PE INTERNATIONAL
SUSTAINABILITY PERFORMANCE

Resource Efficiency in the Built Environment

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PE INTERNATIONAL

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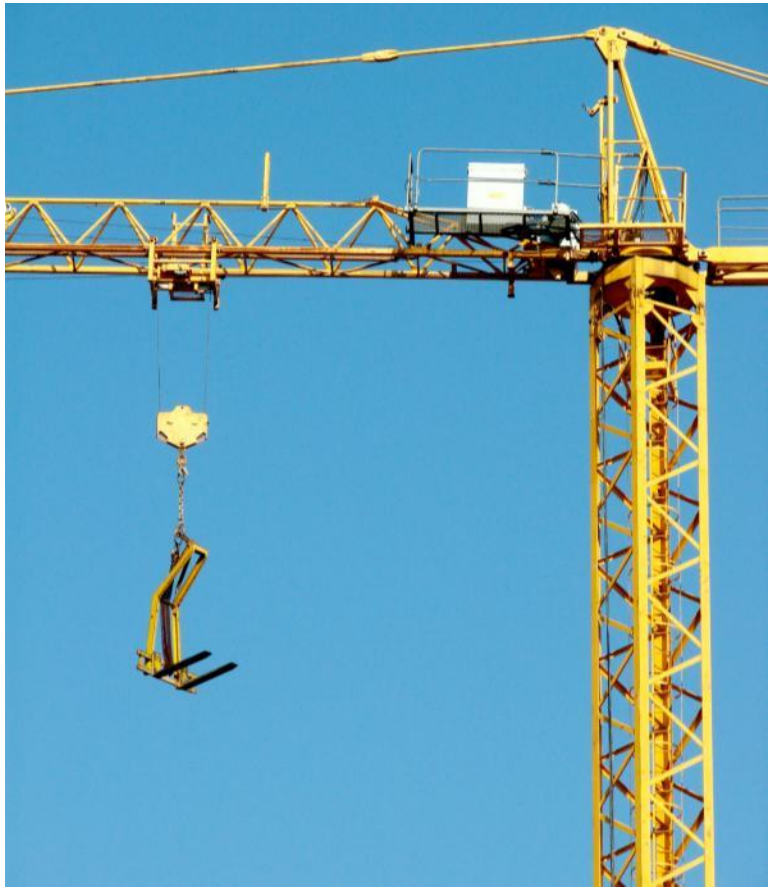
Global **leader** in sustainability performance solutions

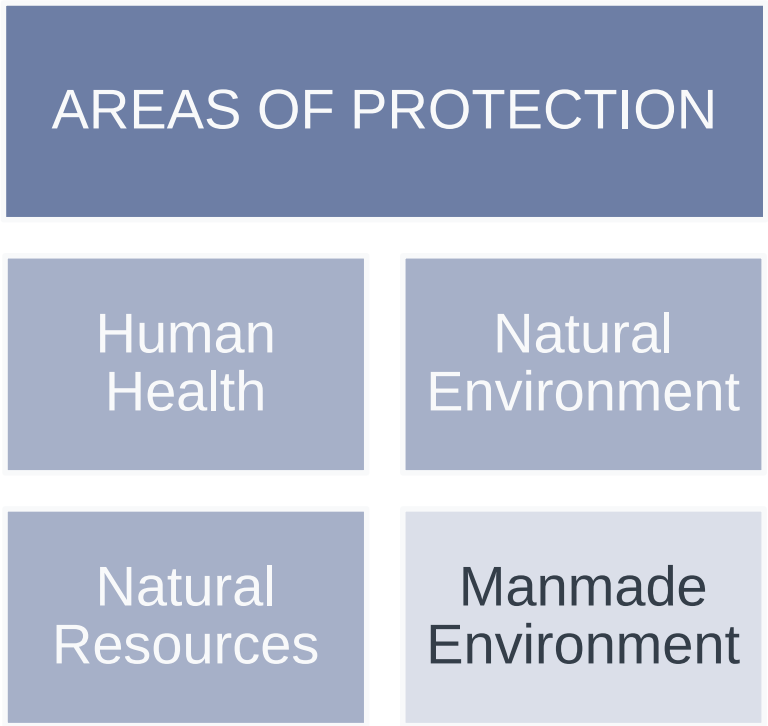
- The only player with an end-to-end value proposition
- 9/10 of the top Green Brands 2011 use PE sustainability solutions
- More than 20,000 software users; over 1,500 leading businesses
- Over 20 years of expertise in developing solutions that address sustainability challenges
- Globally reputed for thought leadership – publications by expert consultants
- Undisputed global leader in integrated sustainability performance solutions
- Unparalleled roster of sustainability experts: Half of PE International's experts have over 10 years of sustainability experience

