

12 APPENDIX A: NPS NN, Relevant sections on EIA Regs

252 The National Policy Statement for National Networks (“NPS NN”) was promoted through the Planning Act 2008 (“PA2008”), approved by Parliament and published by the Secretary of State for Transport in December 2014.

253 Chapter 4 of the NPS NN (Department for Transport, 2014) sets out the principles for assessment of schemes such as the A38 Derby Junctions under the PA2008 DCO planning regime.

254 Section 4.3 lays out that the Examining Authority and the Secretary of State, for any proposed development, should take into account:

- *“its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits;*
- *its potential adverse impacts, including **any longer-term and cumulative adverse impacts**, as well as any measures to avoid, reduce or compensate for any adverse impacts.” (my emphasis)*

255 The A38 Derby Junctions is an Environmental Impact Assessment (EIA) project

256 NPS NN Section 4.15 to 4.21 describes how environmental assessment should be done.

*“The Directive specifically requires an environmental impact assessment to **identify, describe and assess effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them.** Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 sets out the information that should be included in the Environmental Statement including a description of the likely significant effects of the proposed project on the environment, **covering the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project, and also the measures envisaged for avoiding or mitigating significant adverse effects.**” (my emphasis)*

257 Section 4.16 states:

*“When considering significant cumulative effects, any environmental statement should provide information on **how the effects of the applicant’s proposal would combine and interact with the effects of other development** (including projects for which consent has been granted, as well as those already in existence).” (my emphasis)*

258 Specifically on assessment of carbon emissions in the Environmental Statement, Section 5.17 states:

“Where the development is subject to EIA, any Environmental Statement will need to describe an assessment of any likely significant climate factors in accordance with the requirements in the EIA Directive.”

13 APPENDIX B: EIA Regulations

259 The A38 Derby Junctions is an EIA development and the decision-making process, therefore, needed to comply with the EIA Regs.⁴⁶ As I note above in Appendix A, the NPS NN Section 4.15 to 4.21 also requires compliance with the EIA Regs.

260 Reg 4(2) prohibits the granting of development consent for EIA development “unless an EIA has been carried out in respect of that application”. The EIA is defined in Reg 5 as:

- (1) *The environmental impact assessment (“the EIA”) is a process consisting of—*
 - (a) *the preparation of an Environmental Statement or updated Environmental Statement, as appropriate, by the applicant;*
 - (b) *the carrying out of any consultation, publication and notification as required under these Regulations or, as necessary, any other enactment in respect of EIA development; and*
 - (c) *the steps that are required to be undertaken by the Secretary of State under regulation 21 or by the relevant authority under regulation 25, as appropriate.*
- (2) *The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors—*
 - (a) *population and human health;*
 - (b) *biodiversity, with particular attention to species and habitats protected under any law that implemented Directive 92/43/EEC⁴⁷ and Directive 2009/147/EC⁴⁸;*
 - (c) *land, soil, water, air and **climate**;*
 - (d) *material assets, cultural heritage and the landscape;*
 - (e) *the interaction between the factors referred to in sub-paragraphs (a) to (d).*
- (3) *The effects referred to in paragraph (2) on the factors set out in that paragraph must include the operational effects of the proposed development, where the proposed development will have operational effects.*
(...) (my emphasis)

261 The Environmental Statement, is further defined in Reg 14:

- (1) *An application for an order granting development consent for EIA development must be accompanied by an Environmental Statement.*
- (2) *An Environmental Statement is a statement which includes at least—*

⁴⁶ Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

⁴⁷ Habitats Directive

⁴⁸ Wild Birds Directive

- (a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;
- (b) a description of the likely significant effects of the proposed development on the environment;
- (c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- (d) a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- (e) a non-technical summary of the information referred to in subparagraphs (a) to (d); and
- (f) any additional information **specified in Schedule 4** relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected. (my emphasis)

262 Schedule 4 of the EIA Regs then sets out in more detail the information to be included in Environmental Statements. This includes, *inter alia*:

“Para 1:

A description of the development, including in particular—

... (c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity⁴⁹) used;

Para 4:

*A description of the factors specified in regulation 5(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, **climate (for example greenhouse gas emissions, impacts relevant to adaptation)**, material assets, cultural heritage, including architectural and archaeological aspects, and landscape.*

Para 5

A description of the likely significant effects of the development on the environment resulting from, inter alia—

⁴⁹ This is relevant to land-use and land-clearance emissions from roads infrastructure construction as discussed in main text

- (a) *the construction and existence of the development, including, where relevant, demolition works;*
- (b) *the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;*
- (c) *the **emission of pollutants**, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;*
- (d) *the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);*
- (e) *the **cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;***
- (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;*
- (g) *the technologies and the substances used.*

*The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, **cumulative**, transboundary, **short-term, medium-term and long-term**, permanent and temporary, positive and negative effects of the development.*

*This description should take into account the **environmental protection objectives established at Union level** (as they had effect immediately before exit day) or United Kingdom level which are relevant to the project, including in particular those established under [the law of any part of the United Kingdom that implemented Council Directive 92/43/EEC and Directive 2009/147/EC.]” (my emphasis)*

263 Paragraph 5 of Schedule 4 above shows that the Environmental Statement must cover “the direct effects and any indirect, secondary, **cumulative**, transboundary, **short-term, medium-term and long-term**, permanent and temporary, positive and negative effects of the development”, taking into account the “**environmental protection objectives**” established both at EU or UK level. The “objectives” include relevant climate change targets set under UK law including:

- the UK’s Nationally Determined Contribution (NDC) under the Paris agreement
- the legally binding target under the Climate Change Act 2008 to meet net-zero carbon emissions by 2050
- the UK Sixth Carbon Budget (6CB), and other carbon budgets and policy within that
- the Governments recent Transport Decarbonisation Plan (TDP)
- NPPF (July 2021) 152 planning requirement to have contributions to “radical reductions of greenhouse gas emissions”,

- the statutory duty on National Highways under the Infrastructure Act 2015 section 5(2) to have regard for the environment

264 Finally, EIA Reg 20 allows for an Examining Authority to suspend consideration of an application if the Environmental Statement is found to be inadequate:

a. “Reg 20(2)

This paragraph applies if—

(a) the applicant has submitted a statement that the applicant refers to as an Environmental Statement; and

(b) the Examining authority is of the view that it is necessary for the statement to contain further information.

b. Reg 20(1)

Where an Examining authority is examining an application for an order granting development consent and paragraph (2) applies, the Examining authority must—

(a) issue a written statement giving clearly and precisely the reasons for its conclusion;

(b) send a copy of that written statement to the applicant; and

(c) suspend consideration of the application until the requirements of paragraph (3) and, where appropriate, paragraph (4) are satisfied.” (*my emphasis*)

14 APPENDIX C: Highways England (National Highways) Licence

265 The National Highways licence requires at 5.23

“5.23 ... the Licence holder should:

...

c. Consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance;”

15 APPENDIX D:

<not used>

16 APPENDIX E: TABLE HEADER EXAMPLE

266 This example is taken from the A47 BLOFIELD TO NORTH BURLINGHAM DUALLING, ES, Chapter 14⁵⁰. This shows the second column with the Table header “Net change in Carbon over 60-year appraisal period (tCO₂e) (DS vs DM)”. Whilst “differential” would be a more accurate term than “net”, the column does show genuinely DS-DM data, as opposed the RESP-8.121, Table 2-2, as described in the referring section.

Table 14-10 : Summary of the net change in emissions against relevant carbon budgets

Project Stage	Net change in Carbon over 60-year appraisal period (tCO ₂ e) (DS vs DM)	Net change in carbon per UK carbon budget period (tCO ₂ e) (DS vs DM)				Change as % of total UK carbon budget			
		Fourth (2023 to 2027)	Fifth (2028 to 2032)	Sixth (2033 to 2037)	2038 to 2087	Fourth (2023 to 2027)	Fifth (2028 to 2032)	Sixth (2033 to 2037)	2038 to 2087
Construction	+25,765	+25,765	-	-	-	<0.001%	-	-	-
Operation	+133,337	+9,487	+14,245	+12,287	+97,317	<0.001%	<0.001%	0.001%	Unknown
Total	+159,102	+35,252	+14,245	+12,287	+97,317	0.001%	<0.001%	0.001%	Unknown

⁵⁰ TR010040/APP/6.1, REP2-002 in that scheme’s library

16.1 APPENDIX F: WHAT IS A CARBON BUDGET AND HOW DOES IT POINT TO THE TRUTH?

267 A financial budget is defined as ‘a plan to show how much money a person or organisation will earn and how much they will need or be able to spend’⁵¹. A carbon budget is similar, but instead of money, it sets out “the cumulative amount of carbon dioxide (CO₂) emissions permitted over a period of time to keep within a certain temperature threshold⁵².” **Unlike money, for carbon budgets, there are no overdraft facilities, nor national deficits, not quantitative easing mechanisms from central banks.** Once a CO₂ budget is spent, it cannot be recovered, and the laws of physics determine the consequences for the planet and for humanity⁵³. Carbon budgets reveal the truth of this situation.

268 The “laws of physics” can now provide increasingly accurate modelling of the global and local carbon budgets. In the last five years the reports of the Intergovernmental Panel on Climate Change (IPCC) have highlighted that our political institutions, businesses, and society have not started to respond to the climate emergency with the urgency required. Simply put we are living outside of our budget.

269 Collectively, we now know that this decade is the most crucial decade for reversing 200 years of carbon polluting activities, reversing the rash, profligate spending of our collective carbon budget, and building a new future based on a non-polluting global society. It is crucial that we address this emergency using every tool possible, and this includes carbon budgets and their capacity to point to the truth of where we are not doing enough, **and what we may be unable to do or build consequently.**

270 The Paris Agreement 2015 is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016⁵⁴. The UK is a signatory to the agreement. Its goal is to limit global heating to well below 2°C degrees, preferably to 1.5 °C, compared to pre-industrial levels.

271 Scientists have established models that calculate how much more carbon dioxide⁵⁵ may be emitted globally into the atmosphere before breaching various temperatures of global overheating – eg: how many billions of tonnes (or Gigatonnes, GtCO₂) before breaching 1.5 degrees, how many billions of tonnes before breaching 2.0 degrees etc. These are

⁵¹ <https://dictionary.cambridge.org/dictionary/english/budget>

⁵² <https://carbontracker.org/carbon-budgets-explained/>

⁵³ Greenhouse gas removals (GGR) and negative emissions technologies may provide extremely costly, speculative, and unproven at scale methods which proxy for an “overdraft facility”. Even if these work, they would be like paying back a loan at a huge interest rate. See, Kevin Anderson, John F. Broderick & Isak Stoddard (2020): A factor of two: how the mitigation plans of ‘climate progressive’ nations fall far short of Paris-compliant pathways. Climate Policy, DOI: 10.1080/14693062.2020.1728209, Appendix A “*However, there is wide recognition that the efficacy and global rollout of such technologies are highly speculative, with a non-trivial risk of failing to deliver at, or even approaching, the scales typically assumed in the models. ... Whilst the authors of this paper are supportive of funding further research, development and, potentially, deployment of NETs, the assumption that they will significantly extend the carbon budgets is a serious moral hazard (Anderson & Peters, 2016).*”

⁵⁴ <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

⁵⁵ In fact, the models assess a variety of Greenhouse Gases, but for simplicity I restrict this document to CO₂ (carbon dioxide) carbon budgets

referred to as carbon budgets, and I have previous explained them above as a bank account analogy but with no overdraft, deficit, or quantitative easing facilities available.

272 It is important to understand the difference between science-based carbon budgets and political targets like the net-zero target in the UK. Net-zero by 2050 can be achieved by many different paths or trajectories of annual carbon emissions, and the carbon emitted is basically the area under the curve. Annual emissions cuts may be applied late (not as “backloaded”) or early (known as front loaded). Backloaded, or less steeply front-loaded, cuts will have a much greater quantum of carbon emissions emitted under the curve, and therefore also use much more of the carbon budget. Science-based carbon budgets by contrast aim to define a trajectory which meet a criterion – in the examples here, the path necessary to meet the temperature target in the Paris agreement. The UK Committee on Climate Change publish paths and budgets, but their ability to meet the criteria of the Paris temperature target has not been demonstrated scientifically – although CCC may claim, and genuinely, endeavour to meet that criterion. In fact, the CCC budgets, and assumptions, and hence UK carbon budgets, are increasingly challenged by scientists, see below.

273 It is further worth noting that a recent report⁵⁶ from Climate Crisis Advisory Group (CCAG) has recently said that there is no remaining carbon budget and policy should be directed towards net-negative carbon emissions as soon as possible. The report says:

“The CCAG is clear that the current shift in global emissions is not sufficient to avoid global disaster, and there is no ‘remaining Carbon Budget’. If proper account is taken of all greenhouse gases, and their CO2 equivalence, the 450ppm threshold has already passed, contradicting the widespread notion of a ‘carbon budget’ that could still be spent whilst remaining below 1.5°C temperature rise.”

The CCAG was founded, and is chaired, by the eminent scientist Professor Sir David King, Fellow the Royal Society (FRS), and former UK Government's Chief Scientific Advisor from 2000 to 2007. CCAG comprises prominent climate scientists. It was created in response to the Climate Emergency this year, as a new advisory group to help inform the public, governments and financial institutions providing them with the most comprehensive science, and more crucially, guiding them towards action for climate repair. CCAG’s important scientific commentary on the climate crisis can be made by their small group on a faster cycle than the IPCC.

⁵⁶ CCAG report, August 2021, “The final warning bell”, <https://static1.squarespace.com/static/60ccae658553d102459d11ed/t/61275c5abba2ec034eefb534/1629969503477/CCAG+The+Final+Warning+Bell.pdf>

16.2 *Science-based carbon budget assessment of compliance against UK obligations under the Paris agreement*

274 To understand what emission reductions should be made in UK local authority areas to make a ‘fair’ contribution⁵⁷ towards the Paris Climate Change Agreement, scientists at Manchester Tyndall centre have taken IPCC global carbon budgets and produced the so-called SCATTER budgets for UK local authorities. SCATTER stands for Setting City Area Targets and Trajectories for Emissions Reduction project and was funded by the Department for Business Energy and Industrial Strategy (BEIS). It developed a methodology for Local Authorities to set carbon emissions targets that are consistent with United Nations Paris Climate Agreement⁵⁸. The Tyndall budget for the East Midlands area is given in Appendix F.

275 These budgets translate the “well below 2°C and pursuing 1.5°C” global temperature target, and the equity principles enshrined in the United Nations Paris Agreement, to a national UK carbon budget which is then split between sub-national areas using different allocation regimes.

276 The assumptions for this transformation from global to local budgets in given in two sources:

- a) a 2020 Climate Policy paper⁵⁹, widely referred to as the “Factor of Two” paper
- b) the “full” report from the Tyndall Carbon Budget Tool for UK Local Authorities⁶⁰, widely referred to SCATTER budgets

These two sources are authored by the same research group and are internally consistent. The “Factor of Two” paper is a landmark in 2020 in appraising national carbon budgets.

16.3 *Relevant carbon budgets/targets derivable from the Climate Change Committee*

277 The Climate Change Committee (CCC) has recently published its sixth Carbon Budget (6CB) report. Its headline recommendation is for the UK to deliver a reduction in net annual emissions of 78%, against a 1990 baseline, by 2035. Previous UK ambition was targeting an 80% reduction against 1990 figures by 2050 under the original Climate Change Act, so this represents a halving of the time to get to around 80% emission cuts (against 1990 baseline) from 2020.

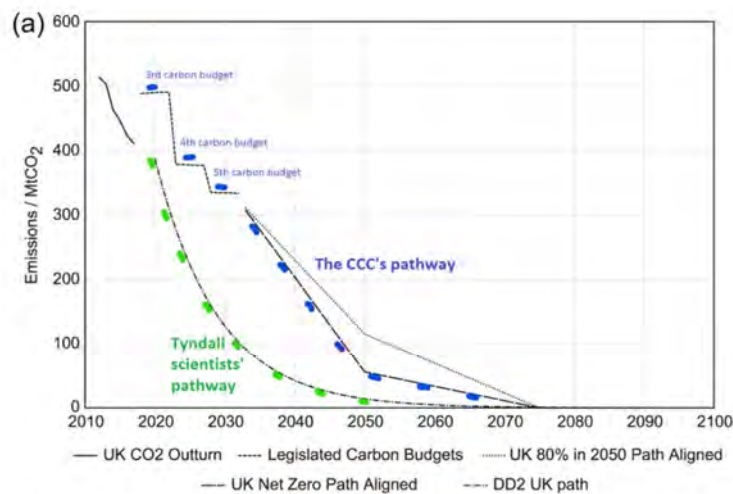
⁵⁷ ‘fair’ meaning equitable under the Paris Agreement equity principles between developing and developed nations, known as Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC) <https://www.oxfordclimatesociety.com/blog/what-you-need-to-know-about-common-but-differentiated-responsibility>

⁵⁸ <https://carbonbudget.manchester.ac.uk/about/>

⁵⁹ Kevin Anderson, John F. Broderick & Isak Stoddard (2020): A factor of two: how the mitigation plans of ‘climate progressive’ nations fall far short of Paris-compliant pathways, Climate Policy, DOI: 10.1080/14693062.2020.1728209

⁶⁰ <https://carbonbudget.manchester.ac.uk/reports/>

278 However, the CCC do not show anywhere how the 6th Carbon Budget (6CB) can be derived directly by a stepwise downscaling from a scientifically established global carbon budget (in contrast to the Manchester Tyndall references above which do demonstrate this). The derivation of the 6CB is focussed more on meeting the national, politically set, net zero-target of 2050 via an array of policy interventions rather than fitting to a specific carbon budget (relating to the back-loading and front-loading point above). The point here is that there are many possible pathways to reach net-zero, and each will have different accumulated carbon emissions under the curve – so one can reach net-zero having added more or less emissions to the global atmosphere, some pathways may blow our carbon budgets. The science-based carbon budget approach is designed to specify a pathway which keeps within the carbon budgets.



This graph is from the [Factor of Two paper](#) by climate scientists at the Tyndall centre. People & Nature added the highlights. The pathway for UK carbon emissions highlighted in green is one that, the scientists argue, is compatible with the Paris agreement. The pathway highlighted in blue is one they have plotted to reflect the CCC's emissions reductions proposals: it implies cutting emissions at about half the pace that the scientists' pathway implies

Figure 2

279 Generally, the difference between the Tyndall and CCC carbon budgets is that the Tyndall ones are 2 – 3 times smaller (and tighter). As shown above, the Tyndall budgets have rapid decarbonisation from 2020 in order to meet the overall budget (area under the curve). The Tyndall trajectory is derived from the IPCC budget for 1.7°C, supporting the point from CCAG that there is no remaining budget for 1.5°C.

280 The graph above is taken from⁶¹ and illustrates the difference between CCC and Tyndall carbon budgets. In simple terms, the carbon budget is the area under the annual emissions trajectory curve. Issues such the shape of the curve, front-loading or back-loading emissions reductions can produce vastly different curves and corresponding

⁶¹ <https://peopleandnature.wordpress.com/2021/07/08/how-the-uk-climate-change-committee-steals-from-the-carbon-budget/>

areas under the curve. So it is possible for the UK to meet net-zero at 2050 via vastly different overall carbon budgets. Therefore “net-zero”, in itself, is not a good measure of compliance with the Paris agreement temperature target whereas a science-based carbon budget is.

281 Further, the details of the carbon accounting differ, so it is not easy to get a like-for-like comparison between the science-based carbon budget from Manchester Tyndall and the Climate Change Committee budgets. For further information, see footnotes⁶².

⁶² “How the UK Climate Change Committee steals from the carbon budget”, blog post by Professor Peter Somerville, 8th July 2021, <https://peopleandnature.wordpress.com/2021/07/08/how-the-uk-climate-change-committee-steals-from-the-carbon-budget/> and “Calculating a fair carbon budget for the UK”. blog post by Professor Peter Somerville, 8th July 2021, <https://peopleandnature.wordpress.com/2021/07/08/calculating-a-fair-carbon-budget-for-the-uk/>

18 APPENDIX G: SCIENCE BASED CARBON BUDGET FOR EAST MIDLANDS AREA

282 As generated at <https://carbonbudget.manchester.ac.uk/reports/EM/>

283 Tyndall Carbon Budget Reports present recommended climate change commitments for UK local authority areas that are aligned with the commitments in the United Nations Paris Agreement, informed by the latest science on climate change and defined by science-based carbon budget setting.

Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER)

284 This work was developed as part of the Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER) project. The SCATTER project, funded by the Department for Business Energy and Industrial Strategy (BEIS), developed a methodology for Local Authorities to set carbon emissions targets that are consistent with United Nations Paris Climate Agreement. The SCATTER project was a collaboration between Tyndall Manchester, Anthesis Group and Greater Manchester Combined Authority. The further development of the carbon budget methodology into a widely applicable free online resource for local authorities UK-wide was supported through funding from the University of Manchester EPSRC Impact Support Fund. A SCATTER online tool by Anthesis Group is also available to local authority users online.

Quantifying the implications of the United Nations Paris Agreement for DERBYSHIRE
 DERBYSHIRE CONSISTS OF THE FOLLOWING LOCAL AUTHORITIES: AMBER VALLEY, BOLSOVER, CHESTERFIELD, DERBY, DERBYSHIRE DALES, EREWASH, HIGH PEAK, NORTH EAST DERBYSHIRE, SOUTH DERBYSHIRE

Date:	September 2021
Prepared By:	Dr Jaise Kuriakose, Dr Chris Jones, Prof Kevin Anderson, Dr John Broderick & Prof Carly McLachlan



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Setting Climate Commitments for the East Midlands

Quantifying the implications of the United Nations Paris Agreement for the East Midlands

Date:	October 2021
Prepared By:	Dr Jaise Kuriakose, Dr Chris Jones, Prof Kevin Anderson, Dr John Broderick & Prof Carly McLachlan

NB: All views contained in this report are solely attributable to the authors and do not necessarily reflect those of the researchers within the wider Tyndall Centre.

Key Messages

This report presents climate change targets for the East Midlandsⁱ that are derived from the commitments enshrined in the Paris Agreement, informed by the latest science on climate change and defined in terms of science based carbon setting. The report provides the East Midlands with budgets for carbon dioxide (CO₂) emissions and from the energy system for 2020 to 2100.

The carbon budgets in this report are based on translating the “well below 2°C and pursuing 1.5°C” global temperature target and equity principles in the United Nations Paris Agreement to a national UK carbon budgetⁱⁱ. The UK budget is then split between sub-national areas using different allocation regimes. Aviation and shipping emissions remain within the national UK carbon budget and are not scaled down to sub-national budgets. Land Use, Land Use Change and Forestry (LULUCF) and non-CO₂ emissions are considered separately to the energy CO₂ budget in this report.

Based on our analysis, for the East Midlands to make its ‘fair’ contribution towards the Paris Climate Change Agreement, the following recommendations should be adopted:

1. Stay within a maximum cumulative carbon dioxide emissions budget of 171.6 million tonnes (MtCO₂) for the period of 2020 to 2100. At 2017 CO₂ emission levelsⁱⁱⁱ, the East Midlands would use this entire budget within 6 years from 2020.
2. Initiate an immediate programme of CO₂ mitigation to deliver cuts in emissions averaging a minimum of -13.8% per year to deliver a Paris aligned carbon budget. These annual reductions in emissions require national and local action, and could be part of a wider collaboration with other local authorities.
3. Reach zero or near zero carbon no later than 2041. This report provides an indicative CO₂ reduction pathway that stays within the recommended maximum carbon budget of 171.6 MtCO₂. At 2041 5% of the budget remains. This represents very low levels of residual CO₂ emissions by this time, or the Authority may opt to forgo these residual emissions and cut emissions to zero at this point. Earlier years for reaching zero CO₂ emissions are also within the recommended budget, provided that interim budgets with lower cumulative CO₂ emissions are also adopted.

Sections 1, 2 and 5 of this report - **Introduction, Methods and References** - can be found in the [full print report](#)

3. Results

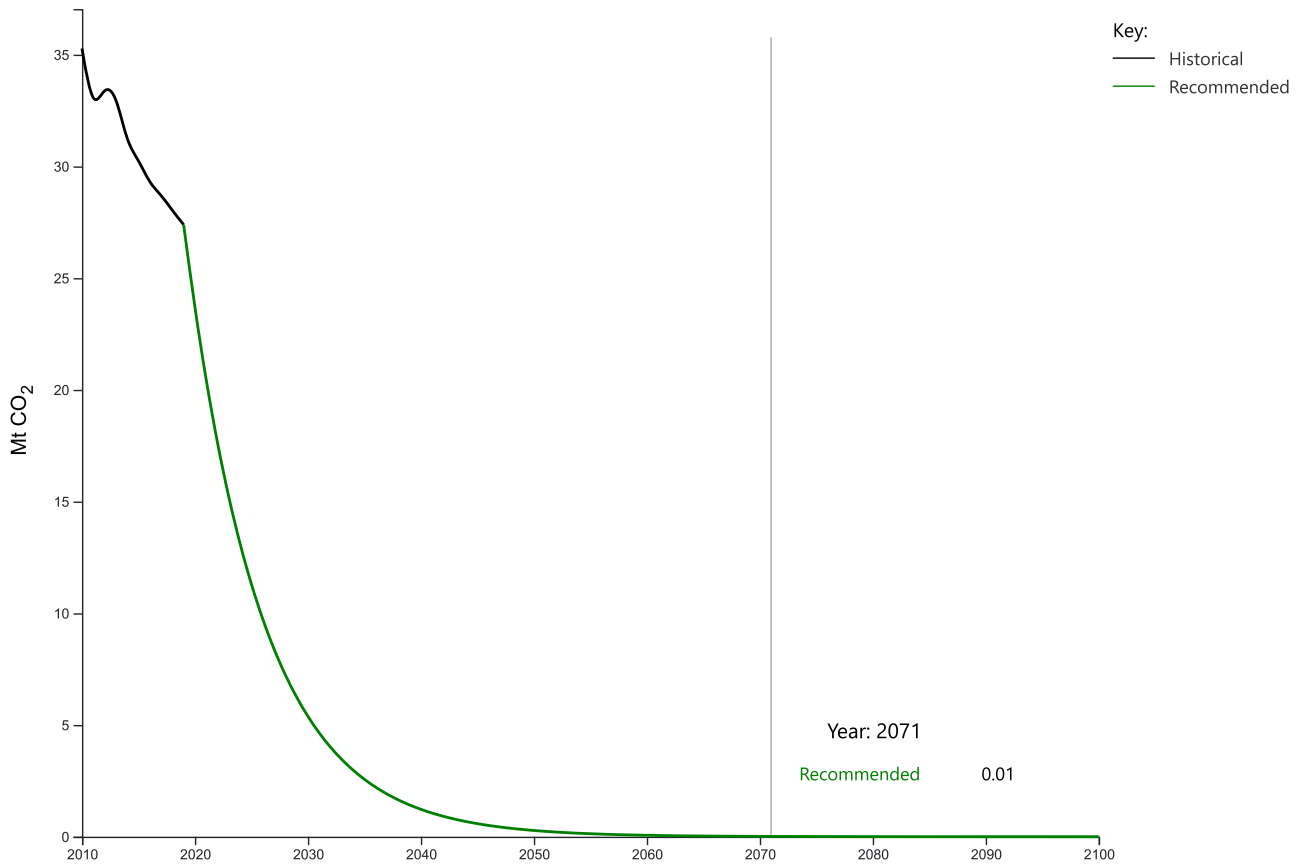
3.1 Energy Only Budgets for the East Midlands

Following the Method the recommended energy only CO₂ carbon budget for the East Midlands area for the period of 2020 to 2100 is 171.6 MtCO₂. To translate this into near to long term commitments a CO₂ reduction pathway within the 171.6 MtCO₂ is proposed here. A consistent emissions reduction rate of -13.8% out to the end of the century is applied. In 2041 95% of the recommended carbon budget is emitted and low level CO₂ emissions continue at a diminishing level to 2100.

Figure 1: An interactive chart of Energy related CO₂ only emissions pathways (2010-2100) for the East Midlands premised on the recommended carbon budget.

Tracking your mouse over this chart will display the actual figures for each of the pathways, as well as for the lead-in historical values.

Pathway projections for the East Midlands



Show alternative pathway projections (see below)

Table 1 presents the East Midlands energy CO₂ only budget in the format of the 5-year carbon budget periods in the UK Climate Change Act. To align the 2020 to 2100 carbon budget with the budget periods in the Climate Change Act we have included estimated CO₂ emissions for the East Midlands for 2018 and 2019, based on BEIS provisional national emissions data for 2018 and assuming the same year on year reduction rate applied to 2019. The combined carbon budget for 2018 to 2100 is therefore 227.0 MtCO₂.

Table 1: Periodic Carbon Budgets for 2018 for the East Midlands.

Carbon Budget Period	Recommended Carbon Budget (Mt CO ₂)
2018 - 2022	117.0
2023 - 2027	57.6
2028 - 2032	27.4
2033 - 2037	13.1
2038 - 2042	6.2
2043 - 2047	3.0
2048 - 2100	2.7

The recommended budget is the maximum cumulative CO₂ amount we consider consistent with the East Midlands’s fair contribution to the Paris Agreement. A smaller carbon budget, with accelerated reduction rates and an earlier zero carbon year, is compatible with this approach. It is however important that for an alternative zero carbon year the proposed 5 year budget periods are the same or lower that those specified in Figure 2. Furthermore meeting the budget must not rely on carbon offsets.

