



Bayer MaterialScience


FOAM

INFORMATION ABOUT SPRAY FOAM BOOK 4

BOOK

INSIDE: a high performance SPF system that advances sustainability in homes.






The image features a warm, golden sunset background. A large, leafy tree is silhouetted against the bright sun, which is positioned behind its trunk, creating a lens flare effect. To the right of the tree, a person is silhouetted against the sky, holding a small wind turbine aloft with their right hand. The overall scene conveys a sense of environmental sustainability and renewable energy.

Bayer MaterialScience's
Spray Polyurethane Foam contribution
to Bayer Corporation's
Sustainable Development Program

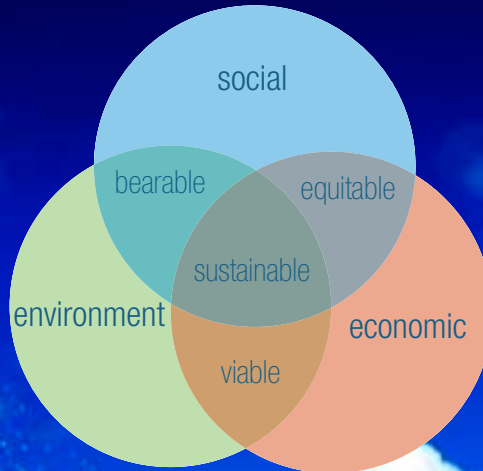
What is Sustainable Development?

Sustainability is an abstract concept subject to interpretation.

Bayer MaterialScience **defines sustainability as follows:**

-  Sustainability is an attribute of a system
-  Sustainability is achieving commercial success through solid business models in a way that meets the needs of our employees, society, and protects the environment and natural resources
-  Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs

Pillars of Sustainability



- **Environmental**
- **Social**
- **Economic**

At the 2005 World Summit it was noted that sustainability requires the reconciliation of environmental, social and economic demands - the “three pillars” of sustainability. This view has been expressed as an illustration using three overlapping ellipses indicating that the three pillars are not mutually exclusive and can be mutually reinforcing.

Source: Johann Dreo - Sustainable development 2006

Environmental Sustainable Development

What we know:

- Fossil fuels are a finite source of energy
- Burning fossil fuels emits green house gases
- Energy efficiency in buildings conserves resources such as fossil fuels
- Buildings insulated with spray polyurethane foam will typically use 30 percent less energy for heating and cooling.*

*compared to buildings insulated with traditional fibrous insulation material. Source DOE Air sealing

The background of the slide features a silhouette of an oil pumpjack (jack-o'-lantern) against a dramatic, fiery orange and red background that resembles molten lava or a sunset. The pumpjack is positioned on the right side of the frame, with its complex mechanical structure clearly visible. The overall mood is intense and industrial.

Fossil Fuels

Fossil fuels are a finite resource being depleted from the earth.

By conserving energy, we can slow down the depletion of fossil fuel, giving time to develop long-term solutions to meet energy needs for the future.

Insulating our homes and buildings conserves the fossil fuels needed to heat and cool them.

Environmental Sustainability

Buildings are responsible for more than **40 percent** of global energy use and **one-third** of global greenhouse gas (GHG) emissions in both developed and developing countries.

Industry &
manufacturing
32%



Transportation
28%

Commercial
18%

Residential
22%

Greenhouse **G**asses



Since the beginning of the industrial revolution, the burning of fossil fuels has substantially increased the level of CO₂ in the atmosphere.

The current estimated global GHG emissions are between three or 4 times the Earth's natural absorption rate of CO₂*.

*Intergovernmental Panel on Climate Change

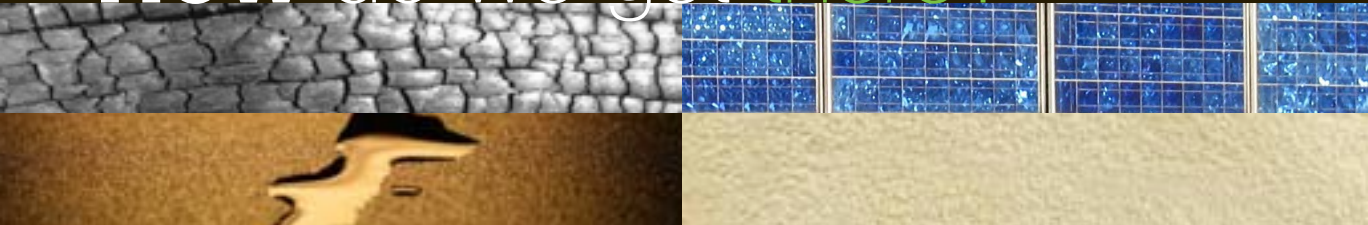
The Challenge

The challenge is to conserve fossil fuels and reduce the CO₂-equivalent emissions in the atmosphere.

