- **BRIEFING NOTE**

CSE's Regional Dialogue on Sustainable Building

Bhubaneswar, December 13, 2013

•Centre for Science and Environment(CSE) opens a dialogue on sustainable buildings with congratulating Odisha, the first state to notify the Energy Conservation in Buildings code(ECBC), says notification is not enough

• Other states of the regions must follow cue, and look at implementation of ECBC for energy efficiency in buildings.

• Says cities need to chalk a plan towards resource efficiency.

The urban building sector ¨C our homes, offices, shops ¡ª are the end users of energy, water and a whole range of materials that influence the resource footprint of cities. Buildings are complex ecosystems that have many aspects of resource use and waste generation ¨C energy, water, land, bio diversity, air and so on. The built up area in Indian cities will expand phenomenally in the coming decades. In fact, almost 70 per cent of the building stock is yet to come up. The built up area is expected to swell almost 5 times from 21 billion square feet in 2005 to approximately 104 billion square feet by 2030. The real estate growth story in India has got both the domestic and international investors excited. The government was also quick to roll out the red carpet by allowing 100% FDI in the real estate sector. The year 2011-12 witnessed a massive US$ 453 million FDI investment, while private equity investment in the 2011 touched almost US$ 741 million. The momentum is only going to accelerate from hereon, but clearly our capacity and ability to handle such an enormous real estate surge, is doubtful.

This workshop, organised by the New Delhi-based research and advocacy body Centre for Science and Environment (CSE) in association with the Bhubaneswar Development Authority (BDA), will discuss and chalk out the future of energy consumption in buildings in the wake of the increasing energy deficit in the country. Currently, buildings in India (domestic and commercial) consume an enormous 33 per cent energy.

Real estate boom

Property cost in Odisha has grown more than 100 per cent in last five years and is maintaining the pace. Most of the urban regions in the state have been facing higher demand for the residential properties. Bhubaneswar is one of the few cities in the world that has surpassed its planned projected population in every decade. The city lies within the district of Khurda, which features the highest degree of urbanisation in Odisha, the highest population density and a population growth rate of nearly 25 % between 2001 and 2011.

The state also experienced a boom in the commercial sector; there has been recent entry of malls in the area which is one of the factors leading to the increase in property rates. Most of the investors as well as developers are earning huge profits from investing in the commercial sector. The growth of the

commercial sector has been very rapid. The shops dealing with the construction (2600 %) material and the hotels (2587%) have shown the maximum growth in organised shopping sector.

The real estate sector in West Bengal grew at a rate of 15-20 per cent in 2012 making it one of the fastest growing sectors in the state. In Kolkata, an increase in the spending capacity of people and entry of multinational corporations has led to a steep increase in demand for commercial and residential property. Real estate is being seen as a less risky venture which provides high returns. The housing sector is especially growing at a tremendous rate with a number of real estate developers undertaking large housing projects in a number of cities in the state.

Other cities in close proximity to the state capital like Howrah, Durgapur and Haldia are also experiencing rapid development. In Durgapur, the setting up of the Software Technology Park as well as a knowledge and health city has resulted in an influx of real estate investment. Siliguri is favorably located to serve as a commercial hub for transactions between the remote north east and the mainstream economy and has the potential to attain the status of a major trans-shipment and logistic hub. High end projects have been driving the property market in Siliguri, and the takers for such residential apartments have been investors from Sikkim, Nepal, Bhutan and Bangladesh.

Though still in its nascent stages, real estate in Chhattisgarh is expected to develop rapidly in the next decade. Apart from New Raipur, new private townships are being planned in various districts of Chhattisgarh. Chhattisgarh's capital city is experiencing a retail boom. Residential property development in Chhattisgarh is being propelled by real estate builders with mega housing complexes.

The real estate boom has also reached the North Eastern states, many of the Northeastern cities like Guwahati have become a hot spot for realty. According to the experts, Assam has become one of the top investment destinations in the country. Guwahati remains the hub of commerce and trade in the Northeast. Along with the development of commercial projects, developers are also developing luxury residential projects.

The Asian Development Bank invested over USD260 million for the development of the capital cities of five North Eastern states(except Sikkim and Anurachal Pradesh). The project, which is likely to be over by the next five years, aims at development of roads, setting up a proper system of water supply and drainage systems and slum area development.

