

GES Review of the Economics of Sustainable Development



GES

GOVERNMENT ECONOMIC SERVICE


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Government Economic Service Review of the Economics of Sustainable Development **Findings**

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Government Economic Service and Department for
Environment, Food, and Rural Affairs

July 2010

DISCLAIMER:

This is a Government Economic Service Review of how to improve the analytical advice given to Ministers. It is not a statement of Government policy

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Government Economic Service Review of the Economics of Sustainable Development **Final Report**

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Foreword



Richard Price

Chief Economist, Defra and Member of the GES Board

This paper concludes the GES Review of the Economics of Sustainable Development. The purpose of the Review was to improve the analytical basis for advising Ministers across government on the consequences of individual policy decisions for 'sustainability'. We have focused on how to take better account of policy impacts on the environment and on society which:

- have significant impacts on individuals' wellbeing but are hard to measure;
- have long-term, sometimes irreversible consequences; and
- have significant consequences for future generations.

This Report sets out ways to improve the analysis which supports advice to Ministers: is not a statement of Government policy, nor does it represent the views of Ministers.

I hope that this Review represents a step forward in the appraisal of sustainability in government. At the outset we found that while existing guidance helped to set out the wide range of factors which influence sustainability, it had little practical advice for those analysing alternative different policy options or for helping to choose between competing alternatives.

In the UK, most policy decisions are informed using social cost benefit analysis (SCBA) using an approach set out by HM Treasury. This helps officials to set out the relative merits of alternative policy approaches when advising Ministers. In the Interim Report we identified a number of ways in which existing approaches to SCBA can be improved to give better assessments of the impact of policy on the environment. This Report sets out the progress that has been made.

More fundamentally, we proposed to move to a 'capitals approach' for assessing sustainability, which shows more explicitly whether the stock of wealth-creating assets we pass on to future generations is better or worse than what is available to us today. Using this approach, it is easier to see which aspects of sustainability are well reflected in SCBA and which are not. Research for this Review suggests that much of what is needed to assess sustainability is, in principle, already taken into account by SCBA when it is done well. This means that government is already doing much to ensure that decisions taken are compatible with sustainability. However there are some circumstances in which standard SCBA does not reflect the full consequences of policy choices – particularly where there are large, non-marginal impacts or where the consequences are hard to reverse. We have identified steps which can be taken to adapt SCBA to reflect these when presenting options to Ministers.

While this Review has made progress on environmental valuation, there is still work to do on social impacts and social capital so that these can be integrated consistently into mainstream appraisal. We have set out what needs to be done, and this work will now be developed by the Social Impacts Task Force, a group which will draw on analytical expertise from across UK government departments and leading researchers from outside government.

Finally, this Review has helped move beyond thinking of economic growth and environmental performance as mutually exclusive alternatives. There is no fundamental incompatibility between long-term economic growth and the environment: indeed there are many reasons why they go hand in hand. In this context we have also examined, in a paper published with the Final Report, the relationship between GDP growth and the broader wellbeing of society.

I hope that the approaches developed by this Review, and which are being incorporated into mainstream policy analysis, mean that we are well placed to see that, as the economy grows and prospers, our environment and society also become stronger, and that we leave them in a good state for future generations.

Richard Price

July 2010

Summary

- i. This Final Report concludes the Government Economic Service Review of the Economics of Sustainable Development. This project, which began in late 2008 alongside several other GES Board focus groups, aimed to turn the UK's sustainable development principles into a workable framework for the appraisal and evaluation of decisions in government, and to produce practical help and guidance to aid this goal.
- ii. An Interim Report was published in October 2009,¹ setting out the results of the group's call for evidence across Whitehall, the literature review conducted by Giles Atkinson of the London School of Economics and the Review team's own findings. It concluded that although the UK's sustainable development aims were currently expressed as an 'integrated' approach, a 'capitals' approach would be the best way to assess sustainability in the context of economic appraisal and evaluation.
- iii. In policy development terms, this would involve using social cost-benefit analysis (SCBA) to ensure that policies were consistent with sustainable development. However, the literature review revealed that although SCBA could take us a long way to assessing sustainability, the approach should be augmented to take account of the overall long-run direction of potential for wealth creation (which contrasts with SCBA's partial equilibrium approach), and the need to account for thresholds in environmental systems, irreversible impacts and inter-generational impacts.
- iv. The Interim Report provided recommendations to help operationalise this thinking in the appraisal of policy options. This report sets out the steps taken in the second stage of work to put these recommendations into practice in two ways: first, by improving how SCBA takes into account both important risks that do not have a monetary value and inter-generational impacts; and second, by investigating the potential to augment SCBA with an 'asset check' to account for large, irreversible impacts on assets that are essential to social and economic activity.
- v. This Final Report also sets out the Review's developments in thinking on social capital and how this will be taken forward. Lastly as the Review has focused on policy appraisal and evaluation the Report recognises that work on economic and well-being indicators is now being taken forward, and that the findings of this Review have implications for the development of those measures.

