

Developing the Plan for Growth to go 'beyond carbon'

1 Sir John Harman FRSA, Hon FICE, FIWEM, FIWM, FSE, DCL
Director, Aldersgate Group, London, UK

2 Ian Dickie
Director, Aldersgate Group, London, UK

3 Andrew Raingold MA
Executive Director, Aldersgate Group, London, UK



Growing demands on the world's finite resources will mean that resource efficiency will be one of the key determinants of economic success in the twenty-first century. While markets respond to short-term supply restrictions, they are less effective at anticipating constraints in natural resource stocks. As a result, prudent economic policy would promote low resource consumption as a vital part of securing future competitive advantage. However, what policies are required to enable the transition to a resource-efficient economy? This paper summarises the outcomes of three roundtables with high-level practitioners that examined the challenges faced in three sectors (water, food and materials) to make general conclusions. It argues that as resource efficiency and related innovation increasingly become primary benchmarks of a successful economy, it is clear that the UK needs an industrial strategy to address critical resource challenges and one that goes beyond reducing carbon dioxide emissions.

1. Introduction

It is increasingly evident that resource efficiency (RE) – defined as the systematic reduction in the quantity of resources employed to produce goods and services in the economy – will be one of the key determinants of economic success and human wellbeing in the twenty-first century. This is the inescapable general conclusion from the science that demonstrates that human societies are already depleting the physical and biological resources of the Earth at an unsustainable rate – a problem that is deepening with rising population and per capita consumption.

This general observation does not, however, tell us much about the pace at which RE will have to be driven, nor about which resources will most immediately require management. In general, we know that markets respond to short-term supply restrictions, as was the case with the global spikes in commodity prices between 2006 and 2008 (FAO, 2008). They do not, however, anticipate constraints in natural resource stocks. Therefore, a prudent economic policy would promote low resource consumption as a vital part of securing future competitive advantage, in advance of the market. Such a policy is also essential for an efficient transition to a low carbon dioxide economy. A more efficient transition will be enabled by long-term policy

mechanisms that are implemented before resource-constraint shocks force change in the economy. Advocacy of such policy has been a core position for the Aldersgate Group (AG), a coalition of leading businesses, non-government organisations (NGOs), professional bodies and political leaders, since its formation.

What would a resource-efficient economy look like and what public policies would be needed to enable the transition to such an economy? The AG addressed these questions in a recent report (AG, 2010). To inform this work, practitioners with an interest in three sectors (water, food and materials) were asked to think about what their sector would be like in a resource-efficient economy. Those insights were then discussed in a series of roundtable sessions. The general conclusions are summarised in this article.

One strong feature that emerged from the discussions is that resource use has to be considered sector by sector. There are some very clear common issues – which are highlighted later in the paper – but these common principles work out differently in different sectors because of the nature of the resources in question. The sector examples of water, food and materials can be found in the full report (AG, 2010), but this article

focuses on what can be learnt in the way of general principles in RE. Are there common features that would help us navigate through the transition to a resource-efficient economy and manage it well when we get there? The roundtable sessions answered both these questions with a firm 'yes'. There are indeed general principles of economic management for a resource-efficient world and what follows is a discussion of those that emerged from the case studies.

2. RE policies require a lifecycle approach

Policy interventions usually apply at one point of a resource cycle, but isolated interventions are rarely effective and often create unintended consequences elsewhere. Effective management of resources necessitates a consideration of the whole cycle, and often a suite of measures. A good example is the UK government's waste strategy (Defra, 2007), which sets out a hierarchy of options for waste minimisation, material reuse, recycling and disposal in all parts of the UK. Over time, a number of policy interventions have been introduced to reinforce this strategy, from tax on one form of disposal (landfill) and European Union (EU) prohibitions on the landfilling of some materials, to various initiatives to create demand for secondary materials and campaigns to change public and commercial attitudes to 'waste'. Policy interventions in other fields have impinged on this strategy, as for example in subsidies for various forms of energy recovery. While it could not be claimed that the regime is comprehensive or that it guarantees RE, it does illustrate that, over time, resource management has called for a range of different interventions at various points of the cycle, and that the more coordinated these can be, the better. A recent report by the Environment, Food and Rural Affairs committee (Defra, 2010) found that Defra's waste strategy leaves 90% of waste without specific recycling targets and that government knowledge of commercial and industrial recycling rates is patchy and outdated. A lifecycle approach will, of course, require an international approach, with all kind of difficulties involved in managing resources along different firms and jurisdictions.

