are some of the reasons that Gurgaon gained national prominence in no time. Other sleepy towns in Haryana like Faridabad, Dharuhera, Sonepat etc. are beginning to realize their worth for residential, industrial and commercial activities. The real estate market which was dominated by big developers like DLF, Ansals, Parsvanath, Omaxe few years ago is witnessing competition from several small time players and individual investors.

The real estate boom has been to a large extent supported by the Haryana government which has been very keen to arrange sufficient infrastructure and allow concessions to developers and builders. Besides, neighboring Delhi, availability of land and the scope for further development were the main catalyst for development and attraction for developers. Haryana government demonstrated its intention when it earmarked 58 new sectors covering over 14500 Ha. as residential zones in the Master plan 2021. A large tract of this land is envisaged for development of malls and commercial buildings.

Further, licenses have already being granted to group housing projects with total area of more than 490 acres. Several developers claim to have letter of intent from the government and around 600 licenses are including commercial projects, are under consideration. As far as Gurgaon is concerned, it has over 75per cent of Haryana's share of applications for licenses and clearances of residential projects.

Another issue with the building development projects is with transparency and information communication. According to the Times of India report in March 2011, the consumers who are investing their money in the real estate are not provided adequate information by the builders. Even after the Town and Country Planning department of Haryana in 2011, issued orders for builders to display licenses and building clearances details on their advertisement, adherence has been poor.

Source:
Anon, 2008, New Vikas Rikhye, Residential Projects in Sector of Gurgaon covered in Master Plan 2021, blog on real estate, available http://www.vikasrikhye.com/2008/09/18/new-residential-projects-in-sector-of-guraon-covered-in-master-plan-2021/
Chowdhury Tanushree Roy, 2011, Lack of reliable info on housing projects worries buyers, The Times of India, gurgaon, March 13, http://articles.timesofindia.indiatimes.com/2011-03-13/gurgaon/28685868_1_builders-advertisements-licence

Metering for Monitoring- Missing: Wherewithal for monitoring has also not been spruced up. With regards to the groundwater extraction and use, metering is extremely crucial. There is discrepancy between the amount mentioned in the form 1A and the actual ground water extraction during and after construction. This un-metered withdrawal provides immense loophole to the developer and builder to

withdraw water at will with little regards for the aquifer status. Large building project rarely install groundwater withdrawal meters to scientifically assess and monitor water withdrawal. Overall weak post project monitoring including meter functioning and accuracy, virtually absolves developer of over extraction.

The environmental clearance for buildings include traffic impact assessment. But its scrutiny and assessment is either very weak or nearly non-existant.

Regulatory Authorities: Weakening scrutiny: The Central Ground Water Authority (CGWA) regulates and controls development and management of ground water resources in India. It has notified 43 critical/ overexploited areas in India including in NCT Delhi, Haryana, Punjab etc. due to large scale extraction of groundwater and decline in the groundwater table. In these areas the concerned deputy commissioners/ district magistrates have been directed under Section 5 of Environment (Protection) Act, 1986 to regulate ground water development in these notified areas. In these notified areas construction of new ground water structures is prohibited. Infact, permission of drilling tubewells is granted only to the government agencies responsible for drinking water supply.

Earlier groundwater permission required renewal every two years, but CGWA has discontinued it since. This has weakened the monitoring system further. According the CGWA, the authority is constrained due to low manpower. Infact, according to CGWA officials, there are hardly any official who can undertake site visits across the country and report on non-compliance and over extraction. Everyday, numerous applications are received by CGWA for approval of groundwater extraction. This leaves the officials at the authority with very little time to actually monitor the buildings and sites onsite that have been granted permission previously. As a result, the CGWA requests the SPCB officials visiting the buildings to also check for groundwater besides the air and water quality.

There is lack of clarity and little information available on the impact of such an arrangement in terms of coordination and information exchange. In the environmental clearance conditions the SEAC generally states that CGWA permission is mandatory for grant of the clearance. But, in parts of UP especially projects proposed for Noida and Greater Noida, the committee rarely mentions this. As a result, only 10 per cent of the projects come to CGWA for permission. Since water table is relatively high in these areas, there is little felt need for permission and regulation of groundwater even amongst the committee members, according to CGWA. In Delhi, the permission given by the CGWA for rain water harvesting is being widely misused. Builders and residents often dig borewells under the cover of RWH.

Lack of Sustainability Approach: It is known that water use and water demand is bound to increase over time due to a variety of factors including water population increase, lifestyle changes, aging infrastructure, leakages etc. But, in the EIA process only the present water demand, use and wastewater generated are required to be furnished. There is absolutely no reference to future plan of action with regards to meeting water demand and wastewater management. The developer is not required to declare and submit details on how they are going to meet the growing demand and proportionate increase in supply along with wastewater treatment capacity. The form 1A does not specifically require the Project Proponent to present any kind of projections based on appropriate projection techniques for infrastructure capacity for waste and wastewater management, water demand etc. Thus EIA cannot deal with the impact assessment in a dynamic manner.

Clearly, therefore, EIA rules in the water sector will have to be revisited for greater scrutiny, precision in targets, accuracy of resource assessment and strong action on water conservation.

4. EIA and Traffic

Environmental clearance of buildings will have to look beyond buildings – at the neighbourhood impacts. This is the future challenge in cities where the built up area will increase several folds in the coming decades. As cities will plan more densification at the city centre the traffic impact of this development will be severe in already gridlocked cities.

The growing motorization and the ever worsening mobility crisis in which personal vehicle usage is marginalizing the public transport, cycling and walking, has added another urgent dimension to impact assessment of buildings in cities. This is especially true for large commercial buildings that induce and attract additional traffic in the neighbourhood. This is already becoming a serious cause of tension in many localities of Indian cities.

In Delhi for instance the resident welfare association of the Greater Kailash II, a posh colony in South Delhi, has filed a court case against the proposal to convert the Savitri commercial complex into multiplex integrated with other commercial development. As it is very strategically located at the entry junction of the colony that is also a gateway to substantial traffic of the South Delhi, the local residents fear traffic deluge. Similar phenomenon has been observed in many prime shopping mall areas like Saket in Delhi and so on. Both induced traffic at its entry and exit points, adjacent arterial roads, and also the parking spill over cause serious traffic and congestion and makes the area unliveable.

Also the next stage of urban renewal mission are expected to integrate the principle of transit oriented development that will bring jobs, home and recreation close to enable walking, cycling and public transport with high safety index. The environmental clearance process will have to align with these requirements to mitigate traffic impact of new commercial development. At present the environment clearance rules for buildings include traffic impact assessment. But its scrutiny and assessment is either very weak or nearly non existent.

What EIA demands to know on traffic impacts?

The form 1A relate directly to traffic and parking related issues and list only three queries:

- Will the proposal create shortage of parking space for vehicles? Furnish details of the present level transport infrastructure and measures proposed for improvement including traffic management at the entry and exit to the project site
- Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc. with the areas under each category
- Will there be significant increase in traffic noise and vibrations? Give details of the sources and the measures proposed for mitigation of the above

During the last decade several attempts made to reform the EIA rules has faced strong resistance from the building industry.

Of the three questions only two questions are more specific to the traffic impact on the surrounding areas and demands management plan. The third question refers to the internal traffic movement in project site.

In response to the first question most of the projects provide a standard response about the number of parking spaces that the project would provide including open and covered. The problem with such simplistic response is that it provides parking figures which is only indicative of availability and not management to curtail

parking spill overs and parking pricing strategies. It seems that little or no assessment of the projected demand for parking is undertaken by the project proponent and the committee once the project is operationalised. It does not make any assessment of the parking spill over, and look at the need for zero tolerance for surface parking in public spaces around the project area.

The issue of peak parking demand in terms of either day or week is also not mentioned in the question as well in the responses. A mall can have very high rush or inflow of visitors during a weekends and evening peaks during the week, which can lead to traffic problems in the area and also accentuate air pollution. In fact the environment clearance rules demand assessment of the air quality of the project area. But traffic emissions are not included in this estimation.

The forms reviewed by CSE show that none of these concerns have any mention in the reports filed by the project proponents.

The traffic impact assessment of the proposed project on the adjacent areas is largely left unaddressed. No information is available either in the minutes to demonstrate that the impact of increased traffic due to the project has been considered with respect to the traffic situation in the surrounding areas and roads. It is fairly well known that poorly managed and heavy traffic congestion even in a small area usually has a spill over effect in the adjoining areas. This critical correlation and alignment of the traffic situations in the project location and neighborhood is not addressed adequately in environmental clearance process for building and construction projects.

There are critical issues also at the review and clearance stage. CSE's review of the Haryana and Delhi SEAC's minutes show that unlike electricity, water, wastewater, no NOC or permissions from any traffic related authority is demanded from the project proponent. In Delhi for example the two key authorities responsible for traffic management and planning, traffic police and UTTIPEC- DDA are not even consulted when granting permissions to projects like malls, commercial complexes, hotels etc. which are likely to create traffic congestion. This concern is further exaggerated when multiple projects of similar nature that attract even more traffic are also granted permission in the same area. Thus, the cumulative impact of these constructions on the area's carrying capacity is hardly assessed in the environmental clearance process for building and construction projects.

The review of the minutes also shows that the proponent is sometimes asked to submit a self designed traffic circulation and management plan, which is not required to be vetted from any of these authorities. Even though, the SEACs usually mention traffic management near entry /exit points and fully internalized parking as one of the conditions in the EC, but traffic chaos, congestion, paced parking spaces, on road parking remains a common sight in and around big malls, hotels, office complexes etc.

Even with decentralisation and alignment with the building clearance process of the urban local bodies, an assessment under the Environment Protection Act is necessary to set the terms of environmental action.

NEXT STEPS ON TRAFFIC AND BUILDINGS

Clearly therefore, the EIA authorities will have to accord priority to this dimension of impact of buildings and ensure that buildings obtain consent from the designated authorities in the city and also develop and implement a traffic management plan that obviates pressure on the neighbourhood, surrounding public spaces and roads. The global best practices show efforts that the developers make to ensure public transport connectivity to the project areas. In Shanghai for instance a shopping mall has given access to the nearby metro station.

