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# FUTURE PERFECT?

“Bahrain: A Zero Waste Place?”

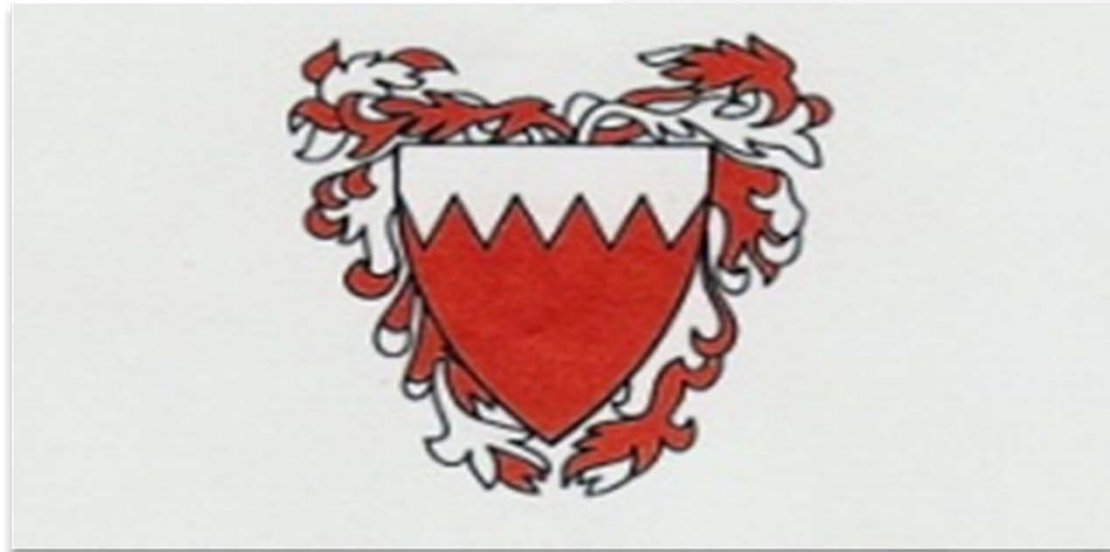
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## BAHRAIN INTERNATIONAL JOURNAL OF SUSTAINABLE RESOURCE AND WASTE MANAGEMENT



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ON



HH Shaikh Khalifa  
bin Salman Al Khalifa  
Prime Minister of the  
Kingdom of Bahrain



His Majesty King Hamad  
bin Isa Al Khalifa  
King of Bahrain



HH Shaikh Salman  
bin Hamad Al Khalifa  
Crown Prince, Commander-in-Chief  
of the Bahrain Defence Force and  
Chairman of the Economic  
Development Board







## Editors

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**University of Northampton, U.K**



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**Bahrain Center for Studies and Research**



**Professor Dr. Waheeb Essa Alnaser**  
**University of Bahrain**





## **The journal publishes research papers and reviews on topics, which include:**

Efficient management and use of all resources, including air and water, with regard to the qualitative as well as quantitative aspects of resource use.

Economic, societal and technological change for recovery and reuse of materials and energy from all waste streams.

Sustainable production and consumption patterns, including management, instruments and methods.

Innovation: tools and methods relating to resource productivity improvement.

Management systems involving resource status, use and material flows in society.

Policy aspects to improve the sustainability of resource use, including strategies for managing resource supply and demand, lowering energy intensities and increasing the serviceability of products.

Substitution of primary resources by renewable or regenerative alternatives.





## **ZERO WASTE England?**

England should more than halve the amount of waste going to landfill in the next 10 years

Compostable items should be banned from landfill and how a ban will work.

In ten years time 75 per cent of household waste will either be recycled or used for energy, and over time this figure will increase even further.

A new Zero Waste Places Standard for Local Authorities will also recognise areas which are going above and beyond national waste targets.

The Government expects Local Authorities to offer a full collection service for all recyclable items by 2020.

Publication of aims and actions for Commercial and Industrial Waste. This will help businesses to use resources more efficiently.





# ZERO WASTE Wales?

## What are we aiming for?

1. By **2025** we want all sectors in Wales to be recycling at least **70%** of their waste – this includes businesses, households and the public sector.
2. By **2050** we hope to have achieved zero waste. This will mean that products and services will be designed so they have eliminated waste entirely.

## How are we going to do it?

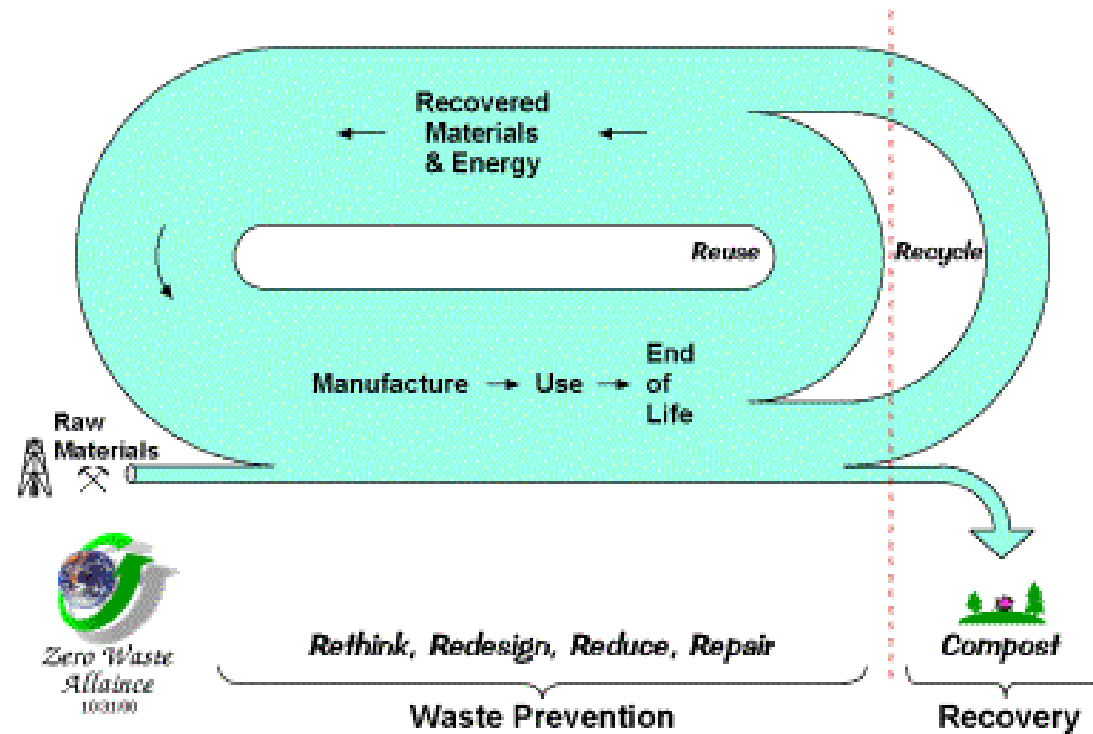
- By reducing the amount of waste we all produce.
- By making sure we have the right facilities to collect and treat our waste – this is not only from our waste at home, but also commercial and industrial waste.
- By looking at all the materials that are thrown away and deal with the ones that will have the most benefit for the environment first.
- We will encourage businesses and retailers to take more responsibility for the waste they produce, or cause others to produce.







