

## EcoCommercial Building Program



# EcoCommercial Building Program of Bayer Material Science

## Realization of a Net-zero-energy Building in China



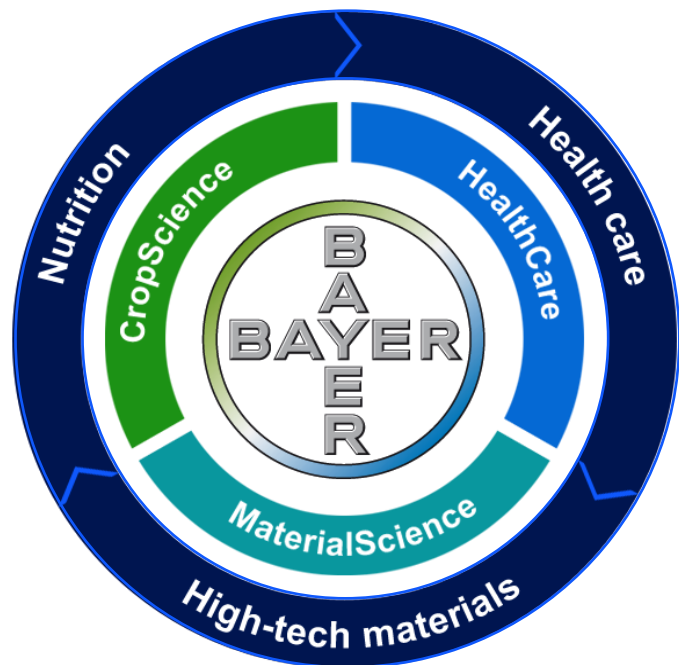
Jack Sun

16-Jun-2011  
Harbin



# Bayer – Science for a better life

## Innovative Products and Solutions



- 2010
- Employee: 108,400
- Turnover: EUR 35.1 bn
- F&E Invest: EUR 3.1 bn



### Bayer MaterialScience

- Industries:
  - ☐ Automobile
  - ☐ Electrical / Electronic
  - ☐ Sports / Recreation
  - ☐ Construction: Insulation - glazing - floors & coating - Lighting - Building

- 2010
- Employee: 14,300
- Turnover: EUR 10.2 bn



# Bayer: A Leading Company in Sustainability



## •Carbon Disclosure Leadership Index

Bayer rated as the most transparent of the 500 largest stock-market-listed companies in the world in 2009 and 2010



•Bayer continues to be included in the **Dow Jones Sustainability World Index** for 2010/11 for the 12<sup>th</sup> consecutive period



FTSE4Good

•Bayer continues to be chosen by the Financial Times and the London Stock Exchange (FTSE) to be included in the FTSE4Good Europe Index and the FTSE4Good Global Index

CHINA ENVIRONMENTAL  
PROTECTION FOUNDATION

中华环境保护基金会

•Bayer in China is awarded **China Environmental Excellence Prize 2010** by the China Environmental Protection Foundation





# Climate program: Keep CO<sub>2</sub>-Emissions on 2007 up to 2020

## 2008 – 2010: EUR 1 bn for CO<sub>2</sub> emission reduction

### Production & Processes



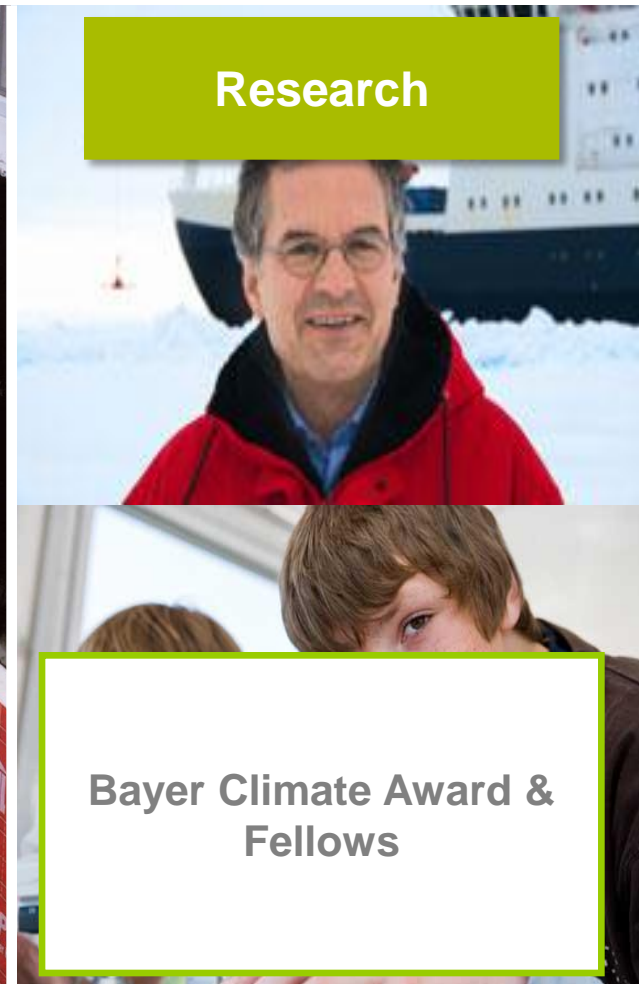
- Increase efficiency
- Reduce emissions
- Capture CO<sub>2</sub> as raw material

### Products & Solutions



- Light weight
- Renewable energies
- Thermal insulation
- Life cycle performance
- ...