Outline



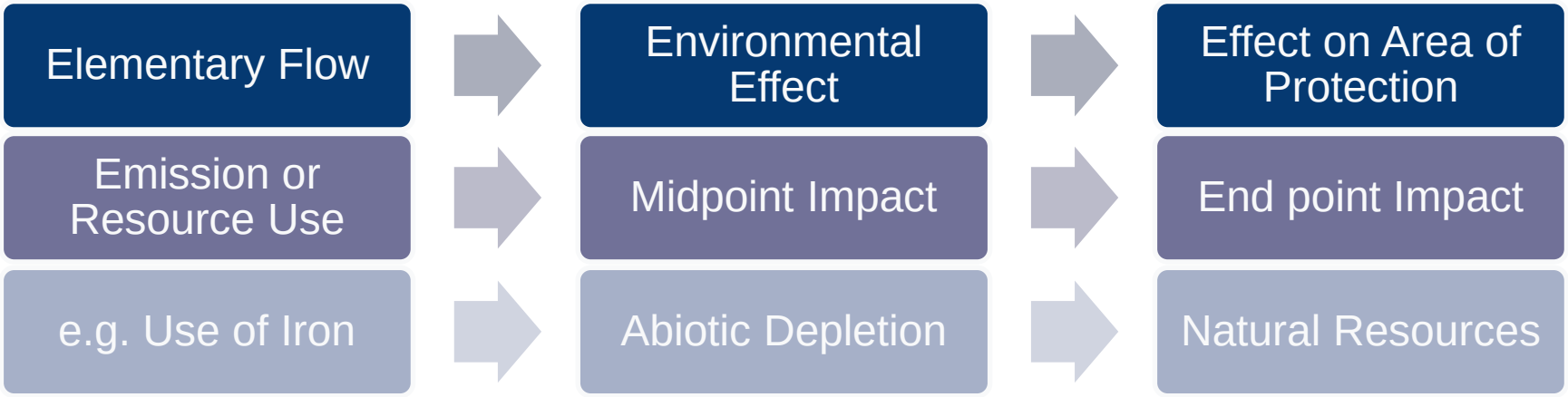
- What type of resource indicators can be used?
- What data are available for construction products?
- What is the contribution of construction products to resource use in the built environment?
- How can product level data be used to make choices?

Resource Efficiency
Types of indicators



- **Environmental indicators normally focus on the pathways of impact for three areas of protection.**
- **The Manmade Environment can also be considered as an area of protection but is not often considered in environmental impact assessment**

Resource Efficiency
Types of indicators



- Indicators can be chosen at any point on the environmental pathway between Flows and the Areas of Protection.
- The amount of uncertainty increases as the pathway moves from midpoint to endpoint indicators
- Flows can affect more than one midpoint or end point indicator.