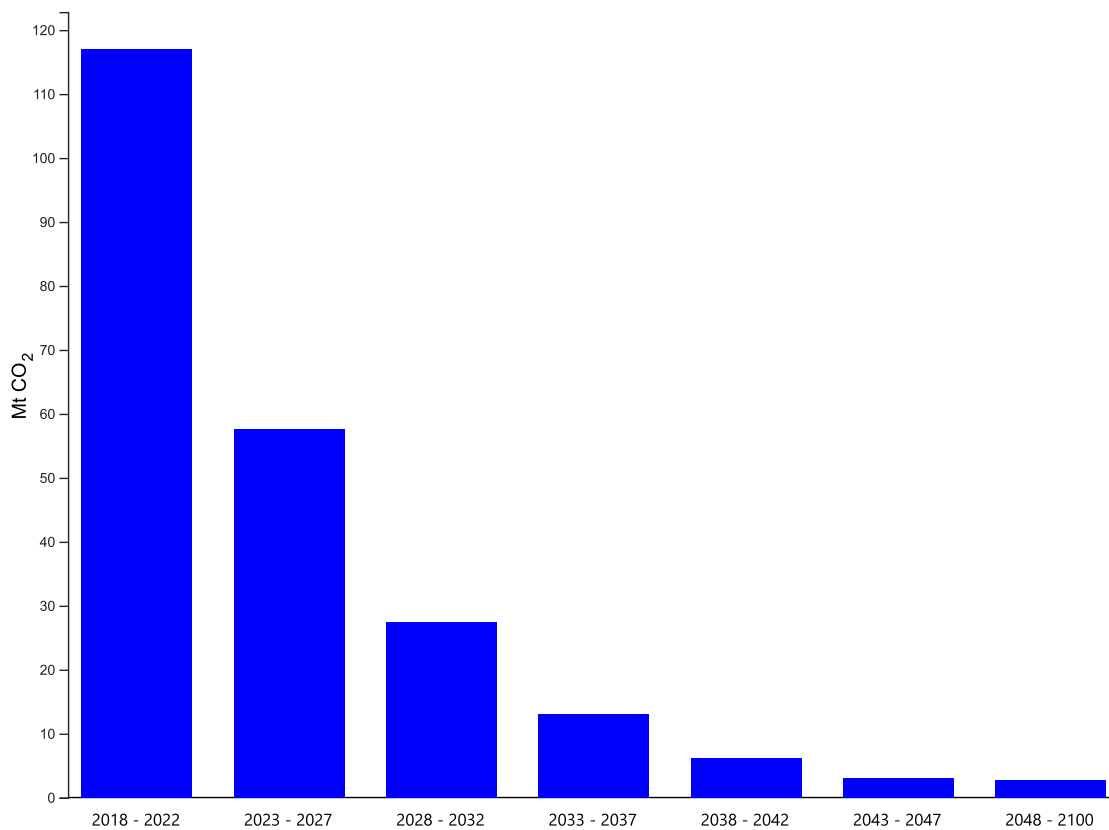


Figure 2: Cumulative CO₂ emissions for budget period (based on Table 1) from 2018 to 2100 for the East Midlands

3.2 Recommended Allocation Regime for Carbon Budget

The recommended carbon budget is based on a grandfathering allocation regime for sub-dividing the UK sub-national energy only carbon budget. There are three distinct allocation regimes that can be applied to determine sub-national budgets. We have opted to recommend one common approach for allocating carbon budgets that can be applied to all Local Authority areas. This enables straightforward compatibility between carbon budgets set at different administrative scales. For example this makes it easier for individual Local Authorities to calculate their own carbon budgets that are compatible with a budget set at Combined Authority scale. It also means that under the recommended carbon budgets, all Authorities are contributing to a common total UK carbon budget. If for example all Authorities selected the allocation regime that offered them largest carbon budget the combined UK budget would not comply with the objectives of the Paris Agreement. The common approach to allocation we recommend therefore further assures that the carbon budget adopted is Paris Agreement compatible.

We have chosen a grandfathering as our common allocation approach because, based on our analysis, it is the most appropriate and widely applicable regime within the UK.

Population and Gross Value Added^{iv} (GVA) are alternative allocation regimes. Population shares the carbon budget equally across the UK on a per capita basis. In this allocation regime the UK population is compared to that of the East Midlands from 2011 to 2016. The carbon budget (2020-2100) for the East Midlands is then apportioned based on its average proportion of the UK population for the period 2011-2016. For regions where per capita energy demand deviates significantly from the average (e.g. a large energy intensive industry is currently located there) the budget allocated may not be equitable for all regions, therefore it is not recommended as the preferred allocation. GVA is used as an economic metric to apportion carbon budgets. For example, the UK total GVA is compared to that of the East Midlands from 2011 to 2016. The carbon budget (2020-2100) for the East Midlands is then apportioned based on the East Midlands's average proportion of UK GVA for the period 2011-2016. GVA can be useful as a proxy for allocation on economic value, however without an adjustment for the type of economic activity undertaken, areas with high economic 'value' relative to energy use can get a relatively large budget, while the inverse is true for areas with energy intensive industries, and/or lower relative economic productivity. We would therefore not recommend GVA as an appropriate allocation regime for all regions.

Table 2 presents the result outcomes for alternative allocation regimes – population and gross value added (GVA).

Table 2: Energy only CO₂ budgets and annual mitigation rates for the East Midlands (2020-2100) by allocation regime

Allocation regime (% of UK Budget allocated to the East Midlands)	UK Budget ^v (MtCO ₂)	East Midlands Budget (MtCO ₂)	Average Annual Mitigation Rate (%)
Grandfathering to the East Midlands from UK (7.7%)	2,239	171.6	-13.8%
Population split to the East Midlands from UK (7.2%)	2,239	160.7	-14.6%
GVA split to the East Midlands from UK (5.8%)	2,239	130.6	-17.3%

To view the pathways for the Population and GVA allocation regimes, select the checkbox under Fig. 1

3.3 Land Use, Land Use Change and Forestry emissions for the East Midlands

Land Use, Land Use Change and Forestry (LULUCF) consist of both emissions and removals of CO₂ from land and forests. We recommend that CO₂ emissions and sequestration from LULUCF are monitored separately from the energy-only carbon budgets provided in this report. The East Midlands should increase sequestration of CO₂ through LULUCF in the future, aligned with Committee on Climate Change's high level ambition of tree planting, forestry yield improvements and forestry management. Where LULUCF is considered, we recommend it compensate for the effects of non-CO₂ greenhouse gas emissions (within the geographical area) that cannot be reduced to zero, such as non-CO₂ emissions from agriculture.

3.4 Non-CO₂ Emissions

The IPCC SR1.5 report identifies the importance of non-CO₂ climate forcers (for instance methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), sulphur dioxide (SO₂) and black carbon) in influencing the rate of climate change. However, a cumulative emission budget approach is not appropriate for all non-CO₂ greenhouse gases, as the physical and chemical properties of each leads to differing atmospheric lifetimes and warming effects. There are also substantial relative uncertainties in the scale, timing and location of their effects.

We do not provide further analysis or a non-CO₂ emissions reduction pathway in this report. However the global carbon budget in the IPCC Special Report on 1.5°C, that our analysis is based on, assumes a significant reduction in rate of methane and other non-CO₂ emissions over time. Therefore to be consistent with carbon budgets the East Midlands should continue to take action to reduce these emissions.

The Department of Business Energy and Industrial Strategy's Local Authority emissions statistics do not at this time provide non-CO₂ emissions data at the regional level. Given the absence of robust non-CO₂ emissions data, any non-CO₂ emissions inventory by other organisations at scope 1 and 2 for the East Midlands may form the basis of monitoring and planning for these emissions. We recommend considering the adoption of a LULUCF pathway that includes CO₂ sequestration sufficient to help compensate for non-CO₂ emissions within the East Midlands's administrative area.

4. Conclusions

The results in this report show that for the East Midlands to make its fair contribution to delivering the Paris Agreement's commitment to staying "well below 2°C and pursuing 1.5°C" global temperature rise, then an immediate and rapid programme of decarbonisation is needed. At 2017 CO₂ emission levels^{vi}, the East Midlands will exceed the recommended budget available within 6 years from 2020. **To stay within the recommended carbon budget the East Midlands will, from 2020 onwards, need to achieve average mitigation rates of CO₂ from energy of around -13.8% per year.** This will require that the East Midlands rapidly transitions away from unabated fossil fuel use. For context the relative change in CO₂ emissions from energy compared to a 2015 Paris Agreement reference year are shown in Table 3.

Table 3: Percentage reduction of annual emissions for the recommended CO₂-only pathway out to 2050 in relation to 2015

Year	Reduction in Annual Emissions (based on recommended pathway)
2020	22.1%
2025	62.8%
2030	82.3%
2035	91.6%
2040	96.0%
2045	98.1%
2050	99.1%

The carbon budgets recommended should be reviewed on a five yearly basis to reflect the most up-to-date science, any changes in global agreements on climate mitigation and progress on the successful deployment at scale of negative emissions technologies.

These budgets do not downscale aviation and shipping emissions from the UK national level. However if these emissions continue to increase as currently envisaged by Government, aviation and shipping will take an increasing share of the UK carbon budget, reducing the available budgets for combined and local authorities. **We recommend therefore that the East Midlands seriously consider strategies for significantly limiting emissions growth from aviation and shipping.** This could include interactions with the UK Government or other local authority and local enterprise partnership discussions on aviation that reflect the need of the carbon budget to limit aviation and shipping emissions growth.

CO₂ emissions in the carbon budget related to electricity use from the National Grid in the East Midlands are largely dependent upon national government policy and changes to power generation across the country. **It is recommended however that the East Midlands promote the deployment of low carbon electricity generation within the region and where possible influence national policy on this issue.**

We also recommend that the LULUCF sector should be managed to ensure CO₂ sequestration where possible. The management of LULUCF could also include action to increase wider social and environmental benefits..

19 APPENDIX H: GUIDANCE ON THE PREPARATION OF THE ENVIRONMENTAL
IMPACT ASSESSMENT REPORT





Environmental Impact Assessment of Projects

Guidance on the preparation of
the Environmental Impact
Assessment Report

(Directive 2011/92/EU as amended by 2014/52/EU)

Printed in Luxembourg

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (<http://ec.europa.eu>).

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Paper	ISBN 978-92-7974373-3	KH-04-17-939-EN-C	doi:10.2779/8247
PDF	ISBN 978-92-7974374-0	KH-04-17-939-EN-N	doi:10.2779/41362

Cover:

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This document benefited from Specific Contract No 070201/2016/729522/SER/ENV.D.1 under Framework Contract No ENV.F.1/FRA/2014/0063, implemented for the European Commission by COWI A/S and Milieu Ltd. The main authors were: Adrien Lantieri, Zuzana Lukacova, Jennifer McGuinn, and Alicia McNeill from Milieu Ltd

**Guidance on the preparation of the EIA Report
(Directive 2011/92/EU as amended by 2014/52/EU)**

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GLOSSARY OF TERMS

Key terms used in the guidance documents are explained in the Glossary below.

Term	Explanation
2012 IA Study	Impact Assessment Accompanying the document Proposal for a Directive of the European Parliament and the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private Projects on the environment, SWD/2012/0355 final
Alternatives	Different ways of carrying out the Project in order to meet the agreed objective. Alternatives can take diverse forms and may range from minor adjustments to the Project, to a complete reimagining of the Project.
Baseline scenario	Description of the current status of the environment in and around the area in which the Project will be located. It forms the foundation upon which the assessment will rest.
Candidate Countries	Countries which are seeking to become Members States of the European Union.
Competent Authority (CA)	The authority which the Member States designate as responsible for performing the duties arising from the Directive.
Cumulative effects	Changes to the environment that are caused by activities/projects in combination with other activities/projects.
Developer	The applicant for a Development Consent on a private Project or the public authority which initiates a Project.
Development Consent	The decision of the Competent Authority or Authorities which entitles the Developer to proceed with the Project.
EIA Directive	European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private Projects on the environment
EIA process (or EIA)	The process of carrying out an Environmental Impact Assessment as required by Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private Projects on the environment. The EIA process is composed of different steps: preparation of the EIA Report, publicity and consultation and decision-making.
EIA Report	The Environmental Impact Assessment Report is the document prepared by the Developer that presents the output of the assessment. It contains information regarding the Project, the likely significant effect of the Project, the Baseline scenario, the proposed Alternatives, the features and Measures to mitigate adverse significant effects as well as a Non-Technical Summary and any additional information specified in Annex IV of the EIA Directive.
Measures to mitigate (Mitigation Measures)	Measures envisaged to avoid, prevent or reduce any identified significant adverse effects on the environment
Measures to monitor (Monitoring Measures)	Procedures to keep under systematic review the significant adverse effects on the environment resulting from the construction and operation of a Project, and to identify unforeseen significant adverse effects, in order to be able to undertake appropriate remedial action.
Member States (MS)	Countries which are members of the European Union
Measures to compensate / offset (Compensation Measures)	Measures envisaged to offset any identified significant adverse effects on the environment.
Non-Technical Summary	An easy-to-follow and understandable summary of the information included in the EIA Report addressed to a non-technical audience.
Project	The execution of construction works or of other installations or schemes, and/or other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources.
Reasoned Conclusion	The explanatory statement made by the Competent Authority on the significant effects of the Project on the environment, based on the examination of the EIA Report and, where appropriate, on the results of its own supplementary

	examination.
Screening	The process of determining whether a Project listed in Annex II of the EIA Directive is likely to have significant environmental effects.
Screening Decision	Decision taken by the Competent Authority on whether a Project listed in Annex II will be made subject to the EIA procedure.
Scoping	The process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process.
Scoping Opinion	The Competent Authority's decision on the Scoping process.

LIST OF ABBREVIATIONS

Key abbreviations used in the guidance documents are detailed in the list below.

Abbreviation	Full name
AA	Appropriate Assessment
Aarhus Convention	Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters
BISE	Biodiversity Information System for Europe
CDCIR	Community Documentation Centre on Industrial Risk
CJEU	Court of Justice of the European Union
CLIMATE-ADAPT	European Climate Adaptation Platform
EIB	European Investment Bank
EIONET	European Environment Information and Observation Network
EMIS	Environmental Marine Information System
EMODNET	European Marine Observation and Data Network
ePRTR	European Pollutant Release and Transfer Register
ESPOO Convention	Convention on Environmental Impact Assessment in a transboundary context
GBIF	Global Biodiversity Information Facility
GEO BON	Group on Earth Observations Biodiversity Observation Network
GMEP	Global Marine Environment Protection
IED	Industrial Emissions Directive
INSPIRE	Infrastructure for Spatial Information in the European Community
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
LCA	Life Cycle Assessment
LEAC	Land and Ecosystem Accounting
LIFE +	The EU's Financial Instrument for the Environment
MSFD	Marine Strategy Framework Directive
PCI	Project of common interest
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RBMP	River Basin Management Plans
SEA	Strategic Environmental Assessment
TEN-E	Trans-European Networks for Energy
TEN-T	Trans-European Networks - Transport
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive
WISE	Water Information System for Europe

PREFACE

In 2001, the European Commission published three EIA Guidance Documents concerning specific stages in the EIA process: Screening, Scoping, and Environmental Impact Statement Review. These documents have been updated and revised to reflect both the legislative changes brought about since the publication of the original guidance documents and the current state of good practice.

These three updated documents concern the following three specific stages of the EIA process:

- EIA Guidance Document on Screening;
- EIA Guidance Document on Scoping;
- EIA Guidance Document on the preparation of the EIA Report.

What is the aim of the Guidance Documents?

The aim of the Guidance Documents is to provide practical insight to those who are involved during these stages in the EIA process, drawing upon experiences in Europe and worldwide.

The Screening and Scoping EIA guidance documents aim to improve the decisions taken on the need for an EIA and the terms of reference on which the assessment is made. These two documents focus on getting the EIA process started well.

The preparation of the EIA Report guidance aims to help Developers and consultants alike prepare good quality Environmental Impact Assessment Reports and to guide competent authorities and other interested parties as they review the Reports. It focuses on ensuring that the best possible information is made available during decision-making.

Who can use the Guidance Documents?

The three EIA Guidance Documents are designed for use by competent authorities, Developers, and EIA practitioners in the European Union Member States and, where applicable, by Candidate Countries. It is hoped that they will also be of interest to academics and other organisations who participate in EIA training and education, to practitioners from around the world, as well as to members of the public.

Who prepared the Guidance Documents?

The original 2001 EIA Guidance Documents were prepared by Environmental Resources Management (ERM) under a research contract with the Directorate General for Environment of the European Commission. The revised 2017 EIA Guidance Documents have been prepared by Milieu Ltd and COWI A/S under a service contract specific contract number 070201/2016/729522/SER/ENV.D.1. to framework contract ENV.F.1/FRA/2014/0063 with the Directorate General for Environment of the European Commission.

How can I get a copy of the Guidance Documents?

Copies of the Guidance Documents can be downloaded from the website of the Directorate General Environment of the European Commission at <http://ec.europa.eu/environment/eia/eia-support.htm>.

EIA: concept and stages

The Environmental Impact Assessment (EIA) of Projects is a key instrument of European Union environmental policy. It is currently governed by the terms of European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private Projects on the environment (EIA Directive).

Since the adoption of the first EIA Directive in 1985 (Directive 85/337/EEC), both the law and EIA practices have evolved. The EIA Directive was amended by Directives 97/11/EC, 2003/35/EC, and 2009/31/EC. The Directive and its three amendments were codified in 2011 by Directive 2011/92/EU. The codified Directive was subsequently amended by Directive 2014/52/EU. This guidance document focuses on the modifications made to the EIA Directive since 2001, with a particular emphasis on the key changes brought about by the most recent 2014 amendment to the Directive, which Member States have to transpose into their national legal systems by 16 May 2017.

The EIA Directive requires that public and private Projects that are likely to have significant effects on the environment be made subject to an assessment prior to Development Consent being given. Development Consent means the decision by the Competent Authority or authorities that entitles the Developer to proceed with the Project. Before Development Consent can be granted, an EIA is required if a Project is likely to impact significantly upon the environment. Article 2(1) of the EIA Directive (see box below) sets out the Directive's overarching requirement.

Box 1: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 2(1)

Member States shall adopt all measures necessary to ensure that, before development consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects on the environment.

The guidance documents in this series cover three stages involved in EIA: Screening, Scoping, and the Preparation of the EIA Report.

The 'Screening stage' ascertains whether the Project's effects on the environment are expected to be significant, i.e. the Project is 'Screened' to determine whether an EIA is necessary. Projects listed in Annex I to the Directive are automatically subjected to an EIA because their environmental effects are presumed to be significant. Projects listed in Annex II to the Directive require a determination to be made about their likely significant environmental effects. The Member State's Competent Authority make that determination through either a (i) case-by-case examination or (ii) set thresholds or criteria.

The 'Scoping stage' provides the opportunity for Developers to ask Competent Authorities about the extent of the information required to make an informed decision about the Project and its effects. This step involves the assessment and determination, or 'scoping', of the amount of information and analysis that authorities will need.

The information relating to a Project's significant effects on the environment is gathered during the third stage: the preparation of the EIA Report.

These three stages are complemented by specific steps in the EIA process. This is defined in Article 1(2)(g) (see box below) which provides a definition of the Environmental Impact Assessment by describing the EIA process.

Box 2: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 1(2)(g)

For the purposes of this Directive, the following definitions shall apply:

[...]

(g) 'environmental impact assessment' means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

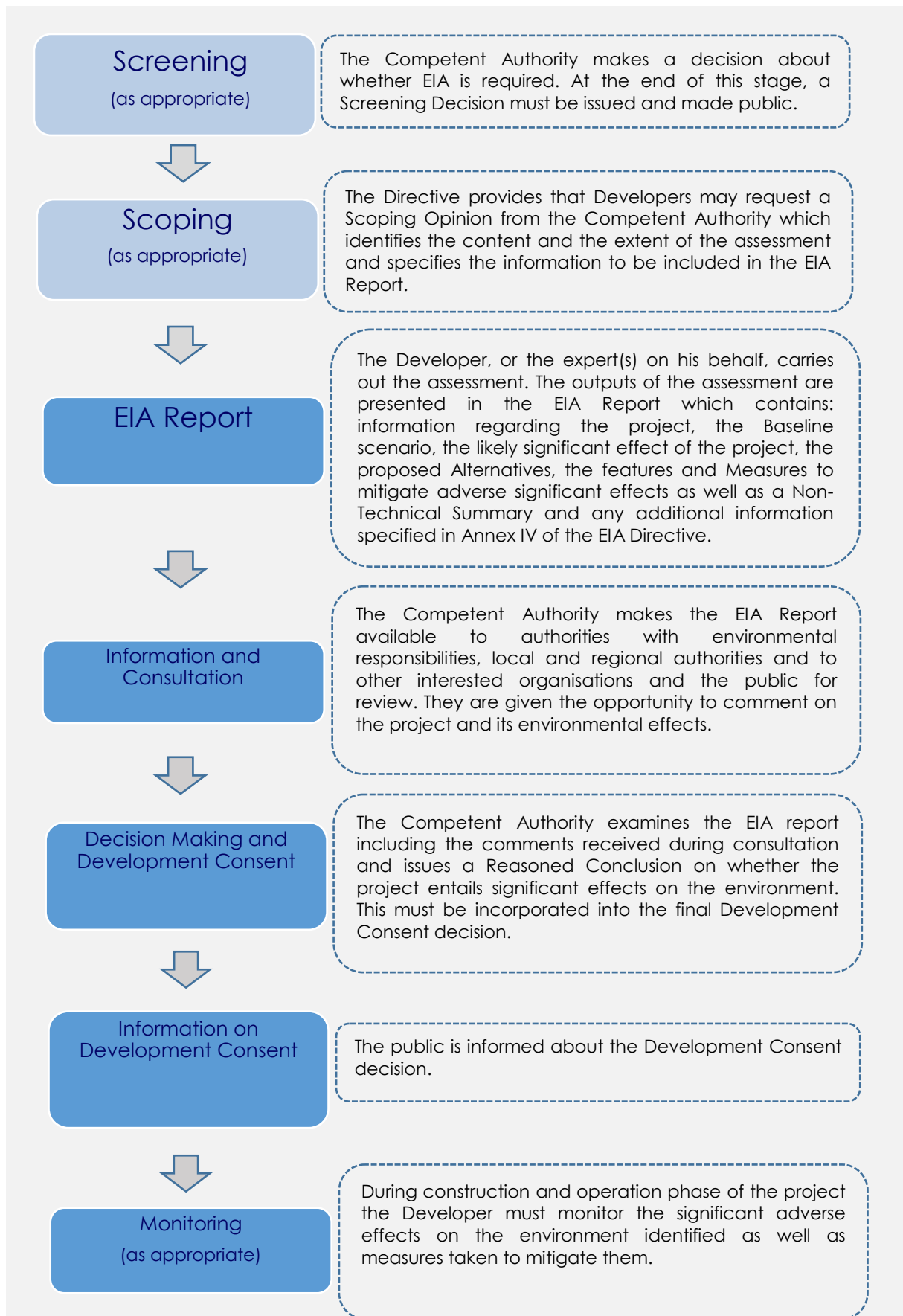
(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.

The figure below sets out an overview of the stages and steps usually taken when completing an EIA. As mentioned above, implementation arrangements for these stages may vary slightly between Member States, so care should be taken in this regard. The steps defined under Article 1(2)(g) are mandatory when undertaking an EIA. By comparison, undertaking the Screening and Scoping stages may not be required, depending on the nature of a Project or other circumstances: e.g. Screening is not necessary for Projects listed under Annex I to the Directive, and the Directive only foresees Scoping to be mandatory when it is requested by the Developer to the Competent Authority.



GUIDANCE ON THE PREPARATION OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

HOW TO USE THIS GUIDANCE DOCUMENT

This Guidance Document is one in a series of three Guidance Documents on EIA that has been published by the European Commission. This Guidance Document is about the preparation of the EIA Report. The other two guidance documents are concerned with Screening and Scoping.

This Guidance Document has been designed to be used throughout the European Union (EU) and cannot, therefore, reflect all of the specific legal requirements and practices of EIA in the different EU Member States. As such, any existing national, regional or local guidance on EIAs should always be taken into consideration alongside this document. Furthermore, the Guidance Documents should always be read in conjunction with the Directive and with national or local EIA legislation. Interpretation of the Directive remains the prerogative of the Court of Justice of the European Union (CJEU) solely and, therefore, case-law from the CJEU should also be considered.

The guidance is designed for use by various participants in the EIA process.

- **Project Developers and EIA practitioners:** Project Developers are ultimately responsible for preparing a submitting to the Competent Authorities an EIA Report that meets the requirements of the Directive as transposed to national legislation. They frequently hire specialist experts or consultants ('EIA Practitioners') to support them in the preparation of the EIA Report. Part B Section 1 of this Guidance Document reviews the requirements of the EIA Report in detail, and provides practical tips. Part B sections 2 and 3 on quality of the report and the review procedure can also be useful for Developers and practitioners, who will need to follow the decision-making process and provide additional information if requested. Part C is a checklist that can be used during the process of preparing the report to check that it is in line with requirements.
- **Competent Authorities:** Competent Authorities will need to review the EIA Report and use the information for decision-making. They need to ensure that they have the necessary expertise to carry out this role, either through in-house or external resources. Where appropriate, the Competent Authority may request further information to be submitted by the Developer in order to reach a credible, reasoned conclusion about the impacts of the proposed Project or development on the environment. Part B sections 2 and 3 explain the requirements of the Directive in this regard and provide some practical information on how Competent Authorities can best carry out this role. Authorities can use the checklist in Part C when reviewing the report to ensure that it meets the requirements of the Directive.
- **Review Bodies:** In some EIA regimes, bodies have been set up to review environmental information submitted under EIA procedures and to advise Competent Authorities on the adequacy of the information before it is used for decision-making. As noted above research institutes and professional bodies may also be asked to undertake reviews by Competent Authorities.
- **Consultees – the public and stakeholders:** Some consultees who have significant interests in particular Projects may also undertake reviews of an EIA Report on their own behalf to ensure themselves that their interests have been adequately addressed and that it forms a sound basis for decision-making.

The guidance is comprised of three main sections:

- **Part A – Overview of legislative requirements for the EIA Report.** This section introduces the concept of the EIA Report and the relevant provisions of the EIA Directive that govern its preparation and use. It serves as a reference point for guidance users to check which sections of the legislation they need to refer to, and for understanding the main changes to the legislation in 2014.

- **Part B – Practical guidance on the preparation of the EIA Report.** The practical guidance is more hands-on and detailed, aimed at providing an in-depth understanding of the specific, current legislative requirements regarding the preparation and use of the EIA Report. It also provides information on how to carry out the required steps, based on practice from around the EU.
- **Part C – The EIA Report checklist.** The EIA Report checklist allows users to determine if they have fulfilled all the relevant information requirements for different parts of the EIA Report. It follows the structure of the practical guidance in Part B and is designed to be used by practitioners and Developers during the process of preparing the EIA Report and by Competent Authorities when reviewing the report for completeness and quality.

PART A – OVERVIEW OF THE LEGISLATIVE REQUIREMENTS FOR THE PREPARATION OF THE EIA REPORT

1 LEGISLATIVE REQUIREMENTS FOR THE PREPARATION OF THE EIA REPORT

As part of the Environmental Impact Assessment, the Developer must prepare and submit an Environmental Impact Assessment Report (hereafter referred to as the EIA Report). This is the first step of the EIA process, as mentioned in Article 1(2)(g), that defines the EIA process (see box 2 in the Preface). This Guidance Document is designed to support users to prepare and complete the EIA Report to the high standard envisioned by the Directive. This report must include the necessary information for the Competent Authority to reach the Reasoned Conclusion and should be of a sufficient quality to enable this judgement. Many of the EIA Directive's requirements and provisions aim to ensure that the EIA Report is of a sufficient quality to effectively serve this purpose.

Article 5 of the EIA Directive sets out what must be included in the EIA Report, and how to ensure that it is both of a sufficient high quality and complete. Extracts from the text of the Article can be found in the box below.

Box 3: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1)

1. Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:

- (a) a description of the project comprising information on the site, design, size and other relevant features of the project;
- (b) a description of the likely significant effects of the project on the environment;
- (c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- (d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- (e) a non-technical summary of the information referred to in points (a) to (d); and
- (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

[...] the environmental impact assessment report [...] include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. The developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report.

Article 5(3)

3. In order to ensure the completeness and quality of the environmental impact assessment report:

- (a) the developer shall ensure that the environmental impact assessment report is prepared by competent experts;
- (b) the competent authority shall ensure that it has, or has access as necessary to, sufficient expertise to examine the environmental impact assessment report; and
- (c) where necessary, the competent authority shall seek supplementary information from the developer, in accordance with Annex IV, which is directly relevant to reaching the reasoned conclusion on the project's significant effects on the environment.

[...]

Article 5(1) sets out what Developers must include as a minimum in the EIA Report. Annex IV, referenced in Article 5(1)(f), expands on these requirements. In short, this includes the following:

- **A description of the Project:** this is an introduction to the Project, and includes a description of the location of the Project, the characteristics of the construction, and the operational phases of the Project, as well as estimates of the expected residues, emissions, and waste produced during the construction and operation phases (Article 5(1)(a) and Annex IV point 1);

- **Baseline scenario:** a description of the current state of the environment, and the likely evolution thereof without the implementation of the Project. This sets the stage for the subsequent EIA, and Member States shall ensure information for the Baseline scenario held by any authorities is available to the Developer (Annex IV.3);
- **Environmental factors affected:** a description of the environmental factors impacted by the Project, with specific emphasis being placed on climate change, biodiversity, natural resources, and accidents and disasters (Article 3, Annex IV points 4 and 8).
- **Effects on the environment:** this section addresses the concept of ‘significant effects’¹ and the importance of cumulative effects (Article 5(1)(b), Annex IV point 5);
- **Assessment of Alternatives:** Alternatives to the Project must be described and compared, with an indication of the main reasons for the selection of the option chosen being provided (Article 5(1)(d) and Annex IV point 2);
- **Mitigation or Compensation Measures,** i.e. features or measures to avoid, prevent or reduce, and offset adverse effects should also be considered (Article 5(1)(c) and Annex IV.7);
- **Monitoring:** Monitoring Measures proposed should be included in the EIA Report, where significant adverse effects have been identified. This monitoring should be carried out during the construction and operation of a project(Annex IV.7);
- **Non-Technical Summary,** i.e. an easily accessible summary of the content of the EIA Report presented without technical jargon, hence understandable to anybody without a background in the environment or the Project (Article 5(1)(e) and Annex IV.9);
- **Quality of the EIA Report:** as well as presenting the Report well, complete with the Non-Technical Summary, experts preparing the EIA Report should be competent, and the Competent Authority reviewing the EIA Report should have access to sufficient expertise to examine it. Failure to include all necessary information can result in the Competent Authority requesting supplementary information (Article 5(3)).

Article 5 also refers to the scope and level of detail that are to be included in the EIA Report:

- This should match the scope and level of detail requested by the Competent Authority in the Scoping Opinion, where one exists, and should be sufficient to allow for a Reasoned Conclusion on the significant effects of the Project on the environment to be arrived at (Article 5(1) last paragraph).
- The Developer shall, with a view to avoiding duplication of assessments, take the available results of other relevant assessments under Union or national legislation, into account when preparing the Environmental Impact Assessment report (Article 5(4)).

The EIA Directive also contains provisions on how the EIA Report, once it has been drafted by the Developer, should be used in practice. The EIA Report serves as a tool to 1) communicate the results of the assessment of significant effects of a proposed Project on the environment; and 2) enable the Competent Authority to reach a Reasoned Conclusion regarding the impact of the proposed Project on the environment and whether and how the Project should be granted consent to be implemented. These provisions are laid out in Articles 6, 7, and 8 of the EIA Directive.