An opportunity for sustainability

More than half to 95 per cent of the new buildings will come up in resource-stressed suburbs and new townships throughout the country. Infrastructure Development Finance Company Limited's *India Infrastructure Report 2009* states "the size of private 'integrated' townships ranges from 100 to over 1000 acres and nationally more than 200 such townships covering more than 200,000 acres are under approval for planning and construction." Touted as *Walk to Work Green Towns,* the new towns are sprouting across the country without clear green benchmark, implementation strategy or strong regulatory safeguards. .

While individual buildings have an impact on the surrounding environment, cumulatively they make a significant impact on the urban environment. In India, buildings are responsible for 40 per cent of the

energy use, 30 per cent of the 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 the carbon emissions, 30 per cent of solid waste generation, and 20 per cent of the water effluents.

Despite being a major resource predator, the sector is poorly regulated. There are a few regulations for sustainability in buildings, especially those for energy efficiency, but these require aggressive implementation.

Over the last few years, Odisha government has assumed pioneering role and initiated action on 'green' buildings.

Odisha - First to notify ECBC

Odisha is the first state to notify Energy Conservation in Buildings Code (ECBC) in 2011 and make it mandatory for big commercial and official complexes. Energy department in Odisha is the nodal agency of Bureau of Energy Efficiency (BEE) and gives approval to the ECBC complaint buildings. BDA has included ECBC provisions in the city by laws and is giving an extra .25 Floor Area Ratio as an incentive to developers of such buildings. However the enforcement of ECBC is still weak. Though, discussions with BDA, Confederation of Real Estate Developers Associations of India (CREDAI) and Institute of architects in Odisha have been going on, ground level work is non existent.

The state still does not have any officially ECBC complaint building and there is no definite reason for the lack of them. Though some developers or individuals building their offices or homes using products which reduces their operating costs, they do not bother with the certification. Secondly, there is reluctance to invest in an ECBC complaint building, as the technology required for the approval tends to increase the initial building cost drastically. Additionally, new technologies promoted by ECBC does not have an established market base in the state and the issue of maintenance and repair support is a deterrent.

Status of ECBC in other states

Apart from Odisha, only West Bengal and Mizoram in the region have taken steps to implement ECBC. Rest of the states are yet to initiate energy efficiency measures. Delhi, on its part, has adopted the following measures:

-- Cool roof programme initiated

-- Implementation of ECBC in government buildings to bring down average energy use by 25-40 per cent

-- One of the targets in Enhanced Energy Efficiency Mission is to retrofit 100 existing buildings with area above 10,000 sq ft to make them energy efficient.

-- Delhi secretariat to be converted into a green building. About 15 more government buildings have been identified

-- Solar water heater system mandatory in industries, hotels, hospitals, nursing homes, hotels, canteens and residential buildings having an area of 500 sq meter. Grant of subsidy worth Rs 6,000 for purchase of solar water heater etc

-- Proposal for a solar city in the NDMC area

Way towards energy efficiency in buildings

Cities must ensure effective resource savings: With efficient lighting, ventilation, air conditioning, refrigeration and architectural design it is possible to save 30-70% of energy. The 2010 McKinsey estimates confirm that the national power demand can be reduced by as much as 25 percent in 2030 by improving energy efficiency of buildings and operations. According to BEE, existing buildings have the potential to save 30-50 percent energy.

Cities need to chart the road map for implementation of energy regulations, especially energy code for building construction (ECBC). Learning from Odisha, notification of the code is not enough and additional steps are needed to ensure energy efficiency in buildings. New and existing buildings can be made more energy-efficient using a combination of passive and active design measures and operations. This demands strong institutional framework and technical capacity building in urban local bodies, along with suitable fiscal incentive and regulatory push to encourage the market to move beyond the minimum requirements of ECBC and maximize energy savings.

Appropriate and sustainable material: 'Green building' demands appropriate selection of building material that are locally appropriate, locally available, have low embedded energy and compliment innovative architectural design. In 2012, the Supreme Court order enforcing new environmental control guidelines issued by the Union ministry of environment and forests (MoEF) related to mining and brick kilns has led to shortage of construction materials like sand, gravel and bricks. The cost of building materials have increased by almost 30 percent, thereby increasing the investment required for any construction activity. This may be looked at, as an opportunity to use alternate building materials.

Ignored resource: Construction and demolition waste

Waste generated in the construction, maintenance and disposal phase of the building is categorised as construction and demolition (C&D) waste. In India, it is estimated that 48 million tonnes per annum of solid waste is generated, of which waste from Construction Industry accounts for 25% at 10-12 million tonnes. Indian cities have just started recognising the C&D waste as a major problem.