Often the details regarding the final approval or the conditions laid down in the approval letter are not available from the ministry.

NEED INDUSTRY SUPPORT FOR THE REFORMS

Clearly, the reforms for EIA in buildings needs support from industry. But there has been resistance from the industry to effective reforms in the sector. Over the last decade various attempts made by the ministry of environment and forests to reform the system has faced strong resistance from the industry (see box 24: Push for Reforms).

The CREDAI in their report to the Prime Minister Office has complained that the environmental clearance process is tedious and herculean process. They want the process of clearance to move to the urban local bodies in cities. They have also complained about the time consumed in clearances and so on.

It is however evident that decentralisation of the clearance process through the regional committees has helped to save time. But it is also noted that often the time is lost due to the incomplete information furnished by the developers and absenteeism in meetings.

It is however important to note that even with decentralisation and alignment with the building clearance processes of the urban local bodies based on the National Building Code, ECBC and local byelaws, an assessment under the Environment Protection Act is important to set the terms for environment action. This legal back up is important. Otherwise, the process will get reduced to voluntary and adhoc guidelines to be enforced by the local municipal authorities.

BOX 24: PUSH FOR REFORMS

There is official demand for reforms of the EIA process. The Planning Commission had set up a Task Force in 2006 that was later merged with the Task Force on Environment Impact Assessment. The Task Force has set forth several key recommendations especially for the eleventh Five Year Plan in the Report of the Task Force on Governance, Transparency Participation and Environmental Impactr Assessment and Urban Environmental Issues. Some of these related to the building sector include:

- **All construction and buildings projects should not be classified as category B project exempted from detailed EIA. Urban areas are among the most vulnerable areas and can affect largest number of people. Therefore, all building and construction projects in major cities and in other urban areas with significant level of environmental stress (to be separately classified by the MOEF) should be classified as category A projects as should be all township areas within 20 km of such cities.**
- **All townships, regional development plans and industrial estates should be assessed in terms of their impact on the ecology of the region through the ecological footprint method.**
- **Do not exclude defense and strategic projects from public hearing.**
- **Instead of project proponent selecting the consultant to prepare the reports, it is desirable that the MOEF selects the consultants, and sponsor the studies to remove conflict of interest. The cost can be recovered from the project proponents.**
- **Clearance should be granted not exceeding two years. Thereafter this should be renewed. No clearance should be extended without public hearing on the status of compliance.**
- **Post fact clearances should be prohibited by law.**
- **The accumulated impacts of projects of activities in a site have similarly to be assessed and future siting of projects and activities determined on the basis of the existing accumulative and historical impacts. This should be the responsibility of any specific project proponent and therefore should be taken up on a priority basis by the MOEF through various expert agencies.**

5. Reality Check: Case Studies

The Centre for Science and Environment took the initiative to check out a few ground realities of environmental clearances. It attempted to take stock of the compliance and monitoring status of the buildings that have actually obtained environmental clearances and are operating now. Here is a snapshot of the on-field experience and observations.

Poor information on the projects

At the outset it is important to note that an assessment of this kind is beset with hurdles. The biggest barrier is the lack of information in the public domain. CSE attempted to track some of the buildings in Delhi that have obtained environmental clearances, checked the conditions that are laid down in the environment clearance letters from the Ministry of Environment and Forests and also the information provided in the compliance reports of the project proponents. It also organized site visits.

The first step was to check out the letter of environmental clearance that are issued by the Ministry of Environment and Forests that are expected to lay down the basic conditions for compliance. Based on these conditions post-project monitoring and compliance is expected to be carried out. But the confusion of the law starts right from Ministry's doorsteps. The environmental clearance letters with the environmental clearance conditions have to be displayed by law. Also the six monthly compliance reports from the project proponents are required to be made public. According to point 10 (ii), on Post Environmental Clearance Monitoring in the EIA notification 2006, '*all such compliance reports submitted by the project management shall be public documents. Copies of the same shall be given to any person on application to the concerned regulatory authority. The latest such compliance report shall also be displayed on the web site of the concerned regulatory authority.'*

But in most cases the environmental clearance letters are missing and not available for several projects on the Ministry's website. The Ministry website simply states that environmental clearance is issued or the project is approved. For example one of the most popular malls in Delhi is the Metropolitan Mall at District Centre Saket, Delhi, developed by MGF Developments Limited. The MoEF website states that 'there is NO letter.' But, this project is listed in the category of construction projects 'granted EC' on the same website and is fully operational. This is just one of the many projects that has similar status. The effort to get these letters was futile.

In most cases the environmental clearance letters are missing. These are not available for several projects on the ministry's website.

Following are some projects that figure on the long list of the projects that are included in the EC granted category with 'No Letter' status on the MoEF website.

- Environmental Clearance for the Building project of K.K.Birla Academy on plot No 2, Institutional Area, Vasant Kunj, Phase-II, New Delhi, developed by K. K. Birla Academy 19, kasturba Gandhi Marg, New Delhi.
- Environment clearance of building project in Waziarpur developed by Omaxe Construction LTd.
- Construction for Residential on Plot No. 16 in Sector 23, Dwarka Delhi developed by Army Welfare Housing Organisation
- Environmental clearance for construction of "Hotel Crowne Plaza" on Plot No.13 A, Mayur Vihar District Centre, New Delhi developed by Eros Resorts & Hotels Pvt. Ltd.

- V3S East Centre at Plot N. 12, Laxmi Nagar District Centre, Vikas Marg, New Delhi developed by YMC Builders Pvt. Ltd, Connaught Place, New Delhi.
- Construction of West Gate Mall (a commercial complex) at plot No. 4, 5, 6 at District Centre, Shivaji Place, Raja Garden developed by GPS Properties Pvt. Ltd.
- Environmental clearance for construction of Shopping Mall in Saket developed by Select Infrastructure Pvt. Ltd.

Infact some of the prominent Commonwealth games venues that were upgraded and renovated before the games in 2010 also have 'No Letter' displayed on the website but are deemed cleared.

- Upgradation/Renovation, New construction in Jawahar Lal Nehru Stadium sports complex, New Delhi, developed by CPWD, New Delhi
- Upgradation/renovation new construction works in Dr. Karni Singh shooting Ranga at Tuglakabad Delhi Common Wealth Games 2010 , developed by CPWD, New Delhi
- Upgradation Renovation/New Constructions in Dr. S.P. Mukherjee Swimming Pool, New Delhi, developed by Commonwealth Games Division.
- Remodelling & Upgradation of Major Dhyan Chand National Stadium for commonwealth games 2010, developed by CPWD, New Delhi .
- EC for Table Tennis and Sports Complex, East Delhi and Common Wealth Games, East Delhi developed by DDA.

Another status message for several projects displayed on the MoEF website in the category of building projects granted EC states that 'the project has been approved'. But, the environmental clearance letter is not available. Following are the examples of some of the projects that have been approved with no details of the clearance letter.

- Construction of a residential complex JMD Regent Arcade Commercial Complex at sector-28, M.G. Road, Gurgaon developed by New Heights Buildcon Pvt. Ltd.
- Uppals Element nine Shopping Cum office Complex at L Block, IMT Manesar, Gurgaon developed by Uppal Housing Pvt. Ltd., New Delhi
- Proposed Collage Courts Mall at Paragpur, GT Road, Jullandhar, Punjab developed by Corrage Estates Pvt, Ltd, 56-58, Community Centre, East of Kailash, New Delhi.
- Ansals Sushant City, Karnal, Haryana developed by Ansal Properties & Infrastructure Ltd, 115, Ansal Bhawan, 16, Kasturba Gandhi Marg, New Delhi.

One look at the buildings in Jasola reveals high use of glass that without the use of shades could increase the cooling requirement and therefore energy use.

CSE tried to access the environmental clearance letter on the website of some of these projects but without success. The project website carries other information about the projects but not the clearance letter or the compliance reports. But law requires this. This is a gross violation of the condition. Without the letter it is not possible to know the conditions that have been laid down for the buildings. Even compliance reports from the project proponents are missing. It has also not been easy to access information from site visit. An attempt was made to visit some of the malls in Vasant Kunj like the Ambience mall. When the team contacted the facility managers to see some of their pollution and water management measures there was immense reluctance, hesitation and denial.

HIGHLIGHTS OF SOME OF THE CASE STUDIES

Central Business District, Jasola in Delhi: CSE therefore selected a few buildings for which environment clearance letters are available and organized site visits in Jasola area of Delhi. Jasola to a large extent is symbolic of the kind of development

that is popular in the country. Jasola's Central Business District (CBD) is centrally located on the intersection of NH-2 and gateway to Noida making it a strategic location. It has been touted as an attractive real estate area with good connectivity both via the road and metro. Jasola CBD (phase I) comprises of a total land area of about 27 acres which was opened for auction by the Delhi Development Authority (DDA) in 2004 for public bids. After positive response from private builders to the auction DDA went a step ahead by offering these developments without controlled façade, which was a first for DDA auctioned properties.

As a result, the area's landscape is transformed to high rise glass buildings with commercial and institutional activities. The built up area includes retail outlets consisting of shops and showrooms and office spaces as sale options as well as lease models.

The satellite image (see fig 25: Satellite Picture of the Building Construction Projects in the Central Business District of Jasola, Delhi) clearly shows how a massive piece of land (marked in red) is now covered with buildings and more are in the pipeline. This marked area roughly coincides with the CBD area demarcated by DDA for commercial and institutional development. The real estate opportunities are massive and expanding. The real estate developers are aggressively marketing this space to both Indian and international companies. The present level and the extent of development are already a strong indication of the intensity and nature of buildings that would dot and clot the entire area in the coming years.

Fig 25: Satellite Picture of the Building Construction Projects in the Central Business District of Jasola, Delhi

CSE team organised the field assessment in three stages. i) Review the letter of environmental clearance for the buildings in Jasola area and identify the list of conditions laid down for construction and operations; ii) Look for the compliance report from the project developer iii) Field visit for a cursory and rapid assessment of the key visible conditions. It must be noted at the outset that the compliance reports are not available for any of the projects in the public domain. The project proponents have not made their compliance report public. CSE has filed an RTI to obtain these reports from the Ministry. The reports are still awaited. Field visit was organised for visible assessment of the facilities as the details of compliance was not available from the project proponents.

