The European voice of the
adhesive and **sealant industry**

LESS COSTS, LESS BURDEN, MORE PRODUCTS COVERED

15 OCTOBER 2015 BRUSSELS   10:30 – 14:00

EU-Model Environmental Product Declarations (EPDs)
because less is more!

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Developing
FEICA's EU-Model EPDs

October 15th, 2015

Johannes Kreißig
thinkstep

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2.000+ Customers worldwide

250+ International sustainability experts

thinkstep enables organizations worldwide to succeed sustainably. Our industry-leading software, data and consulting services help businesses drive operational excellence, product innovation, brand value and regulatory compliance.

40% of the Global Fortune 500 rely on thinkstep

With a global presence in 19 countries we serve more than 2,000 companies, including 40 percent of the Fortune 500, such as BASF, Hewlett-Packard, Interface, Siemens, Unilever and Volkswagen.

20.000+ Users of our software solutions

Data foundation to model complete value chains and products in **20+** sectors

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We help organisations worldwide to succeed sustainably by creating value from sustainable business practice.

Business Value
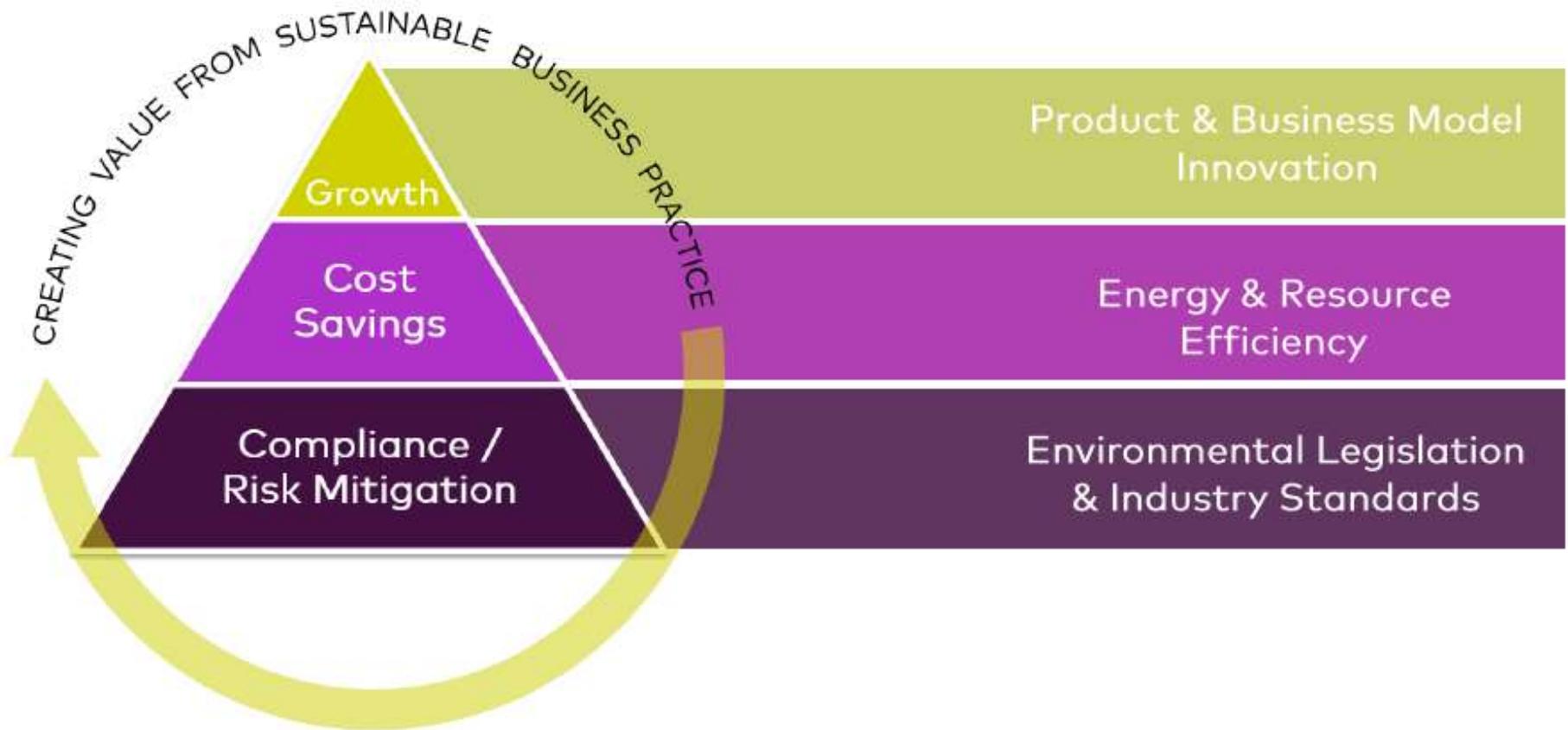
Our software, data and consulting services enable organisations worldwide to **succeed sustainably** by driving their...

