



Review of the Economics of Sustainable Development

Interim Report

Richard Price and Chris Durham

Government Economic Service and
Department for Environment, Food, and Rural Affairs
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Government Economic Service Review of the Economics of Sustainable Development Interim Report

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Review of the Economics of Sustainable Development

Foreword

Richard Price
Chief Economist, Defra and Member of the GES Board

This paper sets out the emerging findings of the review I am leading of the economics of sustainable development, and its use across UK central government in helping to inform policy decisions. It is an analytical review designed to identify ways in which we can give better advice on policy to Ministers. It does not represent a statement of policy of the Government, nor the views of Ministers.

There were two main reasons for wanting to undertake this review. Firstly, my view is that that existing guidance on the application of sustainable development is long on exhortation to do things differently, but short on practical help for people trying to take or advise on policy decisions. Secondly, the repeated assertion that the paraphernalia of economic analysis used in government is somehow 'fundamentally incompatible' with sustainable development has become increasingly unhelpful. This criticism ranges from careful critiques of intertemporal discounting, to tirades against economic growth. It is often in the context of lobbying for or against a specific policy decision. Typically it lacks any real clarity on what the supposed flaws in the approach are, or how they could be addressed. This often heated debate has generated very little insight.

The Review attempts to move beyond this, examining the pitfalls of the current approach to economic analysis of policy from the perspective of sustainability, and identifying what is needed to address them. It proposes a working definition of sustainable development, compatible with the Government's approach, which can be used as the basis for better policy design and appraisal. It identifies options for improving the development of policy to secure key environmental assets which add value in a range of uses - including management of social and economic risks such as flooding, poor air quality and water supply reliability - without compromising productivity and economic growth.

Our findings at this interim stage are essentially that good social cost-benefit analysis takes you a long way, but that in some circumstances other specific tools are needed to

assess whether policy proposals are consistent with sustainability. Our emerging recommendations focus on what to do when policy options have large, non-marginal or irreversible impacts; on taking social impacts into account more systematically; on dealing more transparently with the consequences for future generations; and on improving the way we value externalities (such as damage to environmental assets).

In the next phase of our work, reporting in the spring, we will make specific proposals to revise guidance used across government departments, particularly supplementary guidance to the Treasury's Green Book¹, and in Impact Assessments of all proposals for new or revised policy.

I am very grateful to members of the Interdepartmental Group which has supported this Review, drawing in a wide range of views; to our academic advisers, particularly Giles Atkinson at the LSE for his review of the SD literature; at Defra to Catherine Connolly, Sasha Maguire, Pam Mason and others; Joseph Lowe at the Treasury; to Paul Ekins for his peer review, and members of the GES Environmental Economics Academic Panel for their comments. I am particularly grateful to Chris Durham at Defra for his tireless work to draw in the evidence and to help me to marshal the arguments – much of the value of this work is down to him.

Richard Price
October 2009

¹ HM Treasury (2003): *The Green Book: Appraisal and Evaluation in Central Government*, HM Treasury, London ; see www.hm-treasury.gov.uk/data_greenbook_index.htm

Government Economic Service

Review of the Economics of Sustainable Development

Interim Report

Richard Price and Chris Durham², October 2009

Summary

- i. The Government Economic Service's Review of the Economics of Sustainable Development was set up in autumn 2008 to investigate whether current approaches for policy and project appraisal used in UK government departments were sufficient to ensure that sustainability was taken into account in the design and assessment of policy changes; and if not, whether methodologies should be changed or supplemented. In particular, the Review was tasked with assessing whether the Treasury's Green Book on policy appraisal – the core methodology used by GES economists in all UK central government departments – needed to be revised or supplemented with guidance on sustainable development. This is an analytical review by government economists to identify ways in which we can give better advice on policy to Ministers: it does not represent a statement of policy of the Government, nor the views of Ministers.
- ii. The early findings presented in this interim report suggest that Social Cost Benefit Analysis (SCBA), when done properly, goes a very long way towards ensuring the sustainability of policy is reflected in decision making. However, there remains substantial work to do to ensure policy makers have a suitable toolkit to enable good SCBA, e.g. appropriate values for environmental resource use, and there is scope for new guidance on how to identify and deal with irreversible changes in the resources available to future generations. The Review will aim to recommend courses of action to address these issues in the next phase of work, but emerging recommendations³ include:

² Richard Price is Chief Economist, and Chris Durham Assistant Economist, at the UK Department for Environment, Food and Rural Affairs (Defra). Richard Price led the Review on behalf of the Board of the Government Economic Service.

