Department for Environment, Food and Rural Affairs

Wider Environmental Impacts: Step by Step Guide

This step by step guide is designed to be used with the flowchart in order to complete the Wider Environmental Impact Test and provide guidance to enable you to monetise the environmental costs and benefits where feasible. For detailed support and guidance on valuing environmental impacts in policy appraisal, see Defra's Value Transfer Guidelines.

The emphasis is placed on having a staged and proportionate approach. Hence the early stages focus on scoping work to identify what options have the potential to give rise to significant wider environmental impacts. Where options are not expected to lead to significant wider environmental impacts or are focused on a single environmental impact (eg air quality) then further stages of analysis on other environmental impacts may not be appropriate.

Where it is identified that the impacts on wider environmental impacts could be significant and wide ranging from the scoping stages, subsequent steps in the analysis are proposed including the use of an ecosystem services framework. The ecosystem services framework offers a more comprehensive approach to understanding how policies impact on the wider environment. For further information see An introductory guide to valuing ecosystem services.

Who should be involved in this assessment? The linkages between a policy and the impacts on the environment can be complex. Policy appraisal needs to develop the scientific evidence which forms the basis for valuing environmental impacts in monetary terms. In practice, this may require integrated working between policy, science and economic disciplines.

1. **Basic Scoping stage: Using the checklist, consider if the policy proposal has significant environmental impacts**

It is important to consider the impact of policy options on the environment from the outset. At an early stage in the Impact Assessment or policy appraisal process make a preliminary assessment of the main environmental aspects that are likely to affected using the wider environmental issues checklist of questions.

The checklist of questions will help you decide if your policy option will impact on the environment. By clicking on each question you can access further guidance that will help you appraise specific environmental impacts and provide guidance for subsequent steps including valuing these impacts, where possible.

By following this process, you will have performed a preliminary assessment of the potential wider environmental impacts. This information will help you to decide if the environmental impacts are potentially significant.

- If no significant environmental impacts: complete the Wider Environmental Impacts section and evidence base in the Impact Assessment using the guidance related to the specific environmental impacts.
- If significant environmental impacts are identified: further work (see following steps) is required to identify the importance to the overall policy decision, quantify and value the environmental impacts and highlight key uncertainties and evidence gaps that require further investigation.

2. Detailed qualitative assessment to determine the range and nature of the environmental impacts identified.

Where the potential for significant environmental impacts have been identified, this stage requires taking forward a more detailed qualitative assessment, building on the evidence collected in the scoping stage.

Qualitative assessment of the change:

A qualitative assessment of the change will typically:

- Describe the nature of the change – change in quantity (e.g. emissions of particulate matter) or quality (e.g. river water quality);
- Describe the direction of the change – an increase or decrease (quantity) or improvement or deterioration (quality);
- Describe the temporal nature of the change – a change that will occur immediately or gradually overtime, for a limited period of time (e.g. effects during the construction phase of a project) or permanent;
- Describe the spatial nature of the change – location(s)as to where the change will occur; and
- Describe the scale of the change – an assessment of the significance of the change based on scientific and technical understanding of the policy good and the expected policy or project outcomes (e.g. whether marginal or non-marginal compared to baseline).

For each of the above, uncertainties and gaps in knowledge should be identified.

At this stage you should be able to identify the nature (quality or quantity) and direction of the change in the relevant environmental impact and identify the key uncertainties and evidence gaps – see box above for more details of what a detailed qualitative assessment might include.

When assessing wider environmental impacts you should take a sufficiently broad view of the spatial scale and temporal nature of those impacts. It is possible that the appropriate scale may differ from that first implied by the policy change. The impact of a policy option on wider environmental impacts may be at a local, national or international level.

In cases where the significant environmental impacts are limited to only one aspect, such as air quality or water quality, then it is appropriate to use the specific related guidance to quantify and monetise the impact of that environmental impact where possible (go directly to **Step 4**).

In cases where there are multiple environmental impacts, affecting both market and non-market values, the use of an ecosystem services framework is recommended (see **Step 3** below).

3. Use of an ecosystem services framework: recommended where there are multiple environmental impacts

A key tool that analysts can use in defining wider environmental impacts is the ecosystem services framework. Use of this framework is particularly recommended where there are multiple environmental impacts affecting both market and non market values. This can ensure that the entire range of environmental impacts from a proposed policy or project are taken into account.

Ecosystem services are defined as services provided by the natural environment that benefit people. Ecosystem services can be categorised as: provisioning (such as supply of food and fibre), regulating (such as water and climate regulation), cultural (such as landscapes and recreation) and supporting (such as soil formation and habitats). For further information see:
http://www.defra.gov.uk/environment/policy/natural-environ/ecosystems/index.htm

An initial checklist of ecosystem services can be seen in **Annex 1**. Policy options should be assessed against this initial checklist of ecosystem services. This methodology ensures that all ecosystem services are considered from the outset and the whole ecosystem is considered. A policy option may not affect the majority of ecosystem services and so the use of this framework is to identify which specific services are affected to take forward in terms of further appraisal.

