LEED Toolkit Guidance Document

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Introduction

Purpose and audience

The environment is an essential component of the economy and growth; however this relationship is not always given sufficient recognition in economic planning.

In the past we could assume that the environment was robust in the face of pressures from the economy, but today there is unequivocal evidence that humans are driving significant environmental change. In other words, the relationship between the economy and the environment is now important to *economic*, as well as *environmental*, planning. However, assessing environmental information for its economic relevance can be complicated which results in the environment being insufficiently considered in economic planning.

The Local Environment and Economic Development (LEED) toolkit has been produced by the Defra network (the Environment Agency, Natural England and the Forestry Commission), working in partnership with several Local Enterprise Partnerships (LEPs), Local Authorities (LAs) and Local Nature Partnerships (LNPs).

> The aim of the toolkit is to systematically consider the evidence relating to the local economy/environment relationship in order to reveal opportunities and threats and to consider appropriate responses to them.

The LEED toolkit offers an easy-to-use, technically robust, systematic and proportionate way of making sense of environmental information in relation to economic planning. The toolkit produces accessible, non-technical outputs that assist strategic economic decision making.

The toolkit is aimed primarily at Local Enterprise Partnerships, because they have responsibility for strategic planning for sustainable economic growth. It will also be of interest to other local partners including Local Authorities and Local Nature Partnerships. In fact, the toolkit will be most effective when it is worked through by a local area consortium, including all these bodies and interested others.

This guidance document is the manual for the process. It guides you through the process step by step, telling you who needs to do what, and when. It will refer you to the other project documents when necessary. Looking at the *final report* and *evidence base* from the New Anglia pilot will also be very helpful[1].

The rest of the report is in two sections. Section 2 is a step by step guide, illustrated in the diagram on the next page. The following section contains the essential background, which anyone facilitating a workshop, or undertaking research for the toolkit would need to understand.

Which level of the toolkit do you wish to use initially?

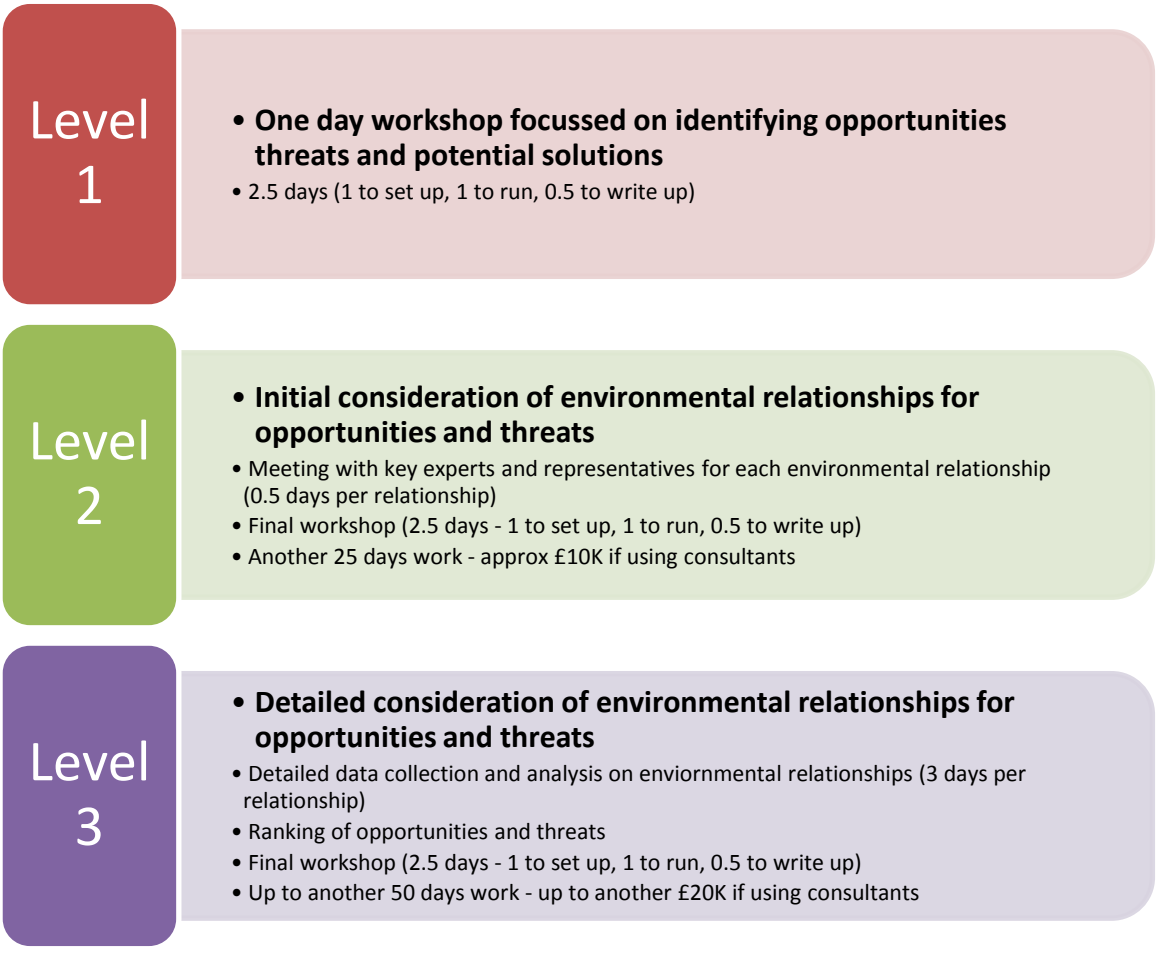
The LEED process has three levels of engagement, depending on the level of need and the availability of time and resources. Level 1 consists of a single one day workshop with the appropriate partners. Level 2 includes the workshop and further meetings with relevant partners to

[1] Links to this report will be provided on the Natural England website as soon as possible.

further develop the evidence base. Level 3 builds on the first two levels with a thorough assessment of data and other evidence to deliver a list of the top ten threats and opportunities and potential solutions. This guidance covers all three levels, but provides specific instructions for each level where necessary. It is of course possible to start with Level 1 and then make an assessment of the desirability of moving to Level 2, and similarly for Level 3.