Operational excellence

- Revenue Resilience
- Revenue Growth
- Sustainability Driven Innovation

Product innovation

- Operational Efficiency
- Employee Productivity
- Value Chain Efficiency

Brand value

- Employee Attraction
- Employee Retention
- Reputation Management

Regulatory compliance

- Operational Risks
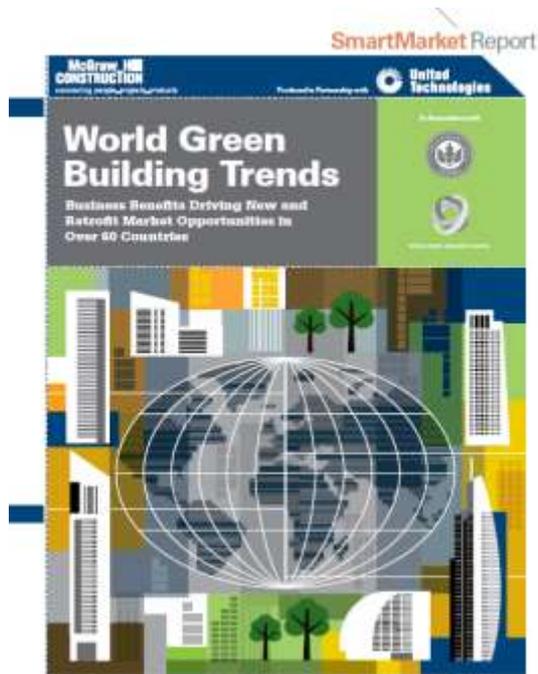- Value Chain Risks
- Societal Risks
- Regulatory Management

Agenda

1. Business case of EPDs

2. Types of EPDs

3. Development of Model EPDs

4. Use of Model EPDs

Is there a business case for Sustainability?

World Green Building Trends — SmartMarket Report, McGraw-Hill Construction

Average 2012 Green Share of Building Project Activity (By Location)

Source: McGraw-Hill Construction, 2013

Non-Green Share
Green Share

Location	Non-Green Share	Green Share
US	52%	48%
Australia	61%	39%
UK	48%	52%
Norway	68%	32%
Germany	72%	28%
Singapore	34%	66%
UAE	49%	51%
South Africa	69%	31%
Brazil	61%	39%
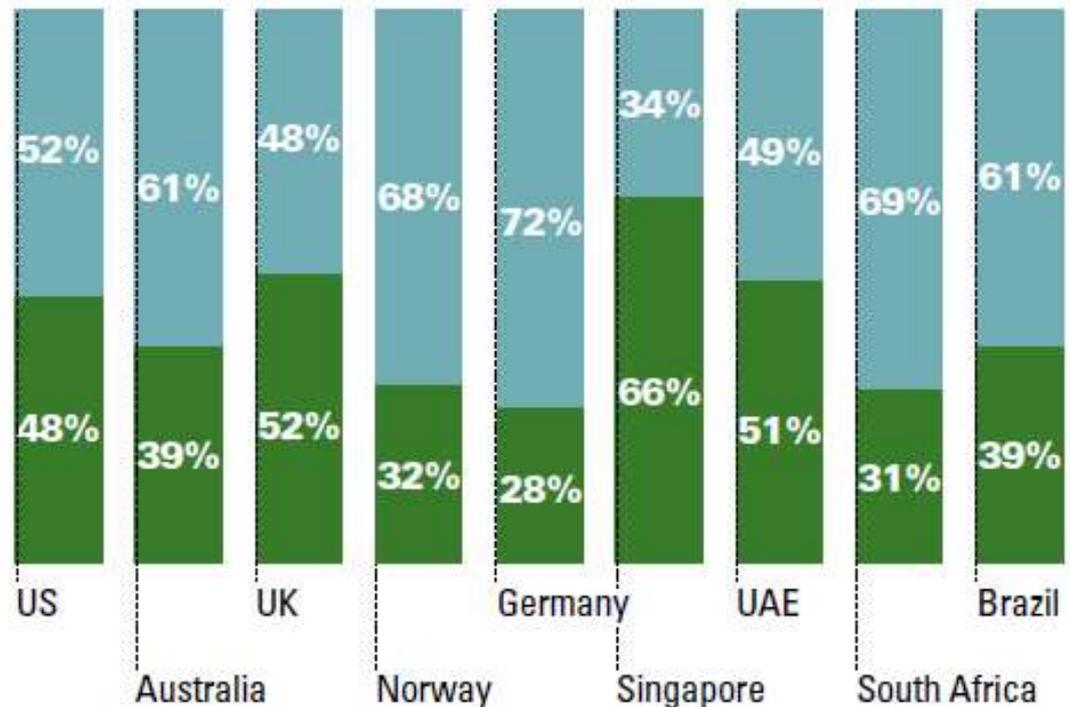
The sustainable building topic has left the niche.