### Research



Bayer Climate Award & Fellows



# Buildings and their influence on the environment

## Major leverage for the protection of the climate and resources

Operation of buildings accounts for **40%** of the global energy demand\*

\* Deutsche Bank Research 2010

Buildings cause **30%** of the global green house gas emissions \*

\* Deutsche Bank Research 2010

Up to **85%** of the heating energy is lost at not insulated houses\*

\* Reference building built in 1960  
Source: Bayer MaterialScience



# The social aspect of construction

## Buildings influence the personnel performance

Every day we spend  
**20 hours indoors\***

\* Source: American Physical Society, 2008

Up to **35%** less short term sick  
leave through better air quality  
and acclimatization\*

\* Source: Mendell, M.J. et. Al, 2005; Fisk, W., 2000

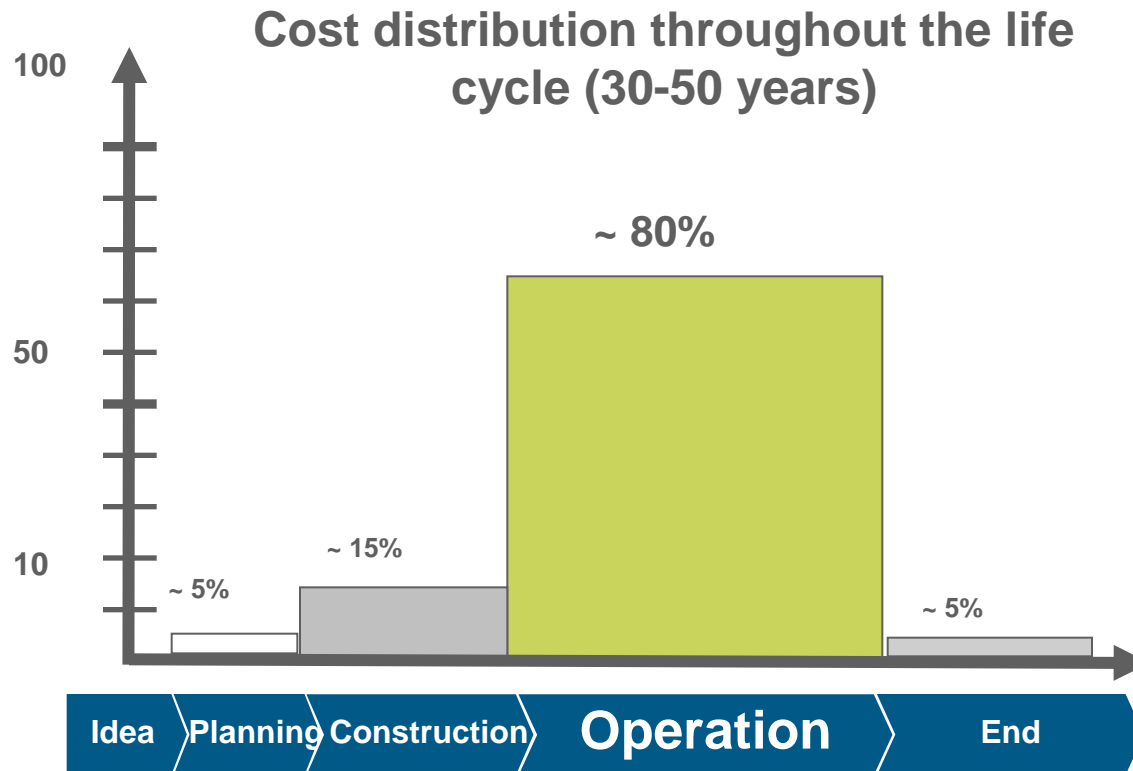
Pupils / students have up  
to **18%** better scores  
through daylight\*