This will require changes in the way society produces, consumes, regulates and behaves.

This challenge will require us to meet these goals without compromising future generations - the practice of sustainable development.

How do we get there?



Studies show what can be done to reduce our need for fossil fuels and reduce GHG* emissions.



Improving the energy efficiency of buildings was found to be an economically sensible strategy for reducing GHG emissions and fossil fuel usage.

*GHG - Green House Gas

*McKinsey and Company December 2007– Reducing US Greenhouse Gas Emissions How Much at What Cost?

*International Council of Chemical Associations July 2009
- Innovations for Greenhouse Gas Reductions.
A life cycle quantification of carbon abatement solutions enabled by the chemical Industry.

McKinsey Study

Abatement Cost Curve

This study finds there are many levers available that will, when acted upon, reduce some GHG levels.

All levers below the horizontal line make good economic sense as they indicate potential savings and minimal costs.

All insulation references are below the horizontal line and show potential savings.

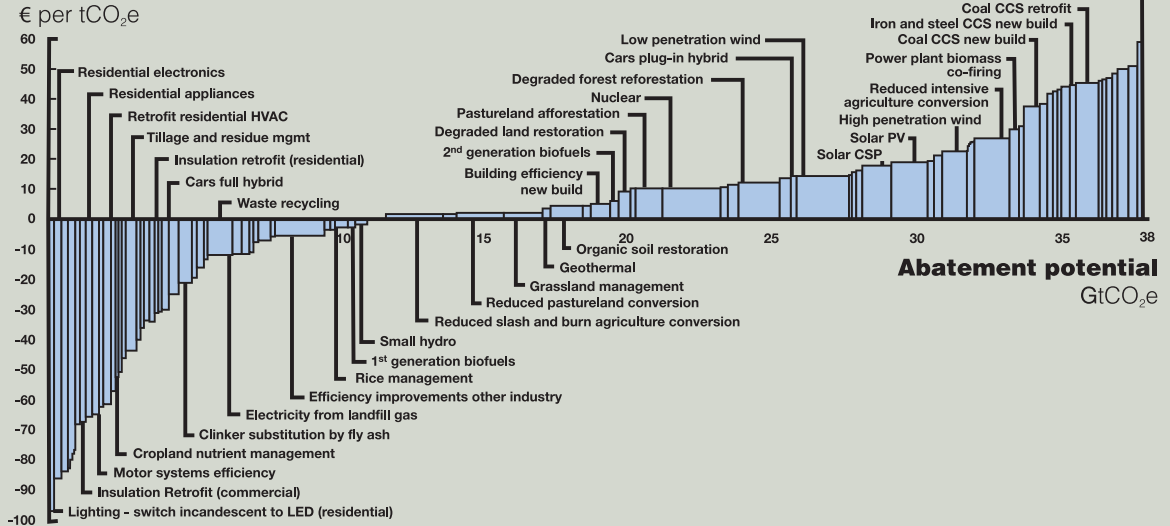
McKinsey Study

Global GHG abatement cost curve

Global GHG abatement cost curve beyond 2030 BAU

Cost of abatement below EUR 60 per tCO₂e

Abatement cost



Note: This is an estimate of the maximum potential of all technical GHG abatement measures below EUR 60/tCO₂e, if each lever was pursued aggressively, not a forecast of what role different abatement measures and technologies will play.

Source: Global GHG Abatement Cost Curve v2.0, McKinsey & Company



Life Cycle Assessment

Life Cycle Assessments (LCA) for some individual chemical product applications, including insulation, were calculated in the ICCA* report.

The life cycle assessment is a recognized multi-step, well-structured methodology that performs environmental impact analysis (based on ISO 14044:2006).

LCA assess energy and environmental impacts of a material in a specified application from cradle to end-of-life.

