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IEMA ENVIRONMENTAL IMPACT ASSESSMENT GUIDE TO

CLIMATE CHANGE RESILIENCE AND ADAPTATION

NOVEMBER 2015

ACKNOWLEDGEMENTS

This practitioner guide has been developed by IEMA and EIA professionals working for organisations registered to the EIA Quality Mark scheme (www.iema.net/qmark).

The project was led by Mott MacDonald, with the guide co-authored and edited by James Montgomery, Phil Le Gouais and Henry LeBrecht (Mott MacDonald), alongside Josh Fothergill (IEMA).

Its development was assisted with input from and discussions with Kay Johnstone (Climate Ready – Environment Agency), Alison Walker and Arefa Siddiqi (HS2), Nick Blyth (IEMA), Ed Barlow (formerly IEMA), Bryony Cunningham (Jacobs), Amy Robinson (RPS Group), James Blake (RSK), Richard Halsey (formerly Turley), Jeonghwa Yi (University of Cambridge), Mark Roberts (Staffordshire Alliance, formerly Wardell Armstrong) and Stephen Brindle (Waterman Group).

IEMA's support to the National Adaptation Programme

IEMA worked with the Department for Environment, Food & Rural Affairs (Defra) in developing the National Adaptation Programme with a particular focus around Objectives 21, 23 and 24, which focus on:

- promoting and gaining widespread uptake in other sectors of adaptation measures that benefit, or do not adversely affect, the natural environment;
- amending awareness and understanding among businesses about climate change risks; and
- increasing the extent to which businesses are actively considering climate change impacts in their risk management, resilience planning and decision-making processes, and taking appropriate adaptive action.

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ABOUT IEMA

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1. SCOPE OF THIS GUIDE

This guide provides a framework for the effective consideration of climate change resilience and adaptation in the Environmental Impact Assessment (EIA) process, in line with the 2014 European Union (EU) Directive.[1]

The EU Directive will not be implemented in UK regulations until May 2017. It is IEMA's intention that EIA practitioners use this guide to help develop their knowledge and experience, and that they capture and feedback any lessons learned. This feedback will be built into a planned second edition of the guidance, to be produced when the new UK EIA regulations are implemented in 2017.

This guide has been prepared to help UK developers understand the new requirements that will be coming into effect in future. This is particularly important for major developments that will be requiring approvals in 2017 or beyond, for which EIA activities will be undertaken in 2015 and 2016.

This guide will enable practitioners to include an effective consideration of both climate change resilience and adaptation in the EIA process. It should be read in conjunction with IEMA's 2010 publication, IEMA Principles Series Climate Change Adaptation in EIA, and the broader components of the related IEMA Principles Series Climate Change Mitigation in EIA, which establish the role of EIA in the management of greenhouse gas emissions.

Definition of climate change, resilience, adaptation and EIA mitigation, along with other terms commonly used in this guide, are included in the Glossary.

An Environmental Statement[2] produced in line with this advice will:

- always make reference to climate change;
- provide a concise explanation of how the project's resilience to climate change was considered;
- set out clearly how effects related to climate change have been assessed; and
- define the significance of effects by pragmatically taking account of the knowledge base used in the impact assessment.

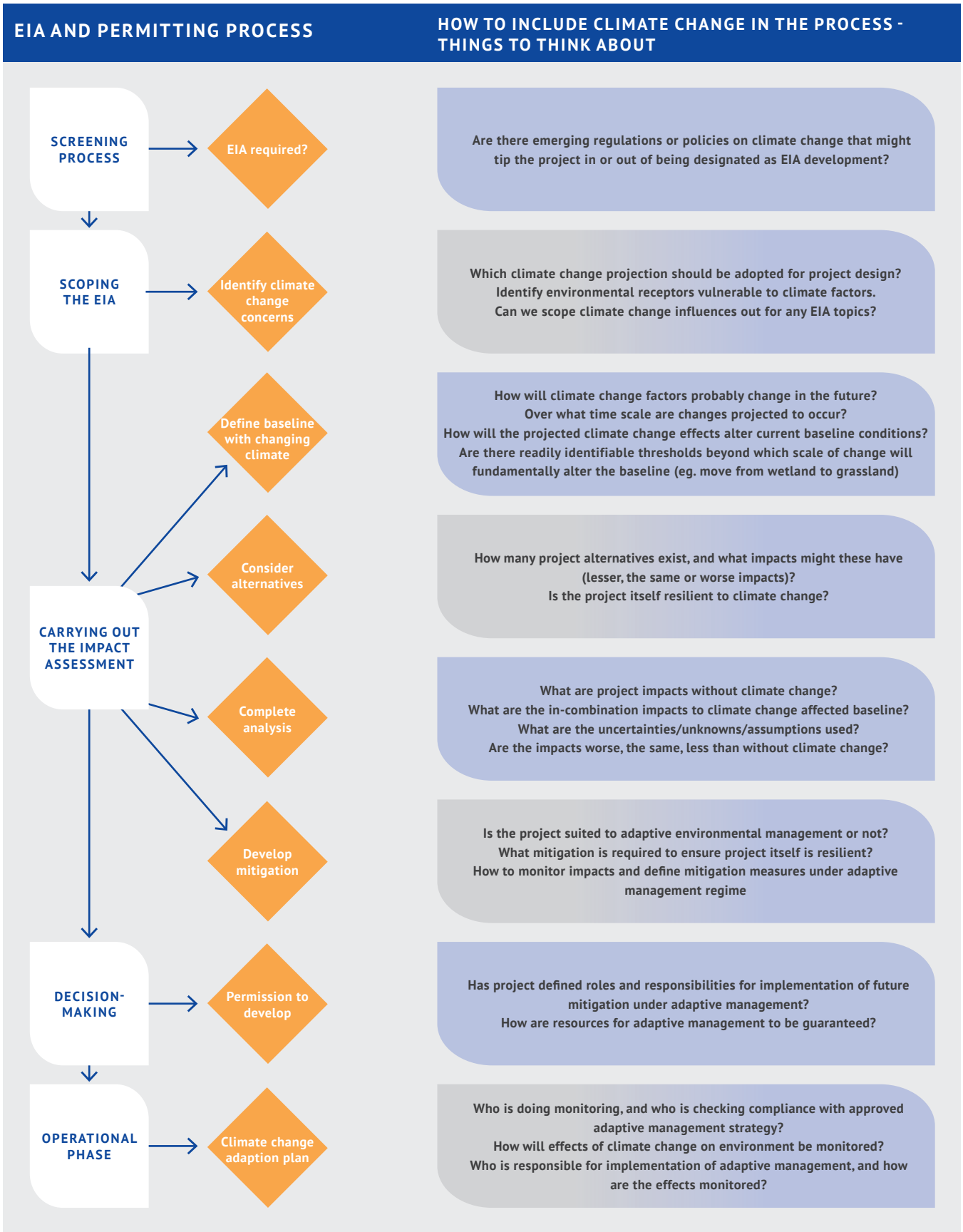
In defining the scope of this guide, systematic consideration was given to the key stages of the EIA process, and how climate adaptation and resilience links to that process. An overview of these linkages is presented in Figure 1.

1.1. Proportionate assessment

EIA should focus on a project's specific impacts: this guide is predicated on all assessments being proportional to the scientific evidence available. It does not recommend a level of detail that creates undue burden to developers and regulators. A focus on proportionate assessment is particularly important here, due to the uncertainties associated with predicting how the environment will respond to climate change.

[1] Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU.
[2] The Environmental Statement is the report produced to record the outcome of an EIA.

Figure 1: Scope of this guide



2. LEGISLATIVE AND POLICY SETTING

FIGURE 1: SCOPE OF THIS GUIDE

2.1. Environmental Impact Assessment Directive 2014/52/EU

Directive 2014/52/EU[3] on the assessment of the effects of certain public and private projects on the environment (hereafter, the EIA Directive) came into force in May 2014 and must be transposed in Member States within three years.