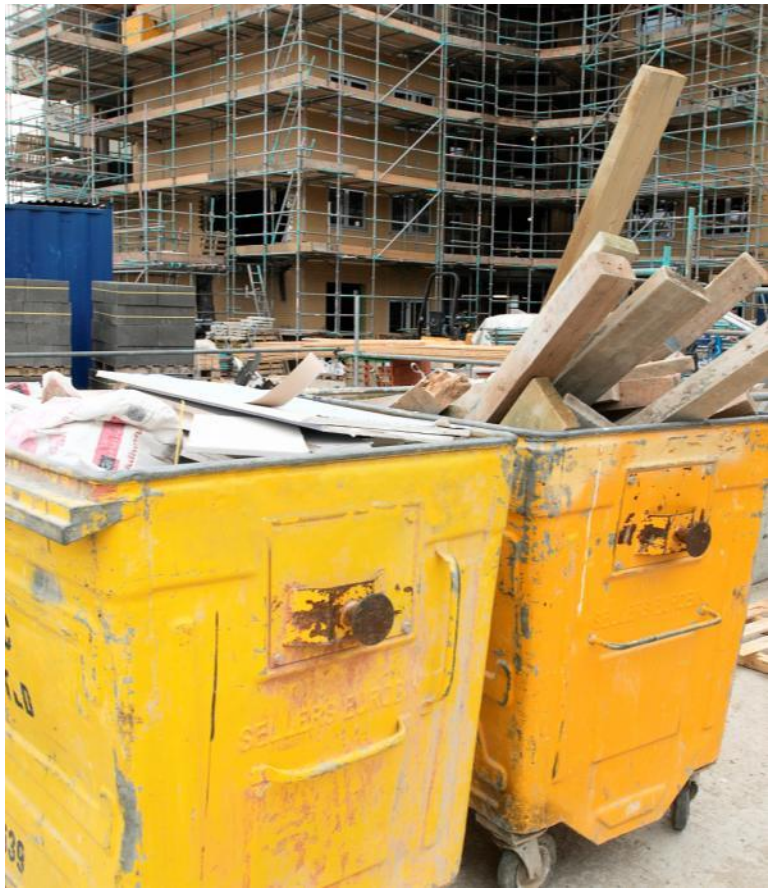
Resource Efficiency
Types of indicators

- **Energy Aspects**
  - Non-Renewable v Renewable
  - Secondary Energy
  - Feedstock Energy
  - Interchangability of Energy
- **Energy Indicators**
  - Abiotic Depletion (Fossil Fuels) - MP
  - Non-Renewable Primary Energy Use - EF
  - Renewable Primary Energy Use - EF

Resource Efficiency
Types of indicators

- **Water Aspects**
  - Freshwater – v other types
  - Use v Consumption
  - Water Scarcity
  - Water Quality
- **Water Footprint**
  - Draft ISO DIS 14046 in development
  - Water footprint inventory analysis - EF
  - Water footprint impacts – eg. Water Scarcity, Eutrophication, Toxicity etc - MP
  - Water Footprint Profile - MP
  - Weighted Water Footprint - MP

Resource Efficiency
Types of indicators

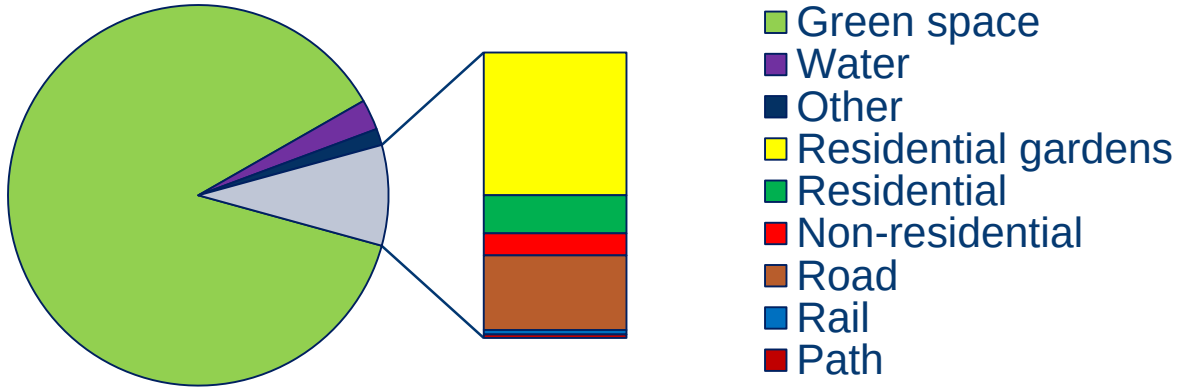


- **Material Aspects**
  - Non-renewable v Renewable
  - Secondary materials
  - Waste Generated v Waste Recovered
  - Scarcity and Reserves
- **Resource Indicators**
  - Total Material Requirement (TMR)/ Direct Material Input (DMI) - EF
  - Mineral Extraction - EF
  - Abiotic Depletion – Elements - MP
  - Exergy - MP