LCA results support decision-making on new projects and compare the energy and environmental impact of different products with quantitative data factoring in all the life cycle phases.

Life Cycle Assessment



LCA performed on insulation products have demonstrated that energy savings during the use phase far outweigh energy associated with manufacturing the raw material, formulating components, transporting, installing and managing at end-of-life.

See Energy and Environmental Benefits of Insulating Commercial Buildings with Polyiso at www.bayermaterialsciencenafta.com for an example of an LCA.

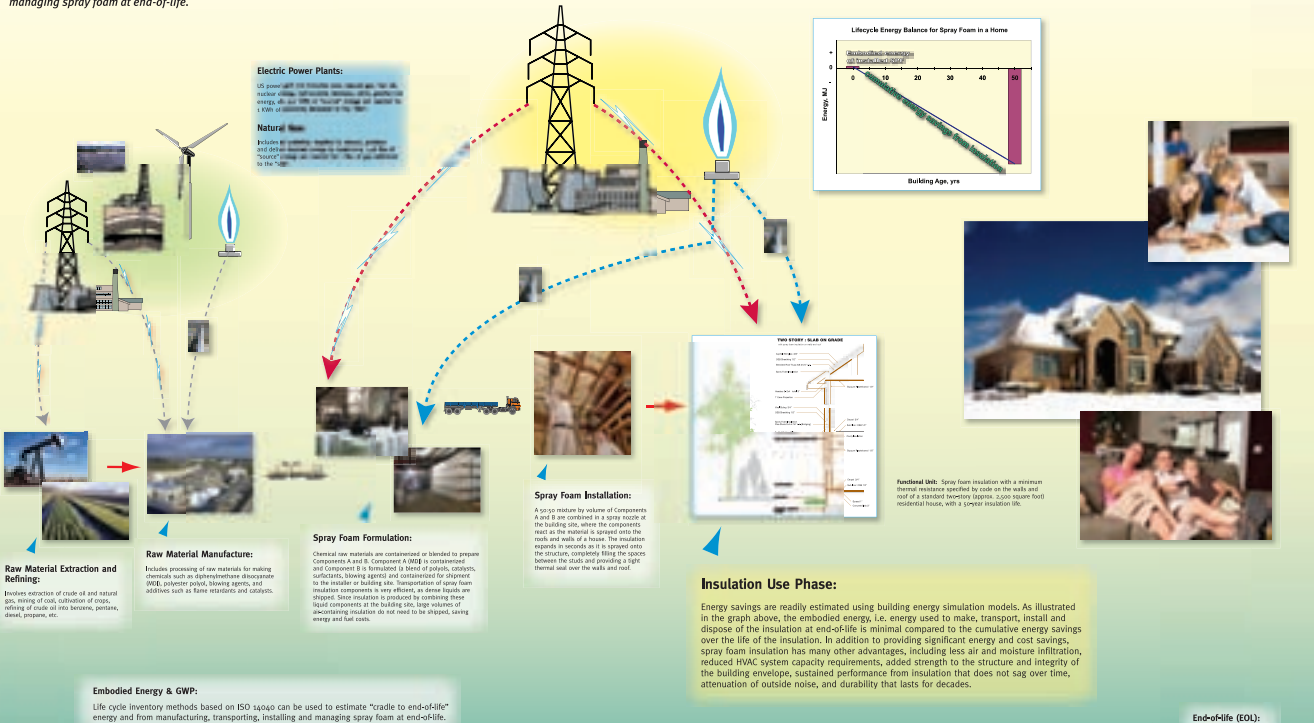
Spray Foam Insulation

Saving Energy, One Spray at a Time...



Spray foam insulation saves energy during insulation use that far outweighs energy associated with manufacturing raw materials, formulating spray foam components, transporting, installing and managing spray foam at end-of-life.

James Lambach and George Pavlovich
Bayer MaterialScience LLC • 100 Bayer Road • Pittsburgh, PA 15205



up to 365 days = 1 year

18,250 days = 50 years

30 days = 1 month

Life Cycle Assessment

- LCA calculations show that the highest values obtained with an increase of insulation can contribute substantially to energy efficiency improvement.*
- Insulation contributes to fossil fuel conservation and GHG reduction.