³ The Review's emerging recommendations are set out in full below.

1. the assessment of social impacts of policy should be more systematic and consistent across government;
 2. more needs to be done to help policy makers to incorporate environmental externalities properly in social cost-benefit analysis. This means better guidance on what to take into account and on how to do it; and also further work to improve estimates of key external costs and benefits. The use of shadow pricing, and the status of corresponding limits and targets, should also be explored;
 3. an 'asset check' should be investigated, providing a basis for assessing the impact of policy proposals on environmental assets;
 4. the Department for Business's guidance on Impact Assessments should define more tightly what is required before Ministers can be advised that a policy is consistent with sustainable development; in particular externalities and environmental limits need to have been addressed;
 5. the assessment of impacts on future generations needs to be made more transparent; and,
 6. more work is needed to develop a more specific working definition of sustainable development if the concept is to be made 'operational'.
- iii. The Review will continue its work in a second phase of this project, examining the identification of critical assets, scoping out a new tool for appraising policies with irreversible or potentially highly non-linear impacts and pushing for significant new work on understanding and valuing social capital. We will aim to recommend simple measures to appraise transparently the impacts of policies on intergenerational equity, and an approach to appraisal that clearly and simply demonstrates consistency with the principles of sustainable development.

Introduction

1. This paper reports the early findings of the Government Economic Service (GES) Review of the Economics of Sustainable Development. Our work is still ongoing and more clarity on the form of any supplementary Green Book guidance is expected towards the end of 2009, but it is useful at this stage to take stock and note plans for further work.
2. The Review was launched in 2008, supported by an Interdepartmental Group on the Economics of Sustainable Development, formed in autumn 2008 following a conference jointly hosted by the GES and the Sustainable Development Commission (SDC).⁴ At this event, speakers emphasised the scale and urgency of some of the environmental problems that we face, in particular relating to climate change and the loss of biodiversity and ecosystem services. It was further recognised that current analytical guidance is not sufficient either to enable policymakers to identify the policy that will make the greatest contribution towards sustainability, or to ensure that, on aggregate, policies across government will guide the economy towards a sustainable path.
3. The Review is being undertaken in the context of wider efforts across the GES to improve appraisal and evaluation, including new supplementary guidance on adapting to climate change⁵. It is an analytical review by government economists to identify ways in which we can give better advice on policy to Ministers: it does not therefore represent a statement of policy of the Government, nor the views of Ministers.

The Issues

4. The Government's overarching framework for sustainability is captured by five principles that together constitute sustainable development: a just society living within environmental limits supported by a healthy economy, good governance and sound science.
5. These principles can be interpreted very broadly and it is often argued that their worth is diminished by their all-encompassing nature. Additionally, it is not yet

⁴ Presentations given by Richard Price and Catherine Connolly at this conference are available at www.defra.gov.uk/evidence/economics/susdev/papers.htm; and a presentation by Dieter Helm is available at www.dieterhelm.co.uk/presentations/Economics_Sust_jul08.pdf

⁵ Defra and HM Treasury (2009): *Accounting for the Effects of Climate Change*; Defra, London. Available at www.hm-treasury.gov.uk/data_greenbook_supguidance.htm#Adaptation_to_Climate_Change

clear how they align with academic concepts of sustainability, such as weak and strong sustainability, and alternative models of sustainability such as the “capitals approach” which advocates non-declining per-capita wealth.

6. At the decision-making level, social cost-benefit analysis (SCBA) is the principal vehicle for appraising government policy following the methodology in the Green Book. This is a powerful tool that is capable of condensing a great deal of information into a simple format and a straight-forward metric – a net present value – that is easily comparable between policy options, and indeed between different policies.
7. However, advocates of sustainable development (SD) often summarily reject SCBA arguing that it is too reductive to capture usefully the complexities of SD⁶. The Review has condensed these objections into three focussed arguments, which the remainder of this paper addresses and to which it suggests potential solutions:
 - SCBA is most appropriate as a strategic aid⁷ for marginal decisions that do not affect the overall long-run direction of potential wealth creation. However, SD considers the possibility that the current path of wealth creation is undesirable and that policy should be aiming for a non-marginal shift in direction.
 - SCBA cannot easily account for e.g. thresholds and discontinuities in environmental systems, or the potential for market failures to cause depletion of a resource at a faster rate than we can develop substitutes.
 - To represent a potential Pareto improvement in welfare, a positive Net Present Value is sufficient if the winners from a policy could compensate the losers and would still be better off. However, particularly between generations we cannot assume this compensation takes place, so for irreversible impacts (even in the very long run) SCBA may not be appropriate.