## Zero Waste System





# Zero Waste?

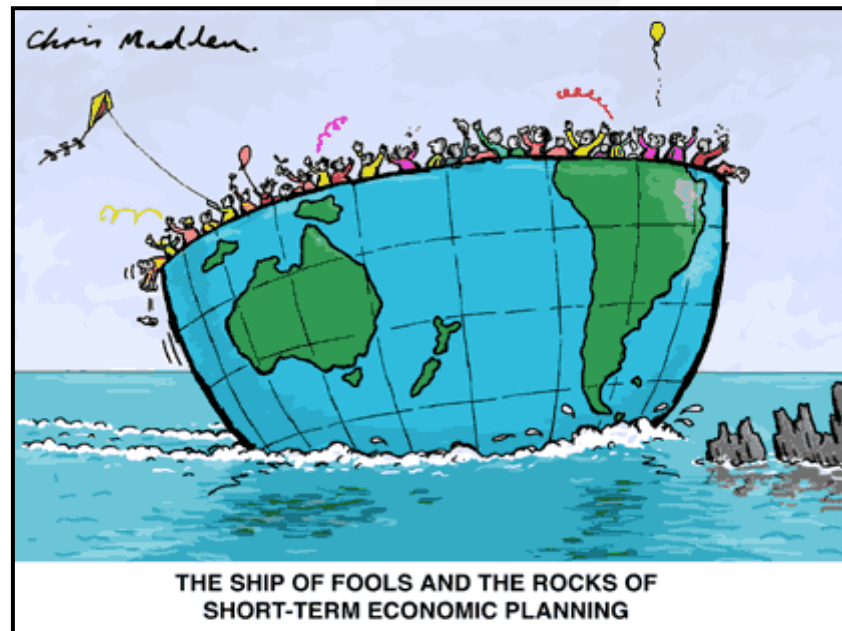
The US *Zero Waste Alliance* defines Zero Waste as “A visionary goal” that strives for:

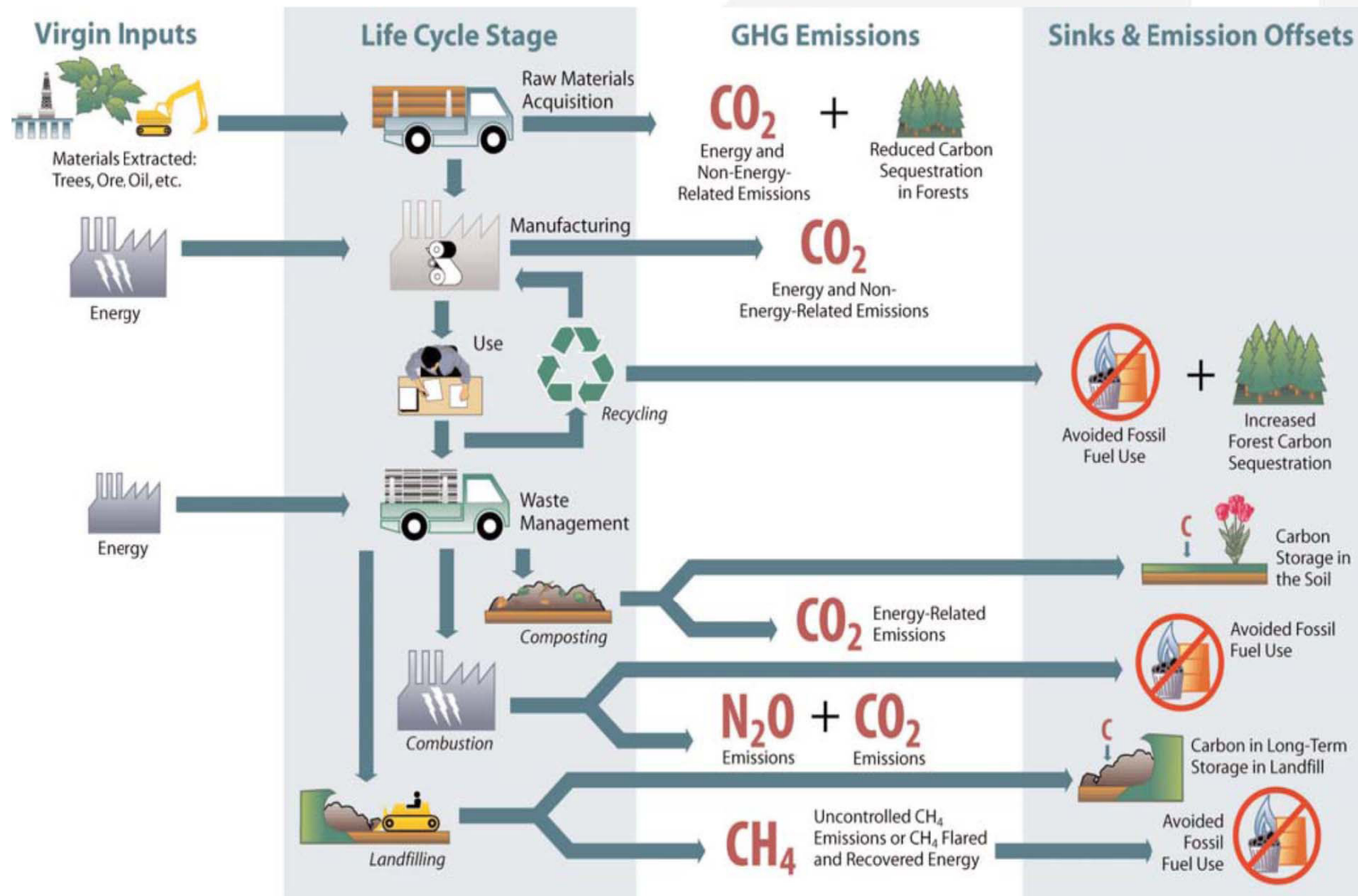
- Zero waste of resources
- Zero solid waste
- Zero hazardous waste
- Zero emissions to air, water or soil
- Zero waste in production and administrative activities
- Zero waste in product life cycles
- Zero toxics”





## What if we do not?







**What are the tools to arrive at Zero Waste  
Bahrain?**

**“Waste Management” or “Resource  
Management”?**







## **Objectives for Waste Policy (England) in Securing the Future**

Protection of human health and the environment by producing less waste and by using it as a resource wherever possible.

Through more sustainable waste management – reduction, re-use, recycling, composting and using waste as a source of energy – the Government aims to break the link between economic growth and the environmental impact of waste.