We strongly recommend reading through this guidance document at least until the end of the level you are planning to use initially, before commencing research.

The table below gives more detail as to the outputs and commitment required for each level. If this is not enough information to help you decide, read further through this guidance document and have a look at the final outputs from the New Anglia pilot. The 'levels' here are sequential; i.e. to run the toolkit to Level 2 you do Level 1 and then Level 2. Similarly to run the toolkit to Level 3 you would do Level 1, then 2, then 3. Level 1 will provide a starting point in thinking through opportunities and threats, Level 2 will test this with local partners and experts and Level 3 will test it against the evidence base.



Having decided which Level you wish to achieve initially you are now in a position to start using the step by step guide. If you're going beyond Level 1 it will be helpful to have the *evidence base template* and the and *final report template* available for reference (also available from the project team)

Step by step guide

The table below shows which steps are needed for which Level of the toolkit.

Level	Step
1	A
2	B
	C
3	D
	E
	F
	G
	H
	I
	J
	K

Step A: Run the Level 1 workshop

Objectives for the workshop

The Level 1 workshop is designed to gather the economic and environmental partners from within a Local Enterprise Partnership area in order increase understanding about the economy's relationship with the environment. Specific objectives for the workshop are to:

- make useful contacts in partner bodies and have a better understanding of each other's perspectives
- understand the principle of economic dependence on the environment and how planned change (i.e. economic growth plan) and unplanned change (i.e. climate change) will act on environmental dependencies to produce opportunities and threats to the economy of the area;
- have developed an initial list of what the most significant opportunities and threats in your area may be and possible approaches for tackling these;
- understand the LEED toolkit and how it accounts for the relationship between the economy and the environment using the ecosystem services approach; and
- understand how Levels 2 and 3 can improve the robustness of the analysis.

Who to invite

The essential attendees are representatives for the Local Enterprise Partnership, the Local Authorities and the Local Nature Partnership. There are others who would have a contribution to make, such as water companies, large land holders and major businesses and could potentially be invited. The balance of those represented is important. The focus of the toolkit is around economic, not environmental targets, and this focus can be lost if the attendance is unbalanced. Therefore ideally half or more of the attendees and workshops should have primarily economic responsibilities.

For this workshop you need a mixture of staff with senior representative positions who can speak for their organisations and some more technical or scientific staff who are closer to the evidence.

Chair

You will need to ask someone to chair the meeting. This should be a respected senior individual with an interest in including environmental information in economic planning. Which organization this person should be from will depend on local circumstances. The Chair should familiar with the essential background information provided by this document.

Facilitation

The day will be used most effectively if you have a competent facilitator. This person can be a member of staff at one of the organizations involved, or another organization. You may be able to find someone who can do it as part of their role, or it may be helpful to hire a facilitator depending on your circumstances. The facilitator must have a thorough grasp of the essential background information provided in section 2, and would probably find it helpful to talk through this with the team that produced the toolkit. They should contact tom.butterworth@naturalengland.org.uk or ring 07500 608 458.

Defra-Network involvement

The workshop will be more valuable if one or more members of the Defra Network are there to offer their expertise and local knowledge. One of the Defra Network representatives should have experience with the toolkit and give the first presentation (see contact details above).

Suggested running order

Below is a suggested running order for the workshop. It will be apparent that attendees will need to block the whole day out of their diary. This will mean sending invitations several weeks ahead at a minimum.

Indicative times	Item	Lead
10:00	**Chair's introduction and housekeeping**	Chair
10:10	**Ice breaking exercise** Exercise to warm-up participants	Facilitator
10:30	**Presentation: Introduction to Ecosystem Services, Input-Output and LEED** • Policy context • Importance of the natural environment and well planned Environmental Infrastructure as a foundation for economic growth • Why LEED? • Short history of LEED including experience from testing • Intro 3 tiered approach to LEED assessment	Defra-Network
10:45	**Presentation: Local Economic Plans and Priorities** • local economic background – strengths and weaknesses; the legacy • Priorities going forward for the whole economy, including any focus sectors for growth	LEP
11:00	**Points of clarification and reflection on presentations**	Facilitator / All
11:15	**Exercise: Mapping growth priorities and their environmental dependencies/relationships** **Objective** = understand how the environment relates to the top local growth priorities If the LEP plans for growth are clearly articulated (presentation above) you may be able to take these as read and use them as a starting point for the exercise. If not, it may be useful to draw out the top growth priorities first – what, where and when – for the group then to map these on to environmental dependencies. The	Facilitator

	LEP would have to be at the centre of the growth discussion. **Output** = Top growth priorities - what, where and when A second stage would be to consider the future shape of the resulting economy and its environmental dependencies. There are two types of environmental dependencies; dependencies on material and energy inputs and outputs and dependencies on living system. You can then map the environmental dependencies associated with this future economy. **Output** =Mapping of top growth priorities and their relationship with / dependency on the environment / Environmental Infrastructure.	
12:15	**Lunch**	
13:00	**Recap on morning exercise**	Facilitator
13:10	**Presentation: Opportunities and Threats** • introduction to 'Opportunities' and 'Threats' • explain purpose of the afternoon session	Defra-Network
13:20	**Exercise: Opportunities and Threats** **Objective** = To build on the relationships and dependencies outputs to (1) draw out the key opportunities and key threats (2) rank their importance / urgency Two stage process. First, bring out the Opportunities and Threats. Second rank their importance / urgency. **Output** = List of key opportunities and threats with ranking on importance / urgency	Facilitator
14:30	**Break incl Tea and Coffee**	
14:45	**Exercise: Responding to Opportunities and Threats** **Objective** = Take the top 3 Opportunities and Top 3 Threats (?) and develop high level ideas on suitable responses. **Outputs** = High level ideas on suitable responses.	Facilitator
16:00	**Summary and close** Summarise the day and clarify next steps.	Facilitator Chair

Running the day

The approach proposed timetable should be applied flexibly. You will need to adapt the content to the available supporting information on the economic growth plans (such as the LEP Multi-Year Growth Plan) or the available information on the local environment. You will also need to reflect venue restrictions and the number of attendees in designing and running workshop sessions.