⁶ This was a common response to the Review’s call for evidence. For more detail see www.defra.gov.uk/evidence/economics/susdev/call.htm

⁷ A strategic aid provides relevant information to help you take a decision, leaving room for interpretation around the factors that it cannot consider. SCBA is such a tool because you may like to consider unquantified but potentially decisive factors such as non-substitutable capital, intergenerational effects, ethics or changes to the distribution of wealth in addition to Net Present Value.

The approach

8. The terms of reference for the Review outline two objectives:
 - To establish a clear and robust analytical framework for the consideration of sustainable development in the context of policy development, appraisal and evaluation.
 - To investigate and make recommendations as to how the analytical framework can be effectively operationalised and integrated into policy-making processes, in particular into policy appraisal.
9. Since the launch of the Review we have produced a number of internal discussion papers and some more formal pieces that we have published on the Review's webpage⁸. A call for evidence has yielded useful results that further motivate this work and reveal a view wide-spread across Government that current guidance on SD is inadequate or incomplete. A literature review by an academic expert, and its peer review, has provided an extremely useful overview of SD theory and some of the related controversies.
10. The remainder of this paper draws together the outputs from our work to date, discusses how we might turn the preliminary findings into operational guidance and closes with the outstanding questions that we continue to investigate.

⁸ See www.defra.gov.uk/evidence/economics/susdev/index.htm

Findings

11. Whilst the work we have undertaken over the last year has certainly confirmed the scale and complexity of sustainability, it has also provided valuable insights into how the problem can be made more tractable. This section focuses on the UK's current guidance on sustainability and two competing conceptual frameworks that provide useful insights for the Review's findings.

The current approach to sustainable development

12. The Review's call for evidence from across Government revealed a clear consensus that current guidance on sustainable development is not useful for decision making. This comment was made particularly in the context of the Sustainable Development Impact Test included in the Impact Assessment template. A variety of reasons have been put forward for this, by respondents to the call for evidence and by members of the Interdepartmental Group on the Economics of Sustainable Development:

- There is no commonly accepted definition of SD that is specific and/or measurable. Operationalising SD is further complicated by a tendency to include every conceivable desirable policy objective, whether future-related or not;
- Guidance on SD in Impact Assessment and on the Government's SD website does not focus on what we want to sustain, or within what bounds we can make policy and still have a sustainable result overall. Approaches to these issues therefore tend to be conflicting;
- The focus of existing sustainable development guidance is on how to make a policy option more sustainable⁹, rather than how to choose the most sustainable option or indeed to ensure that the appropriate option is included at the outset.
- Sustainability is rightly acknowledged to consist of a range of different and often competing objectives. However, a lack of clear guidance in terms of environmental and other limits means that trade-offs between e.g. different assets cannot be analysed consistently and in a way that results in a sustainable outcome overall.

⁹ See for instance "Stretching the Web", a Defra tool designed to highlight potential issues early on in the development of policy, but not appropriate for comparing pros and cons of different policies or options: www.defra.gov.uk/sustainable/think/stretch/index.htm

- It is not clear how guidance on sustainable development is intended to interact with other tools for appraising policy.

13. These findings provide welcome affirmation that the Review's work is important and exploring the right issues. Key to ensuring that our policies lead to a more sustainable world is the decision-making process and integration with current appraisal practices. There is space for more clarity on what we wish to sustain and on how the impacts of individual decisions add up.

Conceptual frameworks

14. The Review commissioned Giles Atkinson to undertake a literature review on key debates that surround theory and practice. Taken together with Paul Ekins' peer review, this paper provides a comprehensive account of the two leading conceptual frameworks of sustainable development.

15. The "integrated approach" includes both present and future equity considerations and is usually organised around broad policy themes¹⁰. This is the approach reflected in the UK's Five Principles of Sustainable Development and has significant merits in highlighting the issues that policy development could consider. However, it is not straightforward to use this framework to identify and plug holes in current appraisal practice.

