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# Resource efficiency in the built environment

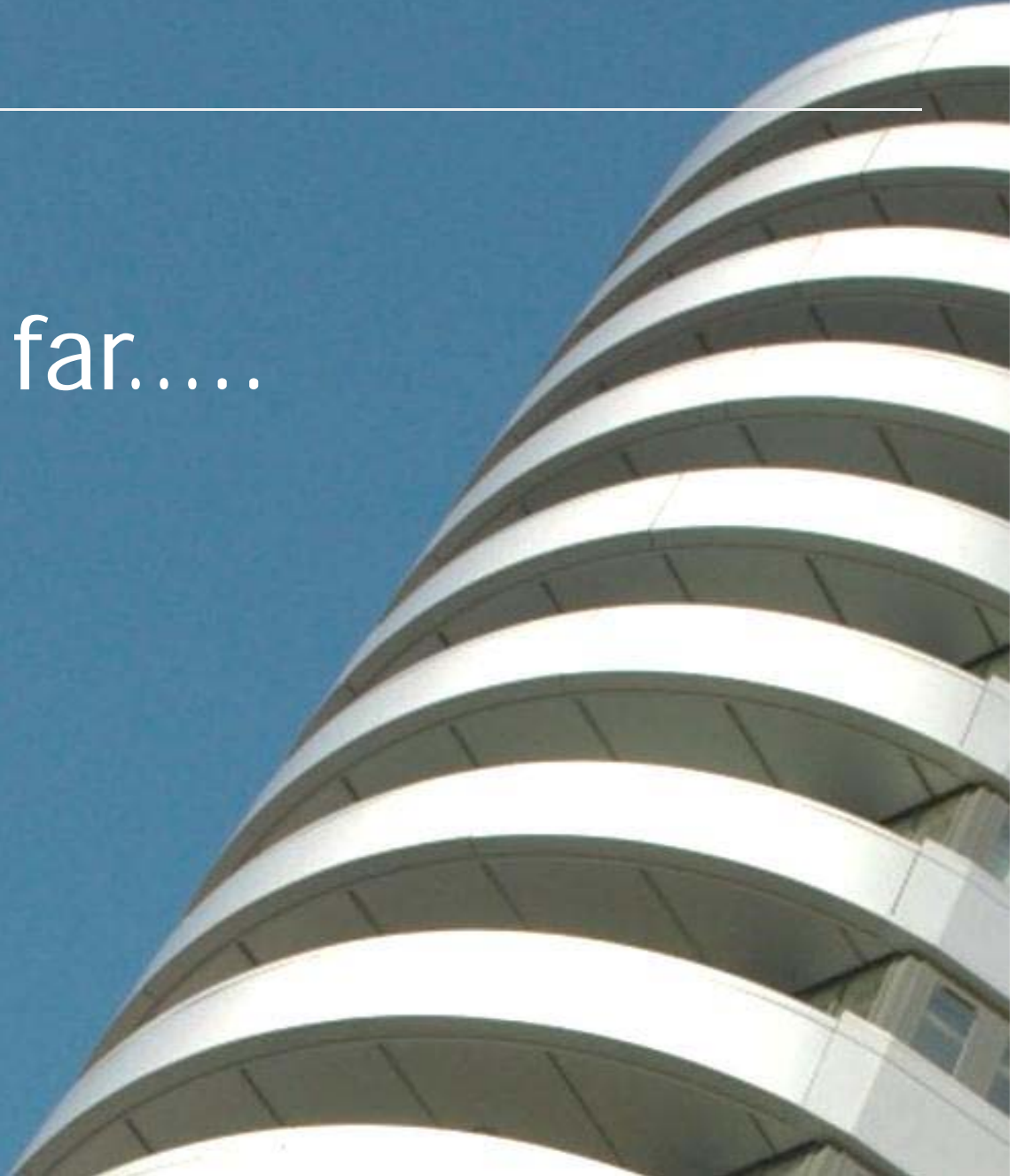
Making the best use of materials,  
water and energy in built assets

Gareth Brown  
Programme Manager

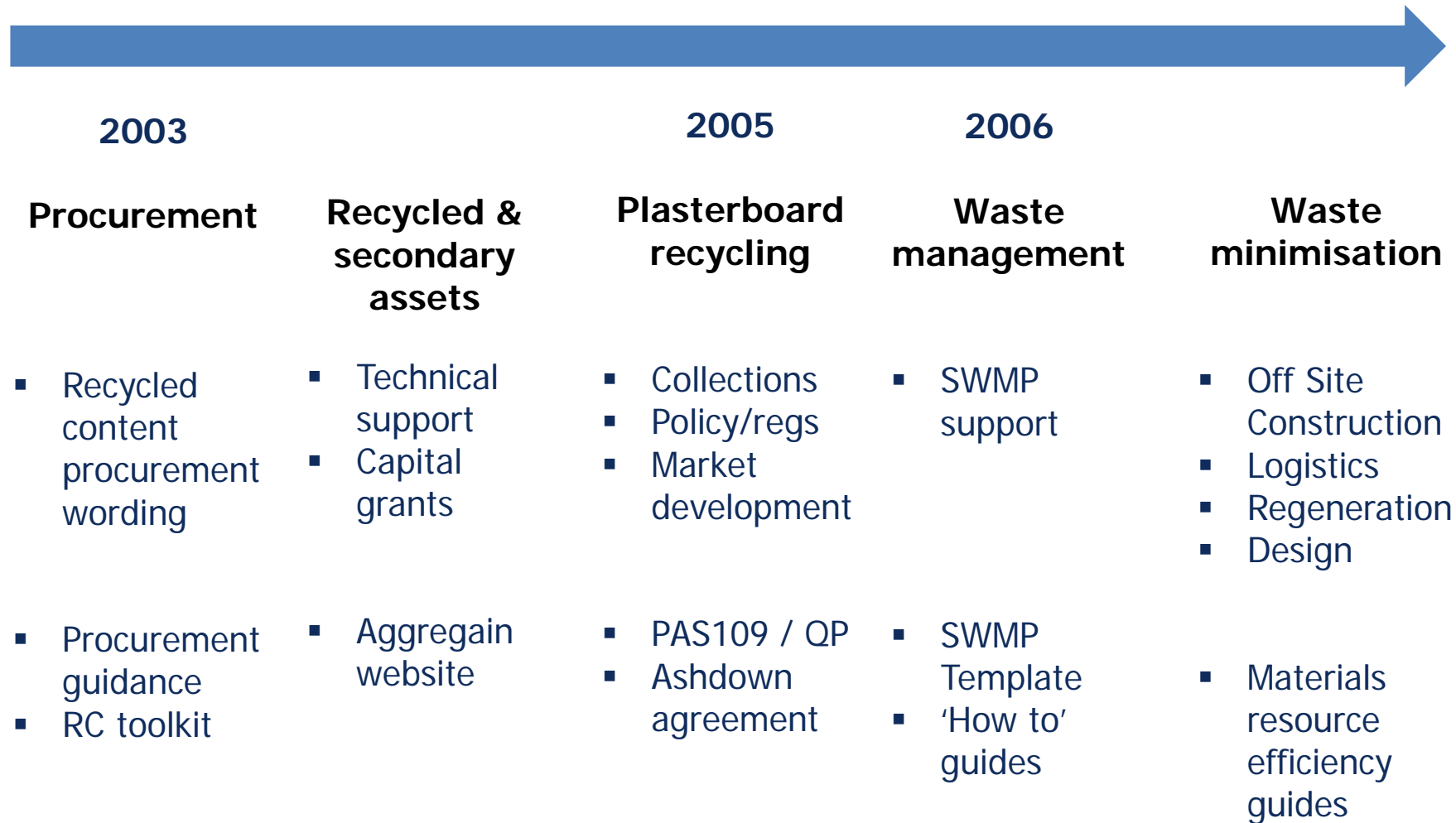


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The story so far.....