CSE team selected three building projects in the area that are listed on the MoEF website with EC granted and also with environmental clearance letters. These include:

- Splendor Forum at Plot No. 3 DDA District Centre, Jasola, New Delhi by M/s Splendor Landbase Ltd, New Delhi. This is fully operational.
- TDI Centre, Office cum Shopping Complex (Commercial Complex) at Plot No.7, Non- Hierarchical Commercial Centre, Jasola, Delhi by M/S Brightways Housing and Land Development Pvt Ltd. This is partially operational.
- 5 Star Hotel at plot No. 15 and 15 A, Non-Hierachial Commercial Complex, Jasola, Delhi by M/s. Emaar MGF Land Pvt. Ltd. This is under construction.

Both the splendor Forum and the office cum shopping complex (Commercial Complex) at Plot No.7 referred to as TDI Centre house commercial retail areas, restaurants and office complexes. The letter of environmental clearance show a detailed list of conditions that the builders must fulfill during construction and operations. But detailed compliance report is not available from the builder.

Therefore, during the field visit the CSE team only randomly selected a few conditions from the letter of environmental clearance that could be observed on site. These include teh extent of the use of glass, green belt design, traffic impact mitigation and application of solar power.

VISIBLE NON-COMPLIANCES, IGNORED

Glass house: First, taking the case of Splendor Forum located right at the entrance of the Jasola CBD. Condition number (xxiv) listed in the Part A- Specific Conditions in Construction Phase (I) in the letter numbered No. 21-374/2007-IA.III, dated 2nd November, 2007 mentions that the *use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air conditioning. If necessary, use high quality double glass with special reflective coating in windows.*

In Jasola, most of the parking is in the open, in service lane and the basement parking is underutilised.

The building shows overwhelming use of glass. It is a a giant glass house spread over 22,815.42 sq.meters (see fig 26: Glass Facade of Splendor Forum). No attempt has been made to reduce the use of glass. Even if the building is using energy efficient technologies and appliances and also the glasses of certain specification (that could not be ascertained on site), over all energy requirement of the building is bound to be high because of excessive use of glass with no shade. The glass house effect would eventually lead to heat generation inside the building therefore increase the need for air conditioning. Since the building exterior has no shades, which is a crucial component of ECBC, interiors of the building receives glare and direct sunlight. This can be inconvenient for the occupants. Therefore, this building is using blinds to give shade and protection to the occupants from the glare and direct sunlight. This in the rebound increases the need for extensive artificial lighting and enhances the overall energy use.

Fig 26: Glass Facade of Splendor Forum

The main entrance to the building has a false glass structure with giant support structures (see fig 27: Glass Structure at the Entrance of Splendor Forum). It appears that this glass structure captures additional heat at the entrance of the building.

Similar story could be recapped for the TDI Centre just adjacent to the splendor forum. This building has received a post facto clearance. The EC letter has almost similar conditions that are mentioned in the environment clearance letter of splendor forum.

This building has also made heavy use of glasses on the exterior. From the outside it seems that this building has used more than 40 percent glass. There is no assessment available how this has affected the energy requirement for air conditioning and artificial lighting. The building has a couple of functional offices at

Fig 27: Glass Structure at the Entrance of Splendor Forum

the rear end. But a majority of the space is still vacant though claimed to have been bought for retail purposes.

In the form 1A in the section 5 on Air Environment, point 5.1. aims to understand whether the project increases atmospheric concentration of gases and result in heat islands? Usually the project proponents respond in the form saying that the building project will not create or lead to heat island effect in the area surrounding the building. But, the reality is hard to assess as they have not put out any information. Almost all the buildings in the Jasola CBD area are nothing less than colossal glass houses which are heat trapping structures, which raises doubts about such claims. About 10 large buildings are standing tall and are in operation in the Jasola CBD (see fig 28: Snapshot of Buildings in Central Business District in Jasola) . More are coming up. Together the heat generated within and outside the buildings and in the surrounding area would be high. The energy requirement then to cool these buildings would again be enormous. But this is not properly monitored.

Fig 28: Snapshot of Buildings in Central Business District inf Jasola

A few compliance reports that were available online were of modest quality and extremely subjective. Several issues in them were contradictory.

Solar - cosmetic gesture: There is also no visible evidence of renewable energy application in this building project. The splendor forum atleast has solar lighting for street lighting purposes, but none of that is evident in the TDI building (see fig 29: Parking, Green belt and Drainage issues around TDI Centre). It is quite clear there is no major initaitive to include solar applications.

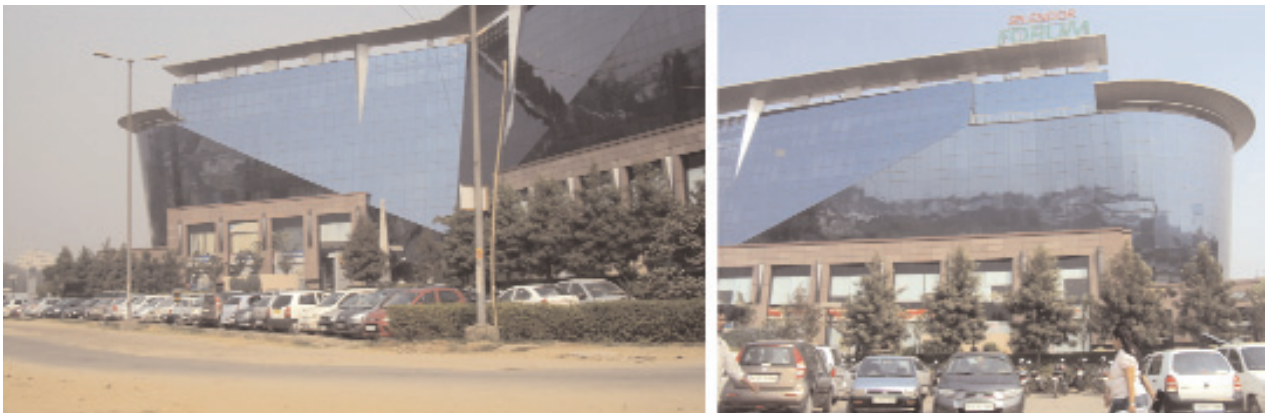
Wither green belt?: Another condition in the environment clearance letter mentions that the *green belt of the adequate width and density preferable with local*

Fig 29: Parking, Green belt and Drainage issues around TDI Centre

species (having thick canopy) along the periphery of the plot shall be raised so as to provide protection against particulates and noise. But, except for a few potted plants there is hardly any green belt developed around the building. The entire area is paved, so there is little chance that green belt area ever be created in the near future.

Traffic impacts: Another condition enlisted as (viii) in the operation phase (II) of the letter stated that the traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized. But, the situation on ground was completely the opposite. The entrance and the service lane adjacent to the building were completely filed with vehicles (see fig 30: Vehicles parked outside Spelndor Forum in Jasola). Infact, on observation the team has found that the basements that are meant to be used for parking are lying nearly vacant with both four and two wheelers lining the building entrance and service lanes.

Fig 30: Vehicles parked outside Spelndor Forum in Jasola



Another key condition in the letter stated that *the traffic congestion near the entry and exit points from the roads adjoining the project site must be avoided. Parking should be fully internalized and no public space should be utilized.* But, hardly a few cars were parked in the basement. Most of the parking was in the open in the service lane with basements being underutilised.

Water impacts: The environment clearance letter for the project also states that *the separation of grey and black water should be done by the use of dual plumbing line for*

separation of grey and black water. Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

It was not possible to ascertain any of this. This can only be verified by the builders and the compliance report that is awaited. It can only be said that in the toilets and in the landscaped area there is no indication or sign that treated wastewater is being used for flushing and gardening purposes. Since the pipes and dual plumbing fittings are wall concealed it is difficult to ascertain whether dual plumbing is actually built for transporting treated water for various uses. Usually the places where treated and recycled water is being reused information and warning signages are expected to be displayed to avoid their use for drinking and other critical uses. Also casual conversations with the staff indicated that freshwater is usually used for flushing, but these are unconfirmed.

Compliance Reporting: a missing link

CSE also made the attempt to check out the compliance reports filed by these project developers. Experts and regulators related to the EIA process accept that the state of post project monitoring and compliance is even worse than the review and clearance process. Not all the project proponents submit reports to the concerned MoEF offices. There is a big question on their regularity, quality and accuracy.

The objective was to ascertain whether these projects with environmental clearance are complying with the environmental conditions, and if there is any documentation of that. Project proponents are expected to put up their compliance reports in their respective websites as well. But none of these projects had their latest compliance reports on their website which is a key requirement for the projects cleared as per the EIA notification 2006. So therefore the buildings that were visited did not have any document on compliance in the public domain.

A few compliance reports of some other projects that were available online were of modest quality and extremely subjective in nature. There were several issues that were contradictory and work was in progress well before the requisite certification and No Objection Certificates (NoC).

For example the half yearly EIA clearance compliance report (January 2011) of NCR One which is a group housing project is being developed by Pashupati Buildwell Pvt. Ltd. The project is located in Sector 95, Gurgaon on the Pataudi Road and has a total built up area of 73456.976 sq meters.

The regulatory and monitoring authority will find it difficult to verify the claim with no proof or data provided by the developer to corroborate their claim.

The report states that the project received environmental clearance from Haryana SEIAA in October 2009 through a letter dated SEIAA/HR/09/1084. But, the Consent to Establish (CTE) which the project has to receive from the state pollution control board (SPCB) is still under consideration since December 2010. Irrespective of CTE from SPCB the project claims to have started construction and the developer anticipates hat the project would be completed by June, 2012.