¹ The Interim Report is available at: www.defra.gov.uk/evidence/economics/susdev/index.htm

Introduction

1. This final report concludes the GES Review of the Economics of Sustainable Development. The Review was launched in Autumn 2008, supported by an Interdepartmental Group on the Economics of Sustainable Development, following a conference jointly hosted by the GES and the Sustainable Development Commission (SDC) at the Treasury.
2. The terms of reference for the Review set out 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.
3. The Review's call for evidence yielded useful results and revealed a view wide-spread across government that current guidance on Sustainable Development does not provide a readily useable approach to factoring sustainability into policy advice – particularly where this involves choosing among alternative policy options. Following this, a literature review was commissioned and carried out by Giles Atkinson;² this, and its peer review by Paul Ekins, helped provide an extremely useful overview of the current thinking on the economics of sustainable development and issues related to measuring it.
4. These pieces of work informed the Review's Interim Report, published in October 2009. This report set out the issues surrounding the economics of sustainable development and reported the findings of the Review: on the current approach to sustainable development and the different conceptual frameworks (weak versus strong sustainability).
5. This report concludes the GES Review of the Economics of SD by drawing together the work carried out to date. It takes into account the findings in the Interim Report but also serves as the final statement of the Review's thinking on the economics of sustainable development. This report documents the steps taken so far to implement the recommendations of the Interim Report and set out steps to monitor and evaluate progress towards full implementation of the recommendations. It also highlights work that is planned after the Review has been concluded, and proposes some pieces of work that would make progress towards the two objectives set out in the terms of reference of the Review.

2 The Literature Review is available here: www.defra.gov.uk/evidence/economics/susdev/documents/sd-review.pdf

Background to the Final Report

6. The Interim Report set out the results and findings of the first year of the Review's work to October 2009. During this time, the Review conducted a call for evidence and commissioned a literature review by Giles Atkinson at the London School of Economics, which was peer reviewed by Paul Ekins (UCL).
7. The call for evidence and the literature review identified the key issues and difficulties with the appraisal of sustainability in government, provided an overview of the conceptual frameworks underpinning the economics of sustainable development, and looked at how Social Cost-Benefit Analysis (SCBA), which is the primary appraisal tool in Central Government, might be augmented to take account of sustainability concerns more comprehensively.

Conceptual frameworks and the capitals approach

8. The call for evidence revealed several themes:
 - Sustainable development (SD) as currently defined was not specific or measurable;
 - Guidance on appraisal in relation to SD was not clear or, worse, gave conflicting objectives;
 - Current guidance looked at how to make a given option more sustainable, rather than being a tool to choose the most sustainable option;
 - Many issues relating to sustainability did not have guidance on valuation or measurement, which made it impossible to assess trade-offs; and
 - It was unclear how SD guidance interacted with other policy appraisal tools
9. Giles Atkinson's literature review covered issues surrounding the theory and practice of the economics of sustainability. There were two objectives: examine the options for an overarching framework to establish the principles of SD and how it is achieved; and to assess more specific options for incorporating SD into policy and project appraisal in order to assess better how these actions contribute to SD.
10. This report found that there were two main overarching frameworks for considering SD in government strategies around the world: the *integrated view* and the *future-oriented view*.
 - The *integrated view* looks at both present and future issues, and tends to be organised around broad themes of the economy, society and the environment;
 - The *future-oriented view*, a subset of the integrated approach, takes the perspective that the intergenerational aspects of sustainable development are key and is concerned with the preservation of assets into the future. This is often further developed by economists into the capitals approach; and

- The *capitals approach* thinks of wealth as the basis for the creation of future wellbeing (thus a subset of the future-oriented view). Development prospects are determined by the current level of wealth (or assets) in the economy. This wealth takes the form of three capital stocks: natural (environmental), man-made (physical) and social (human) capital.
11. In the UK, the approach to SD has been based on a widely-accepted definition of sustainable development that takes the integrated approach: a healthy economy, a just society and living within environmental limits. Added to this were good governance and using sound science responsibly. This is a broad definition which consists of a set of high-level principles that pertain to both current and future wellbeing.
 12. However, its implementation into an operational way of influencing policy suffers from its breadth and from the fact that the principles are too general to indicate either whether or not a given policy is consistent with them or how to make trade-offs where they conflict. The call for evidence showed very clearly that the guidance produced for those assessing the impacts of policies was not helpful in appraising the sustainability of policies.
 13. The literature review argued that the *capitals approach* takes into account only the future-oriented aspects of SD (although this in itself is quite broad), which is why it has not been adopted widely as a definition, however the aspects that it does not include – a focus on the present and intra-generational equity – are usually taken into account in political thinking and policy formulation anyway. Thus, a practical implementation of the wider definition might be to use a capitals approach in appraisal: to ensure that stocks of capital are maintained so that the overall capacity to deliver wellbeing is non-declining over time.

Sustainable development and SCBA

14. The benefit of the capitals approach is that it leads logically to a practical step: the issuing of an 'asset check' to investigate how current UK policies and projects contribute to wealth, or whether they contribute to degrading assets which are critical for sustaining social and economic activity.
15. The literature review found that SCBA can go a considerable way towards assessing how any given action contributes to sustainable development, although as a micro level appraisal tool it cannot inform completely the bigger picture of whether enough is being saved overall for the future. SCBA is still a useful tool for assessing the direction of travel of sustainability provided that the non-market impacts are valued correctly, and that future impacts are considered, such as the Green Book's use of a declining discount rate for impacts in the distant future.
16. There are concerns with this, however. The prices used to value non-market impacts may not be correct, for example the values placed upon environmental changes might not properly reflect the true value of what is lost when natural assets are degraded or destroyed. This is complicated by not knowing what value future generations might put on these assets.

17. The conclusion that SCBA can play a useful (if not complete) part in assessing sustainability under certain conditions leads to the development of a couple of broad areas of work. One is to improve as much as possible the valuation of impacts across as great a range of assets as possible to enable SCBA to better reflect sustainability concerns and enable better policy making on a micro level. The other is to discern how many assets fall beyond straightforward CBA. This may occur for certain types of assets where policy options will mean non-marginal or non-linear changes in that asset. SCBA combines all costs and benefits into a single metric based on the fundamental assumption that all assets can be traded off against each other, though this may not be the case for certain assets (leading towards a strong sustainability view).³
18. The interim report therefore looked at means to improve both of these two strands of thinking, and ways on implementing these into current practice in appraisal and evaluation.