Products from the workshop

The workshop should produce the following outputs;

- record of the relationship between the local economic plan and the environment including a mapping of the top economic growth priorities and their relationship with / dependency on the natural environment, green infrastructure and environmental infrastructure
- initial list of the most significant opportunities and threats to local economic plans with a simple ranking of importance and severity
- high-level responses to the top opportunities and threats

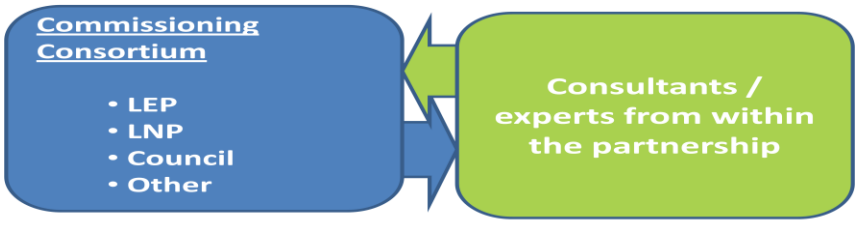
If using the toolkit at Level 1 you should now proceed straight to Step K to consider the next steps. This should include consideration of using Level 2.

Step B: Set up a Local Area Consortium of the key partners

This is the beginning of Level 2. It is possible to run Level 2 separately and then consider whether to do Level 3 or you could decide to do Level 2 and then 3 at this stage.

Level 2 involves a more formal research process, which produces a report and then a final workshop. You will therefore need to make arrangements to manage the research, provide staff and/or funding for it, and agree sign-off and publication procedures. It will therefore be advantageous to set up a more formal Local Area Consortium at this stage. Hopefully the key people and organisations were already represented at your Level 1 workshop. As well as managing the research process the consortium can facilitate it, because most of the knowledge and expertise required will be within the relevant organisations.

Step C: Interview key partners and experts about opportunities and threats to the economy



Step C is the beginning of research for Level 2 of the toolkit, where we take the initial ideas about what some of the opportunities and threats might be and check these with key partners and experts

in a systematic manner. Before engaging in this step it is important to decide what research model you wish to use. One approach is to use consultants to do the research on behalf of the steering group. Provided you ensure that consultants have the appropriate expertise in environmental science and economic planning they may be able to work faster and more effectively. There are advantages to face to face consultations for this stage of research, and local consultants will be more cost-effective for this, but this needs to balanced against the need to ensure they have the right expertise. Alternatively, you may well have people working for the organizations in the consortium who have the right expertises between them to do this research. Experience of testing the toolkit suggests that this needs sufficient time from dedicated staff. In particular somebody must be responsible for driving the project forwarding, coordinating the work and pulling together the findings.

At this stage researchers will find it helpful to refer to the *evidence base template.* Although for Level 2 of the toolkit we will not be completing the whole template, it will be helpful to refer to it and to fill in some sections. *Please ensure at this stage that you continue to follow these step by step instructions in the guidance document, we don't recommend that you work through the evidence base template from beginning to end.*

At the beginning of the evidence template is a short section which summarizes the current economic situation, and then considers the local economic *plan* or *forecast*. Filling this in at the beginning of the process should give some useful background to your interviews. You should be able to fill this in entirely by summarizing already existing documents, which you can then reference for those who need more detail. No primary data analysis should be required. This section should be no more than 6 pages and should take no more than one working day.

Researchers should then quickly review through the evidence base template, and then go the appendix at the back which lists the main people to talk to in your local area and which sections of the template they should be able to help you with. Starting from this list will allow you to plan your time effectively and make the most of each meeting. Before contacting anyone it is important to carefully think through your priorities given the amount of time and resource you have. For example your knowledge of the local economy might allow you to place some ecosystem services as low-priorities, for example *game and wild food* might not be significant. The steer from the initial workshop may also be helpful, but when making these decisions do so on the basis of evidence rather than opinion, otherwise your results may inappropriately confirm initial expectations.

There are questions within each section of the *evidence base template*. These questions are designed to help the researcher think through the relationship between the economy and the environment, particularly change to ecosystem services driven by economic growth and other expected change. Thinking through these relationships is the essential first step to arriving at opportunities and threats based on the economy's dependence on the environment. *The questions are not designed for researchers to ask directly to the people they are interviewing, and are likely to cause confusion if used in this way. Neither do we recommend just asking the interviewee what the main opportunities and threats are.* Instead use the conversion to understand environmental change and its relationship to the economy and develop the opportunities and threats from this understanding.

There are some suggested sources of evidence and data in the second appendix to the *evidence base template*. It will be useful when speaking to interviewees to gather the sources of data they use to justify their views and to note these down in case you decide to proceed to Level 3. This Level 2 research will supply a greater weight of expert/stakeholder opinion which will either confirm or challenge the initial findings at the workshop. It will not go as far as a formal ranking of opportunities and threats, detailed investigation of the supporting data for them or any significant consideration of the appropriate responses. If not proceeding to Level 3 don't attempt to use the full evidence base template to write up your findings (because it is too demanding for the time commitment), but do use the input/output and then Ecosystem Services Framework structure in writing your report.

Step C2: Final workshop for Level 2

This step is only for those who are planning to stop at Level 2, before considering whether to proceed to Level 3. If you have already decided to proceed to Level 3 you should skip this step and go straight to Step D.

At this point you should have a list of opportunities and threats, which have checked against local expert and stakeholder opinion, and which have been fleshed out further in discussion. They may be the same as those identified at the initial workshop, or they may have changed significantly. You are now ready to introduce them to your key audiences, senior people representing the LEP, Local Authority and other local consortium partners. It will also be helpful to invite some of your local experts, but the meeting will work best with 10 people or less. This meeting will need booking in diaries well in advance and will need to be communicated with a note explaining about the toolkit process. Hopefully many of your key people will have been to the initial workshop and so will have some familiarity with the toolkit. This meeting requires two hours.

As with the experts workshop you will want to begin the session by reminding those present about the purpose and aims of the LEED process, including what it can and can't offer. This is essential context for what will follow. You will also want to remind them of the process you have been through to get to this stage, and possibly comment on how it has gone.