Resource Efficiency
Types of indicators

- **Land aspects**
  - Area of Occupation
  - Time of Occupation
  - Type of Occupation
  - Change of Use
  - Productive output
- **Land Use Indicators**
  - Land Occupied (m^2/annum) - MP
  - Land Transformed (m^2/annum) - MP
  - Soil Organic Matter (SOM) - MP
  - Normalized Extinction of Species (NEX) - EP

Land use by type in England in 2005 (ONS, 2007)



Resource Efficiency
ILCD recommended indicators for Europe

Impact Category	Recommended Method	Description
Land use	Model based on Soil Organic Matter (SOM) (Milà i Canals et al, 2007b)	Midpoint - Soil Organic Matter
Resource depletion, Water	Model for water consumption as in Swiss Ecoscarcity (Frischknecht et al, 2008)	Midpoint - Water use related to local scarcity of water
Resource depletion, mineral, fossil	CML 2002 (Guinée et al., 2002)	Midpoint - Scarcity of minerals based on elemental reserve base
Only midpoint indicators recommended. Endpoint indicators not well developed.		

Resource Efficiency
TC 350 indicators

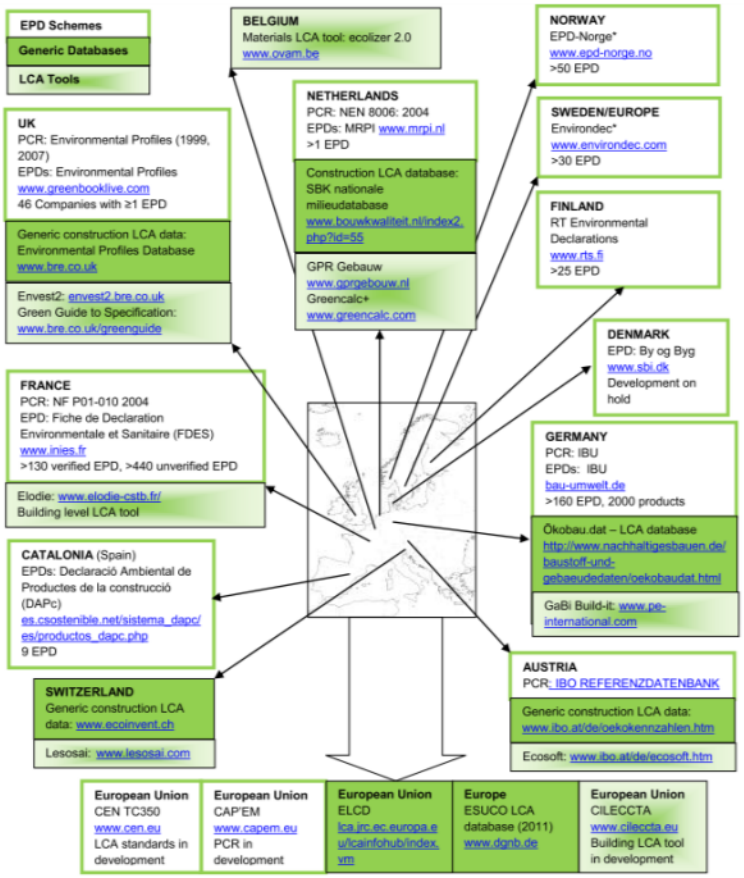
Environmental Impact Indicators	Abiotic depletion potential for non fossil resources (ADP-elements) - (ultimate reserve) – MP
	Abiotic depletion potential for fossil resources (ADP-fossil fuels) – MP
Resource Category Indicators	Use of renewable primary energy excluding renewable primary energy resources used as raw materials – EF
	Use of renewable primary energy resources used as raw materials – EF
	Total use of renewable primary energy resources (primary energy + primary energy resources used as raw materials) – EF
	Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials – EF
	Use of non renewable primary energy resources used as raw materials – EF
	Total use of non renewable primary energy resources (primary energy +primary energy resources used as raw materials) – EF
	Use of secondary material – EF
	Use of renewable secondary fuels – EF
	Use of non renewable secondary fuels - EF
	Use of net fresh water - EF

Resource Efficiency
TC 350 indicators

Waste Category Indicators	Hazardous waste disposed – EF
	Non hazardous waste disposed - EF
	Radioactive waste disposed – EF
Output Flow Indicators	Components for re-use - EF
	Materials for recycling - EF
	Materials for energy recovery – EF
	Exported energy - EF

Resource Efficiency

What data are available for construction products?