In the next compliance report for June 2011, the developer states that they are still awaiting CTE from the Haryana SPCB. Besides, the report also mentions that the permission to abstract ground water is still not granted since February 2011 by the Central Ground Water Board and local authority. The project developers continues to state that the project is under construction phase and the completion date remains unchanged despite absence of CTE and CGWB permission for groundwater use. In the meanwhile, the company's name has been changed from M/s Pashupati

Buildwell Private Limited to Sidharatha Buildhome Private Limited, vide letter dated 17/09/2010, issued by Registrar of Companies. But there is no mention whether the same was communicated to the SEIAA.

Often responses of the developer is unsubstantiated and open ended. This makes assessment difficult.

In another project as ILD Trade Center which is a shopping-cum-office complex developed by ALM Infotech City private limited is being constructed in sector – 47, Sohna Road, Gurgaon in Haryana. The project has been accorded environmental clearance by the Ministry of Environment & Forests (21-428/2006-IA-III) in June 2007. According to the report the commercial property would include ground plus nine floors above ground and three level basements. The total built up area is 23,331 sq meters. The project as stated in the compliance report for June 2011 has completed construction and is in the operation phase.

But the developer in one page compliance report hails that everything is on track. The report covers only a few aspects rather than providing a status check on all the listed components in the form (1and 1A) and environmental clearance conditions.

For example, in waste management, the report states that the project at full occupancy would generate about 454 TPA. It further mentions that the wastes shall be disposed off at the common waste disposal site at Faridabad - Gurgaon road. The project compliance report fails to provide the status and the disposal means of the waste generated by the project currently.

The project is still awaiting consent to operate (CTO) from the Haryana SPCB. The project states that the efficacy and efficiency of the STP of 100 KLD would be undertaken and completed as soon as the developer would obtain Consent-to-Operate on trial basis. There is no mention about the quantum, treatment and disposal mechanism for the wastewater being generated from the project presently in the operational phase during partial occupancy. The only information the project provides in the one page compliance report is on project area, hazardous and waste management, greenbelt, installation of STP, rainwater harvesting and expenditure on environmental management plan. There is no data on environment monitoring including monitoring & analysis of ambient air samples, ambient noise monitoring, sampling & testing of soil samples, sampling & testing of ground water sample, water use etc.

Another environment clearance six monthly compliance report for the project IREO City located in Ludhiana developed by Var Realtors Pvt. Ltd was reviewed by CSE. The project received environment clearance (SEIAA/2009/19147) from the Punjab SEIAA in May 2009.

The report is highly subjective and it is difficult to ascertain the extent and quality of compliance by the developer from their responses in the report. For example, in response to a condition where the project was asked about the provision and maintenance of all the sanitary and hygienic measures at the construction site, the developer states 'adequate sanitary and hygienic measures are being adopted and maintained throughout the construction phase.' It is certainly difficult to comprehend what are the measures and adequacy of those measures claimed to be adopted by the project developer. Infact the conditions stated by the authority are also too general as a result they solicit equally vague responses. The developer response to another condition is that the arrangement for safe disposal of wastewater and solid waste has been made, which is completely unsubstantiated. The issue here is that the regulatory and monitoring authority would logically find it difficult to verify the claim with no proof or data provided by the developer to corroborate their claim.

Regarding drinking water for the laborers the condition mentions that 'for disinfection of wastewater, use ultra violet radiation, not chlorination.' But in response the developer states that 'disinfection will be done using UV technology and shall be applicable during the operation stage.' This essentially implies that UV treatment for water would not be done during construction stage which is clearly what is stated in the environmental clearance condition. The condition related to water demand mentions that the 'water demand during construction should be reduced by use of premixed concrete, curing agents and other best practices referred.' In response merely mentions 'is being adhered to.' This response is again difficult to verify the extent and adequacy of adherence by the developer to the stated condition.

Environmental clearance under the Environment protection Act is expected to have higher degree of stringency.

The energy use of the building is a very critical component of environment impact assessment, but the responses to the condition related to the same are vague and generalistic. For example for the condition which mentions that 'use of glass may be reduced adequately to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.' The developer conveniently responds to this condition by stating that the 'glass usage will be reduced adequately and possibility of using double glass shall be explored.' It is very clear that the response to the condition is completely unsubstantiated and open ended and in reality is the developer might be waivering from his claims.

These are only some of the example of the complete lack of accuracy, substantiation and clarity in the half yearly environmental clearance compliance reports submitted by the developers.

6. The Way Ahead

The review of the environment clearance process for buildings expose systemic weaknesses as well as specific concerns related to each aspect of building appraisal that blunt the effectiveness of the policy.

Environmental clearance of buildings represents a critical transition towards consumption based management practices.

The review makes it very clear that in view of the emerging environmental concerns in the building sector, buildings cannot be treated as a low impact sector. While individually they can aggravate local pollution and resource impacts, cumulatively they can be a very heavy draw on key resources including energy and water in cities.

Implementation glitches are many. Buildings are prolific, widespread and numerous with varying impacts, and cannot be directly compared with the industrial and mining sites. This has raised the question if there is any merit in having a system of environmental clearance for each and every individual building unit. Should this clearance process be integrated with the normal building clearances done at the city level by the local urban bodies with enhanced environmental conditions.

But there is still strong interest in EIA for buildings. The interest stems from the fact that in the future consumption based management practices will become important to reduce resource impacts and emissions and wastes in cities. Greening of buildings will be the core of this approach. Already energy audits have gained credence as policy tools that will require assessment of each individual building. ECBC has mooted the requirement. Once this is opened up for both commercial and residential buildings cities will have to develop capacity to carry out the assessment and benchmarking of the targeted buildings, including the high impact buildings that are within the ambit of the EIA. But this may not be effective.

Just shows that individual buildings will come under scrutiny. But the framework and stringeny is important. The EIA process is expected to have greater degree of stringency simply because composite environmental assessment is carried out under the Environmental Protection Act with a legislative back up. Otherwise, the current building clearance process at the city level is governed by the voluntary National Building Code with a set of mandatory local building bye laws. These do not comprehensively assess all aspects of environmental impacts of high impact buildings as is required by the EIA process. Only ECBC – which is still a voluntary programme on energy efficiency in buildings, has a legislative back up in Energy Conservation Act.

Eventually, not only the high impact buildings but a much larger scope of buildings in both residential and commercial sectors are expected to come within the ambit of ECBC.

Keeping the environment clearance process under the powerful Environment Protection Act that is administered by the Ministry of Environment at the national level and by the state environment department at the city level, is important. However, it is also very clear that the institutional structures that have been created for enforcement of environmental clearances are very weak and not conducive to strong implementation. It is therefore, recommended that the enforcement strategies work as a 'plug and socket' with the relevant laws on resource efficiency and align with the institutional arrangement of the urban local bodies and the other relevant institutions for enforcement.

At the same time individual building clearances may also have to be supported by

the zonal planning in cities for proper integrated land-use planning that can then be the reference point for site clearance at the time of environmental clearance. The city Master plan and the zonal plan can then effectively guide the decision on site clearance and local environment management plan for the buildings.

The environment clearance tool requires special attention for the simple reason that this is a holistic appraisal of the overall impact of the buildings and addresses the most high impact large building categories that are expected to emerge as major resource guzzlers. It is therefore time to set the terms of the policy discussion and action on the ways to reform the environmental clearance process for the buildings.

There is still a significant interest in retaining and reforming the environmental clearance system for buildings for the following reasons.

First of all the environmental clearance of buildings is a critical transition to a new generation of regulations and enforcement systems that shifts the focus from production based environmental management to consumption based management practices. This is because buildings form the microcosm of consumption in cities.

Secondly, the demand for regulatory capacity for implementation of such a strategy is enormous. This truly requires scrutany of nearly all medium to high impact buildings and their consumption pattern to reduce resource impacts, emissions and wastes in cities. There are often doubts raised about the effficacy of such an approach. But this cannot be avoided in the future as all regulations be it for energy, water or waste in buildings will require direct monitoring of individual buildings. Already ECBC, the energy regulations for buidlings will require monitoring of energy consumption in a large number of individual buildings especially when it becomes mandatory. This means cities will have to develop skills and capacity to carry out the impact assessment and benchmarking of numerous individual buildings. In fact EIA is a our first generation experience with such a regulatory and implementation approach that requires monitoring of buildings on a case bv case basis.

Thirdly, should environment impact assessment be done by the environment ministry and its regional committees and SPCB/s or should this be fully decentralised and aligned with the existing building clearance process of the urbal local bodies in cities based on the voluntary National Building Code and local building byelaws? The answer to this that it is desirable to carry out the environment impact assessment and post construction monitoring under the Environment Protection Act for the simple reason that it provides strong legal mandate and legal back up for compliance. The National Building Code and the building bye laws that are implemented by the urban local bodies in cities do not have mandatory provision for all aspects of resource conservation in high impact buildings as is required by the EIA process. Also most part of NBC is voluntary and does not have the teeth. Even though the NBC and the local bye laws have some requirements related to energy, water and waste management these are not uniform across states and cities and do not have strong statutory back up to achieve environmental objectives. Therefore, environment assessment of high impact buildings may continue under the Environment Protection Act. As of now EIA is the only tool that requires holistic appraisal of the overall impact of the buildings.There is merit in keeping the high impact buildings within the scope of the Environment Protection Act to ensure compliance.

The longer term solution will be to carry out rigorous EIA of the integrated zonal plans or master Plan of cities that earmark the land-use and development projects.

EIA is the only tool that requires holistic appraisal of the overall impact of the buildings. Such an assessment of the high impact buildings is important as is evident from the local protests against some of the commercial projects in Delhi. These projects have significant local impacts. Decision on their siting and mitigation

strategies will have to be assessed on a case by case basis.

Even globally the common practice is to assess alternative locations to select the most appropriate site.

Fourthly, our review makes it clear that the current institutional mechanism for assessment and enforcement of environmental clearance for buildings is very weak. The committee based approach with very weak staff and technical back up is not conducive for proper assessment, enforcement and monitoring. It is therefore, recommended that the system of clearance and monitoring should work as a `plug and socket` with the other institutional arrangement of the urban local bodies and the other relevant institutions that are now shaping up in cities for enforcement.