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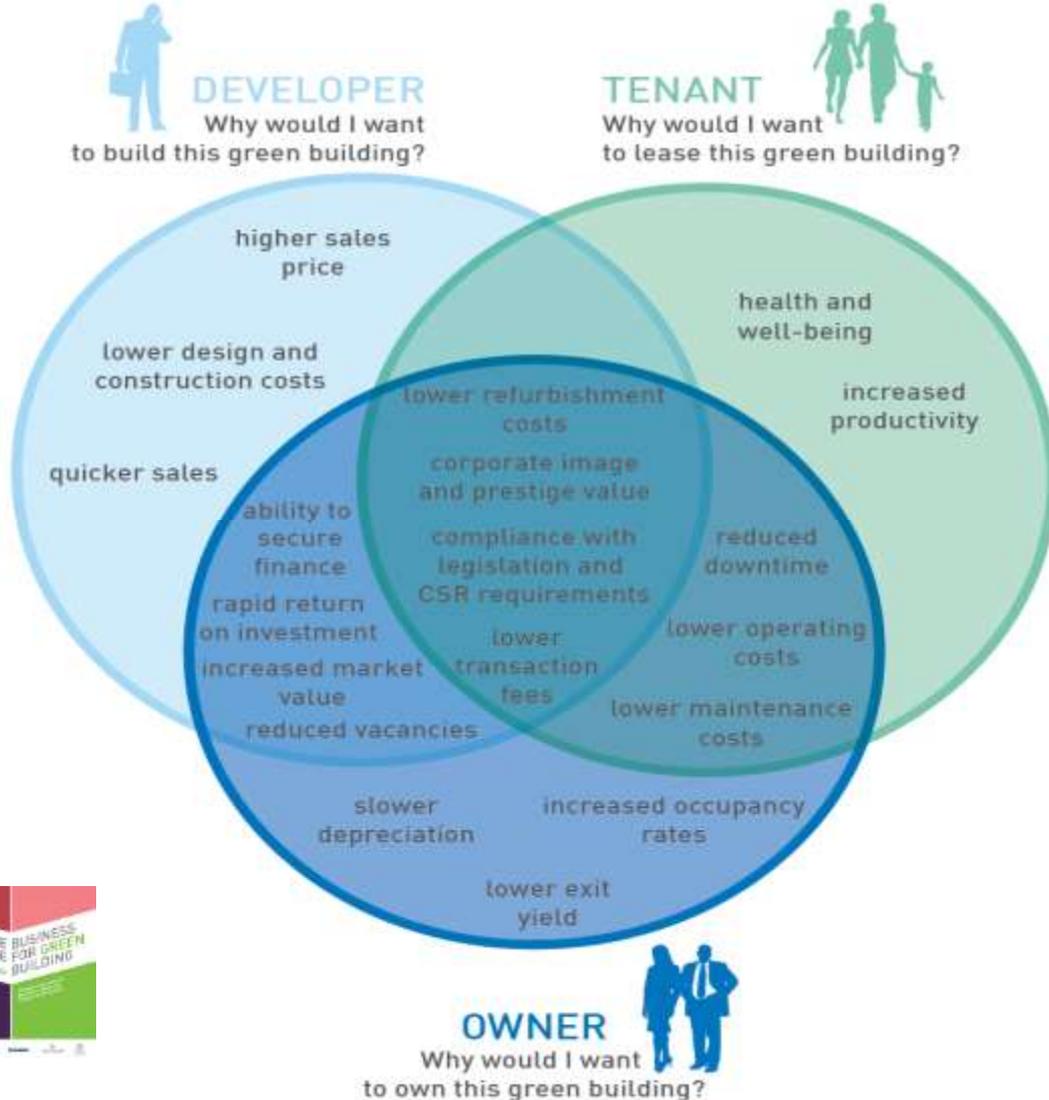
- Less **vacancy**

- Higher **sales price**

- Lower **construction cost**

- Higher **rental income**

- Higher **productivity** of user

- Less **illness**

- Lower life cycle **cost**

The Business Case

- Asset value

- Design and construction Costs

- Operation Costs

- Workplace Productivity and Health

- Risk Mitigation

- Scaling Up from Green Buildings

But how to measure sustainability?

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- **Building Design**

  Architectural competition (design stage)

  Building certification as build (DGNB, BREEAM, HQE, LEED...)

- **Procurement**

  Green Public Procurement

  Green specification (e.g. MASDAR), Sphere e tool

- **Marketing**

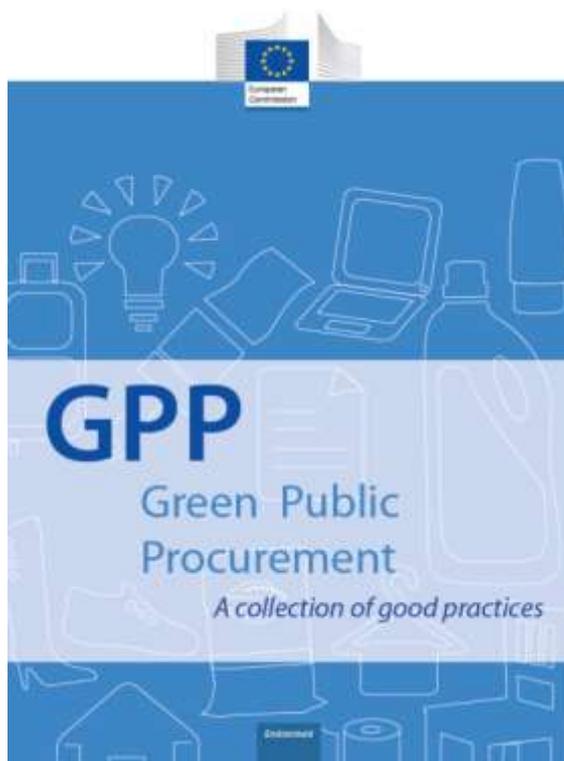 Fact based communication and brand reputation

- **R & D**

  Product design

  Competitors monitoring (⇨ CSR insight)

- **Innovation**

  Method to drive innovation within company and supply chain

  Environmental KPIs to drive environmental performance of the complete company

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- **Building Design**

  Architectural competition (early stage)

  Building certification as build (DGNB, BREEAM, HQE, LEED...)

