Let’s make it work!
Sustainable research

Dr. Peter Nagler
December 4, 2013
Structural approach for well stocked innovation pipeline

R&D expenses 2012

€393 million

- Market and application oriented research
  - ~85%

- Strategic research
  - ~15%

Business Units

- Focus on existing markets and technologies
- Strong customer orientation
- Short-term and medium-term projects

- Strategic innovation unit Creavis
- Focus on new business options and new competence platforms
- Medium-term and long-term projects
Creavis: A success story

Powerful:

• 25% of all long-term Evonik projects with a high potential, but also with a high risk, originate from Creavis

Networked:

• So far, Creavis has collaborated with partners on 45 publicly funded projects

Successful:

• In the last three years, 20 innovations projects were transferred to the Business Units and new business was initiated (e.g. Membrane)

Sustainable:

• The Life Cycle Management Team established at Creavis, works on 20-30 projects per year (Evonik Carbon Footprint, Life Cycle Assessments)
Reorganization as of January 1, 2014

**Faster:**
- Generation of ideas

**More flexible:**
- Start of new research projects

**More dynamic:**
- Creation of new business options for the operational units

**More comprehensive:**
- Development of new technology expertise
Sustainability creates added value

Balance between all aspects of sustainability

[Diagram showing the balance between Society, Ecology, and Economy]
Sustainability that goes under the skin: Myristyl myristate for cosmetics

Conventional

- Raw materials
- Reaction
  - Catalyst
  - Steam
  - bleach
- Desodor.
- Bleaching
- Drying
- Filtration
  - Filter aids
- Packing

Enzymatic

- Raw materials
- Reaction
  - Recycled catalyst
- Applied temperature: >180°C, 140°C, 100°C, 60°C, 20°C
- Packing

- Less steps
- Lower temperatures
- Less energy
- Less waste
- More resource efficiency
### Biotechnology: Evonik covers the entire process chain

<table>
<thead>
<tr>
<th>Category</th>
<th>Activities</th>
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| Renewables sourcing       | • Feedstock availability  
                           | • Geographical scenarios                                                  |
| Metabolic Engineering     | • Design of metabolic routes  
                           | • Evaluation of microbial strains                                           |
| Fermentation              | • Process optimization, strain characterization, scale-up, operational excellence |
| Biocatalysis              | • Identification, design and characterization of highly efficient enzymes and whole cell catalysts |
| Down stream processing    | • Recycling of cells and by-products  
                           | • Product isolation and purification                                        |
## Competence network biotechnology: Current examples

<table>
<thead>
<tr>
<th>Market maturity</th>
<th>Project launch</th>
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<tbody>
<tr>
<td>Strengthening the market position</td>
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<tr>
<td>New biotechnological process for serine amino acid (component for active pharmaceutical ingredients, e.g. for the treatment of tuberculosis)</td>
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<td>Satisfying consumer wishes</td>
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<td>New product Sphingokine NP for Ceramide tightens the skin and reduces depth of lines and wrinkles</td>
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<tr>
<td>Developing new sources of raw materials</td>
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<td>Globally unique biotechnological process based on palm kernel oil for the manufacturing of PA12-precursor (\omega)-amino lauric acid (BioLL); pilot plant.</td>
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<td>Producing every day products more sustainably</td>
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<td>Project DesFA: Development of biotechnological synthesis for long chain fatty acids for plastics and cosmetics; sugar as raw material instead of tropical oils</td>
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<tr>
<td>Products from flue gases</td>
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<td>Project Syngas: bacteria convert CO, CO(_2) and H(_2) in molecules with 2/4 C atoms.</td>
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Global networks for driving innovation

- Publically Funded Projects
- Ideation Jams
- Corporate Foresight
- Corporate Venturing
- University Cooperations
- R&D Projects with Customers
- Industrial Cooperations
- Internal Networks
- Technology Scouting
- Open Innovation

Global networks for driving innovation

December 4, 2013 | R&D press conference | Sustainable research
Corporate Venturing supports innovation and growth strategy

- €100 million investment volume
- Investments in both start-ups and funds
- Focus on strategically important markets and technologies
Drivers for Innovation

- Innovation cycles are becoming ever shorter
- Innovation challenges are becoming more complex
- New global competence centers are springing up
- The availability of raw materials is being shifted
- Demands for sustainability are on the increase
What if...

...the world’s population grows by 83 million every year and the planet’s resources remain the same?