

Executive summary

Meeting the UK climate change challenge: The contribution of resource efficiency



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Resource efficiency is defined by the United Nations as “reducing the environmental impact of the consumption and production of goods and services over their full life cycle” (Cropper, 2009¹).

Improving resource efficiency² could contribute almost 10% of the required reduction in Greenhouse Gas (GHG) emissions by 2020.

The UK Government’s Climate Change Act (2008) commits the UK to reduce its territorial GHG emissions by 80% by 2050 from 1990 levels. Much of the activity and discussion about how to achieve this has focussed on changing the way we generate energy, in particular moving to low-carbon electricity generation and vehicle fuels.

There are significant environmental and economic advantages to taking immediate action if we are to achieve the deep cuts in GHG emissions required. The Stern Review on the Economics of Climate Change identified that delaying the actions needed to stabilise GHG emissions in line with a 2 degree threshold would lead both to an increased risk of the harmful impacts of climate change, and higher mitigation costs.

In line with this, the UK Low Carbon Transition Plan sets out a roadmap for achieving an intermediate GHG emission reduction goal of 18% to 2020.

¹Cropper A. (2009) Decoupling Economic Growth from Environmental Degradation – The Crucial Role of Resource Efficiency, speech notes to the Resource Panel of the United Nations of the Division of Technology, Industry and Economics. Available from: http://www.unep.fr/scp/rpanel/pdf/opening_angela_cropper.pdf

²Resource efficiency in this research relates to efficient use of materials.

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WRAP has carried out new research³ on the contribution resource efficiency can make to achieving climate change targets.

It covers supply of and demand for materials and products in the UK economy, and also accounts for the trade with the rest of the world. Thus, it covers the contribution from UK territorial emissions and from emissions related to consumption of goods and services imported from abroad.

Our key findings are:

- Improvements in resource efficiency can be taken immediately, as advocated by Stern, and could deliver almost **10% of the reductions** required by the Low Carbon Transition Plan.
- In terms of consumer emissions (including imports), resource efficiency could **reduce these by 8%** by 2050.
- All strategies can be implemented with **no significant negative effect on UK GDP**, although the impacts will clearly be varied at the individual business level.
- There is a significant risk that about 50% of the benefits of resource efficiency could be lost unless we address the rebound effect. This is where money saved from resource efficiency measures in one area is spent in another which creates negative environmental impacts.

**For the full report see
www.wrap.org.uk**

³ Commissioned from Stockholm Environment Institute and an expert group of academics and economists.

Resource efficiency strategies and scenarios

This research explored strategies to drive resource efficiency in both the production and consumption of goods and services in the UK.

Thirteen different key strategies were identified which could affect a number of industry sectors or household products groups⁴. These are shown below. For production, they relate to a change in the efficiency of UK production or production structure, and on consumption, they relate to the level of household consumption or the composition of the household purchases of both domestic and imported products.

Production	Consumption
<ul style="list-style-type: none">▪ Lean production (e.g. lightweighting)▪ Material substitution▪ Waste reduction▪ Waste recycling▪ Dematerialisation of service sector (e.g. implementing resource efficiency measures)▪ Sustainable building (e.g. new build)▪ Efficient use of existing infrastructure	<ul style="list-style-type: none">▪ Lifetime optimisation (e.g. using goods for their technical lifetime)▪ Goods to services (e.g. renting instead of buying some products)▪ Reducing food waste▪ Dietary changes▪ Restorative economy (e.g. reuse and refurbishment)▪ Public sector procurement

Four scenarios are presented on implementing these resource efficiency strategies – one a reference scenario where nothing new is done on resource efficiency, the three others being various levels of action.

- **Reference Scenario** – this takes into account both the historical trends on material flows from 1992 to 2004 and uses econometric modelling to suggest a plausible future for the UK economy. This assumes continued economic growth and increasing purchases of consumer goods.
- **Quick Wins Scenario** – what can be achieved in the short term using the time period of 2010 to 2020.
- **Best Practice Scenario** – what could be achieved if we fully adopt current technologies up to 2050. No further technological advances are required, although often our behaviour and business models would need to change.
- **Beyond Best Practice Scenario** – what could be achieved if all barriers are removed to realise the full potential of the resource efficiency strategies. The scenario timeline is until 2050.

⁴For a full definition and explanation of these please see the full report.

When the resource efficiency strategies are modelled against each of these scenarios, the contribution of resource efficiency action is evident – see Figure 1 below.

In particular, the case for immediate action (the quick wins) is a significant saving of 254 million tonnes of GHG emissions by 2020. Taken together, if the beyond best practice scenario is reached, resource efficiency could ensure that GHG emissions related to consumption are 8% lower than they otherwise would be by 2050.