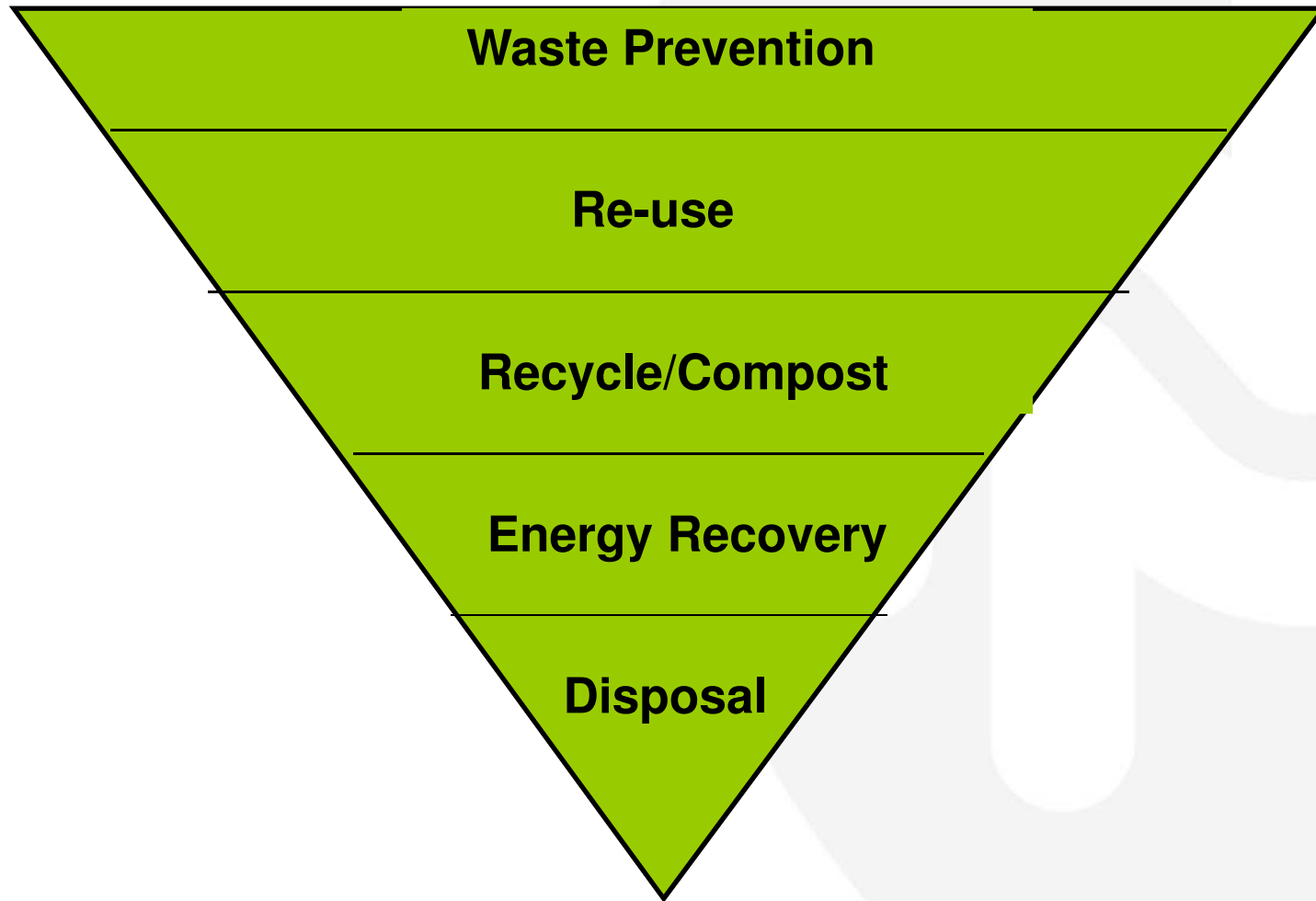




## Some Principles to Manage Waste

- The concept of ‘Sustainability’
- The Waste Hierarchy
- The Proximity Principle
- The Precautionary Principle
- The Polluter Pays Principle
- The Prevention Principle
- Zero Waste Philosophy







# Definition

## Environment Agency: Waste Minimisation Industrial

*“The reduction of waste at source, by understanding and changing processes to reduce and prevent waste. This is also known as process or resource efficiency. Waste minimisation can include the substitution of less environmentally harmful materials in the production process”*





# Resource Management

The European Environment Agency defined resource management in 2006 as follows:

*“Resource Management is taken to mean activities aimed at or effecting the efficient use of material resources throughout the economic system including resource extraction, product design, production systems, distribution, consumption, re-use, waste prevention, recycling and disposal”*







## Possible Resource Efficiency Savings across UK Economy

Table A1: Summary of the estimated resource efficiency savings opportunity across the UK economy

Resource	Estimated Savings Opportunity (£M)	% of total estimated savings
Energy	3,349	52
Waste	2,659	41
Water	441	7
Total	£6,449M	100%





Table 1.1: Estimated waste savings opportunity in the manufacturing sector in 2003.

Sector	Total savings		Savings as % of GVA	Investment required (£M)
	(£M)	% of total savings		
Food, drink and tobacco	407.7	17.0	7.6	379.9
Textiles, leather and clothing	232.5	9.7	19.2	101.4
Coke, petrol and nuclear fuels	5.6	0.2	0.1	3.5
Chemicals and man-made fibres	966.1	40.3	24.0	574.6
Basic metal and metal products	139.2	5.8	2.3	128.8
Engineering and allied industries	262.6	11.0	2.2	145.5
Other manufacturing	381.0	15.9	4.3	177.8
<b>Total</b>	<b>£2,394.7m</b>	<b>100%</b>	<b>6.7%</b>	<b>£1,511.5m</b>





## Savings in one Resource Efficiency Club (20 companies) 1999 - 2000

Category	Potential savings (£)	Actual as % of potential
<b>Business rationalisation</b>	<b>212 520</b>	81
<b>Effluent</b>	<b>405 652</b>	10
<b>Electricity</b>	<b>611 256</b>	65
<b>Gas</b>	<b>75 322</b>	61
<b>Oil</b>	<b>14 880</b>	15
<b>Packaging</b>	<b>242 352</b>	88
<b>Process efficiency</b>	<b>643 410</b>	93
<b>Raw materials</b>	<b>639 742</b>	52
<b>Solid waste</b>	<b>509 990</b>	68
<b>Special waste</b>	<b>166 980</b>	2
<b>water</b>	<b>240 425</b>	49
<b>Total</b>	<b>3 762 529</b>	60





## Top RECs in England 2008

Name	Number of companies	Potential savings (£)	Cost (£)	Savings to cost ratio	% conversion after 1 year
West Midlands Food	17	695,689	46,514	14.9	7.5
Plymouth	13	527,795	49,850	10.5	10.2
BFM	10	593,450	49,500	11.9	6.7
Oxfordshire	26	403,215	39,462	10.2	8.0
Hertfordshire	30	841,770	49,965	16.8	0.9
<b>CWIC (Northants)</b>	<b>120</b>	<b>808,877</b>	<b>48,700</b>	<b>16.6</b>	<b>11.0</b>
Bradford	14	148,058	49,991	2.9	10.0
Cornwall	5	422,526	50,000	8.4	4.4
ENWORKS	136	1,779,842	200,000	8.8	2.4
GBN	28	354,900	43,000	8.2	2.6





## The Goal: Route to Industrial Symbiosis

### Inter Company

- Development for regional Industrial Ecology site
- Company development via Industrial Symbiosis

### Intra company

- New, clean technology adopted after economic analysis
- Wide array of tools used such as eco-design and teams trained for Continuing Professional Development. Company Certificated to show progress
- Teams addressing issues and under-going training
- Waste prevention plan developed/ workforce engaged
- Waste quantified and linked with legislation
- Waste seen as disposal issue only
- No perception of waste problem