16. The "future-oriented view" is concerned with the preservation of assets into the future, and is therefore a subset of the "integrated approach". The future-oriented view has been developed by the academic community into the widely accepted "capitals approach", which is more obviously applicable to the specific problems with Social Cost Benefit Analysis commonly identified in the sustainability literature. The integrated approach and the future-oriented view are by no means incompatible, but given that much of what is considered by the more holistic integrated approach is already present in guidance on policy appraisal, and the likely familiarity of the audience with capitals and assets, we focus here on the future-oriented view and its associated capitals approach.

17. Between the call for evidence, the literature review, its peer review and the Review's own research a lot can be said on what tools might usefully augment SCBA. Using the language of assets, a good starting point for the following technical discussion is that stocks of natural (environmental), man-made (physical) and social (human) capital

¹⁰ Atkinson 2009 (GES literature review, page 3)

must be maintained over time so that the overall capacity to deliver produced goods and wellbeing more generally is non-declining over time. In other words, the options available to future generations are not unduly limited by actions in the present (this is effectively a re-formulation of the Brundtland¹¹ definition).

18. There is an approach to risk implied by requiring options for future generations to be left open: we currently have insufficient information on the nature or value of these options, so we cannot make efficient trade-offs with alternative uses of assets in the present (where use of the asset is rival between generations).

Reconciling sustainable development and SCBA

19. A strong conclusion from the Review was that we do not adequately value certain types of asset (notably many environmental assets where market prices will not reflect their total economic value¹²) and that we do not have values at all for others (social assets for instance). Additionally, a key conclusion of the Review's literature review is that with all the right prices SCBA can reflect the sustainability of marginal decisions.

20. The experience with carbon shows that the market¹³ does not necessarily produce the "right" prices for path-dependent assets (i.e. assets that are rival between generations, with use in the present irreversibly affecting what is available to future generations). Hence there is scope for government to introduce carefully designed constraints on such assets and factor associated shadow prices into SCBA; and also to establish shadow prices based on established targets. Comparison of shadow prices and social costs can also give a broad sense of whether existing targets are more or less consistent with the value society attaches to the underlying environmental asset or service.

21. In practice, of course, it is often very difficult to know the prices consistent with a sustainable path. Furthermore, until prices correctly signal the sustainable

¹¹ Original 1987 report by the UN World Commission on Environment and Development available at www.un-documents.net/wced-ocf.htm; Brundtland's definition at chapter 2, section IV, paragraph 4 states "Sustainable Development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life."

¹² For a discussion on environmental assets and total economic value, see Defra's paper "valuing ecosystem services", pp 29-32. Available at www.defra.gov.uk/wildlife-countryside/pdf/natural-environ/eco-valuing.pdf

¹³ We refer here to markets before the creation of a "market for carbon"; cap and trade schemes present their own difficulties with setting adequate caps, but that is for a separate discussion. The key point here is that path-dependent assets with external costs present a specific challenge to policy-makers.

allocation of resources (and therefore the sustainable rate of substitution between resources), debates over strong versus weak sustainability will continue. These are summarised in Box 1.

22. In the literature review, Giles Atkinson identified three very practical reasons why a positive NPV alone may not justify confidence that a policy contributes to sustaining development¹⁴:

- The quality of appraisals may vary between policy proposals and may not always conform to best-practice in valuation;
- We need to look at the “bigger picture” in terms of how much is being saved overall for the future, and SCBA tends to mask this;
- Equally, we need to ask “are the losses tolerable?” There will always be uncertainty in valuation, so perhaps we should not rely completely on the substitutability of assets implied by their valuations – maybe there is scope for a precautionary principle.

23. However, the development of a viable target-consistent shadow price of carbon represents a potential way out of this impasse for specific assets with certain characteristics¹⁵: setting targets on asset stocks and assigning shadow prices that reflect scarcity within these targets would go a long way to extending the applicability of SCBA to sustainable development. The level at which targets are set could reveal how we expect future generations to value specific assets, the risk we attach to getting those estimates wrong and the degree to which we value non-declining welfare between generations (an alternative configuration of the inter-generational compensation problem).

¹⁴ Ibid, page 3

¹⁵ It will not be the case that targets and shadow prices are required for all environmental or other assets, and the Review will aim to clarify which characteristics do indeed make this approach possible and appropriate.