3. Pricing resources and the environment

To make the market work more effectively for RE, the first requirement must be to ensure that prices reflect environmental realities and contribute to the achievement of policy targets, such as those for greenhouse gas (GHG) emissions. This is usually expressed by saying that environmental externalities, by which we mean environmental changes that affect human welfare but are not reflected in markets, are incorporated into prices. This is undeniably desirable, but there are many problems and difficulties in implementing this in practice.

For many environmental issues, a key difficulty is how to quantify and price the externalities. There are at least two significant reasons why this approach is not implemented to a greater extent.

Firstly, lack of political will means that available policy tools are not utilised. The Stern review (Stern, 2006) concluded that the future costs of inaction on atmospheric concentrations of GHGs far outweigh the present cost of mitigation, yet there are unused opportunities (namely higher carbon dioxide taxation and emissions trading with more tightly controlled, auctioned allocations and greater coverage) by which this future cost could be internalised into prices. Therefore, most of the cost of current action is borne by the taxpayer through public spending, rather than consumers who could respond to more resource-efficient sources of supply. A green tax shift would ensure that taxes on the things that are valued by society (such as jobs, incomes and profits) are reduced and the lost revenue is replaced by taxes on things society does not like, such as pollution and environmental degradation (GFC, 2009).

Secondly, some key externalities are not fully understood. For example, a current major international research effort on the economics of ecosystems and biodiversity (Teeb, 2009) draws attention to the long-term costs and benefits of ecological systems, and it is obvious that the way we draw on these systems is an important 'externality'. Yet we are a long way from being able to calculate the size of the external costs concerned, which is clearly required if they are to be internalised into the price.

The effort to reflect environmental costs in price is an essential one, not least because getting price to be a more accurate measure of resource and environmental cost will help to remove some of the perverse price effects noted in the case study examples. However, for complex environmental problems such as climate change and biodiversity loss, thresholds may exist beyond which damage to human welfare is irreversible. A policy approach that relies simply on factoring external costs – to the extent they can currently be measured – into prices risks failing to avoid serious impacts on human welfare.

An alternative approach is to specify the target outcome explicitly (e.g. quantity of resource consumed or pollution emitted) and to establish prices accordingly; for example, the approach recently adopted by government economists in respect of carbon dioxide pricing, whereby the shadow price of carbon dioxide is taken to be the point at which enough carbon dioxide abatement would result to meet the government's carbon dioxide reduction targets, which are intended to avoid dangerous climate change. For this policy to be effective, the carbon dioxide price must be set at a high enough level (for current figures see DECC (2009)). Such an approach could be applied to other environmental issues, but still brings risks of failure because there is no guarantee that the use of the resource will adjust to the desired level in response to the price set.

4. Pricing policy alone is insufficient

Sustainable use of the environment and its resources should be at the centre of economic policy and analysis. Each case study example illustrates that pricing policy, however necessary for sustainable use of environmental resources, is not by itself sufficient to achieve it. The reason, of course, is that prices only work through markets and depend for their effect on markets working efficiently. There are many examples, not just in the field of resource use, where this does not happen and other policy instruments are then necessary to correct the resulting market failures.

The sector-specific case studies (AG, 2010) demonstrate that regulation also has an important role to play. In the water sector, the role of the regulator is key to ensure there is a business case for companies to innovate. For food, standards need to be better defined and implemented, and policy in the metals sector must encourage reuse as well as recycling. In each case, the regulatory framework has the potential to create economic and environmental benefits, as well as to drive UK competitive advantage.

