



Detergents based on Renewable Raw Materials

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Deutscher Bioraffineriekongress 2007

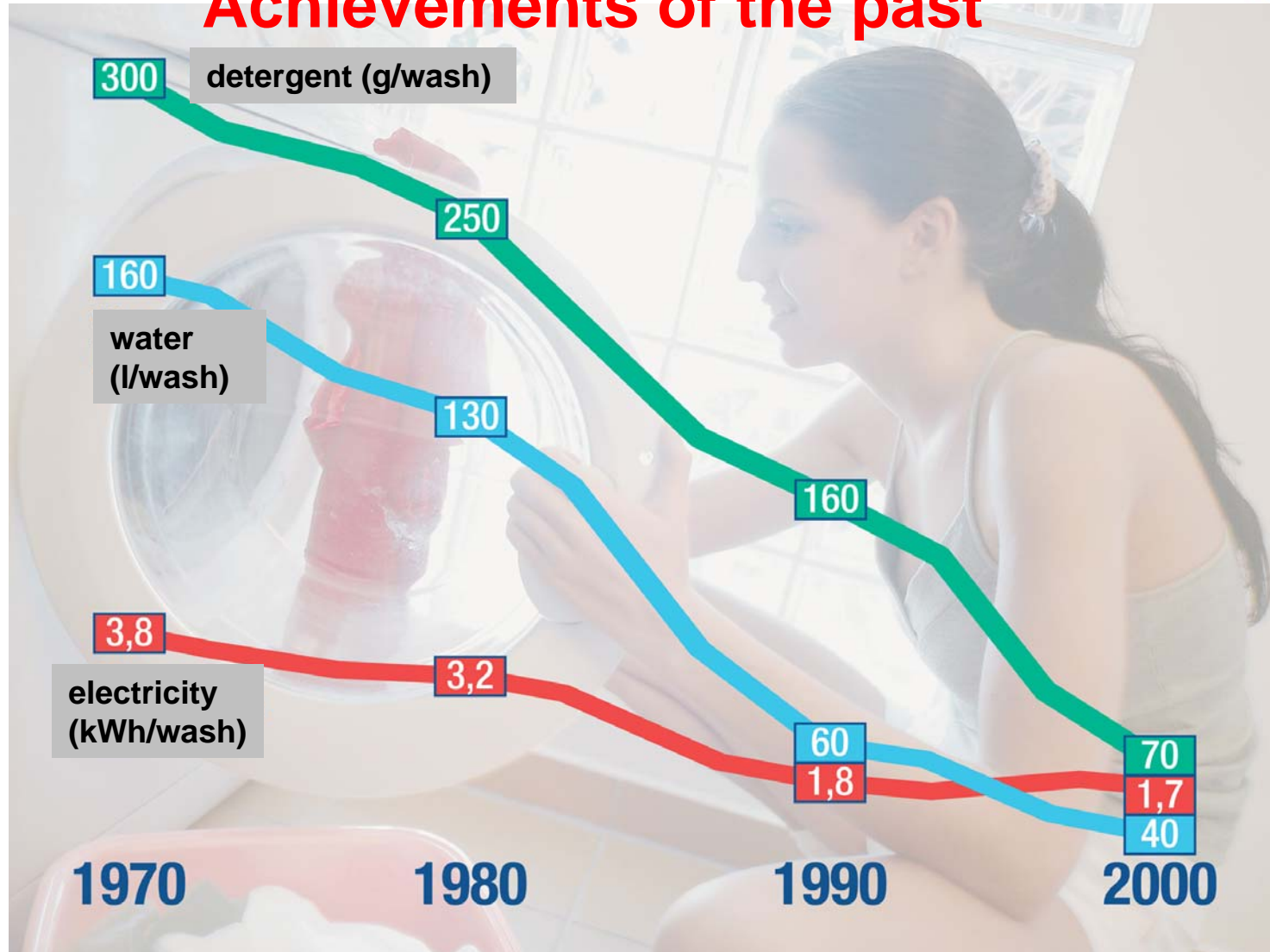
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Detergents and Raw Materials

