A Dream Comes True

Use of carbon dioxide for the production of plastics
Forward-Looking Statements

This presentation may contain forward-looking statements based on current assumptions and forecasts made by Covestro AG.

Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in public reports of Covestro and Bayer which are available on the Covestro website at www.covestro.com as well as on the Bayer AG website at www.bayer.com.

Covestro assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.
Covestro – who we are

ONE OF THE WORLD’S LEADING POLYMER PRODUCERS
Covestro, a leading Specialty Polymer Producer
Leading technologies based on a strong Innovative DNA

<table>
<thead>
<tr>
<th>Polycarbonates Granules &amp; Sheets for a variety of applications</th>
<th>Polyurethanes Raw Materials for rigid &amp; flexible foams</th>
<th>Coatings, Adhesives, Specialties Raw Materials for Coatings Adhesives &amp; Specialties</th>
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</thead>
<tbody>
<tr>
<td>#1 Producer of PCS</td>
<td>#1 Producer of PUR</td>
<td>#1 Producer of Aliphatic ISO’s</td>
</tr>
<tr>
<td>Medical</td>
<td>Furniture</td>
<td>Coatings</td>
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<td>Automotive</td>
<td>Construction</td>
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<td>IT &amp; E</td>
<td>Seating</td>
<td>Flooring</td>
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July 16 | Proprietary & Confidential
To make the world a brighter place
Three dreams ...

“Reduce our carbon footprint!”

“Make CO₂ react …!” (the catalyst quest)

“Our industry’s dream”

Society’s dream

The researchers’ dream

Our industry’s dream
Three dreams …

Covestro makes the dream come true
CO\textsubscript{2}-BASED HIGH VALUE PLASTICS
Incorporation of $\text{CO}_2$ into the polyol leads to polyethercarbonate polyols.
Scientific breakthrough

The right catalyst was found after 40 years of research …

… thanks to close cooperation between Covestro and the CAT Catalytic Center at Germany’s RWTH Aachen University.
Dream Production

- CO₂ content of new polyols at roughly 20 percent
- Excellent carbon footprint of new technology
- CO₂ is chemically integrated and cannot escape
- Properties are at least as good as those of conventional materials
- Production of new polyether polycarbonate polyols planned to start from 2016 at the Covestro site in Dormagen, Germany
Imagine … speeding up CO₂ research

- With CO₂, Covestro is able produce another new kind of polyol
- Next step: Extending the range of plastics based on CO₂
- Typical end-consumer products: Sporting goods like ski boots, car interiors
- Polyoxymethylene polycarbonate polyols are for thermoplastic polyurethanes, films, casting elastomers and more
Dream Polymers

A two-pronged approach

- CO₂ is used twice:
  - Directly by incorporating it into the new polyol
  - Indirectly by transformation into a methanol-based precursor for the new polyol
- CO₂ or renewable content of new material already at 40 percent
- Positive application tests
Dream Production and Dream Polymers

Direct use of CO₂ vs. direct and indirect use of CO₂

DREAM PRODUCTION

Epoxide + Epoxide + CO₂ → Polymer (Polyol)

DREAM POLYMERS

Epoxide + CO₂-based + CO₂ → Polymer (Polyol)

CO₂-based intermediate
Positioning
Sustainability

PEOPLE
- Serving people
  - improve well-being
  - enhance safety
  - support social progress

PLANET
- Reducing CO₂ emissions
  - responsible use of resources
  - improve product life cycles
  - close material cycles

PROFIT
- Creating value
  - need-based products and solutions for customers and markets
  - safeguarding growth, jobs
The dream goes on …

**OUR VISION**

- To use CO₂ to create more kinds of high-value plastics
- To find further fields of application for CO₂-based plastics
- To increase the amount of CO₂ in chemical precursors
- More projects are underway …
The dream goes on…

CO₂ Polyols making their way to market

Path ahead
Commercialization

Covestro to start industrial production

**New production plant**
- Opened on June 17 a production plant in Dormagen
- It is now using carbon from CO$_2$ to manufacture a new type of polyol - a core building blocks for polyurethane foam

**Plant Facts**
- Production capacity of 5,000 tons / year
- Production started in June 2016
The dream goes on…
CO₂ Polyols making their way to market
Thank you for your attention!

To make the world a brighter place.