# Programme evolution



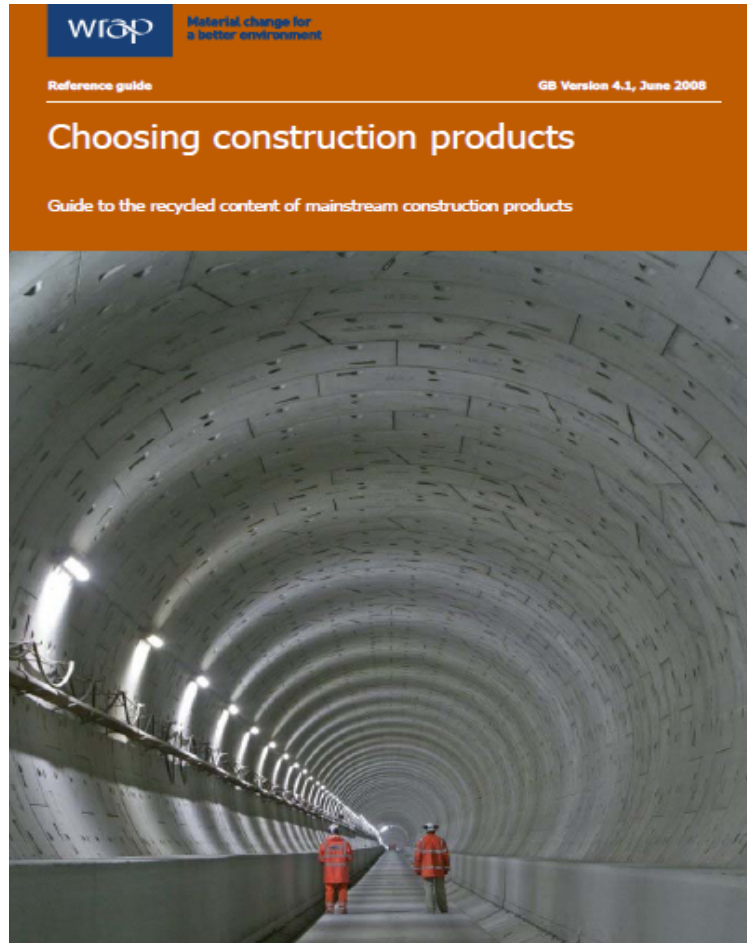
# Driving change through procurement



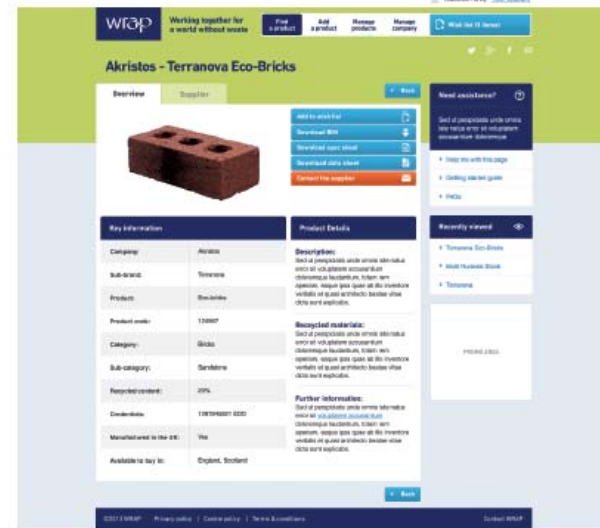
- Model wording for each project stage
- Client and contractor actions
- Corporate policies and project documents

**£42bn** value of projects influenced by WRAP's procurement wording

# Guide to recycled content of products



Online database to facilitate choice editing of products and materials to increase recycled content.



## Halving Waste to Landfill

The Commitment was built around a simple statement of intent ...

*"We commit to playing our part in halving the amount of construction, demolition and excavation waste going to landfill by 2012. We will work to adopt and implement standards for good practice in reducing waste, recycling more, and increasing the use of recycled and recovered materials"*





# Programme evolution



2006

## Waste management

- SWMP support
- SWMP Template
- 'How to' guides

2008

## Waste minimisation

- OSC
- Logistics
- Regeneration
- Design
- Materials resource efficiency guides

## Construction Programme



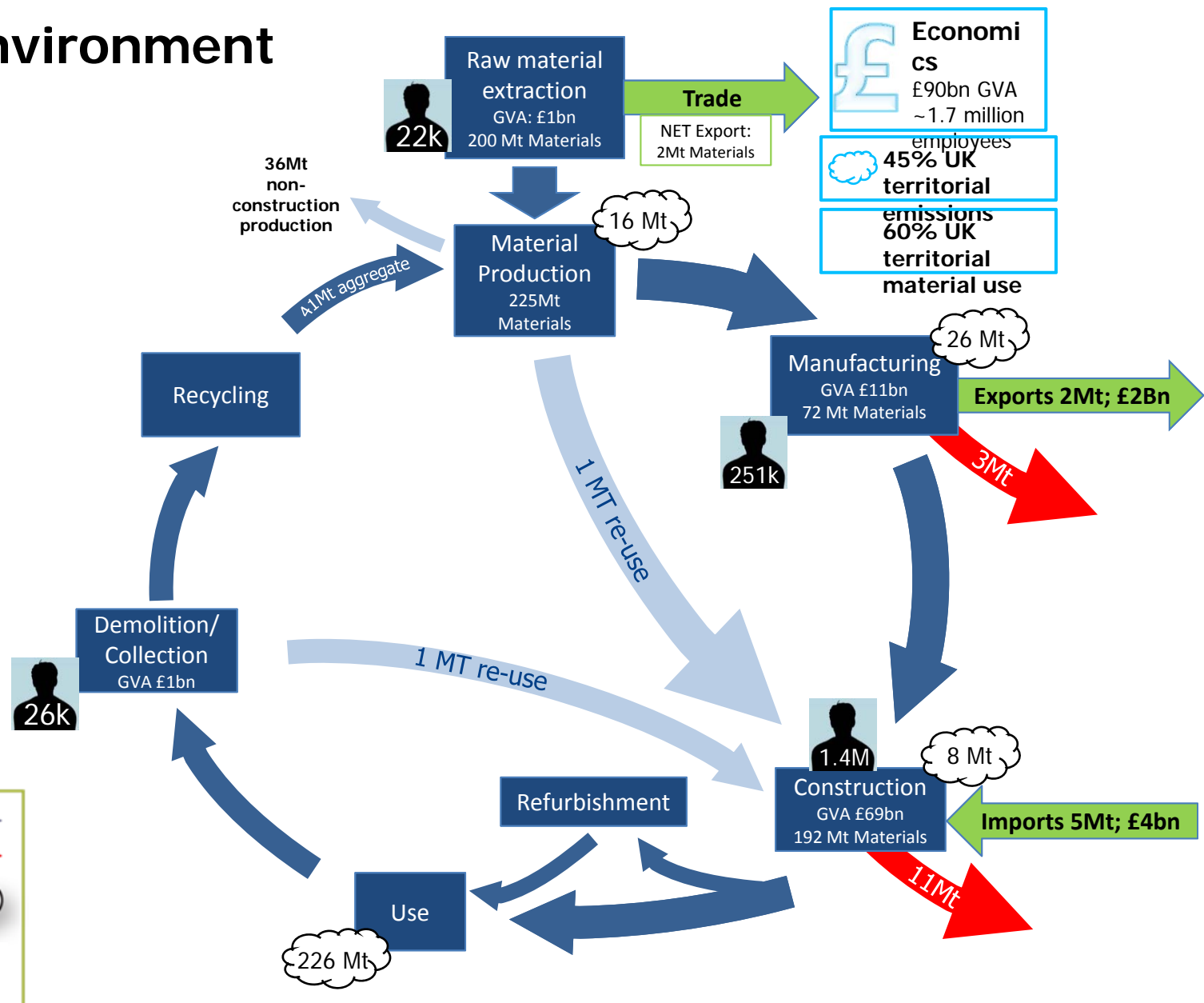
- Net Waste Tool

2011+

## Construction & Refurbishment (Built Environment)

- Designing out Waste
- DoW guides and tools
- Resource efficiency
- Design
- Construction
- Refurbishment
- Products
- Low Carbon Route-map
- Closing the Performance Gap

# Built Environment



**Material Flows** →

**Waste** →

**CO<sub>2</sub>e** ☁

**Employees** 👤



## WRAP Built Environment Programme

- Construction RE
  - Tools, design guidance, RMP
- Products
  - RE reviews, REAPs
- Refurbishment
  - Durability, Green Deal, M&E