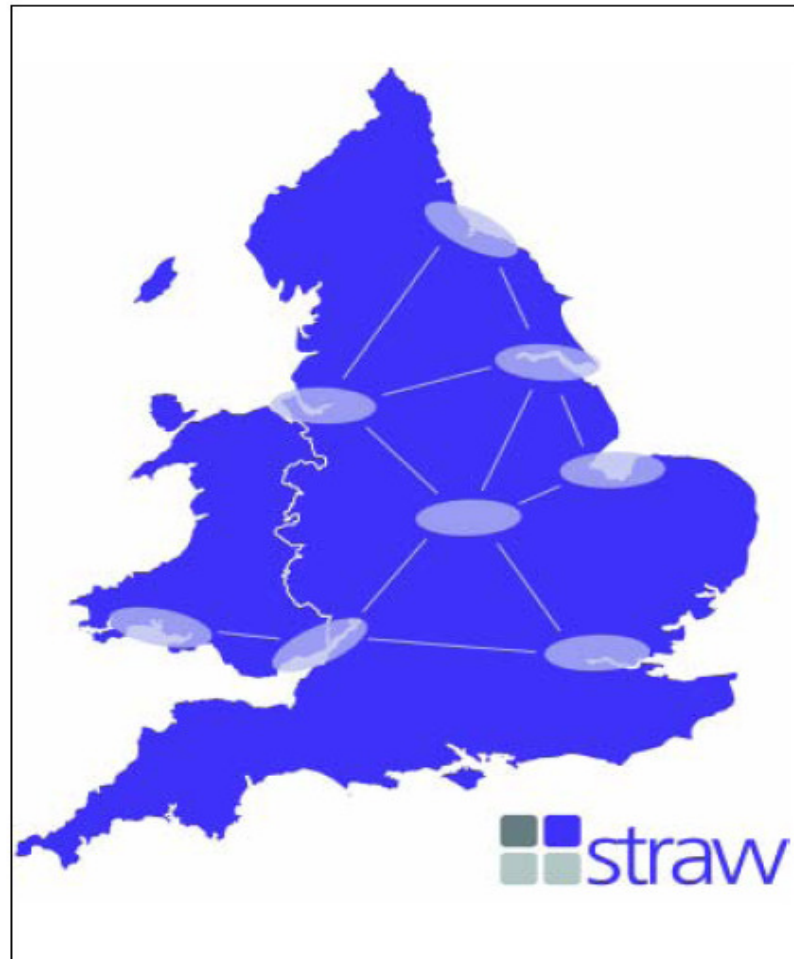


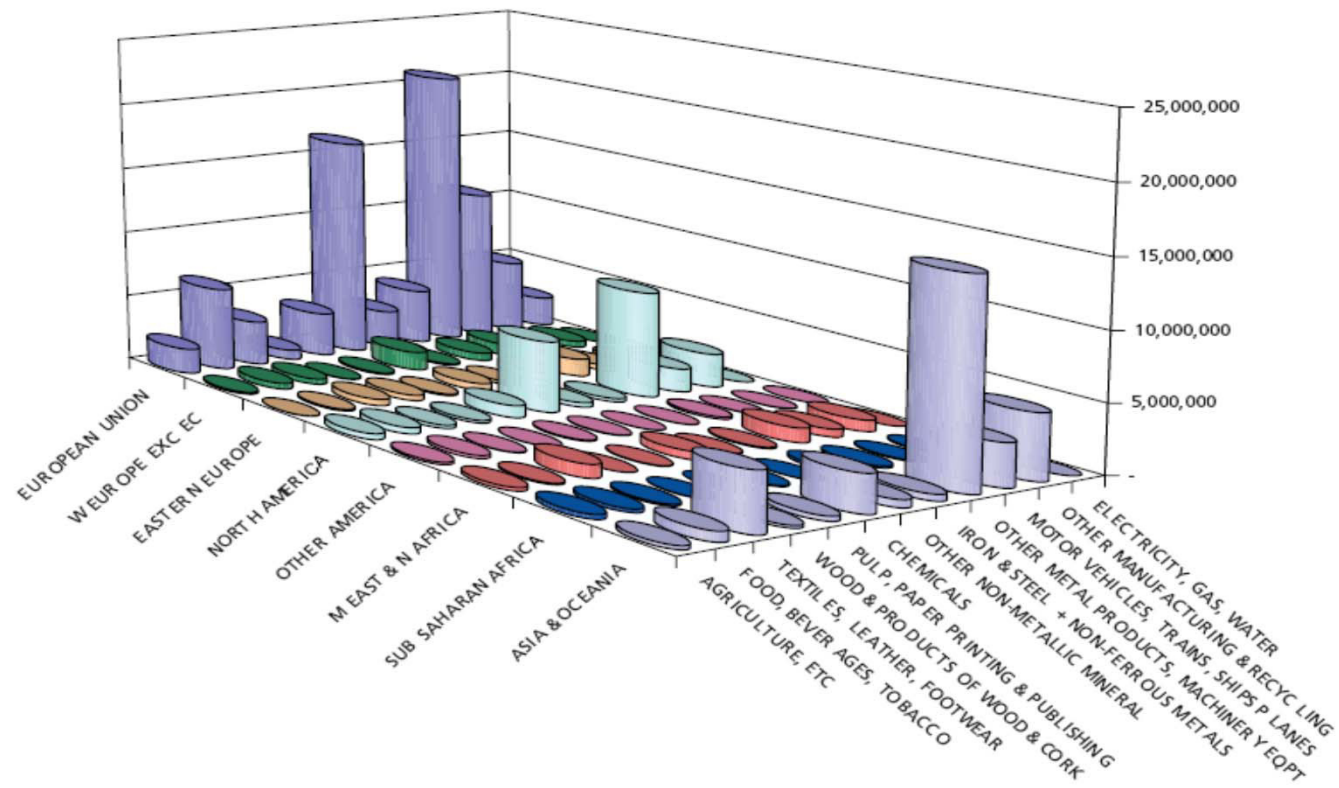
Figure 3; Indicative Intermodal Transport Nodes for Waste Management and Reprocessing in the UK





## What about imported, embedded CO<sub>2</sub>?

Embedded carbon dioxide emissions (tonnes) by UK import categories from different geographical regions (2000) [Ref 20]





## **Government support**

**Investment in appropriate support structures in  
journey to Zero Waste Place**





## UK / England Support Programmes

Action Sustainability	Sustainable procurement
Business Resource Efficiency and Waste (BREW)	In 3 years it had £200 m
The Carbon Trust	Low carbon technologies
Environment Agency	Regulator
Market Transformation Programme	Develops policy strategies for resource efficiency
National Industrial Symbiosis Programme (NISP)	Links companies to work together on resources
Envirowise	Best Practice programme that offer free advice on waste prevention and clean technology
Regional Development Agencies	Address market failure
Waste and Resource Action Programme (WRAP)	Creates markets for recyclates >£50 m per annum





