

## Annexure D - Case study Greater Noida, India

### Module 7: Climate Change and Shelter and Housing

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#### 1. Name of practice

Climate Protection through zero emission building by Bayer in Greater Noida, India

#### 2. Location(s)

*[List district/city/town & country.]*

Greater Noida, near New Delhi, India



Greater Noida is a 100,000 citizen strong census town located in the Gautam Budh Nagar district of the northern Indian state of Uttar Pradesh. It comes under the purview of National Capital Region (NCR) of India. It is located 40 kilometres (25 mi) to the southeast of New Delhi and 20 kilometres (12 mi) southeast of Noida, one of the largest industrial townships of Asia. The development of Greater Noida is managed by the Greater Noida Industrial Development Authority. Greater Noida is a fast growing region, on a trajectory to be one of the largest industrial and education hubs of India. In summer the weather remains hot and temperature ranges from maximum of 45°C to minimum of 23°C. Monsoon season prevails during mid June to mid September. The cold waves from the Himalayan region

make the winters in Noida chilly. Temperatures fall down to as low as 3 to 4°C at the peak of winters.

In January 2011 Bayer MaterialScience has opened its first emissions-neutral office building in Asia. Bayer MaterialScience is a world-leading materials provider. According to the Bayer Group's mission statement "Science For A Better Life", Bayer MaterialScience works on solutions for the challenges of climate change. Bayer supports the development of renewable energies and contribute to modern buildings by making them energy saving and well protected against the heat and cold.

### 3. Actors

*[List key partners and stakeholders as well as the roles of each.]*

- Client: Bayer Group India, Greater Noida, India
- Architects: Banz + Riecks Architekten, Bochum, Germany
- Construction companies: local firms from Greater Noida, India
- Technical support: Bayer Technology Services, Greater Noida, India
- Energy consulting: Solares Bauen, Freiburg, Germany
- Materials: Bayer MaterialScience, Greater Noida, India



Dr. Ram Sei Yelamanchili and Krishna Kumar Mitra with insulating material (Source: Bayer 2011)

The fundamental design of the building, which was developed in cooperation with Bayer Technology Services and other renowned experts such as architects Banz & Riecks and energy specialists solares bauen GmbH (both from Germany), takes account of both the local climatic conditions and the technical infrastructure at the site.



Inauguration of the EcoCommercial Building for Bayer in Greater Noida, India (Source: Bayer 2011)

#### 4. Issues addressed/ focus [1 paragraph]

*[Describe what challenges/gaps the practice is addressing; consider key co-benefits.]*

Bayer MaterialScience's new building in Greater Noida addresses climate protection through intelligent design, innovative construction and the use of new materials. The building draws 100 percent of its electricity from a photovoltaic plant and needs 50 percent less power than comparable buildings in the region. Foams based on high-quality materials from Bayer MaterialScience perform both tasks with exceptional efficiency. The new office building is approximately 1,000 square meters in size and can accommodate around 40 workstations. It also serves as a model for customers of a sustainable, climate-friendly building solution. By various integrated measures the company steps up its efforts to further reduce CO2 emissions at its production facilities and develops new solutions for climate protection and for dealing with climate change.

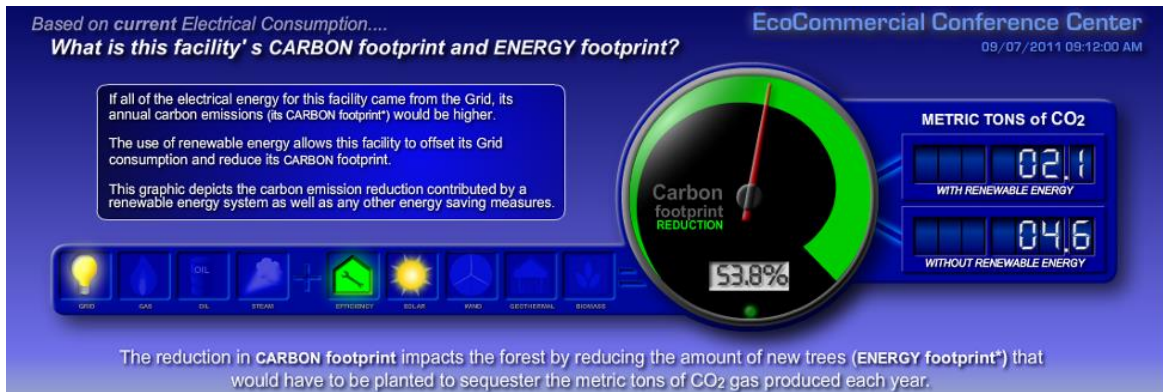


During the design process: rendering of the zero emission building in Greater Noida, India (Source: Bayer Material Science 2010)