\* Source: Heschong Mahone Group, 1999



# Life cycle costs

## Operation costs as major leverage



Up to 1/3 of the operation costs for energy

Saving potential of 90% with existing technologies

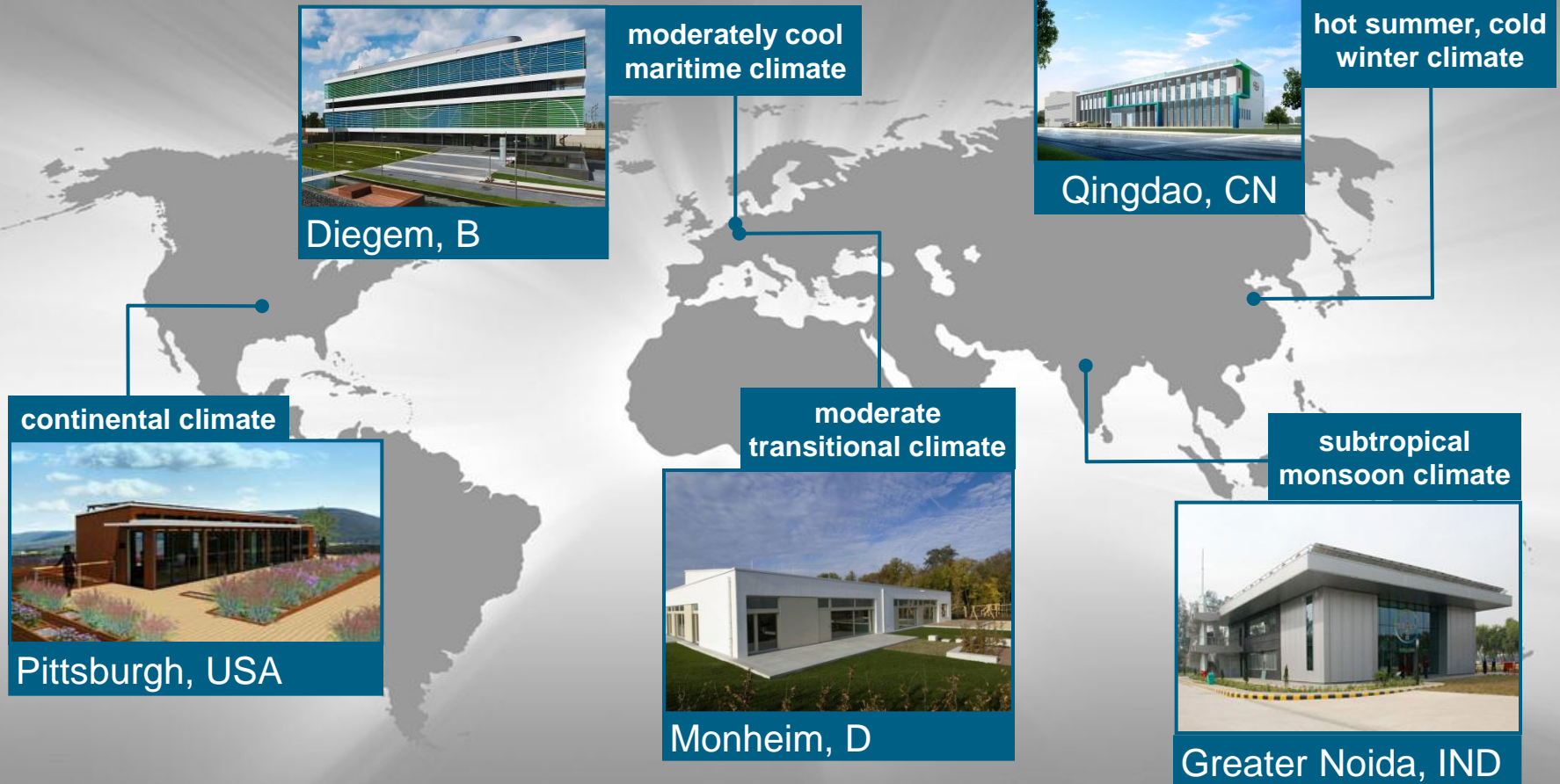
Rising energy costs  
1998 – 2008 +33.5%\*





# EcoCommercial Building Lighthouses around the Globe

## Demonstrate applicability under different climate conditions







# Bayer ECB Lighthouse Project

## Monheim, Germany

### Status ECB Monheim

- **Energy consumption**
  - Reduced up to 55% compared to German building standard
  - Plus 13.6 MWh supplied to the grid in 2010
- **Energy supply** (100% renewable)
  - 60% photovoltaic (for electricity)
  - 30% geothermal (for heating)
  - 10% solar heat (for warm water)
- **Budget & Schedule**
  - Budget of € 2,3 Mio is kept.
  - Additional costs for zero emission approx. 10% of the total investment
  - In operation since November 2009