**One component of way ahead:**

**Pro-Environmental Behaviour by Citizens**

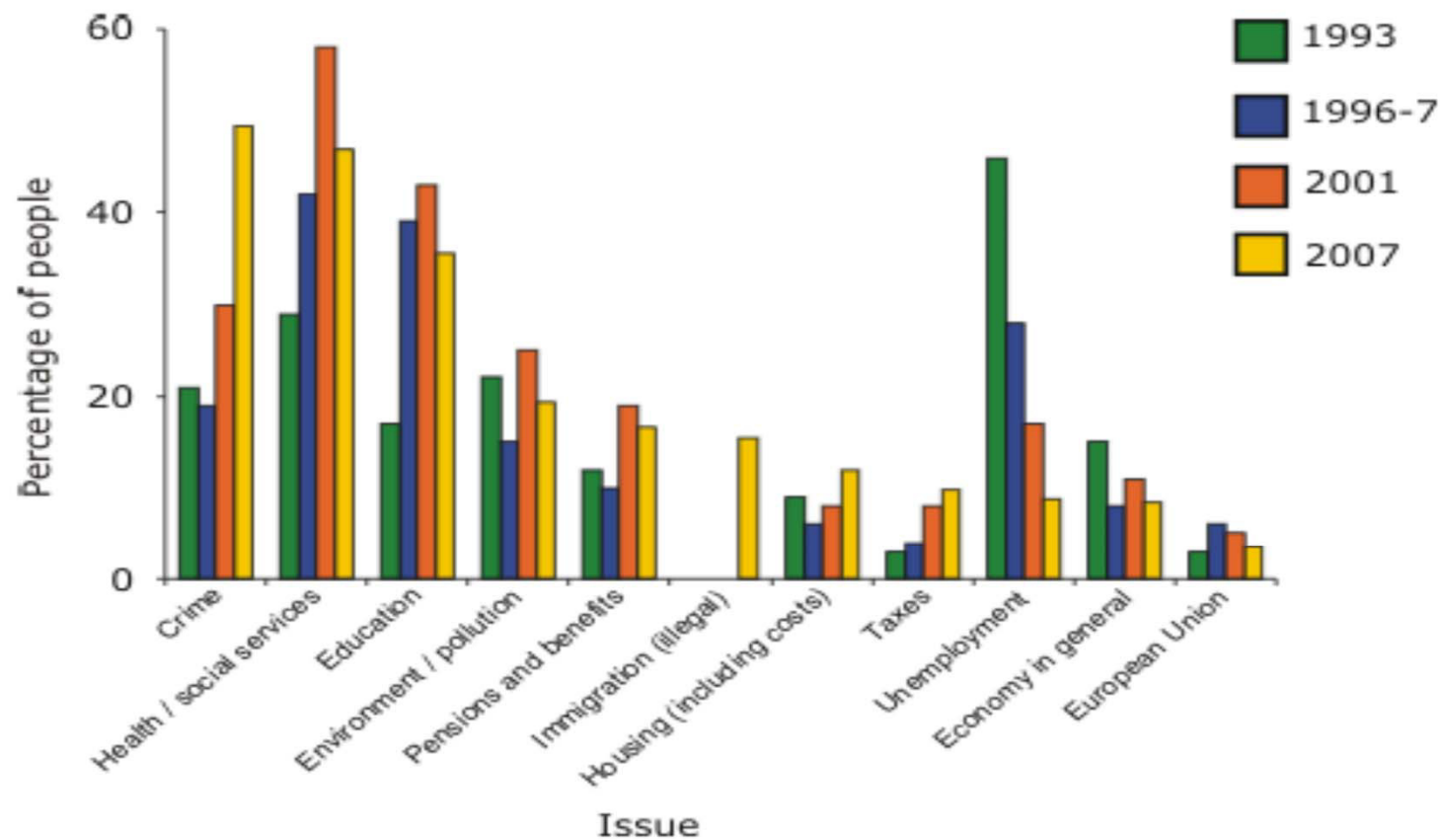






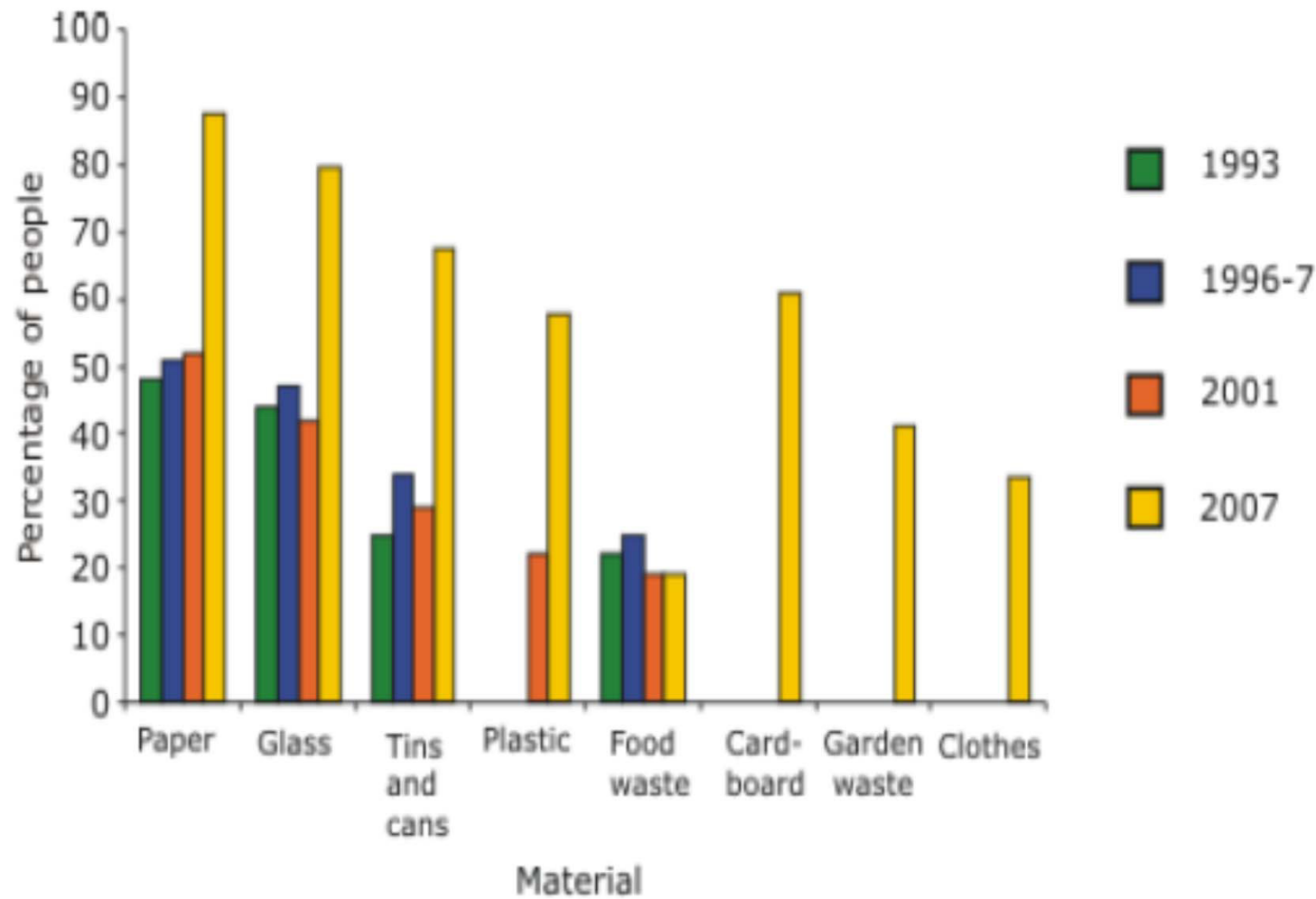
## But what does the public want?