Changing consumer, producer and investor behaviour are all important for a successful RE strategy, supported by the traditional policy levers of price and regulatory drivers. Historical evidence supports the view that the UK cannot rely on RE improvements alone to reduce carbon dioxide emissions, but must pay attention to what and how much is consumed (WRAP, 2009).

5. Resource management has many bottom lines

From discussions on pricing, it was concluded that optimisation of resource use cannot be done solely on the basis of monetary value. There needs to be some form of physical accounting for the use of key resources on an economy-wide basis and economic decisions will have to balance measures of these resources alongside more familiar monetary measures. The resource measures that appear on the nation's economic dashboard will have to be carefully chosen; even today we see the beginning of such an approach with carbon dioxide accounts managed by statute. Various policies to manage carbon dioxide emissions require that emissions must be measured and these requirements should be strengthened (AG, 2007a).

In fact, this is a rather fundamental issue. This research showed that the single-minded pursuit of efficiency for one resource will often work to the opposite effect for another. While pricing mechanisms can give incentives to resolve these complex RE issues at a whole-economy level, they are inevitably imperfect. The balancing of economic and social considerations to manage resource use across the economy will require considerable political judgement, allied to, and aided by, usable measures of resources.

6. Social equity

A world in which the use of resources is more closely managed will throw up more issues of equity of access to those resources, if productive efficiency fails to keep pace with resource pressures. This effect is already very present in the debates about water pricing and fuel poverty, and would be exacerbated exactly in proportion to the degree to which price is used as the primary control. It can thus be concluded that RE decisions cannot be taken in isolation from consideration of their equity effects.

7. Resource security

A striking feature of government strategy on two important resource themes over the last decade has been the reappearance of security of supply as a major strategic theme. In both energy and agricultural policy, the prevailing assumptions of the 1990s about globalisation led policy makers and economists to dismiss concerns about energy and food security. These concerns have, however, now re-emerged; for example, food security is a major part of Defra's recent food strategy (Defra, 2010). This is not a reaction against globalisation but a recognition that global resource constraints may raise issues of availability and price escalation that require the attention and response of national governments.

Security considerations are likely to strengthen as resource constraints tighten and to become significant for a number of other resources. Elsewhere in the world, water is already a strategic problem. The metals case study in this work raised concerns both about the price of bulk metals and the strategic availability of rare materials.

8. Carbon dioxide

Each of the case study groups involved in this work found itself considering carbon dioxide impact. This is inevitable because of the ubiquitous role of energy in the economy, together, in the case of the food industry, with other large GHG impacts from biological processes and the use of oil as a feedstock for inputs. The management of carbon-based fuels was noted to be one of the most important resource questions for all the sectors. This reinforces previous arguments (AG, 2007b) that stronger carbon dioxide constraints within the EU emissions trading scheme (ETS) would stimulate innovation and therefore economic activity in the EU. It also underlines two earlier points.

Firstly, it underlines the interdependencies between various resource management regimes. Carbon dioxide cuts across everything, but so does, for example, water use. While individual sectors will have rather different circumstances and characteristic approaches to resource management, making sectoral approaches necessary, a resource-efficient economy cannot treat the sectors as independent.

Secondly, in order to be able to make sense of these interdependencies, the price signal has to be as aligned to environmental priorities as much as possible. Even though price by itself is not enough to ensure that carbon dioxide concentration targets are met, it is key to ensuring that rational economic decisions are made on things such as the transportation of foodstuffs or recyclates. The alternative would be to make inappropriate regulations which control quantities, and will often fail to anticipate the needs of a dynamic economy. Where carbon dioxide enters other resource calculations it must do so at an accurate price to reflect the 'real' environmental cost that will drive progress towards the targets of environmental policy.

9. Innovation

The need for innovation was highlighted in each sector study. It is, by definition, hard to describe what is yet undiscovered, but we are aware that increasing RE will depend on improving processes and that innovation must play a large part in this. The sectors involved in this study, however, are not hotbeds of innovation.

This leads to the conclusion that, whether through direct sponsorship or market signals, governments wishing to adopt RE strategies need to promote research and development (R&D) into RE science and technology, resource measurement and resource economics. Because the benefits of such investment will take time to materialise, a vigorous R&D effort must be an early part of an RE strategy, as well as the development of measures to enable and stimulate uptake of innovation.