Recommendations

19. The Interim Report contained six recommendations, repeated in full here:

Recommendation 1:

Sustainable development assesses the capacity of three 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 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 study 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, developing a system of shadow prices consistent with Government targets and limits, to help to minimise the overall cost of meeting these targets.

3 For an explanation of weak and strong sustainability, please see the Interim Report (Box 1)

Recommendation 3:

An ‘asset check’ should be investigated, allowing a rapid assessment of the potential impact 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) develops. The NEA will provide much of the scientific information needed to assess the existing condition (and trend) 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 it 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; and
- 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 the impact of the proposal.

The second condition for non-marginal impacts will help to ensure that no single policy change jeopardises the Government’s environmental commitments, while allowing substantial flexibility in how they are met. The development of an ‘asset check’ (recommendation 3) is potentially an important step towards this.

Recommendation 5:

More transparency is needed in assessment of 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. We therefore recommend 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. Combined with an assessment of the 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 it 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.

Progress since the Interim Report

Examining the links between economic growth, wellbeing and sustainability

20. A debate exists about how to preserve the potential for future generations to enjoy wellbeing and living standards at least at the level experienced by this generation, and whether economic growth is necessary to achieve this.⁴ In particular, it has been argued that current economic growth is linked to environmental degradation which, left unchecked, would undermine wellbeing and lead to dangerous climate change. There is also a wider debate that seeks to understand how best to measure societal progress,⁵ with concerns that economic growth does not on its own adequately capture progress or sustainability. The report of the Sarkozy Commission for example makes recommendations for measuring progress at the whole-economy level, covering much the same ground that this review covers at the level of informing individual policy decisions.
21. The Review has considered these linked issues, and has produced a paper which sets out its thinking on this subject, *Economic growth, wellbeing and sustainable development*. The main conclusions are that:
- economic growth and wellbeing are highly linked;
 - achieving growth in future requires absolute decoupling⁶ of economic activity from environmental resource depletion and degradation, and avoiding breaching critical thresholds in natural assets;
 - GDP must be supplemented by other indicators when measuring progress to ensure that we are taking account of other factors related to wellbeing; and
 - indicators are required for certain assets, particularly environmental, to ensure that we preserve enough of these assets to maintain or increase future wellbeing.

Examining the links between social impacts and social capital

22. The Interim Report set out a 'capitals' framework for the consideration of the economics of sustainable development, but acknowledged that measurement of the broad range of societal consequences of policies would currently be best assessed within a social impacts framework. The following section explores the links and differences between social impacts and social capital.
23. There are a number of definitions of social impacts. For example, the Interorganizational Committee on Principles and Guidelines for Social Impact Assessment (2003) states:

4 These include Simms et al. (2010), Jackson (2009)

5 Joseph E. Stiglitz, Amartya Sen and Jean-Paul Fitoussi (2008): Report by the Commission on the Measurement of Economic Performance and Social Progress. See www.stiglitz-sen-fitoussi.fr

6 Absolute decoupling means stable or declining environmental resource use even as GDP is rising.

'By social impacts we mean the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society'.

24. The International Association for Impact Assessment's framework (2003) is very broad, conceptualising social impacts as changes to one or more of the following:
- people's ways of life - that is, how they live, work, play and interact with one another on a day-to-day basis;
 - their culture – that is, their shared beliefs, customs, values and language or dialect;
 - their community – its cohesion, stability, character, services and facilities;
 - their political systems – the extent to which people are able to participate in decisions that affect their lives, the level of democratisation that is taking place, and the resources provided for this purpose;
 - their environment – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
 - their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;
 - their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties; and
 - their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.
25. Just as there are various definitions, there are also different approaches for assessing social impacts which can be complex to operationalise. However, in addition to overall assessment of social impacts, awareness of the differential distribution of impacts among different groups in society, and particularly the impact burden experienced by vulnerable groups in the community, is of prime concern (Vanclay, 2003).
26. Bourdieu (1986) defined social capital as 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition'. ESRC (2008) describes social capital as the connections among individuals and their social networks and the norms of

reciprocity that arise from them. Following Putnam (1995, 2000), three different forms of social capital are often referred to:

- bonding social capital, from membership of groups of similar people with strong ties, such as networks of friends, family and associates;
- bridging social capital, from membership of more diverse associations, with weaker links between individuals, such as interest groups or social and leisure clubs; and
- linking social capital – describing connections with people in positions of power, and good for accessing support from formal institutions. This differs from bonding and bridging, being concerned with relations between people not on an equal footing.

27. Social capital is an important issue for policy makers as it can strengthen the ability of communities to engage on issues directly affecting them and can generate positive outcomes, but it is worth noting that high levels of this resource are not always beneficial. For example, social capital is present in criminal networks, and strong ties between some people in any community may be experienced as exclusion by others.
28. Overall, social impacts cover a broad range of potential changes that may result from a policy, programme or project. Assessment of social impacts includes the full set of consequences for individuals and communities which result from a policy change or a project; including factors which are often not valued in cost-benefit analysis, even though in some cases they could be. Social capital meanwhile is an intangible asset giving resilience to and connection within a community. It can help to facilitate desirable social outcomes, including positive social impacts.

Implementing the Review's recommendations

29. Since the interim report, efforts have been made across Whitehall to implement the recommendations and to improve the tools available to policymakers to assess the sustainability of projects. This section sets out what has been done so far, the results to date, and progress on our approach to appraising sustainability in Government.