It is likely that this will be a small meeting, with ten or less people present. If this is the case slide presentation and a single group roundtable discussion would be appropriate.

Introducing these findings to key audiences provides a good opportunity to build an understanding of the opportunities and threats and discuss possible actions. …It is good to let the conversation flow between those present, and ensure that someone is capturing any actions agreed, or positive suggestions discussed. The process will really come to life if there are follow-on actions or meetings agreed.

This meeting is also an opportunity to get some feedback from this group about the opportunities and threats selected and the solutions offered. As with the experts workshop the *substance* of the issues identified should not be changed at this stage based merely on views, but they could be reconsidered if evidence based arguments are offered (and backed up with evidence after the meeting). It is much more likely at this stage that feedback will be offered about the tone or wording of how the issues are expressed, due to political sensitivity or concern about

misunderstanding. If these changes don't change the substance of the opportunity and threat they should be adopted.

Before closing the meeting it will be helpful to highlight the possibility of Level 3, which would offer a more through consideration of the evidence base, would rank the opportunities and threats to produce the top ten of each, and would propose strategic or tactical solutions.

If using the toolkit at Level 2 you should now proceed straight to Step K to consider the next steps. This should include consideration of using Level 3.

Step D: Evidence and data analysis

The remaining steps in this document are relevant to Level 3. Step D involves the researcher going back to the primary evidence sources in order to provide a stronger, more objective evidence base for the opportunities and threats identified. In the appendix of the *evidence base template* is a list of key data sources and the sections they relate to. It is advisable to work through this by data source, rather than by section as it will be more efficient. Additionally there may be other data sources referenced during the interviews.

The goal of looking at these data sources is to provide an evidence base which can support or challenge possible opportunities and threats already identified, and also to find new ones. Of particular interest is change to the environment and economy, the trajectory of change and projections into the future. In particular, without specific action material input, energy input and waste and emissions all tend to increase with economic growth.

The environment and its relationship with the economy is complex and not fully understood. There are significant uncertainties even in well established data sets, and large areas where no data is available. Furthermore we are dealing with the future, about which there is no certainty. Therefore we are not trying to develop an evidence base which can *prove* an opportunity or threat. Instead we are supporting decision making in the context of uncertainty. This may mean making logical inferences and explicit assumptions. The goal is to be as explicit as possible about the strengths and weaknesses of the evidence base. The evidence does not have to be complete, but rather, if the evidence is strong *enough* the opportunity or threat should be considered.

Step E: Ranking opportunities and threats

The *evidence base template* contains a table at the head of every section in *inputs/outputs* and *ecosystem services*. This is designed to capture emerging opportunities and threats and also to rank them. Each opportunity and threat is given two scores between 0 and 4, one for its importance and one for its urgency.

A guide to scoring the importance of an opportunity of threat is offered below;

4 - Affects the whole economy

3 - Affects one or more of the significant sectors or places, and could have substantial knock-on impacts to other significant sectors or places

2 - Affects one or more of significant sectors or places with some knock-on effects across the whole economy

1 - Affects one significant sector or place with limited knock-on effects

0 – No, or minimal, expected impact on significant sectors or places

A guide to scoring the urgency of an opportunity or threat is offered below;

4 - Action on this opportunity and threat should have started already, has started already, or has been identified as requiring urgent action in existing plan or strategy.

3 - This opportunity or threat should be considered within a three-year planning cycle, and/or other plans and strategies include this opportunity and threat within a three-year planning cycle.

2 - This opportunity or threat should be considered within a ten-year planning cycle, and/or other plans and strategies include this opportunity and threat within a ten-year planning cycle.

1 - This opportunity or threat should be considered within a twenty-year planning cycle, and/or other plans and strategies include this opportunity and threat within a twenty-year planning cycle.

0 - This opportunity or threat does not need consideration with a twenty-year plan and/or has not been identified as requiring action in existing plans or strategies.

These scores are then multiplied together to produced a score between 0 and 16. A worked example is offered below;

Code	Name of Opportunity or Threat	Importance Rating [A] (0-4)	Justification	Urgency Rating [B] (0-4)	Justification	Combined Score [A*B] (0 – 16)
O12	Ex-industrial area landscaping	3	- Ex-industrial parts of Avalon are largely bypassed by the tourist industry, but with appropriate landscaping has great potential for leisure walking	3	- Merits consideration in a three-year plan	9
T10	Inappropriate development in	3	- Tourism is of central importance to Avalon's economy, but the rate of	4	- Requires action straight away	12

	area of outstanding natural beauty		development is putting this landscape under pressure			

Once you have considered all the relevant sections of the report you will be able to collect and rank all your opportunities and threats in the table provided in the document, with the most significant opportunities and threats at the top. There are two columns one for opportunities and one for threats. You may find that some opportunities and threats are mirror images: there's one issue which can be looked at either way. In this case you may like to use colour coding to indicate this on your table as shown below.

Opportunities					Threats				
Combined Score	Importance Rating	Urgency Rating	Code	Name	Combined Score	Importance Rating	Urgency Rating	Code	Name
12	3	4	O34	Inward investment due to landscape offer	16	4	4	T3	Increased flood risk
4	4	1	O1	Demand for local produce	8	4	2	T44	Fossil fuel prices
1	1	1	O12	Liveable city centres.	6	2	3	T6	City-centre temperature

Step F: Final workshop with experts

The next step is to run a final workshop in order to reality check your findings. You should invite to this workshop the local people who are expert in the local environment, economy and its relationship. You should not invite senior people with representative roles for their organizations at this stage, unless they have specific expertise to offer and are very enthusiastic, because you will need to invite them to a senior workshop a few weeks later. The workshop will be most effective with between 10 and 20 people.

It is essential to restate the aims and objectives of the toolkit clearly at the beginning of the workshop, and also be clear about what it won't deliver, because it may be some weeks since the workshop participants actively engaged with the toolkit. Experience shows managing people's expectations in this regard is important. Ideally this workshop would be balanced between people whose expertise was economic and those who expertise was environmental, but you may find that one group or the other is comparatively over-represented. Clear explanation and facilitation may be required to keep the workshop focused on the approach set out in Step D.