These and other requirements and provisions regarding the preparation of the EIA Report are covered in greater detail in Part B of this Guidance Document.

¹ More details on how to understand the concept of significant effects have been provided in the EIA Guidance document on Scoping.

2 LEGISLATIVE CHANGES FOR THE PREPARATION OF THE EIA REPORT

A key objective of the 2014 amendments to the EIA Directive has been to improve the quality of EIA, including with respect to the collection and assessment of environmental information and to the EIA Report's content. Briefly, the key changes include:

- The coverage of environmental issues required in the EIA Report is extended as new requirements related to climate change, biodiversity, risk of major accidents and/or disasters are introduced (Article 3.1 and Annex IV.4, IV.5 and IV.8 – this is described in detail in Part B section 1.4 below). Moreover, the EIA Report will have to cover transboundary effects, and the requirements for the assessment of cumulative effects are provided in further detail.
- The assessment of reasonable Alternatives is broadened: Alternatives studied by the Developer e.g. Alternatives to Project design, technologies, location, size, and scale, must be described in the EIA Report and an indication of the main reasons for the option chosen must be given (Article 5.1(d) and Annex IV, paragraph 2 – this is described in detail in Part B section 1.5 below);
- Provisions related to the completeness and quality of EIA Reports have been introduced (Article 5.3 – this is described in detail in Part B section 2 below);
- Monitoring requirements to be carried for Projects with significant adverse effects (Article 8a, paragraph 4 – this is described in detail in Part B section 1.6 below);
- The Competent Authority's Development Consent decision needs to be justified (Article 8a, paragraph 1) and must be issued within a reasonable period of time (Article 8a, paragraph 5 – this is described in detail in Part B section 3 below). This decision is furthermore required to include a number of elements, such as the Reasoned Conclusion and any environmental conditions attached to the decision such as Mitigation, Compensation, and Monitoring Measures (Article 8a).

These and other changes to the Directive, and how they should be implemented in practice, are presented in greater detail in Part B of this Guidance Document.

PART B - PRACTICAL GUIDANCE ON THE PREPARATION OF THE EIA REPORT

INTRODUCTION

This part of the Guidance Document gives practical guidance on the preparation of the EIA Report. It covers the following aspects:

- **The information requirements of the EIA Report.** This section reviews all of the information that Developers must include in the EIA Report. It is important to note that the content of the EIA Report may not include all of the information uncovered during the process of preparation of the EIA Report. The Directive requires that the EIA Report covers the Project and Baseline description, environmental factors, the assessment of effects on the environment, Project Alternatives, identification of Mitigation and Compensation Measures, as well as monitoring requirements;
- **The quality of the EIA Report.** This section covers the format and presentation of the EIA Report, as well as requirements concerning the expertise of those who prepare, examine and evaluate the EIA Report. It also addresses the Non-Technical Summary that must be included in the EIA Report;
- **Consultations and decision-making.** The EIA Directive has specific requirements regarding the use of the EIA Report, both as a tool to inform concerned stakeholders and the public, as well as to make decisions regarding Development Consent for Projects. This section reviews these procedures.

1 THE EIA REPORT'S CONTENT REQUIREMENTS

1.1 PROJECT DESCRIPTION

This section outlines what is required by the Developer when describing the Project, as required under Article 5 and Annex IV of the EIA Directive.

Box 4: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1)

The information to be provided by the developer shall include at least [...] a description of the project comprising information on the site, design, size and other relevant features of the project.

Annex IV, point 1

- a) a description of the location of the project
- b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;
- c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy use, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;
- d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

The Directive is relatively detailed in its requirements, and Developers should provide an overview of:

- the location, site, design, size, etc.;
- the physical characteristics of Project (including any demolition or land-use requirements);
- the characteristics of the operational phase of the Project;
- any residues, emissions, or waste expected during either the construction or the operational phase.

While the list in Annex IV outlining the specific characteristics to be included is only indicative, it has been developed through different iterations of the EIA Directive (see the box below In practice - 2014 amendments), and so should be thoroughly considered by practitioners. In any case, Developers should include any additional relevant characteristics of either the operational or construction phases.

Box 5: In practice – 2014 amendments to the Project description

The requirement to include a description of the Project in the EIA Report is not new, and earlier iterations of the Directive have also been quite prescriptive in this regard.

The key difference brought about by the 2014 amendments is the inclusion of relevant requisite demolition works during the construction and operational phases. In addition, an estimate of residues and emissions during the construction phase is to be included, where previously such estimates concerned only the operational phase. This change broadens the scope of the description of the Project, and aims to identify more potential environmental effects.

Other changes faced by Developers are relatively minor:

- Article 5 requires other relevant features of the Project to be included;
- A description of the location of the Project is now specifically required by Annex IV;
- The operational phase of the Project is not limited to production processes, as it was previously.

In addition, the lists of characteristics given in Annex IV, point 1 have been expanded upon:

- Any requisite demolition works must now be described, where relevant;
- Energy demand and energy used should be described in context of the operational phase;
- Natural resources must now be described in the context of the operational phase, with the Directive giving some examples;
- The list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution;
- Estimates of quantities and types of waste produced must now be given.

1.2 BASELINE SCENARIO

This section introduces the Baseline scenario, which is typically the starting point of the assessment process. It covers the legal requirements concerning the Baseline scenario, including the 2014 amendments to the Directive, as well as some practical steps regarding data collection and points to consider when beginning to compile a Baseline scenario.

1.2.1 The notion of Baseline

Defining Baseline scenario: a description of the current status of the environment

The Baseline is a description of the current status of the environment in and around the area in which the Project will be located. It forms the foundation upon which the EIA will rest.

Specifically, developing a robust Baseline scenario for the EIA serves two key purposes:

- it provides a description of the status and trends of environmental factors against which significant effects can be compared and evaluated;
- it forms the basis on which ex-post monitoring can be used to measure change once the Project has been initiated. See the section on monitoring for more information.

Legal requirements of the Baseline scenario in the EIA Directive

In practice, an assessment of the existing and future environmental situation has, typically, always been the EIA procedure's starting point. However, after the 2014 revisions to the Directive, the description of the Baseline scenario, and likely future developments, is now specifically required as part of the Environmental Report. The exact references are shown in the box below.

Box 6: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1) of the Directive states that:

'The information to be provided by the developer shall include at least...any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.'

Annex IV, point 3 outlines the information for the Environmental Impact Assessment Report, and includes:

'A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.'

It is important to bear in mind that the EIA Directive requires the inclusion of both:

- a description of the current state of the environment in the EIA Report; and
- an outline of what is likely to happen to the environment should the Project not be implemented – the so-called ‘do-nothing’ scenario.

The state of the environment and the nature of impacts such as pollution rates or emission limits change over time, and this has to be accounted for in the Baseline assessment. In addition, the Baseline should consider Projects in the vicinity that exist and/or that have been approved (see Part B section 1.4.3 on Cumulative Effects). The Baseline should, therefore, be dynamic, going beyond a static assessment of the current situation. This is especially important for issues where there is considerable uncertainty, such as climate change, or for longer-term developments, such as large infrastructure Projects. Predicting uncertain elements can be challenging, particularly concerning the availability of information, as well as ensuring that the assessment is carried out with reasonable effort.

Tips on understanding how to carry out the Baseline assessment are provided in the following sections. The box below summarises the changes arising from the 2014 amendments to the EIA Directive.

Box 7: In practice – 2014 amendments to the Baseline

The specific requirement to include the Baseline scenario in the EIA Report is a new provision of the 2014 EIA Directive. However, in most cases, the changes will not have much of an effect on those carrying out the EIA:

- EIAs carried out prior to this requirement have established some kind of Baseline on which to assess the Project;
- The new provision formalises this step in the EIA process and aims to bring about some consistency between EIAs, between practice in Member States, and with the provisions on the SEA Directive's baseline (see the section below on sharing baseline assessment results).

The new provisions require consideration of:

- The ‘do-nothing’ scenario: the evolution of the Baseline, i.e. how the situation would be expected to develop over time, (rather than a static description of the state of the environment at the time of the assessment);
- The proportionality of the efforts to be expended, making sure resources are not spent collecting data if the cost outweighs the benefits

1.2.2 Carrying out the Baseline assessment

The Baseline forms the foundation against which the Alternatives and the Project itself are assessed. As such, the description of the current state of the environment must be sufficiently detailed and accurate to ensure that the effects, arising both during the development of the Project and in the future, can be adequately assessed. At the same time, the collection of data and the assessment of the Baseline need to be completed with reasonable effort. Developers and practitioners alike need to determine what aspects are important and can be readily understood and where qualified assumptions or estimates can be made to ensure the timely completion of the EIA.

Essentially, carrying out the Baseline assessment involves determining what is relevant and finding the data and information necessary to set the framework against which to assess impacts on the environment.

The collection of relevant data

The development of the Baseline can often comprise the bulk of the EIA process, and can occupy a significant proportion of the final EIA Report. However, care must be taken to ensure that data

collection efforts are focused on those aspects of the environment most likely to be significantly impacted, and that environmental data and scientific knowledge are reasonably available. The EIA Directive requires that only the ‘relevant aspects’ be investigated, and the over-collection of data can result in unnecessary costs. Detailed and thorough Scoping, undertaken at the outset of the Project, will go a long way to avoiding this issue (see the Guidance Document on Scoping). In some cases, communication with the Competent Authority about the scope of significant impacts, and what can be considered reasonable in terms of data availability, is also very helpful.

More generally, the scope of the Project will determine what level of detail is required, and how far the Baseline should extend. A small Project will likely only require that a small area be covered, but the nature of the Project may well mean that a high level of detail is required. A large Project may require a bigger area, but environmental effects may be small and it may be that only a broad level of detail is needed. Another issue concerns the timeline. Practitioners will need to decide how far into the future the Baseline will stretch. This will be decided on a case-by-case basis, but should at least be far enough in the future to show the development of the Project. However, a Baseline looking 100 years into the future will be less accurate than one working on a shorter timeframe. The use of existing plans and programmes, such as spatial plans and their SEAs, can also be a good way to determine the time frame, given that the scales may be similar and appropriate data are likely to be available.

Depending on the type of Project or specific environmental aspect, practitioners will need to gauge what is relevant when developing a Baseline. Keeping this in mind, the box below gives an overview of the types of data typically used in developing the Baseline assessment.

Box 8: Types of data to be considered for the Baseline scenario

Physical: topography, geology, soil types and quality, surface, ground and coastal water quality, pollution levels, meteorological conditions, climate trends, etc.

Biological: ecosystems (both terrestrial and aquatic), specific flora and fauna, habitats, protected areas (Natura 2000 sites), agricultural land quality, etc.

Socio-economic: demography, infrastructure facilities, economic activities (e.g. fisheries), recreational users of the area, etc.

Cultural: location and state of archaeological, historical, religious sites, etc.

Accessing data for the Baseline assessment

If Scoping has been carried out, it is possible that initial data has already been collected, which can be used for developing the Baseline. In such cases, data should be checked for relevance and accuracy, and if necessary, expanded upon. The Guidance Document on Scoping includes some guidelines on where initial data can be found, but this section is intended for those cases in which Scoping has not been carried out, or information identified during Scoping has proven to be insufficient.

Data should be collected and interpreted by the relevant experts (see the section on competence of expertise and quality control). If highly technical data are used, then data should be verified for the accuracy of interpretation and its relevance. Where no such experts are available in-house, external experts should be used. Experts may also be found at the local level, given that communities may have local knowledge which is highly relevant to understanding the Baseline conditions.

Data may be difficult to find; in some cases, proxy indicators can be used that can help to understand the environmental situation in other ways. For example, a lack of air quality monitoring data from an urban area could be resolved if there are data outlining trends in traffic flows/volumes over time, or trends in emissions from stationary sources. Assumptions about the environment can be generated from other available data and can be useful in determining the relevance of impacts.

Practitioners should be aware that data sources may differ from case to case, and the most high-tech or extensive collection method may not be the best one. In some cases, desk research may be more effective than field surveys, and Google Earth may be just as useful as satellite imagery that has been purchased.

In many Member States, data are collected either nationally or regionally, and include not only data from EIAs, but also from other environmental assessments and monitoring schemes. This practice is also encouraged by other EU level Guidance Documents (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). These databases help to speed up the preparation of environmental assessments. Frequently updated databases will also facilitate transboundary consultations and the linkages between strategic and Project level environmental assessments. Practitioners should always first check what institutions are already in place, and what data are already available, before starting data collection for the Baseline scenario. In addition, Article 5(4) of the EIA Directive requires Member States to, if necessary, ensure that any authorities holding relevant information make this information available to the Developer. This means that the Developer should be able to easily obtain relevant information from the different relevant authorities and to obtain guidance to that effect from the Competent Authority.

Some typical sources of information used for collecting Baseline data are listed below.

- National/regional databases of previous EIAs;
- Data collected under other EU legislation (especially the SEA Directive and the INSPIRE Directive);
- EU level and other international databases (see the box below);
- Local level/community experts; and
- Primary research carried out by competent experts.

Box 9: Some examples of supra-national level environmental databases

General datasets

- European Commission – Eurostat database;
- European Environment Agency (including national emissions, water, land cover, etc.);
- European Environment Information and Observation Network (EIONET);
- Copernicus (previously Global Monitoring for Environment and Security);
- Infrastructure for Spatial Information in the European Community (INSPIRE);
- United Nations Environmental Data Explorer.

Biodiversity and climate change datasets

- Biodiversity Information System for Europe (BISE);
- Global Biodiversity Information Facility (GBIF);
- Natura 2000 Network Viewer;
- Reporting under Habitats Directive and Birds Directive;
- Common Database on Nationally Designated Areas (CDDA) managed by the European Environment Agency;
- Ecosystem assessments (MAES)
- Group on Earth Observations Biodiversity Observation Network (GEO BON);
- EuMon (species and habitats of Community interest);
- IPCC Data Distribution Centre.

Water & Marine datasets

- Water Information System for Europe (WISE);
- European Marine Observation and Data Network (EMODNET);
- Environmental Marine Information System (EMIS) ;
- European Atlas of the Seas.

Chemicals and industrial datasets

- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH);

- Major Accident Reporting System (MARS);
- Community Documentation Centre on Industrial Risk (CDCIR);
- European Pollutant Release and Transfer Register (ePRTR).

An example of data sharing platforms is provided in the box below.

Box 10: An example of data sharing

In Italy, several environmental and territorial databases are available for public access via a website dedicated to the SEA/EIA procedures. The ministry of the environment provides a catalogue of environmental data at the national and regional levels which is updated regularly. Sources include databases, web resources, documents, spatial datasets (webGIS service, Google Earth, WMS and WFS). Specific criteria are used to ensure the reliability and quality in accordance with national and EU provisions.

Information from the Italian's government website Ministero dell'Ambiente.

Sharing Baseline assessment results

Sharing results from other types of environmental assessment procedures or similar Projects' EIAs is also important for the Baseline's assessment. For example, if one year is spent collecting Baseline data for a windfarm, a similar windfarm Project in a similar location would be able to use much of the data already collected for the first Project.

The SEA, WFD, IED, and Habitats Directive (see the Annex to this Guidance Document on Links with Other EU Instruments) all require that some form of baseline be developed: for instance, under the Habitats Directive the baseline would be the conservation objectives of the Natura 2000 site. But very few Member States have provisions on how this is to be done. In any case, practitioners should check the Baseline scenario, as well as environmental reports and other relevant assessments of the status of the environment carried out under the SEA and Habitats Directives, the WFD, and the IED if they are carried out in the vicinity of the Project covered by the EIA. Care should be taken to ensure that the data are still up to date and relevant, keeping in mind the differences in scope of the different instruments.

The similarities between the SEA and EIA provisions also mean that SEA guidance documents and reports prepared in this context may be used to inspire an EIA. Below is an example from the 2001 SEA Guidance Document issued by the European Commission (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). It should be borne in mind that similar documents may exist at the national level, and would include information which may differ from this guidance and provide additional information.

Box 11: SEA Guidance Document: a comparison with EIA Baseline provisions

The SEA baseline provisions were first introduced in 2001, and guidance and lessons learnt have been developed since then. The SEA Guidance can prove useful to applying the EIA provisions to the Baseline. Below are the phrases that appear in both Directives in **bold**, and how they are covered in the SEA Guidance Document.

PART A **'the relevant aspects'** refer to environmental aspects that are relevant to the likely significant environmental effects of the plan or programme. These aspects could be either positive or negative. This concept should be considered in the same way during both assessments, but the aspects themselves may differ between EIA and SEA. An SEA, for example, may cover a large area of land and, therefore, may have much broader aspects that may be affected than an EIA, which may be assessed at a much smaller level of detail.

PART B **'current state of the environment'** requires that the information be up-to-date. Both the SEA and EIA will benefit from the data being up-to-date (see the section on decision-making).

PART C **'likely evolution of the relevant aspects without the implementation'** of the plan or programme gives a foundation upon which the plan or programme (if it does go ahead) can be assessed. For an SEA, the description of the evolution should cover roughly the same time horizon as that envisaged for the

implementation of the plan or programme. The same timeframe could be used for an EIA falling under such an SEA.

Information collected under the other environmental assessments may provide a starting point for an EIA, given that Developers must provide authorities with data on various issues regularly. EU-level initiatives such as INSPIRE provide standardised data collection, making comparison between different environmental assessments easier. The IED, for example, requires that Developers provide annual information on their emissions with regards to different mediums, volume, and amount of materials on-site (stocked, disposed of, etc.). Such information, collected solely for the purposes of the IED, may not be directly transferrable to the EIA Report, given that the scope and purpose of these collections may differ from EIA requirements. However, previously reported information may prove invaluable for establishing a Baseline and mapping trends over time.

1.2.3 Baseline: In a nutshell

- The Baseline assessment is the starting point of an EIA. The Baseline scenario and its assessment provide a description of the affected environment as it is currently, and as it could be expected to develop if the Project were not to proceed;
- A Baseline has typically always been included in EIAs, but the 2014 amendments to the EIA Directive specify that a Baseline must be included in the EIA Report and that it must include the current environmental situation as well as expected future developments ('do-nothing' scenario);
- The Baseline assessment needs to be detailed and comprehensive enough to allow for an understanding of the extent of environmental impacts, but must be conducted within a reasonable time and with a reasonable amount of effort on the part of the Developer. Scoping helps to understand this in advance;
- The collection of relevant data is critical to a robust assessment of the Baseline. Data should be identified and assessed by qualified experts;
- Efficiencies in data collection from existing databases, free services, and other relevant environmental assessments should always be investigated.

1.3 ENVIRONMENTAL FACTORS

This section reviews the scope of the environmental factors covered by the Directive, with a focus on those factors that have been expanded in the 2014 amendments to the Directive.

1.3.1 Scope of environmental factors covered by the Directive

As shown in the box below, Article 3 sets out those environmental factors that EIAs have to consider relevant for particular Projects. These factors are described further in Annex IV, point 4 to the Directive, which provides details about the information required for the EIA Report.

Box 12: Directive 2011/92/EU as amended by Directive 2014/52/EU

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 health²;

² Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air

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

2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.

In particular, the requirements have been expanded to cover some of these factors in greater detail, in response to the evolution of the understanding of the interaction between Projects and the environment, and other policy actions taken in light of these developments. These elements are:

- Climate change – both mitigation and adaptation;
- Risks of major accidents and disasters;
- Biodiversity;
- Use of natural resources.

Developers are, therefore, expressly required to assess a broader scope of impacts with respect to these issues wherever relevant. These issues are each treated specifically in the following sections.

1.3.2 Impacts related to Climate change

Legislative requirements and key considerations

Box 13: Directive 2011/92/EU as amended by Directive 2014/52/EU

Annex IV point 4

A description of the factors specified in Article 3(1) likely to be significantly affected by the project: ... climate (for example greenhouse gas emissions, impacts relevant to adaptation) ...

Annex IV point 5(f)

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; ...

Annex IV to the EIA Directive includes direct reference to climate and climate change in two provisions. The emphasis is placed on two distinct aspects of the climate change issue:

- **Climate change mitigation:** this considers the impact the Project will have on climate change, through greenhouse gas emissions primarily;
- **Climate change adaptation:** this considers the vulnerability of the Project to future changes in the climate, and its capacity to adapt to the impacts of climate change, which may be uncertain.

In 2013, the European Commission issued a guidance document on integrating climate change and biodiversity into Environmental Impact Assessment (see the Annex to this Guidance Document on Other Relevant Guidance). This guidance document provides information about the legal aspects of understanding these issues in EIAs, the benefits and challenges of integrating them into assessment

pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population.

procedures, and detailed methodological approaches to carrying out assessments on these issues. It should be read alongside this section of the EIA guidance document.

Climate change mitigation: Project impacts on climate change

Most Projects will have an impact on greenhouse gas emissions, compared to the Baseline (see the section on Baseline), through their construction and operation and through indirect activities that occur because of the Project. The EIA should include an assessment of the direct and indirect greenhouse gas emissions of the Project, where these impacts have been deemed significant:

- direct greenhouse gas emissions generated through the Project's construction and the operation of the Project over its lifetime (e.g. from on-site combustion of fossil fuels or energy use)
- greenhouse gas emissions generated or avoided as a result of other activities encouraged by the Project (indirect impacts) e.g.
 - Transport infrastructure: increased or avoided carbon emissions associated with energy use for the operation of the Project³;
 - Commercial development: carbon emissions due to consumer trips to the commercial zone where the Project is located.

The assessment should take relevant greenhouse gas reduction targets at the national, regional, and local levels into account, where available. The EIA may also assess the extent to which Projects contribute to these targets through reductions, as well as identify opportunities to reduce emissions through alternative measures.

Climate change adaptation: the vulnerability of the Project to climate change

The Directive also requires that Environmental Impact Assessments consider the impacts that climate change may have on the Project itself — and the extent to which the Project will be able to adapt to possible changes in the climate over the course of its lifetime. This aspect of the issue of climate change can be particularly challenging as 1) it requires those carrying out the assessment to consider the impacts of the environment (the climate in this case) on the Project, rather than vice-versa; and 2) it often involves a considerable degree of uncertainty, given that the actual climate change impacts, especially at local levels, are challenging to predict. To this end, the EIA analysis should take trends and risk assessment into consideration.

In April 2013, the European Commission adopted the EU Strategy on adaptation to climate change (COM(2013) 216 final), which sets out a framework to prepare the EU for climate impacts now and in the future. One of its main objectives is related to the promotion of better-informed decision-making through initiatives such as the European Climate Adaptation Platform (CLIMATE-ADAPT)⁴ which was designed, as a web-based platform, to support policy-makers at the EU, national, regional, and local levels in the development of climate change adaptation measures and policies. The Strategy comprises a set of documents that are useful to a wide range of stakeholders. In relation to the adaptation measures considered within EIAs, the Commission Staff working document entitled *Adapting infrastructure to climate change* (SWD(2013) 137 final), as well as *Guidelines for Project Managers: Making vulnerable investments climate resilient* (DG Climate Action, Non-paper) are of particular importance.

³ For example, such a requirement is already included in the French legislation concerning EIAs.

⁴ <http://climate-adapt.eea.europa.eu/about>.

- Integration of climate change mitigation considerations into EIAs

The effective assessment of impacts on climate change mitigation within EIAs is heavily dependent upon the methodology employed, and a number of standardised methodologies for calculating greenhouse gas emissions already exist. The extent to which they will be applicable to the specific case in question will be important, as well as issues relating to data collection. Calculating direct impacts will be more straightforward than indirect impacts – and assessments will have to rely on estimates in some cases.

The European Commission Guidance Document on integrating climate change and biodiversity into EIA identifies key European sources of data, including data repositories and online digital datasets thought to be useful when integrating climate change in EIA. This guidance document also provides links to carbon calculators and to other methodologies, including to the methodology for calculating absolute and relative GHG emissions piloted by the European Investment Bank (EIB) (EIB, Methodologies for the Assessment of Project GHG Emissions and Emission Variations) – see the Annex to this Guidance Document on Other Relevant Guidance and Tools.

On the global level, in 2011 the United Nations Framework Convention on Climate Change issued a paper on ‘Assessing climate change impacts and vulnerability, making informed adaptation decisions’ (UNFCCC, Highlights of the contribution of the Nairobi work programme, Assessing climate change impacts and vulnerability, making informed adaptation decisions) which contains sections on, inter alia, the development and dissemination of methods and tools, the provision of data and information, and the assessments of impacts and vulnerability at different scales and in different sectors.

The Life Cycle Assessment (LCA) can be used to consider a Project’s overall direct and indirect greenhouse gas emissions balance.

- Integration of climate change adaptation considerations into EIAs

As discussed above, the integration of climate change adaptation considerations into EIAs is challenging; it requires a shift in thinking about assessments and taking possible long-term risks and uncertainty into account. Recent improvements in the information base for understanding climate change impacts and risks for a variety of sectors and locations has made this challenge less daunting, however, and the information base and acquisition of experience on this topic is growing rapidly. The European Climate Adaptation Platform, known as Climate-ADAPT, is a good place to start to find support tools and links to the latest adaptation knowledge, including detailed studies on vulnerabilities and risks.

The European Commission Guidance Document on integrating climate change and biodiversity into EIA is another important source of information and ideas on how to carry out the assessment (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). It provides examples of key questions to ask to identify climate change adaptation concerns; these consider major impacts such as heat waves, droughts, extreme rainfall, storms and winds, landslides, rising sea levels, and others. The guidance document also explains how to take account of trends, drivers of change, and risk management approaches in EIAs. It suggests approaches to building adaptive capacity into Projects through alternative measures, such as changes in the use of materials or construction designs that will be more resilient to expected risks. It also shows how EIAs can facilitate adaptive capacity and management in Projects by clearly acknowledging their assumptions and uncertainty in climate impacts and by proposing practical monitoring arrangements to verify the validity of predictions and responses over time.

1.3.3 Impacts related to risks of major accidents and disasters

Legislative requirements and key considerations on accidents and disaster risks

Box 14: Directive 2011/92/EU as amended by Directive 2014/52/EU

Annex IV point 5(d)

A description of the likely significant effects of the project on the environment resulting from, inter alia:

- (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters) and

Annex IV point 8

(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. [...] Where appropriate, this description should include [...] details of the preparedness for and proposed response to such emergencies.

Annex IV contains direct reference to accidents and disaster risks in two provisions. The Directive uses the terms ‘major’ accidents and ‘disasters’, which are tied to the notion of significant effects (see the section below on assessing effects on the environment): the focus of these provisions is on significant risk and/or a risk that could cause significant environmental effects.

Two key considerations emerge therefrom, namely:

- The Project’s potential to cause accidents and/or disasters

In this case, the Directive explicitly refers to considerations for human health, cultural heritage, and the environment.

- The vulnerability of the Project to potential disaster/accident

In this case, the requirement covers both natural (e.g. earthquakes) and man-made disasters (e.g. technological hazards) that could significantly impede the Project’s activities and objectives and which might have adverse effects. In its 2009 Prevention Communication, the Commission has committed itself to mainstream disaster prevention concerns in the EU legislation and in the EIA Directive in particular. The need to build ‘resilience to natural and man-made disasters’ and to invest in risk prevention is envisaged in several EU strategies and proposals⁵. Some relevant information on these topics is readily available and can be obtained through risk assessments pursuant to other EU legislation, such as the Seveso III Directive on the control of major-accident hazards involving dangerous substances⁶ or the Directive establishing a Community framework for the nuclear safety of nuclear installations⁷. Other relevant assessments, carried out pursuant to national legislation, may also be used for this purpose provided that the requirements of these Directives have been met.

An example from Ireland, presented in the box below, illustrates the necessity to consider the adverse impacts of natural disaster/risks when constructing a Project.

⁵ E.g. the EU Internal Security Strategy COM(2010)673, the Commission's proposal for the Cohesion fund for 2014-2020 COM(2011)612, the Commission's Communication on the prevention of natural and man-made disasters COM(2009)82.

⁶ Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.

⁷ Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations.

Box 15: Assessment of natural disasters risk in an EIA in Ireland – CJEU, C-215/06, *Commission v Ireland*

In 2008, the ECJ ruled that Ireland had failed to fulfil its obligations under several Articles of the EIA Directive. This case concerned the construction of the largest terrestrial wind-energy development ever planned in Ireland and one of the largest in Europe.

When initial phases for development consent were granted in 1998, wind farms were not included in either Annex I or II to the Directive and, therefore, were not subject to an EIA. However, wind farm construction required a number of works, including the extraction of peat and of minerals other than metalliferous and energy-producing minerals, as well as road construction, which were listed in Annex II to the EIA Directive requiring Screening to be carried out. The competent authority in Ireland assessed that no EIA for these supplementary works was required, given that their impact would not significantly impact the environment.

Subsequently, a landslide occurred in October 2003, which the Commission claimed led to a large-scale ecological disaster, when the mass of peat which was dislodged from an area under development for the wind farm polluted the Owendalulleagh River, causing both the death of about 50,000 fish and lasting damage to the fish spawning beds. Ireland contended that the landslide was caused by the construction methods used and that there was no question of difficulties which could have been anticipated by an EIA, even one in conformity with the Community requirements.

The ECJ stated that the intended Projects of peat and mineral extraction and road construction were not insignificant and that the EIA should have been carried out.

Given that it was not undertaken, the question of soil stability, even though it is fundamental when excavation is intended, was not assessed.

Integration of disaster/accident risk considerations into EIAs

Box 16: Key considerations on disaster/accident risk

Including disaster/accident risk assessment in EIAs should address issues such as:

- What can go wrong with a Project?
 - What adverse consequences might occur to human health and to the environment?
 - What is the range of magnitude of adverse consequences?
 - How likely are these consequences?
 - What is the Project's state of preparedness in case of an accident/disaster?
 - Is there a plan for an emergency situation?
-
- Assessment of the Project's vulnerability to disaster risks

An integrated assessment of vulnerability to disaster risks and hazards aims to assess whether the Project is indeed vulnerable to such events and, if so, to provide recommendations to avoid/minimise those risks. Where relevant, a multi-risk approach should be followed to cover the climate-related hazards, discussed previously in the section concerning climate change (see section above on climate change). The study on the EIA and risk assessment undertaken as part of the Sixth Framework Programme (the Sixth Framework Programme covers EU activities in the field of research, technological development and demonstration) contains useful information concerning risk assessment and risk management, lists existing guidelines on the subject and the results of the EIA's application in terms of risk assessment in several Member States (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). It examines the ways in which, and the extent to which, extraordinary hazards and risks are dealt with in the EIA in the EU Member States, both within the regulatory framework and in EIA practice. The study also lists qualitative, semi-quantitative, and quantitative methods by which to assess risk of accident/disasters.