Progress on each recommendation

Recommendation 1:

30. The interim report acknowledged that the economic appraisal of social impacts was not nearly as well developed as that for economic and environmental impacts, and recommended better assessment of social impacts and social capital. To this end, Defra's social researchers were asked to look into improving guidance for those conducting social research (SR) across Government.
31. Initial work focused on adapting and extending guidance produced for Defra on appraising social impacts for use by the Government Social Research Service (GSR). This work is ongoing, building on the approach developed by the International Association for Impact Assessment (IAIA), wider Social Impact Assessment (SIA) methodology and ideas submitted in response to Defra's external consultation on this issue in Spring 2009.
32. A cross-Government group on social impacts (the Social Impacts Task Force) has also been established. The Task Force will seek to develop a cross-government analytical approach to:
- reach a common definition of the concepts of social impacts, social capital and wellbeing; understanding how they interact with each other and with other measures of assets and social welfare; and their potential relevance for operations and decision-making;
 - map out existing measures and tools which help us to understand these concepts, and to assess whether they are getting 'better' or 'worse' both at a macro level and in relation to specific policy changes;
 - assess how these concepts fit with our established approaches to policy and project appraisal, set out in the Green Book and the Impact Assessment framework; in particular how they can be sensibly incorporated into social cost-benefit analysis;
 - identify the key gaps in our knowledge and data which prevent us from making this framework operational, and assess and prioritise what could be done to close those gaps;
 - assess existing approaches to valuing social impacts, and consider whether these can be applied more generally across government; and more generally propose a common approach to, and GSR guidance on, the analysis of social impacts.
33. The task group aims to report back on the initial mapping and evidence stage by autumn 2010.

Recommendation 2:

34. Increasing the scope and accuracy of environmental valuation techniques was a key conclusion of the literature review and the interim report. This resulted in recommendation 2 of the interim report, on the need for improvement on incorporating environmental externalities into SCBA.
35. Since the interim report, several pieces of work have been published that contribute to this recommendation. This includes a revised Wider Environment Specific Impact Test, within the Impact Assessment framework⁷ and the publication by Defra of value (benefit) transfer guidelines,⁸ *Valuing environmental impacts: practical guidelines for the use of value transfer in policy and project appraisal*, which aims to provide analysts with practical help through step-by-step guidance on valuing environmental impacts in policy appraisal. Training on these guidelines is currently taking place within the Defra network with further training opportunities for other government departments under consideration.
36. Defra has a newly formed *Natural Value Programme* that aims to make progress on mainstreaming how environmental values and valuing ecosystem services are taken into policy decisions across government. Ensuring the right tools for environmental valuation are available is one aspect alongside targeted work to enable and facilitate progress. Current new work includes the drafting of supplementary the Treasury's Green Book guidance on accounting for environmental impacts in policy and project appraisal.
37. The recommendation also proposed greater use of (cost based) shadow pricing for certain assets in specific circumstances, consistent with Government targets and limits. This approach is the subject of further exploratory work by Defra to consider in greater depth its merits, problems and practical implications. Box 1 provides an example of how shadow prices have been introduced to complement SCBA in relation to air quality.
38. Overall, it must be recognised that the goal of full environmental valuation still has a long way to go. This is an incredibly challenging area where values can be hard to elicit. Increased value transfer and use of shadow prices as described above will help, but these should be regarded as the start of the effort rather than the end of a process.

7 The test guidance can be found at: www.defra.gov.uk/corporate/policy/guidance/index.htm

8 See: www.defra.gov.uk/environment/policy/natural-environ/using/value.htm

Box 1: Air Quality: A pragmatic application of shadow prices.

Air quality is associated with a range of impacts on human health and the natural and man-made environment. Furthermore, the distribution of these impacts across the nation is unequal, creating notable equity issues. To manage the impact of air pollution, international obligations are established for emissions for specific technologies (emission limits) and minimum standards for ambient concentrations (limit values)¹. Recent experience has shown that technology standards alone are not sufficient to deliver compliance within the limit values for all pollutants in all areas of the UK.

Recognising this issue, in March 2010, Government agreed to adopt, following the recommendation of the Interdepartmental Group on Costs and Benefits air quality subject group (IGCB(A)), the use of abatement cost pricing to better reflect the impact of limit values in the policymaking process. This approach places monetary values on decisions which would contravene these obligations by estimating the cost to restore compliance. The use of this approach thereby both protects areas from exceeding international obligations and provides support to policymakers to undertake action to restore compliance.

The use of these shadow prices is complementary to the IGCB(A)'s central approach to monetise changes in air quality. The central approach looks to estimate social consequences of air pollution through established links to a range of outcomes (such as human health), which are then valued. Using this central approach in order to value air pollution impacts in monetary terms helps deliver higher standards of air quality where it is efficient to undertake such measures.

More information on these approaches is available from the Defra website (www.defra.gov.uk/evidence/economics/igcb)

¹ Limit values are established based on best available scientific evidence on the impacts of the specific air pollutant.

Recommendation 3:

39. Following on from the last recommendation, the third recommendation was to investigate the literature review's suggestion of an 'asset check' which could keep track of the impact of Government policies on a set of specific environmental assets. These assets should be those which were regarded as essential to social and economic activity.