- **Procurement**

  Green Public Procurement

  Green specification (e.g. MASDAR), Sphere e tool

- **Marketing**

  Fact based communication and brand reputation

- **R & D**

  Product design

  Competitors monitoring ($\Rightarrow$ CSR insight)

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  Method to drive innovation within company and supply chain

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- **Single product EPD**

  EPD for an individual product from one or more sites of one producer

  EPD for an individual product from several sites of multiple producers

- **Average product EPD**

  EPD for the average of a group of products from one or multiple producers with an environmental performance within a small range

- **Model EPD**

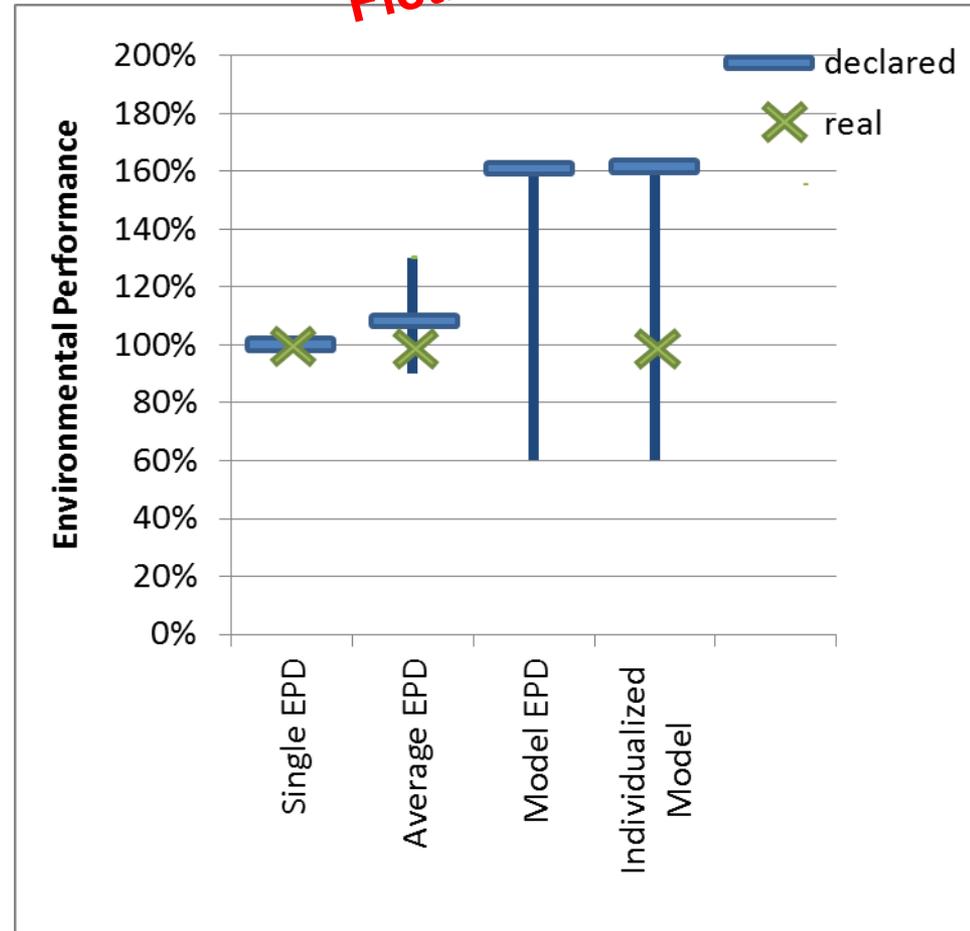 EPD for a defined group of products with an environmental performance within a certain range

- **Individualized Model EPD**

  EPD for one or more individual products from one or more sites of one producer based on a model EPD

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- **Single product EPD**

  Discrete environmental performance

- **Average product EPD**

  Average environmental performance within a small range

- **Model EPD**

  Worst case approach within a certain range

- **Individualized Model EPD**

  Worst case approach within a certain range

- Extreme high number of EPDs in product groups with many products

- High effort due to high representativity required in data collection

- Needs development of classification scheme for product groups

- Easy to develop and company specific, but worst case declaration

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- **Single product EPD**

  Discrete environmental performance

- **Average product EPD**

  Average environmental performance within a small range

- **Model EPD**

  Worst case approach within a certain range

- Individualized Model EPD

  Worst case approach within a certain range
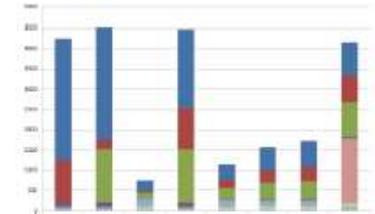

Fictive example

Agenda

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- **Data collection for wide range of products**

  Allows application for most products (good coverage)

- Classification based on the environmental performance

  Screening method to allocate products to classes

  Focus on highest impacts of product group (LC stage and impact category)