#### 5. Stage of implementation [2 paragraphs]

*[What year was the practice initiated? Is it partially or fully implemented/ functioning/ operational?]*

In 2008, Bayer MaterialScience laid the foundation for its first “EcoCommercial Building” in Greater Noida. The intention is to set a milestone of Bayer’s contribution to climate protection (Patrick Thomas, CEO of Bayer MaterialScience AG, ground-breaking ceremony, 2008). “Together with partners we have developed and are now realizing a unique zero-emission building concept for the commercial sector.” Construction work took around two years.



Monitoring system of the carbon and energy footprint of the building (Source: Bayer, 2011)

Since the end of 2010 the building is successfully in use and constantly monitored to check energy and water consumption in real time. This helps to reduce energy and water usage, optimizes performance of renewable energy systems, and reduces the carbon footprint of the building.

**6. What was/ is being done? [2-3 paragraphs]**

*[Describe how the practice works/ what it does, and why this particular approach was chosen. What are the key innovations and value-added of the practice? What is its scope and costs?]*



The Bayer zero energy building in Greater Noida after completion (Source: Bayer, 2011)

The idea behind the project was to put India on the green building map. The local government of Greater Noida and Bayer Group India intend to create a lighthouse project that address climate change issues. At the same time marketing and commercial interests of the local government and Bayer India Group took an important role. To ensure a net-zero consumption, the offices are insulated with polyurethane foam boards that lock out solar heat and reduce cooling needs by

over 70 percent. Grey water systems, locally-sourced and recyclable materials, double-glazed windows and intelligent lighting and climate control systems contribute to the building's green status, with day-lighting and water harvesting components. The building is designed to function up to eight hours off-power without any impact on the infrastructure. The investment costs came to approximately EUR 5 million.



Light and intelligent building materials installed in the Bayer zero energy building in Greater Noida (Source: Bayer, 2011)

**7. Outcomes and impacts [2-3 paragraphs]**

*[What has been achieved and who is benefitting? In what ways is it pro-poor? What main factors for success would you emphasize?]*

Bayer's EcoCommercial Building has received the highest score in the category "New Construction" of the international rating system "Leadership in Energy and Environmental Design" (LEED) rating system. The building was awarded 64 points out of a total possible score of 69 points. Bayer's EcoCommercial Building achieved the maximum possible number of points in three out of six categories, namely in 'Water Efficiency', 'Indoor Environmental Quality' and 'Innovation & Design'.



LEED certification levels (Source: United States Green Building Council, 2012)

The building received the highest score in the LEED NC rating worldwide. LEED is a green building rating system founded by United States Green Building Council (USGBC) that reflects the highest level of sustainability-focused certification.

## 8. Sustainability [1 paragraph]

*[What is the strategy to keep this practice going over the mid and long terms?]*

Bayer's strategy to keep this practices going over the mid and long terms is to continue the process of research, development and testing new ideas, technologies and materials for the building sector. A wide range of individual energy conservation measures such as intelligent envelope (thermal insulation for roofs), optimized windows (type of windows), smart lighting (lighting controls & systems), central plant (chiller type, sizing) to the budget case in order to optimize the performance of the proposed building. A photovoltaic system on the roof generates more than 120000 kilowatt hours of electricity each year, thus reducing CO<sub>2</sub> emissions by approximately 108 tons. The building consumes 70 percent less energy than other local office buildings constructed to Indian standards (total energy requirement: 45 kWh/m<sup>2</sup>a).