- Tools: prevention, monitoring and early warning

After the major natural and man-made risks have been identified and assessed, measures to control and manage their significant impacts should then be taken, e.g. to ensure compliance with existing minimum prevention standards, safety requirements, building codes, improved land use planning, etc. These could be integrated into a coherent risk management plan that also includes sufficient preparedness and emergency planning measures to ensure an effective response to disasters or to the risks of accidents (cf. 2012 IA Study, page 140).

1.3.4 Impacts related to biodiversity

Legislative requirements and key considerations on biodiversity

Box 17: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 3

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:

- (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

Annex IV point 4

A description of the factors specified in Article 3(1) likely to be significantly affected by the project:

... biodiversity (for example fauna and flora) ...

Annex IV (4) refers to biodiversity and includes, inter alia, fauna and flora. The reference to the assessment of impacts on ‘biodiversity’ was added to the Directive in the 2014 amendments, which previously referred only to ‘fauna and flora’. This is important: fauna and flora taken individually refer to animal and plant life in a particular zone or time, it involves a somewhat individual perspective, while biodiversity refers to the interactions and variety of, and variability within, species, between species, and between ecosystems; this is, therefore, a much broader concept than simply looking at the impacts on fauna and flora individually. This change is in line with some of the actions of the 2006 EU Biodiversity Action Plan requiring that ‘all EIAs should take full account of biodiversity concerns’ (Halting the loss of biodiversity by 2010 - and beyond - Sustaining ecosystem services for human well-being, SEC(2006)621). This is particularly important, given that the EU has missed its 2010 target of halting the loss of biodiversity and the new 2011 EU Biodiversity Strategy reiterates that this target is to be achieved by 2020 (Our life insurance, our natural capital: an EU biodiversity strategy to 2020, COM (2011) 244 final).

In addition, Article 3(1) also spells out the need to assess both the direct and indirect significant effects of the Project on, inter alia, biodiversity, with particular attention being paid to species and habitats protected under the Habitats Directive and the Birds Directive. The reference to these Directives was also added in the 2014 amendments.

Integration of biodiversity considerations into the EIAs

A number of key issues need to be addressed by Developers in relation to biodiversity concerns. These include, for instance, the degradation of ecosystem services⁸, the loss and degradation of habitats, the loss of species diversity, and the loss of genetic diversity.

⁸ Ecosystem services are understood as the ecosystem’s capacity for (i) provisioning, (ii) regulating, (iii) supporting, and (iv) providing cultural benefits. This means, for instance, that if pollution to a water stream is taking place, then this could result in degradation of the stream’s capacity to (i) provide clean water, ensuring thereby that fish and aquatic plants are (ii) healthy and (iii) thriving, leading to (iv) the depreciation of the site’s value for local fishermen.

The European Commission issued guidance concerning the integration of biodiversity into the EIA in 2013 (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). This guidance document lists key concerns and includes examples of key questions that should be asked, in order to assess impacts on biodiversity effectively. There are also several other guidance documents that are useful for the integration of biodiversity concerns into the EIAs. Some of these documents are listed in the box below, please also refer to the Annex to this Guidance Document on Other Relevant Guidance and Tools.

Box 18: Guidelines on biodiversity integration in the EIA

- Commission, Assessment of plans and Projects significantly affecting Natura 2000 sites, Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- Netherlands Commission for Environmental Assessment & CBD-Ramsar-CMS, Voluntary Guidelines on biodiversity-inclusive Environmental Impact Assessment.
- Slootweg, Roel; Kolhoff, Arend, Generic approach to integrate biodiversity considerations in screening and Scoping for EIA.
- Chartered Institute of Ecology and Environmental Management, Guidelines for ecological impact assessment in the UK and Ireland, Terrestrial, Freshwater, and Coastal, January 2016.

In cases in which Projects are likely to have significant effects on a site protected under the Habitats and Birds Directives, the assessment of effects of Projects on biodiversity will be carried out as part of an Appropriate Assessment according to Article 6(3) of the Habitats Directive. The 2014 amendments to the EIA Directive require that this assessment be carried out in coordination with the EIA, according to procedures specified in the European Commission guidance on streamlining environmental assessments under Article 2(3) of the EIA Directive (see the Annex to this Guidance Document on Other Relevant Guidance and Tools). It is important to bear in mind that EIAs must assess impacts on biodiversity even in cases in which certain Projects do not impact upon a Natura 2000 site.

Integration of marine biodiversity into the EIAs

Following the adoption of the Marine Strategy Framework Directive (MSFD), in 2008⁹, impacts on the marine environment are to be further considered in EIAs for Projects within marine areas. These could include Annex I Projects, such as trading ports, or Annex II Projects such as extracting minerals by dredging, wind farms, shipyards, coastal work to combat erosion, for example, moles and jetties.

Contrary to biodiversity on land, which has been covered by EU law since the 1980s, a thorough analysis of biodiversity in the sea only became required with the adoption of the MSFD. The issue of data gathering and problems with the lack of data may, therefore, be greater than it is for other Projects. However, a number of tools, databases, and information systems are now available and aim to preserve the natural resources and biodiversity, while keeping the marine economic sectors viable.

These include:

- Several tools developed to support the assessment of the marine environment under the MSFD. Member States are required under Article 8 of the MSFD to carry out an assessment of their marine waters every 6 years. This can be considered as a form of baseline. In addition, according to Article 11 of the MSFD, Member States must establish a monitoring programme, reviewed every 6 years, which should also gather data for the purposes of achieving good environmental status;

⁹ Directive 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).

- There are also regional sea conventions that have relevant information concerning data on marine biodiversity and sea such as the Helcom¹⁰ in the Baltic region, OSPAR for the North East Atlantic, the Barcelona Convention for the Mediterranean and the Bucharest Convention for the Black Sea;
- The Global Marine Information System has been developed by the JRC to provide the stakeholders with an appropriate set of bio-physical information (GIS functionalities) that is important in conducting water quality assessments and resource monitoring in the coastal and marine waters;
- The Global Marine Environment Protection (GMEP) Initiative is a best practices-sharing mechanism that was prompted by several high profile offshore drilling accidents. GMEP was conceived by the G20 Leaders at the Toronto Summit in 2010 to protect the marine environment.

See the Annex to this Guidance Document on Other Relevant Guidance and Tools for full references.

In 2014, the Commission also adopted a Directive establishing a framework for maritime spatial planning¹¹ that requires Member States to establish so-called maritime spatial plans with the overall objective of achieving the sustainable use of marine resources. This Directive requires Member States to establish the maritime spatial plans as soon as possible, and at the latest by 31 March 2021. Several types of Projects within the maritime spatial plans, such as those concerning renewable energy development, oil and gas exploration and exploitation, maritime shipping and fishing activities, ecosystem and biodiversity conservation are all subject to the EIA and the Developer will have to ensure that they are in line with their respective maritime spatial plan objectives.

Several guidance documents have been written in relation to the assessment of environmental impacts of Projects in the marine environment, at the EU as well as national levels. Some are listed in the box below and are part of the list provided under the Annex to this Guidance Document on Other Relevant Guidance and Tools.

Box 19: Relevant Guidance documents

EU Guidance Documents

- Commission guidance on wind energy development in accordance with the Natura 2000

Other Guidance Documents

- OSPAR, Assessment of the Environmental Impact of Offshore Wind-farms
- RPS, Environmental impact assessment practical guidelines toolkit for marine fish farming
- EMEC, Environmental impact assessment (EIA) guidance for developers at the European Marine Energy Centre

A good practice example from Italy and Malta, involving the assessment of impacts on marine biodiversity as part of the EIA, is described in the box below.

Box 20: Minimising cable impact on marine ecosystem by Terna

Terna, the Italian electricity grid operator, has developed an innovative methodology for the installation of marine cables that minimises the environmental impact of submarine grid interconnections between Malta and Sicily and protects meadows of the rare sea grass 'Posidonia oceanica'.

The corridor foreseen for this cable crossed an area that is home to 'Posidonia oceanica', a seagrass that is declining (according to the RedList) and provides a habitat for many species. In order to protect the 'Posidonia oceanica' as well as other seabed species from harm, Terna refrained from the drilling technique most commonly used for marine cable installation.

¹⁰ <http://www.helcom.fi/baltic-sea-trends/data-maps/>.

¹¹ Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning.

This technique would have involved the use of bentonite to lubricate and consolidate the sand around the drilling head, which could have potentially suffocated the 'Posidonia oceanica' due to the bentonite debris. The innovative solution applied used Xanthan gum, a polysaccharide sometimes employed as a food additive that can easily be biodegraded.

Good Practice of the Year 2016 award, http://renewables-grid.eu/fileadmin/user_upload/Files_RGI/RGI_Publications/Good_Practice_of_the_Year_Award_brochure_2016.pdf

1.3.5 Impacts related to the use of natural resources (depletion risks, resource use considerations)

Legislative requirements and key consideration on use of natural resources

Box 21: Directive 2011/92/EU as amended by Directive 2014/52/EU

Annex IV point 1(c)

Description of the project, including in particular:

- (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

Annex IV point 5(b)

A description of the likely significant effects of the project on the environment resulting from, inter alia:

- (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

Annex IV (1) and (5) requires the Developer to assess the use of natural resources and the impacts of the Project resulting from their use/depletion. In this context, the Directive requires the assessment to consider the sustainability of resources as far as possible, in particular land, soil, water, and biodiversity, as well as energy. The requirement for the assessment of a Project's impacts on the availability of natural resources is additional to the requirement to assess the impact on the resources — and a slightly different emphasis needs to be taken into account by Developers and practitioners. This emphasis reflects a shift in environmental policy focus from one of protecting natural resources — through assessing and mitigating impacts — to one of preserving the availability of natural resources for human activity. In this sense, assessments should also focus on the efficiency of resource use; can Projects do more with less in terms of energy use, water intake, land and soil use, etc.?

The integration of the use of natural resources into EIAs

The European Commission's Thematic Strategy on the Sustainable Use of Natural Resources (COM(2005) 670) has defined three types of indicators needed to measure resource efficiency:

■ Resource use indicators

Indicators of resource use should inform not only on the quantities of resources extracted, but also their quality, abundance (e.g. renewable, non-renewable, exhaustible, non-exhaustible), availability and location.

■ Environmental impact indicators

Resource use also impacts the environment and human health through a sequence of changes in the state of the natural environment. Life Cycle Assessment (LCA) methodology provides a framework for describing environmental impacts. An LCA quantifies all of the physical exchanges with the environment, be they inputs (materials, water, land use, and energy) or outputs (waste and emissions to air, water, and soil). These inputs and outputs are then assessed in relation to specific environmental impact potentials (e.g. climate change, eutrophication, ecotoxicity). These so-called midpoint impacts can then, once more, be related to endpoint impacts such as human health, the natural environment,

and natural resources (for full references to the European Commission, Assessment of resource efficiency indicators and targets see the Annex to this Guidance Document on Other Relevant Guidance and Tools).

■ Socio-economic indicators

Indicators of socio-economic benefits are not just limited to the market value of resources, but also to those aspects of resource use related to well-being and to quality of life that are not measured within the economy.

Methodologies for the assessment of resource use and efficiency are fairly recent, and only a few documents providing details thereon are currently available. These are provided in the box below and are part of the list provided under the Annex to this Guidance Document on Other Relevant Guidance and Tools.

Box 22: Methodologies on the assessment of natural resources use

- European Commission. 2012. Life cycle indicators framework: development of life cycle based macro-level monitoring indicators for resources, products and waste for the EU-27. European Commission, Joint Research Centre, Institute for Environment and Sustainability
- Assessment of resource efficiency indicators and targets, Final report, European Commission, DG Environment, 19 June 2012
- Land and Ecosystem Accounting (LEAC), European Topic Centre Terrestrial Environment, LEAC methodological guide book, July 2005

1.3.6 Environmental factors: In a nutshell

- Article 3 of the EIA Directive provides the scope of environmental factors that should be assessed by the EIA. This list of environmental issues was broadened by the 2014 amendments to the Directive, by adding the following factors in particular: climate change – both mitigation and adaptation; risks of major accidents and disasters; biodiversity; and the use of natural resources;
- These factors sometimes require EIA practitioners to pay greater attention to issues of risk, uncertainty and resource use related to a Project than they may have previously – in some cases new assessment methods or techniques will be necessary;
- In addition to the guidance provided in this section, reference is made to a large number of initiatives, mostly at the EU-level, to further assist practitioners in their assessment. Practitioners are encouraged to make use of these tools, many of which are listed under the Annex to this Guidance Document on Other Relevant Guidance and Tools.

1.4 ASSESSING EFFECTS ON THE ENVIRONMENT

Article 3 requires that the EIA Report identify, describe, and assess significant effects. Section 1.3 above concerns the identification of the environmental factors likely to be impacted upon by the Project. This section focuses on the phrase ‘significant effects’; that is, identifying which effects are to be considered and which are determined to have only a negligible effect on the environment. The concept of cumulative effects has also been included in this section, given that effects considered to be insignificant in isolation may have a significant impact on the environment when they interact with other effects.

1.4.1 Legal framework of significant effects

The EIA Directive stipulates that ‘significant’ effects must be considered when it comes to assessing the effects (or impacts) on the environment. The concept of significance considers whether or not a Project’s impact could be determined to be unacceptable in its environmental and social contexts. The assessment of significance relies on informed, expert judgement about what is important, desirable or

acceptable with regards to changes triggered by the Project in question.

This limits the assessment to those impacts that are likely to have a significant or important enough impact on the environment to merit the costs of assessment, review, and decision-making. While the concept of significant effects is referred to several times throughout the EIA Directive (see the box below), no clear definition is provided, and significance has to be assessed in light of the Project's specific circumstances. If Scoping has been carried out, the significance of effects may have been either indicated or, in some cases, already determined at the Scoping stage and, therefore, practitioners should refer to the Guidance Document on Scoping.

Box 23: Directive 2011/92/EU as amended by Directive 2014/52/EU

The phrase 'significant effect' is used throughout the Directive, in various contexts. The following extracts highlight only those relevant for understanding the phrase in the context of the EIA Report. References to cumulative effects have also been highlighted.

Article 1(1) of the Directive states that:

'This Directive shall apply to the assessment of the environmental effects of those public and private projects which are likely to have **significant effects** on the environment.'

Article 3(1) of the Directive states that:

'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'

Article 5(1) of the Directive states that:

'where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:

(...)

(b) a description of the **likely significant effects** of the project on the environment

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset **likely significant adverse effects** on the environment;

(...)'

Annex IV point 5 to the Directive states that:

5. A description of the **likely significant effects** of the project on the environment resulting from, inter alia:

(...)

(e) a **cumulation of effects** with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

(...)

The description of the **likely significant effects** on the factors specified in Article 3(1) should cover the **direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects** of the project...'

As seen in the box above, the concept of significance is a core concept for the EIA Directive; it is one that, in essence, guides the EIA process. In addition to the present section, further information on this concept can be gathered from the Guidance Documents on Screening and Scoping.

1.4.2 Significance in the context of the preparation of the EIA Report

Those preparing the EIA Report may have to determine the significance of the effects of the Project upon the environment. This could be because Scoping was not undertaken earlier in the EIA process, or additional effects and/or data surface during the evolution of the EIA Report. In these instances, the assessment of significance should be based on clear and unambiguous criteria:

- Significance criteria take both the characteristics of an impact and the values associated with the environmental issues affected into account;
- Significance is always context-specific and tailored criteria should, thus, be developed for each Project and its settings.

Furthermore, the EIA Directive requires that significant effects be described in the EIA Report in an *appropriate manner* (Article 3 of the Directive), so that it ultimately allows for decision-making. For this reason, significance determinations must be substantiated: it is important that the assessors set out a transparent methodology that explains how they approach the assessment and that they then demonstrably apply that methodology in their assessment. The methodology should explain how the assessor deems whether or not a significant effect will occur, allowing others to see the weight attached to different factors and can understand the rationale of the assessment (see the box below).

Box 24: Methodological considerations on the assessment of significant effects in the EIA Report

As mentioned in the IEMA Special report:

'In order to provide justifiable results, EIA practitioners gather evidence to inform and explain the evaluation of an individual effect. Effective EIA practice ensures that the methods used are clearly explained in the environmental statement (now EIA Report) so that they can be readily understood by the stakeholders and the public consulted. The assessment's findings are regularly set out as different levels of significance (e.g. major, moderate, minor, etc.).

This approach is considered good practice: whilst recognising the inherent subjectivity of the assessment, it attempts to aid communication of the scale of the impact by introducing a classification. This approach also allows the practitioner to identify and discuss effects that some groups may consider significant, whilst others would not. For example, a negative landscape effect described as being of 'minor significance' might be considered to indicate that a majority of people would not consider the effect to be significant; however, a smaller group, perhaps within the local community, may disagree and consider the effect to be significant.'

IEMA special report: The State of Environmental Impact assessment practice in the UK

At the same time, significance determinations should not be the exclusive prerogative of 'experts' or 'specialists': significance should be defined in a way that reflects what is valued in the environment by regulators and by public and private stakeholders. A common approach used in EIA is the application of a multi-criteria analysis. Common criteria used to evaluate significance include the magnitude of the predicted effect and the sensitivity of the receiving environment:

- **Magnitude** considers the characteristics of the change (timing, scale, size, and duration of the impact) which would probably affect the target receptor as a result of the proposed Project;
- **Sensitivity** is understood as the sensitivity of the environmental receptor to change, including its capacity to accommodate the changes the Projects may bring about.

A LIFE + Project has developed a practical tool that uses the multi-criteria analysis to assess the most significant environmental impacts of various Projects and to illustrate the results thereof. This Project is detailed in the box below.

Box 25: IMPERIA project: improving environmental assessment by adopting good practices and tools of multi-criteria decision analysis

The aim of the IMPERIA Project was to collect good practices and to develop new methods and tools to enhance effective and good-quality impact assessments with transparent and clear reporting in the context of EIA and SEA.

The Project proposes the use of multi-criteria analysis methods to collect, organise and to present the possible impacts of developments and plans in a systematic, comprehensive and transparent way. The tools developed in IMPERIA enable the structured comparison of impacts affecting different objects, acting in different directions, and involving different scales.

The ARVI method is the key deliverable of the Project: it is an excel-based tool for impact significance assessment and for the comparison of Alternatives. It allows experts assessing different types of impacts to follow uniform principles and to report about the reasoning chains in an illustrative manner.

IMPERIA project: Improving Environmental Assessment by Adopting Good Practices and Tools of Multi-Criteria Decision Analysis

1.4.3 Cumulative effects

It is important to consider effects not in isolation, but together; that is, cumulatively. Data collected during this stage may indeed show that analysed impacts become significant when they are added together or with other effects. While the concept of cumulative effects ties in closely with significant effects, as seen in the legislation box above, Annex IV, point 5 (e) of the EIA Directive requires that the cumulation of effects with other existing and/or approved Projects are described in the EIA Report. Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from:

- the interaction between all of the different Projects in the same area;
- the interaction between the various impacts within a single Project (while not expressly required by the EIA Directive, this has been clarified by the CJEU – see the box below).

The coexistence of impacts may increase or decrease their combined impact. Impacts that are considered to be insignificant, when assessed individually, may become significant when combined with other impacts. The box below provides clarification on these points, in light of case-law from the CJEU.

Box 26: Cumulative effects - useful interpretation from CJEU case-law

Interaction between different Projects in the same area:

- 'Not taking account of the cumulative effect of Projects means in practice that all Projects of a certain type may escape the obligation to carry out an assessment when, taken together, they are likely to have significant effects on the environment within the meaning of Article 2(1) of the Directive.' CJEU, C-392/06, *Commission v Ireland*.
- 'A national authority must examine [a Project's] potential impact jointly with other Projects. Moreover, where nothing is specified, that obligation is not restricted only to Projects of the same kind.' CJEU, C-531-13, *Marktgemeinde Sträßwalchen and Others*.

Interaction between the various impacts within a single Project:

- 'The Court indicated as much for road Projects (CJEU, C-142/07, *Ecologistas en Accion-CODA*) as for transboundary Projects (CJEU, C-205/08, *Umweltanwalt von Kärnten*) that the whole Project should be considered: the division into fifteen sub-Projects of a road Project or the existence of a border splitting a power line Project in two sections does not mean the Project is below the threshold set by the Directive' (M.Clément, *Droit Européen de l'Environnement, Jurisprudence commentée*, 3ème édition 2016, p. 147-148).

Cumulative effects can occur at different temporal and spatial scales. The spatial scale can be local, regional or global, while the frequency or temporal scale includes past, present and future impacts on a specific environment or region.

Because of their complex nature, significance thresholds and criteria for the assessment of cumulative effects should be defined through a collaborative approach, involving all of the interested and affected parties in the process of data collection and analysis. They may also need to make greater use of interdisciplinary perspectives and methods: e.g. network diagrams and models that identify the cause-effect relationships which result in cumulative effects, trend analyses that identify historical, current and future trends for a given resource, and interactive matrices that consider the interactions of magnitude of the impacts assessed individually (for full reference to Lawrence D. (2005), *Significance Criteria and Determination in Sustainability-Based Environmental Impact Assessment* see the Annex to this Guidance Document on Other Relevant Guidance and Tools).

Box 27: In practice – 2014 amendments to the EIA Directive

The concept of significance is not a new concept for the EIA Directive; however, the use of the word is more noticeably present in the aftermath of the 2014 changes. In many instances, the addition of the word would have little impact for practitioners, as the effects identified and studied would have often been significant. However, it should be noted that:

- The 2014 amendments align the EIA Directive with the SEA Directive (Annex I(f) to the SEA Directive);
- Practitioners are dissuaded from using resources to investigate insignificant effects;
- Practitioners should make sure that they have grounds for determining significance, which can be defended if need be;
- The cumulation of effects is now specifically mentioned in a stand-alone paragraph, under Annex IV, point 5(e), in addition to being iterated in the list of Annex IV, point 5 last paragraph.

1.4.4 Assessing effects on the environment: In a nutshell

- Effects to be assessed in the EIA should be determined to be significant. This ensures that effort is not wasted on insignificant effects.
- Significance is covered in detail in the Guidance Document on Scoping, which should be read by anyone preparing an EIA Report who is forced to determine the significance of environmental effects.
- Practitioners should determine significance based on their own judgement, clearly stating their methodology and reasons for the conclusion. At the same time, there are various criteria available for use, including a multi-criteria analysis.
- When considering significance, the cumulative effects of all of the Projects in the area, both spatial and temporal, should be considered.

1.5 MANDATORY ASSESSMENT OF ALTERNATIVES

This section covers the selection, description, and assessment of the reasonable Alternatives required by the EIA Directive. Within the context of the EIA process, Alternatives are different ways of carrying out the Project in order to meet the agreed objective. Alternatives can take diverse forms and may range from minor adjustments to the Project, to a complete reimagining of the Project.

1.5.1 The notion of Alternatives

The identification of Alternatives to the Project is a long-standing requirement of the EIA Directive, but it is often mentioned by practitioners as comprising a difficult element of the EIA process. The consideration of Alternatives is an important part of the EIA process, which ought to be reflected in the effort and resources allocated to this part of the EIA process (see e.g. Jalava, K., et al., (2010) Quality of Environmental Impact Assessment, full references in the Annex to this Guidance Document on Other Relevant Guidance and Tools).

Identifying and considering Alternatives can provide a concrete opportunity to adjust the Project's design in order to minimise environmental impacts and, thus, to minimise the Project's significant effects on the environment. Additionally, the proper identification and consideration of Alternatives from the outset can reduce unnecessary delays in the EIA process, the adoption of the EIA decision, or the implementation of the Project.

The legal requirements of the EIA Directive, relating to the assessment of Alternatives, are presented in the box below.

Box 28: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1) states that the developer shall include at least:

- d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

Annex IV point 2 expands further:

2) A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

Put simply, the Developer needs to provide:

- A description of the reasonable Alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

The number of Alternatives to a proposed Project is, in theory, infinite, considering that the Directive does not specify how many Alternatives should be considered. National legislation or general practice may, however, dictate how many Alternatives are to be considered. The number of alternatives to be assessed has to be considered together with the type of alternatives, i.e. the ‘Reasonable Alternatives’ referred to by the Directive. ‘Reasonable Alternatives’ must be relevant to the proposed Project and its specific characteristics, and resources should only be spent assessing these Alternatives. In addition, the selection of Alternatives is limited in terms of feasibility. On the one hand, an Alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an Alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible Alternative.

Section 1.7 below expands further on Monitoring Measures, but if significant adverse effects can be avoided, prevented, reduced, or offset, it is likely that Monitoring Measures will be required. The costs of these Monitoring Measures should be considered, given that they may lead to the economic unfeasibility of the Project. In this regard, the costs of the Mitigation/Compensation Measures may also need to be considered.

Ultimately, Alternatives have to be able to accomplish the objectives of the Project in a satisfactory manner, and should also be feasible in terms of technical, economic, political and other relevant criteria. A brief checklist, highlighting key reasons why an Alternative might *not* be considered to be reasonable, is provided in the box below.

Box 29: An Alternative may be considered unreasonable/infeasible if:

- There are technological obstacles: high costs of a required technology may prevent it from being considered to be a viable option, or the lack of technological development may preclude certain options from consideration;
- There are budget obstacles: adequate resources are required to implement Project Alternatives;
- There are stakeholder obstacles: stakeholders opposed to a Project Alternative may make a particular option unattractive;
- There are legal or regulatory obstacles: regulatory instruments may be in place that limit/prohibit the development of a specific Alternative.

The feasibility of the Alternatives proposed can be determined on a case-by-case basis. The final set of reasonable Alternatives identified will then undergo a detailed description and assessment in the EIA Report.

Box 30: In practice – 2014 amendments to Alternatives

- In Article 5, the ‘outline of the main Alternatives’ has been replaced with a ‘description of the reasonable Alternatives’ studied by the Developer.
- Annex IV provides examples of the types of reasonable Alternatives (Project design, technology, location, size, and scale). Annex IV also requires a comparison of the environmental effects across the options as justification for selecting the chosen option, whereas previously the requirement was that such effects had to be ‘taken into account’.

- Prior to 2014, 13 Member States¹² had already introduced a legal obligation to consider different types of Alternatives (including the 'do-nothing' scenario in some cases – see below).

1.5.2 Identifying Alternatives

This section further explains the types of Alternatives that should be identified and assessed in the EIA Report. It should be noted that each Project and each EIA is different, and there can be no definitive list prescribing how Alternatives are to be identified and assessed. Practices and legal requirements vary greatly between Member States, and practitioners should check these before beginning to consider Alternatives. In some cases, Alternatives will have been developed at the plan stage (e.g. a plan for the transport sector, a regional development plan, or a spatial plan) or by the Developer during the Project's initial design. In such cases, some Alternatives may have already been excluded, in which case, it would likely be unnecessary to consider them again. In other cases, the EIA practitioner may have to work out Alternatives or variants of Project components in order to mitigate significant environmental impacts that emerge during assessment. The process is iterative and requires some flexibility and good communication between all parties.

An open mind should be kept when considering the scope and nature of Alternatives. Indeed, depending on the Project at hand, Alternatives that should be considered may refer to the fundamental design of the Project itself, or may concern finer details, such as the technical specifications of the Project. In some cases, Alternatives to the type of Project should also be considered. It may even be the case that important Alternatives fall outside the expertise or remit of the Developer (i.e. that could not be implemented by the Developer). If relevant, these should not to be dismissed as being unreasonable from the outset.

The identification of Alternatives can be facilitated on the basis of information available at the planning level or the information received through the public consultation. If Project Alternatives have been explored in a plan or programme, practitioners should check SEAs and other environmental assessments undertaken in the near vicinity for similar Projects for Alternatives which may be relevant for the EIA. Public consultations can also help to identify reasonable Alternatives. Not only do the public concerned have local knowledge, which should be utilised, they may also give an indication of the reasonableness of an Alternative. Moving a bridge 15km downstream may increase environmental benefits, but if Developers have to fight or compensate commuters upset about an increased journey to work, then the Alternative may be deemed unreasonable.

However, Alternatives are to be identified and assessed both by the developer and the competent authorities and it is very important that the identification and consideration of Alternatives should not be treated as a mere formality.

Types of Alternatives to be considered

Annex IV to the Directive gives some examples of the types of Alternatives to be considered and which include:

- Project design;
- technology;
- location;
- size;
- scale.

¹² According to IA in 2012: Bulgaria, Denmark, Estonia, Finland, Germany Greece, Italy, Netherlands, Poland, Romania, Slovakia, Spain.

This list serves as inspiration for a multitude of other Alternatives. These roughly relate to the categories above. Some such Alternatives are listed below:

- the nature of Project;
- timeframes for construction or the lifespan of the Project;
- process by which the Project is constructed;
- equipment used either in the construction or running of the Project;
- site layout (e.g. location of buildings, waste disposal, access roads);
- operating conditions (e.g. working schedule, timing of emissions);
- physical appearance and design of buildings, including the materials to be used;
- means of access, including principal mode of transport to be used to gain access to the Project.

The Competent Authority in charge of the Scoping phase may already have highlighted, if not required, the consideration of certain Alternatives during the preparation of the EIA Report (see the Guidance Document on Scoping). As highlighted in the example below, a number of Alternatives can be indicated during the Scoping phase. A number of reasons may lie behind these choices, including the key EIA concepts of significant effects and reasonableness.

Box 31: Examples of Alternatives identified and considered in the construction of a power line in Portugal

The Project concerned the construction of a power line crossing the Alto Douro Wine Region (UNESCO World Heritage). During the Scoping phase several points were identified:

- Aerial vs. underground lines;
- 400 kV vs. 220 kV line capacity;
- 6 possible points of connection to the national grid, and 9 different routes were indicated.

1.5.3 Assessing Alternatives

Methods for assessing Alternatives

The EIA Directive requires that Developers provide the main reasons for selecting the option chosen. This means that the resources should not be spent on an intricate explanation; however, the reasons should be transparent.

The method for assessing Alternatives will depend on the type of Alternatives; the only requirement in the EIA Directive is a comparison of the environmental effects (Annex IV to the EIA Directive). However, Developers should be flexible during the assessment of Alternatives. During the assessment, one preferred Alternative may transpire to be ‘unreasonable’; in other cases, one Alternative may inspire other Alternatives. The level of detail concerning the description of the environmental effects of the Alternatives may be less than for the chosen option. Nevertheless, the aim of the exercise is to provide a transparent and well justified comparison.

Local knowledge and interests are also very important during the assessment of Alternatives and, therefore, dialogues with the public concerned on Alternatives are encouraged where appropriate. In certain situations, this may already be required by other permitting processes parallel to the EIA (e.g. when deciding on an electricity line’s route planning, national law may mandate for dialogue with land-owners in addition to organising public consultations as part of the EIA). In addition, after the EIA Report has been drafted (see section B.3.) during public consultations ensuring the public is aware that Alternatives have been considered, and providing clear reasons why the final choice was made, increases transparency. Ensuring early participation with the public concerned on Alternatives is a good practice that could not only save resources, but also reduce delays as a result of challenges arising from the public or other organisations/authorities.