40. The interim report proposed that an asset check for critical environmental assets should be undertaken alongside the UK National Ecosystems Assessment (NEA).⁹ Since the publication of the interim report, discussions have taken place with the NEA Economics team, led by Professor Ian Bateman at the University of East Anglia to establish ways in which the NEA could support an asset check approach. This work is ongoing, and the NEA is due to report in February 2011.
41. An important step which must be taken over the longer term is to identify more clearly the precise nature and scope of critical natural assets, and to elucidate more clearly how they benefit society and why they deserve particular status as critical assets (if certain assets are found to be critical, then we may need to go a little way beyond weak sustainability to ensure future wellbeing). Further work will then need to identify the safe minimum standards for these assets, in quantity or quality. Defra plans to develop a working approach to this assessment of the condition of critical assets as part of the newly formed *Defra Natural Value Programme* – so that the “asset check” can be used in policy appraisal. As highlighted above, the development of the UK NEA is a very important part of this.
42. As a step in bringing effects on environmental conditions more into play in policy appraisal, Defra will shortly be publishing a full summary of all statutory environmental limits which are currently in force. This will be used within appraisal, for example in the revised SD Specific Impact Test, and will help decision makers to identify when policy options proposals may contribute to the breach of a limit and highlight the need for mitigating or compensatory actions.
43. Understanding these critical assets and existing statutory limits, and ensuring that government sends clear signals to businesses regarding these limits, is an essential part of the transition to a green economy where natural assets are used sustainably. Simplifying frameworks for environmental regulation, helping businesses to understand environmental targets, and reducing administrative costs of environmental regulation are all necessary steps in encouraging innovation and investment.
44. The asset check will help to improve the understanding of sustainability and the risks surrounding environmental assets and resources. This understanding of risks is key to government’s ability to handle and compare environmental risks. To facilitate this, Defra has established a Risk Centre at Cranfield University, in collaboration with three of the UK Research Councils, to help build its environmental risk assessment capability. One of the

9 The UK National Ecosystem Assessment focuses on the terrestrial, freshwater and marine ecosystems across the UK and considers the services that these ecosystems provide to society.

A team of over 200 scientists and economists are critically examining how the levels of these services have changed over the last 60 years, and, by developing a range of future scenarios, will also consider how these services may change over time. This will enable it also to consider the most appropriate policy responses based on the changing needs of society and the continuing requirements of environmental systems.

For more information on the NEA, see www.defra.gov.uk/environment/policy/natural-environ/research/international-research.htm

Centre's tasks is to develop a strategic risk assessment tool characterising environmental risks according to key social, environmental and economic attributes. This approach will lead to a better understanding of the level of residual risk to society, the environment and the economy (given current investment in risk mitigation) and influence discussions with decision-makers about whether more or less risk can be tolerated, and how the risk might respond to increased or decreased investment. A better understanding of critical assets is key to establishing where risk can be tolerated.

45. Defra's work alongside the NEA is to look at the nature and scope of critical natural assets. However critical assets may not be limited to environmental assets. For example, the loss of cultural and heritage assets may have significant non-marginal or irreversible impacts that may adversely affect our ability to generate wellbeing in future. The Review has not considered the examination of non-environmental critical assets in conjunction with the NEA, but if non-environmental critical assets are found to exist then future appraisal guidance may need to be updated with appropriate steps to ensure that they are taken into account.

Recommendation 4:

46. One clear conclusion from the Review's call for evidence across Whitehall was that the current guidance on assessing whether policies and projects were compatible with the principles of sustainability was not adequate. The interim report called for clearer guidance that would define more tightly what was required before a policy option could be compatible with sustainable development.
47. The overall goal for this recommendation is to put in place an approach for appraising sustainability in the framework of the Treasury's Green Book – this may take the form of supplementary guidance. This will extend the framework to cover all appraisal within government, not just impact assessments. Defra is currently working with the Green Book team at the Treasury to put this in place.
48. As a first step towards full Green Book guidance, a completely revised Sustainable Development Specific Impact Test was developed for use in Impact Assessments. This was published in April 2010 alongside the new Wider Environment Specific Impact Test.¹⁰ The test is underpinned by the capitals approach and provides a framework within which to combine information about SD impacts with information from the rest of the Impact Assessment about the balance of monetised and non-monetised costs and benefits.
49. The test involves two stages, firstly considering the policy's SD-relevant impacts in particular relating to environmental limits and to intergenerational impacts, and secondly considering whether and how these impacts should be factored into further policy development, for example in terms of identifying mitigating or compensatory actions.
50. The guidance is a 'living' document and will develop in line with the latest evidence. In particular, the test will increase its coverage of social impacts when an appropriate framework has been developed and agreed with the Social Impacts Task Group.

¹⁰ Both tests can be found here: www.defra.gov.uk/corporate/policy/guidance/index.htm

Recommendation 5:

51. The interim report recommended greater transparency in assessing the impacts of current policy on future generations. Discounting is a useful tool helping to inform decisions with impacts into the future, and this is true for both short- and longer-term effects. The Treasury’s Green Book advises the use of declining discount rates, so that very long term impacts – including those on future generations – are effectively given greater weight. Nevertheless discounting alone can appear to lack transparency in its treatment of complex long term effects. Even with declining discount rates into the future in the Green Book, significant impacts that could affect future generations might not be valued properly by SCBA. We recommended that advice on the long term consequences of policy options should be spelled out more clearly, in particular, the effects on the quantity and quality of assets passed on to future generations should be transparent.
52. Progress has been made on improving this in the new IA template that was published in April 2010. BIS’s new IA template now contains an embedded sheet that must be completed to show the undiscounted profile of costs and benefits over the entire appraisal time period that forms the NPV. See the figure below for an example of how this looks.

Annual profile costs and benefits – (£m) constant prices

	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇	Y ₈	Y ₉
Transition costs	12345									
Annual recurring costs		12345	12345							
Total annual costs										
Transition benefits										
Annual recurring costs							12345	12345	12345	12345
Total annual benefits				12345	12345					

53. This was further augmented by a step in the associated SD Specific Impact Test which asked policymakers to state explicitly whether the distribution over time of the key monetised and non-monetised impacts had been assessed. Added to this was a further question on whether any significant impacts fell on future generations disproportionately. If so, the test requires that Ministers are informed and offered mitigating and compensatory measures that achieve the objective but offset these issues.
54. The possible development in the longer term of an asset check for critical environmental assets could help to ensure that current generations are passing to future ones sufficient natural capital (of the right variety) to sustain their wellbeing without compromising current wellbeing unduly.