The UK is unlikely to transpose the amendments prior to this deadline, as such revised EIA Regulations reflecting the 2014 Directive amendments are likely to come into force in the UK in May 2017.[4] The revisions do not specifically refer to 'climate change' in Article 3 (they simply refer to 'climate'), but the need to consider climate change specifically is confirmed through revisions to Annex IV (see below). [5]

The revisions identify the important role that EIA can play in assessing climate change, stating in the preamble to the 2014 amendments to the EIA Directive[6] that:

> *(7) Over the last decade, environmental issues, such as resource efficiency and sustainability, biodiversity protection, **climate change,** and risks of accidents and disasters, have become more important in policy making. They should therefore also constitute important elements in assessment and decision-making processes.*
>
> *and:*
>
> *(13) **Climate change** will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to **climate change.***

The 2014 amendments to the EIA Directive incorporate the inclusion of both 'climate' and 'climate change' within the following.

Article 3:

(1)The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;
(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
*(c) land, soil, air, water and **climate;***
(d) material assets, cultural heritage and the landscape;
*(e) the **interaction**[7] between the factors referred to in points (a) to (d). [emphasis added]*

Annex III (criteria to determine whether the projects listed in Annex II should be subject to an EIA) – where selection criteria to determine whether the projects listed in Annex II should be subject to an EIA are to include, among other characteristics:

*1(f) the risk of major accidents and/ or disasters which are relevant to the project concerned, including those caused by **climate change,** in accordance with scientific knowledge. [emphasis added]*

Annex IV (information to be included within the EIA report):

*(4) A description of the factors specified in Article 3(1) likely to be significantly affected by the project, including **climate** (for example greenhouse gas emissions, impacts relevant to adaptation).*
(5) A description of the likely significant effects of the project on the environment resulting from, inter alia …
*(f) The impact of the project on **climate** (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to **climate change.***

[3] Directive 2014/52/EU amending the EIA Directive 2011/92/EU: *http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014L0052*
[4] Paul Suff, 'Built to assess impacts', The Environmentalist, 7 April 2014 *http://www.environmentalistonline.com/article/built-assess-impacts*
[5] Annex IV sets out the information to be included in an Environmental Impact Assessment report (i.e. the Environmental Statement). Paragraph 5(f) therein has specific requirements relating to climate change.
[6] Ibid
[7] The reference to 'interaction between the factors' provides the facility to consider the effect that climate may have on issues considered under other factors (i.e. the influence that climate stresses may have on biodiversity considerations of the project).

2.2. European Union guidance

In 2013, the European Commission launched guidance documents that focused on how to consider biodiversity and climate change in EIA[8] and Strategic Environmental Assessment.[9] The EIA-focused guidance provides useful context on the types of risks that are likely to increase in line with our changing climate, and also provides some direction on how these risks could interact with environmental factors (e.g. water, air, land, etc) listed in Article 3 of the EIA Directive.

Given the EU-wide scope of the guidance, it inevitably retains a strategic focus and only provides a broad, question-oriented approach to advising on the actual assessment of climate change in EIA. While it is a key reference document for practitioners working in this area, further professional judgement will be needed to account fully for climate change in many EIA processes, in line with the guidance provided below. A recording of an IEMA webinar from May 2013 – led by the European Commission and one of the guide's principal authors – is available, and provides a useful introduction to the Commission's ambitions for EIA's consideration of climate.[10]

2.3. United Kingdom policy and regulation

The Climate Change Act 2008 established the context for government action, incorporating a requirement to undertake climate change risk assessments[11] and to develop a National Adaptation Programme (NAP)[12] to address the opportunities and risks from climate change. The Government commissioned the completion of the National Climate Change Risk Assessment, which was reported in January 2012. The Climate Change Risk Assessment provides a useful basis for assessing the likely future environment which EIAs need to consider, and provides information on the range of impacts likely to be experienced in the following sectors:

- agriculture;
- biodiversity and ecosystem services;
- the built environment;
- business, industry and services;
- energy;
- floods and coastal erosion;
- forestry;
- health;
- marine and fisheries;
- transport; and
- water. [13]

The Centre for Climate Change Economics and Policy produced a policy brief in March 2013[14] to inform the preparation of the NAP, incorporating useful guidance on the NAP and flow diagrams to consider when undertaking climate change in an appraisal (it should be noted that appraisal is different to EIA).

In terms of planning, the UK Government addresses climate change through the National Planning Policy Framework. This recognises that planning plays a key role in minimising vulnerability, providing resilience and managing the risks associated with climate change.[15] The Framework does not make specific reference to EIA's role in mitigating and adapting to climate change; however, it does recognise that local planning authorities should adopt proactive strategies to mitigate and adapt to climate change.

[8] European Commission (2013) Guidance on integrating climate change and biodiversity into Environmental Impact Assessment *ec.europa.eu/environment/eia/pdf/EIA Guidance.pdf*

[9] European Commission (2013) Guidance on integrating climate change and biodiversity into Strategic Environmental Assessment *ec.europa.eu/environment/eia/pdf/SEA Guidance.pdf*

[10] IEMA (2013) Introducing the European Commission's guides to integrating climate change and biodiversity in EIA and SEA *http://www.iema.net/event-reports/introducing-european-commissions-eia-and-sea-guides-integrating-climate-change-and*

[11] There are numerous reports produced as part of the national Climate Change Risk Assessment – summarised in HM Government, 'UK Climate Change Risk Assessment: Government Report', January 2012: *https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report*

[12] Department for environment, food and rural affairs and Department of Health (2013) National adaptation programme, *https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209866/pb13942-nap-20130701.pdf*

[13] There are summary and technical scientific reports on all these sectors, along with 'The UK Climate Change Risk Assessment 2012 Evidence Report': *http://randd.defra.gov.uk/Document.aspx?Document=TheUKCCRA2012EvidenceReport.pdf*

[14] Fankhauser (et al) An Independent National Adaptation Programme for England, Centre for Climate Change Economics and Policy (March, 2013): http://www.cccep.ac.uk/Publications/Policy/briefingNotes/2013/independent-national-adaptation-programme-briefing-note.aspx

[15] Department for Communities and Local Government (2012) National Planning Policy Framework, Chapter 10: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

The NAP is primarily for England but also covers reserved, excepted and non-devolved matters. The individual devolved administrations (Scotland, Wales and Northern Ireland) have developed their own programmes, and the UK Government is working with them to share areas of common interest, to ensure a consistent approach in the shape and focus of all the programmes. Details of the specific approaches being taken in each of the devolved administrations are set out as follows:

- Scotland – a Scottish Adaptation Programme[16] addressed the risks identified for Scotland in the UK Climate Change Risk Assessment. It replaced the existing adaptation framework which already contributes to building resilience and capacity to adapt to climate change.

- Wales – the Climate Change Strategy for Wales[17] [18]sets out an adaptation framework to present a national, coordinated approach to ensure that Wales understands the risks and opportunities that climate change presents, and is well placed to adapt in a sustainable way. The Welsh Government also has developed sectoral adaptation plans across five important sectors, and has put programmes in place to embed resilience measures against extreme weather events and climate change into all that it delivers.[19]

- Northern Ireland – a cross-departmental Northern Ireland adaptation programme has been developed. Progress on climate change adaptation is reported annually to the Northern Ireland Executive by the Cross-Departmental Working Group on Climate Change.[20]

[16] Scottish Government (2013) Scottish Climate Change Adaptation Programme http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/adaptation

[17] Welsh Government (2011), Climate Change Strategy for Wales, http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf

[18] Welsh Government (2011) Adaptation Delivery Plan: Climate Change Strategy for Wales, http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/adaptationplan/?lang=en

[19] Welsh Government (2014) Climate Change Publications, http://gov.wales/topics/environmentcountryside/climatechange/publications/?lang=en

[20] Department of Environment Northern Ireland (2012) Northern Ireland Climate Change Adaptation Programme, http://www.doeni.gov.uk/index/protect_the_environment/climate_change/climate_change_adaptation_programme.htm

3. RESOURCING ENVIRONMENTAL IMPACT ASSESSMENTS TO EFFECTIVELY ASSESS CLIMATE CHANGE EFFECTS

3.1. Introduction

In order to integrate climate properly into the EIA process, it will be important for informed advice to be available to EIA technical specialists on future potential climate conditions. Future climate projections are published by the Met Office through the UK Climate Projection website.[21] These projections (currently based on 2009 publications, and called UKCP09) produce information that is available to practitioners, but the information is complex and needs to be used with care.

For any EIA development, developers should consider how climate change may affect the project as part of the design process. If this is not the case, then the EIA leader must raise this as a significant requirement of the EIA process (Annex IV(5) of the EIA Directive).