It has to work synergistically with other relevant laws, benchmarks and standards for water, energy and waste and enforcement mechanism in the future. EIA should take them on board formally. For example, EIA should demand ECBC compliance for all EIA buildings. It makes eminent sense for the EIA to leverage and take ECBC on board for assessing energy consumption of the high impact buildings. Similar approach should be taken to align with water and waste audits etc. This is possible. There should be a clear interface with these systems and also an oversight system for effective delivery. Align and harmonise with the institutional mechanism of the urban local bodies and other concerned departments for enforcement.

The environmental clearance therefore is an opportunity to bind all the key regulations related to resource efficiency together to bring greater precision in targets and action. It has to work synergistically with other relevant laws, benchmarks and standards and enforcement mechanism in the future. For example, detailed indicators of ECBC compliance is being developed for the urban local bodies under the National Habitat Mission. These will be widely used in cities. It makes eminent sense for the EIA to co-opt and leverage this process for assessing the high impact buildings. Similar approach should be taken to align with water and waste audits etc. Getting the template right is important. It should leverage the mechanism that are being put in place to implement energy and water audits and other waste management strategies.

Fifthly, the longer term and bigger reform should link up area/zonal planning in cities with the evaluation of the individual buildings. This will help a lot to mitigate the issues related to siting and locations of buildings. The integrated zonal and Master Plan that earmarks the prospective development by land-use should consider local area impact assessment in advance. This can help in quick and effective decision on siting of individual buildings. Even today Master Plans require environment impact assessment but are rarely done. It is essential for cities to develop integrated zonal and Master Plan for earmarking the prospective development by land-use types taking into account the carrying capacity of the targeted zone. This area or zonal planning will consider much of the local area impact assessment in advance that can enable quick and effective decision on individual buildings.

Clearly, therefore, EIA provides the opportunity to bind all regulations for resource efficiency together to bring greater precision in targets and action. But this tool will have to be strengthened substantially for effective improvement in energy savings in buildings. Keeping these imperatives in mind it is time to set the terms of the policy discussion and action on the ways to reform the environmental clearance process for the buildings.

Steps to strengthen the overall EIA approach to buildings

- **Zonal plan and EIA:** The longer term solution will be to carry out rigorous EIA of the integrated zonal plans or Master Plans for cities that earmark the land-use

BOX 25: REVISITING EIA FOR BUILDINGS: A DISCUSSION

A round table discussion of stakeholders was organised by the Centre for Science and Environment on September 8, 2011 in New Delhi. The prominent stakeholders including professionals, members of expert appraisal committees, environment clearance consultants, and academics had gathered to brainstorm on the way ahead on EIA and buildings. The group agreed with many of the findings of this study as well as highlighted the following:

SITE SELECTION: Land is the focal point of all environmental concerns and its selection is the most important step in minimizing environmental damage through development. However, in the existing scheme of things, the options for land are restricted by the Master Plan which is mostly prepared without due attention to environmental sustainability. The exercise of EIA in a post-facto situation for sites approved/allotted by government do not have any tangible benefits if the master plan hasn't accounted for Environmental Factors. Reform of the land use determination process is indispensable to make EIA process effective.

CARRYING CAPACITY OVERLOOKED: The current scope of the Environmental Clearance process for buildings is too simplistic and dom not consider carrying capacity of the site. This is ignored in the evaluation. Many projects have in fact been cleared in areas known to be stressed for availability of energy, water, sewerage and adequate road network.

FLAWED IMPLEMENTATION AND MONITORING MECHANISM: The current implementation process is very lax. The projects' clearance rests with the SEACs and SEIAAs. With no regulatory powers vested in them nor any accountability, nothing tangible can be expected out of these bodies. These bodies are appointed by the MoEF upon the nominations from state administrations. This procedure is inadequate. Politicians are involved when approvals are expected on technical issues. The committees are not reconstituted in time for seamless clearance of projects. In states that do not have a committee, the projects go to the central committees for approval which are already overburdened with clearances. This leads to inordinate delay. Projects are cleared by committees without sufficient domain-expertise. Monitoring reports are not submitted by projects to the state committees or the pollution control boards. And neither MoEF nor the state agencies monitor compliance, much less impose penalties on defaulters. When there are no precedents of polluters paying or being punished, there is no scope for delivery of the current system without radical reform. MoEF has the responsibility to reform the process.

POOR TECHNICAL CAPACITY: There were many stories about the ineptitude of consultants. Some consultants do not even show basic aptitude to create a coherent set of field observations and a plausible environmental management plan. The reports are generally plagiarized from those of projects that have obtained clearance. The whole clearance exercise is based on a single interaction with the committee which itself might not be well-rounded to handle the specific concerns of the project. With considerable number of projects to be cleared once every month, most projects are cleared with suggestions for improvement. But the projects rarely communicate the compliance. With the project proponent appointing the EC consultant, there is a conflict of interest where the consultant is primarily paid for getting the clearance whether or not the site is suitable for the proposed project.

NEED FOR BENCHMARKING: The present clearance process is highly subjective with no clear benchmarks to contrast made by the project proponents. The lack of clear benchmarks makes it more difficult to verify the actual use and impact when the buildings are in operation.

TRANSPORT LINKAGES ARE IGNORED: The scope of the EIA should include Transportation Impact of the development. The Government of India should overhaul the Master planning system using the National Sustainable Habitat standards. All existing and future master plans should be evaluated from the Environmental perspective and restrictions on development be imposed to respect the carrying capacity of the region. Third party verification of environmental compliance should be put in place by the state through empanelling the experts and paying them directly rather than project proponent. A regime of exemplary penal action should be enforced to discourage defaulters. Academics are engaged in experimental urban design models whose performance results need to be widely discussed and disseminated.

and indicate the land-use and development projects in the city. This blue print of the city planning will itself be assessed for environmental impact more holistically. Buildings can then be derived as sub-plans. This can make locational analysis and appraisal more effective, relevant to city specific planning on a case by case basis. But case by case appraisal cannot be eliminated for the simple reason that the resource impacts of buildings require continuous monitoring and compliance during the operational phase. Cities will have to build capacity to carry out water, energy and waste audits as future regulations for energy code and water efficiency are likely to become legally enforceable for a much larger

number of buildings. To enable this it can align with the various institutional mechanism that are being created at the city level to assess buildings. This leveraging will make implementation effective. Zonal plans to be prepared by the urban planning departments should be the reference point for the committees for environmental clearance.

Formally introduce benchmarking of water consumption for environmental clearance of buildings.

- **Reform EIA rules for buildings to include public consultation:** While it may not be practical for the building sector to adopt the detailed EIA prescribed for the industrial and mining sector given its numbers and scale, a few essential elements may be identified for inclusion in environmental clearance for buildings. One such crucial element is public consultation or prior informed consent and decision. As is evident from the cases in Vasant Kunj and Greater Kailash in Delhi, citizen's concern will have to be integrated. In Vasant Kunj ridge case, the local residents and civil society had campaigned against the malls and hotels that were constructed on the ridge. As there is no formal procedure of public consultation citizen's perspective was ignored and mass scale construction was promoted and is continuing till date. Even globally as we have seen in Japan and US public consultation is an important element. In the Japanese approach public hearing and consultation is carried out during scoping as well as after the environment assessment.

- **Strengthen screening of sites:** It is important to plug the major flaw that a project proponent can actually start the process of land acquisition, even when the project has not been cleared. Land should be acquired only after the suitability of the site has been established. Project proponent should indicate the options. Building plan needs an explicit link with an environmental plan. Even globally the common practice is to assess alternative locations to identify the most appropriate site. This needs to emerge from the master plan of a city. Both zonal plans and master plans require environmental clearance. But that is not followed. In most cases therefore land is already allotted to the developers without any environmental screening. But site clearance is needed to understand the boundaries of influence and sensitivity of the location. Site screening will also help in cumulative impact assessment. The cumulative impacts will have to be addressed not only through individual project clearance but also through zonal planning and cumulative impact assessment.

- **Need strong benchmarks:** The current environmental clearance process is not linked with effective benchmarks for resource consumption and waste management. Developers get away with very poor benchmarks. For instance, the clearance is not aligned with the regulatory requirements related to extraction of ground water and usage, urban water bodies, energy efficiency codes. The only legal instrument that is explicitly taken note of is the forest conservation act etc. The government of India is planning to make the energy code for buildings mandatory. It makes eminent sense to adopt the ECBC formally for EIA assessment and post construction monitoring. Similar synergy should be built with the water efficiency related guidelines and requirement.

- **Adopt enforceable post construction monitoring protocol, capacity and compliance strategy:** In addition to the self assessment and self reporting by the project proponent independent third party audits are essential to prevent escalation in resource use and neglect of waste management. Regional offices should be suitably empowered and aligned with other line departments to monitor the on ground reality and take corrective action. The central environment ministry should also be made liable for ensuring that independent

monitoring is being carried out in a transparent manner. Also develop clear protocol for inspection by the regional offices and ensure that these are adhered to. This will help to address time delays in clearing projects. Enforce the proposal of the MoEF's appointed committee to make environmental violations a non bailable offence. Technically it is said that if compliance report is not submitted the project proponent is liable to be punished. All compliance reports are expected to be on the website of the project proponents. But this is rarely done. Also the environmental clearance for buildings should not be for ever but be time bound. This will help to put brakes if the overall efficiency of the building deteriorates during the post construction phase. Plug into the enforcement mechanism of the urban local bodies for post construction monitoring.

- **Ensure strong enforcement to prevent post facto clearances:** Institutional reforms are needed to plug loopholes and discipline enforcement. Reforms are needed for stronger penalty and deterrents and more effective use of the closure clause permitted under the law. The current area criteria of 20,000 sq meter to 1,50,000 sq meter need additional indicators to identify the high impact buildings to address the deviation.

- **Quality of information and disclosure:** Develop and implement protocol for quality assurance and quality control on existing data. Also integrate the data generated by other concerned departments for performance assessment of the projects.To improve decision-making improve public access and scrutiny; enable research on regional and cumulative environmental impact and develop baseline data on environmental and social parameters for different parts of the country. There should be increased public disclosure of all documents, proceedings of meetings; decisions and final decision and conditions/safeguards for granting clearance. All EIA documents must be available online and for public comments.