Construction EPD Schemes

- BRE Environmental Profiles (UK)
- Fiche de Declaration Environmentale et Sanitaire - FDES (FR)
- Declaració Ambiental de Productes de Construcció - DAPc (ES)
- EPD-Norge
- International EPD®
- MRPI (NL)
- RT Declaration (FI)
- Institut Bau und Umwelt (DE)
- PEPecopassport (FR – Services)

Resource Efficiency

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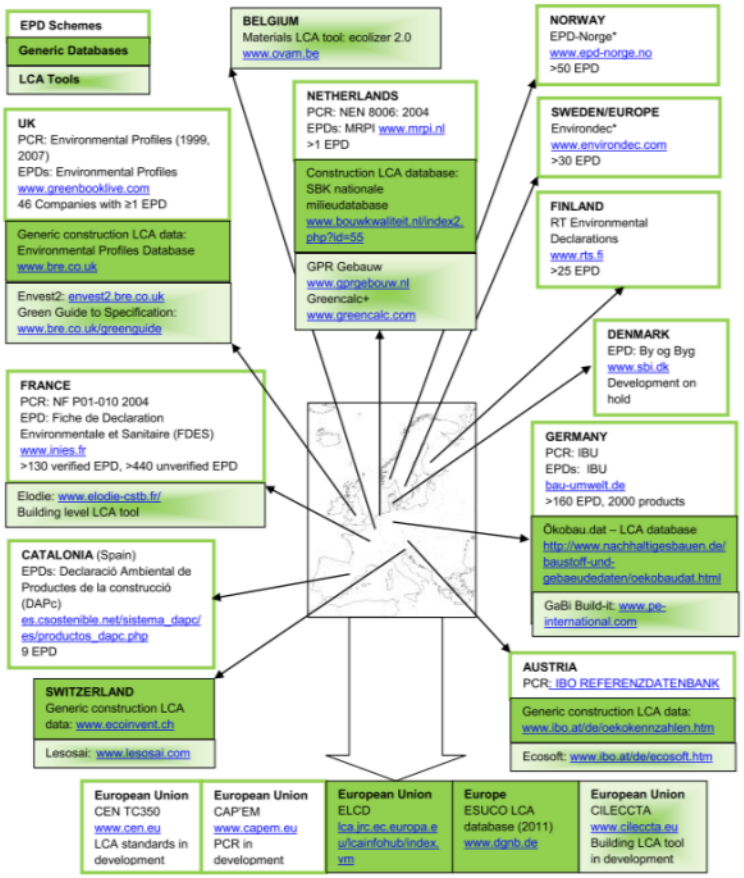