3.2. Climate change co-ordinator

IEMA recommends that every EIA team includes a practitioner who is knowledgeable about future climate change scenarios, and is experienced in the use and interpretation of future climate projections. This person should be:

- fully conversant with the UKCP09 projections and how these differ;
- able to provide advice on the range of climate change scenarios that could be considered; and
- able to provide advice on the potential range of effects of climate change (e.g. how temperature will vary).

It is recommended that one person within an EIA team is given the responsibility of:

- identifying what climate projection information is most relevant to the EIA;
- ensuring consistency in approach to climate change in the EIA; and
- providing information on the broad range of topic specific guidance available in relation to climate change (e.g. the National Planning Policy Framework guidance on water and flood risk, or Design Manual for Roads and Bridges guidance on drainage design and water resources impact assessment[22]).

In this guide this individual is referred to as the climate change co-ordinator (CC co-ordinator). However, it is important to stress that this guide is not specifically advocating the involvement of a climate specialist; simply that a nominated team member has the required understanding of climate factors to perform the tasks outlined below.

The CC co-ordinator should:

1. **be able to access readily available information sources, such as regional climate patterns and national datasets, and make recommendations to the EIA co-ordinator on these projections** – such datasets are provided by the Met Office and the UKCP09 climate projections, and Intergovernmental Panel on Climate Change (IPCC) reports;

2. **write the background on climate change in the Environmental Statement that is appropriate to the EIA** – this should refer to any relevant Strategic Environmental Assessments, local and national climate change adaptation plans, other EIAs for projects in the area, and local experience and observations to inform the EIA team;

3. **work with EIA technical specialists to ensure that the information being used in the EIA does not contradict any topic-specific guidance** – if there are inconsistencies in the approach recommended in different technical guidance documents in relation to climate change, then the CC co-ordinator should provide advice on how to manage these in the EIA.

[21] UK Climate Projections (2009) http://ukclimateprojections.metoffice.gov.uk/22537

[22] National Planning Policy Framework, Technical Guidance includes factors to allow for sea level rise and rainfall changes (Department for Communities and Local Government, March 2012), and Design Manual for Roads and Bridges, Volume 11, Section 3, Part 10 – HD45/09, Chapter 4 discusses climate change and how to allow for this in the EIA process.

4. IDENTIFYING THE FUTURE CLIMATE

4.1. Introduction

Scientific evidence shows that our climate is changing. However, there are significant uncertainties in the **magnitude, frequency** and **spatial occurrence** – either as changes to average conditions, or extreme conditions. Such uncertainties make it difficult to assess the impacts of climate change in relation to a project. It is the role of the EIA co-ordinator to ensure that the uncertainties highlighted are properly understood and addressed in the EIA, whether this is covered by the CC co-ordinator or the various topic specialists.

An added consideration is the fact that climate change predictions are based on global models for a range of greenhouse gas emission scenarios (called climate change projections) and look generally at regional responses to climate change. In comparison, almost all EIAs look at specific sites compared to regional or national-level climate change models, and the uncertainty of predicting future climate effects on such a small spatial area is potentially large.

There are three aspects of uncertainty that need to managed:

1. which climate change projection to use – as this informs the parameters to account for in the assessment and design process;
2. what climate change scenario is to be included in the design – i.e. how resilient to climate change does the proposed design need to be; and
3. what the environmental baseline will be under the future projected climate – and how can it be assessed.

4.2. Selecting a climate change projection

Where climate change adaptation is included in the EIA, a key step will be to define an emissions scenario[23] and probability, to identify the range of potential future climate conditions to use in the EIA: this should be done at the scoping stage. Once a projection has been identified, then this must be used by all disciplines thereafter as the basis of the EIA process, to ensure consistency in approach. However, there could be situations where additional sensitivity testing is needed for very vulnerable, high-value receptors, where the impact of climate variations under other projections may need to be considered.

Climate projections are updated periodically: it should be the responsibility of the CC co-ordinator to ensure that the EIA is based on the latest projections, and that all the topic specialists fully understand what they are required to use in their assessments. Further reading on climate projections is available from the UKCP09 website.[24]

UKCP09 considers the effects arising from a series of emissions scenarios which project how future climatic conditions are likely to change at a local level (i.e. at a sub-regional scale in the UK), accounting for naturally occurring climate variations.

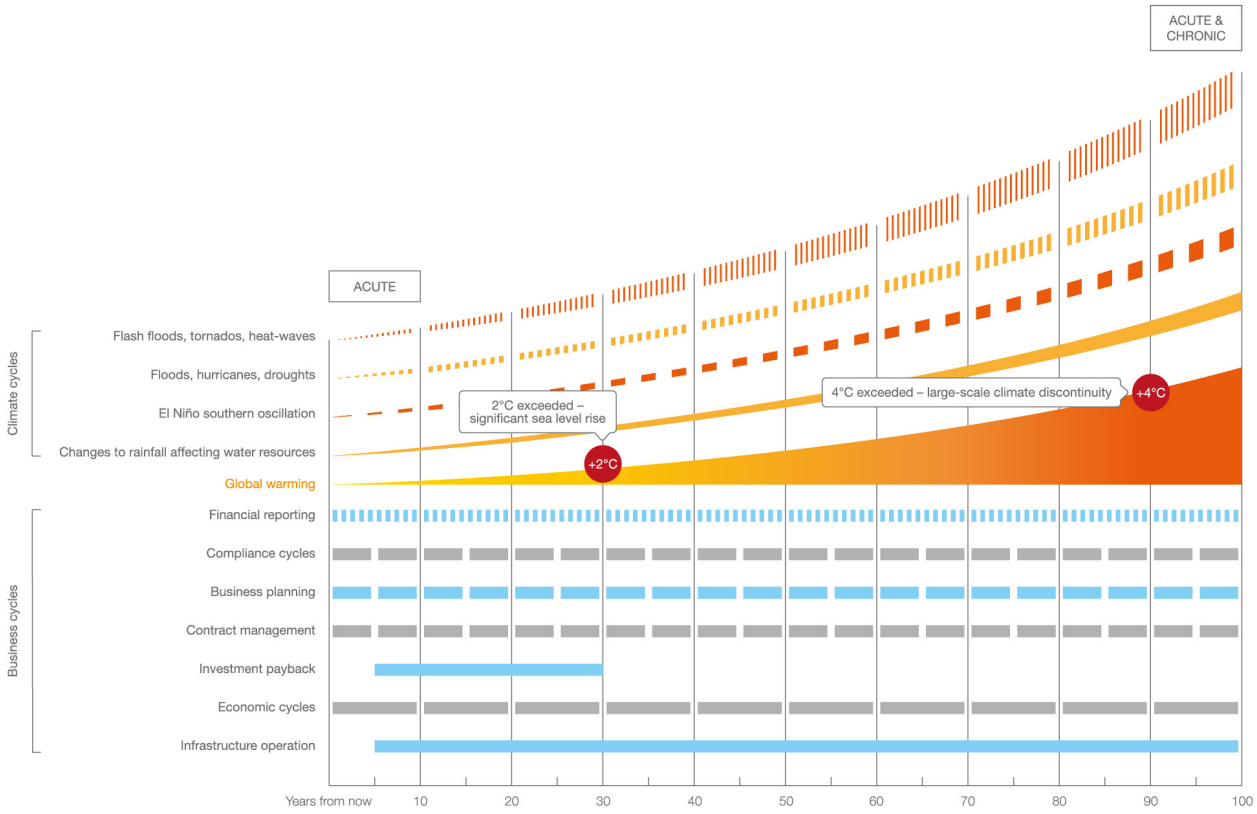
During the EIA it is important to understand and take account of the uncertainty associated with the selected climate projection, and all outputs must reflect any assumptions made. It is also important to understand that the inertia in the climate system means that climate change over the next two or three decades (up to about 2040) will be relatively insensitive to emissions (see Figure 2). As such, a short lifespan development is not likely to be particularly sensitive to which emissions scenario is selected for the EIA.

However, after the 2040s the projections for different emissions scenarios increasingly diverge, and it will be important to take a considered approach to identifying the right emissions scenario to select where the planned operational life of a scheme goes significantly beyond 2040.