The workshop should then move on to present the interim findings to participants and collect their views and comments. The idea is to use these views and comments to assess whether the right threats and opportunities have been selected, whether they are presented in the right way, and whether the proposed solutions offered make sense. *It is important that adjustments at this stage are not made purely on the basis of the views of those present; an evidence-based argument needs to be presented which alters the scoring, and therefore ranking, of an issue in order to make a change to the top ten opportunities and threats at this stage.*

The workshop will be more effective if it is interactive. Therefore it is advisable to present the opportunities and threats on printed tables with their rankings so that people can look at and comment on them. With a larger group it will be helpful to break these up so that each group looking at them contains no more than eight people. One approach to breaking up the work would be to consider economy wide, sector specific and place specific opportunities and threats. If breaking up into groups you will need to ensure each has an effective facilitator and note-taker (if experienced these may be the same person).

You will need at least three hours to run this workshop effectively, ideally four.

Step G: Collating opportunities and threats

When the toolkit was trialed in New Anglia we found that a very large number of opportunities and threats were identified. We also found that the issues identified varied in scale from relatively specific measures to much bigger strategic themes. For example planted swale-ditches between the pavement and the road provide an opportunity to reduce urban flooding and polluted runoff. But this is a specific response to the more general issue of urban flooding, which again is part of water cycle management for the economy. The aim of this stage is to collate opportunities and threats under wider 'umbrella' opportunities and threats. This makes the information collected easier to communicate and ensures a like to like comparison. A table to help you do this is included in the *evidence base template*, which like all the other tables can be expanded as needed.

Start with the highest scoring opportunities and threats, possibly those scoring 12 or 16, but it will depend on how many you have collected and how they are ranked. You then need to reduce this number to ten opportunities and ten threats by finding issues which are specific examples of wider umbrella' issues. This will then produce ten opportunities and ten threats for you final report. If you identify less than ten of each, once they are collated, you will need to go back and include some lower scoring opportunities and threats in the process.

Step H: Draft final reports

By this stage your *evidence base template* should be complete and should be made available to anybody who is interested in the evidence behind your identification of the top opportunities and threats. However the *evidence base template* is aimed at experts, rather than decision makers, and should not be used as the main output of the project.

Therefore we have developed a *final report template* which is designed to make the findings of the process interesting and accessible to decision makers. The template is self-explanatory, and the bulk of it consists of one page of A4 for each of the top ten opportunities and top ten threats. At the top of each of these pages is a space for the slides you developed for the workshop. There is then room

to give more detail, justification, express any major uncertainties, and make suggestions about possible responses. You may like to look at the example from the New Anglia trial.

Step I: Final workshops with key audiences

Once you have your final top ten opportunities and threats you are ready to introduce them to your key audience, senior people representing the LEP, Local Authority and other local consortium partners. This meeting will need booking in diaries well in advance and will need to be communicated with a note explaining about the toolkit process. Hopefully many of your key people will have been to the initial workshop and so will have some familiarity with the toolkit. This meeting requires two hours.

As with the experts workshop you will want to begin the session by reminding those present about the purpose and aims of the LEED process, including what it can and can't offer. If you are unsure about this, re-read the essential background section in this document. This briefing will provide essential context for what will follow. You will also want to remind them of the process you have been through to get to this stage, and possibly comment on how it has gone.

You then need to introduce your top ten opportunities and threats to the audience, at a high level using PowerPoint slides. See the appendix 1 for an example of the slides that Risk and Policy Analysts use in presenting the findings of the pilot in New Anglia, these provide an example of a highly summarized, high impact way of presenting the findings, which you could talk around. It is likely that this will be a small meeting, with ten or less people present. If this is the case slide presentation and a single group roundtable discussion would be appropriate.

Introducing these findings to key audiences provides a good opportunity to build an understanding of the opportunities and threats and discuss possible actions. …It is good to let the conversation flow between those present, and ensure that someone is capturing any actions agreed, or positive suggestions discussed. The process will really come to life if there are follow-on actions or meetings agreed.

This meeting is also an opportunity to get some feedback from this group about the opportunities and threats selected and the solutions offered. As with the experts workshop the *substance* of the issues identified should not be changed at this stage based merely on views, but they could be reconsidered if evidence based arguments are offered (and backed up with evidence after the meeting). It is much more likely at this stage that feedback will be offered about the tone or wording of how the issues are expressed, due to political sensitivity or concern about misunderstanding. If these changes don't change the substance of the opportunity and threat they should be adopted.

Step J: Final reports

Having had your final workshop, you are now in a position to finalise both the *evidence base* and the final *report.* Once these are signed-off they should be circulated to interested parties, as widely as the local area consortium is happy with. Ideally they should also be made available on line. If there is interest and capacity a workshop which presents findings to a much wider audience than was involved in producing the toolkit would be useful.

Step K: Next Steps

- Hopefully in reaching this step of the toolkit further thinking, work, or partnership arrangements which are necessary have been identified. Some of these may cross the boundaries of the LEP area. Taking this forward is beyond the range of this toolkit, but it is important for these next steps to be clearly noted and considered and the final steering group meeting which closes the project.
- Sharing the work and findings with other LEPs would encourage mutual learning and support the development of best practice in this sort of economic/environmental planning.
- It is also appropriate for the steering group to consider the process from start to finish, how effective it has been and whether it has delivered value for money. Any lessons learnt should be noted in case the exercise is undertaken again, or a similar exercise is conducted. Feeding back lessons learnt to the DEFRA network would also be appreciated.
- Ideally the LEED process should be carried out whenever the economic plan is substantially refreshed, with the process made more efficient by the ability to draw on last time's work. Consider when it would be appropriate to run the process again?