Box 1: Weak versus Strong Sustainability

The question of substitutability has been explored extensively in the literature in the debate between weak and strong sustainability. Weak sustainability involves valuing changes in environmental and manmade capital stocks to show whether, overall, the value of the portfolio of assets is increasing or decreasing. Strong sustainability argues that there are certain natural assets that are crucial and do not have substitutes. The distinction is particularly pertinent when it comes to measuring sustainability, because weak sustainability can be measured by a single indicator, namely the value of the aggregate capital stock. Because strong sustainability involves limiting the loss of certain types of capital, an aggregate indicator is only possible if all of the critical elements are sustained.

Weak sustainability has proved to be a useful concept in certain contexts. For instance the World Bank has used the Genuine Savings measure to illustrate that some countries that are dependent on depleting and exporting natural assets are failing to invest sufficiently in other forms of capital to maintain the value of their overall capital stocks and hence their consumption over time. However, it also indicates that OECD countries are sustainable, and therefore does not reflect the widespread concerns outlined at the beginning of this note.

Strong sustainability on the other hand has often been dismissed as being unrealistic as it fails to recognise real-world needs to make trade-offs, and can sometimes imply that all remaining natural assets need to be preserved. However, the Review's literature review argued in favour of a more moderate version of strong sustainability, where we seek to identify certain critical resources that are crucial for continued human wellbeing and which have no substitutes.

Recognising the value of both approaches begs the question of whether, in measuring and moving towards sustainability, it is sufficient to maintain some measure of the overall value of the capital stock, and to accept policies and projects that are consistent with this? An approach, which arguably moves beyond the weak-strong dichotomy, is to recognise that there exist environmental and other limits that cannot be safely breached without jeopardising future wellbeing, but that within these limits we wish to use resources efficiently. This could mean preserving an asset if the value (as indicated e.g. by Willingness to Pay) is very high, or using a shadow price to indicate the scarcity of the remaining available resource.

Beyond marginal analysis?

24. Of course, the above is only true when impacts are strictly marginal (in the sense that they do not affect the long-term growth path of the economy) and where it is feasible and appropriate to use targets to reflect irreversibility. At the suggestion of both Giles Atkinson and Paul Ekins, the Review is investigating whether some test for a change in the overall level of assets in the economy (perhaps framed as an “asset check”) would provide useful information to decision makers faced by a policy with non-marginal impacts. For instance, if a policy could be expected to have a very large impact on one asset and perhaps breach its target, an asset check could examine the overall change in the *potential to create wealth over time*.
25. Putting together target-consistent shadow prices where appropriate and the concept of a check of the potential to create wealth over time, we may have a powerful set of tools with which to augment SCBA. However, there are very practical considerations that demand significant work around identifying assets that require targets, investigating precisely how to set these targets and developing and recommending asset checks without introducing large additional burdens on policy appraisers. Furthermore, much of the above is applicable to natural capital but far from sensible when considering other forms of capital (social/man-made etc). More work is needed particularly on social capital, and the Review will be working closely with Social Researchers in Defra and across government who are currently engaged in a project to appraise social impacts.
26. With such caveats in mind, the next section discusses how to make sustainability assessment tools work in practice.

Making it work

27. Continuing with the language of capitals and assets, the most obvious first step towards making sustainable development useful for decision-makers is to identify the relevant assets to sustain. Secondly, for each of these assets we need to establish the levels below which they should not be allowed to fall as a result of any one generation's actions and the abatement or compensation necessary if these limits might be breached. Finally, we come to consider how we can ensure that policy decisions are clearly and transparently taken in the light of the trade-offs involved in sustainable development.

Prioritisation

28. A significant difficulty with the concept of sustainable development is that it can include consideration of almost everything; there is considerable work to do to effectively prioritise the efforts of sustainability practitioners. It is neither reasonable nor necessary to envisage limits on all forms of capital that are in decline since only certain assets will have binding constraints with significant irreversible impacts (because they are rival between generations) that require immediate action to control.

29. For instance, availability of stocks of fossil fuels has been a long-standing sustainability concern. However, many argue that because the impacts of climate change would become devastating long before we have exhausted available fossil fuel supplies, it is the earth's capacity to absorb greenhouse gases and their damaging effects that is the binding constraint, not stocks of fuel.