## Optimized Energy Demand

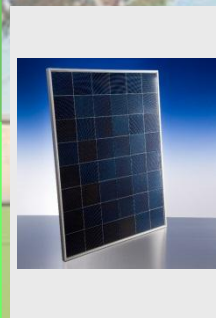
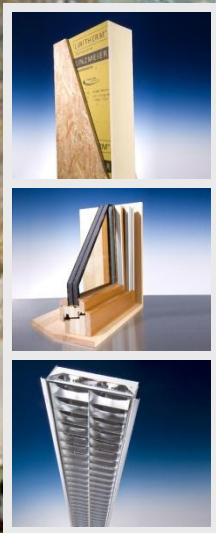
## Renewable Energy Supply



# Zero Emission

## Balance of optimized energy demand & renewable energy supply

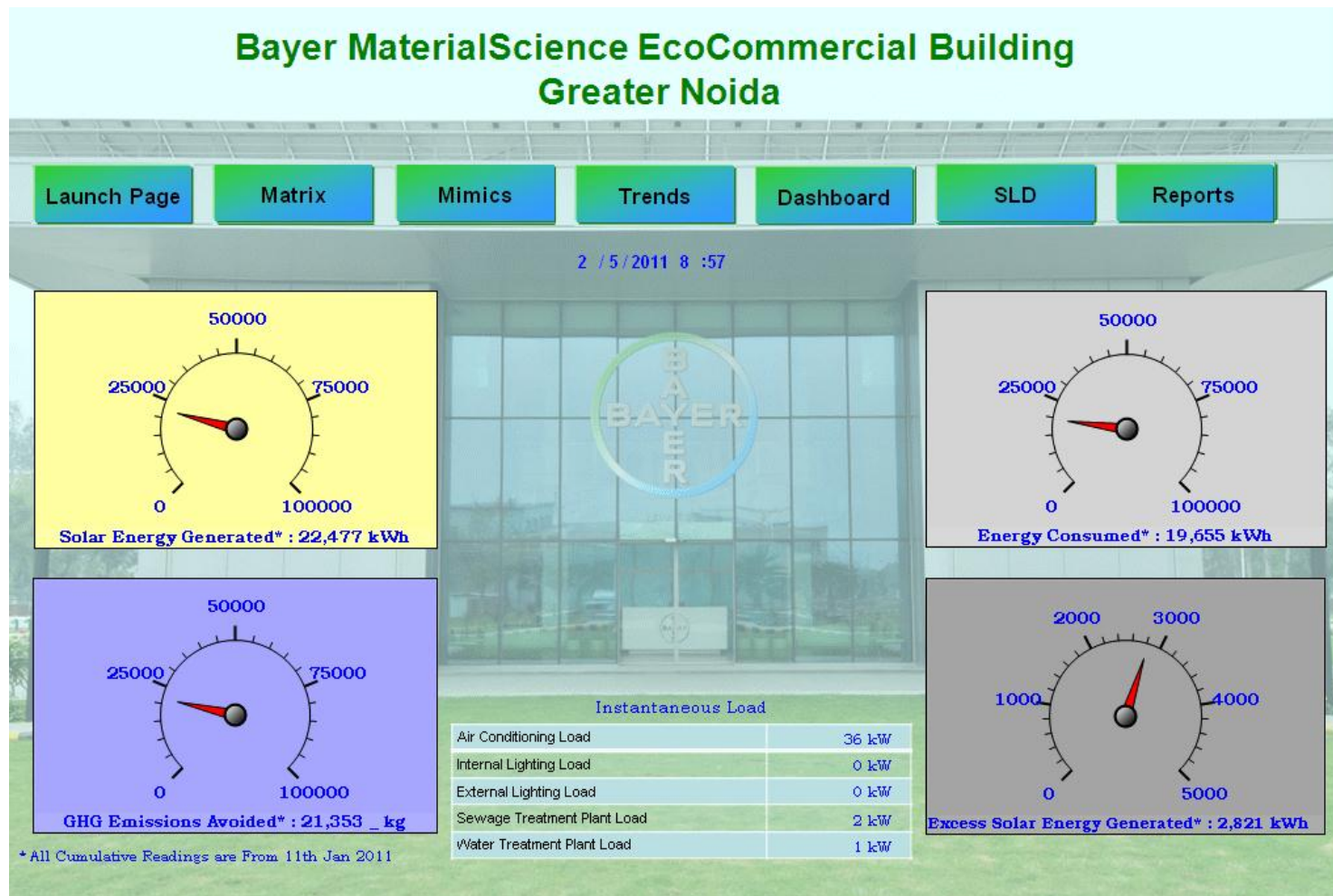
Optimized Energy Demand		Renewable Energy Supply	
Hot Water	11.7 MWh	Solar Heating	7.9 MWh
Heating	21 MWh	Geothermal heating	17.7 MWh
Lighting	9.6 MWh	Photovoltaic	34 MWh
Other electrical demand	16.6 MWh		
Total	58.9 MWh	Total	59.6 MWh