- **Issue guidelines for EIA for township projects:** This ambiguity must be immediately resolved to ensure that the high impact township projects follow the EIA guidelines similar to those for category A projects. The current discretionary approach towards these projects is leading to a lot of adhocism. Reforms will ensure uptake of strong efficiency measures even for new individual buildings within the township and maximize benefits.

- **Build capacity for enforcement and also promote more coordinated action:** The organizational capacity and human resources available with the regional offices will have to be strengthened. Sheer number of projects place huge burden on the regional offices to monitor these projects. At the same time for effective appraisal and monitoring create institutional arrangement for better coordination with other authorities and agencies that do independent monitoring, grant NOC, grant environmental and other critical clearances, and responsible for allocation of resources. Improve communication between SEAC and the regulatory bodies.

Both data and methodology for assessing resource efficiency in buildings should be made more transparent and composite.

STRENGTHEN SECTORAL INTERVENTIONS

Reform to reduce water and waste water impacts of buildings

- **Introduce benchmarking of water consumption for environmental clearance of buildings:** Currently, there are no mandatory norms to benchmark the per capita water consumption for environmental clearance. In practice for estimating water demand based on per capita consumption they mention the

guidelines of the Bureau of Indian Standards/ CPHEEO/UDPFI. The project proponent often underestimates or randomly takes the per person water requirement to get the project cleared and to prove low impact of the projects on water resources in the area. Therefore, adopt and align with the standards and norms for water consumption and waste to bring clarity, parity and precision with regard to resource use. This is needed for benchmarking of the post-project monitoring as well.

- **Availability vs Allocation-** Even a cursory review of the project proposals show that the project proponents only mention the water needs of the buildings. They mention the guidelines of the Bureau of Indian Standards/ CPHEEO/UDPFI to estimate the water demand based on per capita consumption. But this is not backed up by any assessment from the water providers to show if they can supply the requirement. Therefore, often in water stressed areas authorities grant permission and allocate water based on the demand made by the project proponent without much reference to the water availability – both surface and ground water. Therefore, environmental clearance should be linked with assessments of resource availability. Often rain water harvesting is used as a panacea for all. Civil structures for rain water harvesting is made without any assessment of the existing water table and quality and the change possible with rain water harvesting. Licenses are being issued indiscriminately in Gurgaon without such checks in place.
- **Prevent undercover Exploitation:** It is important to tighten the provision regarding water use and to increase the vigilance and stricter action by the Central Groundwater Board/Authority in the clearances. Rainwater harvesting in buildings is currently being used as an excuse to exploit groundwater in critical areas. This is widely evident in Haryana. The CGWA needs to demand renewal of groundwater permission after two years. This would act as a check and regulate the developers exploiting groundwater resources. Currently, there is only one time permission that the developer has to seek and can continue to exploit the groundwater forever without its renewal.

- **Drive conservation methods and uptake of water efficient fixtures:** There is need to diversify and increase water conservation measures. Currently, water conservation measures that find mention in the proponent's reports are stereotypical and are there to satisfy the conditions. But, there are several other ways and measures that can be adopted to reduce water use and increase efficiency of water use in the buildings and construction projects. Only stricter benchmarking can force diverse and more innovative approaches. Moreover, there should be a special policy focus on rapid uptake of water efficient fixtures.

Reforms for reducing energy impacts of buildings:

- **Integrate ECBC with environmental clearance**: ECBC has already been adopted officially as the key regulatory tool for guiding energy conservation in buildings. It is expected to become mandatory soon. All EIA covered buildings will have to be ECBC compliant. This needs to be formally adopted and integrated with the EIA process. The current institutional and monitoring mechanisms in place for ECBC would then have to align with the monitoring process of the EC cleared building projects. The committees monitoring the EIA projects at the regional level would have to be aware and adequately trained and informed to understand the ECBC process and its monitoring requirements. At present the EIA clearance process in the Ministry of Environment and Forests does not have any representation from BEE for the energy impact assessment. Energy experts are needed who can vet the energy consumption data and ECBC compliance with the use of simple

If the National Building Code, ECBC and other relevant rules related to resource efficiency and conservation form a "plug and socket" with EIA rules, it can bring better results.

modeling tools to verify the claims of the project proponents. Or it should leverage similar technical capacity to be created in the urban local bodies.

- **Align with National Habitat Standards for energy efficiency:** Under the National Habitat Mission the Ministry of Urban Development along with the Bureau of Energy Efficiency is developing guidelines for energy efficiency that are to be integrated with the existing building bye-laws in cities. These guidelines have been derived from ECBC and deal extensively with lighting, ventilation requirements, energy efficiency in lighting, heating, ventilation, and air conditioning systems, renewable energy utilization etc. These include guidance on thermo physical properties associated with various envelope elements such as wall, roof, windows, skylight etc. These extensive guidelines can be incorporated in the EIA rules for building to further streamline the ECBC requirements for optimum energy performance. Otherwise, the EIA tool the way it is currently designed for energy efficiency is not at all sufficient to address energy conservation in the high impact buildings.

- **Establish minimum energy benchmark for environmental clearance:** As of now there is no clear process or methodology for assessing or challenging the energy conservation data provided by the project proponents. It is often not clear how clearances are given based on the information provided and how the information and data sets are assessed and used by the EIA authorities. Currently, some development agencies like the Central Public Works Development voluntarily consider a minimum 3 star rating of ECBC as the minimum benchmark. BEE informs that in 2007 it had communicated to GRIHA and LEED that buildings rated by them would have to be minimum 3 star. A similar approach is needed for EIA compliant buildings. In fact in the case of EIA compliant buildings a higher star rating may be adopted as these are high impact capital intensive buildings.

- **Data management for proper impact assessment and monitoring mechanism**: Both data and methodology for energy efficiency in buildings should be made more transparent and composite. This data set should be properly reviewed. Validity of environment assessment will depend on quality of inputs and methodology. Sometime the discussion and assessment seem over simplified. The system will have to be revamped to create incentive for best practice models. There will always be a big dilemma between the modeled and actual energy performance of the buildings. But this demands clear indicators for projection as well as operating performance of the buildings. This will also require clear protocol for data generation, data quality, consistency and reliability and good modeling and simulation for assessment. The system will need specific benchmark that tracks building performance overtime, and changes in operations.

- **Energy audits:** The biggest challenge in any resource conservation effort in buildings will be to monitor resource use during the operational phase. Environment clearance will require supportive tools to be able to ensure that the intended objectives of environmental assessments are met. Energy audits must be made mandatory for the bi-annual compliance reports that the project proponents are expected to file. This will require institutional alignment to ensure that the EIA compliance. The urban local bodies are in any case expected to carry out resource audits as and when the cities adopt these strategies for mandatory enforcement. EIA compliance process should be linked with that. BEE has begun the system of creating a small group of certifiers for energy audits. But this will have to be formally broad based in urban local bodies. EIA monitoring should also be linked with this.

High impact buildings will require special scrutiny to minimise their impacts.

- **Harmonise Environmental Clearance with ECBC and National Building Code:** Another important opportunity is the voluntary National Building Code that is followed nationally with some variation and customisation at the city level for all buildings. The NBC 2005, include some aspects of energy and water conservation but it is not composite enough. If the National Building Code and ECBC and other rules related to the resource conservation form "Plug and Socket" it can bring better results. The Bureau of Indian standards (BIS) that has framed NBC is now adding a detailed chapter focused on "sustainability" that is expected to consolidate the energy conservation and resource management approaches strewn across the NBC. BIS is coordinating this effort.

- **Make traffic related clearances from competent authorities mandatory**: Traffic impact assessment of buildings will have to be done more rigorously. The EIA authorities will have to accord priority to this and ensure that buildings obtain consent from the designated authorities in the city. The expansion in commercial and retail space in cities will induce heavy traffic and will require effective mitigation. The developers will have to be made accountable for improving public transport and non-motorised transport feeders and access to the building complex. They will have to develop and implement a traffic management and mitigation plan that obviates pressure on the neighbourhood, surrounding public spaces and roads. In Delhi for instance all projects should be routed through UTTIPEC and traffic police to clearly asses the traffic impacts of the proposed projects. These should fulfill the criteria of street design guidelines, guidelines for transit oriented development, fulfill the requirements of public transport connectivity, non-motorised transport approaches and so forth. These should also align with the parking policy of the city and prevent parking spill over on the public spaces surrounding the project area.

- **Leverage established legal systems and municipal system for enforcement:** It is very clear from the review of the current environmental clearance process for the buildings that enforcement and monitoring hinge on a very weak institutional framework with very poor technical back up. It is not possible for the loosely formed regional committees with very poor staff and technical backup to verify, monitor, enforce and check compliance based on various norms and benchmarks for resource efficiency and environmental performance of the buildings. This is one of the reasons why there is so much of reservations about the merit of continuing with environmental clearance for buildings. But this can be addressed if the environmental clearance process is aligned with the institutional mechanism that are now evolving at the city level for resource auditing in buildings. As mentioned earlier, this process is beginning with energy audits and ECBC compliance process and also water conservation efforts that will be spearheaded by the urban local bodies. The urban local bodies in each city are now expected to develop capacity and systems to enforce ECBC, as well as the reformed National Building Code and other regulations related to water and waste management.

  All developers and building owners have to come under the scrutiny of the urban local bodies. The municipal agencies or the concerned urban planning bodies that will be implementing these rules at the city level can build protocols along with the state pollution control boards and the EIA committees to verify, monitor and check compliance of high impact buildings as well. The environmental clearance process for the high impact buildings can align with this mechanism. This will help to bring rigour, skill and capacity. High impact buildings will require special scrutiny to minimise their impacts. Environmental clearance under the Environment Protection Act offers the opportunity to address the composite impacts of these buildings with strong legal back up.