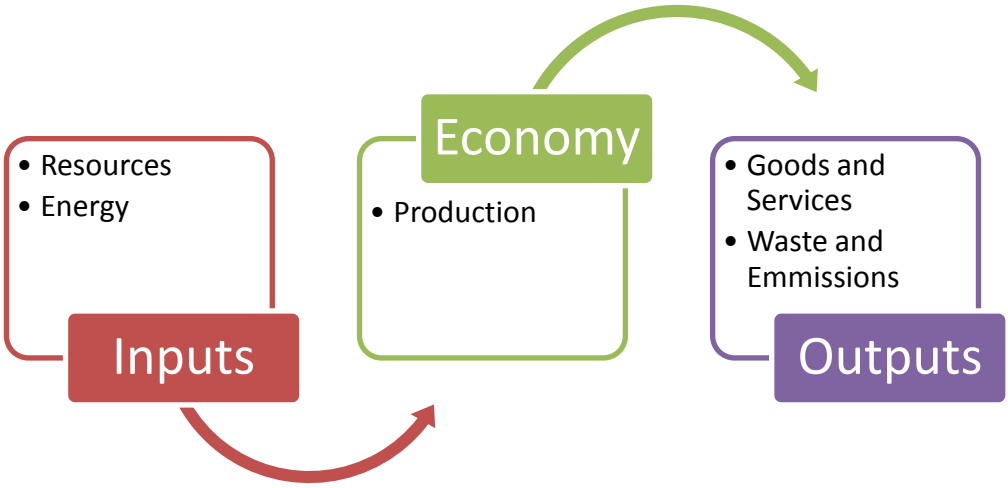
Section 2: Essential background for researchers and workshop facilitators

2.1 Understanding the economy environment relationship

In order to use the toolkit effectively you will need to know how it approaches the relationship between the economy and the environment, which is rooted in natural science. The process uses two related ways of making sense of this relationship, input/output and ecosystem services.

Input/output

In economic development planning we are used to thinking of the economy in terms of abstract monetary value. This is in contrast to businesses who are very focused on the materials they need to operate. Just as businesses take in material resources and energy and produce final products and waste, so does a local economy.



There are opportunities and threats to the economy which stem from the availability of inputs to the economic process. The outputs are the goods are services society wants, but also waste and emissions. There are also opportunities and threats to local economic development from this side of the process. This stems from damage to the wider environment, or the need to prevent such damage. The input/output section will deal only with dead materials such as coal, but also captures the economy's dependence on living systems outside the local area and internationally. A central concern of the toolkit is the economy's relationship with the local living systems, and this is captured under the Ecosystem Services section.

Ecosystem services

The natural environment provides people with a range of benefits. Many of these benefits are essential to the economy and human wellbeing. This could be ignored, if the environment was robust in the face of human induced pressures, but scientific research shows that this is not the case. The Ecosystem Services Framework is the standard framework in policy and scientific use for making sense of these benefits and the related dependencies.

Provisioning Services	Regulating Services	Cultural Services
Food	Air-quality regulation	Cultural heritage
Fibre and Fuel	Climate regulation	Recreation and tourism
Genetic Resources	Water regulation	Aesthetic value
Biochemicals, natural	Natural hazard regulation	
Medicines, Pharmaceuticals	Pest regulation	
Ornamental resources	Disease regulation	
Fresh water	Erosion regulation	
	Water purification and waste treatment	
	Pollination	

Supporting Services

Soil formation, Primary production, Nutrient cycling, Water cycling, Photosynthesis

The Ecosystem Services Framework, shown above, divides these services provided by the environment into four categories; *provisioning*, *regulating*, *cultural* and *supporting*. Provisioning services are the most straightforward to understand, they are products that are produced by ecosystems, such as food, timber and freshwater. Regulating services are somewhat more abstract, they describe the way in which ecosystems provide order and structure to the world in ways which are important, but that we often take for granted until they go wrong. To give two examples, upstream agricultural patterns have been connected to downstream flooding, and urban trees help to reduce air pollution and reduce temperature fluctuations. The cultural services section captures the non-material importance of ecosystems to human beings, such as the importance of nature for tourism and recreation. The importance of nature to mental health and physical health goes fits in this section under recreation.

Underpinning all of these are supporting services, which are things such as soil quality and the nitrogen cycle. These are not used by people directly, but are essential to delivering all the other ecosystem services. For the purposes of this project supporting services will be discussed only as they relate to provisioning, regulating and cultural services in order to avoid repetition.

2.2 Understanding how the toolkit works

Based on the explanation for Step C, it's now possible to understand how the toolkit works. We start with standard economic planning. The process is most effective when there is an *economic plan* in place. This is because the toolkit is future focused and we need to consider how the economy will change in future. We understand the *plan* to map out a future for the local economy that those with responsibility for local development planning consider to be both desirable and feasible given our current understanding. This plan must be owned by the LEP and/or Local Authorities, but it can be in development or draft phase. It is very helpful if the plan has detail about the planned rate of growth, sectoral change (including any growth sectors) and general patterns of development, but the toolkit can be used at different levels of detail.

If there is no plan available, there may be an official or high-quality economic *forecast* for the area. A forecast is just a prediction, and does not have the element of required change, but still gives a useful handle on the sorts of changes that are currently expected. As with a *plan* detail about the

expected rate of growth, sectoral change (including any growth sectors) and general patterns of development is useful, but the toolkit can be used at different levels of detail. If there is neither a *plan* or a *forecast* for your area you can create a rudimentary *forecast* by simply assuming a long-term rate of growth that is considered reasonable (for example 2%) and assuming the sectoral and geographical make up of the economy will remain similar. Although this is crude, both plans and forecasts are subject to high levels of uncertainty and so using this rudimentary forecast will be sufficient to bring out the important environment economy relationships.

The toolkit enables you to connect these plans to evidence about input and outputs from the economy. You can then use the Ecosystem Services Framework to systematically consider the current state of the environment, the trajectory of change and what this means to the economy. This allows us to produce the project outputs. The main output is;

a) an assessment of the opportunities and threats to the LEPs plans for increasing local Gross Value Added (GVA),

b) based on the economy's dependencies upon the environment.

It is essential that all outputs of the project conform to both parts of the output definition above. This is to prevent the work drifting into either economic development planning which is not specifically related to the environment or a wider conversation about the relationship of the environment and economy in general.