10. RE to enable a low carbon dioxide economy

There are a number of market failures that militate against efficient resource use, and some of them are visible in the sector examples. They are not just a problem for a future RE economy – they also undermine today's efforts to achieve a low carbon dioxide economy.

This work argues for a resource policy 'beyond carbon', but even if we were to concentrate solely on the low carbon dioxide transition, as reflected in the low carbon dioxide industrial strategy, we would end up going beyond carbon dioxide in a search for solutions.

Existing policy mechanisms and other tools may reduce emissions from electricity generation (e.g. a switch to renewable energy), but otherwise are mainly restricted to marginal changes that have limited potential to reduce emissions (e.g. energy-efficient lightbulbs and real-time energy consumption monitoring in commercial premises). These measures are an important start but are unlikely to drive the substantial cuts in emissions specified by the Committee on Climate Change

(CCC, 2009). More substantial cuts in emissions will require significant changes to carbon dioxide use in many sectors, involving restructuring of some activities and changes to the use of natural resources with significant indirect carbon dioxide impacts.

11. Conclusions

As RE and related innovation increasingly become primary benchmarks of a successful economy, it is clear that the UK needs an industrial strategy to address critical resource challenges. The previous government started this process with the publication of the UK Low Carbon Industrial Strategy (HM Government, 2009) and increased investment in low carbon technologies is a key benchmark in the recent Plan for Growth (HM Treasury, 2011). But we need to go 'beyond carbon' and adopt general RE principles through practices such as resource pricing and lifecycle management.

RE policies should become key objectives for management of the economy and should be supported across government departments. An effective RE industrial strategy would ensure that UK business significantly increases its efficient use of the world's limited resources and the British economy maintains employment and competitive advantage now and in the future.

REFERENCES

- AG (Aldersgate Group) (2007a) *Carbon Costs and Related Campaign for Mandatory Carbon Reporting*. AG, London.
- AG (2007b) *Trading for Growth: The Role of the EU ETS in Cutting Emissions and Stimulating Wealth Creation*. AG, London.
- AG (2010) *Beyond Carbon: Towards a Resource Efficient Future*. AG, London.
- CCC (Committee on Climate Change) (2009) *Meeting Carbon Budgets – The Need for a Step Change*. CCC, London.
- DECC (Department of Energy and Climate Change) (2009) *Carbon Valuation in UK Policy Appraisal: A Revised Approach*. DECC, London.
- Defra (Department for Environment, Food and Rural Affairs) (2007) *Waste Strategy for England, Scotland's Zero Waste Plan (to be launched in 2010) and Welsh Assembly Government (June 2002) Wise about Waste*. Defra, London.
- Defra (2010) *Food 2030: How We Get There*. Defra, London.
- EFRA (Environment, Food and Rural Affairs Committee) (2010) *Waste Strategy for England 2007*. EFRA, London.
- FAO (Food and Agriculture Organization) (2008) *Proceedings of High-level Conference on World Food Security*. See http://www.fao.org/fileadmin/user_upload/foodclimate/HLCdocs/HLC08-inf-1-E.pdf for further details (accessed 23/05/2011).
- GFC (Green Fiscal Commission) (2009) *The Case for Green Fiscal Reform*. GFC, London.

HM Government (2009) The UK Low Carbon Industrial Strategy. The Stationary Office, London, UK. See www.bis.gov.uk/files/file52002.pdf (accessed 29/09/2011).
HM Treasury (2011) The Plan for Growth. The Stationary Office, London, UK. See http://cdn.hm-treasury.gov.uk/2011budget_growth.pdf (accessed 29/09/2011).

Stern N (2006) *The Economics of Climate Change*. Cambridge University Press, Cambridge.
TEEB (The Economics of Ecosystems and Biodiversity) (2009) <http://www.teebweb.org/> (accessed 23/05/2011).
WRAP (2009) *Meeting the UK Climate Change Challenge: The Contribution of Resource Efficiency*. WRAP, Banbury, p36.

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