## **What is a resource efficient built environment?**

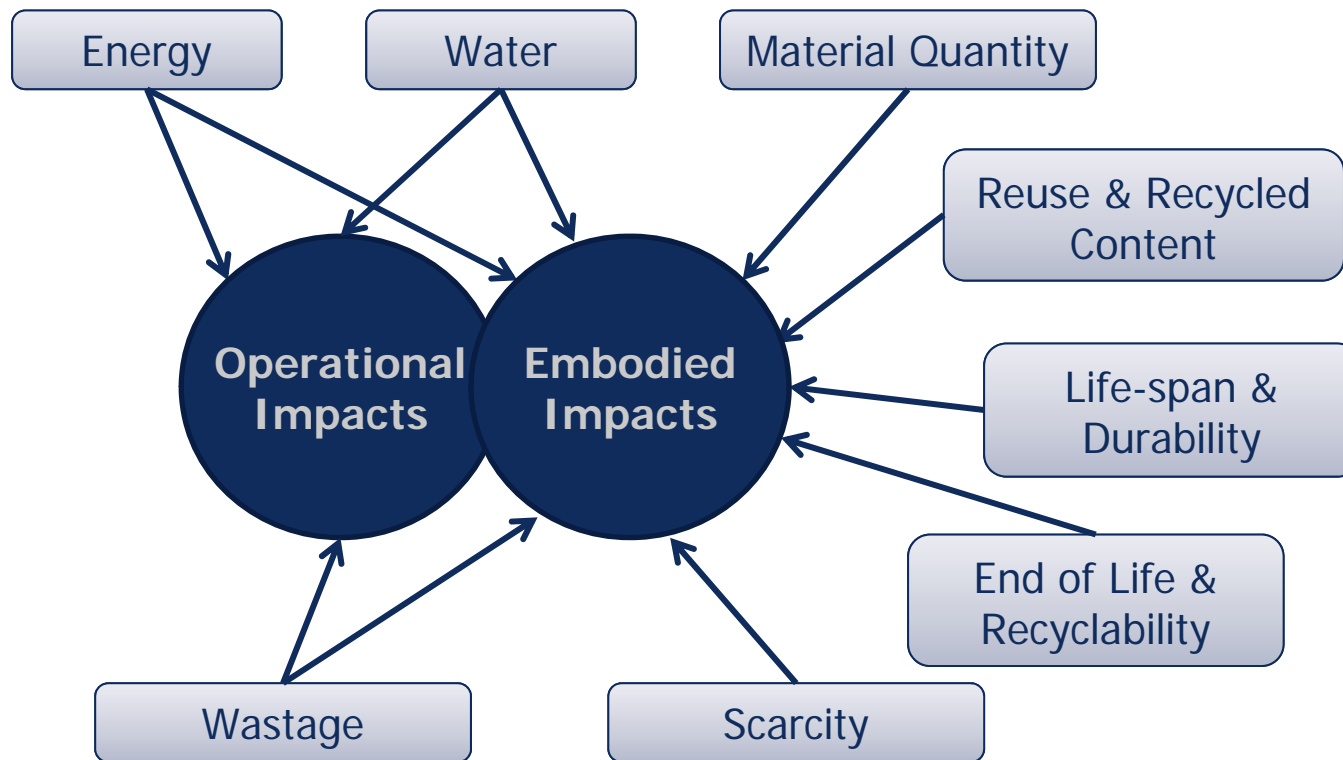
### **The UNEP definition of resource efficiency:**

*Reducing the environmental impact of the consumption and production of goods and services over their full life cycle.*

### **WRAP's definition of a resource efficient built environment:**

*A built environment that makes best use of materials, water and energy over the lifecycle of built assets to minimise embodied and operational impacts.*

# Resource efficiency in the built environment



## A resource efficient built environment

Prioritises consideration of

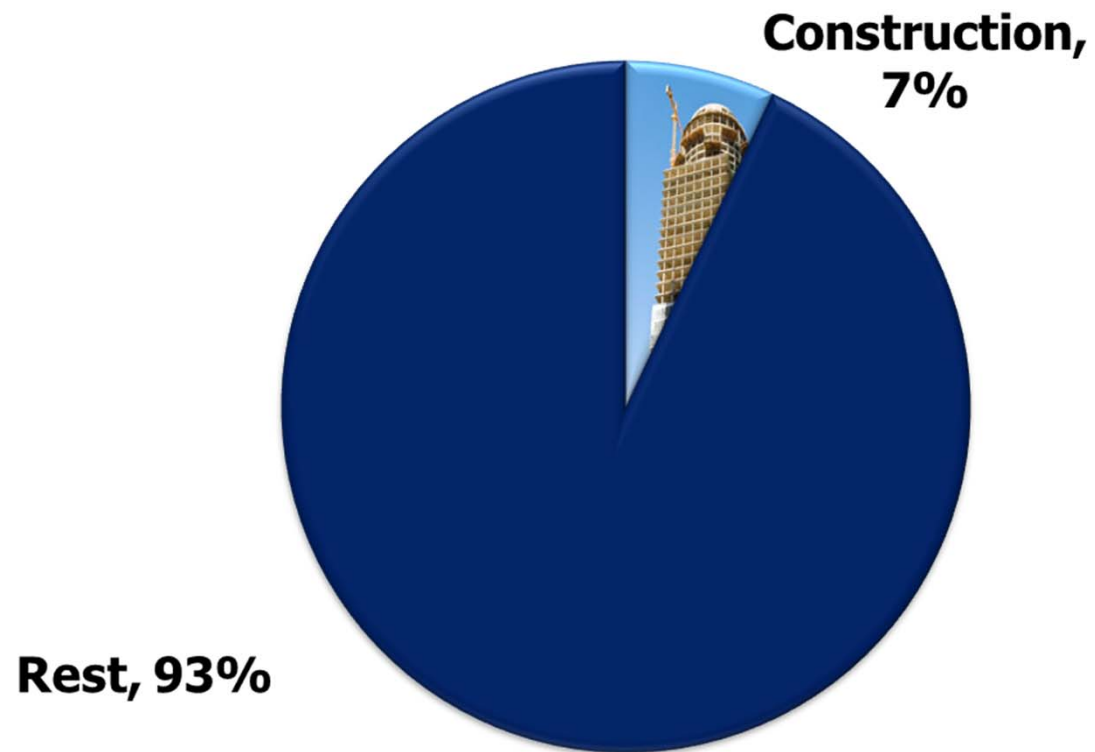
- reducing resource **consumption** and **wastage**
- increasing **reuse** and **recycled content**, and enabling reuse and **recyclability** at end of life
- matching the **durability** and **lifespan** of assets to service life
- using resources with no **scarcity** and source **security** issues
- using products with lower **embodied carbon** and **embodied water**
- **reducing energy and water** use during construction; and
- enabling **energy and water efficiency** in use.

# Business case

Resource efficient  
construction

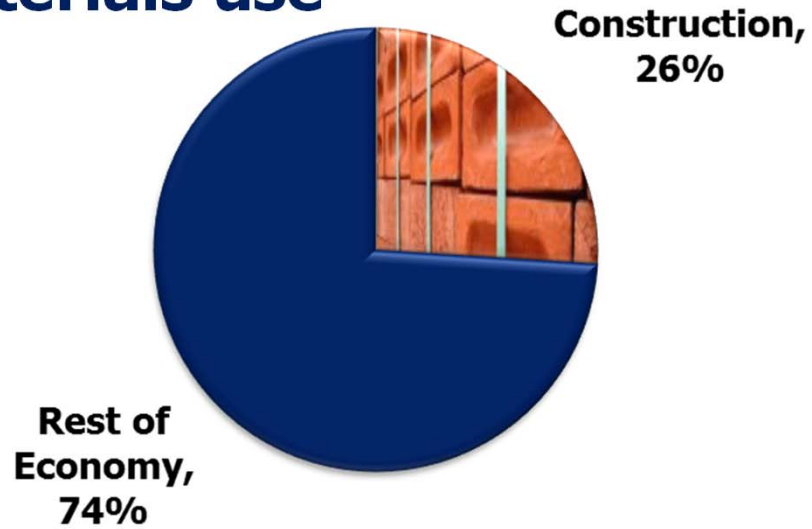


## Construction as a slice of GDP

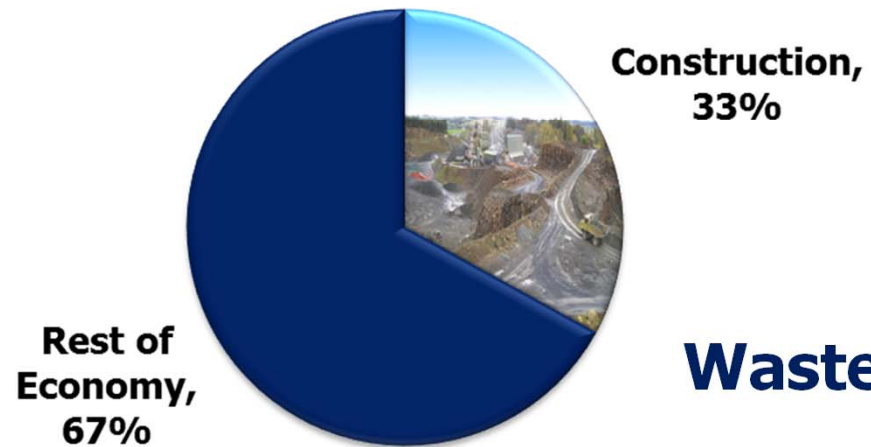
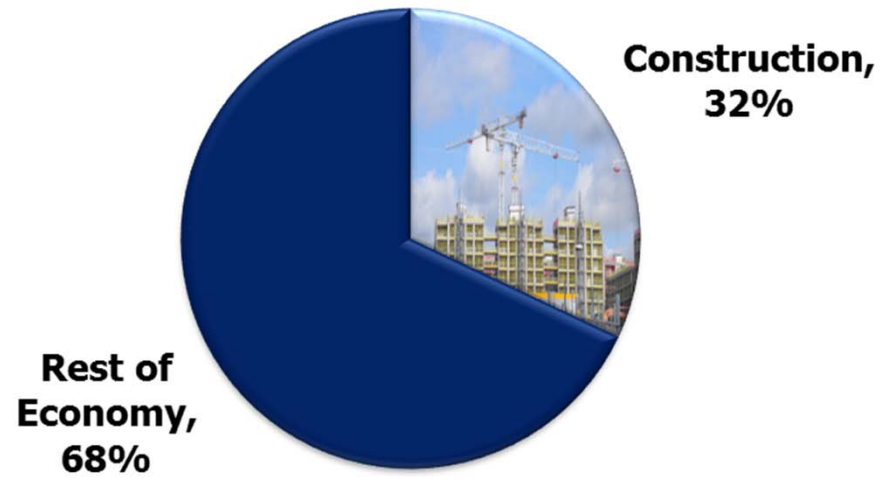