Annex 1

KEY REGULATORY TOOLS FOR RESOURCE CONSERVATION IN BUILDINGS

Here is a quick highlight of the key policies and regulatory tools emerging in the country to promote resource use efficiency and management with focus on energy and water. While each of these sectors has national and state level laws, the overarching building byelaws are enshrined in National Building Code (NBC). NBC compasses all aspects of buildings design. Some of these have some bearing on energy and water conservation.

REGULATORY TOOLS ON ENERGY AND BUILDINGS

Development and implementation of several legislative and policy reforms over the years are indicative of the changing trends and priorities for the energy sector both at the central and the state level for buildings.

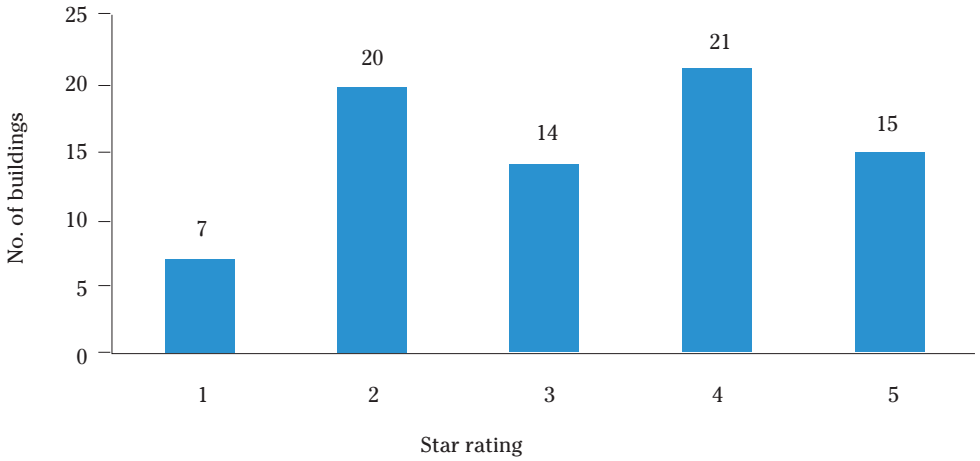
Integrated Energy Policy 2006: This policy has identified key areas in the building sector for energy efficiency measures. This includes building design, construction, heating, ventilation, air conditioning, lighting, and household appliances. It has asked for mandatory periodic energy audits for all buildings with loads above 1 MW also for all government buildings. It has also asked for energy benchmarking of buildings to be done by BEE.

Energy Conservation Act 2001: Following this the Bureau of Energy Efficiency was established under the Ministry of Power to implement the Act. The Act requires large energy consumers to meet the energy conservation norms, large commercial buildings to meet the energy building code, and appliances to meet energy consumption standards and label.

Energy conservation building code (ECBC): BEE has framed the ECBC to reduce India's baseline energy consumption. It takes into account climatic zone variation and occupancy of the buildings and provides minimum standards for reducing energy demand through design and construction practices. ECBC is now voluntary and applies to large commercial building and is applicable to all buildings with a large air-conditioned floor area. ECBC has both prescriptive and performance-based compliance paths. The prescriptive aspect requires minimum requirements for the building envelope and energy systems (lighting, HVAC, service water heating and electrical). The performance-based compliance path requires the application of Whole Building Simulation Approach to prove efficiency over base building as defined by the code. This leaves the code inherently flexible and easy to adopt. There are several references to the NBC in the ECBC, especially for natural ventilation, day lighting, lighting, comfort, and other standards.

ECBC is the key umbrella energy regulations for the buildings. But this is a voluntary measure only for large commercial buildings with minimum 100 KW connected load. So far only 119 buildings have been rated by BEE of which 15 are 5 star rated and 21 are 4 star rated (see fig1: Example of BEE Star Rated Buildings in 2010). The BEE registered buildings account for 7.865 Million Sq.ft (2010) as per BEE website. The existing buildings that were chosen initially are government buildings and included energy retrofitting programs. Though a good programme, the scope of the programme is extremely limited. The immediate challenge is to scale up the ambit of its enforcement and bring a much larger number of buildings in both commercial and residential segment within its ambit nation-wide for an effective impact.

Fig 1: Example of BEE Star Rated Buildings in i2010



Source: BEE

Appliance standards and labelling: BEE has started a scheme of labelling many consumer products and supports it with minimum energy performance standards (MEPS). The products covered by the standards and labeling program include refrigerators, air conditioners, fluorescent tube lights, domestic water heaters, TVs, set top boxes, ceiling Fans, distribution transformers, induction motors and others and agricultural pump sets. The program aims to cover most of the end-use appliances under the mandatory standards and labelling program in the next few years. The energy performance of the highest star level can be significantly higher than the non-star and lower star products.

Missions under the national climate action plan: The Enhanced Energy Efficiency Mission has provided for market transformation for energy efficiency. This has recommended mandatory labelling of appliances and equipment, mandatory maximum energy efficiency norms per square feet for new buildings as well as existing building (through retrofits) to be ECBC compliant. Replacement of inefficient appliances and fiscal instruments.

Similarly, the National Mission on Sustainable Habitat has also recommended strategies for mitigation that include harmonising energy building code with the national building code, implementation strategies and incentives, building performance and rating systems, demonstration projects, consumer awareness programmes, enhance appliance standards and labelling, etc.

National Solar Mission is relevant from the perspective of the encouragement of the application of the rooftop solar PV and small power plats to replace diesel gensets etc. There are also indirect benefits of utility based incentive programmes.

National Building Code: Building by-laws are under the state governments. The Bureau of Indian Standards has developed the National Building Code (NBC) in the 1980s that guides municipalities and development authorities on building by-laws. The voluntary code covers most aspects of building design and construction, with a small part dedicated to energy efficiency. NBC was revised in 2005. In the latest version, the code provides guidance on aspects of energy conservation (related to Day lighting and Natural Ventilation). NBC provides general guidance on potential energy-efficiency aspects of such factors as daylight integration, artificial lighting requirements, and HVAC design standards.

Environment Impact Assessment: Environment impact assessment requirement under the Environmental Protection Act (1986) cover large-scale developmental activities. This includes buildings with more than 20,000 sq meters. Builders and developers need environmental clearance from the Ministry of Environment and Forests before beginning large construction projects. This is a composite requirement for green buildings that includes energy and other resource and waste management.

Building certification: Green Rating for Integrated Housing Assessment (GRIHA): The Ministry of New and Renewable Energy and TERI has developed the nationally accredited Green Building rating system for buildings with conditioned and non-conditioned spaces under different climatic conditions. The energy efficiency buildings, based on the traditional vernacular building design with the inclusion of passive cooling techniques, solar integrated photovoltaic design for roof, originally viewed towards energy savings at individual dwelling unit. In addition, the building is designed according to the modern specifications for energy saving, star rated household appliances, possible use of renewable energy, recycled building materials etc. as mentioned in its green rating system. The actually saving percentage and environmental benefits differ at building scale level, however, 30per cent saving from baseline building energy consumption is expected from GRIHA rating compliance.

Leadership in Energy and Environmental Design (LEED): The LEED rating system is completely a voluntary system and has established very interesting green building projects across in India. The Indian Green Building Council formed under the guideline of US based Green Building Council (USGBC) with support from World Green Building Council, CII and Government of Andhra Pradesh. The LEED certified green building foot print has grown since from first green building project of 20,000 sq.ft. constructed in 2002 to the total registered project accounting 466.22 million sq.ft as per mentioned in IGBC website. Approximately the 40-50per cent rise from 2002 to 2010 in green building footprint annually for IGBC shows the awareness amongst corporate and individual consumers for energy saving, green building and their business alike

State Level action on energy: Many states have active state designated agencies (SDA) under the Energy Conservation Act that work with BEE to develop and implement state level energy efficiency policies and programs. Some state governments have taken initiatives to legislate selected measures (e.g., use of solar water heating in residential/commercial buildings, or the use of CFLs etc). But scale of these programmes is still very small.

Regulatory tools on water and buildings

Water being a state subject is different from energy, since the Government of India Act, 1935 has in principle given power to the states to legislate in this area. At the central level there are a few acts, advisory guidelines, policies, whereas at the state level there are more specific acts and regulations.

The existing water law framework in India is characterised by the coexistence of a number of different principles, rules and acts adopted over many decades. These include common law principles and irrigation acts from the colonial period as well as more recent regulation of water quality and the judicial recognition of a human right to water. But, it is important to understand the overall structure of the legal and policy framework under which water is governed and regulated in India (see box 2).

BOX 2: LEGAL AND POLICY FRAMEWORK FOR WATER IN INDIA THAT CAN ALSO HAVE BEARING ON WATER USE AND TREATMENT AT THE BUILDING LEVEL

Water Pollution Act, 1974: Regarding water pollution, one of the most important developments was the adoption of the Water (Prevention and Control of Pollution) Act (1974). This Act provides for the prevention of control of water pollution and the maintaining or restoring of wholesomeness of water. The act prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance.

Water (Prevention and Control of Pollution) Cess Act, 1977: This Act provides for a levy and collection of a cess on water consumed by industries and local authorities. It aims at augmenting the resources of the central and state boards for prevention and control of water pollution. Following this act, The Water (Prevention and Control of Pollution) Cess Rules were formulated in 1978 for defining standards and indications for the kind of and location of meters that every consumer of water is required to install.

Environment Protection Act, 1986- The purpose of the Act is to function as an "umbrella" legislation designed to provide a frame work for central government co-ordination of the activities of various central and state authorities established under previous laws, such as Water Act & Air Act. In terms of responsibilities, the act and the associated rules requires for obtaining environmental clearances for specific types of new / expansion projects (addressed under Environmental Impact Assessment Notification, 1994) and for submission of an environmental statement to the State Pollution Control Board annually.

The act provide power to make rules to regulate environmental pollution, to notify standards and maximum limits of pollutants of air, water, and soil for various areas and purposes, prohibition and restriction on the handling of hazardous substances and location of industries (Sections 3-6).

