

Technology Strategy Board

Driving Innovation



Resource Efficiency

Strategy 2009-2012

EXECUTIVE SUMMARY

ENVIRONMENTAL SUSTAINABILITY APPLICATION AREA

Executive summary

The issue of sustainability has attained unprecedented prominence on both national and international agendas, occupying the minds of businesses and governments as never before.

Globally, climate change is recognised as the most urgent environmental issue of our time. The *Stern Review of the Economics of Climate Change* set out a strong economic case for prompt action to tackle the effects of climate change, and the UK Government has been one of the first to act, with a range of measures that include the establishment of binding targets to cut carbon dioxide emissions under the Climate Change Act.

Reducing carbon dioxide emissions is not the only issue. Our growing population and improving standard of living mean that we will not be able to ensure access to the key resources our society is built on – whether it's food and water or minerals, metals and oil – if current trends in consumption continue. Governments and businesses are realising that solving this problem will provide major market opportunities, and that 'green' jobs and cleaner technologies can help us through the current economic difficulties, preparing for the prosperous UK industries of the future.

What is resource efficiency?

Resource efficiency is a broad area offering opportunities for innovation and wealth creation that permeate the wider economy. There is no resource efficiency sector *per se*, but a wide range of businesses and their supply chains responding to a common set of issues. Supporting these is a range of providers of products, processes and services, many of which form part of the traditional Environmental Goods & Services (EG&S) sector.

Resource efficiency has a key role to play in mitigating wider issues such as depletion of resources, environmental impact and materials security, and it also contributes significantly to the low-carbon economy. We have estimated the UK market value of this broad sector (see diagram) to be £50-75bn (see Appendix 4 for further details).

Our strategy

This strategy document sets out the Technology Strategy Board's approach to helping UK companies across a range of industry sectors to develop innovative solutions that add value, by embedding more reliability in the supply of material resources while reducing environmental impact.

These solutions will be well-placed to generate competitive advantage and so wealth creation in the future.

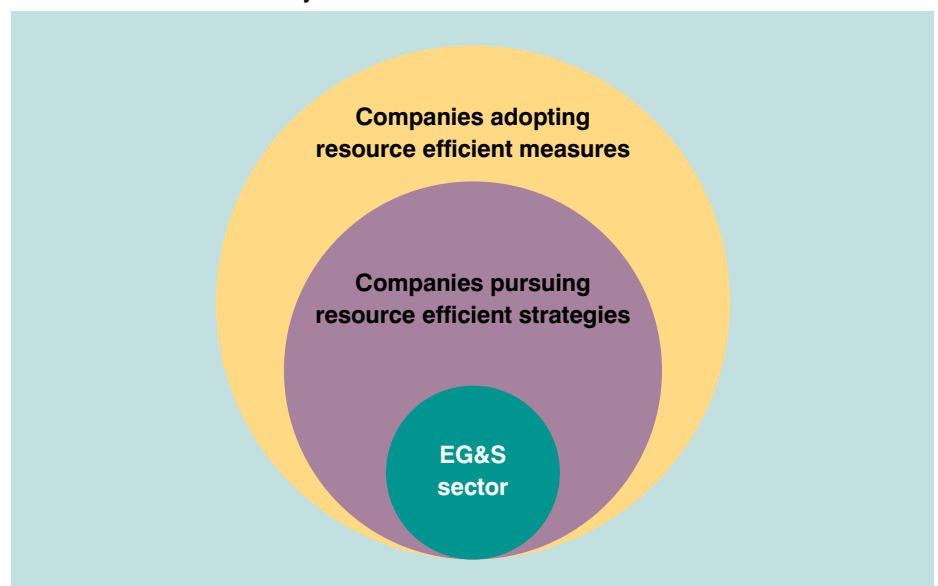
In the longer term, substantial improvements in resource efficiency will require a transition to (more) closed-loop

models of consumption, taking full account of the resource lifecycle. On a macro scale this implies the widespread adoption of principles of industrial ecology, and ultimately of a zero-waste model where all 'wastes' are eliminated or become raw materials for other uses.

We believe that the UK should:

- support the wider adoption of lifecycle thinking through the use of indicators and quantitative methods such as lifecycle assessment, embedded carbon and embedded water
- make greater use of its influence in product specification (at a business and European policy level) to reduce environmental impacts through global supply chains
- identify gaps in knowledge and data for fluxes of materials and the composition of waste streams, and work with bodies such as the International Panel for Sustainable Resource Management to address these.