## Materials use



## Carbon emissions



## Waste

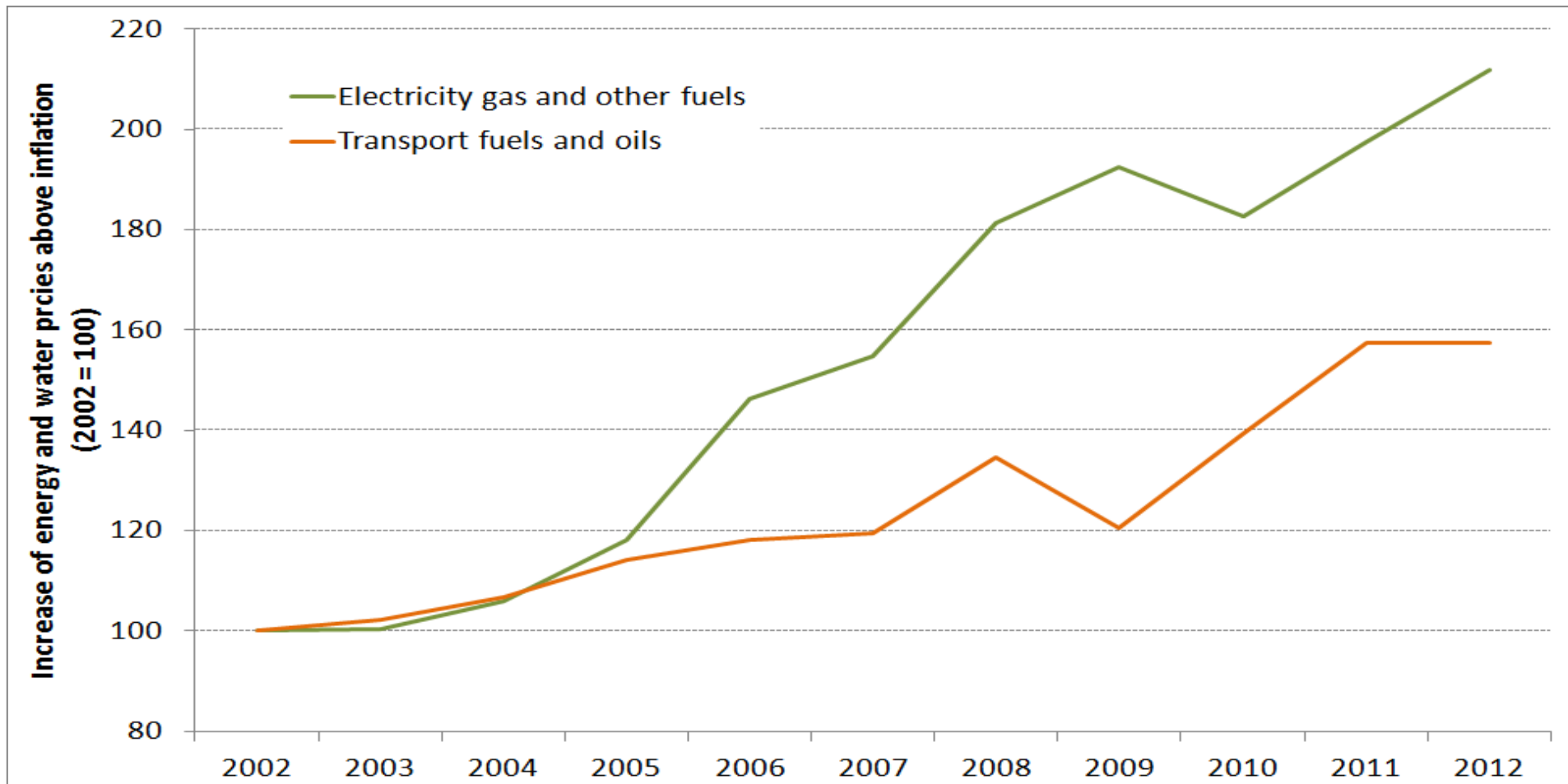
## Drivers for improving resource efficiency

Resource efficient construction can provide strong **business benefits** of:

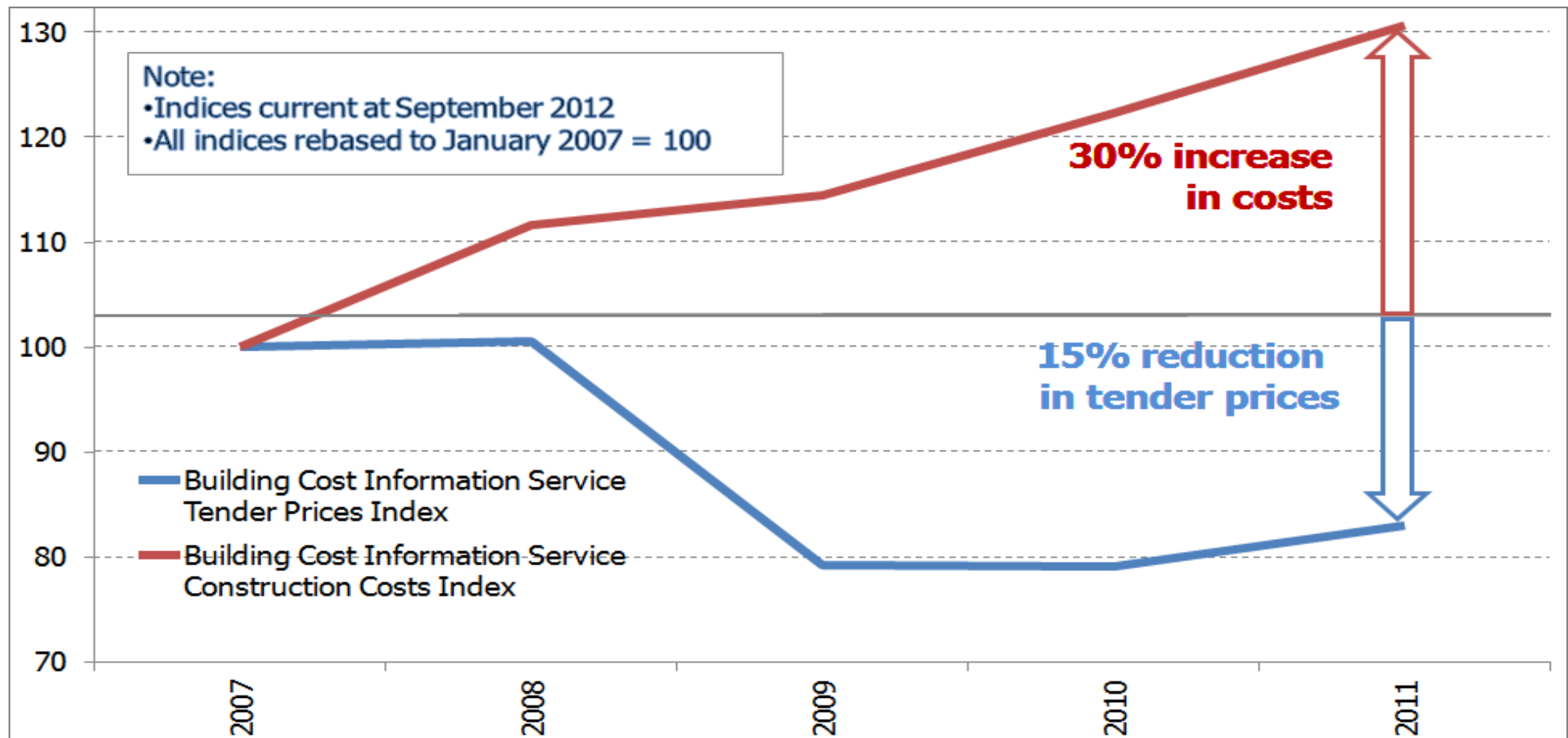
- cost savings
- risk reduction
- opportunities for innovation
- compliance with regulations, standards and planning requirements
- supporting industry objectives
- improved reputation



# The business case for resource efficiency



# The business case for resource efficiency



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# Helping achieve resource efficient construction

WRAP guidance and support

A photograph of a modern building's curved facade, featuring a series of white, curved balconies or architectural elements that create a rhythmic, wave-like pattern. The building is set against a clear blue sky.