*Issues that the Government should be dealing with, 1993-2007*



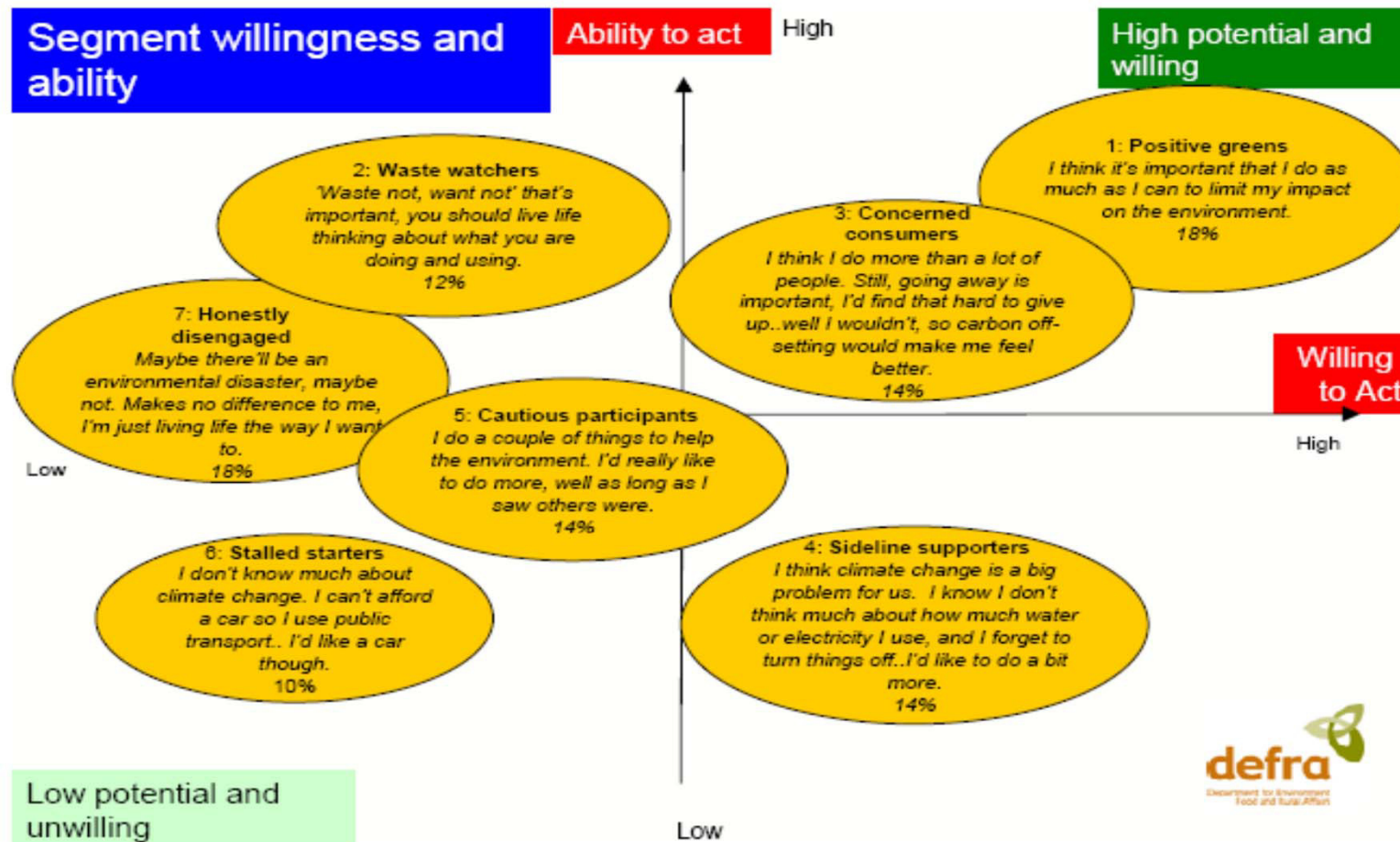


## *The proportion of people recycling different materials, 1993-2007*



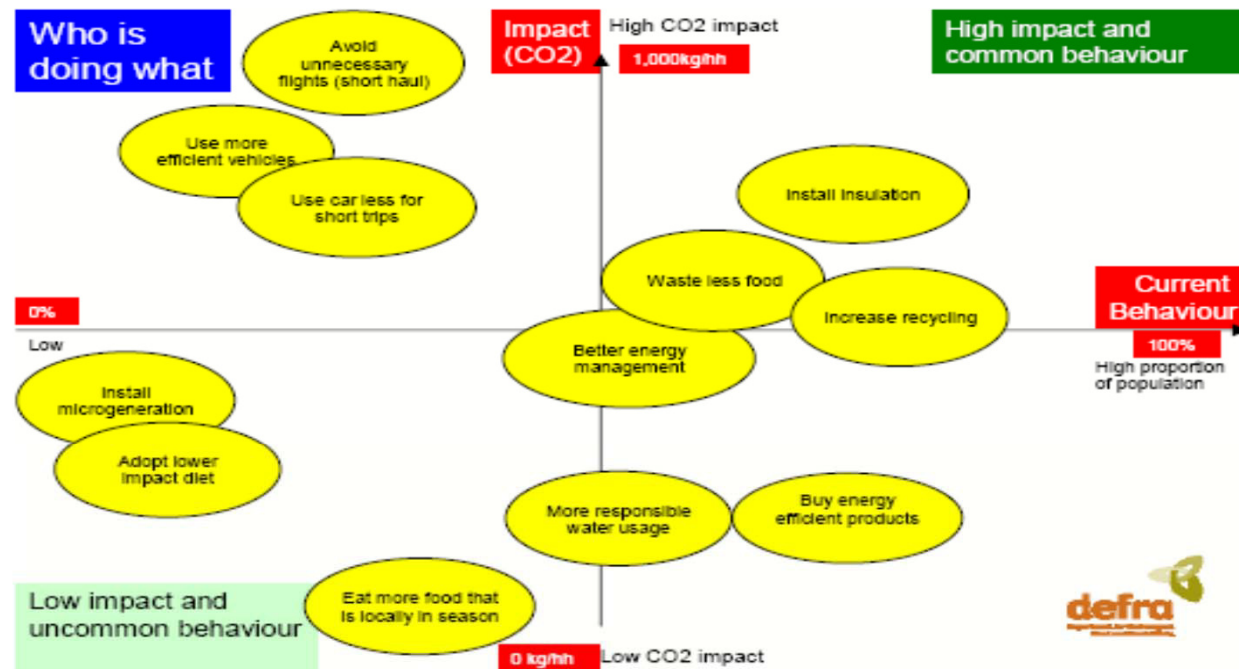


## The seven population segments





## Impacts and current take up of behaviours



Inclusion of impacts other than carbon (e.g. on air quality, water demand, landfill, biodiversity) would affect the ranking. We are commissioning







*Approach evolves as attitudes & behaviours change over time*

## Encourage

- Through tax system
- Expenditure - grants
- Reward schemes
- Recognition/ social pressure – league tables
- Penalties/ fines & enforcement action

## Enable

- Remove barriers
- Give information
- Provide facilities
- Provide viable alternatives
- Educate/ train/ provide skills
- Provide capacity

**Catalyse**  
- is the package enough to break a habit and kick start change?

## Engage

- Community action
- Co-production
- Deliberative fora
- Personal contacts/ enthusiasts
- Media campaigns/ opinion formers
- Use Networks