Assessing the ‘do-nothing’ scenario

The ‘do-nothing’ scenario or ‘no Project’ Alternative describes what would happen should the Project not be implemented at all. In some Member States, national legislation requires the ‘do-nothing’ scenario to be considered and included in the EIA Report. In some cases, however, the ‘do-nothing’ scenario cannot be considered a feasible policy option, as a Project is very clearly needed: for example, if another policy dictates an action, such as a waste management plan, which requires improved waste management, then a new plant must be built.

The ‘do-nothing’ scenario is heavily based on the Baseline. Therefore, the section of this Guidance Document on developing the Baseline should be consulted, in order to ensure a solid foundation for the ‘do-nothing’ scenario.

1.5.4 Mandatory assessment of Alternatives: In a nutshell

- The EIA Directive requires Developers to describe the reasonable Alternatives that have been identified and studied and to compare their environmental impacts against the Project option chosen. This is an important aspect of the EIA Report and one that often challenges practitioners and Developers. Alternatives have to be ‘reasonable’, meaning that feasible Project options meet the Project’s objectives.
- The 2014 amendments to the Directive now require the EIA Report to include a description of the reasonable Alternatives (as opposed to an ‘outline’) studied by the developer who holds the pen. They also suggest types of Alternatives, such as Project design, technology, location, size, and scale.
- The approach to identifying Alternatives is highly Project-specific. Some Alternatives are overarching and may be identified in plans and programmes (e.g. transport plans or regional development programmes) or by the Competent Authority at the EIA Scoping stage. Others might concern the technical design and are identified by the Developer. In cases, EIA practitioners may identify Alternatives and propose them to the Developer. The process of identifying and assessing Alternatives is iterative and requires some flexibility and good communication between all parties.
- Consultation with the public is usually very important both for identifying and assessing Alternatives. A clear presentation of Alternatives, and how they have been assessed, also lends transparency to the process and can improve public acceptance and support for Projects.
- The environmental assessment of Alternatives should be targeted and focused on the comparison of impacts between several options and presented as such in the EIA Report.

1.6 MITIGATION AND COMPENSATION MEASURES

Measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment are described in the EIA Report. These measures are commonly referred to as ‘Mitigation Measures’, with the exception of the last action, offsetting, which can be considered to be a Compensation Measure. The box below sets out the legislative requirements.

Box 32: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1) of the Directive states that:

‘(...) the developer shall include at least:

- (c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;’

Annex IV point 7 states that:

‘A description of the measures envisaged to avoid, prevent, reduce, or if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for

example the preparing of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover by the construction and operational phases.'

In addition to the legislative requirements, Recital 35 of the 2014 Directive amending the EIA Directive references 'mitigation and compensation measures', noting that such measures should be appropriately monitored.

Box 33: In practice – 2014 amendments to the measures to mitigate and compensate

- In Article 5, the actions 'prevent' and 'offset' have been added.
- Annex IV point 7 now includes 'avoid' (although 'prevent' is not new to Annex IV).
- Annex IV also includes the new provision to provide Monitoring Measures, and a description explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduce or offset, specifically referencing that these apply to both the construction and operational phases.

When considering Alternatives, such Mitigation Measures might influence how Alternatives are assessed. For example, an Alternative might be considered unfeasible until a Developer factors in a Mitigation or Compensation Measure that reduces the impact of the Alternative. In addition, by considering Mitigation Measures when considering all Alternatives, even feasible Alternatives may benefit from a more environmentally sound Project design, ultimately ensuring a high level of environmental protection.

Different types of Mitigation Measures act in different ways to reduce adverse impacts:

Box 34: Types of Mitigation Measures

Type of measure	How it works
Measures to prevent	Impact avoidance by: <ul style="list-style-type: none"> ■ Changing means or techniques, not undertaking certain Projects or components that could result in adverse impacts. ■ Changing the site, avoiding areas that are environmentally sensitive. ■ Putting in place preventative measures to stop adverse effects from occurring.
Measures to reduce	Impact minimisation by: <ul style="list-style-type: none"> ■ Scaling down or relocating the Project. ■ Redesign elements of the Project. ■ Using a different technology. ■ Taking supplementary measures to reduce the impacts either at the source or at the receptor (such as noise barriers, waste gas treatment, type of road surface).
Measures to offset	Offset or compensate for residual adverse impacts that cannot be avoided or further reduced in one area with improvements elsewhere with: <ul style="list-style-type: none"> ■ Site remediation / rehabilitation / restoration. ■ Resettlement. ■ Monetary compensation.

For the purposes of the Directive, in accordance with the precautionary and preventive action principle, a long-term approach should be promoted, and priority should be given to avoiding impacts (prevention measures), while remediation and Compensatory Measures should only be considered as a last resort.

Mitigation and Compensation Measures are assessed on the basis of how effective they are in reducing potentially significant adverse environmental impacts. In some cases, existing legislation (e.g. the IED - see the Annex to this Guidance Document on Other Relevant Guidance and Tools), refers to the use of best available techniques, as set out in reference documents, in order to ensure that operators use the latest, most effective and economically justified technology to protect the environment. From this perspective, best available techniques can provide a very reliable starting place for Developers to identify risk management approaches and technologies that may be in turn be suggested as Mitigation Measures in an EIA Report. The EIA Report should clearly describe the adverse impact each measure is intended to avoid, mitigate or compensate when implemented. It should also describe the effectiveness of such measures, their reliability and certainty, as well as the commitment to ensuring their practical implementation and monitoring of the results.

1.6.1 Mitigation and Compensation Measures: In a nutshell

- Mitigation and Compensation Measures should be considered when assessing Alternatives, both with a view to strengthening the feasibility of Projects, and to improving the Project's design.
- Both Mitigation and Compensation Measures may be costly, and may influence the choice of Alternatives
- Mitigation and Compensation Measures may apply to both the construction and operational phases of the Project.
- A description of Mitigation and Compensation Measures for significant adverse effects must be incorporated in the decision to grant Development Consent for a Project (see section 3.2. on 'Decision-making: Reasoned Conclusion and Development Consent' of this Guidance Document).

1.7 MONITORING

This section covers the legislative requirements of the EIA Directive to ensure that adequate Monitoring Measures are in place, both during the construction and operational phases of the Project. It also sets out some guidelines to help practitioners to identify possible Monitoring Measures.

1.7.1 Legislative requirements for EIA monitoring

Monitoring Measures must be incorporated in the Development Consent for a Project if the Project is likely to have significant adverse effects (see the section on decision-making below). Monitoring Measures are, therefore, referred to in Article 8a of the EIA Directive, which outlines the information to be incorporated in the Development Consent, and the Monitoring Measures proposed (if appropriate) should be included in the EIA Report. The description of Monitoring Measures is linked to the description of measures proposed to mitigate significant adverse effects on the environment and should be directly linked to ensuring these measures are carried out successfully.

Monitoring Measures may be developed directly for the Project in question, or may arise from other requirements – EU or national legislation governing the operation of a Project, funding requirements or other sources. It is important – and a requirement of the Directive – that there is no duplication or inconsistency of effort in monitoring. With a view to avoiding duplication, if Monitoring Measures stem from other EU or national legislation, then this should be reflected in the EIA Report so as to inform the Competent Authority. The Competent Authority may then decide to use these existing measures if appropriate (Article 8a (4) 3rd paragraph). Indeed, the 2012 Impact Assessment for the review of the EIA Directive estimated that 50% of Projects developed each year would fall under other EU legislation requiring monitoring, and thus monitoring would be carried out regardless of EIA requirements.

The relevant requirements of the EIA Directive are given in the box below.

Box 35: Directive 2011/92/EU as amended by Directive 2014/52/EU

Annex IV point 7 on the information referred to in Article 5(1) sets out the information for the EIA Report and includes:

- (7) A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

As the proposed monitoring measures mentioned above are used to develop the final measures issued with the development consent, Article 8a is also relevant. This Article states:

- (1) The decision to grant development consent shall incorporate at least the following information: [...]
(b) any environmental conditions attached to the decision, a description of any features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment as well as, where appropriate, monitoring measures.

In addition, Article 8a also states:

- (4) In accordance with the requirements referred to in paragraph 1(b), Member States shall ensure that the features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment are implemented by the developer, and shall determine the procedures regarding the monitoring of significant adverse effects on the environment.

The type of parameters to be monitored and the duration of the monitoring shall be proportionate to the nature, location and size of the project and the significance of its effects on the environment.

Existing monitoring arrangements resulting from Union legislation other than this Directive and from national legislation may be used if appropriate, with a view to avoiding duplication of monitoring.

Monitoring is also referenced in Recital 35¹³ of the 2014 Directive amending the EIA Directive. Although it is not legally binding, it explains the intent of the Directive on monitoring, emphasising the need for the results of the EIA to be implemented in practice, and for procedures to be put in place to ensure that this is the case.

The 2014 amendments to the Directive have strengthened the requirements for monitoring in both the EIA Report and the Development Consent. A summary is given in the box below.

Box 36: In practice – 2014 amendments to measures to monitor

- Monitoring of significant adverse effects on the environment and/or measures taken to mitigate them is now required (where appropriate) when issuing Development Consent.
- Monitoring arrangements may be required by other EU legislation and, therefore, monitoring carried out under the EIA Directive should not result in duplication.
- Monitoring arrangements have to be examined, where appropriate, during the preparation of the EIA Report and are to be included in the EIA Report.

¹³ Recital 35 of the 2014 Directive amending the EIA Directive: 'Member States should ensure that mitigation and compensation measures are implemented, and that appropriate procedures are determined regarding the monitoring of significant adverse effects on the environment resulting from the construction and operation of a project, inter alia, to identify unforeseen significant adverse effects, in order to be able to undertake appropriate remedial action. Such monitoring should not duplicate or add to monitoring required pursuant to Union legislation other than this Directive and to national legislation'.

1.7.2 Objectives of Monitoring Measures

The monitoring requirements can help ensure:

- Significant adverse impacts from the construction and operation of Projects do not exceed impacts Projected in the EIA Report and that measures taken to offset such impacts are carried out as planned;
- the methods with which significant adverse effects can be assessed for robustness. This can help to improve the identification of impacts in future EIA Reports;
- the EIA is in line with other EU legislation, especially the SEA Directive¹⁴.

These three points are examined below in turn.

Monitoring ensures the Project meets predicted impacts

The EIA Directive aims to reduce Projects' significant adverse effects on the environment, as much as possible; however, some Projects cannot be implemented without significant impacts on the environment. During the EIA process, such impacts are not only identified, but their evolution is also forecasted. The systematic ex-post impact monitoring of adverse significant effects, resulting from the Project, offers an opportunity to identify if forecasted impacts are not developing as predicted, so that steps may be taken for rectification. This monitoring also tracks the effectiveness of measures set in place to mitigate or to compensate for significant effects. Monitoring also allows for additional or unforeseen relevant information to be taken into account, climate change or cumulative impacts for example, again allowing for remedial action.

Assessment for future EIAs

In addition to evaluating the impacts of a Project, ex-post Project monitoring can also shed light on the effectiveness of the EIA procedure, with regards to the quality of the data used and the accuracy of the approaches and methods. This can improve the transparency, legitimacy, and effectiveness of the EIA process, especially if documented evidence of the actual environmental impacts of a Project is publicly available.

Other EU legislation

The SEA Directive, IED, and WFD all require ex-post monitoring, and the Habitats Directive recommends monitoring, after an Appropriate Assessment, to be a good practice (more information about these other EU instruments can be found in the Annex to this Guidance Document on Links with Other EU Instruments). The MSFD also requires Member States to establish and implement coordinated monitoring programmes for the ongoing assessment of the environmental status of their marine waters. Further consideration of these Directives, as well as associated EU, or national-level, guidance documents should be carried out, not only as a means to avoid duplication when a Project falls under more than one Directive, but also as a baseline upon which to develop guidance on ex-post EIA monitoring. In more practical terms, monitoring should not duplicate the monitoring carried out under other assessments; therefore, practitioners should make themselves aware of other such arrangements.

The European Commission already had the opportunity to publish a guidance document on streamlining environmental assessments, including monitoring. Information from this document is

¹⁴ For more information on the importance and utility of EIA follow-up, please refer to Morrison-Saunders A., R. Marshall and J. Arts 2007 EIA Follow-Up International Best Practice Principles. Special Publication Series No. 6. Fargo, USA: International Association for Impact Assessment.

relevant and a selection from which is presented in the box below.

Box 37: Monitoring requirements for other EU environmental legislation	
Appropriate assessment (Habitats Directive)	<ul style="list-style-type: none"> ■ Monitoring is considered good practice. ■ In particular, the monitoring of Mitigation or Compensation Measures will help to ensure effectiveness (either ensuring that there are no adverse effects on the integrity of the site or by maintaining network coherence).
SEA	<ul style="list-style-type: none"> ■ Member States monitor the significant environmental effects of the implementation of plans and programmes to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action (Article 10(1)). ■ The EIA Report shall include 'a description of the measures envisaged concerning monitoring' (Annex I (i)). ■ Monitoring allows the actual significant environmental effects of implementing the plan or programme to be tested against those predicted. Any problems that arise during implementation, whether they have been foreseen or not, can be identified and future predictions can be made more accurately. ■ Monitoring can be integral in compiling baseline information for future plans and programmes, and in preparing information which will be needed for EIAs of Projects.
IED	<ul style="list-style-type: none"> ■ Member States shall take the necessary measures to ensure that the Competent Authority periodically reconsiders all permit conditions and, where necessary to ensure compliance with the IED Directive, updates those conditions. ■ If the Competent Authority so requests it, the operator shall submit all information necessary for reconsidering the permit conditions, including, in particular, results of emission monitoring and other data, that enables a comparison of the operation of the installation with the best available techniques and with the emission levels associated with the best available techniques (Article 21 (1)-(2)). ■ Member States shall ensure that the monitoring of air polluting substances is carried out (Article 38). The monitoring of the emissions is prescribed in Article 48, Article 60, Article 70, and it depends on the type of the installations.
WFD	<ul style="list-style-type: none"> ■ The WFD includes the requirement to establish monitoring programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district (Article 8 and Annex V).
<p><i>Extracts from: European Commission, 2016, Commission guidance document on streamlining environmental assessments conducted under Article 2(3) of the EIA Directive, OJ C 273/1, 27.07.2016</i></p>	

1.7.3 Developing Monitoring Measures

Developing monitoring indicators is an essential first step for any monitoring activity. These indicators are highly dependent upon the type of Project concerned; however, consultation of the Baseline (see the section concerning the Baseline) may guide Developers in identifying the right indicators. In addition, some indicators, water and air for example, may come from EU legislation such as the WFD and the IED.

Taking the legislative requirements outlined in this section into account, as well as Recital 35, Monitoring Measures could:

- Make sure that the significant effects identified develop as predicted;
- Ensure that the measures in place to mitigate and compensate significant adverse effects are carried out;
- Identify unpredicted significant adverse effects.

The types and number of environmental parameters to monitor, and the monitoring frequency, are very Project-specific, and need to be proportionate to the Project's relevant parameters. The Directive

provides some suggestions on these in Article 8a(4): the ‘nature, location and size of the Project and the significance of its effects on the environment’. In essence, this means that the time, effort, and costs put into Monitoring Measures should be justified by how important the potential environmental impacts will be, as well as the complexity of any Mitigation and Compensation Measures recommended in the EIA Report to avoid, prevent, reduce or to offset effects. The cost of monitoring can indeed be a decisive factor when considering not only the Alternatives (as mentioned above), but also when developing Monitoring Measures. Other parameters, such as the sensitivity of the local environment, the number and type of affected stakeholders, and the level of uncertainty regarding the assumptions and Projections made in the assessment itself should also be taken into account.

Monitoring data collection and evaluation activities should be frequent enough so that the information generated is still relevant, but not so frequent as to be a burden to those implementing the process. Monitoring need not be difficult or overly technical, and could even be as simple as a photo taken from the same vantage point over time, if such a photo clearly documents the relevant indicator.

The EIA Directive does not specify how to carry out monitoring, who should do it or how monitoring results should be analysed and used. Below are some more practical suggestions that Developers and practitioners can take into account when designing Monitoring Measures as part of the EIA Report.

- Monitoring Measures should be detailed enough to allow for proper implementation – the parameters, frequency, methods, responsibilities, and resources should be identified in advance.
- Authorities issuing the Development Consent should be satisfied that monitoring results will be evaluated by relevant authorities, naming such authority if relevant (this could be done via random inspection). Rather than carrying out monitoring individually for each Project, measures could be coordinated at higher level (depending on the Projects this may take place in a variety of different fora such as municipal plans, via an SEA, or more informally). The section on Baseline recommends developing a database to reduce the time spent on extensive field surveys and to facilitate future environmental assessments for similar Projects. Such a database would also be closely linked to monitoring results from ongoing Projects.
- Discussions with authorities and communities during the Scoping stage would help identify issues requiring monitoring. This can also build trust and partnerships that may become valuable when collecting data for monitoring.
- To the extent that it is reasonable, Monitoring Measures should have the capacity to identify any unforeseeable adverse effects, meaning that they should take the state of the affected environment, as well as the specific impacts (e.g. emissions, resource use) generated by the Project, into account.
- Monitoring results should be made available to the Competent Authorities and to the public.

Box 38: Examples of Monitoring Measures

The French ‘Grenelle 2’ law, n°2010-788 of 12 July 2010 introduced a requirement for EIAs to include a description of how the effectiveness of the main preventing/mitigating/offsetting measures would be monitored; it also introduced the possibility for Developers to be inspected in order to check that such measures have actually been implemented (cf. 2012 IA).

A good practice example, recommended by the European Commission Guidance Document on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (see the Annex to this Guidance Document on Other Relevant Guidance and Tools), involves the ex post monitoring programme established for wind farm developments in the North Sea. In the Belgian part of the North Sea, several areas within a specifically designated zone have been given in concession to wind farm operators. The Belgian Competent Authority has set up a joint monitoring programme that is financed by the wind farms in operation, given that it is not efficient to require each wind farm operator to run a similar ex-post monitoring programme independently.

1.7.4 Monitoring: In a nutshell

- Monitoring Measures for Projects with significant adverse effects must be incorporated in the decision to grant Development Consent for a Project and, as such, should generally be included in the EIA Report. Monitoring Measures may be linked to other legal requirements, such as those stemming from the IED, WFD or the Habitats Directive. Care must be taken to avoid duplication in Monitoring Measures in this regard. Requirements on Monitoring Measures were added to the EIA Directive as part of the 2014 amendments (Article 8a and Annex IV).
- Generally, Monitoring Measures can help to ensure that Projects meet all existing environmental legal requirements, and that impacts are in line with EIA Report Projections. They should also ensure that any Mitigation or Compensation Measures for expected significant effects are carried out as planned.
- Monitoring Measures can also provide insight into the quality of the EIA procedure carried out, and can generate lessons learned and good practices for future EIAs.
- Practitioners should first check which Monitoring Measures are required by other legislation. If these are not sufficient or appropriate for monitoring the expected environmental impacts or proposed Mitigation Measures, then additional measures may be proposed within the EIA Report. Monitoring Measures should always strive to be proportionate to the nature of the environmental impacts in terms of the time, costs, and other resources involved.
- Monitoring Measures should be specific and detailed enough to ensure their implementation, including defining roles, responsibilities, and resources. In some cases, economies of scale can be achieved through the joint monitoring of related Projects. Measures should also be capable of identifying important unforeseen effects

2 QUALITY OF THE EIA REPORT

This section covers the quality of the EIA Report. It addresses the format and presentation of the EIA Report, and the more recent requirements concerning the competence of the experts involved in preparing and reviewing the EIA Report.

2.1 FORMAT AND PRESENTATION OF THE EIA REPORT

The main aim of an EIA Report is to provide prudent information for two types of audiences – decision-makers and people potentially affected by a Project. The Report, therefore, must communicate effectively with these audiences.

2.1.1 The qualities of a good EIA Report

To this end, Article 3(1) of the EIA Directive requires that significant effects be identified, assessed and described in an ‘appropriate manner’. Article 5(1) sets the form – the information should be presented in an EIA Report that enables stakeholders and authorities to form opinions and to take decisions regarding the proposed Project. While there are no formal requirements concerning the format and the presentation of the report, it is recommended that the EIA Report clearly sets out the methodological considerations and the reasoning behind the identification and assessment of significant effects, so that others can see the weight attached to different factors and can understand the rationale of the assessment.

The box below provides some of the main characteristics that a good EIA Report should have to meet this objective.

Box 39: The qualities of a good EIA Report

- A clear structure with a logical sequence that describes, for example, existing Baseline conditions, predicted impacts (nature, extent and magnitude), scope for mitigation, proposed Mitigation/Compensation Measures, significance of unavoidable/residual impacts for each environmental factor;
- A table of contents at the beginning of the document;
- A description of the Development Consent procedure and how EIA fits within it;
- Reads as a single document with appropriate cross-referencing;
- Is concise, comprehensive and objective;
- Is written in an impartial manner without bias;
- Includes a full description and comparison of the Alternatives studied;
- Makes effective use of diagrams, illustrations, photographs and other graphics to support the text;
- Uses consistent terminology with a glossary;
- References all information sources used;
- Has a clear explanation of complex issues;
- Contains a good description of the methods used for the studies of each environmental factor;
- Covers each environmental factor in a way which is proportionate to its importance;
- Provides evidence of effective consultations (if some consultations have already taken place)
- Provides basis for effective consultations to come;
- Makes a commitment to mitigation (with a programme) and to monitoring;
- Contains a Non-Technical Summary which does not contain technical jargon;
- Contains, where relevant, a reference list detailing the sources used for the description and assessments included in the report.

2.1.2 The Non-Technical Summary

As can be seen in the box above, Article 5(1)(e) of the EIA Directive requires Developers to include a Non-Technical Summary of the EIA Report. This obligation is reiterated under Annex IV, point 9.

Box 40: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(1)

1. Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:

- (e) a non-technical summary of the information referred to in points (a) to (d);

Annex IV point 9

9. A non-technical summary of the information provided under points 1 to 8.

The contents of that summary are broad: Article 5(1) lists points (a) to (d) which includes almost all of the elements listed under Article 5(1), while Annex IV point 9 lists points 1 to 8, again almost all of the elements included in this Annex. This summary is, therefore, broadly encompassing as it needs to include the description of the Project, the significant effects, Mitigation Measures, Monitoring Measures, the Baseline, and reasonable Alternatives, as well as the methods used for the assessment including explanations on any hurdles encountered during the analysis. This indicates that the Non-Technical Summary ought to be more than just a few pages long. However, it should be borne in mind that it is a summary and needs to be concise and engaging enough to enable stakeholders and the public to get a proper sense of the key issues at stake and the proposed way forward. Depending on the Project, and the degree of complexity of the environmental issues involved, a Non-Technical Summary of 10 to 30 pages in length is generally considered to be good practice.

Moreover, the term ‘non-technical’ indicates that this summary should not include technical jargon. It should be understandable to someone who does not have a background in the environment or in-depth knowledge of the Project, and should be easily identifiable within the EIA Report –provided either at the very beginning or at the very end of the document.

EIA Report authors may also consider providing context about the methodology for carrying out the EIA, highlighting any significant uncertainties about the outcomes. It may also be useful to describe the Development Consent process for the Project, and the role of the EIA in this process, to help lay members of the public to understand the context for the EIA.

The box below summarises elements that are typically found in a good Non-Technical Summary for an EIA Report. These points are further reiterated in the checklist under Part C.

Box 41: The qualities of a good Non-Technical Summary

- The Non-Technical Summary is easily identifiable and is accessible within the EIA Report;
- The Non-Technical Summary provides a concise, but comprehensive description of the Project, its environment, the effects of the Project on the environment, the proposed Mitigation Measures, and the proposed monitoring arrangements;
- The Non-Technical Summary highlights any significant uncertainties about the Project and its environmental effects;
- The Non-Technical Summary explains the Development Consent process for the Project and the role of the EIA in that process;
- The Non-Technical Summary provides an overview of the approach to the assessment;
- The Non-Technical Summary is written in non-technical language, avoiding technical terms, detailed data and scientific discussion;
- The Non-Technical Summary is comprehensible to a lay member of the public.

2.2 THE COMPETENCE OF EXPERTISE AND QUALITY CONTROL

2.2.1 Legal requirements

The effectiveness of the EIA procedure relies upon high-quality EIA Reports that can be properly reviewed and evaluated by competent experts and which can contribute to sound decision-making. In order for this to be possible, the competent experts must be involved in both the preparation and in the review of the EIA Report.

A high-quality EIA Report must be prepared by competent experts, experts who understand the relevant legislation and technical parameters involved in carrying out an effective assessment and in the preparation of a high-quality report. In turn, the Competent Authority responsible for evaluating the report must have access to sufficient expertise to judge its quality and request revisions as appropriate. This section covers the legislative requirements and changes in place to ensure the quality of the experts and those reviewing the EIA.

Article 5(3) of the EIA Directive refers to the quality of the expertise used to carry out the EIA report and the need for sufficient information in order for the Competent Authority to reach a conclusion about the Project's effects on the environment. The text is given in the box below.

Box 42: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 5(3)

In order to ensure the completeness and quality of the environmental impact assessment report:

- (a) the developer shall ensure that the environmental impact assessment report is prepared by competent experts;
- (b) the competent authority shall ensure that it has, or has access as necessary to, sufficient expertise to examine the environmental impact assessment report; and
- (c) where necessary, the competent authority shall seek supplementary information from the developer, in accordance with Annex IV, which is directly relevant to reaching the reasoned conclusion on the project's significant effects on the environment.

In short, the Directive requires the following:

- the Developer needs to ensure the quality of the experts who prepare the EIA Report;
- the Competent Authority needs to ensure that it has access to the necessary expertise to review and to evaluate the EIA Report; and
- the Competent Authority must be able to request more information, where relevant, from the Developer.

These three aspects are discussed in greater detail in the following sections.

2.2.2 Experts used by Developers

This section examines how experts, used by a Developer to prepare EIA Reports, can be considered to be competent and looks at the different systems used in Member States to ascertain the competence of EIA experts.

Defining 'competent experts' (Developers)

It is important that Developers understand the concept of 'competence', with regards to experts preparing the EIA Report. The EIA Directive does not go into detail, requiring that experts be for instance external consultants instead of in-house experts, rather the Directive simply requires that experts be competent, leaving it up to the interpretation by the Member States concerned.

The original approach proposed during the 2012 review of the EIA Directive was to include the phrase ‘**accredited** experts’ in the amended Directive. Neither the words ‘accredited’ nor ‘qualified’ can be found in the operative provisions of the Directive; however, the latter term is included in Recital 33 of the 2014 Directive amending the EIA Directive: ‘[e]xperts involved in the preparation of environmental impact assessment reports should be qualified and competent...’. The non-specific requirement allows for greater flexibility for the Member States who can choose to establish an accreditation system, increase transparency, or can set out how to define how competences can be measured.

The box below stresses the recent changes brought about by the 2014 amendments relating to the competency of experts.

Box 43: In practice – 2014 amendments to the competency of experts

In most cases, the changes will not have much effect on those carrying out the EIA:

- At least 14 Member States already use accredited consultants;
- A large majority of Developers already hire specialist consultants who can be considered to be competent.

The new provisions provide a more formal check on the EIA Report:

- Experts must be proven to be competent, especially if the EIA is contested afterwards;
- Developers need to consider more seriously how they demonstrate the competence of those who prepare the EIA Report, and look to external expertise where required even if the costs incurred are higher.

Finding competent experts (Developer)

Different approaches to ensuring the competence of the experts engaged by Developers to prepare EIA Reports can be taken. Some of the examples listed directly below are discussed in greater detail in this section:

- Developers use a centralised list/standardised qualification to determine competence;
- Developers use experts from recognised institutions;
- Developers use experience of practitioners as a measure of competence;
- Developers use a more flexible approach, where transparency allows competence to be scrutinised easily.

These approaches to verifying competence can be used in isolation; however, a combination of these approaches can also be used. For instance, a list of accredited experts may be used and experts are then picked from that list on the basis of their experience or institutional affiliation. Choosing between one or several of the different approaches is important, and careful consideration should be given in implementing different approaches, as seen in the box below.

Box 44: Examples of the different approaches used in Poland to determine competent experts since the 1980s

Poland has employed several approaches to determine ‘competent experts’ since the 1980s (N.B. a form of EIA was undertaken early on in this country, before to their accession to the EU).

- A system of listing ‘qualified’ experts was set up, but in practice it did not work as expected and ended up being considered to be counterproductive. In addition, the list was set up at the national level, whereas most EIAs are done at a regional, decentralised level. The approach was, subsequently, abandoned.
- In Poland, the National Environmental Impact Assessment Commission has been functioning for years. It is an opinion-giving and advisory body of the General Director for Environmental Protection. The main task of the

National Commission is to provide opinions on complex EIA matters and cases. There are also Regional EIA Committees, which act as advisory bodies for regional directors for environmental protection. The EIA Commission also takes part in proceedings where there are complex environmental issues.

- More recently, a more flexible approach has been adopted. National legislation sets criteria for experts requiring higher education (in various relevant fields including ecology, biology, etc.) and five years of proven experience doing EIAs under the supervision of more senior experts. Transparency also plays a considerable role, given that all of the Reports are to be made publicly available and in a formal register where anyone can challenge the study's accuracy (either formally or through public scrutiny).

Many Member States do have such approaches in place that allow for the discovery of EIA experts and to verify their competence. Developers hiring these experts should, therefore, check whether these accreditation systems are available to help them to ensure that any external experts they employ for the preparation of the EIA Reports have been duly certified. It should be noted that what makes an expert 'qualified' or indeed 'competent' may vary between different Member States.

- Qualification and/or centralised list

This approach requires experts who wish to prepare EIA Reports to undertake specialist training, either through a university or through another standardised provider, in order to ensure that they have the necessary skills. Once qualified through this procedure, experts can then join a central list held at the national or local levels or by the Developers themselves.

Box 45: Benefits and drawbacks of accreditation and listing

Benefits	Drawbacks
<ul style="list-style-type: none"> ■ Experts have same minimum level of knowledge as peers; ■ Suitability checked using application criteria; ■ Developers can easily find suitable experts; ■ Added transparency to the process of selecting experts. 	<ul style="list-style-type: none"> ■ Limits the use of specialist experts not on the list; ■ False sense of security (especially where there is no way to check previous performance or no transparency regarding how people join the list, e.g. by paying a fee); ■ List must be updated regularly; ■ List must possess enough experts with a knowledge of each local level and each type of impact.