# Delivering resource efficiency with WRAP



Resource efficient construction



Clients



Resource efficient refurbishment



Designers



Resource efficient products and materials

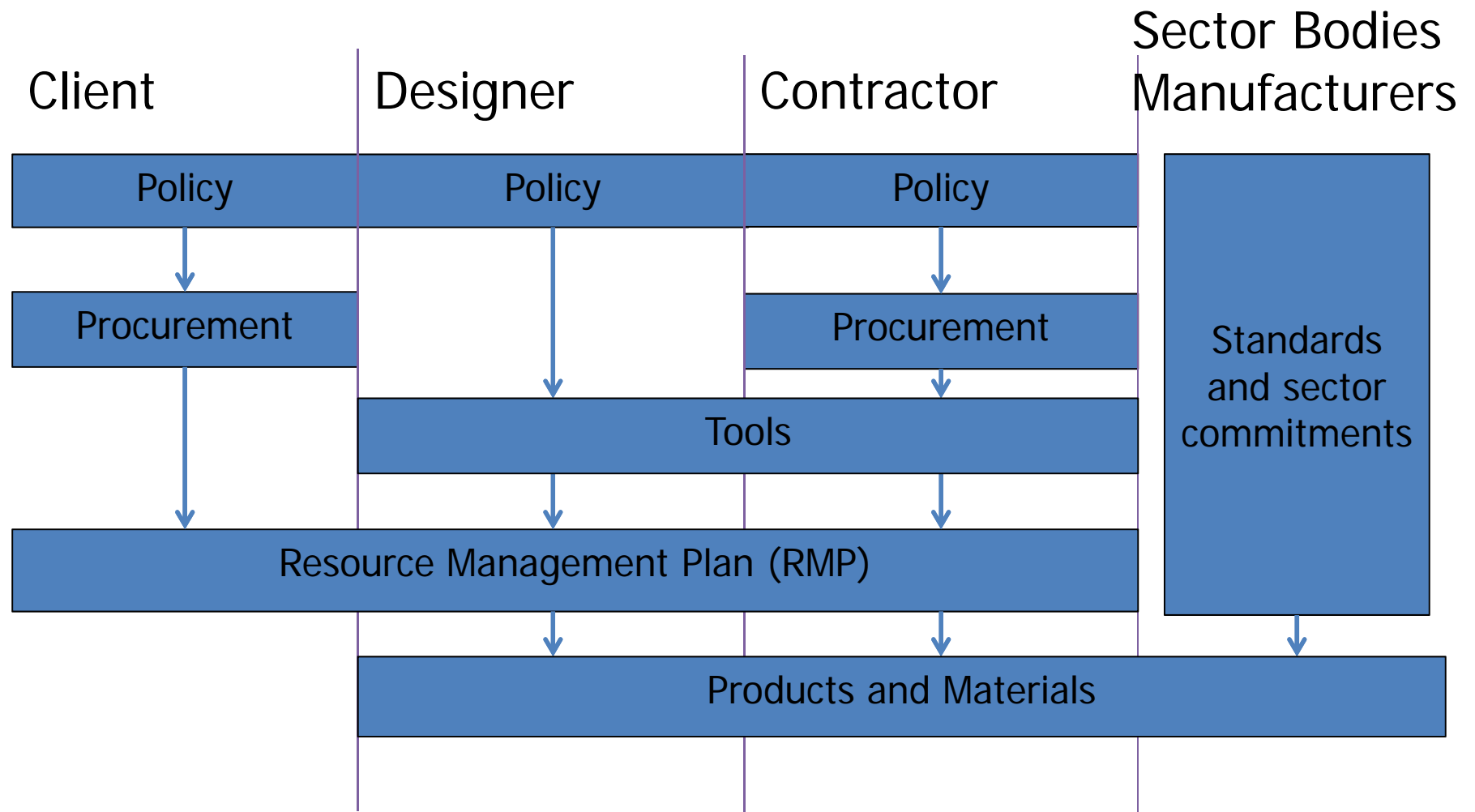


Contractors



Specialist and sub contractors

# Implementing resource efficiency



## DfRE Principles



Design for ...

1. reuse and recovery
2. off site construction
3. resource optimisation
4. resource efficient procurement
5. the future

## DfRE Process



- Identify opportunities to improve resource efficiency through design
- Prioritise those with biggest impact and easiest to implement

## DfRE Process



- **Identify** opportunities to improve resource efficiency through design
- **Prioritise** those with biggest impact and easiest to implement
- Investigate their viability
- Quantify the benefits



## DfRE Process

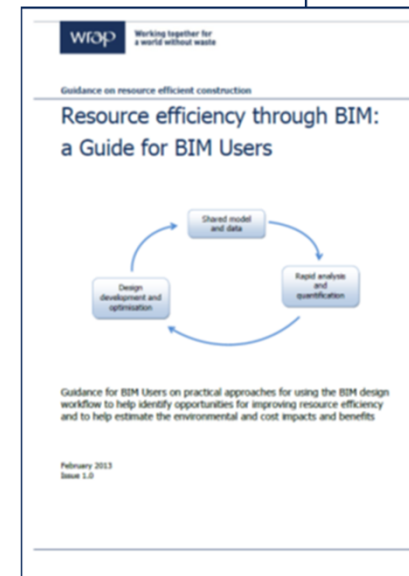
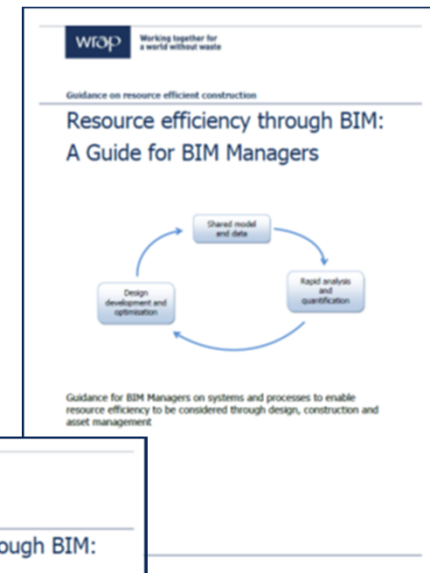


- **Identify** opportunities to improve resource efficiency through design
- **Prioritise** those with biggest impact and easiest to implement
- **Investigate** their viability
- **Quantify** the benefits
- **Embed** in the design
- **Record** in the RMP
- **Communicate** to the construction team

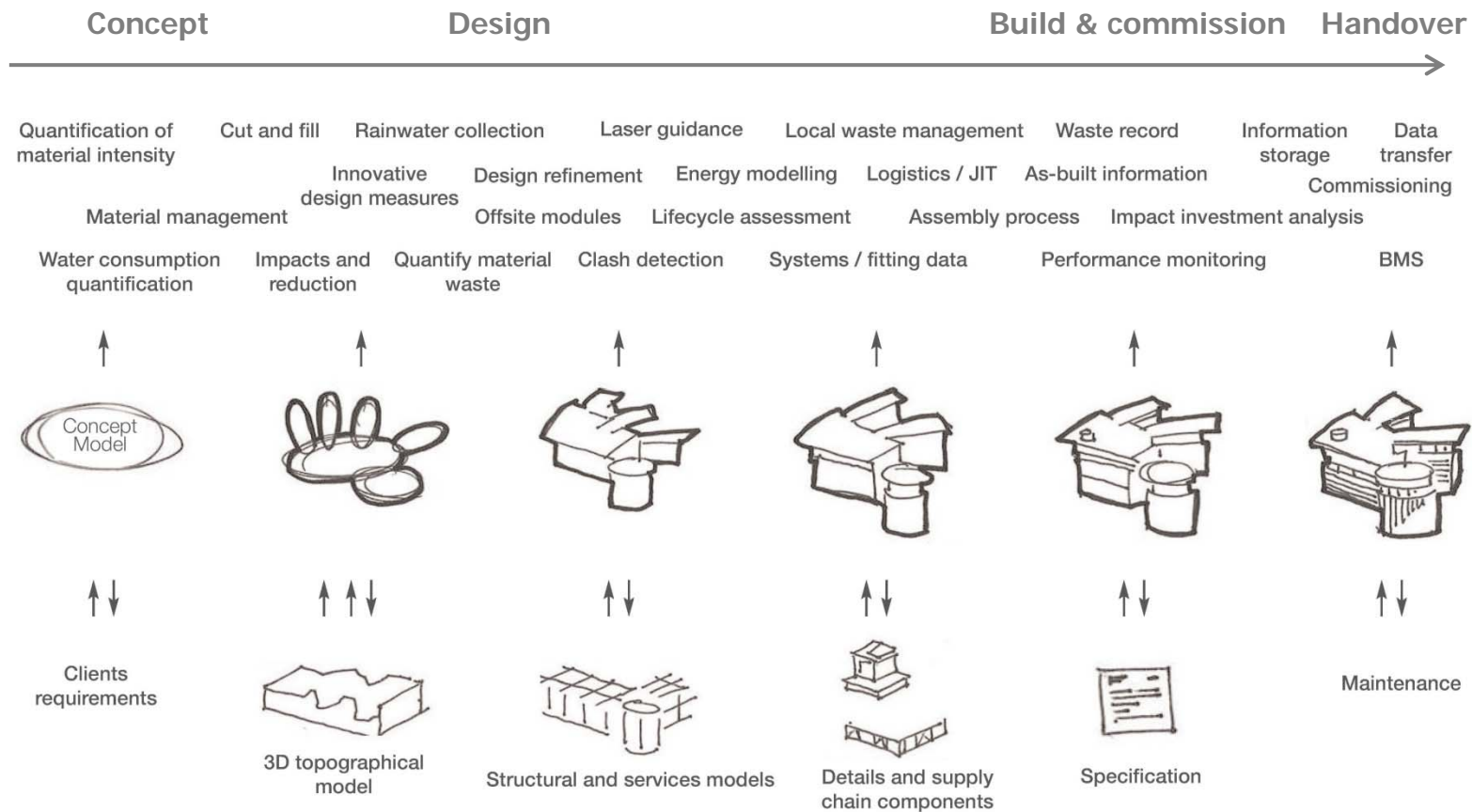
# Resource efficiency through BIM

Incorporating resource efficiency into BIM implementation is effective because BIM processes and data can readily be used to:

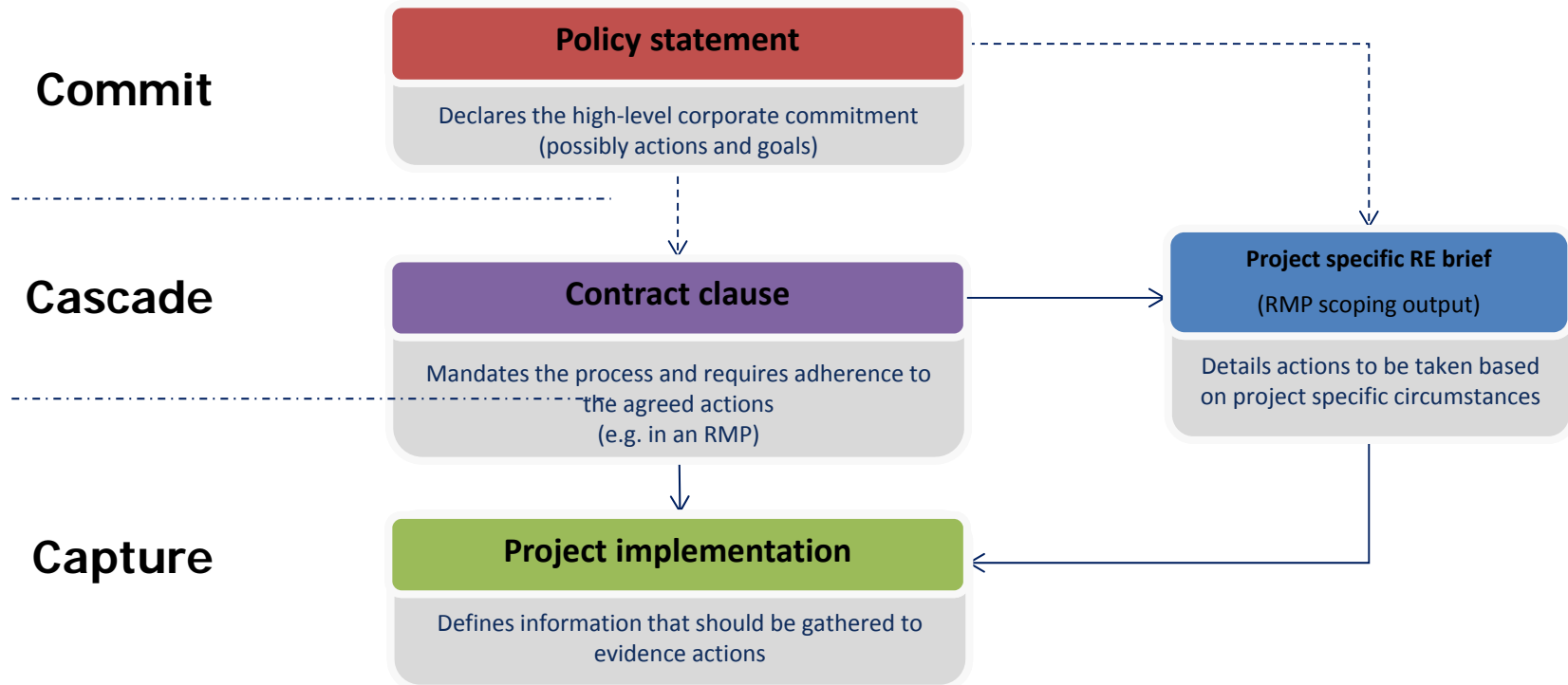
- achieve design and construction efficiencies;
- identify priority opportunities to reduce costs and carbon; and
- benchmark and monitor performance.



# Opportunities through BIM - buildings



# Procurement




# Resource Management Plans (RMPs)

## Resource Management Plan Process

Lower Costs  
Prioritise efforts  
Consistent Approach







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## Site Waste Management Plan template 'lite'

The Site Waste Management Plan (SWMP) template 'lite' is a simplified version of the WRAP [SWMP tool](#) and aims to drive good practice waste forecasting and reporting on smaller projects.

Our SWMP 'lite' tool is aimed at the smaller contractors and tradesmen. Use the SWMP 'lite' to:

- estimate waste and identify actions to reduce waste and costs;
- record actual waste movements; and
- review project performance.

In addition to CD&E activities the tool includes options for Fit out, Refurbishment, Retrofit and Strip out projects - making it ideal to use alongside environmental refurbishment schemes such as [SKA Rating](#) and [Green Deal](#) refurbishments.

The tool includes example projects to help you develop your own waste management plan.

Register to download our [SWMP 'lite' tool](#).

View our [SWMP Lite Video tutorial](#).

### Related pages

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[SWMP 'lite': Registration form](#)

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[Site Waste Management Plans](#)

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[Specialist and SME contractors](#)


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[Site Waste Management Plan Tools: Video Tutorials](#)


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### Related documents

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 [SWMP lite: Actual waste checklist \(164.05 KB\)](#)

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 [SWMP lite: Estimated waste checklist \(158.85 KB\)](#)

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### Contact us

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[bulletenvironment@wrap.org.uk](mailto:bulletenvironment@wrap.org.uk)

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### RELATED CATEGORIES

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**Role**

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[Contractor](#)

---

**Sector**

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[Construction](#)

---

**Subject**

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[Waste reduction](#)

---

**What we offer**

---

[Good practice guidance](#)

---

[Tools, templates and apps](#)

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# Resource Efficiency Portal

WRAP Material change for a better environment WRAP Resource Efficiency Portal [Back to WRAP >](#)

Data entry - corporate Save & Back Save Cancel

My corporate data **Energy** Water consumption Material Use Waste Carbon Scarcity Durability

Notes

Operational data

Category	Type	Quantity	Unit	Source	By sub-contractor	t CO2e	£
Fuel (project)	Grid electricity	200	kWh	Bill	<input checked="" type="checkbox"/>	96.92	
Fuel (project)	Petrol	34	Litres	Estimated	<input type="checkbox"/>	76.33	
Fuel (project)	CNG	68	Litres	Metered	<input type="checkbox"/>	32.23	
Please Select					<input type="checkbox"/>		
Please Select					<input type="checkbox"/>		

+ New Row

Add non Operational data

	Type	Quantity	Unit	t CO2e	£
Elec (Premises)	Grid electricity	200	kWh	96.92	
Fuel (project)	Petrol	34	Litres	76.33	

+ New Row

Save & Back Save Cancel

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WRAP Material change for a better environment WRAP Resource Efficiency Portal [Back to WRAP >](#)

Reporting

Report Filters

Start: January 2011  
End: December 2012  
Baseline year: 2011  
Compare to: Industry benchmark  
Operational area: All  
Sector: All  
Structure type: All  
Stage: All  
Location: All  
Postcode: AB12 3CD  
Tags: 2011, Corporate  
Status: Anonymous