Construction LCI Databases

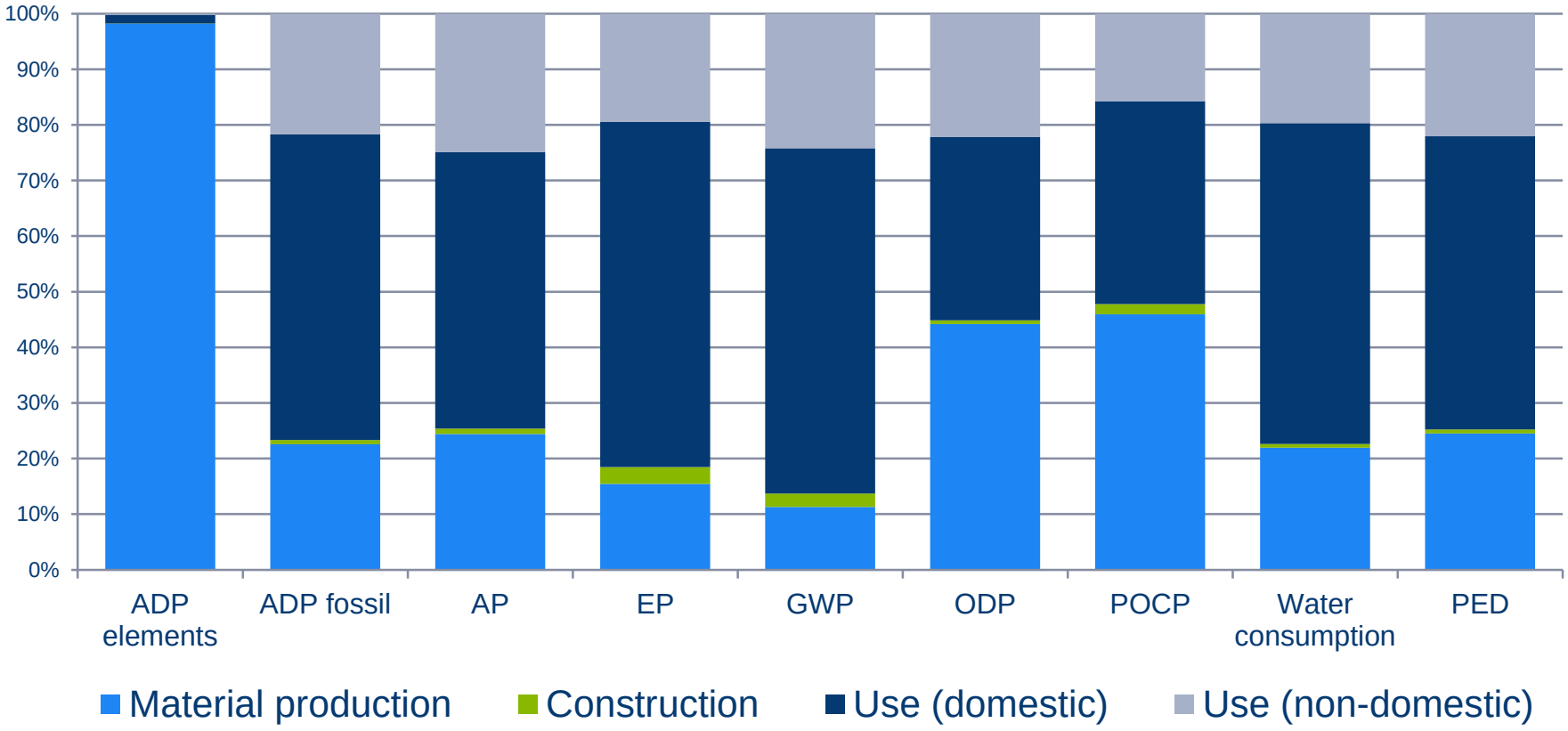
- European Life Cycle Database - ELCD (Europe)
- ecoinvent (CH)
- GaBi (DE)