# Transparency of Energy Performance

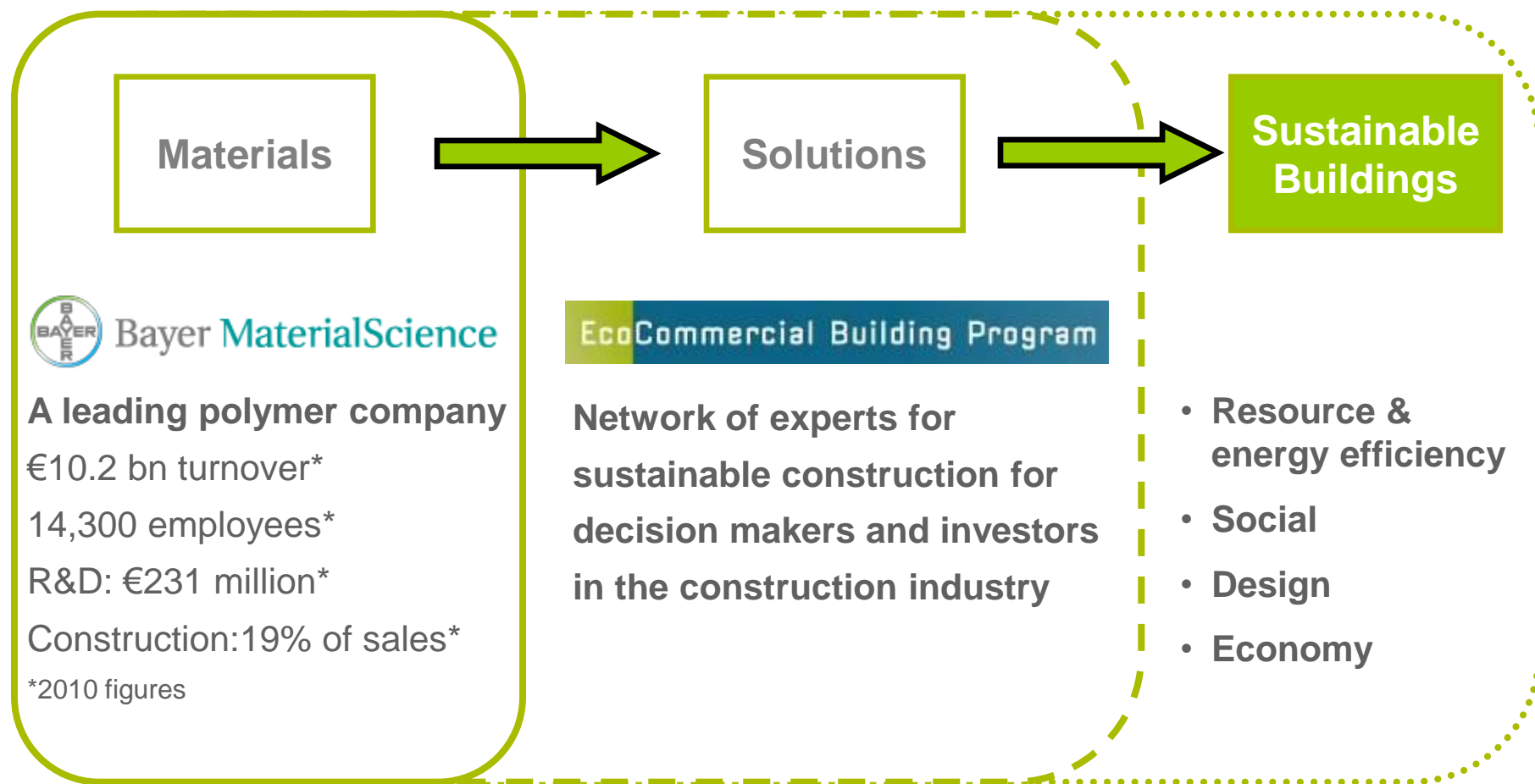
## India lighthouse project monitors energy systems in real time