Examples of this approach exist in Belgium, where only accredited persons can be designated as EIA Report authors (*agrément des auteurs d'études d'incidences*) in the Walloon Region and in the Brussels Capital Region. The implementation of this approach in both Regions is briefly presented in the box below.

Box 46: An example of accreditation procedures: Walloon and Brussels-Capital Regions of Belgium

	Walloon Region	Brussels Capital Region
Date system first instituted	1985	1992
Framework	Single legislation (Walloon Code of Environment, Article R.58 and following), but several accreditations are required, depending on the type of Project (e.g. industrial, civil engineering, urbanism)	Different legislation and provisions depending on the Project's nature
Issuance	Walloon Minister responsible for urban and rural planning Publication in Official Journal (<i>Moniteur Belge</i>)	Brussels Government in Council Annual publication of the list of accredited individuals/companies in Official Journal (<i>Moniteur Belge</i>)
Validity	5 years (maximum), renewable with the relaunch of the procedure	15 years (maximum), renewable with the relaunch of the procedure

Changes	Holder of authorisation must notify the authority in case of changes made to the situation which might impact of one of the authorisations	
Sanctions	Temporary or permanent withdrawal under different circumstances: <ul style="list-style-type: none"> ■ disrespect of the Walloon Code of Environment ■ after prior warning and where a developed Project does 'not seem consistent with the rules of art' or is of a 'poor quality'. Prior warning can be triggered by different environmental administrations. 	Temporary or permanent withdrawal under different circumstances: <ul style="list-style-type: none"> ■ the approval holder no longer meets the conditions for approval ■ the approval holder no longer has sufficient technical means at its disposal ■ after prior warning, if a Project developed is of 'unsatisfactory quality'

- Recognised institutions

Another similar approach to ensuring the demonstrable quality of experts is to pre-qualify the institutions from which they are supplied. The experts themselves may not hold the necessary qualifications or experience, but could work under the authority of their institution, which may be a university (or a specific department thereof) or a consultancy specialising in the field of impact assessment. This places a lot of trust in the institution to ensure that the expert is competent, given that having seen the expert work on other Projects, the recognised institution would be in a good position to vouch for the expert. The institution has its own name and reputation to uphold and is, therefore, incentivised to provide good quality work.

- Experience

Basing competence on experience would require experts to demonstrate their experience working on EIAs when being selected for the role of preparing the EIA Report, regardless of their formal qualifications. As time goes by, experts will gain more and more experience and, thus, the quality of the work they do will increase. Experience can be judged both on a set of criteria or on a case-by-case approach and should be demonstrable in case the quality of the EIA Report is questioned thereafter.

- Transparency

Selecting and verifying experts through a more ad hoc, transparent process allows for greater flexibility on the part of the Developers, given that it does not require a prescribed method for measuring competence. Instead, regardless of how experts are selected, the names and CVs of all of the consultants are included in the final report, and the reason(s) for employing them is clearly detailed. Competence can, therefore, be checked and scrutinised by the public and by the Competent Authority.

2.2.3 Quality control by Competent Authorities

Just as Developers need to ensure that the EIA Report is prepared by competent experts, authorities also need to be able to demonstrate that they have sufficient experts to examine and evaluate EIA Reports. Different approaches are adopted for this across the EU Member States.

Defining 'sufficient expertise' (Competent Authorities)

Article 5(3) of the EIA Directive requires that the Competent Authorities have access to the necessary expertise required to accurately assess an EIA Report. Recital 33 of the EIA Directive states that: 'Sufficient expertise, in the relevant field of the Project concerned, is required for the purpose of its examination by the component authorities in order to ensure that the information provided by the Developer is complete and of a high level of quality.' The Competent Authority needs to check the

structure and logic of the EIA Report, as well as the overall quality of the data, judgements, and conclusions presented.

Competent Authorities can have expertise in-house or can access this expertise through external channels. In some Member States, where EIAs have been carried out for decades, those reviewing EIA Reports, in particular those within the Competent Authorities, have years of experience and they can, thus, be considered to be experts. In some cases, EU Cohesion Policy funds, including technical assistance available from the European Reconstruction Development Fund or training activities under the European Social Fund, may be available to support training for both authorities and for other stakeholders. Where expertise is not available in-house, research institutes and professional bodies may be asked to undertake reviews. In some Member States, a review body may be available to undertake the review (see box 47 below)¹⁵.

Box 47: In practice – 2014 amendments on the expertise of Competent Authorities

In most cases, the changes will not have much of an effect on those examining the EIA Report:

- The Competent Authorities reviewing large number of EIAs already have the necessary expertise;
- Some Member States have already set up diverse review system mechanisms, including independent review bodies or inter-institutional platforms (see the box below presenting the systems in Cyprus, France, Italy, and the Netherlands).

The new provisions in Article 5(3)b require authorities to be able to demonstrate their experience:

- Experts must be proven to be competent;
- Where no suitable expert is available in-house, external experts should be used.

Finding sufficient expertise (Competent Authorities)

Competent Authorities can take various approaches to ensuring that they have access to the expertise necessary to examine EIA Reports, where this is not available in-house. If individual experts are contracted on a case-by-case basis, many of the approaches adopted by Developers in the past, detailed above, can also be used to find competent experts to carry out a review of the EIA Report on behalf of the Competent Authority. Another possible option is for Member States to set up a dedicated independent review body, a body which is always available to provide insight into the evaluation of EIA Reports.

Under Article 5(3)(c), the Competent Authority can request any supplementary information that it requires from the Developer before reaching its decision, as long as the information is directly relevant to reaching the Reasoned Conclusion. Competent Authorities need to ensure that the additional information that they request can be clearly linked to the decision-making process, and is not merely precautionary in nature.

Several Member States ensure that all authorities have access to sufficient expertise to review EIA Reports through the establishment of institutions to serve this purpose. These vary in composition, size, as well as their links to authorities.

¹⁵ Examples of independent review bodies can be found in the Netherlands (Netherlands Commission for Environmental Assessment), France (*Conseil General de l'Environnement et du Développement Durable*; General Council of Environmental and Sustainable Development), and Italy (*Istituto Superiore per la Protezione e Ricerca Ambientale*; Superior Institute for Environmental Protection and Research).

In some Member States these can be considered to be independent: in the Netherlands, a Commission is appointed by the minister whose exclusive role is to maintain a pool of approximately 300 experts who are then responsible for providing opinions on EIAs. In France, the review body is made up of nine evaluation specialists, stemming from the Ministry of the Environment directly, as well as six external qualified experts.

Other Member States opted for mechanisms closer to that of an inter-institutional platform (which may include members of the civil society). For instance, in Cyprus, ten members comprise the EIA Committee, including representatives of different ministries, the chamber of engineers, the federation of environmental organisations, and two qualified experts. The box below presents four examples in greater detail.

Box 48: Examples of quality review in Cyprus, France, Italy and the Netherlands				
Member State and body	Cyprus	France	Italy	Netherlands
	EIA Committee (Επιτροπή Εκτίμησης Περιβαλλοντικών Επιπτώσεων) ¹⁶	General Council of Environment and Sustainable Development (CGEDD) acting as Environmental Authority ¹⁷	Technical Commission for environmental impact assessment ¹⁸	Netherlands Commission for Environmental Assessment (NCEA)
Proximity to EIA procedure	Integrated into the EIA procedure	Integrated into the EIA procedure	Integrated into the EIA procedure	Integrated into the EIA procedure
Degree of involvement	<ul style="list-style-type: none"> ■ responsible for EIA Screening ■ examines the content of each EIA Report ■ consults the Competent Authority with regard to any EIA issues 	<p>Acts as Competent Authority for certain Projects (and all plans and programmes, cf. SEA).</p> <p>Oversees the EIA process:</p> <ul style="list-style-type: none"> ■ responsible for EIA Scoping ■ issues an opinion on the quality of the EIA Report 	<p>Acts as an advisory body:</p> <ul style="list-style-type: none"> ■ upon request ■ checks the applicability of exclusion conditions during the Screening stage ■ checks compliance with the requirements contained in the EIA decision ■ advises on the interpretation and application of the EIA decision ■ advises during the Scoping stage. 	<p>During or after preparation of the EIA Report:</p> <ul style="list-style-type: none"> ■ responsible for Scoping of the EIA; ■ interim recommendation can be submitted if requested; ■ checks whether the EIA contains all of the necessary information once drafted.
Time taken for review		Opinion on the EIA Report issued within 3 months This opinion is published before the EIA Report is submitted to public consultations.	Opinion on EIA decision by 60 days after the start of the procedure (30 days to ask for additional documents if deemed necessary). No other specific timelines set.	Opinion on the EIA Report issued within 6 – 9 weeks.

¹⁶ The creation of the Committee is provided under Article 5 of the main law on EIA (Law 140(I)/2005 – as amended).

¹⁷ Autorité environnementale du Conseil général de l'Environnement et du Développement durable <http://www.cgedd.developpement-durable.gouv.fr/l-autorite-environnementale-r145.html>.

¹⁸ The functioning and the organization of the Commission are established by Ministerial Decree GAB/DEC/150/07 of 18 July 2007.

Experts	The Committee is composed of ten members, including six administrators, and four civil society representative.	Nine qualified evaluation specialists from the Ministry of the Environment and six external qualified experts. Maintains a pool of relevant experts.	The Commission is composed of 50 members with adequate technical qualifications in environmental matters appointed by the Ministry of Environment.	Members of the commission are appointed by ministers. The commission maintains a pool/list of circa 300 relevant experts from the fields of industry, universities, government agencies or related groups.
Expert appointment on specific EIAs	The Committee can appoint special technical committees to examine specialised environmental issues that may arise during the examination of an EIA study.	Experts assigned according to relevance of expertise and availability. Each opinion adopted after review by all experts.		Assigned according to the relevance of expertise.
Nature of decision	Opinions are not binding and in certain cases the Committee only acts when consulted.	Opinions are not binding; however, they contain recommendations and are included in the documents for public consultation. Moreover, judges can rely on them in litigation.	Opinions are not binding and, in certain cases, the Commission only acts when requested (see row above on degree of involvement).	Opinions are not binding.

2.2.4 The competence of expertise and quality control: in a nutshell

The Directive requires that the EIA Report shall be prepared by competent experts:

- Where previously Developers were not formally obliged to use competent experts to prepare EIA Reports, they are now required to ensure that the EIA Reports are prepared by such experts;
- Many Member States have adopted systems to ensure that the EIA Report is prepared by competent experts, and Developers will have to comply with these requirements when selecting experts. These include accreditation systems and lists of pre-qualified experts or institutions.

The Directive requires that Competent Authorities have sufficient expertise to review an EIA Report:

- Several Member States already have systems in place, including the establishment of an independent review body. The functions of these bodies vary between Member States and Developers and Competent Authorities will need to check national provisions.
- The Competent Authorities should hire external experts if they do not have access to such experts internally, regardless of whether a formal review body is in place.
- Additional information can be requested by the Competent Authority, as long as the information is directly relevant to reaching a Reasoned Conclusion.

3 CONSULTATIONS AND DECISION-MAKING

The EIA Report is ultimately an informative decision-making tool: once it has been prepared by the Developer, it has to be examined by the public and various concerned authorities. This section sheds light on how these procedures are carried out, given that they are relevant to those gathering the information during the preparation of the EIA Report. It looks at the requirements of the EIA Directive with regards to public consultation and the role of EIA in the decision on Development Consent, including a discussion on time-frames applicable to both cases.

3.1 CONSULTATIONS ON THE EIA REPORT

Consultation procedures are often highly detailed in national legislation, and also fall under international legislation (Aarhus and Espoo Conventions – see the Annex to this Guidance Document on Links with Other EU Instruments). Practitioners must, therefore, consult all relevant national legislation and guidance. This guidance document provides an overview of consultation requirements and, in particular, of applicable time-frames as they impact on those preparing the EIA Report.

3.1.1 Legislative requirements for consultations

Articles 6 and 7 of the EIA Directive are the main provisions of the EIA Directive on consultations. A number of other provisions scattered throughout the Directive are also relevant: e.g. Article 4(5) on the Screening stage or Article 5(2) on the Scoping stage (see the Screening Guidance Documents and the Scoping Guidance Document of this series for more information).

Together, these provisions outline (i) what information is to be provided to the consultees, (ii) who is to be consulted during the EIA process, and (iii) lays out some minimum standards to ensure that this is done effectively (distinguishing information and participation, and setting time-frames). Furthermore, it should be borne in mind that Article 8 of the EIA Directive requires the results of these consultations to be duly taken into account in the Development Consent procedure (see the decision-making section below).

Box 49: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 6 (extracts)

(1) Member States shall take the measures necessary to ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities or local and regional competences are given an opportunity to express their opinion on the information supplied by the developer and on the request for development consent, taking into account, where appropriate, the cases referred to in Article 8a(3). To that end, Member States shall designate the authorities to be consulted, either in general terms or on a case-by-case basis. The information gathered pursuant to Article 5 shall be forwarded to those authorities. Detailed arrangements for consultation shall be laid down by the Member States.

(2) In order to ensure the effective participation of the public concerned in the decision-making procedures, the public shall be informed electronically and by public notices or by other appropriate means, of the following matters early in the environmental decision-making procedures referred to in Article 2(2) and, at the latest, as soon as information can reasonably be provided:

- (e) an indication of the availability of the information gathered pursuant to Article 5;

(3) Member States shall ensure that, within reasonable time-frames, the following is made available to the public concerned:

- (a) any information gathered pursuant to Article 5;

(4) The public concerned shall be given early and effective opportunities to participate in the environmental decision-making procedures referred to in Article 2(2) and shall, for that purpose, be entitled to express comments and opinions when all options are open to the competent authority or authorities before the decision on the request for development consent is taken.

(6) Reasonable time-frames for the different phases shall be provided for, allowing sufficient time for:

- (a) informing the authorities referred to in paragraph 1 and the public; and
- (b) the authorities referred to in paragraph 1 and the public concerned to prepare and participate effectively in the environmental decision-making, subject to the provisions of this Article.

(7) The time-frames for consulting the public concerned on the environmental impact assessment report referred to in Article 5(1) shall not be shorter than 30 days.

Article 7

(1) Where a Member State is aware that a project is likely to have significant effects on the environment in another Member State or where a Member State likely to be significantly affected so requests, the Member State in whose territory the project is intended to be carried out shall send to the affected Member State as soon as possible and no later than when informing its own public, inter alia:

- (a) a description of the project, together with any available information on its possible transboundary impact;
- (b) information on the nature of the decision which may be taken.

The Member State in whose territory the project is intended to be carried out shall give the other Member State a reasonable time in which to indicate whether it wishes to participate in the environmental decision-making procedures referred to in Article 2(2), and may include the information referred to in paragraph 2 of this Article.

Groups to be consulted

In accordance with these provisions, consultations on different information should take place with different groups:

- public authorities likely to be concerned (Article 6(1) of the EIA Directive):

Authorities likely to be concerned by the Project, due to specific environmental responsibilities or local/regional competencies, must be given an opportunity to express their opinion on the information supplied by the Developer, and on the Development Consent. Authorities can be identified either in general terms or on a case-by-case basis, and shall be given an opportunity to express their opinion on the information supplied by the Developer and on the request for Development Consent. Exactly how this is to be done is to be laid down by the Member States.

- the public concerned (Article 6(2), 6(3), 6(4) of the EIA Directive):

The public and the public concerned must have access to any information gathered during the preparation of the EIA Report, the reactions of the Competent Authority/Authorities at the time the information is made available, and any other relevant information which may arise later. The public concerned must be given early and effective opportunities to participate, and be able to provide their comments and opinions. Exactly how this is done is up to Member States to decide, although the EIA Directive does set out several provisions, including mandating what information should be available to the public. This information includes the EIA Report itself.

- relevant parties in affected other Member States (Article 7 of the EIA Directive):

If a Project is likely to cause significant environmental effects in another Member State, or if another Member State so requests, then transboundary consultations must be carried out. The Member State in whose territory the Project will be carried out will send the affected Member State a description of the Project (including any information on the likely transboundary impacts) and information about the nature of the decision which may be taken. The Member State affected must be given a reasonable period of time in which to indicate whether or not it will participate in decision-making procedures; if the Member State affected indicates that it will participate, then the authorities and the public in the Member State affected must be informed and given the opportunity to forward their opinion before the Development Consent is granted. These consultations may be conducted through an appropriate joint body, and some Member States may have national legislation which may lay out additional requirements.

Minimum standards for effective consultation

Consultations include two main elements:

- informing the consultees; and
- giving consultees, whether the public or public authorities, time to prepare and participate effectively in the environmental decision-making.

In addition, requirements on time-frames are provided in relation to consultations. The following time-frames are required by the Directive:

- an explicit time-frame is provided by the Directive in Article 6(7) whereby a minimum of thirty days is required for public consultation;
- no other minimum or maximum is provided, yet Article 6(6) of the EIA Directive requests that ‘reasonable time-frames’ are provided for consultations of public authorities and the public. This notion is further reiterated throughout the different paragraphs of Article 6, as well as in Article 7 in relation to transboundary consultations. The concept of reasonable time-frames is explored in the section below.

Some of the requirements detailed above were included in the EIA Directive in 2014 and are summarised in the box below.

Box 50: In practice – 2014 amendments on consultations

The 2014 amendments included significant changes to consultations and highlighted time-frames concerning consultations:

- The Directive now differentiates between information and participation;
- The provisions on public consultation require ‘reasonable time-frames’ for each of the different phases of consultation with regard to both the public and public authorities;
- A minimum of 30 days for public consultation is required. The Directive expressly refers to local or regional authorities as authorities likely to be concerned;
- The Directive now envisages information on public consultation to be made electronically available.

3.1.2 Consultations and ‘reasonable time-frames’

The Developers and practitioners preparing EIA Reports need to be aware that information needs to be shared with relevant parties in a timely manner, which may be determined by national legislation specifically or by agreement with the relevant authorities more generally. Methods for disseminating the information are also left up to Member States; however, it is worth noting that the EIA Directive specifically envisages the electronic availability of information. In any case, clearly defined methods of dissemination, as well as time-frames, can enhance administrative certainty, prevent delays, and provide certainty that different steps in the EIA process will occur within a certain period of time.

Reasonable time-frames in EU Law

- Explanation of the use of the term ‘reasonable’ by the EIA Directive

Pursuant to the principle of subsidiarity, the EIA Directive leaves the precise determination of the time-frames applicable to consultations to Member States. Indeed, as is demonstrated in the box below, Projects requiring an EIA differ in size, scale, location and complexity, and therefore setting standard and explicit time limits applicable to all Projects for the different stages, may not be considered to be appropriate.

Box 51: Understanding the concept of 'reasonable' with regard to timing in the EIA procedure

- Recital 36 of the 2014 Directive amending the EIA Directive

'Member States should ensure that the various steps of the environmental impact assessment of Projects are carried out within a reasonable period of time, depending on the nature, complexity, location and size of the Project'

- Average duration of the EIA process

The average duration of an EIA procedure was estimated to be 11.3 months but figures range from 5 to 27 months. The average time taken to reach the final EIA decision after completion of the consultations was 2 months.

Source - GHK (2010), *Collection of information and data to support the IA study of the review of the EIA Directive*.

- Compliance Committee of the Aarhus Convention: Lithuania ACCC/2006/16; ECE/MP.PP/2008/5/Add.6, 4 April 2008, para. 69

'A time frame which may be reasonable for a small simple Project with only local impact may well not be reasonable in case of a major complex Project.'

- Defining reasonable time-frames in application of the EIA Directive

Article 6 of the EIA Directive makes several references to reasonable time-frames when it comes to carrying out public and other concerned authority consultations. In addition, Article 6(7) explicitly gives 30 days as the minimum amount of time for consulting the public on the EIA Report.

This concept of reasonable time-frames, with regards to public consultations, is widely covered by other documents on the subject, those concerning the Aarhus Convention in particular, as shown in the box below on case law. This guidance document can be used as an indication to establish time-frames applicable to the EIA procedure (see also the Annex to this Guidance Document on Other Relevant Guidance and Tools).

Box 52: Reasonable time-frames for public participation in case-law of the Aarhus Convention Compliance Committee

- Sufficient time-frame:

Case Law of the Aarhus Convention Compliance Committee determines that a total of 90 days, including 45 days to inspect the relevant information and prepare, plus a subsequent 45 days to comment, is sufficient.

- Insufficient time-frame:

Case Law of the Aarhus Convention Compliance Committee found that 10 working days, to inspect relevant information and to prepare to participate in decision-making, cannot be considered to be reasonable.

A. Andrusevych, T. Alge, C. Konrad (eds), *Case Law of the Aarhus Convention Compliance Committee 2004-2011*, 2nd edition, pages 44-45.

With regards to transboundary consultations, Article 7 addresses how Member States should approach EIAs for Projects that are likely to have significant effects on the environment in another Member State. Again, the word 'reasonable' is used when referring to the time at which information is to be shared with the public or concerned authorities. In addition, Article 7(5) states that time-frames should be determined based on those set out in Article 6. Here, the guidance materials developed concerning the Espoo Convention could support the interpretation and implementation of the EIA Directive in this context.

Practitioners developing the EIA Report should familiarise themselves with these Articles and national legislation in order to reduce delays and improve administrative certainty. At any rate, it should be noted that informing the affected Member State must be done at the latest when informing the public within the Member State where the Project takes place.

- Time-frames and streamlining environmental assessments across EU instruments

Projects are often subject to several environmental assessment procedures, including the EIA. Article 2(3) of the EIA Directive requires either a coordinated or joint procedure for Projects falling under the scope of both the EIA and the Birds/Habitats Directives. In addition, this Article encourages the use of coordinated procedures when assessments of the effects on the environment arise from the EIA and other EU legislation (for more information see the Annex to this Guidance Document on Links with Other EU Instruments). Joint or coordinated procedures for other EU environmental assessments can reduce overlapping procedures, which can then lead to unnecessary delays, discrepancies, and administrative uncertainty. Time-frames play an important role in the successful coordination or joint procedures, given that defined time-frames can help align procedures which may be headed by different parties.

The European Commission Guidance Document on streamlining environmental assessments conducted under Article 2(3) of the EIA Directive provides advice about how to manage different environmental assessments in the context of joint and/or coordinated procedures, and should be read in conjunction with this guidance document. In addition, other regulations may dictate the structure of the time-frames. The Trans-European Networks-Energy Regulation (see the Annex to this Guidance Document on Links with Other EU Instruments), for example, gives three and a half years as a binding time limit for the overall permit granting process (i.e. delivering the Development Consent decision) for relevant Projects. The European Commission has also issued a Guidance Document on streamlining environmental assessments within the context of the TEN-R Regulation (see the Annex to this Guidance Document on Other Relevant Guidance and Tools).

Box 53: Other relevant EU Guidance

Commission Guidance on streamlining environmental assessments for energy infrastructure Projects PCIs (Streamlining Guidance) July 2013

Commission guidance document on streamlining environmental assessments conducted under Article 2(3) of the Environmental Impact Assessment Directive (Directive 2011/92/EU of the European Parliament and of the Council, as amended by Directive 2014/52/EU) (2016/C 273/01)

Implementing reasonable time-frames in the national context

While they are not established at the EU level, explicit time-frames, with minimum and/or maximum limits, may be set out either by Member States in national legislation or by the Competent Authorities on a case-by-case basis.

In any case, if time-frames are set-out, Recital 36 of the 2014 Directive amending the EIA Directive indicates that they ought:

- to stimulate more efficient decision-making and increase legal certainty; and
- not to affect the achievement of the objective of the Directive which is to ensure a high level of protection of the environment and of human health.

The following box provides a few tips on setting reasonable time-frames for EIAs.

Box 54: Tips for setting explicit time-frames

- Time-frames should be proportionate to the nature, complexity, location and size of the Project.
- Time-frames should be clearly defined.
- Time-frames should be flexible enough to adjust to extenuating circumstances.
- Time-frames should aim to reduce unnecessary delays in assessment procedures and increase administrative certainty.
- Time-frames should in no way lower the quality of the environmental assessments performed.

3.1.3 Consultations: in a nutshell

- The EIA Directive requires consultations with three different groups on the content of the EIA Report: the public concerned must always be consulted; public authorities must be consulted when they are likely to be concerned; and other Member States for Projects with transboundary impacts.
- Consultations include both the provision of information and the possibility to effectively prepare and participate in decision-making.
- The Directive sets out an explicit minimum time-frame for public consultations on the EIA Report (at least 30 days).
- In other cases, the Directive refers to reasonable time-frames. The notion of reasonable time-frames should be refined at the national level, depending on the Project at hand, in order to enhance administrative certainty and to reduce delays.

3.2 DECISION-MAKING: REASONED CONCLUSION AND DEVELOPMENT CONSENT

3.2.1 Legislative requirements on decision-making

The definition of the EIA in Article 1 of the Directive refers to:

- a Reasoned Conclusion, essentially the decision of the Competent Authority on the environmental impacts of the Project based on the EIA Report and on other relevant information, including information received through the consultations;
- the incorporation of the Reasoned Conclusion in the Project's Development Consent, i.e. in the decision that either grants or refuses permission to carry out a Project.

Article 8 of the Directive also requires that, in order to make the Development Consent decision, the Competent Authority takes the results of consultations duly into account.

Box 55: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 1(2)(g)(iii), (iv) and (v)

For the purposes of this Directive, the following definitions shall apply:

(g) 'environmental impact assessment' means a process consisting of:

- (iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;
- (iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination;
- (v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.

Article 8

The results of consultations and the information gathered pursuant to Articles 5 to 7 shall be duly taken into account in the development consent procedure.

Article 8a(1)

1. The decision to grant development consent shall incorporate the following information:

- (a) the reasoned conclusion referred to in Article 1(2)(g)(iv);
- (b) any environmental conditions attached to the decision, a description of any features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment as well as, where appropriate, monitoring measures.

Article 8a(2)

(2) The decision to refuse development consent shall state the main reasons for the refusal.

Article 8a(6)

(6) The competent authority shall be satisfied that the reasoned conclusion, referred to in Article 1(2)(g)(iv), or any of the decisions referred to in paragraph 3 of this Article, is still up to date when taking a decision to grant development consent. To that effect, Member States may set time-frames for the validity of the reasoned conclusion referred to in Article 1(2)(g)(iv) or any of the decisions referred to in paragraph 3 of this Article.

Articles on decision-making ensure that a clear justification of the reasons and the conditions associated with the decision to grant (or refuse) Development Consent are provided and that environmental conditions stemming from the EIA decision are not sidelined when making the Development Consent decision. Thus, the aim is to ensure that the EIA process has informed the decision-making process, and that a high level of environmental protection can be guaranteed once the Project is implemented and operating.

Box 56: In practice – 2014 amendments on decision-making

The amendments of the different articles seek to strengthen decision-making in two ways; firstly, with regards to obtaining more formal and transparent justification of decision-making:

- Article 8 includes the words 'duly into account', thereby seeking to ensure that environmental considerations and the opinions of the public consulted are not side-lined when issuing Development Consent decisions;
- Article 8a(1) requires the integration of different elements into the Development Consent decision (e.g. Reasoned Conclusion, environmental conditions, Monitoring Measures);
- Article 8a(2) requires the justification of decisions to refuse Development Consent.

Secondly, the amendments seek to ensure that that environmental considerations remain under scrutiny during the actual Project construction phase and/or operational phase, as well as in any subsequent permitting procedures:

- Article 8a(1) requires the integration of different elements into the Development Consent decision (e.g. Reasoned Conclusion, environmental conditions, Monitoring Measures);
- Article 8a (6) requires that the Competent Authority checks that the Reasoned Conclusion is up-to-date.

3.2.2 Reasoned Conclusion

This section addresses the duties of the Competent Authority that adopts Reasoned Conclusions, and explains the two different systems envisaged by the EIA Directive that may be used in the Member States in relation to the adoption of a Reasoned Conclusion.

An assessment obligation for the Competent Authority

Article 1(2)(g) of the EIA Directive (introduced by the 2014 amendments), which defines the EIA process, uses the term 'examination' several times in relation to the tasks carried out by the Competent Authority adopting the Reasoned Conclusion. As discussed below, this term requires that the Reasoned Conclusion be the direct outcome of an obligation, on the Competent Authority's part, to assess the Project's significant effects. The Competent Authority must, therefore, not simply rely on the Developer's assessment and compile the information gathered through the consultations, but must also carry out its own separate assessment of the Project's significant effects.

Box 57: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 1(2)(g)(iii) and (iv)

- (iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

- (iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination;

The terminology ‘examine’ is used in a 2011 ruling of the Court of Justice of the European Union (CJEU). In this judgement, the Court ruled that Article 3 of the EIA Directive is a fundamental provision that should guide the whole EIA process. This provision requires the EIA process to not only identify and describe, but also to *assess*, the direct and indirect effects of the Project. This assessment, the Court ruled, involves an *examination* by the Competent Authority of both the information supplied in the EIA Report and of the results of the consultations.

A few key statements from the Court ruling in question are reproduced in the box below.

Box 58: CJEU, C-50/09, *Commission v. Ireland*

40 ... Indeed, that assessment, which must be carried out before the decision-making process (...), involves an examination of the substance of the information gathered as well as a consideration of the expediency of supplementing it, if appropriate, with additional data. That competent environmental authority must thus undertake both an investigation and an analysis to reach as complete an assessment as possible of the direct and indirect effects of the Project concerned on the factors set out in the first three indents of Article 3 and the interaction between those factors.

41 [...] Article 3 is a fundamental provision.

44. [...] namely that of taking the results of the consultations and the information gathered for the purposes of the consent procedure into consideration. That obligation does not correspond to the broader one, imposed by Article 3 of Directive 85/337 on the competent environmental authority, to carry out itself an environmental impact assessment in the light of the factors set out in that provision.

The content of the Reasoned Conclusion

As described above, the Competent Authority must examine the information provided in the EIA Report, as well as the results of the consultations and, where appropriate, must request any supplementary information. The Reasoned Conclusion, as the direct outcome of this assessment, should detail these examinations.

The following box provides a few tips about how to develop a good Reasoned Conclusion.

Box 59: Tips for developing the Reasoned Conclusion

- Examine and justify the different tools and methods used during the preparation of the EIA Report, and subsequent consultations.
- Examine the information and data provided in the EIA Report and during consultations. Key messages of the Baseline conditions, significant effects, predicted impacts of the Project, suggested Monitoring and Mitigating Measures, and other relevant information should be highlighted.
- Clearly discuss the evidence with a view to reaching a conclusion, allowing for any additional arguments which may arise.
- State clearly what the Reasoned Conclusion is and the arguments on which it relies.
- Define a programme to mitigate and monitor the effects of the Project (in case significant adverse effects would be caused).