Construction LCIA Databases

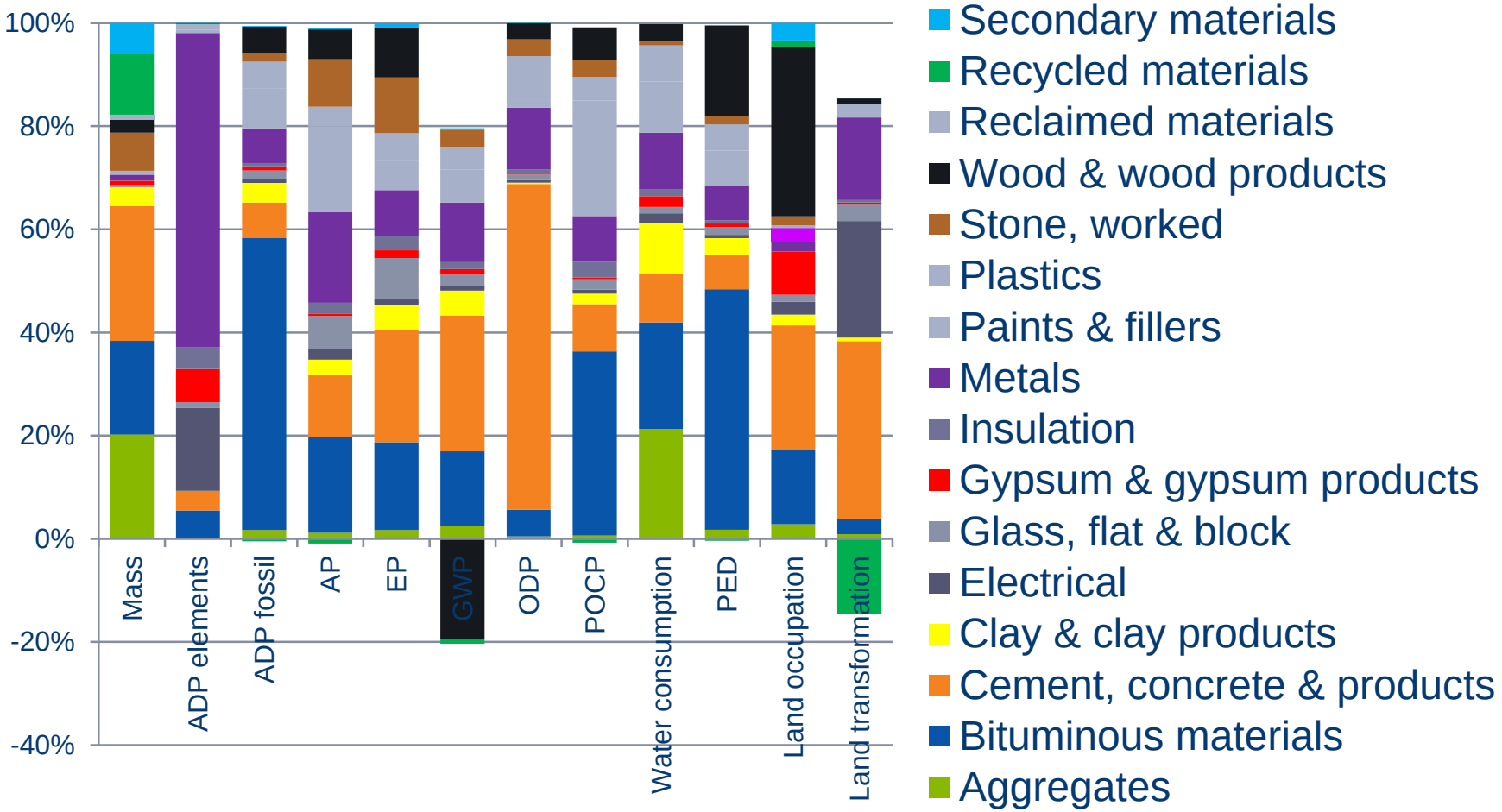
- Oekobau.dat (DE)
- Milieudatabase (NL)
- IBO (AU)
- BRE IMPACT (UK)

How important are construction products in the resource efficiency of the built environment?