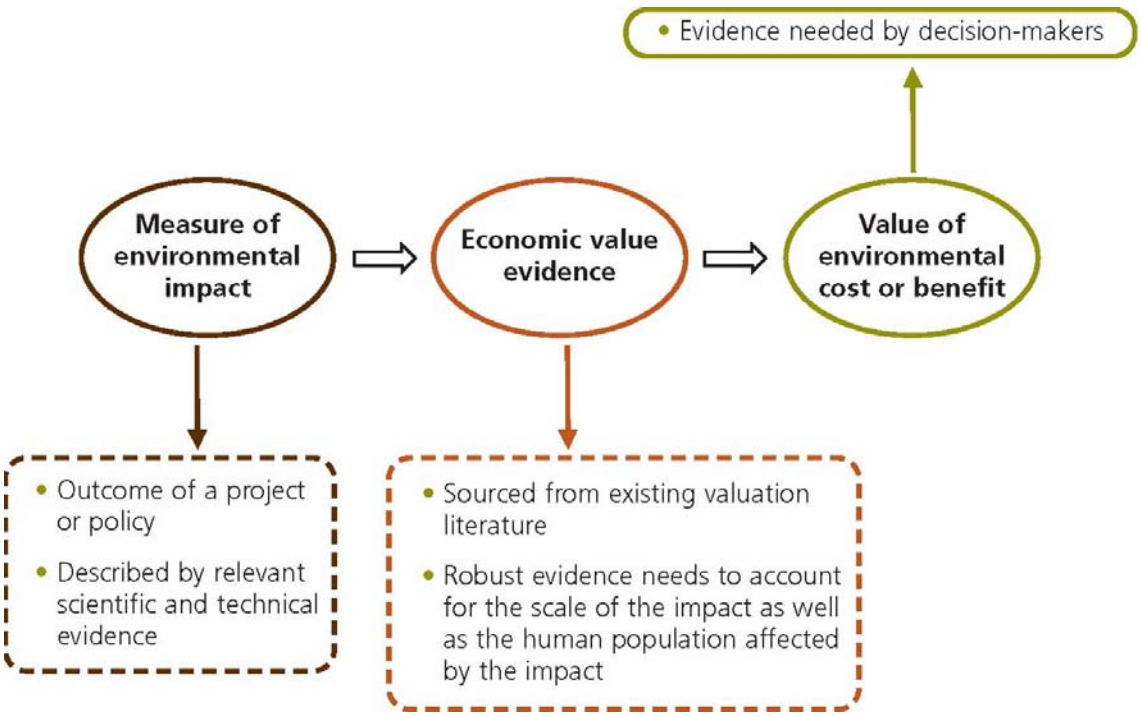
By identifying the impact the policy change has on an ecosystem, and the resulting changes in ecosystem services, it is possible to identify the impacts on human welfare of these changes. The changes in ecosystem services may give rise to environmental costs or benefits which should be included in the Impact Assessment and monetised where possible. Subsequent steps provide more guidance.

The preliminary qualitative assessment of the impacts on ecosystem services should allow you to prioritise quantification of impacts on specific ecosystem services. Some relationships may be complex and scientific advice is likely to be required. Further detail and information can be found in Defra's An introductory guide to valuing ecosystem services.

4. Quantifying and valuing environmental/ecosystem service impacts

The previous steps have provided guidance on developing the qualitative assessment of wider environmental impacts of a policy option – where significant wider environmental impacts have been identified then it is important to attempt to monetise these impacts, where possible. This next step looks at how to quantify and value these impacts, where possible. The box below provides an illustration of the process to value environmental/ecosystem service impacts in policy appraisal.

Chart 1: Overview of valuation information required in policy appraisal



Source: Valuing environmental impacts: Guidelines for the use of Value Transfer, Defra

Quantification of the change should measure the direction and magnitude of the change (and the profile over time) or provide a proxy measure of it. This should be informed by available scientific and technical evidence. This might include a measure of quantity change (e.g. change in carbon emissions or change in PM10

emissions), quality change (e.g. change in river water quality) or a probability of risk of occurrence (e.g. flood risk).

By quantifying the environmental impacts, it may then be possible to value these impacts in monetary terms. Economic valuation is the process of ascertaining a value that people place on the change in the environmental good. In many cases there is no market or price for that good. However, techniques for valuation of non market goods do exist for monetary valuation of changes in environmental/ecosystem service impacts. The Total Economic Valuation Framework provides a useful framework for understanding whether values are use values (both direct and indirect) and non-use values. This framework can help explore what different non market valuation approaches may be appropriate. For more information on the different methodologies please refer to Tools for environmental valuation and An introductory guide to valuing ecosystem services.

