Mass Balance

Raising the share of renewables for your products.
The environment, humanity and the economy: We are convinced that everyone benefits from a positive interaction, ecologically and environmentally.

For us, this means integrating new solutions in proven processes and constantly refining products and services – those of both BASF and our customers through to the end user.

Thanks to close contacts with our customers and partners, we know that, across industry, products from renewable resources are in greater demand today than ever – and the trend is growing. At the same time, we are aware that fossil resources will remain indispensable to the chemical industry in the long term.

The challenge therefore entails finding a solution that does justice to these two facts.
Thanks to its Verbund principle at several locations, BASF has already taken a big step toward efficient resource use. It means that by-products or waste heat from one production plant can be used as feedstock elsewhere.

We have now taken this principle to the next level. With the mass balance approach, we combine integrated production with the input of renewable resources. A novel concept for the chemical industry, but one that only BASF has put into practice for polyurethanes, EPS and XPS.

The principle is comparable to the use of “green” electricity. The basic idea involves using renewable resources – such as bio gas or bio naphtha – together with their fossil equivalents in production itself.

The bio share is then calculated and allocated to the products by applying a method certified by the TÜV SÜD technical inspection body.

It can amount to anything from 25 to 100 percent according to customer wishes, with absolutely identical product characteristics over the fossil equivalent.

Combining resources for high performance.

**Renewable resources**

All products can be manufactured almost entirely on the basis of renewable rather than fossil resources. Customer demand drives the share of bio-derived resources in the BASF value chain.

**Certified system**

To verify the use of renewable resources across all stages in production, a reliable, independent certification system has been developed for the mass balance approach in cooperation with TÜV SÜD.

**Efficient drop-in solution**

The mass balance approach makes use of existing infrastructure at BASF and on the customer site. It is therefore applicable to all existing processes, approvals and certificates – making it a true drop-in solution.

**Unchanged formulation – identical performance**

No differences in quality or properties: The product containing renewable resources is 1:1 chemically identical to its conventional, fossil equivalent. The same basic chemical building blocks are created using renewable and fossil resources.

**Greater resource protection**

Each purchase of mass-balanced products drives the substitution of fossil resources at BASF with renewables.

**Lower carbon emissions**

We use nothing but resources that, according to the EU definition in the bio fuel sector, emit at least 35 percent less carbon than their fossil equivalent when burned.

Consequently, mass-balanced products help not only to conserve fossil resources, but also to reduce greenhouse emissions.

Independent certification of the mass balance approach by TÜV SÜD

Products embodying the certified mass balance approach cut carbon emissions and substitute fossil resources.
Impressive in practice.

Outstanding prospects for the future

Mass balances can be applied in principle to all products and processes of our own and the customer’s portfolio.
In the near future, we see the greatest potential in the following product and application areas – the focus is therefore on expanding the application of the mass balance principle here. But we are also open to new ideas in other sectors and look forward to developing tailor-made solutions in cooperation with our customers.

- **ELASTOPOR®**, **ELASTOPIR®**: polyurethanes (e.g. sandwich panels, SIPs) for climate management and insulation of industrial sheds and cold stores and for all areas in residential buildings

- **NEOPOR®**, **STYROPOR®**: expanded polystyrene (EPS) for efficient construction as exterior and interior insulation and safe packaging; Neopor is the innovative advancement of the insulation classic Styropor

- **STYRODUR®**: the green XPS insulation; Styrodur adds to a healthier indoor climate and protects the structural design against both heat and cold, e.g. perimeter and roof insulation

- **SANDWICH PLATE SYSTEM (SPS) with polyurethane**: Construction and cost-effective modernization of, for example, ships’ decks, bridges and other heavy-load components

- **ELASTOPOR®**: pipe insulation and reliable protection provided by polyurethane for industrial pipelines on- and offshore, e.g. for oil, gas, district heat and refrigeration pipelines

- **ELASTOAVE®**: for the creative design of water-permeable and eco-compatible paving

- **ELASTOCOAST®**: for efficient flood protection on coasts and river banks and for innovative protection against avalanches and rockfalls

- **ULTRAMID®**: e.g. materials for bathrooms and sanitary areas or thermally separating, high-strength brackets for facade elements and insulating materials
Conserving resources and boosting sales.

**Take advantage of the mass balance approach!**

Join with us in working toward a sustainable future in which ecological responsibility goes hand in glove with commercial success. The mass balance approach is the ideal way to achieve this goal.

**Extra business opportunities**

Sustainable activities are developing increasingly into a competitive factor that can make a key difference when the customer takes a purchase decision. Using products with a high share of renewables opens up new business opportunities in ever greener markets.

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**Excellent positioning in the sustainability pyramid:**

By purchasing products with a certified mass balance, you choose in favor of a responsible, forward-looking technology.
Global resource input over the decades*

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons</th>
</tr>
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<tbody>
<tr>
<td>1970</td>
<td>34 billion</td>
</tr>
<tr>
<td>2000</td>
<td>45 billion</td>
</tr>
<tr>
<td>2009</td>
<td>68 billion</td>
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</tbody>
</table>

\[ \text{Global resource input over the decades} \]

Sustainability as a growth generator*

- **2013**: EUR 2.500.000.000.000 was the value of the global market for environmental and efficiency technologies.
- **Forecast for 2025**: Over EUR 5 trillion

Growth of the green markets of the future*

**Annual growth forecast until 2025**: 5.6%

Growing world population*

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>7.3 billion</td>
</tr>
<tr>
<td>2050</td>
<td>9.0 billion</td>
</tr>
</tbody>
</table>

**Constantly growing demand for renewable resources**: 2014: World population 7.3 billion (80 million more than a year earlier); 2050: Over 9 billion (forecast). The world population grows by 2.6 people every second.

**Conscious purchasing behavior**

- **Overall, 55 percent of consumers worldwide attach importance to sustainability when shopping.**

**Active environmental commitment**

- Through the substitution of fossil resources, you actively promote the expanding use of renewable and climate-friendly resources – and thus contribute to resource conservation and the reduction of greenhouse emissions.

**Valuable image boost**

- With your commitment to eco-compatible production, you present yourself inwardly and outwardly as an innovative market participant.
Climate-neutrality has been observed in the production of this brochure.

Sources page 7:

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