[23] IEMA (2010) Principles on Considering Climate Change Mitigation in EIA. For further guidance, see: www.iema.net/eia-cc.

[24] UK Climate Projections (2009) http://ukclimateprojections.metoffice.gov.uk/

Figure 2: Interaction of climate and business risk timelines, indicating overlap between climate impact and development planning and operational cycles



Source: Mott MacDonald / Global Sustainability Institute, Climate Change and Business Survival (2015)

Once an appropriate emission scenario is selected, it can be used to build up a holistic picture of future climate. It is recommended that a summary of the range of projections under the selected scenario is produced – an example of which is shown in Table 1 – to ensure consistency across topics in the EIA.

Probabilistic projections, such as those provided by UKCP09, give a range of possible climate change outcomes and their relative likelihoods, which typically give climate information that is considered unlikely, likely or very likely (i.e. ranging across 10th to 90th percentiles) outcomes. The EIA will have to consider if a specific percentile outcome is used, or whether it is appropriate to consider a range of potential outcomes. This will be influenced by the sensitivity of the project to climate change, and whether there are specific environmental receptors within the project zone of influence that will be especially vulnerable to climate change.

For example, in Table 1, by the 2050s the 50th percentile change predicts a decrease in mean summer precipitation of 20%. This change is very unlikely to be more than a decrease of 45% or an increase of 8%. The wider range of uncertainty is a change of -45% to 16%.

Future environmental baselines for an EIA may choose to focus on the 'central estimate' (50th percentile). However, in some cases it may be appropriate to ensure a higher degree of resilience to climate risks (e.g. for critical infrastructure), by choosing the extremes of the 'likely range' to use in the assessment.

The source of climate projections and the range of projections used in the EIA (and project design) must be clearly described in the Environmental Statement.

Table 1: Example of projected change in selected climate variables in the South West (UK) for the high emissions scenario

SEASON	VARIABLE	TIME PERIOD	LOWEST PROJECTED CHANGE	PROJECTED CHANGE AT			HIGHEST PROJECTED CHANGE
				10TH PERCENTILE	50TH PERCENTILE	90TH PERCENTILE	
WINTER	Mean temperature (°C)	2020s	0.5	0.5	1.2	2.0	2.0
		2050s	0.8	1.3	2.3	3.5	3.5
		2080s	1.4	2.1	3.4	5.1	5.1
	Mean precipitation (%)	2020s	-3	-2	6	8	20
		2050s	0	3	18	41	41
		2080s	5	8	31	73	73
SUMMER	Mean temperature (°C)	2020s	0.5	0.5	1.5	2.6	2.7
		2050s	1.1	1.4	3.1	5.1	5.1
		2080s	1.3	2.7	5.0	7.9	7.9
	Mean precipitation (%)	2020s	-27	-24	-5	18	18
		2050s	-45	-45	-20	8	16
		2080s	-58	-58	-30	4	13

Met Office (2009) UKCP09 maps and key findings *(http://ukclimateprojections.metoffice.gov.uk/21708)*

5. BUILDING CLIMATE RESILIENCE INTO THE PROJECT

It is recommended that project designers conduct a risk assessment to evaluate what resilience measures may be appropriate to include in the design (this should take place at all stages of design development – from optioneering through to detailed design).[25] As discussed in Section 4, the longer the lifetime of a development, the greater the uncertainty about the impact of climate change over time. The risk assessment should be used to identify appropriate adaptive measures, including design features and construction materials, to provide an appropriate resilience to increased extreme weather as well as changes in average conditions. Such adaptive measures need to consider whether there are opportunities to introduce them later with more certainty, or whether they have to be allowed for in the initial design.

The design of any development takes place in stages: the number of design stages reflect the complexity of the development itself. It is good practice to consider the effects of climate change on the development at all stages of design.

In doing so, the developer needs to define the level of risk that is acceptable, taking account of:

- the acceptability of any disruption in use;
- its capital value – if it has had to be replaced;
- its neighbours; and
- (for certain kinds of development) its place in any interconnected network of nationally important assets.

In order to do this, the developer should look at the impact of weather on normal operations, and extreme weather-related disaster scenarios.

The developer should identify an acceptable risk profile for the development, and identify means to mitigate unacceptable risks to acceptable levels. This should include building resilience to climate effects into the scheme.

If this has not been done before the EIA commences, then it should be done during finalisation of the design used in the EIA process, following an iterative design process (as illustrated in Figure 3).

If the project's purpose could be affected by a changed climate, such that the project were potentially no longer viable, then the design would have to be changed. Similarly, if the project could suffer a catastrophic failure due to an extreme weather event, then the design will need to be changed, taking account of the need to protect the environment from the effect of catastrophic impacts, and to ensure that the viability of the project is not compromised.

The project design team should consider resilience measures including:

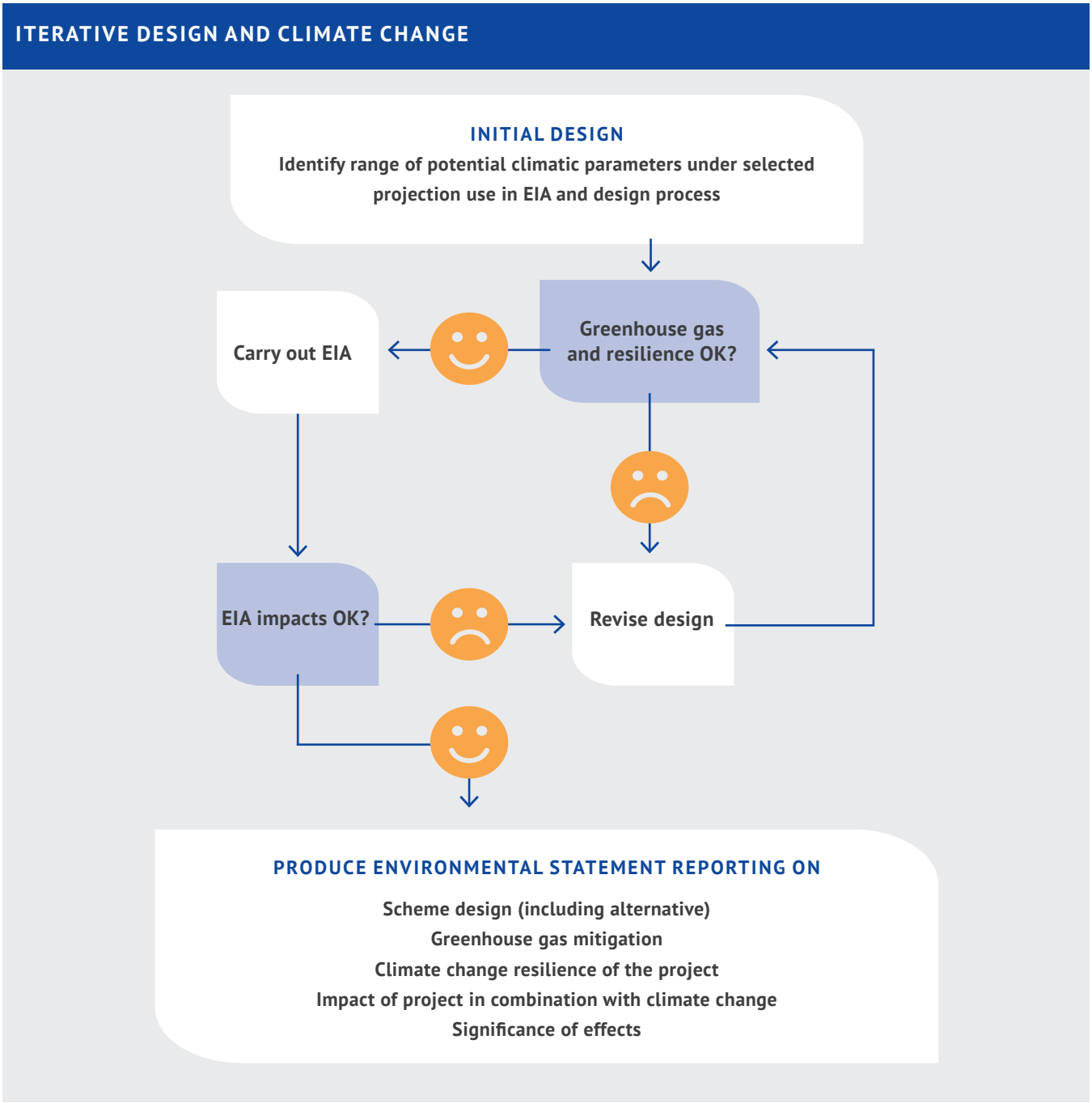
- preventing the loss (total or partial) of the project or components of the project due to the (direct or indirect) effects of extreme climatic events;
- understanding the risks of cascading failure impacting the functionality of the project – e.g. how dependent the project is on telecommunications being maintained 100% of the time;
- changes to operating parameters to maintain productivity and/or functionality under a different average climate;
- changes to capital costs to ensure project resilience under extreme and average climate conditions – e.g. accounting for average temperature impacts on bearings in a bridge over a river, as well as the capacity of the bridge to permit flood flows to pass;
- any variations to maintenance regimes to account for climate change, and
- future-proofing the project to enable modifications in future where some resilience measures are unlikely to be required immediately – e.g. putting in larger foundations to accommodate future increases to flood defence barriers.