## Exemplify

- Leading by example
- Achieving consistencies in policies







# How to ensure Citizen Participation?

## **1. Regulatory Instruments**

**e.g. targets, bans on, take back, segregated collections**

## **2. Economic Instruments**

**e.g. Landfill taxes, producer responsibility, pay as you throw**

## **3. Voluntary Agreements**

**e.g. adoption of eco-design, environmental information**





**Impulsive action or considered action?**

**What do we know? What do we not know?**

**Requirement for Research**





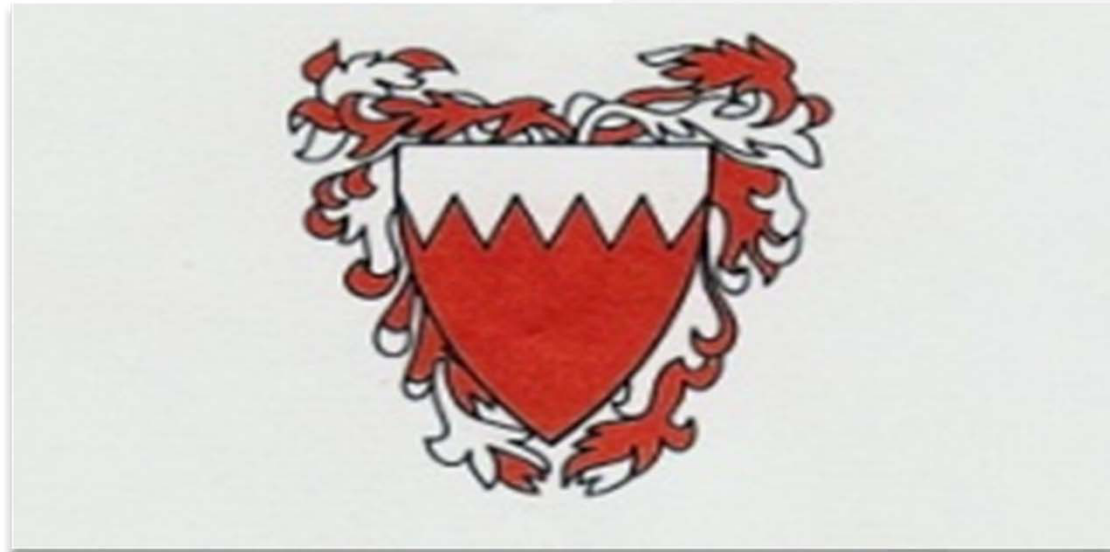
**So what do we need to Drive the waste agenda?**

**Evidence for policy makers to design long term  
waste / resource strategy!**





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## **For England Waste evidence strategy questions from 2007**

- What does current research on household waste prevention tell us and where are the evidence gaps in this work?
- What do we know about the drivers for personal acquisition, consumption and disposal behaviours and how do we improve our forecasting of the impacts of technology and lifestyle trends on waste arisings and composition?
- Is there a sense of how much householders can do to prevent waste, and how much influence they have on retailers and manufacturers?
- How do we ensure an integrated policy and delivery approach to enhancing community-based behavioural change?
- Is there a need to know more about the barriers to waste prevention, reduction and recovery?

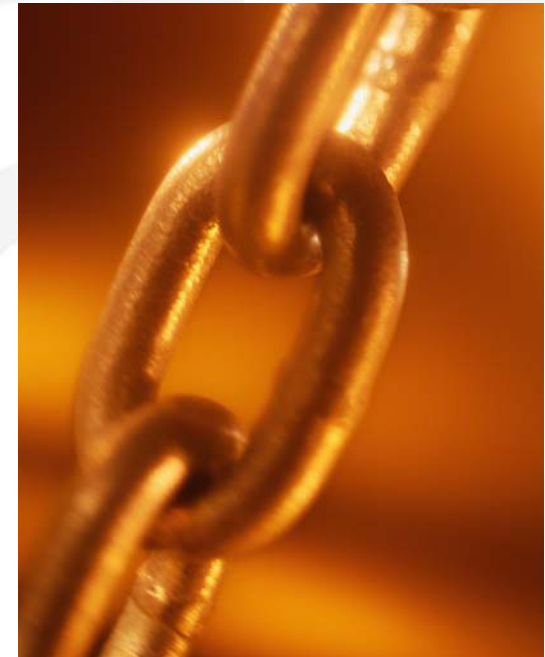






## Evidence-based Policy-Making

- Process marrying experiences, expertise and judgment
- Interconnecting policy goals and evidence through robust analysis
- Evidence needs to be used
- Evidence-based or evidence backed?





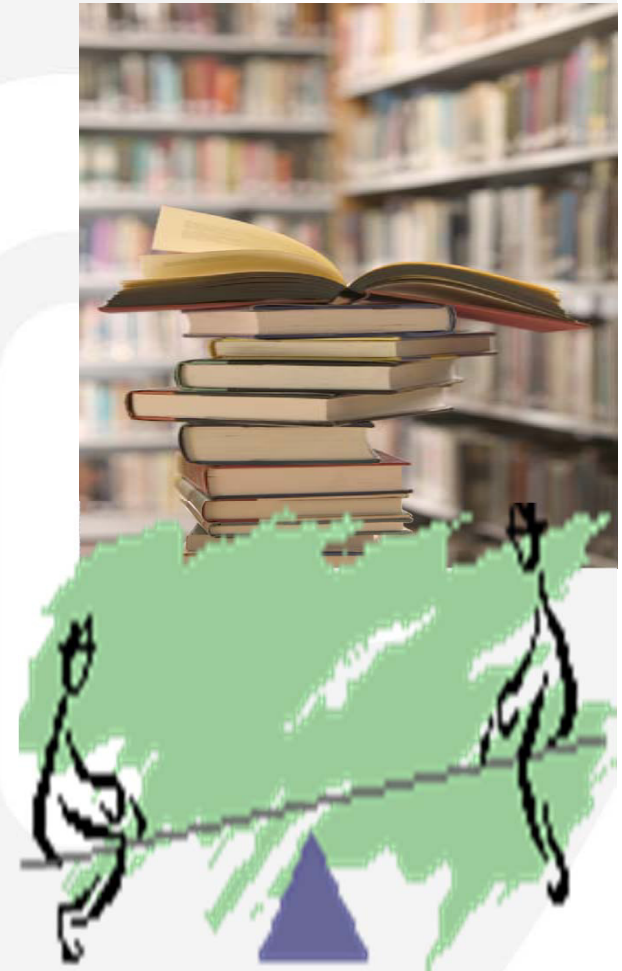
# Balancing Supply and Demand

## Supply (from the research community)

- provider-focused
- robustness and quality
- presentation in a policy-relevant format
- accessibility

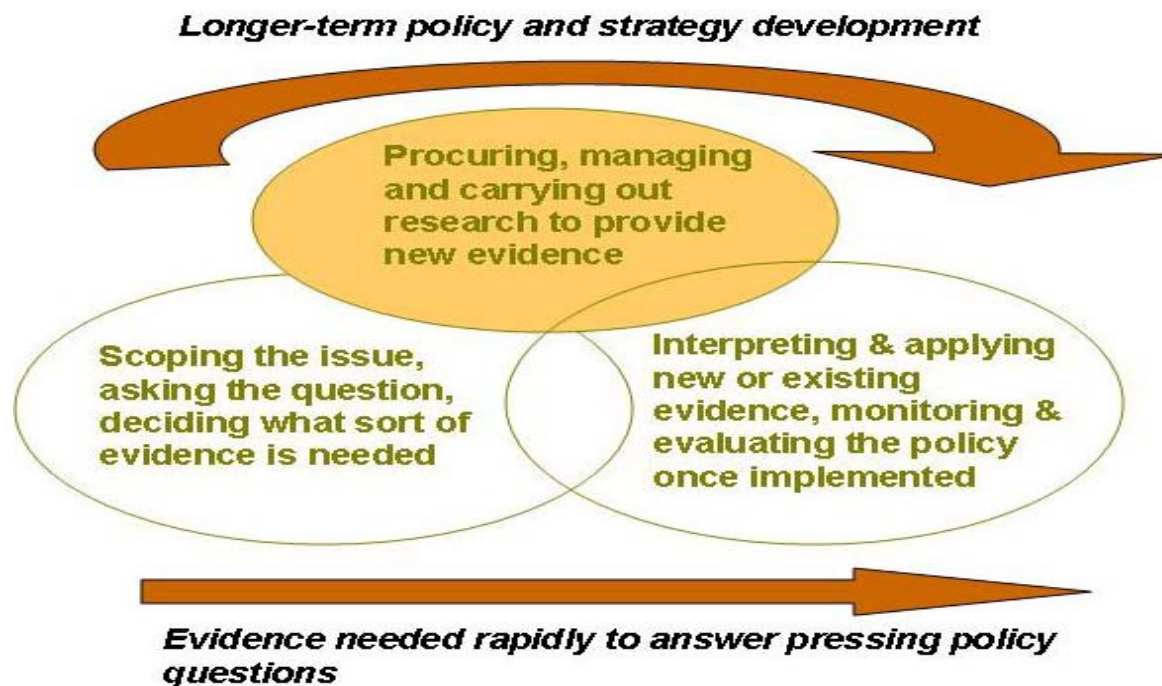
## Demand (from policy specialists)