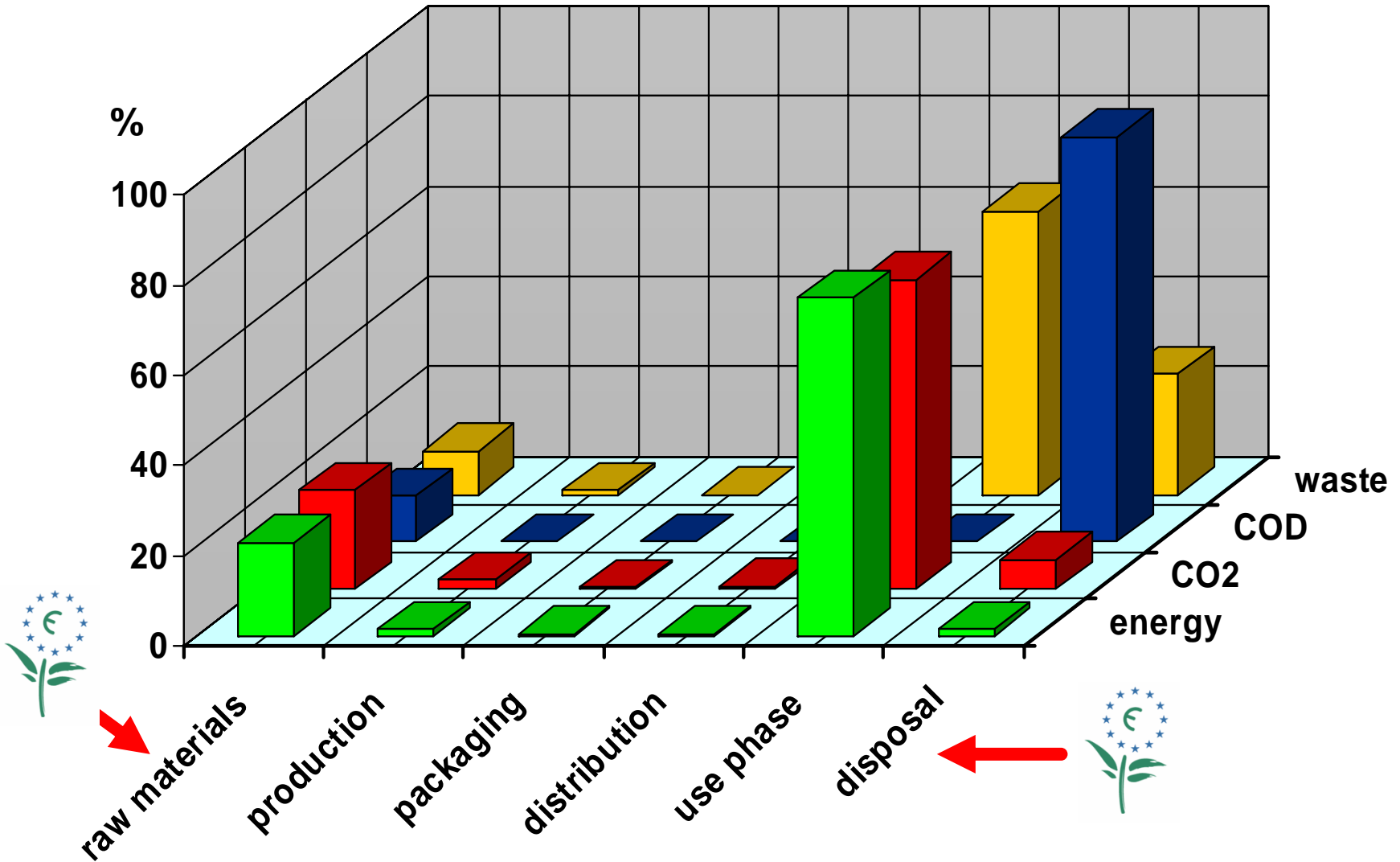


- **Total tonnage in D 630 k t (detergents) + 220 k t (auxiliary detergents)**
- **Market volume in D was 3.689 billion € in 2005 → share of heavy duty detergent was 26 % (0.95 billion €)**
- **Search in Google® resulted in 10,100 hits!**
- ◆ **High potential for RRM in detergents due to high tonnages / volumes?**