*ICCA - Innovations for Greenhouse Gas Reductions July 2009



GHG

A hand is shown in the upper left corner, holding a coin and dropping it into a white piggy bank. The piggy bank is sitting on a patch of green grass. The background is a bright blue sky with white clouds. The overall scene is bright and positive, symbolizing investment and sustainability.

Bayer MaterialScience's **Contribution**

Bayer MaterialScience contributes to environmental sustainability by delivering innovative spray foam products that reduce the energy needs of homes and buildings.

Bayer MaterialScience has reduced its own carbon footprint by focusing on and making our own processes more efficient.

Bayer North America reduced its direct GHG emissions from the baseline (an average of 1998 to 2001) through 2008 by 660,000 equivalent metric tons of carbon. (Verified by a third party - Chicago Climate Exchange).



Social Sustainable Development

Social sustainable development is Bayer's commitment to help our employees, customers, and neighbors to meet their changing personal and professional needs. Some of the ways Bayer does this are as follows:

- Providing guidance in Safety and Health
- Sharing Best Practices within the industry
- Community Outreach Program



Social Sustainable Development

Guidance in Safety and Health

- EPA recognized Bayer MaterialScience for its leadership in product stewardship for spray foam in a teleconference following Bayer's award-winning presentation at the American Chemistry Council's Center for Polyurethane Industry Polyurethanes 2010 Technical Conference on time limits for safe re-occupancy.
- Bayer MaterialScience collaborated with the Spray Polyurethane Foam Alliance (SPFA) and the Center for the Polyurethane Industry (CPI) to launch product stewardship programs and participated on several workgroups.



Social Sustainability Development

Bayer MaterialScience

Direct Involvement with Trade Organizations:

PIMA - Polyisocyanurate Insulation Manufacturers Association

ACC - American Chemical Council

CPI - Center for the Polyurethane Industry

ABAA - Air Barrier Association of America

AIA - The American Institute of Architects

Development

Community Outreach

Girls Hope House in New Orleans, LA

- Application of spray polyurethane foam in a home destroyed by Hurricane Katrina provided a significant savings in the annual energy bill.

Hurricane Katrina Revitalization, Long Beach, MS

- Combination of Spray Polyurethane Foam and steel frame construction completed the mission of creating new building structures able to withstand storms like Hurricane Katrina in the future.

Garfield Manor Detroit, MI, part of Sugar Hill District Urban Renewal

- Spray Polyurethane Foam, along with other energy efficient strategies such as solar power, geothermal walls, white roof, and rainwater harvesting were used in this sustainable redevelopment.

Habitat for Humanity – Cresco, PA

- Application of spray polyurethane foam in a Habitat for Humanity home, providing a 30-50 percent reduction in the monthly utility bills.



Economic Sustainable Development

Bayer MaterialScience
is a large, global, healthy, and
viable business with
a solid financial future.

Bayer MaterialScience will
have the opportunity to be
an economic contributor
to its community.



Economic Sustainable Development

- **Bayer - The Inventor Company**
- **Focused development on new products**
- **Research and Development is a driving force**
- **Innovations are essential for future growth**



Economic Sustainable Development

A woman wearing a yellow hard hat, safety glasses, and a light-colored work shirt is looking upwards. She is working on a red industrial structure, possibly a conveyor belt or a large piece of machinery. The background is dark and industrial.

Bayer Corporation employs approximately 108,000 Full Time employees worldwide.

Bayer MaterialScience LLC employs 14,300 in North America.

Bayer MaterialScience Spray Foam employs 57 full time employees, with 11 temporary employees in two locations in the United States.

As an employer, fair compensation, pension, and health-care plans improve the social security of Full time employees at our sites and strengthen the local purchasing power.

Sustainable Development



Sustainable Development is a path forward that allows humanity to meet current environmental, human, health, economic, and societal needs without compromising the progress and success of future generations.

Sustainable Development policy is a reflection of Bayer MaterialScience's deep dedication to creating products and service that benefit society while meeting Bayer Corporation's social, economic and environmental responsibilities.

Bayer is committed to Sustainable Development and to being a socially and ethically responsible citizen.



Go to www.spf.bayermaterialscience.com
to learn more about the competitive advantages
of spray polyurethane foam.

DOWNLOAD:
Product Datasheets
Specifications
Project Profiles
Material Safety Data Sheets