## 9. Replicability [1 paragraph]

*[Can this practice or parts of it be replicated or was its success local context-specific? Has this practice or parts of it been replicated already, or is someone planning to replicate it?]*

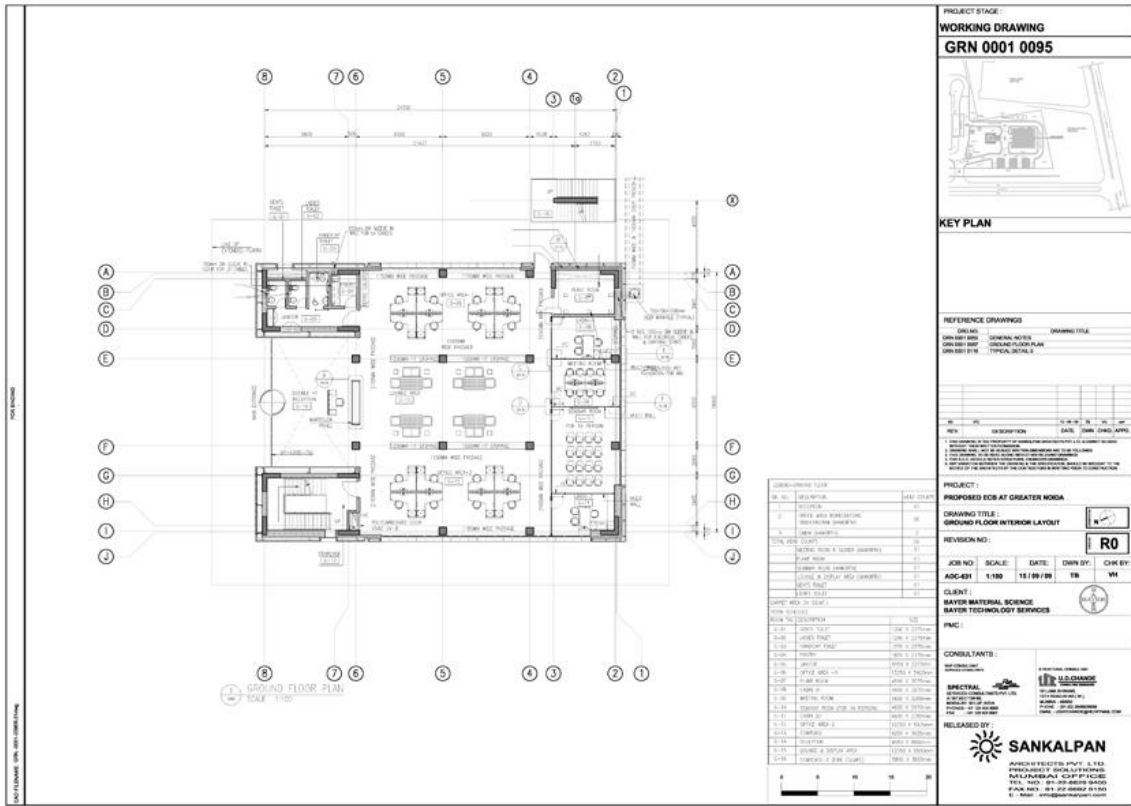
The EcoCommercial Building in India, which Bayer built in conjunction with local companies, shows that the concept is also applicable in other sub-tropical climates. While in the temperate European climate zone building insulation is primarily used to protect against cold, its foremost purpose in countries such as India is to protect against heat. CO<sub>2</sub>-neutral buildings have been built in in Qingdao, China and Diegem, Belgium. Furthermore a construction project in the Brazilian metropolis of Sao Paulo is also following this concept.



CO<sub>2</sub>-neutral buildings in Qingdao, China and Diegem, Belgium by Bayer (Source: Bayer, 2012)

# 10. Documentation

[Please provide the details/ links of/to your sources of information.]



**Links:**

- Bayer MaterialScience: <http://www.materialscience.bayer.com/>
- Bayer Group India: <http://www.bayergroupindia.com/ECB.htm>
- EcoCommerical Building Greater Noida, India: <http://www.bayer.com/en/EcoCommercial-Building.aspx>
- Architects: Banz + Riecks Architekten: <http://www.banz-riecks.de/?id=181>
- Energy consulting: Solares Bauen: <http://www.solares-bauen.de/>
- LEED: <http://www.new.usgbc.org/>
- Greater Noida Authority: <http://www.greaternoidaauthority.in/>