Generate Excel Report Generate PDF Report

Energy Water consumption **Material Use** Waste

Headline results

Performance Over Time

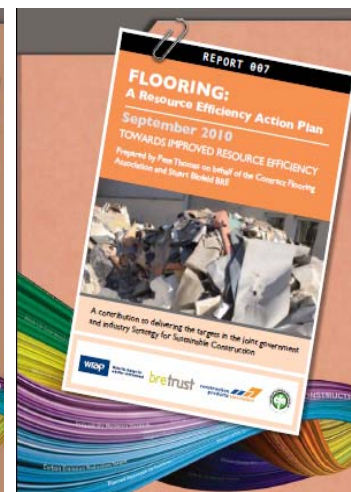
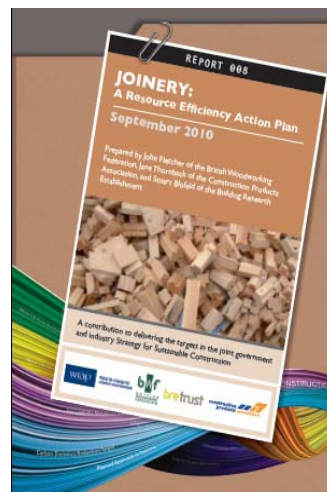
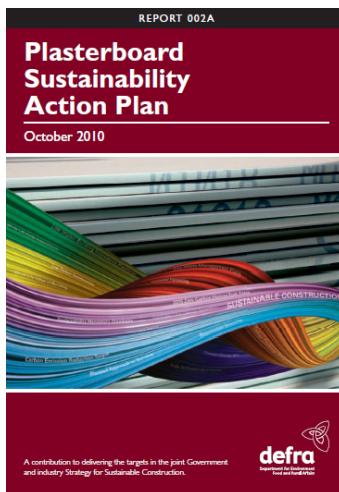
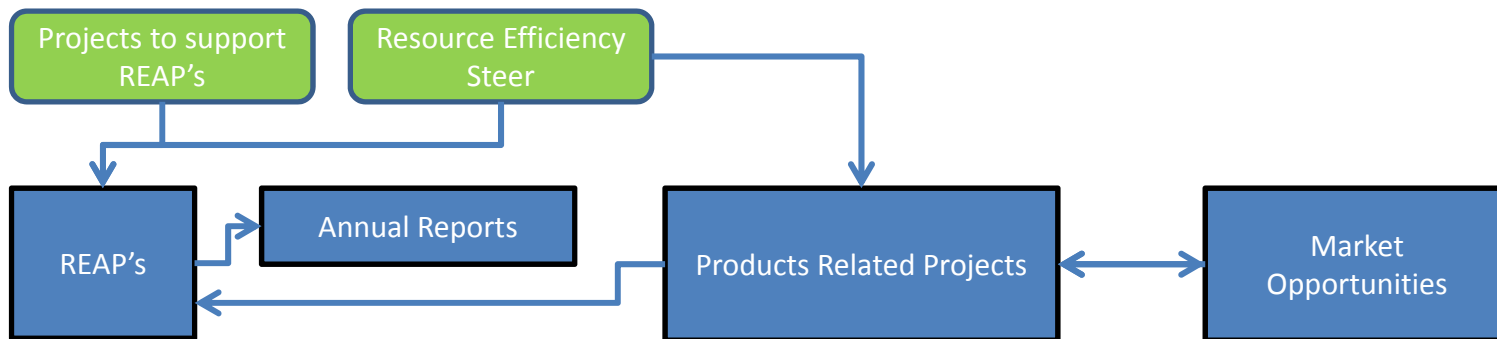
Year	Value (Tonnes / £100k)
2010	20
2011	17
2012	3

Performance Over Time

Category	Value (Tonnes / £100k)
Waste arising	10
Benchmark waste arising	2
Waste to Landfill	5
Benchmark waste to landfill	1

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# Construction Products Resource Efficiency Action Plans (REAPs)



## Current REAPs

- Plasterboard
- Joinery
- Flooring
- Windows
- Solid Insulation
- Ceiling Tiles
- Bricks and Blocks
- Precast Concrete
- Composites



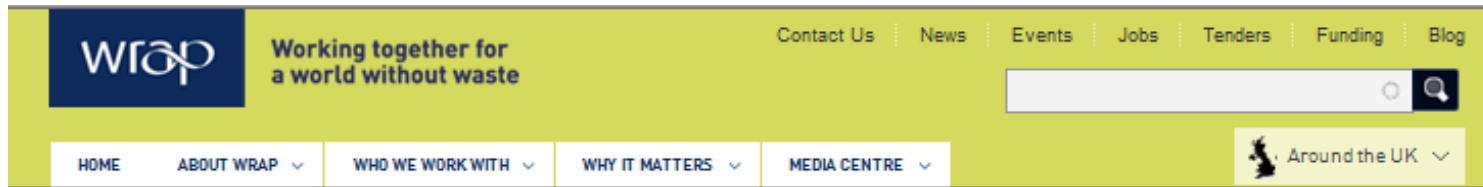
## Business case for resource efficiency in construction

Use the diagram below to explore the the business case for improving resource efficiency during construction.



The case for action is split by component type (water, waste, materials) and by role (contractor, housebuilder, designer).

# Pre-refurbishment Survey Guide



## Achieving Resource Efficiency in Refurbishment Projects

It is well documented that refurbishing properties can have a favourable impact on operational carbon emissions and occupier comfort. Improving the existing stock will have a vital impact on the UK Government's ability to meet its legally binding carbon targets. Therefore, over the next 20 years mass scale refurbishment of both non-domestic and domestic buildings must occur.

To help identify Resource Efficiency opportunities throughout the pre-refurbishment process, WRAP are developing a Resource Efficient Surveying tool. This tool provides advice as to how you can either set your response to requirements to be more resource efficient, and identifies where opportunities exist, how this can be captured and associated benefits.

The tool will be launched at the forthcoming CPD Foundation Morning Briefing; [Achieving Resource Efficiency in Refurbishment Projects](#), and will be available for download from the WRAP website in the Summer 2013.

### Related sites

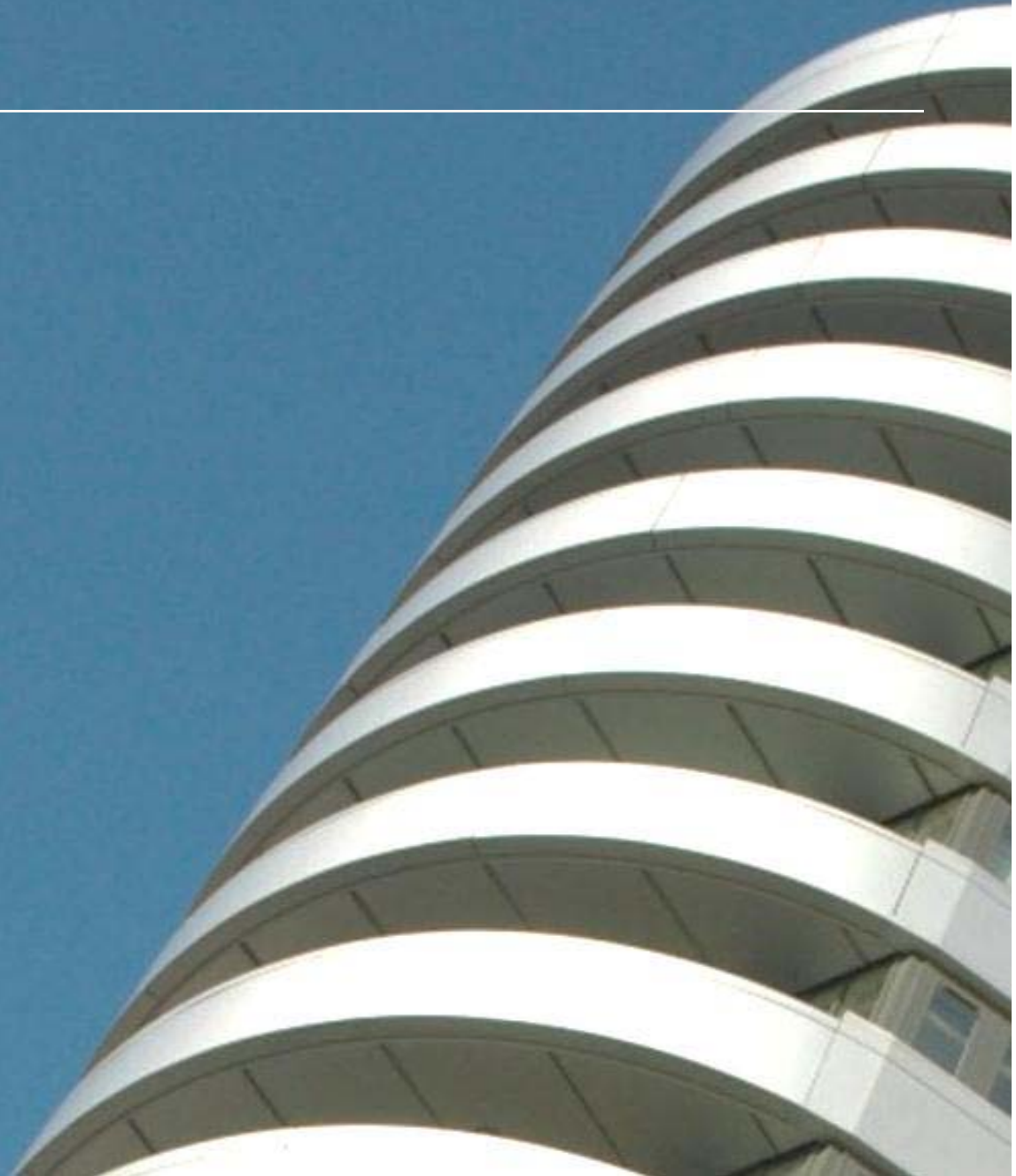
[CPD Foundation](#)