30. The Review is exploring how this prioritisation might take place. Early thinking suggests the need for a review of the suite of environmental assets to determine which ones are both critical and substantially at risk under a "business as usual" scenario. This would need to link into the work of scientists and statisticians working in this area and various projects at the domestic and international level¹⁶.

¹⁶ For example, the UK National Ecosystems Assessment project announced in 2008 by Defra will result in the most comprehensive picture ever of our natural environment, the benefits it provides to society, and how it is changing. The results will be used by Government to prioritise work so that the natural environment is enhanced and damage to it, including biodiversity loss, is effectively tackled. The Economics of Ecosystems and Biodiversity (TEEB) project will evaluate the costs of the loss of biodiversity and the associated decline in ecosystem services worldwide, and compare them with the costs of effective conservation and sustainable use. It is intended that it will sharpen awareness of the value of biodiversity and ecosystem services and facilitate the development of cost-effective policy

From that further work could be initiated to develop a more comprehensive priority list, recognising various limits and targets are already in operation in several areas and identifying the stocks, thresholds and appropriate targets for each asset, along with shadow prices where possible and appropriate. This approach seems particularly appropriate to certain types of environmental capital, and the Review is exploring whether other forms of capital might require an alternative approach.

Targets, abatement and compensation

31. Whether or not targets, shadow prices and an asset check are the right approach for all assets (even some types of environmental capital have location-specific values that may complicate target-setting), the issue of intergenerational compensation will arise. Within a single generation it is assumed that winners of one policy could compensate others so a positive NPV represents the potential for Pareto improvement in the economy.¹⁷
32. To ensure compensation across generations however, “compensatory offsets” for impacts of policy could be used so targets are met or overall assets maintained.¹⁸
33. Targets need to reflect not only the evidence on what is a sustainable stock of asset x (in a renewable sense, for instance fish stocks), but also the trade-offs that are deemed acceptable between different assets at different times. Identifying these targets will require extensive cooperation between analysts, scientists and society more generally, and additionally provides the opportunity to give explicit consideration to future generations in a way that we currently do not.
34. The above is deliberately vague on what intergenerational equity function¹⁹ to take since this is a clear political decision, but it is intended to demonstrate that in

responses, notably by preparing a 'valuation toolkit'. Understanding more fully the economic costs of ecosystem and biodiversity loss and preservation will help improve governments' abilities to prioritise conservation measures at the national and international level.

¹⁷ In economics, a Pareto improvement occurs where the allocation of resources is changed in a way which makes one or more individuals better off, without leaving anyone worse off.

¹⁸ For example, in June 2009 Defra has published a scoping study for the design and use of biodiversity offsets in an English context – see: statistics.defra.gov.uk/esg/reports/Biodiversity%20Offsets%20FINAL%20REPORT%20Defra%2012%20May%202009.pdf This would also help ensure compensation within generations.

¹⁹ Economics teaches us to target efficiency and welfare maximisation, so it is tempting to discuss intergenerational welfare maximisation rather than intergenerational equity. However, in recognition of the fact that welfare maximisation across generations implies an ethical position on intergenerational equity, we prefer the more generic term.

practice, it is by no means impossible to use SCBA within a constraint that preserves intergenerational efficiency, or indeed equity. It is worth noting that merely being more transparent about the implied intergenerational distribution of costs and benefits that result from a decision is likely to initiate policy innovation to make the distribution more equitable.

35. The more difficult issue is what to do about abatement and intergenerational compensation when a policy has clear non-marginal impacts – in this case targets and shadow prices that reference the long-run direction of the economy are less useful, since the long-run direction will change. This is something the Review continues to explore, with particular attention to pricing-in the cost of compensation plans, and designing credible commitments to implement these.

Ownership

36. Currently, there is no single body responsible for ensuring that Government policy appraisals consider everything that falls under the wide umbrella of sustainable development in the way that the Better Regulation Executive is responsible for Impact Assessment (and has strong political backing). There is a risk that even with a clear conceptual framework and new guidance on sustainable development in policy appraisal, policy- and decision-making will not appreciably improve.
37. The Review has not yet started to think about how compliance with policy can be enforced. One suggestion is to assign a central “owner” to each critical asset, responsible for monitoring its stock in much the same way that DECC is responsible for monitoring progress towards meeting our GHG emissions targets. Of course, carbon is a particularly neat example and this approach may not be so applicable for assets with less uniform (more location-specific) impacts.