Summary of work:

55. For ease of reference, the following table summarises the strands of work underway to improve the assessment of sustainability for policymakers, indicating when each is due to be completed.

Recommendation	Task/Activity	Deliverable and timings
1	Social Impacts Task Group	Autumn 2010: agree broad definition of social impacts, being clear about the role of quantification and monetisation and highlighting gaps and overlaps with current processes
	Incorporation of Social Impacts into IAs	Social Impacts to be assessed in the SD Specific Impact Test once guidance is developed by the Social Impacts Task Force
2	New guidance on valuing environmental impacts in appraisal	Defra are currently drafting new supplementary Treasury Green Book guidance on accounting for environmental impacts in policy and project appraisal. Revised guidance for policymakers was also published in April 2010 alongside the new template for appraisal in Impact Assessments
	Improve availability of value (benefit) transfer techniques	New guidance for policymakers published in 2010. Analysts are currently being trained in Defra, there may be scope for this across wider-Government as a next step
	Increased use of shadow pricing	Work is ongoing, some shadow prices already exist (carbon, air quality) and the value of shadow pricing for other assets are being explored by Defra
3	Investigate 'asset check' to find out what critical assets may exist, and the thresholds beyond which their levels should not fall	Asset check will be explored alongside the NEA, which is due to report in 2011. In the interim, Defra will commission research into the precise nature and scope of critical assets. The relevant thresholds would form a vital part of the SD SIT
	Draw up summary of current environmental limits in legislation	This will help policymakers inform ministers if limits will be breached, and lead to mitigating or compensatory action. It will also help businesses to get a clear overview of the full set of regulation affecting them. This should be delivered in 2010
4	Revised SD SIT	This guidance for policymakers was published in April 2010, alongside the new Impact Assessment template and guidance, and revised Wider Environment SIT. Guidance will be revised and updated when relevant new research is published, for example on appraising social impacts or on statutory environmental limits
	New Green Book guidance on sustainability	Guidance produced for Impact Assessments will be revised and adapted to be relevant to all types of appraisal beyond Impact Assessment, with the intention of making the two sets of guidance consistent. This should be delivered in the short term
5	New requirement to display inter-generational impacts in IAs	This was part of the package of measures in the new IA template published by BRE in April 2010, and also forms an important part of the SD SIT
	Ensure we pass enough critical assets to future generations	The development of an 'asset check' should help us to ensure that we are passing the right level and sufficient variety of natural capital to sustain wellbeing for future generations. The 'asset check' approach is being developed alongside the NEA, which is due to report in 2011. This may take the form of indicators to help us to track the overall sustainability of the economy

Future plans, remaining questions and next steps

56. This document represents the final output of the GES Review of the Economics of Sustainable Development. This Review set out to identify a coherent and practical framework which could be used to appraise sustainability in government appraisal and evaluation, and to make this framework operational so that it could be used to usefully inform ministers of the underlying issues and to identify easily the sustainability issues and differences between the options that they are offered.
57. The call for evidence and literature review helped to inform the Interim Report, which concluded that a capitals approach was both compatible with the UK's sustainable development strategy and represented a viable approach to economic analysis; and resulted in several recommendations which have been or are being implemented.
58. The aim of the Review's work has not been to develop new theory, but to review existing approaches to the economics of sustainable development to identify how it can be measured and assessed in practice, and to develop the tools to make this assessment possible. Significant progress has been made, as reported above, and a proportion of the work is still ongoing across government, with in most cases clear target dates for implementation.
59. Once all the work currently in progress has been completed, a clear methodology for assessing sustainability in impact assessments will be in place, with improved guidance for both sustainability and environmental valuation; an asset check to determine whether thresholds are likely to be breached and the risks associated with doing so, and assessment of social impacts. Together, all of this will result in improved advice to Ministers in making policy decisions.
60. At the moment, the new guidance applies to new policy proposals which require an Impact Assessment (IA). The logical next step for this work is to develop the guidance for IAs into updated Green Book guidance on appraising sustainability. The Treasury's Green Book is the guidance on appraisal for central government (which encompasses IAs), and is used to appraise decisions that may not be directly policy-related, for example procurement, operations and estates. This will extend the reach of this Review's recommendations and formalise it into official guidance that will be accessible for everyone, and is consistent for all appraisal across government, not simply policy decisions.

61. More work needs to be done to assess stocks of capitals other than natural capital, to ensure that we are on a sustainable macroeconomic path. The Review is primarily concerned with ensuring that individual decisions are consistent with sustainability. However this is at a disaggregated level, whereas sustainability is determined by the aggregate effect of all decisions, as noted in the literature review. There is therefore scope for work to link in the knowledge gained from this review to other work that is being carried out in government to develop sustainable development indicators reflecting the recommendations of the Sarkozy Commission.¹¹ This will help to achieve consistency between advice on individual policy decisions, and an overall assessment of economic, social and environmental sustainability for the economy as a whole.

Richard Price

July 2010

11 Joseph E. Stiglitz, Amartya Sen and Jean-Paul Fitoussi (2008): Report by the Commission on the Measurement of Economic Performance and Social Progress. See www.stiglitz-sen-fitoussi.fr

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Government Economic Service Review of the Economics of Sustainable Development **Interim Report**

Richard Price and Chris Durham

October 2009

DISCLAIMER:

This is a Government Economic Service Review of how to improve the analytical advice given to Ministers. It is not a statement of Government policy

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 Book,¹ and in Impact Assessments of all proposals for new or revised policy.