# EcoCommercial Building Program Materials

**A strong network for sustainable construction**

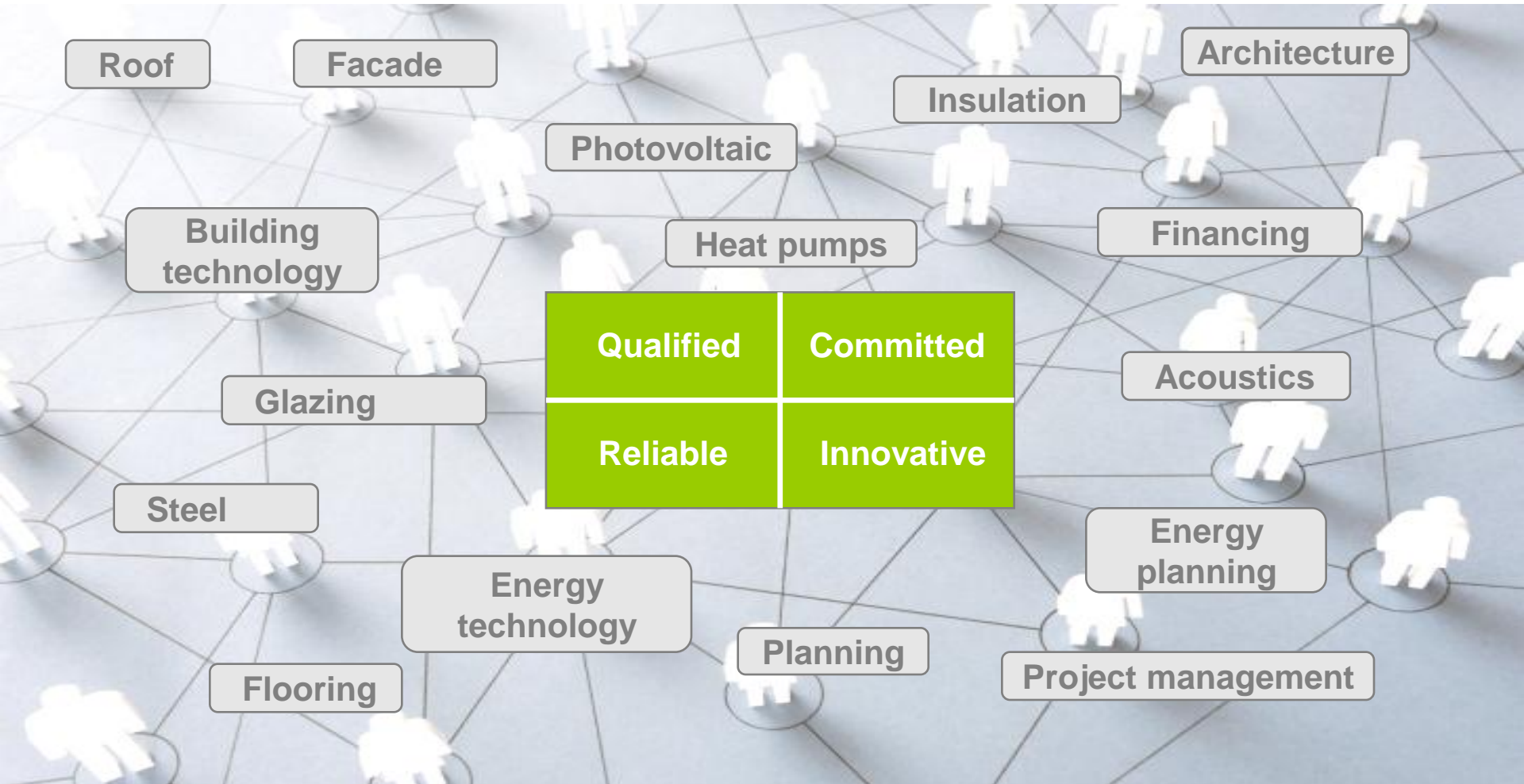






# Competence Network

**Comprehensive: From services to innovative & efficient solutions**





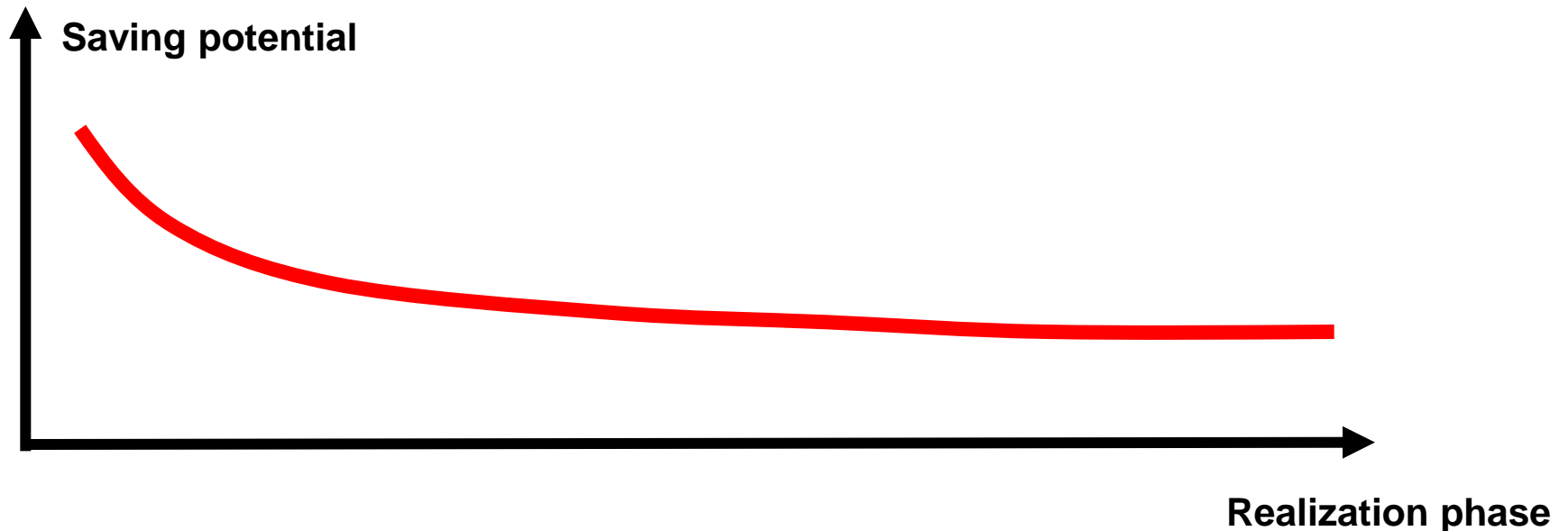
# Integral planning and realization process