The second part of the output is;

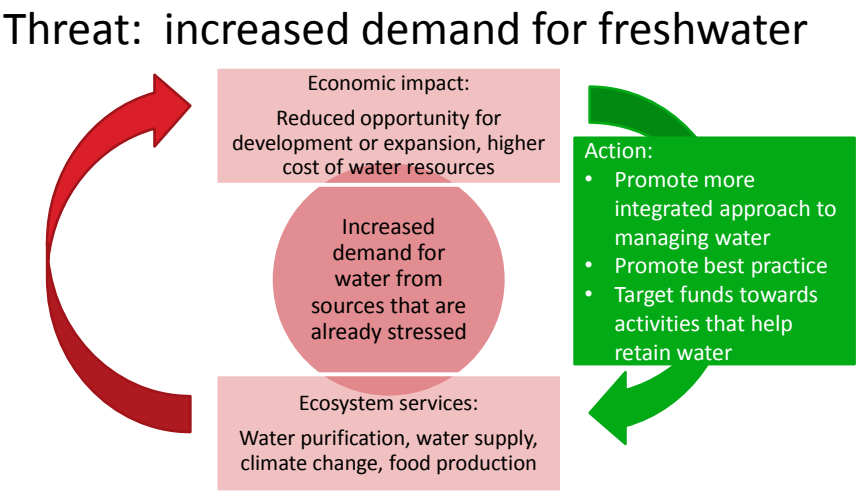
1) Solutions which require a change in the economic plan (strategic solutions)

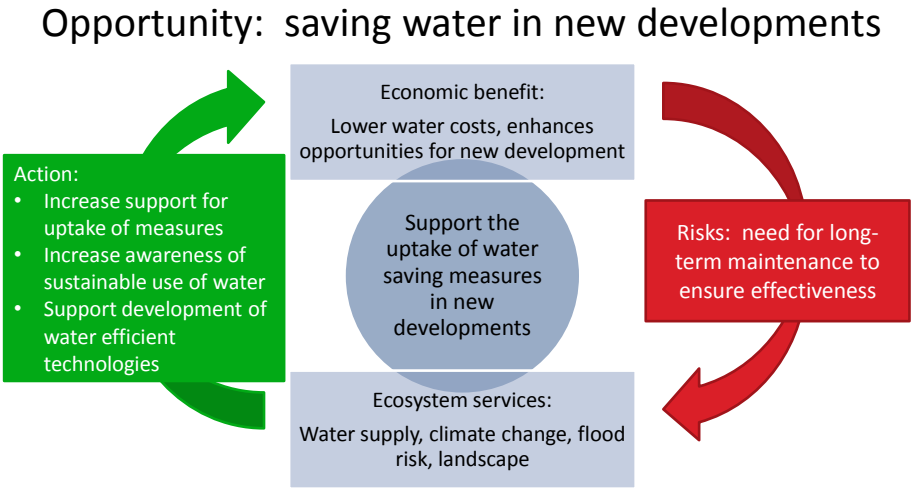
2) Solutions which do not require a change in the economic plan, and can be addressed through specific programmes of projects (tactical solutions)

The weight of the evidence behind these outcomes will depend on which level of the toolkit you use. The outputs from Level 1 can only be considered an initial exploration, and will be based only on the views and knowledge of those at the workshop. Levels 2 and 3 both increase the weight of evidence behind the assessment and reduce the risk of *confirmation bias.* Confirmation bias is the tendency of research to confirm, rather than challenge initial preconceptions, unless there is a process rigorous enough to do so.

Annex 1: Two example slides from the New Anglia trial

Both slides produced by Risk & Policy Analysts

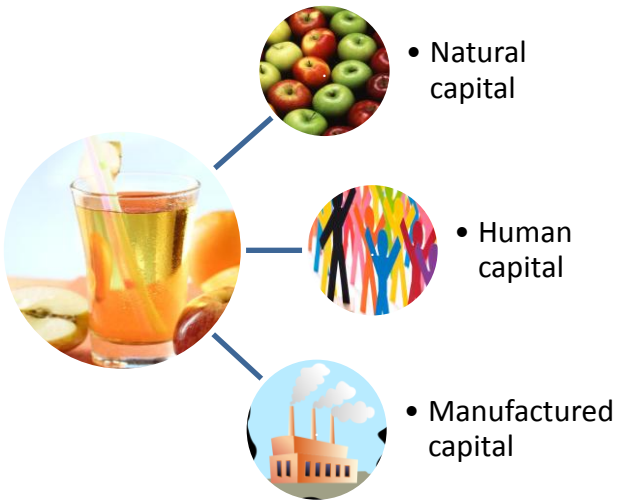




Annex 2: More on Ecosystem Services and relationships with the economy

What are ecosystem services?

Ecosystem services are the central organising framework for this piece of work, so it is important that you are confident and comfortable with them. The picture below is a very simplified diagram of the inputs that go in to producing a final product – in this case a glass of cider. A factory full of processing machines will be required (manufactured capital), as will staff to work the factory (human capital), but without the apples (natural capital) there would be no cider. Whilst the owners of the factory will buy the apples in the market, the apple growers will rely on aspects of the environment they do not pay for such as rain, a stable climate and symbiotic relationships between soil fungus and their trees. Therefore the production of cider is reliant on natural capital, as well as human and manufactured capital and also on elements of the environment which are outside the market place.



Any form of capital is valuable not for its own sake, but for the services it can provide. For example, a car is a piece of manufactured capital which provides transportation services. Similarly nature also provides services and these are known as ecosystem services.

Farming and fishing as examples of the economy/environment relationship

If we look narrowly at the provisioning ecosystem services of food production we can see that it has increased greatly since the Second World War. This is a positive arrow from the environment stock to the economy stock. However, evidence relating to the return arrow towards the environment points to reduced soil fertility, erosion and loss of biodiversity. This negative environmental impact has not yet noticeably impact on food production, but there are reasons to be concerned it might do in the future. Resilience in natural systems is a complex area of science subject to significant uncertainty, which means that we cannot always predict when environmental pressures will lead to ecosystem service changes, and sudden change is a possibility. In particular modern farming is heavily dependent on petro-chemical fertilizers which reduce reliance on the soil's native fertility. This shows that whilst a negative environmental impact sounds a 'warning bell' the extent to which this matters depends on the importance of the damage being done and the extent to which

substitution for these environmental resources is possible. It also suggests that increasing oil prices might increase the importance of soil fertility in the future.