[25] See IEMA (2015), IEMA Environmental Impact Assessment Guide to: Shaping Quality Development.

The EIA may identify climate change risks to the project, which should be communicated to the design team to ensure that they are aware of potential residual issues.

The outcome of this process of design for resilience needs to be properly reported in the final Environmental Statement, under the scheme description and consideration of alternatives.

Figure 3: Ensuring climate change is embedded in project design



6. INTEGRATING CLIMATE CHANGE ADAPTATION INTO THE ENVIRONMENTAL IMPACT ASSESSMENT

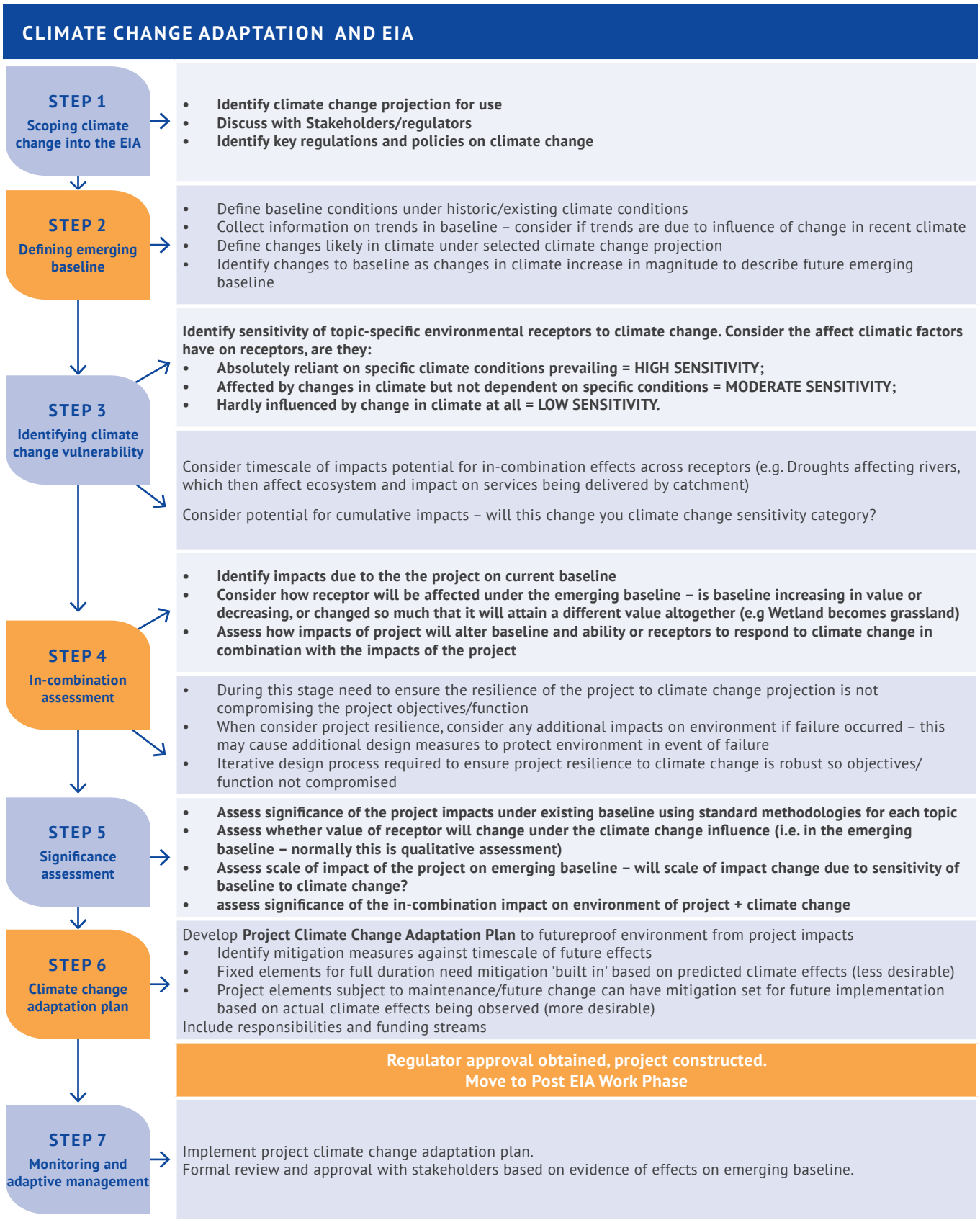
Currently, detailed consideration of climate change in UK EIA is limited. EIA Quality Mark data indicate that only 50% of the Environmental Statements reviewed for the scheme from 2013 achieved a 'pass' grade in relation to the adequacy of their coverage of climatic factors. However, this is set to change with the enhanced focus on climate change within the 2014 amendments to the EIA Directive.

The UK's transposition of these new requirements will see a formal requirement for greater consideration of climate change in UK EIA. As such, this guide advocates that practitioners and competent authorities begin to give enhanced consideration to climate risks in the EIA process in advance of 2017, to ensure that risks are appropriately managed for projects under current consideration, and to support the evolution of sound practice prior to the change in the regulatory regime.

The resilience of the project to the extreme impacts of climate change should be taken into account when screening whether proposed development is likely to be EIA development. Therefore, any screening opinion request should consider climate change in addition to the usual range of receptors and baseline conditions. As part of this consideration, practitioners are advised to review the requirements of Annex III, para. 1(f) of the EIA Directive.

The remainder of this chapter sets out the considerations that should be given to climate adaptation at key stages in the EIA process. Figure 4 shows the steps to be followed, with an indication of the climate change-specific actions that are likely to be required at each stage of the process. Emphasis has been placed on scoping the assessment, as this is the process whereby broad principles need to be translated into tangible plans for addressing climate adaptation issues through the EIA process.

Figure 4 : Step by step approach to considering Climate Change Adaption in Environmental Impact Assessment



6.1 STEP 1: SCOPING CLIMATE CHANGE ADAPTATION INTO THE ENVIRONMENTAL IMPACT ASSESSMENT

6.1.1. The basics: climate change adaptation during scoping

Where EIA is required, the scoping process should consider the significance of effects arising from climate change to ensure that appropriate project mitigation and risk management is included in the development. However, there will be development proposals where climate change adaption can be reasonably scoped out of the EIA.

In order to complete scoping of the EIA, the following should be achieved (Step 1, Figure 4):

- agreement with key stakeholders[26] on the most appropriate climate change projection to adopt for the assessment (see Section 4.2), and any necessary methodological considerations to ensure that climate change is appropriately considered;
- identification of the scale and scope of the project's initial design and its potential impact on the receiving environment, taking into account how this will be affected by a changing climate; and
- engagement with key stakeholders to identify the policies and regulatory regime regarding climate change in the project area.

The incorporation of climate change into the EIA process should not change fundamental EIA processes or accepted conventions and practices. However, it will necessitate interdisciplinary consideration of climate parameters over the lifespan of the project. This should encourage developers to take account of climate change in the project design (as discussed previously), which (iteratively) may significantly alter key characteristics of the project design and, therefore, its impact on the environment.

Preliminary scoping of a project, taking into account climate change, should focus on general considerations rather than detailed, quantitative analysis (see Box 1). To do this will require an early decision on the climate change projection to be used in the EIA process by the project's CC co-ordinator (see Section 3.2).