Our view of resource efficiency sector - estimated market value £50-75bn





Our own investments and interventions in the resource efficiency arena will be guided by, and intended to promote, lifecycle thinking in patterns of resource use. We have identified **four broad approaches** that may be used to improve the efficient use of resources, at the same time reducing their environmental impact:

- substitute the use of at-risk materials or those that have a major environmental impact
- close the lifecycle loop to enable the same resource material to have multiple product lives
- dematerialise – reduce the total amount of material that needs to be used to deliver a consumer benefit
- reduce the amount of energy used over the lifecycle.

These approaches are underpinned by nine competences spanning the lifecycle:

- resource extraction
- bio-based materials
- design
- materials processing
- manufacturing
- service provision
- retail and distribution
- recycling
- disposal (waste and pollution management).

We have examined each of the four approaches in the context of these nine competences. Our initial assessment is that it is better to focus our investment on the four approaches, rather than target any of the nine competences specifically.

We recognise the importance of waste and pollution management as mitigation technologies, and will undertake focused activities in these areas where there is demonstrable benefit and market opportunity.

This strategy recommends actions for the Technology Strategy Board in five discrete areas:

Collaborative R&D

We will:

- run collaborative research and development competitions aimed at meeting specific challenges and appealing to a broad spectrum of business – spanning the four approaches and lifecycle areas described in this strategy
- consider a broader range of investment tools to encourage greater and more effective engagement with business. This could include feasibility and scoping studies for companies new to the field or with limited R&D experience.

Transferring knowledge and skills

There are many opportunities to generate wealth by working to transfer and share knowledge in the resource efficiency sector, ranging from tailoring techniques and processes to individual user needs, through to transferring knowledge and technology across sectors and along supply chains.

We will:

- create a new knowledge transfer network to stimulate the transfer of knowledge between businesses, academics and individuals. This will be formed by combining the Resource Efficiency and Environmental Knowledge Transfer Networks to provide focused support to those working in environmental sustainability
- support the formation of special interest groups, made up of businesses, academics and industry bodies, across a range of knowledge transfer networks to develop cross-sectoral activities in support of the work to address the challenges in the environmental sustainability area
- work with our partners delivering the knowledge transfer partnerships and through the knowledge transfer networks to increase the number and range of knowledge transfer partnerships in the resource efficiency sector.

Working with UK organisations

We recognise that resource efficiency is a broad area that permeates the wider economy. To support the development and deployment of innovations in resource efficiency we will need to engage with other organisations. These include:

- a range of businesses and sectors
- regional and national government (eg the Department for Environment, Food and Rural Affairs; the Department for Business, Innovation and Skills; devolved administrations; and regional development agencies)
- public bodies (eg the Environment Agency, Design Council and Carbon Trust)
- funders of fundamental research (eg the Natural Environment Research Council, Engineering and Physical Sciences Research Council, Biotechnology and Biological Sciences Research Council, and Economic and Social Research Council)
- agencies for market development (eg the Waste and Resources Action Programme).

We will:

- work with businesses, funding bodies and key organisations to identify those areas where the Technology Strategy Board can add most value, and to develop a delivery plan that provides a coordinated and effective response to the challenge to improve resource efficiency.

In particular, we will work with appropriate partners to identify and develop tools to support innovations such as:

- design and product conceptualisation
- changes in business models; for example, extending product lifetimes through the delivery of products as services
- understanding and accommodating human and business behaviours.

Working with international partners

There is broad scope to work with international partners, whether to inform and influence policy development, to share knowledge and best practice, or to participate in large-scale collaborative projects that span the supply chain.

In the short term we will:

- focus on Europe, including working through the new knowledge transfer network to identify opportunities for engagement.

Information gaps and measurement

We will:

- assess capacity in the UK to reduce the total amount of materials necessary to produce goods or deliver services
- work with other organisations such as the Natural Environment Research Council to address gaps in data and develop a framework to assess and prioritise reliability in the supply of raw materials and the global impact for materials that are important for UK business
- develop appropriate ways to measure resource efficiency and sustainability to assess and track activities within the area of environmental sustainability.

This is a summary of the Technology Strategy Board's *Resource Efficiency Strategy*. For the full document, see www.innovateuk.org.

The Technology Strategy Board
North Star House
North Star Avenue
Swindon
SN2 1UE

Telephone: 01793 442700

www.innovateuk.org