Emerging recommendations

38. This paper has discussed a number of shortcomings in the way government conceptualises sustainable development and has attempted to distil critiques of current practice in appraisal with a view to responding to these. The following recommendations will be refined in the next phase of the Review.

Recommendation 1:

Sustainable development assesses the capacity of three broad categories of assets in relation to meeting the needs of this and future generations. The three categories are 'produced' capital (ie: manufactured and built assets, sometimes including human capital), environmental and social capital. However robust measures of social capital do not exist and are probably some way off. In the absence of measures of social capital, **the assessment of social impacts of policy should be more systematic and consistent across government**. Further work on developing measures of social capital should also be undertaken, though this is for the longer term.

Recommendation 2:

More needs to be done to help policy makers to incorporate environmental externalities properly in social cost-benefit analysis. This means better guidance on what to take into account and on how to do it. It also requires further work to improve estimates of key external costs and benefits, including more primary studies to give a better assessment of the values of costs and benefits in different locations and circumstances; and development of 'benefit transfer' techniques allowing estimates from one or more studies to be used in the analysis of externalities in different locations with some similar characteristics.

We also recommend greater use of shadow pricing in policy and project appraisal, where possible developing a system of shadow prices consistent with Government targets and limits. To this end, a comprehensive set of existing limits, and their status in national or European legislation, needs to be compiled.

Recommendation 3:

An ‘asset check’ should be investigated, allowing a rapid assessment of the potential impact of proposed new policies and projects on the stock of specific environmental assets. It should focus on environmental assets regarded as essential to social and economic activity. As well as identifying where the flow of benefits from environmental assets is jeopardised where they are in or nearing an advanced state of depletion, this approach could also be used to assess changes in the stock of assets available to future generations (see intergenerational equity, below). We also propose to examine whether individual Departments should be assigned responsibility for assessing and reporting on the condition of specific assets.

We recommend that a scoping study on the ‘asset check’ be undertaken quickly alongside development of the National Ecosystems Assessment (NEA). The NEA will provide much of the scientific information needed to assess the existing condition (and likely future trends) of environmental assets in the UK.

Recommendation 4:

The Department for Business’s Impact Assessment guidance should define more tightly what is required before Ministers can be advised that a new policy option or project proposal is consistent with sustainable development; in particular we propose that Impact Assessments should not confirm that proposals are consistent with sustainable development unless:

- for all policy proposals with significant environmental impacts, the guidance on incorporating external costs and benefits and/or shadow prices have been followed;
- for all policy proposals which have a non-marginal impact on the stock of environmental assets, or which jeopardise an environmental limit (whether identified by the science or specified in policy), Ministers have been advised of this and offered compensating measures which offset this negative impact of the proposal.

The second condition for non-marginal impacts would help to ensure that no single policy change jeopardises the Government’s environmental commitments, while allowing substantial flexibility in how they are met. The feasibility of identifying offsetting measures in each and every case needs to be investigated in the next phase of our work. The development of the ‘asset check’ scoping study (recommendation 3) is potentially an important step towards this.

Recommendation 5:

More transparency is needed in assessing the impacts of current policy on future generations: The use of discounting in assessing the impact of current decisions on future generations can be extremely opaque – both for policymakers and for the public.²⁰ Development of a system based on the ‘asset check’ (see recommendation 3 above) which assesses how much of different kinds of environmental asset we expect to pass on to future generations, and how these are affected by current policy options, should be considered. Combined with an assessment of the discounted costs and benefits of consuming or preserving these assets, this would allow a more transparent set of judgements to be made on how much we want to pass to future generations.

Recommendation 6:

The definition of sustainable development in the UK’s strategy document ‘Securing the Future’ could be refined to make it more ‘operational’. This Review has found a broad connection between the structure of sustainable development set out in the strategy, and the steps needed to assess whether individual policy and investment options are consistent with it – particularly adopting the ‘three capitals’ approach based on ‘produced’, environmental and social capital. However the connection between the principles and ‘what to do’ is not particularly transparent, and more could be done to set out the definition of sustainable development in a way which makes its implications for decision-making clearer.

²⁰ Recent discounting guidance issued by HM Treasury has been useful in improving the transparency of the methodology, identifying an approach to the discounting treatment of projects with very long term impacts on the wealth of future generations, see:
www.hm-treasury.gov.uk/data_greenbook_sugguidance.htm

Remaining questions and next steps

39. The discussion above has set out how SCBA alone is not sufficient to ensure any particular level of intergenerational equity, but with a few additions we can overcome many of its limitations. There remains, however, a significant amount of work to do before policy makers can routinely use these techniques in policy appraisal.