Box 1: Climate issues to consider during scoping

Climate issues to consider during scoping should include:

- applicable regulatory and legislative requirements;
- the nature of the project, its location and and resilience to climate change;
- the duration of the project;
- the climate-related parameters likely to influence the project;
- anticipated changes to those climatic parameters over the life of the project;
- how sensitive is the environment potentially affected by the project to those climate parameters

[26] Developer, approving authority and any key stakeholders (e.g. Department of Energy and Climate Change, or equivalent devolved administration government department).

Topic leaders should use information collated by the CC co-ordinator, in combination with professional judgement and local knowledge, to determine if climate change effects should be a potential consideration in their part of the EIA process.

Use of the following hierarchy will assist.

1. All Annex I projects should include appropriate consideration of climate change impacts in the EIA (climate change should never be entirely scoped out).

2. Annex II projects requiring EIA for reasons other than climate change still warrant appropriate scoping of key climate change risks (it may be appropriate to scope out climate change effects for some particular technical topics that are not sensitive to climate change).

3. Where climate change is scoped into EIA, then all climate change issues should be established according to legislative requirements, stakeholder and public interest and professional judgement. There may be broad categories of potential project impacts or specific areas of concern. In either case, they should be assessed during the EIA for the whole project lifecycle – i.e. at the design, construction, operation and decommissioning or abandonment stages.

The scoping report should explain how climate considerations will be included in the technical assessments being carried out within the EIA process. In setting the methodology, care is required to ensure that the method is proportional to the evidence base available to support any assessment.

It is worth noting that some topics will be able to deal with climate change relatively easily, while others will be challenged to develop any kind of quantitative assessment.

6.1.2. Defining the boundaries of the climate change assessment

The relevance of climate change should be analysed within spatial and temporal boundaries, which must be clearly established and communicated in the scoping report. The key difference from most historic and current EIAs is that the temporal scope will need to be more clearly defined at the outset, as this will set how future baseline changes need to be accounted for: i.e. agree with the developer the potential project lifespan. This is likely to be longer than the design life embedded in the engineering design, as many developments remain in situ long after the original development has fulfilled its objectives.

The EIA should consider the legacy period of the development, which could be at the end of decommissioning (e.g. when an oil refinery is decommissioned), or which could extend well beyond the lifetime of the original purpose of the development (e.g. the London 2012 Olympic park).

However, the temporal scope needs to be realistic and not assume that a development will remain in situ beyond a reasonably foreseeable timescale. In doing this, consideration should be given to differentiating between elements of the project design which are 'maintenance items', which would be expected to be replaced during the project life, and those elements which are 'fixed assets'.

It may be the case that for some major, long-term projects, the project life exceeds the range over which climate change projections are available (e.g. current UK climate projections (UKCP) are up to 100 years in the future, whereas a major infrastructure project (e.g. a railway line or dam) could have a life of up to 150 years).

In such cases, careful thought is needed to identify the key receptors most vulnerable to climate change and the project, and to determine whether additional

information is needed on the climate change effects beyond 100 years. This is only likely to affect nationally important infrastructure, and where there is concern about very long-term effects relating to climate change, then the developer needs to be engaging with relevant government agencies (e.g. the Met Office) for additional advice. The EIA practitioner should obtain the necessary guidance on how to accommodate such long-term climate change variations from the CC co-ordinator, in consultation with key regulators.

6.1.3. Consultation during the scoping process

Standard consultation requirements are not affected by including climate change in the EIA process. However, it is important that climate change is covered in consultations, as increasingly local authorities and statutory bodies will have dedicated climate change policies with which to comply. In addition, they may have officers with specific responsibility for climate change who can assist in completion of the scoping report.

In many cases a local authority or statutory body may have already considered the implications of climate change. From their knowledge of their area, they could help to identify specific concerns relating to climatic resilience and the changing climate that could be affected by, or affect, the proposed development.

Unless specific studies and reports are available, EIA practitioners, local authorities and statutory bodies will need to use professional judgement, knowledge and experience in determining the issues to be considered in assessment and agreed at the scoping stage.

6.2 EXECUTING THE IMPACT ASSESSMENT

The incorporation of climate change resilience into EIA is described in the remainder of this section. These activities cover:

- identifying the emerging baseline, taking account of the influence of climate change;
- identifying the potential impacts from the scheme during construction, operation and decommissioning;
- assessing the sensitivity of baseline receptors to climate change;
- assessing the scale of impact of the project in combination with climate change;
- assessing the significance of the combined impact;
- identifying mitigation measures and, where these do not result in acceptable impacts, refine the design and reassess the significance until the project achieves the minimum acceptable requirements; and developing a climate change adaptation plan

Practitioners should note that the 2013 EU Guidance on Integrating Climate Change and Biodiversity into EIA includes questions that need to be considered when carrying out the EIA. [27]

6.2.1. Step 2: Defining the emerging baseline

The current baseline is defined by historic climate conditions and the prevailing conditions at the time of the assessment. One fundamental aspect of including climate change into EIA is to understand how this baseline will adapt in the coming decades to the changing climate.

The practitioner needs to look at recent weather patterns, identifying extreme events (e.g. short-term events such as cold snaps and torrential downpours, or moderately lengthy events such as drought). These short-term variations will be useful in determining how the project needs to take climate change into account in the immediate future (e.g. during construction).

This is important, as it is not uncommon to describe the existing baseline using historical trends which may not properly account for climate changes which already have occurred.

However, in assessing climate change risks in the medium (say 15 to 30 years) and longer term (more than 30 years), it is likely that the climate change projection selected for the project will provide more useful guidance on the likely conditions that will alter the baseline.

The practitioner needs to consider a range of factors including:

- extremes in **short-term weather** events that produce sudden shocks, which can have substantial effects on some baseline receptors, such as:
  - heatwaves;
  - extreme flooding and freezing conditions;
  - gales and hurricane-force windstorms;
  - storm surges along coastlines.

- extremes in **longer-term climatic** variability, including:
  - variations in precipitation over one or more seasons resulting in drought or extremely wet conditions;
  - variations in average temperature which, for example, might affect receptors reliant on temperature to drive when breeding cycles commence or end (this may be affected by the availability of specific food sources);
  - potential changes in prevailing wind directions, as the weather system over central Europe changes.

[27] Table 8, p. 31 sets out questions relating to adaptation EC (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

- changes in **average climate** norms resulting in:
- sea level rise;
- increases in freezing or thawing;
- average ambient temperatures that might affect human behaviour or mobile species (e.g. the increased presence of certain bird species currently uncommon in the area);
- changes in seasonal rainfall patterns.

It may be beneficial to develop a matrix to define the physical location of the project, taking account of topography, hydrology, soil conditions, habitats and communities, then to consider how climate change might affect these, and therefore how the baseline is likely to alter (see Table 2 as an example layout).

For longer-lasting projects (e.g. a major infrastructure likely to be in place for upwards of 100 years), it is probably more useful to define several future baseline environments (the current baseline, then in 30, 50, 70 years' time, and more than 100 years' time).

Table 2: Sample presentation of predicted trends in climatic variables

VARIABLE	PREDICTED CHANGE IN TREND AT:		
	10th Percentile	50th Percentile	90th Percentile
Temparture			
Mean minimum winter temperature (ºC) Mean winter temperature (ºC) Mean maximum winter temperature (ºC) Mean minimum summer temperature (ºC) Mean summer temperature (ºC) Mean maximum summer temperature (ºC)	↑	↑	↑
Warmest day of summer (ºC)	↓		
Precipitation			
Annual mean precipitation (%)	↓	↕	↑
Mean winter precipitation (%)	↕	↑	
Mean summer precipitation (%)	↓	↓	
Wettest day in winter (%)	↕	↑	
Wettest day in summer (%)	↓	↕	
Cloud cover			
Winter cloud amount	↓	↕	↑
Summer cloud amount		↓	↕
Humidity			
Winter mean relative humidity	↓	↕	↑
Summer mean relative humidity		↓	
Wind			
Winter wind speed (m/s)	↓	↕	↑
Summer wind speed (m/s			

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Snow			
Snowfall - winter		↓	
Snowfall - spring		↕	
Fog			
Fog days – annual		↓	
Fog days – winter		↕	
Fog days – spring Fog days – summer Fog days – autumn		↓	
Storms			
Storms		–	
Lightning – winter			
Lightning – spring	↓	↑	↑
Lightning – summer Lightning – autumn	↕		
Sea Level			
Sea level rise		↑	

Source: UKCP09 reports and guidance: *http://ukclimateprojections.metoffice.gov.uk/22530*

6.2.2. Step 3: Identifying climate change vulnerability and sensitivity of receptors

Having identified the range of potential climate change most likely to affect future baseline conditions, individual receptors need to be assessed as to their vulnerability to the future climate. This should be done using at least three levels of sensitivity, as follows.