  Aggregation of environmental impacts to a single environmental score

  Guideline how to apply the screening

- Definition of product groups

- Model EPD for the product group

  Different classes

- More than 100 raw materials researched and modelled in GaBi software

- More than 200 formulations were analyzed as a basis for the classification
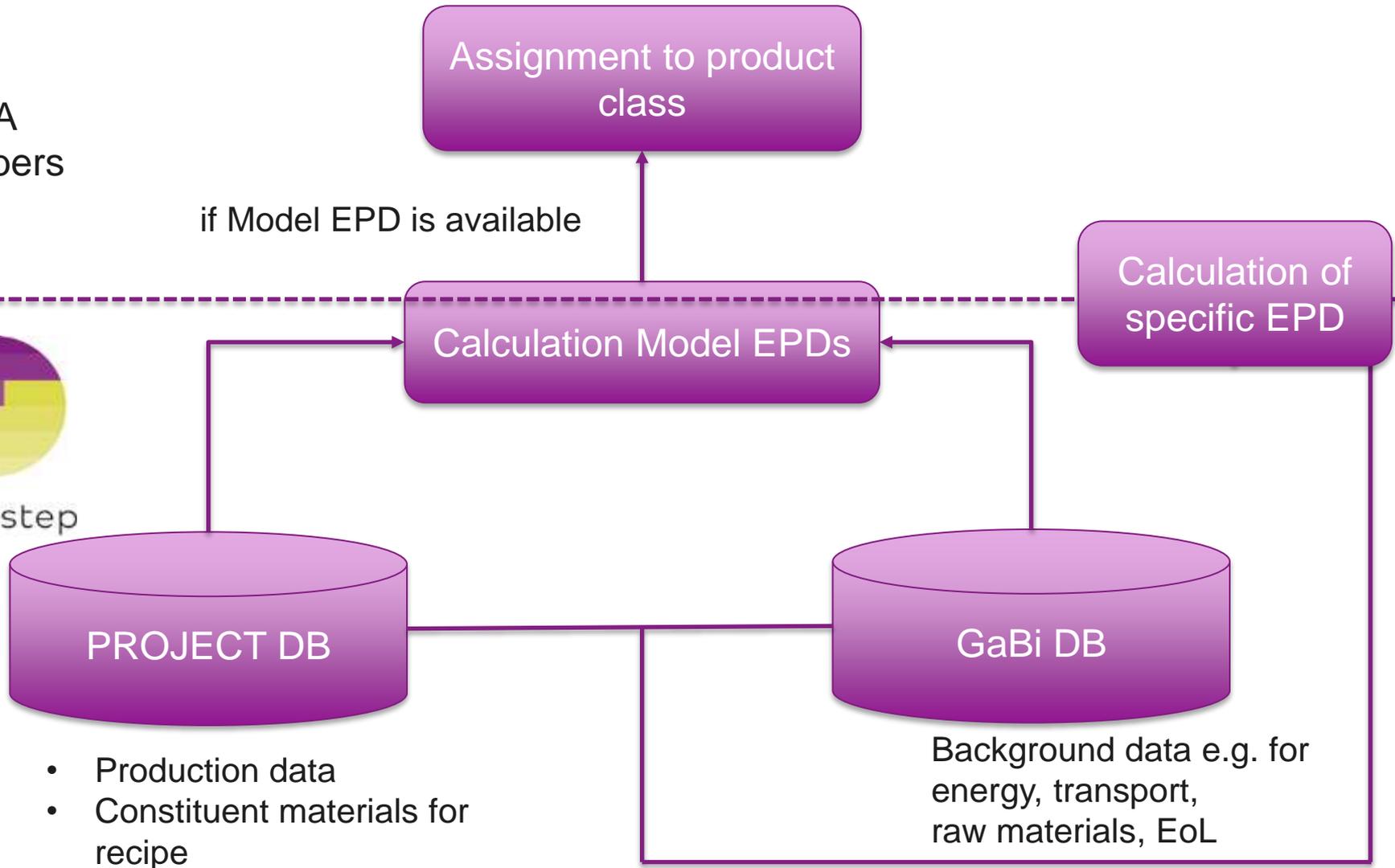

→ But how to address all the different products systematically?

Data flow for FEICA model EPD approach

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FEICA
members

Assignment to product class

if Model EPD is available

Calculation Model EPDs

Calculation of specific EPD

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PROJECT DB

GaBi DB

- Production data
- Constituent materials for recipe

Background data e.g. for energy, transport, raw materials, EoL

- Data collection for wide range of products

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Normalization:

- Result per Impact Category describes the relative contribution of a product compared to national or global impact
- Shows most relevant environmental impact categories

$$\frac{GWP_{input\ material\ A} *100}{\Sigma\ GWP_{input\ materials\ A\ to\ Z}} = \%\ GWP_{input\ material\ A}$$

Cross Category Weighting:

- allows consideration of importance of environmental problems
- We assumed all impacts to be equal

$$\frac{\%GWP + \%PENRT + \%POCP}{3} = single\ score_{input\ material\ A}$$

→ **Single score representing the environmental impact of an input material**

		Punkte
Epoxidharze		
	Bisphenol-A-Harz	27
	Bisphenol-F-Harz	
	Phenol-Novolack-EP-Harz	22
Glycidylether		
	1,6-Hexandiol-diglycidylether	91
	C$_{12}$-C$_{14}$-Monoglycidylether	22
	Trimethylolpropan-Epichlorhydrin-Copolymer	88
	1,4-Butandiglycidylether	

Selection of the most important impact categories by normalization of LCIA* results for a product to the results of Western Europe

Example:
Epoxy resin

LCIA: Life Cycle Impact Assessment

ADPF: Abiotic Depletion of Fossil Fuels
GWP: Global Warming Potential
POCP: Photochemical Ozone Creation Potential