Annual impacts across the UK's built environment



Resource Efficiency
Impacts of Construction Product Use in the UK



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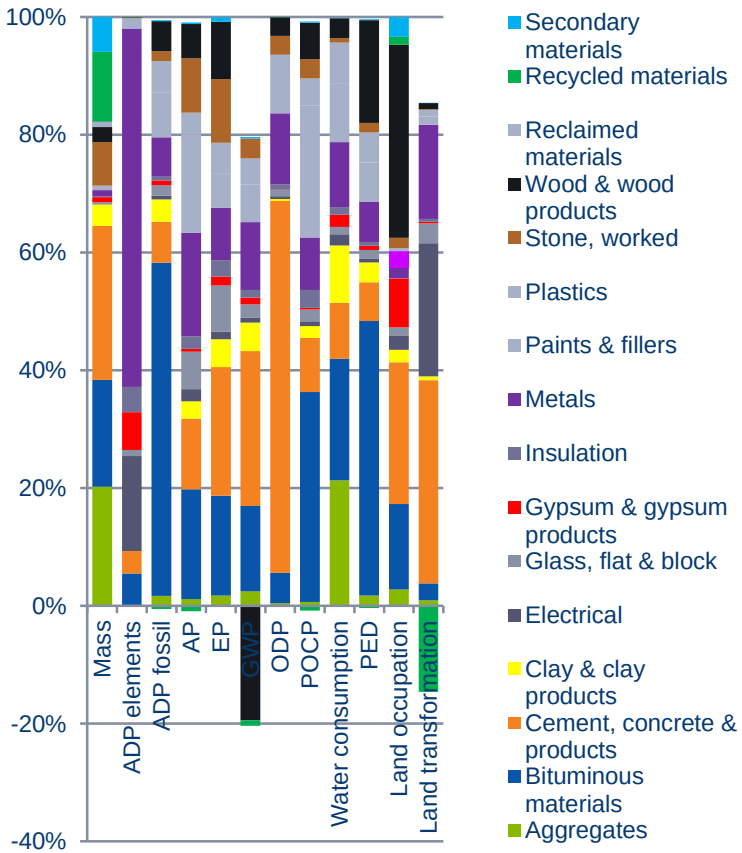
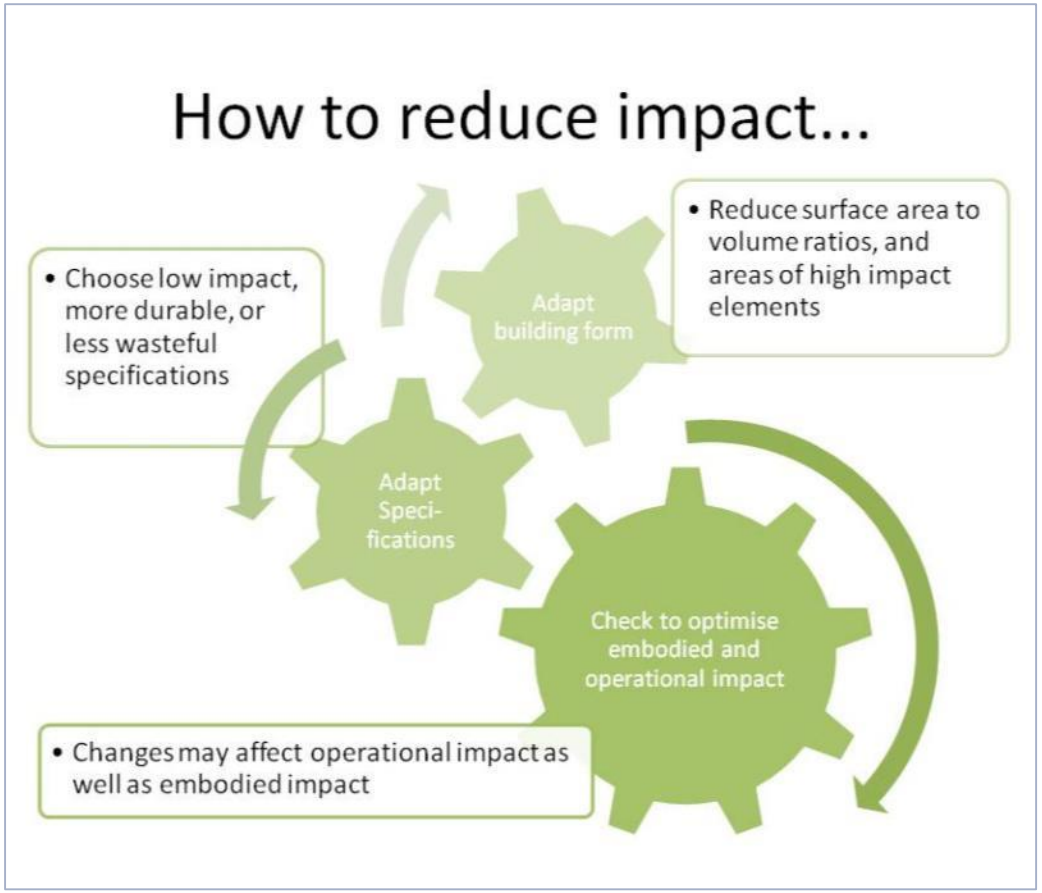


- Data sourced from UK Construction Mass Balance (Viridis 2000)
- Annual Consumption by Material Group assessed using PE data
- Metals and Electricals major cause of ADP elements impact
- Bituminous materials major cause of ADP fossil fuels impact
- Aggregates, bituminous materials and recycled materials major source for Water consumption impact
- Wood and Wood products major cause of land occupation
- Concrete, electricals and metals major cause of land transformation.

How can product level data be used to make choices?



Choosing materials is only one aspect of reducing the impact of our built environment

How can product level data be used to make choices?

- **Which impacts are important to you?**
- **Which life cycle stages and elements of your building have most impact? http://www.eebguide.eu provides links to tools and data**
- **Focus on the most impactful parts of your building first**
- **Increasing service life, reducing waste and increasing waste recycling will all have benefits**
- **Review information in generic databases or EPDs to address materials choice first**
- **Use manufacturer specific EPDs or Ecolabels to identify best in class products**

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Thank you

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