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

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

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 recommendations² include:
 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

² The Review's emerging recommendations are set out in full below.

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).³ 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 change.⁴ 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 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.

3 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

4 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

7. However, advocates of sustainable development (SD) often summarily reject SCBA arguing that it is too reductive to capture usefully the complexities of SD.⁵ The Review has condensed these objections into three focused arguments, which the remainder of this paper addresses and to which it suggests potential solutions:
- SCBA is most appropriate as a strategic aid⁶ 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 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; and
 - 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.

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; and
 - 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 webpage⁷. 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.

5 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

6 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.

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

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 sustainable,⁸ 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; and
- 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.

⁸ 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

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 themes.⁹ 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 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 Brundtland¹⁰ 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).

9 Atkinson 2009 (GES literature review, page 3)

10 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."

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 value¹¹) 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 market¹² 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 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 development:¹³
 - 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; and
 - 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.

11 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

12 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.

13 Ibid, page 3

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.

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 characteristics:¹⁴ 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).

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.

¹⁴ 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.

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 level.¹⁵ 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.

15 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 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.

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.¹⁶
32. To ensure compensation across generations however, “compensatory offsets” for impacts of policy could be used so targets are met or overall assets maintained.¹⁷
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 function¹⁸ to take since this is a clear political decision, but it is intended to demonstrate that in 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.

16 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.

17 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.

18 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.

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 (i.e. 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 has been followed; and
- 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.¹⁹ 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.

¹⁹ 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_supguidance.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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Government Economic Service Review of the Economics of Sustainable Development **Summary**

Department for Environment, Food and Rural Affairs

July 2010

DISCLAIMER:

This is a Government Economic Service Review of how to improve the analytical advice given to Ministers. It is not a statement of Government policy

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Summary

Summary

Across UK Government, social cost-benefit analysis (SCBA) is a key tool in the development and appraisal of policy options, and forms part of the advice which Government Ministers receive when taking policy decisions.

Done well, SCBA can take account of many of the elements of sustainable development, but there are some respects in which it does not reflect the full consequences of policy choices – particularly where these are hard to value, particularly large, irreversible, or affect future generations.

The GES Review has focused on tackling these problems in a practical way, so that they are better reflected in advice to Ministers. In particular it sets out an approach which draws out the relative merits of alternative policy options to support decision-making. This complements indicators of sustainability, GDP and wellbeing as measures of progress for economy as a whole.

Context

Sustainable development (SD) provides an approach to ensuring that today's population is able to enjoy an improving quality of life, without compromising the quality of life of future generations.¹ Actions we take today can have large effects far into the future, and the overall effect of many seemingly small impacts may become large over time. Ministers should be given as much information as possible on impacts and their effects on future wellbeing. This Review aims to bring together the analysis needed to support good decision-making, aiming to ensure that trade offs are made in a joined up and comprehensive way.

The Government Economic Service (GES) Review was launched in 2008 to investigate SD in the policy process. The questions posed were: a) **Do we have a clear framework for considering SD in policymaking?** i.e. are SD issues taken into account in assessing the impacts of policy and is this reflected in advice to Ministers? b) If not, **how can the framework be improved or supplemented?**

This paper is a brief summary of the review's findings and recommendations.

1 Defra: "What is Sustainable Development?" www.defra.gov.uk/sustainable/government/what/index.htm

A – What is economic appraisal?

Policy Appraisals weigh up the benefits and costs of each policy/project:

1. The Treasury's Green Book² sets out the framework for this, including the requirement that economic, social and environmental aspects must be considered.
2. Many impacts (Environmental: e.g. effects on natural habitats or pollution levels, Social: e.g. health, time impacts) are not fully reflected in market values. These non-monetary impacts are translated into monetary values, where possible.
3. Costs and benefits in the future are discounted³ to be valued at today's prices.

This process is called social cost benefit analysis (SCBA), since the full range of benefits and costs affecting society are included, not just those involving financial gains or losses. Being able to compare policy impacts in terms of monetised costs and benefits means that we can determine whether or not a policy leads to an improvement in welfare (i.e. whether the lifetime benefits outweigh the lifetime costs of the policy), and also enable comparisons across potential policy options.

B – What is Sustainable Development?

The latest UK definition of SD⁴ states that *the goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations*. This is supported by 5 principles: (i) a just society (ii) living within environmental limits (iii) supported by a healthy economy, (iv) good governance and (v) sound science.

C – Challenges with considering SD in economic appraisal:

A positive result from SCBA, where the benefits outweigh the costs does not necessarily mean that a policy option is consistent with sustainability, for a number of reasons:

1. Lack of a workable framework for thinking about SD. Ultimately, we have to strike a balance between all these aspirations. SD has a wide definition (see B, above) which can be difficult to use for making decisions: in particular it provides no guidance as to how to make trade-offs between the different elements of sustainability.

2 www.hm-treasury.gov.uk/data_greenbook_index.htm

3 Future benefits and costs are 'discounted' i.e. are valued less than today's benefits and costs. This is to take into account our growth rate and resulting higher future income; the possibility of catastrophe; and our preference for immediate rather than future consumption. Recent Green Book supplementary guidance has presented a revised approach: for impacts greater than 30 years, where generational transfers need to be considered, this last part (the preference for immediate consumption) is dropped. Discount rates are declining after 30 years. Supplementary Green Book Guidance on Intergenerational Transfers and Social Discounting [www.hm-treasury.gov.uk/d/4\(5\).pdf](http://www.hm-treasury.gov.uk/d/4(5).pdf)

4 defraweb/sustainable/government/publications/uk-strategy/index.htm

The Review suggests that a 'capitals' framework can capture the Government's key principles and make it easier to assess sustainability.