- **High vulnerability** – the receptor is directly dependent on existing and/or prevailing climatic factors, and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level); or only able to tolerate a very limited variation in climate conditions.

- **Moderate vulnerability** – the receptor is dependent on some climatic factors, but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK, but is not found in southern Spain)

- **Low vulnerability** – climatic factors have little influence on receptors (therefore, consider whether it is justifiable to assess such receptors further within the context of EIA – i.e. it is likely that such issues will have been excluded in scoping process).

6.2.3. Step 4a: Identify future impacts

Practitioners need to consider whether the impacts of the scheme are likely to be different because of the likely changing climate. In doing this, they must look at the future baseline and decide if the likely impacts of the proposed scheme would be increased or decreased under the emerging climate.

It is unlikely that completely new direct impacts will arise as a result of climate change. However, it is worth considering whether the geographic spread or scale of potential impacts might be changed under the future climate. The recommended approach is to:

- assess the magnitude of the impacts of the project on baseline conditions under current conditions, and the significance of effects (i.e. conduct the EIA as normal without climate change);

- identify the effect of climate change on receptors without the project (this is the future baseline);

- assess whether the impacts of the project will be worse or improved on the future baseline;

- define if these changes affect the significance of effects identified for the project without climate change.

6.2.4. Step 4b: Assessing in-combination impacts

As mentioned previously (see Section 1), the level of assessment and methodology needs to be proportional to the evidence base available to support it.

Given the level of uncertainty, a qualitative assessment based on objective professional judgement of the information available is preferred, unless there are published, accepted quantifiable methods for assessing in-combination effects (e.g. the National Planning Policy Framework on flood risk assessment, specifying rainfall factors to include in flood modelling).

If the same type of receptor is currently found in geographic locations that experience similar climate conditions to those predicted at the site, it may be reasonable to consider how the receptor would be likely to be impacted if the development happened in that location. However, this would need to be done with care, as many other location-specific factors could influence the receptor (e.g. soil and geology variations between the proposed site, and the proxy climatic equivalent could produce significant variations in responses to rainfall).

If there is a compelling reason to take this approach, it may be of value to develop an understanding of the receptors' sensitivities in the climatic proxy site, in order to assess how these compare to its sensitivity under current climatic norms at the EIA site.

6.2.5. Step 5: Significance assessment

This guidance is not proposing changes to the significance criteria used in the EIA process. However, the susceptibility or resilience of the receptor to climate change must be considered as well as the value of the receptor.

Therefore, a high-value receptor that has very little resilience to changes in climatic conditions should be considered more likely to be significantly affected than a high-value receptor that is very resilient to changes in climatic conditions.

The uncertainty of the combined effect needs to be taken into account. If uncertainty about how a receptor will adapt to a changing climate is high, then it is recommended that a conservative threshold of significance is adopted within the evaluation.

6.3 CLIMATE CHANGE ADAPTATION PLAN: MITIGATION AND ADAPTIVE MANAGEMENT (STEPS 6 AND 7)

A key means of dealing with uncertainty is to introduce the concept of **adaptive management**.[28] Adaptive management is the process that enables uncertainty to be included in operational decision-making. This process is not unique, and is practiced widely in all areas where uncertainty in the future is present.

Adaptive management enables the potential impacts from changes in the climate to be dealt with as they become more likely (see Section 6.3.2). By taking an adaptive management approach, projects can introduce additional mitigation if their impact is starting to cause unacceptable effects on the receiving environment.

Currently, this concept is not commonly used in EIA, but it will become increasingly important to avoid inappropriate mitigation being implemented at the wrong time in a project's life.

6.3.1. Step 6: Mitigation

Mitigation should be considered against the timescale of the project, and when mitigation might be most usefully implemented. In all but exceptional circumstances (e.g. when having to design in the fixed elements of a project that cause significant negative effects on current and future baseline conditions), it will not be appropriate to propose that costly and permanent mitigation be put in place if it is not going to be required for another 50 years.

Key considerations in developing mitigation should include:[29]

- 'no-regret' or 'win-win' options that provide benefits under multiple scenarios;
- 'win-win-win' options that resolve predicted future impacts to bring economic, social and environmental benefits;
- favouring flexible mitigation options over options which are locked and cannot be modified in future;
- allowing for safety margins in developing the project design, or in mitigation designs, to ensure resilience of the project or proposed mitigation to climate change;
- shortening the lifetime of front-end elements of the project, to minimise the need for mitigation; and
- delaying elements of the project with high risk or uncertainty until a later date, when the risk associated with uncertainty is likely to be less

In defining EIA mitigation, consideration needs to be given to the mitigation heirachy. The following principles identify how this may apply to climate adaptation-related risks: [30, 31]

- what measures are available to avoid, control or manage identified risks? (avoid, prevent or minimise);
- does the mitigation strengthen the project's capacity to be resilient to climate change itself? (enhance);
- are there risk reduction measures available? (avoid or prevent);
- will the mitigation improve the project's functionality under future climate conditions? (enhance);
- can the mitigation exploit opportunities offered by the natural environment? (minimise or enhance); or
- can the mitigation provide opportunities for environmental improvements that depend on the climate changing? (enhance or compensate).

[28] See Section 6.5.3 of IEMA, 'Special Report: The State of Environmental Impact Assessment Practice in the UK' (2011) for further detail regarding adaptive management in EIA.

[29] Adapted from the EC (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

[30] Adapted from EuropeAid (2009), 'Guidelines on the Integration of Environment and Climate Change in Development Cooperation', Guidelines No. 4, November 2009. https://ec.europa.eu/europeaid/sites/devco/files/methodology-tools-and-methods-series-integration-environment-in-development-200911_en_2.pdf

[31] IEMA (forthcoming, 2016), IEMA Environmental Impact Assessment Guide to: Delivering Post-consent.

6.3.2. Step 7: Adaptive management

The key steps of an adaptive management process that would be appropriate to recommend as part of an environmental management plan are as follows:

1. Conceptualise the issues by completing the EIA and:
   a. identify the significant potential impacts and which receptors are at risk;
   b. identify the critical areas of risk and threat.

2. Manage uncertainty (e.g. by incorporating adaptive management principles into the environmental management plan) by:
   a. setting goals and/or objectives including threshold criteria that would require action to be taken;
   b. identifying the assumptions on which these goals or objectives are reliant;
   c. developing a monitoring plan to check that the assumptions remain valid;
   d. developing a process to implement when assumptions are no longer valid; and
   e. defining roles, responsibilities and funding streams.

3. Implement the plan: [32]
   a. implement the mitigation planned for development; and
   b. monitor and analyse results.

4. Review and update the plan:
   a. regularly collate and analyse the monitoring data;
   b. review the assumptions and objectives;
   c. update and adapt the plan as appropriate, based on results of analysis; and
   d. implement appropriate additional mitigation.

5. Report and update the knowledge base:
   a. disseminate the lessons learned;
   b. roll out the updated plan and inform key stakeholders of proposed changes;
   c. move back to Step 1.

Where climate change adaptation and/or resilience are a prominent feature in the significant effects identified in an EIA, it is recommended that a 'whole-life climate change adaptation plan' be formulated that documents how to take forward the mitigation measures, following the five-step process set out above. This document should contain:

- existing policy objectives and regulatory requirements affecting proposed mitigation;
- any planning or licence conditions;
- responsibility and ownership of the plan, including any financial agreements in place or required in future;
- timelines for mitigation implementation; and
- a procedure to ensure review and update of the plan.

[32] Longer-term management and monitoring of operational risks, or risks that persist through the operational life of the scheme, may be best integrated into a formal environmental management system.