## Incorporate sustainability right from the beginning

**Analysis  
& Planning**

**Engineering  
& Realization**

**Certification  
& Amortization**



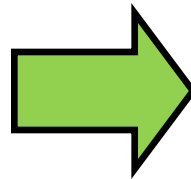


# EcoCommercial Building Program

## Targeting **Decision Maker** and **Investor**

**EcoCommercial  
Building Program:**

**Network** of  
Experts for sustainable  
construction



Solutions for  
**Decision Makers**  
and **Investors** in the  
construction industry



# Network as of today

## > 30 network members



Bayer Technology Services



**uponor**  
simply more



Bayer MaterialScience



INGENIEURBÜRO P. JUNG  
Konzepte für innovative Gebäude



M+W GROUP







# EcoCommercial Building Program as a global concept

## Local climatic conditions & challenges require specific experts & solutions

### The EcoCommercial Building Program Centers

NAFTA  
(USA)

EU  
(BeNeLux,  
DACH,  
EE, RU)

JP

ME  
(GCC)

IN

TH

CN

BR

Global concept

Local expertise

All climate zones

All building types

Member-  
ships:





# Build on the EcoCommercial Building Program

## References & cooperation of a young and growing program







# System house Administration Building, Qingdao Lighthouse

## Zero Emission building

1,000 m<sup>2</sup> office space

Zero Emission

400 employees

CO<sub>2</sub> reduction: 100t p.a.