Figure 1: Consumer-related GHG emissions of goods and services

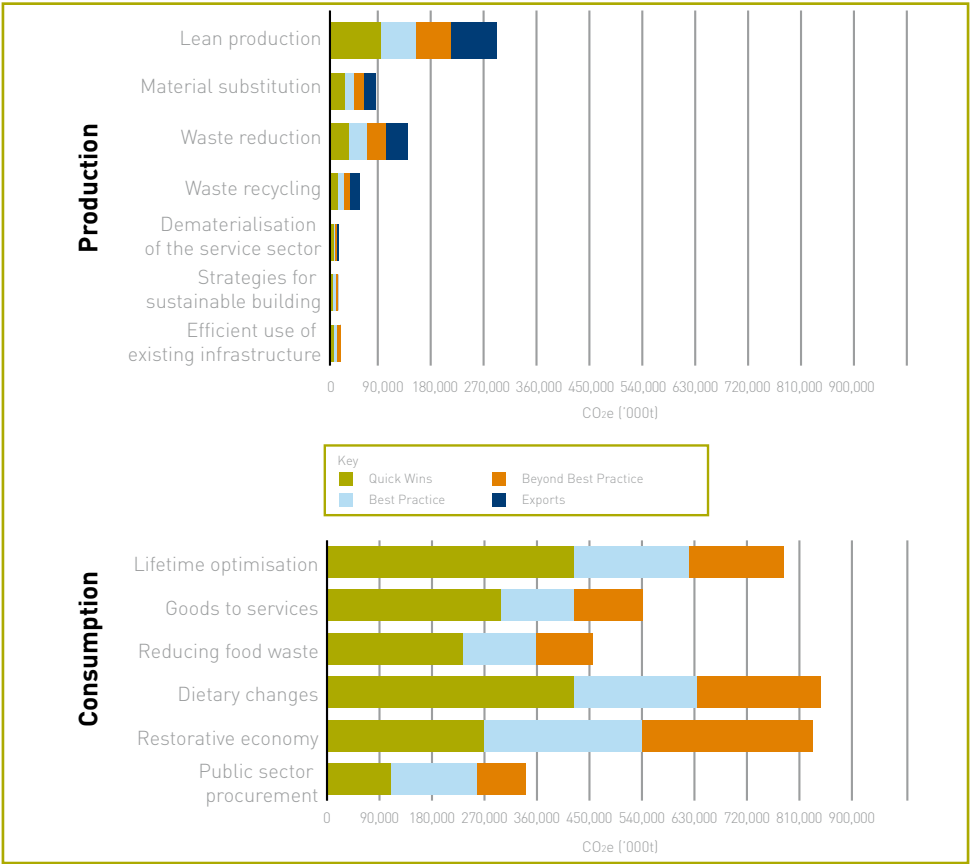


(NB all quick wins are assumed to be implemented by 2020, hence no additional savings occur against quick wins after this time). Emissions from the energy, transport and raw materials sectors are not shown.

The research provides an analysis of the resource efficiency strategies, business sectors and products groups.

An important conclusion is that the production strategies cannot deliver the goal of a lower carbon economy on their own; changing the way we use goods as consumers is also crucial – see the breakdown of the various strategies in **Figure 2** below.

Figure 2: Cumulative GHG emission reduction in production and consumption material sufficiency strategies to 2050, taking into account emissions from a consumption perspective.



Each consumption strategy modelled delivers a greater saving than the best production strategy.

The key reason for this is that consumption strategies have the ability to reduce emissions abroad where production strategies are limited to the UK economy.

For consumption, significant reductions can be made in the food and drink sector by changing diets and reducing food waste, where there is clearly an advantage in early action and waste reductions. Increasing the lifetime of products by making products more durable and encouraging consumers to change their buying patterns is also a big opportunity for business to reduce GHG emissions.

For production, lean production is by far the most effective strategy. This relates to reducing the amount and type of material input in products, while delivering the same function. Furthermore, it reflects the importance of good design of both goods and services to reduce the environmental impact of products.

It is also important to note that the quick wins are based on existing technology. By 2020 the world will have changed and a range of new quick wins will be available.

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For resource efficiency to deliver its full potential to deliver cuts in GHG, as well as understanding and managing consumption patterns, potential rebound effects need to be addressed.

This is where money saved from resource efficiency measures in one area is spent in another area which creates negative environmental impacts. Up to 50% of the benefits of resource efficiency could be lost as a result of the rebound effect.

The economic modelling shows that there is no significant negative impact to UK GDP as a result of these resource efficiency strategies, although the specific impact at individual business levels will vary. Whilst there is some considerable variation, all sectors are able to reduce GHG emissions from each strategy.

Reduced GHG emissions is not the only benefit of resource efficiency. Many, if not all of the strategies, will deliver co-benefits related to other environmental issues such as resource scarcity, pollution and water consumption. However, this research has shown that resource efficiency can make an important and low investment cost contribution to reducing UK GHG emissions.

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