'Capitals' Framework: assumes that future wellbeing flows from current wealth (in economic terms, stocks of capital). These stocks are: natural capital (e.g. soil, biodiversity, fisheries, climate system), physical capital (e.g. buildings and machinery), human capital (e.g. knowledge, skills) and social capital (e.g. trust, behavioural norms).⁵ Different capitals provide different flows of benefits: for example, woodlands (natural capital) provide well-being in the form of a place for amenity, carbon sequestration; a road (physical capital) provides well-being in the form of speed and ease of transport. Ultimately, these capitals each provide well-being and are therefore substitutable to a certain extent. For example, from a social perspective, it may be possible to trade off a field (natural capital) and the well-being it brings, for a building (physical capital) if the flow of benefits it brings will be greater.

One approach to sustainability reflects the trade-offs that we make in everyday life and assumes that all capitals are substitutable: **weak sustainability** is where ensuring the combined total value of these capital stocks does not decline over time implies sustainability. Since each of these capitals provides a flow of benefits, maintaining their total value would suggest we maintain the same potential to deliver wellbeing in future. An alternative approach, **strong sustainability**, assumes that some assets cannot be substituted for others, so looking at the overall level of capital stocks is not enough. Examples where this approach may be important are discussed under non-marginal impacts.

2. Valuation. Valuation of impacts for SCBA can be difficult. There has been significant progress in recent years in our ability to value environmental change, but values for some environmental and social impacts may be subject to uncertainty or may not be available at all. This makes appraisal challenging. If we cannot value all the benefits and costs, we may not be able to make an informed trade-off or maintain capital stocks. Ultimately, this may mean that our decisions do not lead to the greatest wellbeing for society or enable us to maintain wealth for future generations.

3. Non-marginal impacts. Valuation is particularly challenging for certain forms of capital (particularly natural capital) where a policy may have large or irreversible impacts.

Many forms of natural capital are subject to thresholds (sometimes referred to as limits), a point beyond which a fundamental, and potentially irreversible, change takes place. A policy or project, or the cumulative impact of many policies in combination with other outside factors, may mean breaching one of these thresholds. For example, important species may become extinct beyond a certain level of habitat conservation, or an ecosystem, if polluted beyond its limit, may move to a different and less favourable state.

5 The review concluded that, for the moment, there is not sufficient evidence to include social capital quantitatively in the analysis.

If the valuation of certain forms of natural capital does not reflect the serious, and potentially long-term, impacts of damage and depletion, our advice to Ministers will not reflect the full implications and trade-offs inherent in the policy choices they face. Therefore, for particularly important forms of capital (so called 'critical assets'), where irreversible impacts are potentially large, the weak sustainability rule may not be suitable. For these, the review suggests using a 'strong sustainability' approach, which requires the stocks of individual capitals (e.g. individual important species, air and water quality) to be maintained at levels which pose acceptable levels of risk.

Accounting for irreversible changes is especially important if we want to genuinely ensure that the future generations are properly considered, i.e. that they are able to maintain their quality of life, have access to resources and to make their own trade-off decisions.

D – Recommendations from the interim report; what is being done

Aligning Practice with theory:

Making the definition of SD workable in policymaking (Rec 6), through the capitals framework as discussed above, with recognised limits for certain natural capitals.

Impact Assessment Guidance more tightly defined (Rec 4)

A substantially revised Specific Impact Test (SIT) for Sustainable Development was published on 1st April 2010. This helps policymakers to identify key impacts of their policy options relevant to SD. In Impact Assessments, this will be combined with information about the balance of monetised and non-monetised costs and benefits to give a fuller picture of whether a policy option is consistent with SD.

Social Impacts:

Social Impact assessment should be more systematic and consistent across Government (**Rec 1**).

A cross-government group is in place to agree a definition of social impacts and how to measure them. When agreed, this will form part of the wider Government guidance on sustainability. Measuring social impacts is the first step – ultimately, measurement of social capital will also be required to make the capitals framework work.

Valuation:

Environmental Impacts Guidance of what to take into account and how to do this should be clear; estimates for these valuations should be improved as far as possible. For example, valuations should take into account thresholds (as discussed above) (**Rec 2**).

Defra has updated its environmental impact guidance and produced new tools which will make valuation easier, alongside providing training for analysts.

Exploratory work is ongoing in the use of shadow pricing (consistent with statutory limits) to complement SCBA in specific circumstances. So far, this has been applied to air quality.

Non-marginal impacts:

Asset Checks of capitals which are essential to economic and social activity should be undertaken, to find out what the current levels are, in order to be able to consider the future levels of these assets. This will then feed into the valuation work noted above **(Rec 3)**.

Defra's Natural Value Programme will look into the issues around the development and use of an asset check for natural capital, keeping close links with the National Ecosystem Assessment.

Defra is publishing a summary of all statutory environmental limits.

Inter-generational impacts:

Transparency in future generational impacts The current method of discounted costs and benefits could be enhanced with a method including an 'asset check' (as discussed above), or a method illustrating how the costs and benefits play out over time **(Rec 5)**.

The new Impact Assessment template, published 1st April 2010, introduces a requirement to graphically display large impacts falling in the future.

References

Defra *GES Review of Sustainable Development*, available at www.defra.gov.uk/evidence/economics/susdev/

Defra 2010 *Guidance for SD Specific Impact Test*, available at www.defra.gov.uk/corporate/policy/guidance/sd-impact/index.htm

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