Management of C&D waste in India is briefly included in the 'Municipal Solid Waste (Management and Handling) Rules, 2000' very briefly. Mumbai reported 2,000 tonnes of daily generation of C&D waste in 2005, according to the Municipal Corporation of Greater Mumbai (MCGM). While Delhi estimates generation of about 3,000 ¨C 4,000 tonnes per day of C&D waste.

There is a need to generate public awareness regarding the potential of minimising environmental impact of demolition and construction waste, choking our cities, as well as to reduce pressure on naturally sourced construction material.

Avoid rebound effect. Ensure behavioral change: As efficiency of appliances improves, increased multiple ownership of even efficient appliances like refrigerators, televisions can lead to more energy use. Global studies show that people are careless about usage after they install efficient lights. It is estimated, one may lose up to 12 percent of the expected energy savings by leaving them on longer. Similarly, those who buy an efficient furnace lose up to 30 percent because they raise the thermostat. Therefore, as a policy it is important to use a range of other energy indicators to influence and track energy usage like absolute figures on total usage, per person per year, per square meter per year.

Household level targeted metering, auditing, incentives linked with energy billing may help to stimulate behavioral change.

Improve poor people's home as well: Green measures are needed to improve comfort and efficiency of poor peoples' home as well. Rajiv Awas Yojana (RAY) earmarks 20-25 percent of developed land in all housing projects (both public and private agencies) for economically Weaker Section /Lower Income Group with cross-subsidisation. Architectural and material innovations are needed to improve thermal comfort and efficiency of poor peoples' home as well.

Need performance monitoring and reporting actual building performance: Green building regulations may remain a non-starter if post construction monitoring is absent or weak. There are strong concerns about the actual performance of the buildings. Even in cases where green rating systems have been promoted with government back up and incentive,s there is no record of the actual performance of the buildings and the nature of resource efficiency measures applied. There is no information on buildings in the public domain. Cities in Maharashtra, NOIDA in Uttar Pradesh are among others, which allow extra built up area, tax concessions etc to incentivise green rating of buildings. But these incentives are not linked with actual performance of the buildings. Without proper performance monitoring green rated buildings can perform worse than the standard buildings as is evident in the US and other countries.

Affordable and quality energy-efficient solutions must be adapted to local contexts: Green building policies have created enormous market opportunity for innovation in energy efficient technology. Market is abuzz with green building products for lighting, insulation, glazing and glass. Wall insulation products or insulated roof tiles are competing intensely with claims of going beyond the requirements of ECBC. While technology is an opportunity, its inappropriate selection and application can make things go awry. Climatic conditions ¨C temperate, warm and humid, composite and hot and dry, govern the choice of material and design.

But often the construction industry push for material and architecture from the west that are not appropriate Indian climate. For instance, craze for glass in composite hot climate, leads to unacceptable heat ingress and increased use of energy intensive air conditioning. But ECBC allows a maximum wall-to-window ratio (WWR) of 60 per cent, and does not differentiate between various climate zones or between conditioned and non-conditioned buildings. Hence there is a need for ECBC to be critically reviewed to make it more practical and effective.

Air conditioned building adds to need of insulation, pushing for high performance insulation products and use of expensive, imported and environmentally inappropriate materials. The insulation materials in the Indian market include mineral wool, rock wool, vermiculite, foams expanded polystyrene, extruded polystyrene among others. Like gass wool, rockwool can be harmful. Thermocol (polystyrene) is less stable, releases gases in an unavoidable process of degradation that affects all plastics. Buildings may reduce usage of high performance insulation and harmful products by following a system approach using many natural and passive cooling methods -- sun shades, ventilation, and innovative insulation methods to keep structures cool and comfortable.

Improve public acceptance of green buildings and build public support: Demystify green building measures and build public support, create awareness to what "works" and what "doesn't work" in terms of energy-efficient and water-saving strategies for homes. Inform people about cost saving for energy-efficiency and water-conservation products and appliances. People must know where to find information on options, prices and Suppliers. Deepen understanding -- how individual decisions to conserve water and energy add up to overall savings that benefit the community. Resource efficient city development can happen without compromising economic growth.

For more details, please get in touch Avikal Somvanshi ¨C Sustainable Buildings Team at avikal@cseindia.org/09871933410, for interview requests, please contact Sheeba Madan ¨C Media Resource Centre at sheeba@cseindia.org/08860659190