Two different systems of adopting Reasoned Conclusion and granting the Development Consent

Article 8a (1) deals with the decision to grant Development Consent, and reiterates the necessity for this decision to incorporate several elements, including the Reasoned Conclusion and Monitoring Measures (see also the section on monitoring).

In relation to this point, the EIA Directive allows for the existence of different EIA systems in the Member States as provided for under Article 2(2) of the Directive (see box below).

Box 60: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 2(2)

2. The environmental impact assessment may be integrated into the existing procedures for development consent to projects in the Member States, or, failing this, into other procedures or into procedures to be established to comply with the aims of this Directive.

The underlying idea, presented under Recital 21 of the 2014 Directive amending the EIA Directive, is that ‘the Reasoned Conclusion [...] may be part of an integrated Development Consent procedure or may be incorporated in another binding decision’. There are two main systems existing in the EU with regards to the implementation of the EIA Directive. These two systems can be described as, on the one hand, a separate EIA procedure, and an integrated procedure where the EIA is one of the assessments carried out in view to reach a decision on Development Consent on the other.

- The integrated procedure

The integrated procedure system consists of an EIA procedure carried out in parallel with other assessments in view of reaching a decision for Development Consent. The Reasoned Conclusion, as such, forms part of the final decision on the Project’s Development Consent.

- The separate EIA procedure

Under the separate EIA procedure, the Reasoned Conclusion is adopted via a decision procedure that is separate from the one undertaken to grant Development Consent. In this case, the environmental conditions set out in the Reasoned Conclusion are binding. The requirement of Article 8a(1) of the EIA Directive ensures that the environmental conditions set out in the Reasoned Conclusion are included later on in the Development Consent decision. As the conditions set in the Reasoned Conclusion on the EIA are binding, they should be followed when the Development Consent is adopted.

3.2.3 Time-frames concerning decision-making

The obligation of reasonable time-frames in decision-making

Article 8a(5) of the EIA Directive concerns the time-frames set in which the decisions taken during the EIA process must be made.

Box 61: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 8a(5)

5. Member States shall ensure that the competent authority takes any of the decisions referred to in paragraphs 1 to 3 within a reasonable period of time.

This Article prescribes an overall obligation of ‘a reasonable period of time’. This obligation is applicable not as a whole, but to different decisions, including inter alia the Reasoned Conclusion as well as the Development Consent decisions. There is no precise indication in the Directive about how long the reasonable period of time should be, and Developers should be aware that specific time-frames may be set out in national legislation or be applicable from other legislation (e.g. the TEN-E Regulation).

The time taken by the authorities to issue their decisions on the Development Consent can generate significant uncertainty and delays for the Developers, which may also lead to additional costs being incurred. Again, ensuring the decisions are taken within a ‘reasonable period of time’, can contribute to more efficient decision-making and increasing certainty as well as avoiding lengthy EIA procedures.

Time-frames for the validity of Reasoned Conclusion

The EIA Directive requires that the authority, competent for the Development Consent, must ensure that the Reasoned Conclusion is still up-to-date when taking its decision (Article 8a(6)).

Box 62: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 8a(6)

6. The competent authority shall be satisfied that the reasoned conclusion referred to in Article 1(2)(g)(iv), or any of the decisions referred to in paragraph 3 of this Article, is still up to date when taking a decision to grant development consent. To that effect, Member States may set time-frames for the validity of the reasoned conclusion referred to in Article 1(2)(g)(iv) or any of the decisions referred to in paragraph 3 of this Article.

These elements sheds additional light on the overall obligation of ‘reasonable period of time’ of Article 8a(5). Indeed, in the context of separate EIA procedure, the environmental assessment may have been completed years before a decision on Development Consent can be considered.

Member States in this context may establish time-frames for the validity of Reasoned Conclusion.

Box 63: The validity of Reasoned Conclusion in Croatia

The Croatian Environmental Protection Act (*Zakon o zaštiti okoliša*) ('O.G.' No 80/13, 153/13 and 78/15) regulates the EIA procedure in Croatia.

Its Article 92 sets the duration of validity of the final EIA decision for up to two years. More specifically, it renders the EIA decision invalid if an operator does not request a permit leading to the construction permit within two years of the date the decision entered into force

The Competent Authority should, in any case, be satisfied that the Reasoned Conclusion is up-to-date, regardless of time-frames that have not yet expired.

Time-frames for informing the public of the Development Consent decision

Once the Development Consent decision has been reached, the public must be informed of its outcome.

Box 64: Directive 2011/92/EU as amended by Directive 2014/52/EU

Article 9(1)

1. When a decision to grant or refuse development consent has been taken, the competent authority or authorities shall promptly inform the public and the authorities referred to in Article 6(1) [...]

The 2014 legislative change of the EIA Directive added the word ‘promptly’ to Article 9(1) so as to align it with Article 6(9) of the Aarhus Convention which already uses this term. It should be noted that ‘promptly’ can be interpreted differently from the phrase ‘reasonable time-frame’ used throughout the EIA Directive. This suggests that there is not a specified maximum period (time-frame) in which action should be taken, but rather that action should be taken as soon as possible¹⁹.

At the Member State level, there may be national time limits established for challenging the decision that must be complied with.

¹⁹ A. Andrushevych, T. Alge, C. Konrad (eds), Case Law of the Aarhus Convention Compliance Committee 2004-2011, 2nd edition, Page 87.

3.2.4 Decision-making on the EIA Report: in a nutshell

- Environmental considerations, and the opinions of the public consulted, shall be taken ‘duly into account’ during the decision-making steps (both in the Reasoned Conclusion and Development Consent).
- The Reasoned Conclusion is the outcome of an assessment undertaken by the Competent Authority that is separate from the Developer’s assessment. It includes an assessment of the information provided in the EIA Report, an assessment of the results of consultations, and, if adequate, the Competent Authority’s supplementary assessment and resulting decision on the environmental effects of the Project.
- Across the EU Member States, there are two main systems of adopting reasoned conclusion:
 - Integrated procedure – the Reasoned Conclusion is integrated in the decision on Development Consent;
 - Separated EIA procedure – the Reasoned Conclusion, as a legally binding environmental decision, is adopted pending the issuance of the decision on the Development Consent
- Before taking a decision on the Development Consent, the Competent Authority should check that the Reasoned Conclusion is up-to-date.
- Different elements must be integrated into the Development Consent decision, including the Reasoned Conclusion, environmental conditions, and Monitoring Measures.
- Decisions to refuse Development Consent should be justified.

PART C – THE EIA REPORT CHECKLIST

1 INTRODUCTION

This checklist is designed to support this Guidance Document's users with the preparation and reviewing of an EIA Report. The checklist is intended to be used in conjunction with this Guidance Document; it can be used at multiple stages of the EIA procedure in various ways:

- for planning and guiding the preparation of an EIA Report by Developers or practitioners;
- when reviewing a draft, to ensure that it is complete and complies with all requirements and can be used for consultation or submitted to the Competent Authorities;
- when reviewing if enough information has been provided to allow for the public and stakeholder groups to develop informed opinions and reactions; and
- for authorities to carry out the examination of the EIA Report once it has been submitted.

The checklist is organised into seven sections that follow the order of presentation of the issues under Part B:

- Description of the Project;
- Description of the environment likely to be affected by the Project (including Baseline);
- Description of the Project's likely significant effects;
- Alternatives;
- Description of Mitigation and Compensation Measures;
- Description of Monitoring Measures;
- Quality (presentation, Non-Technical Summary, and quality of experts).

Each section includes a number of questions for consideration. These questions are numbered per question in the first column and are stated in full in the second. The third and fourth columns concern if they are relevant and if they have been adequately addressed respectively. The final column is dedicated to the question of what further information is required.

Some instructions for using the checklist have been provided below, but the checklist has, in essence, been developed as a flexible tool to enable different actors in the EIA procedure to use it at different stages of the procedure.

2 INSTRUCTIONS

Reviewing the relevance of the checklist questions

The checklist has been intentionally designed to cover the wide range of eventual Project situations envisaged by the EIA Directive. It also covers different types of user responsibilities, such as confirming whether or not authorities have access to the necessary expertise. Therefore, the first step in using the checklist is to decide, for each of the questions, whether the question is relevant to:

- the specific Project;
- the stage of the EIA procedure (e.g. planning, draft report completed, final review etc.);
- the user in his/her own capacity (e.g. practitioner preparing the report, Developer reviewing a draft, authority examining a final report).

If the question is relevant, then enter 'Yes' in Column 3. At the end of each of the checklist's sections, consider whether or not there are any special features of the Project that mean that types of information that have not been identified in the checklist that could be relevant and add these to the checklist in the spaces provided.

Assessing the sufficiency of the information provided

For all of the questions that are relevant to the Project and context, the user may then:

- include the point in the planning of the EIA Report; or
- review the EIA Report in more detail and decide whether the particular information identified in the question is provided and is sufficient. If it is complete and sufficient, then enter: 'Yes' in Column 3. If it is not, then enter: 'No'.

In considering whether the information is complete and sufficient the reviewer should consider whether there are any omissions in the information and whether these omissions are vital to the consultation or decision-making processes. If these omissions are not vital, then it may be unnecessary to identify or request further information. This will avoid unnecessary delay to the EIA process. Factors to consider will include:

- Both the legal provisions that apply and the factors that the decision-maker is required to take into account at this stage in the consent process for the Project;
- The Project's scale and complexity and the sensitivity of the receiving environment;
- Whether the environmental issues raised by the Project are high profile;
- The views of the public and consultees about the Project and the degree of controversy.

Indication of necessity for supplementary information

If the answer to a review Question is 'No', consider what further information is required and note this in Column 4.

This situation may arise in a variety of situations, for instance:

- Developers reviewing the EIA Report, prior to submission, may find that the information provided by the EIA practitioners is not sufficient and may request that the practitioners gather

- more evidence and analyse it;
- members of the public participating in the consultation procedure may find that the information provided is not complete or is insufficient to allow for their effective participation in the consultation processes. They may indicate this to both the reviewers and the Competent Authority during the consultations. The Competent Authorities intervening in the EIA process must be satisfied that the information provided is sufficient for the purposes of adopting the Reasoned Conclusion and for arriving at a decision on Development Consent.

The user may also wish to make any suggestions about where or how the information might be obtained.

3 THE REVIEW CHECKLIST

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
The Objectives and Physical Characteristics of the Project				
1.1	Are the Project's objectives and the need for the Project explained?			
1.2	Is the programme for the Project's implementation described, detailing the estimated length of time (e.g. expected start and finish dates) for construction, operation, and decommissioning? (this should include any phases of different activity within the main phases of the Project, extraction phases for mining operations for example)			
1.3	Have all of the Project's main characteristics been described? (for assistance, see the Checklist in Part C of the Scoping Guidance Document in this series)			
1.4	Has the location of each Project component been identified, using maps, plans, and diagrams as necessary?			
1.5	Is the layout of the site (or sites) occupied by the Project described? (including ground levels, buildings, other physical structures, underground works, coastal works, storage facilities, water features, planting, access corridors, boundaries)			
1.6	For linear Projects, have the route corridor, the vertical, and horizontal alignment and any tunnelling and earthworks been described?			
1.7	Have the activities involved in the construction of the Project (including land-use requirements) all been described?			
1.8	Have the activities involved in the Project's operation (including land-use requirements and demolition works) all been described?			
1.9	Have the activities involved in decommissioning the Project all been described? (e.g. closure, dismantling, demolition, clearance, site restoration, site re-use, etc.)			
1.10	Have any additional services, required for the Project, been described? (e.g. transport access, water, sewerage, waste disposal, electricity, telecoms)			
1.11	Are any developments likely to occur as a consequence of the Project identified? (e.g. new housing, roads, water or sewerage infrastructure, aggregate extraction)			
1.12	Have any existing activities that will alter or cease as a consequence of the Project been identified?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.13	Have any other existing or planned developments, with which the Project could have cumulative effects, been identified?			
1.14	Has the 'whole Project' been described, e.g. including all associated/ancillary works?			
1.15	Are any activities described as part of the 'whole Project' excluded from the assessment? Are such exclusions justified? (e.g. associated/ancillary activities can be included either because they fall under the scope of the Directive (Annex I or II) or because they can be considered as an integral part of the main infrastructure works using the 'centre of gravity test'. Guidance on associated and ancillary works has been published by the European Commission in an Interpretation Line available at: http://ec.europa.eu/environment/eia/pdf/Note%20-%20Interpretation%20of%20Directive%2085-337-EEC.pdf)			
The Size of the Project				
1.16	Is the area of land occupied by each of the permanent Project components quantified and shown on a scaled map? (including any associated access arrangements, landscaping, and ancillary facilities)			
1.17	Has the area of land required temporarily for construction been quantified and mapped?			
1.18	Is the reinstatement and after-use of the land occupied temporarily for the operation of the Project described? (e.g. land used for mining or quarrying)			
1.19	Has the size of any structures or other works developed as part of the Project been identified? (e.g. the floor area and height of buildings, the size of excavations, the area or height of planting, the height of structures such as embankments, bridges or chimneys, the flow or depth of water)			
1.20	Has the form and appearance of any structures or other works developed as part of the Project been described? (e.g. the type, finish, and colour of materials, the architectural design of buildings and structures, plant species, ground surfaces, etc.)			
1.21	For urban or similar development Projects, have the numbers and other characteristics of new populations or business communities been described?			
1.22	For Projects involving the displacement of people or businesses, have the numbers and other characteristics of those displaced been described?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.23	For new transport infrastructure or Projects that generate substantial traffic flows, has the type, volume, temporal pattern, and geographical distribution of new traffic generated or diverted as a consequence of the Project been described?			
Production Processes and Resources Used				
1.24	Have all of the processes involved in operating the Project been described? (e.g. manufacturing or engineering processes, primary raw material production, agricultural or forestry production methods, extraction processes)			
1.25	Have the types and quantities of outputs produced by the Project been described? (these could be primary or manufactured products, goods such as power or water or services such as homes, transport, retailing, recreation, education, municipal services (water, waste, etc.)			
1.26	Have the types and quantities of resources, e.g. natural resources (including water, land, soil, and biodiversity), raw materials, and energy needed for construction and operation been discussed?			
1.27	Have the environmental implications of the sourcing of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?			
1.28	Have efficiency and sustainability in use of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?			
1.29	Have any hazardous materials used, stored, handled or produced by the Project been identified and quantified? <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			
1.30	Has the transportation of resources, including natural resources (including water, land, soil, and biodiversity) and raw materials to the Project site, and the number of traffic movements involved, been discussed? (including road, rail and sea transport) <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.31	<p>Have the Project's environmentally relevant social and socio-economic implications been discussed? Will employment be created or lost as a result of the Project, for instance?</p> <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			
1.32	<p>Have the access arrangements and the number of traffic movements involved in bringing workers and visitors to the Project been estimated?</p> <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			
1.33	<p>Has the housing and provision of services for any temporary or permanent employees for the Project been discussed? (this is relevant for Projects that require the migration of a substantial, new workforce into the area, either for construction or in the long term)</p>			
Residues and Emissions				
1.34	<p>Have the types and quantities of solid waste generated by the Project been identified? (including the construction or demolition of wastes, surplus spoil, process wastes, by-products, surplus or reject products, hazardous wastes, household or commercial wastes, agricultural or forestry wastes, site clean-up wastes, mining wastes, decommissioning wastes)</p> <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			
1.35	<p>Have the composition and toxicity, or other hazards from all solid wastes produced by the Project, been discussed?</p>			
1.36	<p>Have the methods for collecting, storing, treating, transporting, and finally disposing of these solid wastes been described?</p>			
1.37	<p>Have the locations for the final disposal of all solid wastes been discussed, in consideration with the Waste Management Plan(s) concerned?</p>			
1.38	<p>Have the types and quantities of liquid effluents generated by the Project been identified? (including site drainage and run-off, process wastes, cooling water, treated effluents, sewage)</p> <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.39	Have the composition and toxicity or other hazards of all liquid effluents produced by the Project been discussed?			
1.40	Have the methods for collecting, storing, treating, transporting, and finally disposing of these liquid effluents been described?			
1.41	Have the locations for the final disposal of all liquid effluents been discussed?			
1.42	Have the types and quantities of gaseous and particulate emissions generated by the Project identified? (including process emissions, fugitive emissions, emissions from combustion of fossil fuels in stationary and mobile plant, emissions from traffic, dust from materials handling, odours) <ul style="list-style-type: none"> • during construction; • during operation; • during decommissioning. 			
1.43	Have the composition and toxicity or other hazards of all of emissions to the air produced by the Project been discussed?			
1.44	Have the methods for collecting, treating, and finally discharging these emissions to the air described?			
1.45	Have the locations for discharge of all emissions to the air been identified and have the characteristics of the discharges been identified? (e.g. height of stack, velocity and temperature of release)			
1.46	Have the methods for capturing, treating, and storing these emissions been described?			
1.47	Have the locations for the storage of all emissions identified and the characteristics of the storage unit been identified? (e.g. type of storage unit, storing capacity, methods used)			
1.48	Has the potential for resource recovery from wastes and residues been discussed? (including re-use, recycling or energy recovery from solid waste and liquid effluents)			
1.49	Have any sources of noise, heat, light or electromagnetic radiation from the Project been identified and quantified? (including equipment, processes, construction works, traffic, lighting, etc.)			
1.50	Have the methods for estimating the quantities and composition of all residues and the emissions identified and any difficulties discussed?			
1.51	Have the uncertainty attached to estimates of residues and emissions been discussed?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Risks of Accidents and Hazards				
1.52	<p>Have any of the risks associated with the Project been discussed?</p> <ul style="list-style-type: none"> • risks from handling of hazardous materials; • risks from spills fire, explosion; • risks of traffic accidents; • risks from breakdown or failure of processes or facilities; • risks from exposure of the Project to natural disasters (earthquake, flood, landslide etc.). 			
1.53	<p>Have the measures to prevent and respond to accidents and abnormal events been described? (preventive measures, training, contingency plans, emergency plans, early-warning systems, etc.)</p>			
1.54	<p>Is there a plan in place detailing the preparedness for an emergency (e.g. suggested as part of the EIA Report's Mitigation measures) ?</p>			
1.55	<p>Is this plan in line with other EU legislation requirements, in particular Article 12 of the Seveso Directive (Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances) which refers to emergency plans?</p>			
Other Questions on Description of the Project				

SECTION 2 DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Baseline: Aspects of the Environment				
2.1	Have the existing land uses on the land to be occupied by the Project and the surrounding area described and are any people living on or using the land been identified? (including residential, commercial, industrial, agricultural, recreational, and amenity land uses and any buildings, structures or other property)			
2.2	Have the topography, geology and soils of the land to be occupied by the Project and the surrounding area been described?			
2.3	Have any significant features of the topography or geology of the area described and are the conditions and use of soils been described? (including soil quality stability and erosion, agricultural use and agricultural land quality)			
2.4	Has the biodiversity of the land/sea to be affected by the Project and the surrounding area been described and illustrated on appropriate maps?			
2.5	Have the species (including their populations and habitats), and the habitat types that may be affected by the Project been described? (Particular attention should be paid to any species and habitats protected under the Habitats and Birds Directives (Directives 92/43/EEC and 2009/147/EC).			
2.6	Have the Natura 2000 sites that may be affected by the Project been described?			
2.7	Has the water environment of the area been described? (including reference to any River Basin Management Plans/Programme of Measures under the WFD, running and static surface waters, groundwaters, estuaries, coastal waters and the sea and including run off and drainage. N.B. not relevant if water environment will not be affected by the Project)			
2.8	Have the hydrology, water quality, and use of any water resources that may be affected by the Project been described? (including any River Basin Management Plans/Programme of Measures under the WFD, use for water supply, fisheries, angling, bathing, amenity, navigation, effluent disposal)			
2.9	Have local climatic and meteorological conditions in the area been described? (N.B. not relevant if the atmospheric environment will not be affected by the Project)			
2.10	Has existing air quality in the area been described, including, where relevant, limit values set out by Directives 2008/50/EC and 2004/107/EC as well as relevant Programmes adopted under this legislation? (N.B. not relevant if the ambient air will not be affected by the Project)			

SECTION 2 DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
2.11	Has the existing noise climate been described, including, where relevant, reference to noise maps and actions plans set out by the Environmental Noise Directive (2002/49/EU)? (N.B. not relevant if acoustic environment will not be affected by the Project)			
2.12	Has the existing situation regarding light, heat, and electromagnetic radiation been described? (N.B. not relevant if these characteristics of the environment will not be affected by the Project)			
2.13	Have any material assets in the area that may be affected by the Project been described? (including buildings, other structures, mineral resources, water resources)			
2.14	Have any locations or features of archaeological, historic, architectural or other community or cultural importance in the area that may be affected by the Project been described, including any designated or protected sites?			
2.15	Has the landscape or townscape of the area that may be affected by the Project been described, including any designated or protected landscapes and any important views or viewpoints?			
2.16	Have the demographic, social and socio-economic conditions (e.g. employment) in the area been described?			
2.17	Have any future changes in any of the above aspects of the environment, that may occur in the absence of the Project, been described? (the so-called Dynamic Baseline)			
Data Collection and Methods				
2.18	Has the study area been defined widely enough to include all of the areas likely to be significantly affected by the Project?			
2.19	Have all relevant national and local authorities been contacted to collect information on the Baseline environment?			
2.20	Have all the sources of data and information from existing databases, free services, and other relevant environmental assessments been investigated?			
2.21	Have sources of data and information on the existing environment been adequately referenced?			
2.22	Is justification provided about which particular existing datasets was(were) were relied upon, as opposed to others?			

SECTION 2 DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
2.23	Where data collection has been undertaken to characterise the Baseline environment, have the methods used, any difficulties encountered, and any uncertainties been the data described?			
2.24	Were the methods used appropriate for the purpose?			
2.25	Have the methods used to predict the impact of the Project on climate changes been described? (if relevant)			
2.26	Have the methods used to predict climate change's impact on the Project been described?			
2.27	Is the uncertainty attached to the climate change evolution predictions discussed? (if relevant)			
2.28	Did you consider life cycle assessment of the Project to describe the Project's impact on climate change? (if relevant)			
2.29	Have any important gaps in the data on the existing environment/ evolution prediction identified (e.g. climate change), and the means used to deal with these gaps during the assessment, been explained?			
2.30	Where data collection would be required to adequately characterise the Baseline environment, but they have not been practicable for any reason, are the reasons explained and have proposals been set out for the surveys to be undertaken at a later stage?			
Other Questions on the Description of the Environment				

SECTION 3 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Scoping of Effects				
3.1	Has the process by which the scope of the information for the EIA Report defined been described? (for assistance, see the Scoping Guidance Document in this series)			
3.2	Is it evident that a systematic approach to Scoping has been adopted?			
3.3	Was consultation carried out during Scoping?			
3.4	Have the comments and views of consultees been presented?			
Prediction of Direct Effects				
3.5	Have the direct, primary effects on land uses, people, and property been described and, where appropriate, quantified?			
3.6	Have the direct, primary effects on geological features and characteristics of soils been described and, where appropriate, quantified?			
3.7	Have the direct, primary effects on biodiversity been described and, where appropriate, quantified? (if relevant, are references made to Natura 2000 sites? (Directive 2009/147/EC and Directive 92/43/EEC))			
3.8	Have the direct, primary effects on the hydrology and water quality of water features been described and, where appropriate, quantified?			
3.9	Have the direct, primary effects on uses of the water environment been described and, where appropriate, quantified? (if relevant, are references made for River Basin Management Plans/Programmes of Measures under the WFD (2000/60/EC))			
3.10	Have the direct, primary effects on air quality been described and, where appropriate, quantified? (if relevant, are references made to Air Quality Plans under Directives 2008/50/EC and 2004/107/EC)			
3.11	Have the direct, primary effects on climate change been described and, where appropriate, quantified?			
3.12	Have the direct, primary effects on the acoustic environment (noise or vibration) been described and, where appropriate, quantified? (if relevant, are references made to Action Plans/Programme under the Environmental Noise Directive (2002/49/EU))			
3.13	Have the direct, primary effects on heat, light or electromagnetic radiation been described and, where appropriate, quantified?			

SECTION 3 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
3.14	Have the direct, primary effects on material assets and depletion of natural resources (e.g. fossil fuels, minerals) been described?			
3.15	Have the direct, primary effects on locations or features of cultural importance been described?			
3.16	Have the direct, primary effects on the quality of the landscape and on views and viewpoints been described and, where appropriate, illustrated?			
3.17	Have the direct, primary effects on environmentally relevant demography, social, and socio-economic condition in the area been described and, where appropriate, quantified?			
3.18	Have the secondary effects on any of the environment's aspects, above, caused by primary effects on other aspects been described and, where appropriate, quantified? (e.g. effects on biodiversity, including species and habitats protected under Directives 92/43/EEC and 2009/147/EC caused by soil, air or water pollution or noise; effects on uses of water caused by changes in hydrology or water quality; effects on archaeological remains caused by desiccation of soils)			
3.19	Have the temporary, short term effects caused only during construction or during time limited phases of Project operation or decommissioning been described? (e.g. emissions produced during the construction)			
3.20	Have the permanent effects on the environment caused by construction, operation or decommissioning of the Project been described?			
3.21	Have the long-term effects on the environment, caused over the lifetime of Project operations or caused by build-up of pollutants, in the environment been described?			
3.22	Have the effects that could result from accidents, abnormal events or exposure of the Project to natural or man-made disasters been described and, where appropriate, quantified?			
3.23	Have the effects on the environment, caused by activities ancillary to the main Project, been described? (ancillary activities are part of the Project but usually take place at a distance from the main Project location e.g. construction of access routes and infrastructure, traffic movements, sourcing of aggregates or other raw materials, generation and supply of power, disposal of effluents or wastes). For further guidance and explanation concerning ancillary works assessment see http://ec.europa.eu/environment/eia/pdf/Note%20-%20Interpretation%20of%20Directive%2085-337-EEC.pdf			

SECTION 3 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
3.24	Have the indirect effects on the environment caused by consequential development been described? (consequential development is other Projects, not part of the main Project, stimulated to take place by implementation of the Project e.g. to provide new goods or services needed for the Project, to house new populations or businesses stimulated by the Project)			
3.25	Have the cumulative effects on the environment of the Project, together with other existing or planned developments in the locality, been described? (different future scenarios including a worst-case scenario should be described, as well as the effects on both climate change and biodiversity). For further guidance on the assessment of cumulative impacts see http://europa.eu.environment/eia/eia-support http://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf .			
3.26	Have the transboundary effects on the environment of the Project, either during construction or operation, been described?			
3.27	Have the geographic extent, duration, frequency, reversibility, and probability of occurrence of each effect been identified as being appropriate?			
Prediction of Effects on Human Health and Sustainable Development Issues				
3.28	Have the primary and secondary effects on human health and welfare described and, where appropriate, been quantified? (e.g. health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups).			
3.29	Have the impacts on issues such as biodiversity, marine environment, global climate change, use of natural resources and disaster risk been discussed, where appropriate?			
Evaluation of the Significance of Effects				
3.30	Is the significance or importance of each predicted effect clearly explained with reference to legal or policy requirements, other standards, and the number, importance, and sensitivity of people, resources or other receptors affected?			
3.31	Where effects are evaluated against legal standards or requirements, have the appropriate local, national or international standards been used and has relevant guidance followed?			
3.32	Have the positive effects on the environment been described, as well as the negative effects?			

SECTION 3 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Impact Assessment Methods				
3.33	Have the methods used to predict the effects described, and the reasons for their choice, any difficulties encountered, and uncertainties in the results been discussed?			
3.34	Where there is uncertainty about the precise details of the Project, and its impact on the environment/climate change, have worst-case predictions been described?			
3.35	Where there have been difficulties in compiling the data needed to predict or evaluate effects, have these difficulties been acknowledged and their implications for the results been discussed?			
3.36	Has the basis for evaluating the significance or importance of impacts been described clearly?			
3.37	Have the impacts been described on the basis that all Mitigation Measures proposed have been implemented i.e. have the residual impacts been described?			
3.38	Is the level of treatment of each effect appropriate to its importance for the Development Consent decision? Does the discussion focus on the key issues and avoid irrelevant or unnecessary information?			
3.39	Is appropriate emphasis given to the most severe, adverse effects of the Project with lesser emphasis given to less significant effects?			
Other Questions relevant to Description of Effects				
	Have, with a view to avoiding duplication of assessments, the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report been taken into account? If so, how was this done?			

SECTION 4 CONSIDERATION OF ALTERNATIVES				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
4.1	Have the different Alternatives suggested during Scoping been considered and assessed, and if not has justification been provided?			
4.2	Have the Developer and practitioners, who are preparing the EIA Report, identified and assessed additional Alternatives (to the ones suggested during Scoping)?			
4.3	Have the process by which the Project was developed been described and are the Alternatives to the design of the Project considered during this process been described? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.4	Have the Alternatives to the design considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.5	Have the Alternatives to technology been considered during this process? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.6	Have the Alternatives to the location considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.7	Have the Alternatives to the size considered during this process been described (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.8	Have the Alternatives to the scale considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.9	Has the Baseline situation in the 'do-nothing' scenario been described?			
4.10	Are the Alternatives realistic and genuine Alternatives to the Project? (i.e. feasible Project options that meet the objectives)			

4.11	Have the main reasons for choosing the proposed Project been provided, including an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects?			
4.12	Are the main environmental effects of the Alternatives compared to those of the proposed Project?			
4.13	Are Mitigation Measures considered in the assessment of Alternatives? (more on mitigation in section 5 below)			
Other Questions on Consideration of Alternatives				

SECTION 5 DESCRIPTION OF MITIGATION				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
5.1	Where there are significant adverse effects on any aspect of the environment, has the potential for the mitigation of these effects been discussed?			
5.2	Have the measures that the Developer has proposed to implement, in order to mitigate effects, been clearly described and is their effect on the magnitude and significance of impacts clearly explained?			
5.3	Have any proposed mitigation strategy's negative effects been described?			
5.4	If the effect of Mitigation Measures on the magnitude and significance of impacts is uncertain, has this been explained?			
5.5	Is it clear if the Developer has made a binding commitment to implement the mitigation proposed or acknowledged that the Mitigation Measures are just suggestions or recommendations?			
5.6	Do the Mitigation Measures cover both the construction and operational phases of the Project?			
5.7	Have the Developer's reasons for choosing the proposed mitigation been explained?			
5.8	Have the responsibilities for the implementation of mitigation including roles, responsibilities, and resources been clearly defined?			
5.9	Where the mitigation of significant adverse effects is not practicable, or where the Developer has chosen not to propose any mitigation, have the reasons for this been clearly explained?			
5.10	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to mitigation, including measures to avoid, prevent or reduce and, where possible, offset impacts by alternative strategies or locations, changes to the Project design and layout, changes to methods and processes, 'end of pipe' treatment, changes to implementation plans and management practices, measures to repair or remedy impacts and measures to compensate impacts?			
Other Questions on Mitigation				

SECTION 5 DESCRIPTION OF MITIGATION				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?