■ EPD 1a ■ EPD 1b ■ EPD 2 ■ EPD 3a ■ EPD 3b
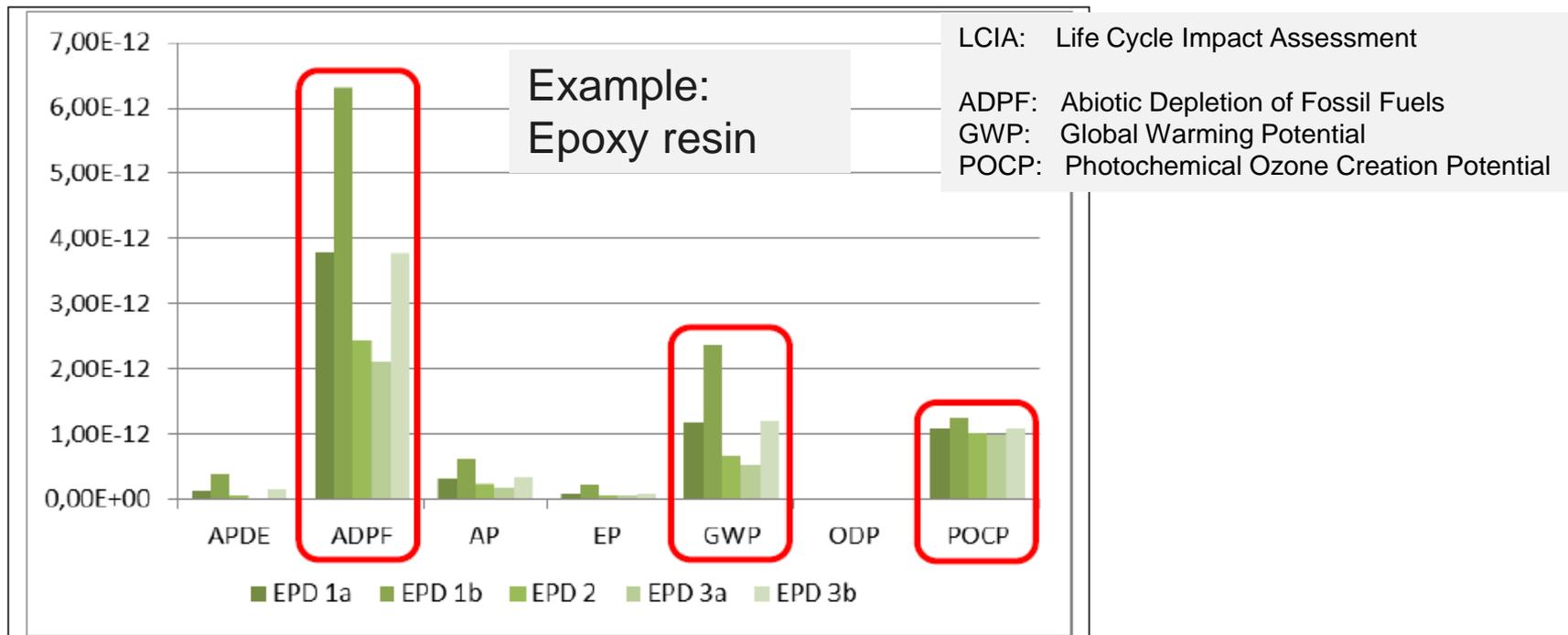
→ ADPF*, GWP*, POCP* (for VOC* containing products) show most relevant in normalisation ⇨ selected for the classification

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Product category: Construction product: Reactive Resins

Product group: Epoxy-based Reactive Resin

Class 1:	unfilled/solvent free with high (low) content of reactive diluent
Class 2	aqueous/unfilled
Class 3	filled and/or aqueous filled with high (low) content of fillers

Product group: Polyurethane-based Reactive Resin

Class 1	unfilled/solvent-free with (or without) polyols
Class 2	filled or aqueous, solvent-free
Class 3	containing solvent 10-50% or < 10%