40. In the next phase of work, the Review will:

- publish interim Green Book Supplementary Guidance on how to improve the transparency of intergenerational impacts;
- undertake a literature review on critical assets, identifying more clearly the characteristics of these assets that require them to be treated differently in policy appraisal, and naming specific assets that existing research has previously highlighted;
- publicly invite views on the emerging recommendations in this report, and how to place existing guidance on appraisal and emerging guidance on intergenerational impacts within a coherent overall framework for sustainable development; and
- produce a revised sustainable development test for inclusion in the revised guidance for impact assessments.

41. These four outputs will feed into longer-term work, which will:

- examine and develop approaches to the measurement of social capital, building on the work on social impacts of social researchers in Defra and more widely, with a view to incorporating social capital more explicitly into guidance;
- produce new robust Green Book Supplementary Guidance on appraisal of policies with intergenerational impacts. This Workstream will be led by Defra and HM Treasury;
- investigate how 'asset checks' could be developed, alongside the National Ecosystems Assessment; including identifying environmental assets which make a significant contribution to social and economic activity; and identifying the current and prospective condition of these assets, identifying any which are at or near critical limits; this should make use of work on the characteristics of critical assets identified in the literature review;

- produce and invite views on a range of scenarios in which identified critical assets are allowed to decline to different extents, to begin the process of understanding and identifying appropriate targets and thresholds for critical assets. For environmental assets, this will be led by Defra, working very closely with scientists and other experts on concepts such as safe minimum standards, resilience, irreversibility and the precautionary principle. Departmental leadership of work on social assets has still to be considered; and
- produce a final project report outlining the preferred framework for appraising sustainable development and further Green Book Supplementary Guidance if required.

42. In addition to the above, Defra economists will be working on a number of projects that will be of use to the Review. Within Defra's Environment & Growth Economics team, there is now a branch dedicated to examining the links between the environment and productivity, and how using and protecting natural assets can enhance productivity (both in the short and the long term). These economists will work closely with those taking forward the actions resulting from this Review.

43. Drawing on expertise from across Defra, the Environment and Growth Economics team is leading on the production of two discussion papers: one looking at the theory and empirical evidence behind the relationship between economic growth and the environment, and the second discussing the case for treating natural capital distinct from other types of capital and the complexities of valuing the benefits of a healthy natural environment.

44. Defra's Natural Environment Economics team continue to work on valuation of a wide range of environmental areas: air quality, biodiversity and ecosystems services, water and soils are notable examples where benefits transfer, willingness to pay techniques and target-consistent pricing are all under investigation. These areas represent opportunities to apply the framework discussed above in a practical context, "road-testing" it as the Review's recommendations develop. For instance, this team is currently exploring target consistent pricing in air quality appraisal, similar to the work undertaken for carbon pricing.

45. The Review's efforts to date have purposely avoided prescription of how targets on critical assets should be set, and on whether or how to sum capital into an asset check when a policy changes the long-term path of the economy. Both of these

extensions to the current work will require significant input from specialists, and will likely reopen other debates such as those concerning discount rates.

46. There is more to say on the political economy of targets; setting targets may be as much a political decision as an analytical one, since it requires a judgement on the substitutability of asset depletion today and in the future. Economists will naturally prefer to target a path of intergenerational welfare maximisation, but in the face of severe uncertainty over what this path is, it is necessary to recognise the judgements that must be made. Setting these targets will force policymakers to make explicit assumptions (which are sometimes already present but often implicit rather than explicit) about, for instance:

- the ability of markets to adequately reflect long-term scarcity and substitutability, and
- the acceptable levels of risk in the presence of uncertainties regarding environmental limits.

Making sensible, informed judgements on these questions also puts great emphasis on insights from natural science. The UK National Ecosystems Assessment will advance our understanding, but science will also need to inform judgements about the substantial uncertainties that will remain.

47. These decisions need to reflect both the needs of future generations, and more immediate concerns about growth, prosperity and wellbeing. The next phase of our work will aim to identify how – for individual policies – these objectives can be reconciled, and where they cannot, how the trade-offs between them can be assessed.

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