PODeST

*Process Optimization and Development through Sustainability*

How sustainability can become a parameter for process optimization and development

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Objectives of today

1. Setting the scene
2. Introduce the PODeST approach
3. Share insights regarding implementation
4. Summary
PODeST

Setting the scene
Evonik is the creative industrial group from Germany and one of the world’s leading specialty chemicals companies.

**Nutrition & Care**
Sales*: €4.3 bn

**Resource Efficiency**
Sales*: €4.5 bn

**Performance Materials**
Sales*: €3.2 bn

**Business Lines**:
- Personal Care
- Household Care
- Comfort & Insulation
- Interface & Performance
- Baby Care
- Health Care
- Animal Nutrition

**Business Lines**:
- Active Oxygens
- Catalysts
- Coating & Additives
- Coating & Adhesive Resins
- Crosslinkers
- Epox Curing Agents
- High Performance Polymers
- Oil Additives
- Silanes
- Silica

**Business Lines**:
- Performance Intermediates
- Agrochemicals & Polymer Additives
- Functional Solutions
- Methacrylates
- Acrylic Products
- CyPlus Technologies

**Technology & Infrastructure**

**Other services**

**Business Lines**:
- Energy & Utilities
- Technical Service
- Process Technology & Engineering
- Logistics
- Site Management

**Service segment**

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* Fiscal 2016
Consideration of sustainability in process development and optimization will strengthen our position as a technology service unit

Sustainability is becoming increasingly important for businesses
- Capital Markets
- Politics
- (Chemical) Industry
- Society
- Customers

Process Technology community has great influence on Evonik’s sustainability performance
- Technology leadership holds the keys to lever future trends
  - More flexible processes regarding energy consumption and raw material composition
  - Phase in of renewables
  - Contribution to circular economy
  - etc.

Process Technology community has great competence about Evonik’s key processes, cost drivers and technological bottlenecks
The process technology community has great influence on Evonik’s sustainability performance
Evonik’s Life Cycle Management (LCM) group, which is part of Process Technology, is leading the “PODeST” project.

**GOAL:**
Develop and implement a standardized and pragmatic process that allows for holistic process assessments in early project phases.

- **Standardized means objective and thus comparable**
- **Pragmatic means cost- and time efficient**
- **Holistic means from a technical, economical and environmental perspective**
PODeST
Approach & Tool
Pragmatic means cost- and time efficient

- What information are already available without any further effort?
- What level of accuracy should the results have?
- How should the procedure for an assessment look like?

**GOAL:**

Develop and implement a standardized and pragmatic process that allows for holistic process assessments in early project phases.
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Develop and implement a standardized and pragmatic process that allows for holistic process assessments in early project phases.

Pragmatic means cost- and time efficient
- Information: Mass- and energy balances are available in general
- Accuracy: Rather robustness than accuracy (right order of magnitude)
- Procedure: Assessment can be carried out by process engineer itself (LCM team involvement not automatically required)
GaBi Envision enables every process engineer to perform a first rough estimation regarding the ecological performance of products and processes.

With GaBi Envision we created a software tool with a simply parametrized process model for a first rough estimation! This tool is called EvoCHEQ.

All in- and outputs must refer to 1 kg product.
The EvoCHEQ tool supports process engineer by creating a report of the calculations and results automatically.
Although a first rough estimation can be conducted by process engineer, results will always be checked by the Life Cycle Management (LCM) team.
PODeST
Summary
In the long run, PODeST is the basis for an improved competitiveness and supports Evonik on its way to become a sustainable company

- Based on already existing data & “Easy-to-use” IT tool reduces complexity, increases efficiency & enhances acceptance
- Documentation and guidance how to address sustainability issues ensures objectivity and thus comparability

Evonik as a sustainable company

- Attraction for future employees
- Meeting requirements from Capital markets
- ...

PODeST (by exploiting internal synergies)

- Increased transparency (economic, technological & ecological)

Better informed decision making

Better exploit opportunities & avoid risks

Improve competitiveness

Other Sustainability activities

Better in informed decision making

Attraction for future employees

Meeting requirements from Capital markets

…
The results of a sustainability assessment is heavily dependent on the availability of material and energy in- and outputs

**Complete mass- and energy balance**

**Inputs** (product, material or energy flow that enters a unit process) comprise:
- **Raw materials** (primary material that is used to produce a product; in terms of renewable raw materials: source of renewable raw material [palm oil, pam kernel oil, sugar cane, sugar beet, etc.]),
- **auxiliary materials** (additives and other substances that are required making products saleable but play an minor role in comparison to the raw materials in terms of quantities or values),
- **utilities** (thermal & electric energy, compressed air, cooling water/other cooling agents, etc.).

**Outputs** (product, material or energy flow that leaves a unit process) comprise:
- **Products** (valuable output; any goods or service)
- **Side products**
- **Surplus energies**
- **Non-valuable output** (e.g. waste [substances or objects, which the holder intends or is required to dispose of], waste water, exhaust gas [e.g. biogenic CO₂-emissions]) including their further treatment
EvoCHEQ = Environmental Value Optimization by means of a Comparative and Holistic Evaluation that is based on Quantitative data

What is EvoCHEQ?

- EvoCHEQ = Environmental Value Optimization by means of a Comparative and Holistic Evaluation that is based on Quantitative data
- EvoCHEQ is a software tool based on GaBi Envision with a simply parametrized process model for a first rough estimation regarding the ecological performance of products and processes

What is needed to perform an EvoCHEQ?

- EvoCHEQ requires a (nearly) complete mass and energy balance, also including utilities like water, compressed air, etc. and transports for example
- All in- and outputs must refer to 1 kg product
- An EvoCHEQ does not require the LCM group to be involved. Instead: Every process engineer will be able to perform a first rough estimation regarding the ecological performance of products and processes on his/her own. However: As EvoCHEQ only provides a rough estimation it is recommended to request support by the LCM team when results will be used beyond internal communication.