...
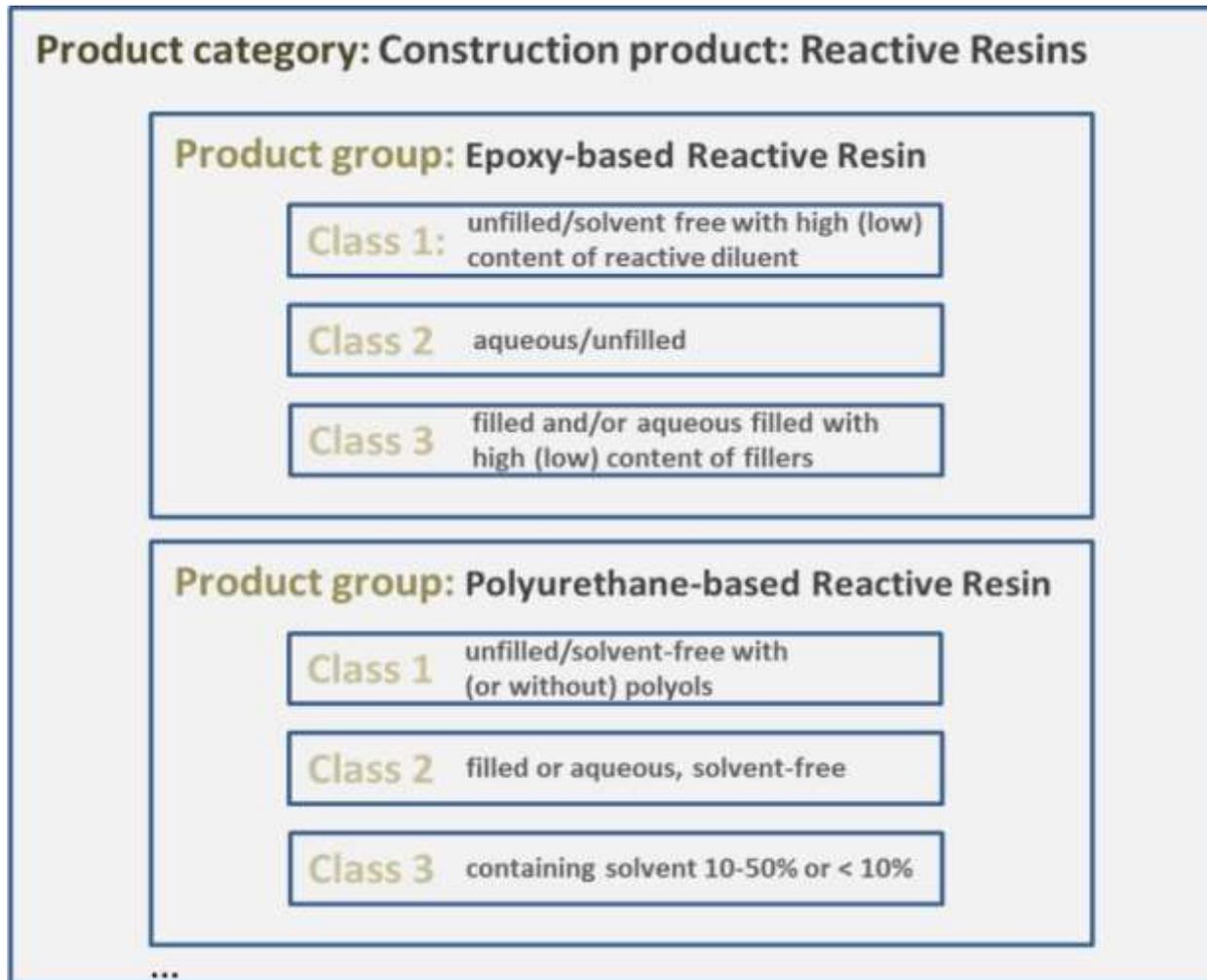
Target: Clustering of recipes with similar chemical composition and similar environmental impact

- Selection of worst case product
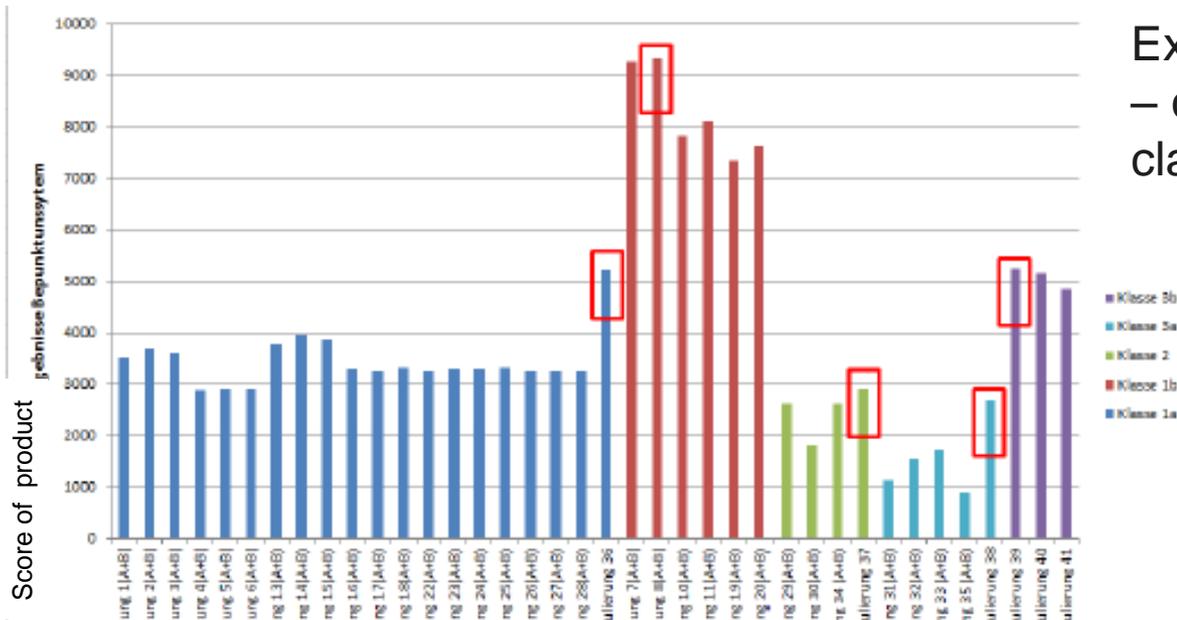
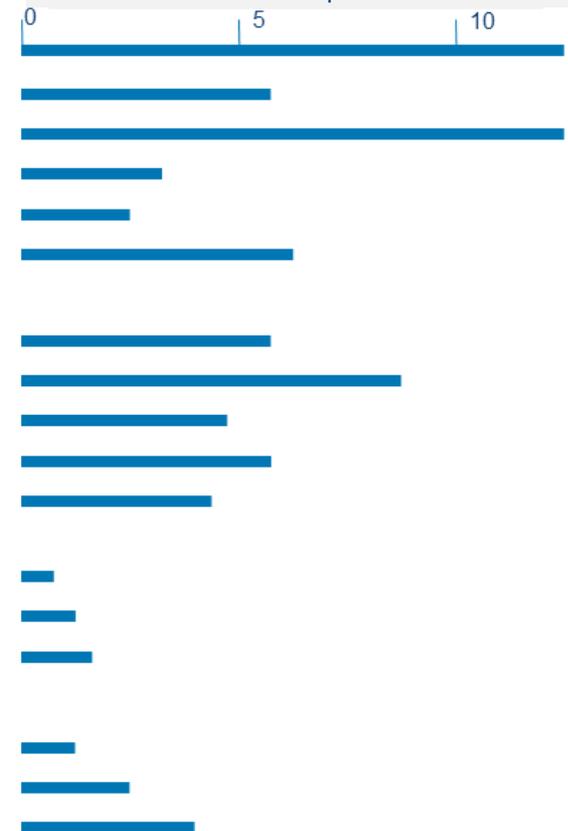Example: Epoxy products – clustered according to classes