Valuing the environmental/ecosystem services impacts using value transfer is a proportionate and effective use of existing evidence. Value transfer, also known as benefits transfer, is the process of taking evidence on economic values from one context (known as the study site) and transferring it to another context (known as the policy site).

Defra published (February 2010) "Valuing environmental impacts: guidelines for the use of value transfer": Value Transfer Guidelines which provides a step by step guide to valuing environmental impacts using value transfer approaches. These guidelines provide help in selecting the most appropriate approach to value transfer and an appropriate level of effort. The guidelines also offer assistance in selecting the most suitable economic value evidence from the literature and practical assistance in applying the valuation evidence appropriately to the new policy appraisal context.

Sources for economic value evidence include:

Existing guidance documents - e.g. Decc carbon value guidance, Air quality IGCB guidance

- Government research – see Value Transfer Guidelines for more details
- Value transfer databases – for example, The Environmental Valuation Reference Inventory (EVRI) is a comprehensive value transfer database supported by Defra.

Where there is no relevant valuation study available in the existing literature and the cost-benefit analysis is seen to depend significantly on the magnitude of the environmental/ecosystem services impacts, undertaking a primary valuation study may be justified. Primary valuation studies can be costly and time consuming so it is something that should be undertaken only when it is proportionate and appropriate.

It is unlikely to be possible to estimate all the economic values associated with changes in environmental/ecosystem services impacts. Qualitative and quantitative information will therefore be required where there are valuation evidence gaps. You will need to consider how crucial these evidence gaps are and if further work needs to be undertaken.

Undertaking sensitivity analysis is an important part of the assessment to understand how estimated environmental costs and benefits are sensitive to different assumptions. As an aid in determining the level of significance of the wider environmental impacts, "switching" analysis of a policy option could also be undertaken. This provides an indicator of the magnitude of the wider net environmental impacts required, in order to switch a policy from one yielding overall net benefits to society to one yielding overall net costs to society (or vice versa).

5. Reporting Stage

This step by step guide should help you to complete the Wider Environmental Impacts test and evidence base in the impact assessment template.

Where an initial assessment has identified there are no significant environmental impacts, no further steps may be required apart from providing suitable evidence in the IA template.

Where significant environmental impacts are identified, further assessment including the possible use of an ecosystem services framework is recommended. As far as possible, these environmental/ecosystem services impacts should be quantified and valued. This assessment should be presented in the main policy appraisal so that environmental costs and benefits can be compared to all the other costs and benefits of a policy option. Where possible, both qualitative and quantitative assessment should also be presented to provide evidence that underpins estimated environmental costs and benefits. Sensitivity analysis should also be presented that help to demonstrate the key assumptions and uncertainties that might affect the analysis of wider environmental impacts.

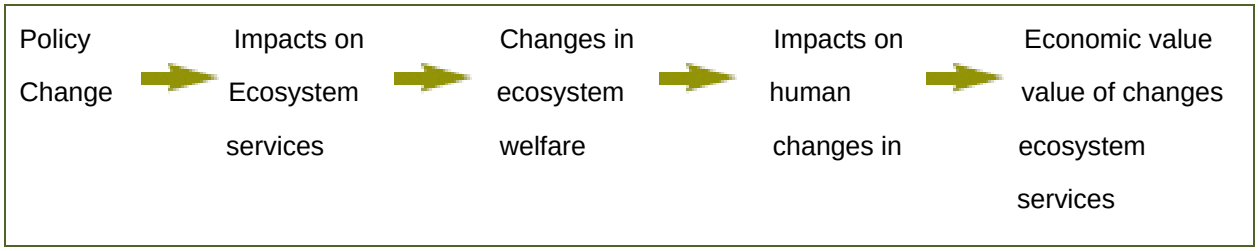
References and Contacts

For detailed support and guidance on valuing environmental impacts in policy appraisal, see Defra's Value Transfer Guidelines

If you have any further questions or issues relating to this process, please contact the Natural Environment Economics team at Defra at nee@defra.gsi.gov.uk.

Annex 1

Overview of impact pathway of policy change



Initial checklist of ecosystem services for consideration

Category	Baseline/ 'Do nothing' policy option 0	Policy option 1	Policy option 2	Policy option 3
Provisioning services				
Food				
Fibre and Fuel				
Genetic resources				
Biochemicals, natural medicines, pharmaceuticals				
Ornamental resources				
Fresh water				
Regulating services				
Air-quality regulation				
Climate regulation				
Water regulation				
Natural hazard regulation				
Pest regulation				
Disease regulation				
Erosion regulation				
Water purification and waste treatment				
Pollination				
Cultural services				
Cultural heritage				
Recreation & tourism				
Aesthetic value				
Supporting Services				

Soil formation				
Primary production				
Nutrient cycling				
Water cycling				
Photosynthesis				

Score	Assessment of effect
++	Potential significant positive effect
+	Potential positive effect
0	Negligible effect
-	Potential negative effect
--	Potential significant negative effect
?	Gaps in evidence