- user-focused
- pro-active
- cost-effective
- working with policy-makers to identify needs
- linking evidence to policy goals and their achievability





# Time Horizon



- Supply and demand
- Balancing short-term research and evidence needs

Source: Louise Shaxson, 2005: figure attributed to Tony Taig.



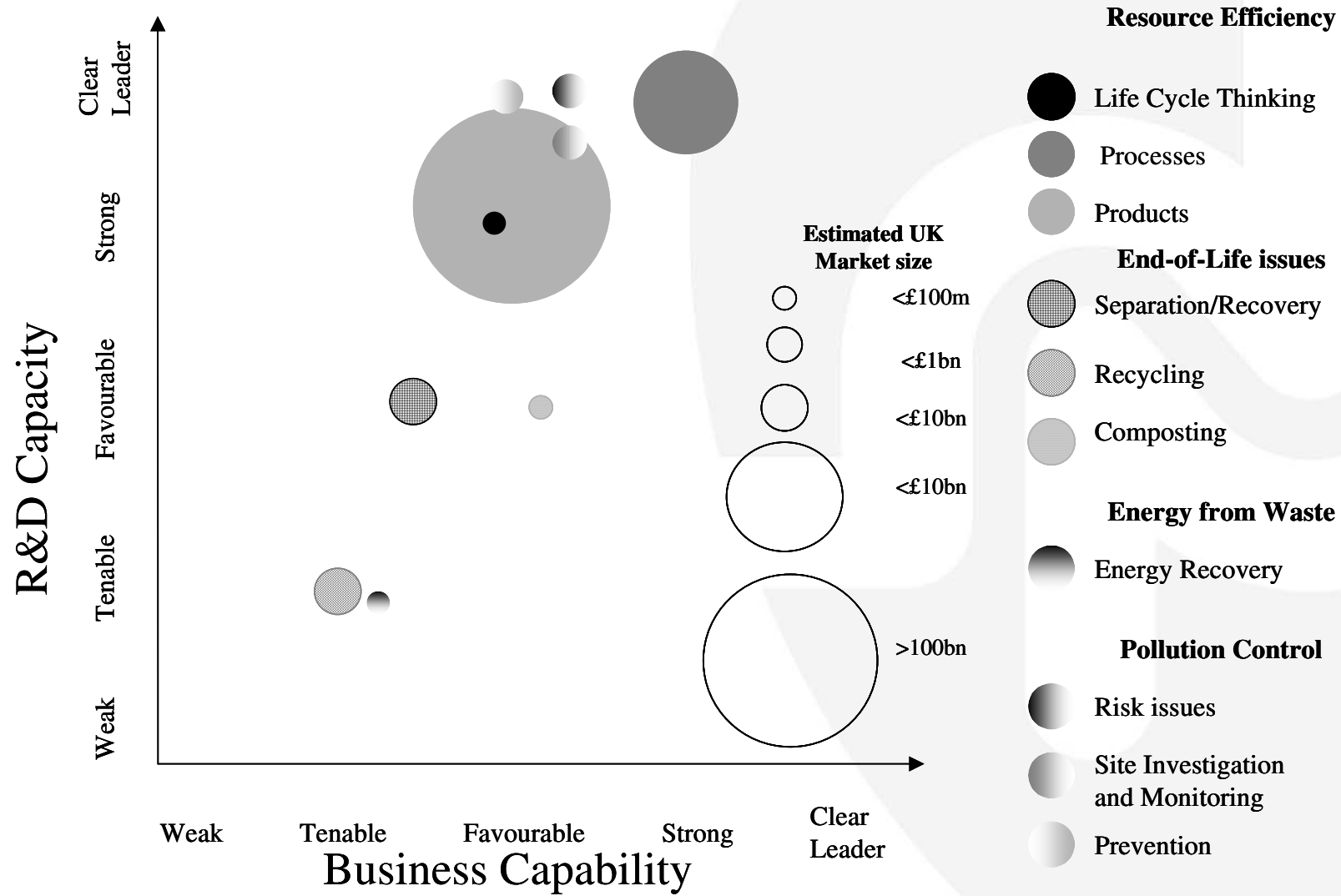


Key issue: Training

Does Bahrain have the Capability to Exploit Innovation  
in Waste / Resource Management?











## Some Year 1 Activities.

**Formation of steering group:** with representatives from Bahrain including Universities, Government, Business and from UK TUoN and Business (e.g. Veolia). The group will guide upon key questions such as buildings for location etc and contractual issues and the mix of activities required.

**Teaching:** At least **40** students studying at least **1** module from UK Distance Learning Degrees at Foundation, First and Masters Degree levels. A virtual learning environment (VLE) set up to support learning.

**Consultancy:** Key Bahrain professionals (**10**) cluster around a UK / European consultancy to determine what model is best suited to Bahrain. Initial market and gap analysis for Region started.

**Research:** Launch Journal

Bahrain students - **5** - are supported to apply for scholarships to enable them to come to UK to a University that is the most suited to the specialism that they have chosen.

**Funding:** The steering group will seek to lever in external funding from Government, British Council, International Business e.g. Veolia. Rolls Royce. In excess of £100 000 sought





## Some Year 3 Activities

**Steering group:** Enlarged from year 1 and 2 to be more inclusive to represent Bahrain as capability and capacity increases.

**Teaching:** At least **20** students studying for full Distance Learning Foundation (12 Modules) and First degree . **10** studying for full Masters Degree (8 Modules).

In addition, **100** students enrolled from Region onto Modules. Modules delivered by Bahrain staff  
New degrees that are based primarily on conditions in Region and will be produced in native language / languages. **These will be owned by Universities from Bahrain who will provide QA.**

**Consultancy:** A national best practice programme set up to support commercial / industrial waste minimisation. Some **30** companies in Bahrain audited and trained and case studies produced. Savings of over £500 000 identified.

**Research:** Some **10** PhD students from Region coming to Bahrain to study  
PhD by papers developed and validates to support professionals in the work place. They can continue to work, produce papers and obtain PhD. Some **5** enrolled.  
A large international research conference to showcase developments in Journal and in Bahrain.

Funding: in excess of £300 000 sought.





# Questions?