State Acts- While water law reforms are largely state specific, therefore a lot of reforms have been undertaken by the individual states. Several states have adopted legislations seeking to restructure the water institutional framework. Several states have now adopted groundwater legislation. The central government formulated the Model Bill to Regulate and Control the Development and Management of Ground Water (2005) and the Environment Protection Act (1986: 3(3)) established a Central Ground Water Authority to regulate and control development and management of groundwater resources.

National Water Policy, 2002- the first National Water Policy (1987) was adopted by the National Water Resources Council reformulated in 2002. The NWP 2002, clearly states the need for conservation of water. The key emphasis is promotion conservation consciousness through education, regulation, incentives and disincentives. Besides, the policy also stated resource conservation availability augmentation by maximising retention, eliminating pollution and minimising losses.

State Water Policies: the NWP has been supplemented by state water policies, which share common principles. Water use allocation should follow priority in terms drinking water.

Groundwater Regulation

The concern over water scarcity and declining groundwater tables has led to the central government formulating advisories to the state governments to enact groundwater laws and regulate its extraction. Ground Water Board has a range of rules for regulating exploitation of ground water according to the mapping of ground water availability.

There is very little that examines the relationship between ground water and buildings There is one example in Gurgaon near Delhi. In 2011 the real picture of real estate in the Gurgaon was exposed, not that it was unknown. Gurgaon police registered 7 FIRs in December 2010, against those found in possession of illegal tube-wells. But, till recently, the offenders were at best asked to appear before the environment court, or told to pay up a paltry amount as penalty. Infact, it all started in 2010, when the High Court took away the rights of even the deputy commissioner to approve applications for tubewells and possession of the same a criminal offence. The administration had taken up the task of inspecting over 300 building sites in the city, where construction work of different housing projects was on in full swing. The court had passed this order after hearing a bunch of PILs filed by an NGO about the plummeting groundwater table in Gurgaon. The hardest hit would be the

real estate builders, who in absence of water source would find it difficult to complete the projects and or even stall it completely. According to some estimates the number of unregistered tubewells is more than 20,000.[xxxi]

Water pricing:
Water in most Indian cities and towns is under-priced. Infact, most water supply entities run at a loss and cover from government subsidies and loans. According to the Asian Development Bank, the average tariff for a kilo litres of water is Rs 4.91/m3, (see fig 2: Average water tariff in various Indian cities). Further, only 24per cent of consumers have their connections metered in India. Since, water is under priced and largely un-metered, consumers tend to care a little about water consumption, efficiency improvement and water savings. Therefore, tariff reforms for water are crucial in the present scenario.

Action on National Building Code of India (NBC)
The National Building Code of India (NBC) is a building code and a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a model code for adoption by all agencies involved in building construction works including the public works departments, other government construction departments, local bodies or private construction agencies. Rain water harvesting system and solar water heater are mandatory for newly constructed building in some states. Unfortunately, the NBC does not include water efficiency standard and offers only guidelines for construction.

Water Audit for Buildings
The reason why water auditing has gained grounds within the industrial sector in India is because of two reasons i.e. efficiency improvement and cost savings. According to DRA Consultants Private Limited located in Pune, it has been engaged in conducting water audits for industries for the past 15 years. According to DRA, water availability more than high water tariffs is emerging as a challenge for these industries. For example industries located in drier regions requiring fresh water for their processes, water availability is a very big challenge apart from high industrial water tariffs. Therefore, industries are much more forthcoming to undertake water audits and conservation. There is a great emphasis on quality aspect as well since there are pollution boards' regulation mandating treatment and discharge for industries. A fact echoed by other agencies like FICCI, Anacon Labs, Synergy and Environmental Solutions. There are several other agencies like Alfa Environ Systems, Energetic Consultants, Tata Consultancy Engineering (TCE), Synergy Engineering and Environmental Solutions etc. all in the business of water auditing but essentially for industries.

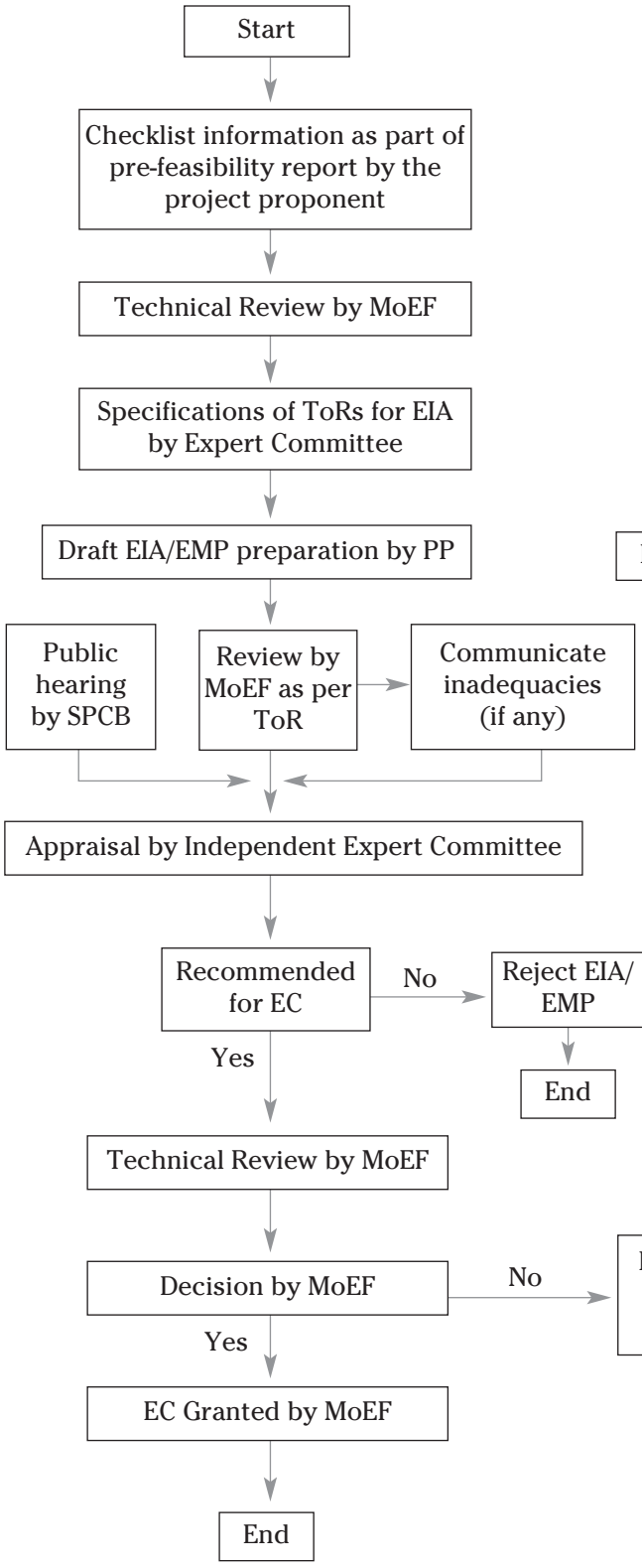
As far as the audit for commercial and institutional buildings are concerned, not many agencies have major projects for water auditing with them. Infact, water auditing and conservation program for Reserve Bank of India (RBI) buildings and campuses across several states was a common project that was undertaken by different consultants in different locations. Besides this there were hardly any other projects in buildings, which were ongoing as reported.

According to DRA consultants, the market for commercial and institutional buildings water audit is not very developed and there are hardly any requests from these buildings representatives for audit exercise. According to them, these facilities are not very keen on undertaking water audit since there is limited motivation, need and above all additional cost implications for undertaking water audit. In addition, water auditing and conservations are not mandatory under any regulation, to be undertaken by these buildings. This is therefore a major

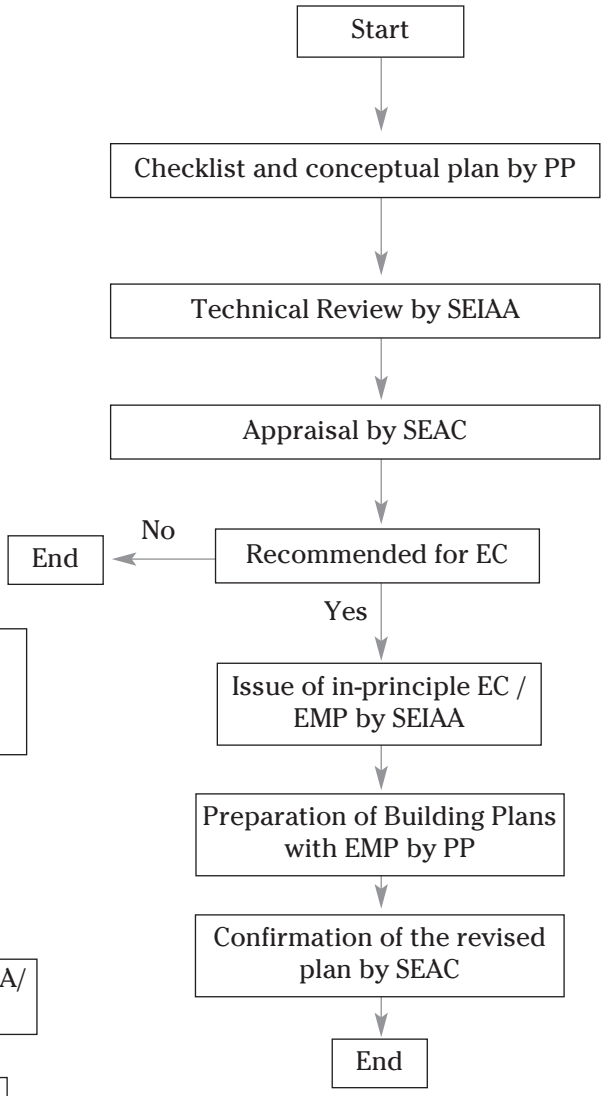
disincentive for the commercial and institutional buildings representatives to audit their building's water use. Also, DRA consultants itself, was not very eager to take up commercial and institutional buildings because of paucity of time due to numerous assignment from industries for water auditing.

Annex 2

Environmental Clearance (EC) Process for all Category A projects (central level)



EC Process for Category B projects for Building Sector (State Level)



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