UK fish stocks provide a clearer and more concerning example. Despite annual increases in fishing effort, landings have been declining since the Second World War suggesting that economic activity has placed greater demands on this ecosystem service than the environment can accommodate. This means that the UK fishing industry now has a resource base well below its original natural potential – and the extent to which it is recoverable is unknown. One final important rider to this section; Ecosystem Services are an artificial conceptual framework. It's a useful framework for considering our relationship with the environment, but the reality is that ecosystems are complex and inter-related. The framework should therefore not be taken to imply services which are apparently unimportant to economic welfare can safely be run-down, because there is a possibility of unintended implications for other services.

Geography and ecosystem services

As you work through the *evidence base template* it will be important to keep a close eye on the geography of ecosystem services, because these vary dramatically. It is helpful to imagine a red-line around your LEP area and consider whether the relationship concerned are entirely within the line, or beyond it, and if so whether from elsewhere in the UK or internationally. For example, the quality of the cultural services offered by local parks is an entirely internal issue. By contrast freshwater supply and flood risk are services where one LEP area may be dependent on a neighbouring one. Global trade means that UK consumption patterns may be dependent on ecosystem services all over the world. An example is the water that is required to produce UK food and textiles imports both require significant water use overseas.

Annex 3: How the *evidence base template* deals with climate change

The main text of this guidance document makes references to climate change, but the purpose of this appendix is to spell out how the *evidence base template* relates to climate change so that it is clear. There are two aspects to climate change. *Mitigation* is about reducing the amount of greenhouse gases emitted to the atmosphere in order to reduce the amount of climate change the world will experience. *Adaptation* is about adapting our plans and infrastructure to cope with climate change. Significant climate change is already 'locked-in' due to past emissions, regardless of the effectiveness of future mitigation plans.

As mentioned in the main text, the UK has binding legal commitments with regard to mitigation in the Climate Change Act [8]. The majority of mitigation actions are driven by decisions in consumption choices, technological change and land use planning and therefore not directly relevant to the *evidence base template*. However landscapes can both emit and sequester carbon and the balance between these can be improved or made worse by land use and land management decisions. This is therefore has an impact on the success of mitigation and is highlighted where relevant in the *evidence base template*, particularly in section *5.1.1 Global Climate Change mitigation*. In addition to this there are instances where a 'green infrastructure' approach to design, which seeks to make use of living design solutions can contribute to mitigation. An example is a green roof – that is a roof that is deliberately planted - can reduce both heating and cooling costs, which reduces energy use. The contribution to climate change mitigation is obviously dependent on the carbon intensity of the heating or cooling source replaced.

By contract *adaptation* is relevant to almost every section of the *evidence base template*, but specifically referenced in some places. Projected climate change is likely to have significant implications for ecosystem services from flood risk to food production, and this is highlighted where necessary. Where a 'green infrastructure' approach has the potential to also be part of the solution, this is also highlighted. Adaptation is therefore 'hard-wired' into the assessment of opportunities and threats.

Annex 3: Sustainability by production or consumption

When considering the sustainability of an economy it is important to be clear whether you are considering sustainability from a *production* or *consumption* perspective. The *evidence base template* uses both, but it's very important to be clear about which is which. We'll use carbon emissions as an example but the distinction applies to all environmental impacts. In the Climate Change Act the UK Government commits to lowering the carbon emitted from the UK's territory by 80% [8]. This is a UK contribution to a global sustainability issue, because global warming potential of carbon emissions is the same worldwide. However, the evidence suggests that whilst there has been some success in lowering direct UK emissions in recent decades, to a very significant extent this is due to the off-shoring of manufacturing and heavy industry. This leads to significant emissions of carbon in China from factories producing products for consumption in the UK. Emissions measured by production are therefore emissions emitted from UK territory, whereas emissions measured by consumption include all the emissions produced anywhere to produce the goods and services that UK residents consume. Who should take responsibility for what carbon is likely to feature in global climate negotiations. Both approaches are relevant to sustainability and should be considered, because it seems likely that in the medium term the UK economy will need to be sustainable by both production and consumption.

Annex 4: Statistical Areas

Most statistics are available in geographies which are in common usage, such was wards, constituencies and to Local Authority boundaries. There are however two statistical specialist geographies which you may not be familiar with, which are discussed below.

Nomenclature d'Unités Territoriales Statistiques (NUTS)

Many statistics are offered at standard European Union geographical areas known as *nomenclature d'unités territoriales statistiques* or in English nomenclature for territorial statistics. These are commonly referred to as NUTS areas.

NUTS Level	Sub-national division	Example
1	Region	Yorkshire and Humberside
2	Sub-region	West Yorkshire
3	Local Authority	Leeds

Super Output Areas

Super Output Areas are statistical levels been Census Output Area and Local Authority level. There are levels of Super Output Area; the Indices of Multiple Deprivation area available at Lower Level Super Output Area (LLSOA) level. This is a very granular level of statistical detail, below ward level. There are 34,378 LLSOAs in England.

Annex 5: GVA and commuting

The size of the economy within the LEP area is a central focus of this toolkit. Put simply, the size of the economy is measured by considering the total amount of money changing hands for goods and services. The best known indicator of the size of the national economy is Gross Domestic Product (GDP). GDP is defined as the value of final economic output of within the domestic economy. 'Final' in this case means finished goods and services; the loaf of bread you buy is included, but the flour to bake the bread is not to avoid double-counting. However, at local level the Office for National Statistics (ONS) offers Gross Value Added (GVA) statistics instead. GVA is a very close cousin of GDP – the difference being is that GVA is value to the producer and so does not include taxes or subsidies on products. For the purposes of the toolkit this subtle difference is not significant. It is important to note that GVA is recorded where the work is done. This means that Manchester Local Authority, for example, has very high levels of GVA per head, but also very high-levels of poverty, because many of the people that work there do not live within the Local Authority. For the toolkit we have chosen to use GVA per capita in order to control for changes to population levels.