7 PRESENTATION IN THE ENVIRONMENTAL STATEMENT

IEMA's Principles on Climate Change Adaptation and EIA[33] (published in 2010) set out the approach to be used in presenting climate change information within an Environmental Statement.

- Where adaptation is considered in EIA, it must be clearly presented within the Environmental Statement – this could be in a climate change section, in a relevant topic chapter, or across a number of different parts of the document.

- Any modelling or detailed quantification of the effects of the changing climate in combination with the project's anticipated impacts should be presented, as relevant, within an appendix. This should be appropriately cross-referenced within the main Environmental Statement.

- Where other assessments of the effect of climate change on either the project or the environment are required, they should be referenced within the Environmental Statement. As a minimum, the Environmental Statement must summarise any other climate-related report's findings, and make effective cross-reference to it.

Recognising the Environmental Statement as an important tool for informing meaningful consultation and decision-making, the climate aspects of the project (whether stand alone, or integrated into other chapters), must be written in a manner that makes it easy for stakeholders and other interested parties to understand the approach and findings of the EIA.

[33] IEMA (2010) Principles on Climate Change Adaptation and EIA, www.iema.net/eia-cc

7 FURTHER READING AND SOURCES OF FUTURE BASELINE INFORMATION

Department for Business Innovation & Skills (BIS) / Government Office for Science 'Foresight Projects': *https://www.gov.uk/government/collections/foresight-projects*

Department for Communities and Local Government (2012) Technical Guidance to the National Planning Policy Framework, *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6000/2115548.pdf*

Department for Environment, Food & Rural Affairs (Defra) (2012) UK Climate Change Risk Assessment, *https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report*

Department of Energy & Climate Change (2010) '2050 Pathways Project': *www.gov.uk/2050-pathways-analysis*

Environment Agency (2011) Strategic Environmental Assessment and Climate Change: Guidance for Practitioners, *https://www.gov.uk/government/publications/strategic-environmental-assessment-sea-and-climate-change*

European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment, *http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf*

European Environment Agency (2010) The European Environment: State and Outlook 2010 – Synthesis, *http://www.eea.europa.eu/soer/synthesis/synthesis*

European Environment Agency (nd) 'Climate Change Data Centre Overview': *www.eea.europa.eu//themes/climate/dc*

European Environment Agency (nd) 'EEA Activities': *www.eea.europa.eu/themes/scenarios/scenarios-and-forward-studies-eea-activities*

European Environment Agency (nd) 'PRELUDE Scenarios Interactive Tool': *www.eea.europa.eu/multimedia/interactive/prelude-scenarios/prelude*

Fast Future (2005) Baseline Scanning Project: A Research Study for Defra's Horizon Scanning and Futures Programme and Strategy and Sustainable Development Directorate.

Highways Agency, Transport Scotland, Welsh Assembly Government and Department for Regional Development Northern Ireland (2008) Assessment and Management of Environmental Effects. Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08, *http://www.standardsforhighways.co.uk/DMRB/vol11/index.htm*

IEMA (2010) IEMA Principles Series: Climate Change Adaptation & EIA, *www.iema.net/eia-cc*

International Association for Impact Assessment (IAIA) (2012) Climate Change in Impact Assessment: International Best Practice Principles, *http://www.iaia.org/publicdocuments/special-publications/SP8%20Climate%20Change_web.pdf*

International Finance Corporation (IFC) (2013) Enabling Environment for Private Sector Adaptation: An Index Assessment Framework, *http://www.ifc.org/wps/wcm/connect/6060670042bd92b6b297be0dc33b630b/Enabling+Environment+for+Private+Sector+Adaptation+-+Stenek,+Amado,+Greenall.pdf?MOD=AJPERES*

Mott MacDonald & Global Sustainability Institute (2015) Climate Change and Business Survival, *https://www.mottmac.com/download/file/127/6772/climate%20change%20and%20business%20survival.pdf*

Natural England (2009) England's Natural Environment in 2060: Issues, Implications and Scenarios, *http://publications.naturalengland.org.uk/publication/31030*

Natural England Secure Environmental Future Project *www.naturalengland.org.uk/ourwork/securefuture/default.aspx*

Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR) (2014) Assessing the Treatment of Climate Change Impacts and Adaptation in Project-Level EAs in the Canadian Mining Sector, *http://www.climateontario.ca/doc/p_ECCC/A_Review_of_Mining_Sector_Environmental_Assessments_OCCIAR_RSI.pdf*

Organisation for Economic Co-operation and Development (OECD) (2012) Environmental Outlook to 2050: The Consequences of Inaction, *http://www.oecd.org/env/indicators-modelling-outlooks/*

UK Climate Projections (nd) 'UKCPO09': *http://ukclimateprojections.defra.gov.uk/*

United Nations Environment Programme (UNEP) (2012) GEO5 Global Environmental Outlook: Environment for the Future We Want, *http://www.unep.org/geo/geo5.asp*

United Nations Environment Programme (UNEP) (2014) 'Global Environmental Outlook': *www.unep.org/geo/*

World Bank (2015) 'Climate & Disaster Risk Screening Tools': *http://climatescreeningtools.worldbank.org/*

GLOSSARY

Adaptive management	A systematic process which monitors the ongoing effectiveness of mitigatory and compensatory measures to determine if they are achieving their desired objectives – and where they are not, either modifies the action, or identifies additional actions to be taken[34]
Carbon emissions scenarios	The basis on which global climate change models are developed that take account of different levels of global carbon emissions. The scenarios are based on complex economic models, but can be simply summarised as low, medium or high emissions scenarios. It is considered highly unlikely that a low carbon emission scenario is a realistic scenario on which to base assessments
Climate	The general weather conditions prevailing over a long period of time. Climate change will see trends in the climate conditions changing (seasonal averages and extremes)
Climate change adaptation (Adaptation)	The process that a receptor or project has to go through to ensure it maintains its resilience to climate change. In the case of a development, project adaptation can be embedded in the design to account for future climate conditions, or the project can introduce measures to ensure it retains it resilience (i.e. the project adapts) to future climate conditions. Environmental receptors will adapt to climate change in varying degrees, depending on how vulnerable they are to climate
Climate change co-ordinator	The practitioner within an EIA team who may or may not be a 'climate expert' has a thorough grasp of climate change projections, policy and regulation, and who is also conversant with the emerging climate change guidance relating to specific technical topics. It is important that all EIA teams have access to a competent climate change co-ordinator
Climate change mitigation	Measures included in a project to reduce the emissions of greenhouse gases. Not to be confused with *EIA mitigation*
Climate change projection	The range of possible climate conditions predicted for a range of probability that the conditions will occur for a specific carbon emissions scenario
Climate change resilience (Resilience)	A measure of ability to respond to changes that something experiences. If a receptor or project has good climate change resilience, it is able to respond to the changes in climate in a way that ensures it retains much of its original function and form. A receptor or project that has poor climate change resilience will lose much of its original function or form as the climate changes

[34] Developed from: *http://www.eiacampus.com/course/category.php?id=15*

EIA co-ordinator	The practitioner with overall responsibility for ensuring that the quality of the EIA satisfies current regulatory requirements, and is consistent with the requirements published for EIA by IEMA. This person should be a chartered environmentalist with experience in the preparation and delivery of EIA, who will be responsible for ensuring climate change adaption is properly accounted for in the EIA process. This practitioner has specific responsibility for advising developers of their obligations under the revised EIA Directive and the implications thereof – especially in advance of the revised EIA regulations that will be introduced in 2017
EIA mitigation	Measures identified during the EIA process to reduce or enhance the negative or positive impacts of a project respectively. Not to be confused with *climate change mitigation*
Projection	A possible outcome defined by modelling of climate variables to give a *possible* outcome. This is in contrast to a prediction which is a statement of *probable* change
UKCP09	UK Climate Projections 2009 is a climate analysis tool produced by the UK Met Office and funded by Defra. Projections are broken down to a regional level across the UK and are shown in probabilistic form, illustrating the potential range of changes and level of confidence in each prediction
Weather	What we experience on a daily basis and defined by atmospheric conditions (such as temperature, wind, cloud cover rain) prevailing at specific moments in time, or over short time periods

IEMA ENVIRONMENTAL IMPACT ASSESSMENT GUIDE TO

CLIMATE CHANGE RESILIENCE AND ADAPTATION

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