Temperate monsoon  
climate

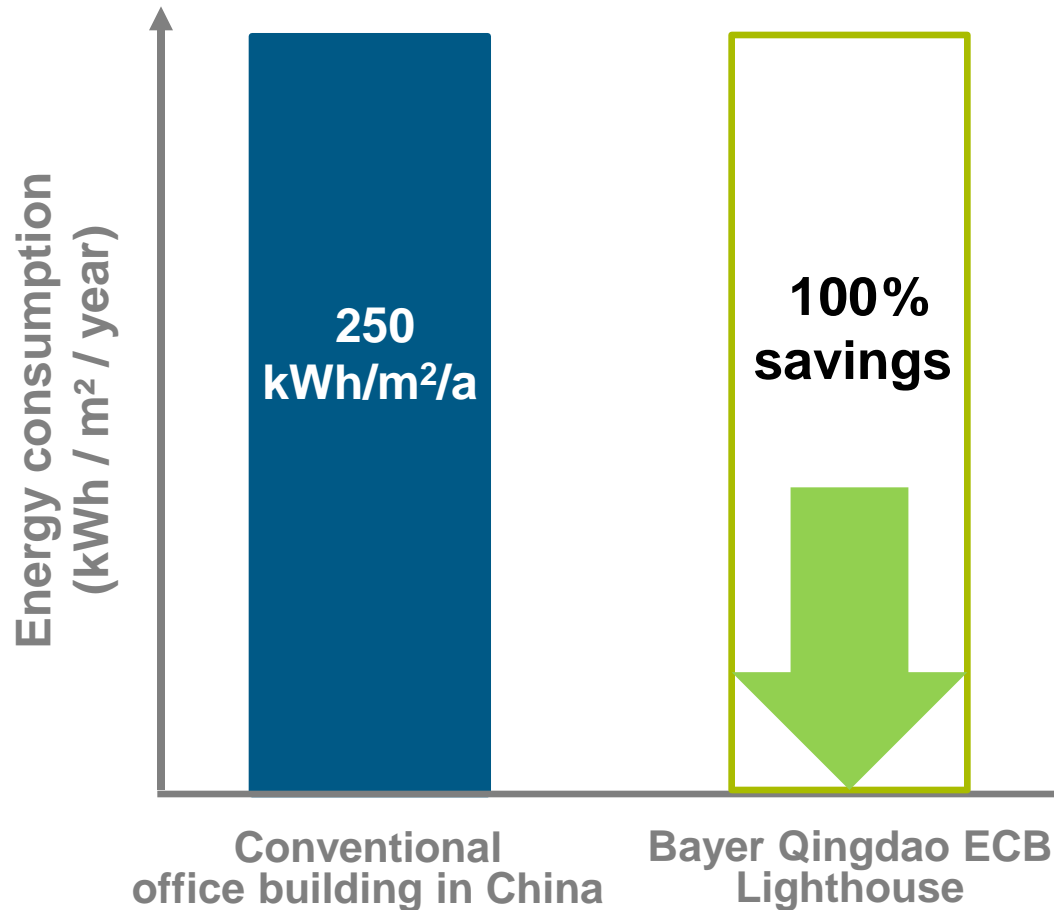


LEED



# The concept behind a green building

## Optimizing energy demand and using renewable energies



### Energy demand optimization:

Building design

Building envelope

Building technology

### Energy supply:

Renewable &

Conventional sources



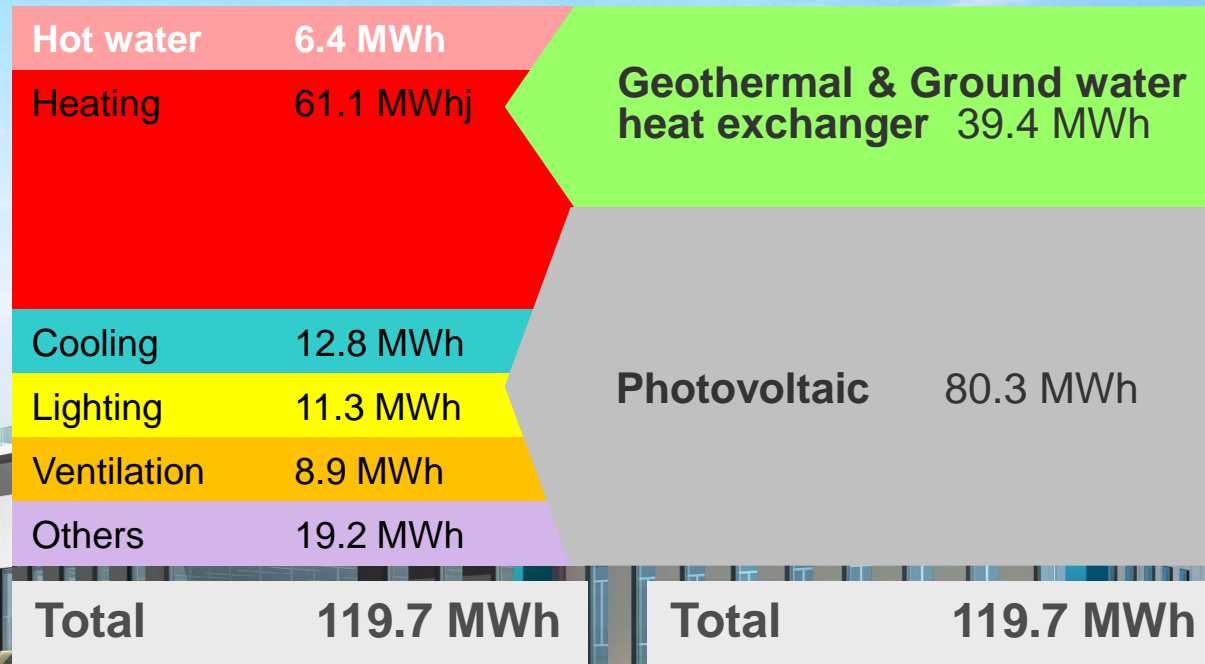


# Performance beyond existing standards starts with planning

## Reduce energy demand & include renewable energies

**Optimized energy demand:  
Envelope & technology**

**Energy supply:  
Renewable & conventional**



**CO2 emission reduced by 100 t per year**



# Smart combination of today's available proven technologies

## Integrated design & solutions

**SPR  
waterproofing  
System**

**PUR Thermal  
Insulation  
system**

**Photovoltaic  
System**

**Bayer PC Sheet  
Facade**

**Low-E Glazing  
Window System**

**Geothermal  
Source Heat  
Pump System**

**Concrete Core  
Active Cooling &  
Heating System**

**LED Lighting  
system**





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**Thank you for your attention.**