Sustainability in Textile Washing: Achievements of the past



Sustainability in Textile Washing: Challenges for the Future



T-A-C-T: Sinner's Wash Cycle



temperature

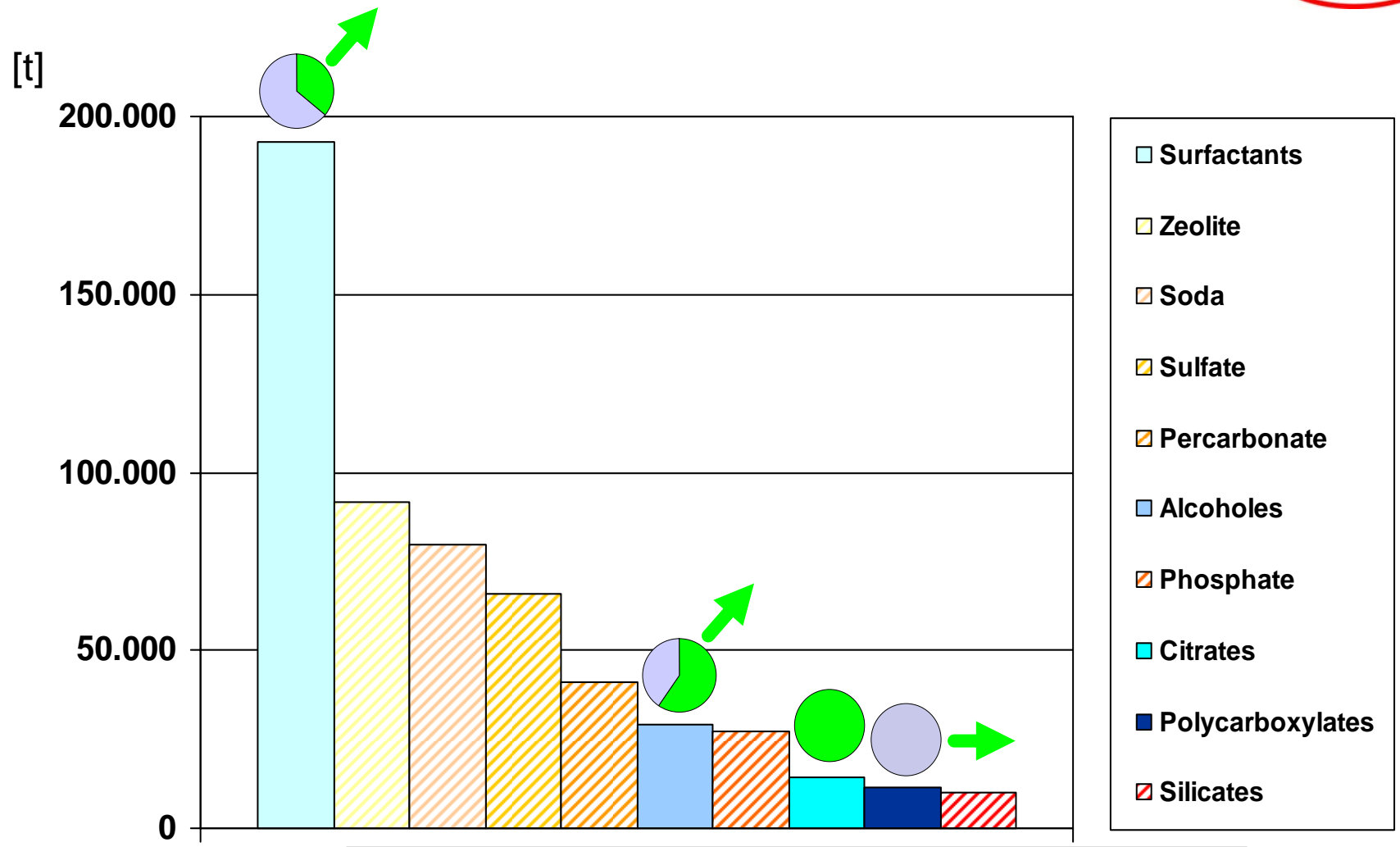


action

chemistry

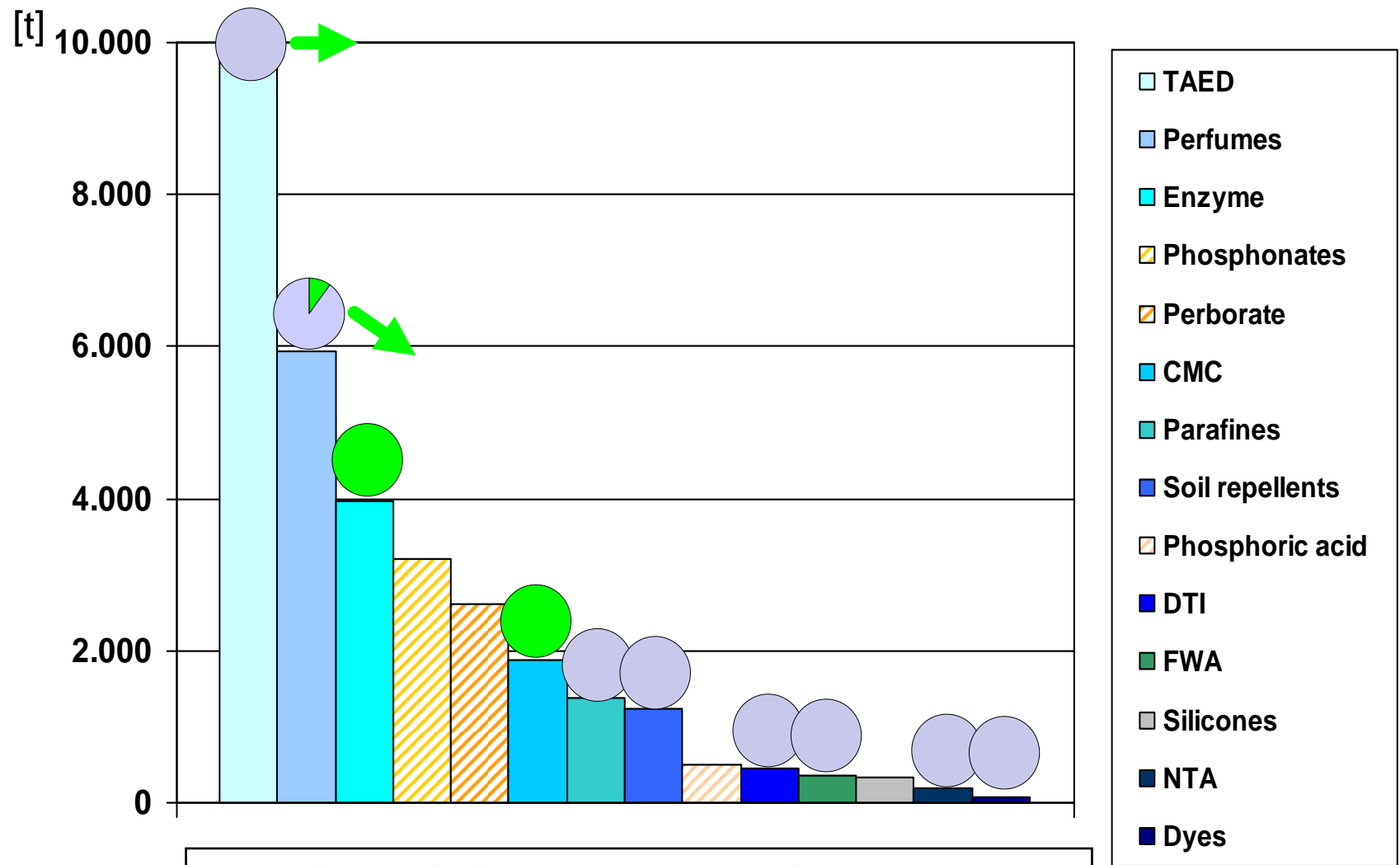
time

Detergent raw materials in D 2006 I



Inorganic material is shaded – data provided by IKW 2007

Detergent raw materials in D 2006 II



Inorganic material is shaded – data provided by IKW 2007

Renewable Raw Materials



- **Renewable raw materials [RRM] are based on ...**
 - ♦ **Plants (palm kernel oil, coconut oil, ...)**
 - ♦ **Animals (tallow, amino acids, ...)**
 - ♦ **Fermentation (white biotechnology)**

- **Chemical processing is usually required → bio-refineries (Verbund)**

- **Prices of RRM are not only market driven but reflect political decisions as well.**

Organic Detergent Ingredients: What is the Potential Renewable Resources?



- **Surfactants** (✓)
- **Alcohols** (✓)
- **Citrate** ✓
- **PCA** –
- **TAED** ±
- **Perfumes** (✓)
- **Enzymes** ✓
- **CMC (Carboxymethylcellulose)** (✓)
- **Paraffines** –
- **Soil repellents** –
- **DTI (Dye transfer inhibitors)** –
- **FWA (Fluorescent whitening agents)** –

Enzymes in Detergents



- **Hydrolases**
 - ◆ Protease (various applications)
 - ◆ Glucosidase (Cellulase, Amylase)
 - ◆ Lipase

- **Oxidoreductase**

- **Activase ?**

Summary



- **Renewable resources (or bio-based products) have a long and successful history in laundry detergents.**
- **Social factors (chemistry from food) are to be taken into account.**
- **There is a need for raw materials that ...**
 - ◆ **exert a specific activity that can help to lower washing temperatures.**
 - ◆ **are environmentally benign.**
 - ◆ **readily available at a competitive price.**