→ Environmental impact of the real, "worst" product of each class are declared for respective Model-EPD classes

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GWP in kg CO_{2eq} / kg

No.	Name of EPD	Classes within EPD		Score
EP 1	Reactive resins based on epoxy	Unfilled/solvent-free	With low content of reactive diluent	< 5000
EP 2			With high content of reactive diluent	< 9500
EP 3		Aqueous/unfilled		< 3000
EP 4			With high content of fillers	< 2500
EP 5			With low content of fillers	< 5000
PU 1	Reactive resins based on polyurethane	Unfilled/solvent-free	Containg polyols	< 4900
PU 2			Polyol-free	< 7400
PU 3		Filled or aqueous, solvent-free or SMP		< 4000
PU 4			Solvent content 10% - 50%	< 11500
PU 5		Containing solvent	Solvent content < 10%	< 3600
MM 1	Mortar-based products	Modified mineral mortars		< 1100
MM 2				1101 - 2000
MM 3				2001 - 3700
DIS 1	Dispersions	Dispersions, solvent free		< 1000
DIS 2		Dispersions products		< 2500
DIS 3				< 4000
	Sealants	Silicone-based sealants		

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Guidance document contains single scores for all constituent materials

➤ Basis for calculation of total score of a formulation

Constituent materials	Single score result
Polyols	
Castor oil (OH-number approx. 160 mg/g)	2
Preparation based on branched polyalcohols with ester- and ether-groups (OH-number approx. 155 mg/g)	30*
Preparation based on linear/ branched polyalkohols (OH-number approx. 7%)	
Polyol	
Trifunctional Polypropyleneether-polyol (OH-number approx. 35 mg/g)	
Polyetherpolyol (OH-number approx. 400 mg/g)	
Dimethyl thio-toluene diamine; DMTDA	15
1,4-Butanediol	25
Triethylene glycol	21
Amine	
Dimethyl thio-toluene diamine; DMTDA	30*
Diethyl toluene diamine; DETDA	
Polyetheramine	50
Latent hardening agent (Oxazolidine)	55

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- Check titel of EPD: Does this title fit to my product?

- Is the application of my product covered in this EPD?

➤ Then you can calculate the total score of your product:

Recipe   Guidance document   Calculator   Model EPDs

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Product/Formulation

Check: All constituent materials available in Guidance document?

yes → no

Similar materials available?

yes → no

Add materials to guidance document

Multiply recipe [%] with single score of consituent materials = total score of fomulation

Possible to select EPD with maximum total score above your formulation's total score and product properties?

yes

no
(total score too high/"too low")

Use existing Model EPD

Create specific EPD

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EXAMPLE:

Formulation:

    50% Polyol

    20% MDI

    30% Calciumcarbonate

Calculation:

Polyol	50 x 30 =	1500
Polymer-MDI	20 x 23 =	460
Calcium carbonate	30 x 1 =	30
Total score		**1990**

The formulation is in the scope of PU EPD 3 (total score < 3400, contains polyol, solvent free).

EPD class		Range of scores
EPD 1	Reactive resins based on PU, unfilled/solvent-free, containing polyols	4300
EPD 2	Reactive resins based on PU, unfilled/solvent-free, polyol-free	6900
EPD 3	Reactive resins based on PU or silane-modified polymers (SMP), filled or aqueous, solvent-free	3400
EPD 4	Reactive resins based on PU, containing solvent, solvent content between 10% and 50%	11000
EPD 5	Reactive resins based on PU, containing solvent, solvent content < 10%	3200

- **Sustainability** is a framework to better understand future changes of our economic system and the related consequences for the environment

- Sustainable construction is driven by an underlying **business case** for most involved stakeholder groups, but information on env. performance is needed

- EPDs communicate **environmental performance** of products

- **EPDs are widely used**, they provide reliable 3rd party verified information

- The **concept of Model EPDs** provides a **cost efficient** option to the European A&S producers to provide EPDs for their products

Thank you
for your attention!

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