[RICS](#)

<http://www.wrap.org.uk/content/achieving-resource-efficiency-refurbishment-projects>

# Summary

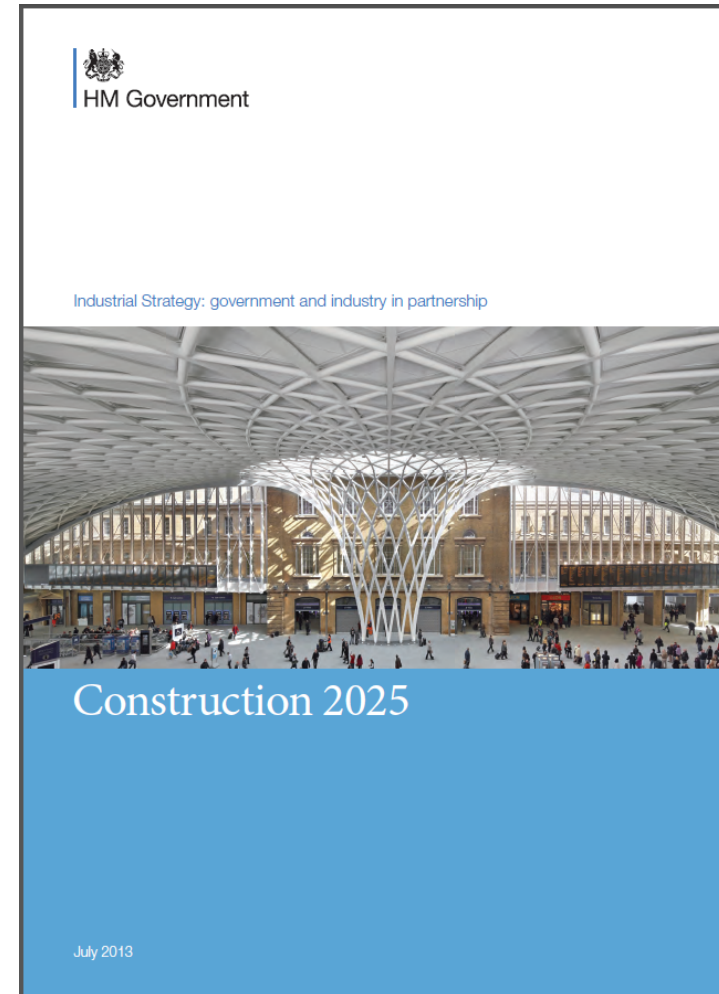
Resource efficient  
construction



# Industrial Strategy

Commit to a resource efficiency voluntary agreement	Spring 2014	Construction businesses with support from WRAP
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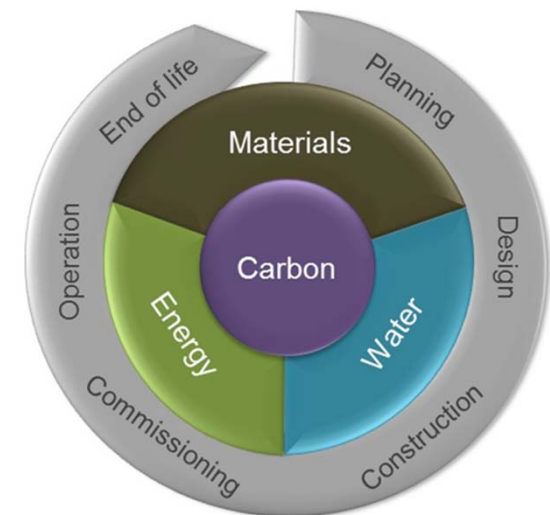
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/210099/bis-13-955-construction-2025-industrial-strategy.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/210099/bis-13-955-construction-2025-industrial-strategy.pdf)



## Summary

### Resource Efficient Construction:

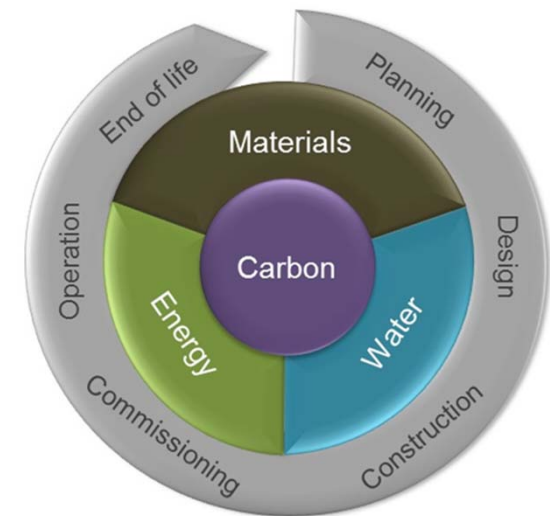
- is a natural progression from waste agenda to RE agenda
- follows same principles as Waste Hierarchy and Designing out Waste
- brings materials, energy, waste and other components into a coherent framework
- is important for business reasons as well as environmental ones



# Summary

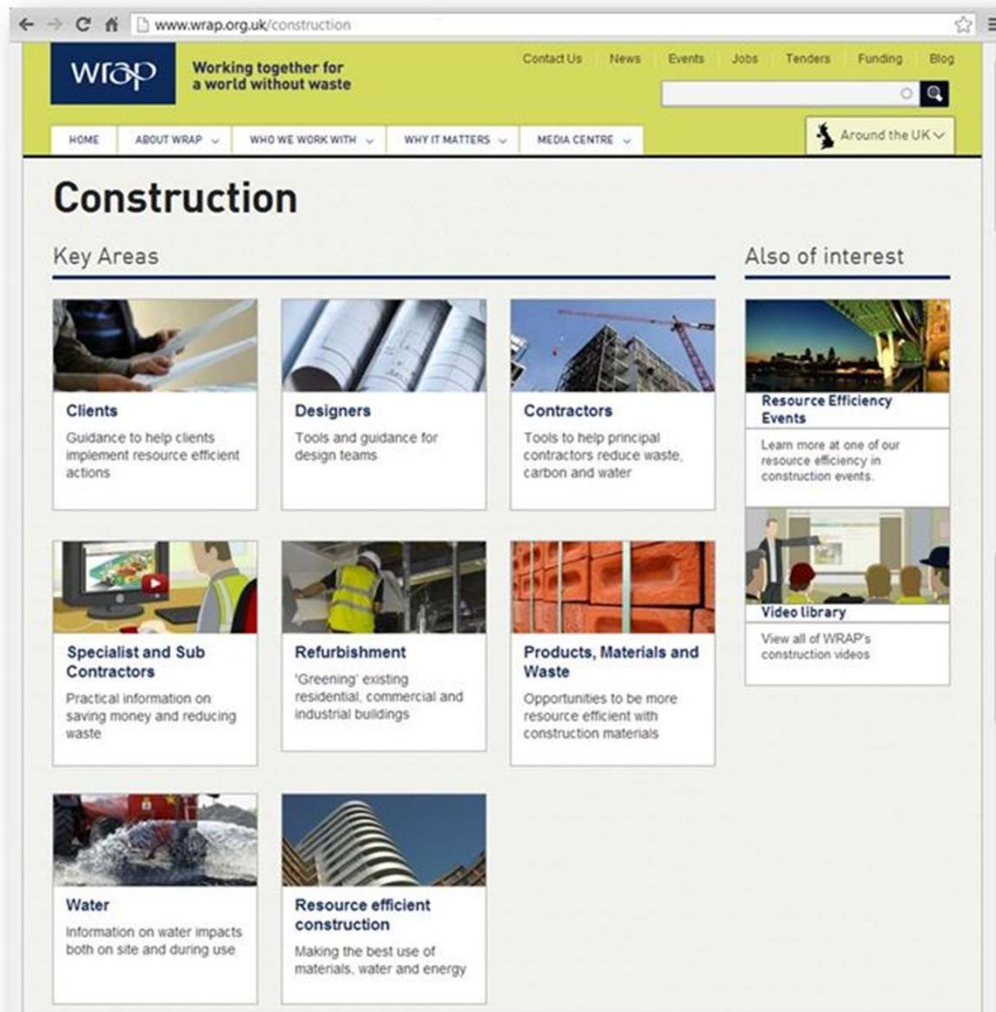
## Resource Efficient Construction

- Set targets/actions; track progress via RMP
- Flexible
- Non-prescriptive
- Embed in procurement contracts
- Compatible with BIM, BREEAM, CEEQUAL
- Website tools, templates and guidance



**RE reduces *cost* and *risk* and improves the *performance* of assets saving money for you and your clients**

# Further information



[www.wrap.org.uk/construction](http://www.wrap.org.uk/construction)

[rcproducts.wrap.org.uk/](http://rcproducts.wrap.org.uk/)

[www.aggregain.org.uk](http://www.aggregain.org.uk)

[www.wrap.org.uk/content/construction-clients](http://www.wrap.org.uk/content/construction-clients)