SECTION 6 DESCRIPTION OF MONITORING MEASURES				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
6.1	Where adverse effects on any aspect of the environment are expected, has the potential for the monitoring of these effects been discussed?			
6.2	Are the measures, which the Developer proposes implementing to monitor effects, clearly described and has their objective been clearly explained?			
6.3	Is it clear whether the Developer has made a binding commitment to implement the proposed monitoring programme or that the Monitoring Measures are just suggestions or recommendations?			
6.4	Have the Developer's reasons for choosing the monitoring programme proposed been explained?			
6.5	Have the responsibilities for the implementation of monitoring, including roles, responsibilities, and resources been clearly defined?			
6.6	Where monitoring of adverse effects is not practicable, or the Developer has chosen not to propose any Monitoring Measures, have the reasons for this been clearly explained?			
6.7	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to monitoring, including Monitoring Measures covering all existing environmental legal requirements, Monitoring Measures stemming from other legislation to avoid duplication, monitoring of Mitigation Measures (ensuring expected significant effects are mitigated as planned), Monitoring Measures capable of identifying important unforeseen effects?			
6.8	Have arrangements been proposed to monitor and manage residual impacts?			
Other Questions on Monitoring Measures				

SECTION 7 QUALITY				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Quality of presentation				
7.1	Is the EIA Report available in one or more clearly defined documents?			
7.2	Is the document(s) logically organised and clearly structured, so that the reader can locate information easily?			
7.3	Is there a table of contents at the beginning of the document(s)?			
7.4	Is there a clear description of the process that has been followed?			
7.5	Is the presentation comprehensive but concise, avoiding irrelevant data and information?			
7.6	Does the presentation make effective use of tables, figures, maps, photographs, and other graphics?			
7.7	Does the presentation make effective use of annexes or appendices to present detailed data that is not essential to understanding the main text?			
7.8	Are all analyses and conclusions adequately supported with data and evidence?			
7.9	Have all sources of data been properly referenced?			
7.10	Has terminology been used consistently throughout the document(s)?			
7.11	Does it read as a single document, with cross referencing between sections used to help the reader navigate through the document(s)?			
7.12	Is the presentation demonstrably fair and, as far as possible, impartial and objective?			
Non-Technical Summary				
7.13	Does the EIA Report include a Non-Technical Summary?			
7.14	Does the Summary provide a concise but comprehensive description of the Project, its environment, the effects of the Project on the environment, the proposed Mitigation Measures, and proposed monitoring arrangements?			
7.15	Does the Summary highlight any significant uncertainties about the Project and its environmental effects?			
7.16	Does the Summary explain the Development Consent process for the Project and the EIA's role in this process?			
7.17	Does the Summary provide an overview of the approach to the assessment?			

SECTION 7 QUALITY				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
7.18	Has the Summary been written in non-technical language, avoiding technical terms, detailed data, and scientific discussion?			
7.19	Would it be comprehensible to a lay-member of the public?			
Expertise				
7.20	Is the competency of experts, who are responsible for the preparation of the EIA Report, indicated or otherwise explained in the EIA Report?			
7.21	Has the Developer complied with national or local legal requirements and practices for the selection of experts responsible for the preparation of the EIA Report?			
Other Questions on Quality of Presentation				

ANNEXES

ANNEX I – LINKS WITH OTHER EU INSTRUMENTS

The EIA Directive is just one of many pieces of EU legislation in place that affect environmental and Project planning. This poses the risk of duplication of assessments and procedures, and offers various possibilities for synergy. Under the principle of Better Regulation, whereby EU policies and laws should be designed and implemented so that they achieve their objectives at minimum cost²⁰, efforts are underway to ‘streamline’ these different assessments and procedures where possible. It is important to bear in mind that ‘streamlining’ in this context means improving and better coordinating environmental assessment procedures with a view to reducing unnecessary administrative burdens, create synergies and hence speed up the environmental assessment process, whilst at the same time ensuring a maximum level of environmental protection through comprehensive environmental assessments.

Streamlining measures can, therefore, be found in the EIA Directive:

■ **Joint or coordinated procedures (Article 2(3) of the EIA Directive)**

Article 2(3) of the EIA Directive requires Member States to set up coordinated or joint procedures when an assessment is required, both under the EIA Directive and the Habitats Directive (see below). Moreover, Member States have the possibility to apply these joint or coordinated procedures to other environmental assessments stemming from EU legislation, in particular under the Water Framework Directive and the Industrial Emissions Directive. See below for more specific information on interactions with these pieces of legislation. Practitioners are advised to check their national legislation to see when and how coordination is required.

■ **Consideration of other assessments (Article 4(4), Article 5(1) of the EIA Directive)**

Article 4(4) of the EIA Directive relating to the Screening stage of the EIA process, as well as Article 5(1) of the EIA Directive on the preparation of the EIA Report, requires practitioners to take the available results of other relevant assessments under other EU and national legislation into account.

■ **Other relevant information held by authorities (Article 5(4) of the EIA Directive)**

In order to strengthen the availability of data, Article 5(4) of the EIA Directive requires any authorities holding relevant information to make it available to the Developers of Projects subject to EIA.

This section introduces the main pieces of EU legislation relevant for streamlining with EIA. Practitioners should always check whether their Project falls under other EU legislation, and their respective national transposing measures, and be aware that there are various other guidance documents issued at EU and national level to help practitioners untangle legislative complexities. Some of these EU guidance documents are referred to in the relevant sections under Part B of the EIA guidance documents and are also listed below as well as in another Annex to this Guidance Document on Other Relevant Guidance Documents.

The legislation covered in this section is by no means an exhaustive list, but the legislation with the most significance include the following (formal names are introduced below):

- SEA Directive;
- Birds and Habitats Directives;
- Water Framework Directive;
- Marine Strategy Framework Directive;
- Ambient Air Quality Directive and Heavy Metals in the Ambient Air Directive;
- Waste Framework Directive;

²⁰ European Commission Staff Working Document, *Better Regulation Guidelines*, SWD (2015) 111 final.

- Industrial Emissions Directive;
- Seveso Directive
- Trans-European networks: TEN-E, TEN-T and TEN-TEC Regulations;
- Aarhus and ESPOO conventions (including Directive 2003/4/EC and 2003/35/EC).

SEA DIRECTIVE

Name used	Formal name
Strategic Environmental Assessment (SEA) Directive	<ul style="list-style-type: none"> ■ Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment
Relevant EU guidance:	<ul style="list-style-type: none"> ■ Commission guidance document on Streamlining environmental assessments conducted under Article 2(3) of the EIA Directive; ■ Commission guidance document on the implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment; ■ Commission guidance on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (PCIs).

The SEA Directive concerns the Strategic Environmental Assessment, which is carried out on certain plans and programmes. In many cases, an SEA of a relevant plan or programme underpinning a proposed Project will have been carried out prior to the EIA. Article 3(2) of the SEA Directive requires an SEA to be undertaken if the plan or programme ‘sets the framework’ for a Project listed in Annexes I and II to the EIA Directive.

Opportunities for synergy

The SEA and EIA are similar procedures, despite the former being carried out on plans and programmes and the latter involving Projects. Both assessments can be summarised as follows: an environmental report is prepared in which the likely significant effects (of plans, programmes or Projects) on the environment and the reasonable alternatives are identified; the environmental authorities and the public (and affected Member States) must be informed and consulted; the Competent Authority decides, taking the results of consultations into consideration. The public is informed of the decision afterwards. While the scope of the two assessments usually differs, very often much of the work carried out under the SEA can be built upon for the EIA. Alternatives identified during the SEA may be relevant for the EIA, some of the data gathered under the SEA may be used to form the baseline of the EIA. Practitioners carrying out the EIA should consult the SEA report done for any relevant plans or programmes with a view of avoiding the duplication of work.

The Guidance document on Streamlining environmental assessments for energy infrastructure Projects of Common Interest (PCIs) (see the Annex to this Guidance Document on Other Relevant Guidance and Tools) provides guidance on how to take advantage of synergies between the SEA and EIA procedures. In addition, various guidance documents exist at national level.

During the Screening procedure of EIA Projects, assessments carried out under the SEA Directive may be directly relevant to the determination of whether or not the Project may have significant impacts on the environment. This may be the case if the assessment under the SEA Directive contains information on specific sensitivities of the local area to certain developments in which the Project is proposed.

Joint/coordinated procedures

Joint or coordinated procedures are not directly provided for by the provisions of the EIA and SEA Directives, given that one relates to projects (Article 2(3) of the EIA Directive) and the other to plans/programmes (Article 11(2) of the SEA Directive); moreover, each procedure must be carried out

on its own merits (Article 11(1) of the SEA Directive). The CJEU has indeed held that an assessment undertaken within the framework of the EIA Directive does not dispense with the requirement to carry out an assessment under the SEA Directive (cf. C-295/10, *Valčiukienė and Others*, para 55-63). However, in some cases a plan/programme, and the subsequent project development, can be subjected to an integrated assessment procedure: Member States are free to set up such mechanisms, as long as all of the requirements of both Directives are fulfilled. In this perspective, the CJEU also held, in the same decision, that a joint procedure may take place in which the requirements under both Directives are covered by a single environmental assessment procedure (cf. C-295/10, *Valčiukienė and Others*, para 55-63).

BIRDS AND HABITATS DIRECTIVES

Name used	Formal name
Habitats Directive	<ul style="list-style-type: none"> ■ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna
Birds Directive	<ul style="list-style-type: none"> ■ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
Relevant EU guidance:	<ul style="list-style-type: none"> ■ Commission guidance document on Streamlining environmental assessments conducted under Article 2(3) of the EIA Directive; ■ Commission guidance on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (PCIs) ■ Commission guidance on Managing Natura 2000 sites: the provisions of Article 6 of Directive 92/43/EEC ■ Manual of European Union Habitats - EUR28.

The Habitats Directive, along with the Birds Directives (Directive 2009/147/EC), aim to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the EU Members States. Together, these Directives set up a coherent network of sites (the Natura 2000 Network) hosting habitats and/or species that should be maintained or restored at favourable conservation status according to the terms of the Directives. Any plan or Project likely to have a significant effect on a site within the Natura 2000 site is subject to an Appropriate Assessment (AA) of the implications for the site in view of the site's conservation objectives (Habitats Directive, Article 6(3)). The AA decision is binding and determines whether a plan or Project may proceed, subject to specific provisions set out in Article 6(4).

Opportunities for synergy

The scope of the AA and the EIA is different – the EIA should consider all significant environmental effects, while the AA focuses on the conservation objectives and the integrity of the Natura 2000 site in question; however, as with the SEA detailed above, some of the information collected for one assessment can be used for the other.

Joint/coordinated procedures

Article 2(3) of the EIA Directive stipulates that when Projects have to be assessed under both the EIA and the Birds or Habitats Directives, Member States *shall, where appropriate*, ensure that coordinated and/or joint procedures are provided for. This differs from instances in which Projects also have to be assessed under other EU legislation, where Member States *may* provide for coordinated and/or joint procedures. The EIA Directive makes several references to the Habitats Directive, for example, when identifying significant impacts of a Project, particular attention must be paid to species and habitats protected by the Birds and the Habitats Directives. The EU has issued a guidance document to assist practitioners in the extent to which the results from an AA assessment is taken into account in an EIA Procedure (see the Guidance document on streamlining environmental assessments conducted under Article 2(3) of the EIA Directive, full references in the Annex to this Guidance Document on Other Relevant Guidance and Tools).

WATER FRAMEWORK DIRECTIVE

Name used	Formal name
WFD	<ul style="list-style-type: none"> ■ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy
Relevant guidance:	EU <ul style="list-style-type: none"> ■ Commission guidance document on Streamlining environmental assessments conducted under Article 2(3) of the EIA Directive ■ Commission guidance on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (PCIs) ■ Common Implementation Strategy for the WFD: Guidance document no 7 Monitoring under the Water Framework Directive ■ Common Implementation Strategy for the WFD: Guidance document no 20 Exemptions to the Environmental Objectives

The WFD establishes a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater. Under this Directive, River Basin Management Plans (RBMP) are established and updated every 6 years to coordinate and implement water status-related measures within each river basin. RBMPs must address the objectives set out by the WFD, and must include an analysis of the river basin's key characteristics, a pressures assessment, review of the impact of human activity on the status of water and measures to meet the Directive's objective of 'good status' for all waters.

Projects that may lead to failure of achieving good status of water bodies or lead to deterioration of quality elements need to be assessed and if possible, a more environmentally friendly alternative should be found. If no alternative can be found, then the Project can only go ahead when it can demonstrate that first all practicable Mitigation Measures are taken to reduce the impact. Secondly, it must also be demonstrated that the reasons for deterioration are of overriding public interest or that the Project's benefits otherwise outweigh failure to achieve the relevant environmental objectives (cf. conditions set out in Article 4(7) of the WFD). The process of identifying and assessing such impacts may be carried out jointly with the EIA procedure. However, the requirement of Article 4(7) of the WFD goes beyond the requirements of the EIA Directive in the sense that it covers activities that may not be listed in Annex I or II to the EIA Directive.

Opportunities for synergy

The WFD ensures that detailed environmental data are collected for water as part of the planning process of the RBMP. Hence, synergies can be gained for part of an EIA through data collection and the required assessments of effects on water bodies according to Article 4(7) of the WFD. As discussed above, if a Project listed in Annex I or II to the EIA Directive is found to impact the status of a water body as set out in the relevant RBMP, further assessment will be required to develop and review alternatives and possibly justify reasons of overriding public interest in line with the requirements of the Water Framework Directive. This may influence the scope and nature of an EIA Report in the sense that it must incorporate an assessment of the likely impacts of the Project on the objectives adopted for the water body in question.

Joint/coordinated procedure

Article 2(3) of the EIA Directive provides the option for joint or coordinated procedures where Projects also have to be assessed under other EU legislation, but it is not a requirement.

MARINE STRATEGY FRAMEWORK DIRECTIVE

Name used	Formal name
MSFD	<ul style="list-style-type: none"> Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)
Relevant guidance:	<ul style="list-style-type: none"> EU Commission Final report on MSFD and licencing and permitting

The Marine Strategy Framework Directive (MSFD) establishes a framework to assess and implement good environmental status of the EU's marine waters by 2020. In doing so, the MSFD takes an ecosystem and integrated approach whereby environmental protection and sustainable use go hand in hand to prevent depletion of natural resources upon which marine-related economic and social activities are based.

Opportunities for synergy

The MSFD ensures that an environmental baseline for the marine waters are established. On the basis of this assessment and baseline, measures must be adopted and gradually implemented to ensure that good environmental status is achieved within a specified number of years. Unlike the WFD, there is no independent requirement in the MSFD to assess activities. However, the objectives and measures adopted in Member States may influence the scope and nature of an EIA Report in the sense that it must incorporate an assessment of the likely impacts of the Project on the objectives adopted for the marine water body in question.

Joint/coordinated procedure

Article 2(3) of the EIA Directive provides the option for joint or coordinated procedures where Projects also have to be assessed under other EU legislation, but it is not a requirement.

AMBIENT AIR QUALITY DIRECTIVE AND HEAVY METAL IN AMBIENT AIR DIRECTIVE

Name used	Formal name
AQD	<ul style="list-style-type: none"> Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
HMAQD	<ul style="list-style-type: none"> Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air
Relevant guidance:	<ul style="list-style-type: none"> EU N/A

The AQD establishes a framework for the active monitoring of ambient air and the removing of pollutants. The Directive establishes different air quality objectives (limit values, target values, critical levels and threshold) in relation to a wide range of pollutants (sulphur dioxide, nitrogen, dioxide, particulate matter, lead, benzene, carbon monoxide). It requires air quality plans when limit or target values are not complied with as well as short-term action plan when alert thresholds are exceeded. In addition, the Directive obliges Member States to keep the public informed and sets out requirements for the assessment of air quality (e.g., the monitoring network). In addition, the HMAQD sets limit values for the air pollutants arsenic, cadmium, nickel and benzo(a)pyrene.

Opportunities for synergy

During the preparation of the EIA Report, the existence of air quality objectives as well as existing air quality plans and short term action plans, provide a strong basis for the analysis of the Baseline, Alternatives to the Project, and environmental factors, in addition to any possible remedial action.

WASTE FRAMEWORK DIRECTIVE

Name used	Formal name
WasteFD	<ul style="list-style-type: none"> Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives
Relevant guidance:	EU <ul style="list-style-type: none"> Application of EIA Directive to the rehabilitation of landfills.

The WasteFD establishes a legal framework for the management and treatment of most waste types. The Directive sets out a waste hierarchy that ranges from prevention to disposal. Waste management under the Directive must be implemented without endangering human health and without harming the environment (e.g. without risk to water, air, biodiversity, and without causing nuisance). It also sets out rules for extended producer responsibility, effectively adding to the burdens of manufacturers to manage products returned after use.

Opportunities for synergy

The WasteFD requires the adoption and implementation of Waste Management Plans and Waste Prevention Programmes at the national and local levels. These plans and programmes should analyse the current situation with regards to waste treatment, as well as identify the measures needed to carry out waste management in the context of the WasteFD's objectives. This includes existing and planned waste management installations, which are likely to constitute Projects subject to the EIA Directive. As waste installations should be provided for under Waste Management Plans, they are also subject to the requirements of the SEA Directive (see above).

The EIA Directive may also bear relevance for any Project with regard to the waste produced not only during the construction and operation of the Project, but also, in particular, with regard to the decommissioning and/or rehabilitation of the site.

During the preparation of the EIA Report, the waste produced and returned to the Project location must be taken into consideration in assessing the Project's significant effects on the environment, and would be relevant for the establishment of Alternatives and Mitigation as well as Compensation Measures.

INDUSTRIAL EMISSIONS DIRECTIVE

Name used	Formal name
IED	<ul style="list-style-type: none"> Directive 2010/75/EU of the European Parliament and the Council on industrial emissions
Relevant guidance:	EU <ul style="list-style-type: none"> Guidance under Article 13(3)(c) and (d) of the IED; Commission Communication on the elaboration of baseline reports under Article 22(2) of the IED.

The IED is the main EU instrument regulating pollutant emissions from industrial installations. Around 50,000 Projects undertaking the industrial activities listed in Annex I to the IED are required to operate in accordance with a permit, which should contain conditions set in accordance with the principles and provisions of the IED. As indicated in the Commission Guidance document on 'Interpretation of definitions of Project categories of Annex I and II to the EIA Directive' (see the Annex to this Guidance Document on Other Relevant Guidance and Tools): the EIA Directive and the Industrial Emissions Directive (IED) sometimes relate to the same type of activities. However, it is

important to be aware of the differences that exist between the objective, the scope, classification systems, and thresholds of these two directives.

Opportunities for synergy

IED permits must take the whole environmental performance of the industrial plant into account, including emissions to air, water, and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and the restoration of the site upon closure. Such an exercise aligns closely with the EIA Directive and ‘Member States have discretion to use the thresholds set by Annex I to the IED in the context of the EIA Directive’ (Commission Guidance Document, Interpretation of definitions of Project categories of Annex I and II to the EIA Directive, see the Annex to this Guidance Document on Other Relevant Guidance and Tools).

In addition, permits issued under the IED are to be reconsidered periodically to ensure compliance. While monitoring carried out under the IED will likely not cover all environmental aspects to be considered, the IED does require specific monitoring, part of which can be used for the EIA. The approach to monitoring for the IED can also be adopted and broadened to cover other aspects outlined in EIA monitoring proposals.

Joint/coordinated procedure

Article 2(3) of the EIA Directive provides the option for joint or coordinated procedures where Projects also have to be assessed under other EU legislation, but it is not a requirement.

SEVESO DIRECTIVE

Name used	Formal name
Seveso Directive	Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances
Relevant guidance: EU	Commission guidance document on Streamlining environmental assessments conducted under Article 2(3) of the EIA Directive Guidance tools are collected on the Minerva portal at: https://minerva.jrc.ec.europa.eu/en/minerva

The Seveso Directive was adopted in response to the industrial accident releasing hazardous chemicals in the Italian city of Seveso in 1976. The Directive has since been revised several times. The aim of the Seveso Directive is to prevent and, in case they occur, limit major accidents involving dangerous substances. It applies to establishments where dangerous substances may be present in quantities above a certain threshold. Certain industrial activities covered by other EU legislation are excluded from the Seveso Directive (e.g. nuclear establishments or the transport of dangerous substances).

The Seveso Directive takes a tiered approach to requiring safety measures at facilities based on the volumes of dangerous substances present at facilities. Seveso sites are categorised as lower-tier Seveso establishments or upper-tier Seveso establishments. Operators of lower-tier Seveso establishments have to notify the competent authority, design a major-accident prevention policy (MAPP), draw up accident reports and take into account land-use planning. In addition to these requirements, operators of upper-tier Seveso establishment must establish a safety report, implement a safety management system, define an internal emergency plan and provide the competent authorities with all necessary information. Furthermore, authorities are required inter alia to produce external emergency plans for upper tier establishments, deploy land-use planning for the siting of establishments, make relevant information publically available, ensure that any necessary action is taken after an accident including emergency measures, and conduct inspections.

Opportunities for synergy

The Seveso Directive is highly relevant to a number of assessments under the EIA Directive such as for instance impacts related to risks of major accidents and disasters, Mitigation, and climate change

adaptation. In addition, in light of the risk presented by establishments covered by the Seveso Directive, rules on permitting as well as regarding governance come into play, and as such the Seveso Directive is often directly linked to other legislation listed in this Annex, such as the IED and Aarhus convention. The Seveso Directive in this regard ensures that detailed information on installations are collected and employed in both land-use planning as well as in contingency planning. Synergies with EIA can be gained for a part of the EIA report containing the design of installations and the assessment of risk hazards that relates to the chosen design. The Seveso Directive can also be of use for the Screening, Scoping and Preparation of the EIA Report stages in relation to: quantitative thresholds for the assessment of significance, rules of public information in relation to governance, and finally the rules on Monitoring.

Joint/coordinated procedure

Article 2(3) of the EIA Directive provides the option for joint or coordinated procedures where Projects also have to be assessed under other EU legislation, but it is not a requirement.

TRANS-EUROPEAN NETWORKS IN TRANSPORT, ENERGY AND TELECOMMUNICATION

Name used	Formal name
TEN-T Regulation: Trans-European Transport Network	<ul style="list-style-type: none"> Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network
TEN-TEC Regulation: Trans-European Telecommunication Network	<ul style="list-style-type: none"> Regulation (EU) No 283/2014 of the European Parliament and of the Council of 11 March 2014 on guidelines for trans-European networks in the area of telecommunications infrastructure.
TEN-E Regulation Trans-European Energy Network (PCI regulation)	<ul style="list-style-type: none"> Regulation (EU) No 347/2013 Of The European Parliament and of The Council of 17 April 2013 on guidelines for trans-European energy infrastructure.
Connecting Europe Facility: financing for TENS	<ul style="list-style-type: none"> Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility.
Relevant EU guidance:	<ul style="list-style-type: none"> Commission guidance on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (PCIs).

The Trans-European Networks consists of lists of key transport, energy and telecommunications infrastructure Projects, known as Projects of common interest (PCIs). These Projects are designed to complete the European internal market and by interconnecting national infrastructure networks and ensuring their interoperability, thereby fulfilling e.g. the EU's energy policy objectives of affordable, secure and sustainable energy.

Under the TEN-E regulation for the energy sector, PCIs can benefit from accelerated planning and permit granting, due to streamlined environmental assessment processes.

AARHUS AND ESPOO CONVENTIONS

Name used	Formal name
Aarhus Convention	<ul style="list-style-type: none"> United National Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.
Espoo Convention	<ul style="list-style-type: none"> United National Economic Commission for Europe Convention on Environmental Impact Assessment in a Transboundary context.
	<ul style="list-style-type: none"> Directive 2003/4/EC of the European Parliament and of the Council on public access to environmental information and repealing Council Directive 90/313/EEC.

		<ul style="list-style-type: none"> ■ Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regards to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission.
Relevant guidance:	EU	<ul style="list-style-type: none"> ■ Guidance on the Application of the Environmental Impact Assessment Procedure for Large-scale Transboundary Projects; ■ Guidance document for member States' reporting under Article 9 of Directive 2003/4.

The Aarhus Convention establishes a number of rights of the public, both individuals and their associations, with regard to the environment. These rights are commonly depicted under the three pillars of access to environmental information, public participation in decision-making, and access to justice in environmental affairs. Parties to the Convention are required to make the necessary provisions so that public authorities will contribute to these rights to become effective. All EU Member States, as well as the EU itself, are parties to the Convention. The first two pillars are also part of EU law via Directives 2003/4/EC and 2003/35/EC, in addition a number of provisions in different EU instruments seek to implement these rights, such as the public participation and access to justice requirements under the EIA Directive, or the Access to Justice provisions under the IED Directive.

The Espoo Convention lays down the general obligation of States to notify and consult each other on all major Projects under consideration that are likely to have a significant adverse environmental impact across boundaries. Article 7 of the EIA Directive provides the legal basis for regulating Member States' rights and obligations in case of an EIA Procedure for a Project with transboundary impacts. Article 7(1) provides rights for the potentially affected Member States to be informed about e.g. a Screening procedure in another Member State. The affected Member State is to be informed at the latest by the time at which the public is informed in the Member State in which the Project is proposed for implementation.

Opportunities for synergy

The Aarhus Convention is the most comprehensive legal instrument relating to public involvement. By establishing rules on information and participation of the public, the Aarhus Convention has led to decisions setting precedents (e.g. on timeframes for informing the public), which can assist in the implementation of the EIA procedure. The main text indicates that public participation should be effective, adequate, formal, and provide for information, notification, dialogue, consideration, and response. Furthermore, just as the EIA Directive requires 'reasonable timeframes', so too does the Aarhus Convention. These may have an impact on the different stages discussed in the EIA Guidance Document series, for instance in relation to consultations, the EIA Directive establishes specific consultation requirements (see Part B Section 3.1).

ANNEX II – OTHER RELEVANT GUIDANCE AND TOOLS

- A. Andrusevych, T. Alge, C. Konrad (eds), Case Law of the Aarhus Convention Compliance Committee 2004-2011, 2nd edition
<https://www.eufje.org/images/DocAarhus/Aarhus%20CC%20case-law.pdf>
- Chartered Institute of Ecology and Environmental Management, Guidelines for ecological impact assessment in the UK and Ireland, Terrestrial, Freshwater, and Coastal, January 2016
http://www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf
- Commission, Assessment of plans and projects significantly affecting Natura 2000 sites, Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC
http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf
- Commission, Assessment of resource efficiency indicators and targets
http://ec.europa.eu/environment/enveco/resource_efficiency/pdf/report.pdf
- Commission Communication on the elaboration of baseline reports under Article 22(2) of the IED (European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions)
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2014.136.01.0003.01.ENG
- Commission, DG Climate Action, Non-paper, Guidelines for Project Managers: Making vulnerable investments climate resilient
<http://climate-adapt.eea.europa.eu/metadata/guidances/non-paper-guidelines-for-project-managers-making-vulnerable-investments-climate-resilient>
- Commission Final report on MSFD and licencing and permitting
https://circabc.europa.eu/sd/a/ca90e911-6585-4de0-983f-dd07a5c2a519/MSGC_19-2016-04_Study%20on%20licencing%20and%20permitting%20and%20MSFD_Final%20Report%20Arcadis.pdf
- Commission guidance document on Non-energy mineral extraction and Natura 2000
http://ec.europa.eu/environment/nature/natura2000/management/docs/nee_i_n2000_guidance.pdf
- Commission guidance document for Member States' reporting under Article 9 of Directive 2003/4 (Guidance document on reporting about the experience gained in the application of directive 2003/4/ec concerning on public access to environmental information)
http://ec.europa.eu/environment/aarhus/pdf/guidance_en.pdf
- Commission guidance document no 7. Monitoring under the Water Framework Directive
[https://circabc.europa.eu/sd/a/63f7715f-0f45-4955-b7cb-58ca305e42a8/Guidance%20No%207%20-%20Monitoring%20\(WG%207\).pdf](https://circabc.europa.eu/sd/a/63f7715f-0f45-4955-b7cb-58ca305e42a8/Guidance%20No%207%20-%20Monitoring%20(WG%207).pdf)
- Commission guidance document no 20. Exemptions to the Environmental Objectives
https://circabc.europa.eu/sd/a/2a3ec00a-d0e6-405f-bf66-60e212555db1/Guidance_documentN%C2%B020_Mars09.pdf
- Commission guidance document on Inland waterway transport and Natura 2000, Sustainable inland waterway development and management in the context of the EU Birds and Habitats Directives
http://ec.europa.eu/environment/nature/natura2000/management/docs/iwt_en.pdf
- Commission guidance on Aquaculture and Natura 2000, Sustainable aquaculture activities in the context of the Natura 2000 Network
<http://ec.europa.eu/environment/nature/natura2000/management/docs/Aqua-N2000%20guide.pdf>
- Commission guidance on Managing Natura 2000 sites: the provisions of Article 6 of Directive

92/43/EEC	http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm
■	Commission guidance document on Streamlining environmental assessments conducted under Article 2(3) of the EIA Directive http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016XC0727(01)
■	Commission guidance on the application of the Environmental Impact Assessment Procedure for Large-scale Transboundary Projects http://ec.europa.eu/environment/eia/pdf/Transboundry%20EIA%20Guide.pdf
■	Commission guidance on wind energy development in accordance with the Natura 2000 http://ec.europa.eu/environment/nature/natura2000/management/docs/Wind_farms.pdf
■	Commission guidance document on the implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (Title: Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment) http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0042
■	Commission guidance on Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest (PCIs) http://ec.europa.eu/environment/eia/pdf/PCI_guidance.pdf
■	Commission guidance under Article 13(3)(c) and (d) of the IED (Guidance document on the practical arrangements for the exchange of information under the Industrial Emissions Directive (2010/75/EU), including the collection of data, the drawing up of best available techniques reference documents and their quality assurance as referred to in Article 13(3)(c) and (d) of the Directive) https://circabc.europa.eu/sd/a/21de9052-ea90-45a3-a681-2614183a3e4a/BREF_guidance%20(final%20for%20Forum%2024%20Jun%2011).pdf
■	Commission guidelines for the assessment of indirect and cumulative impacts as well as impact interactions http://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf
■	Commission, interpretation manual of European Union habitats - EUR28 http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf
■	Commission, Interpretation of definitions of Project categories of annex I and II to the EIA Directive http://ec.europa.eu/environment/eia/pdf/cover_2015_en.pdf
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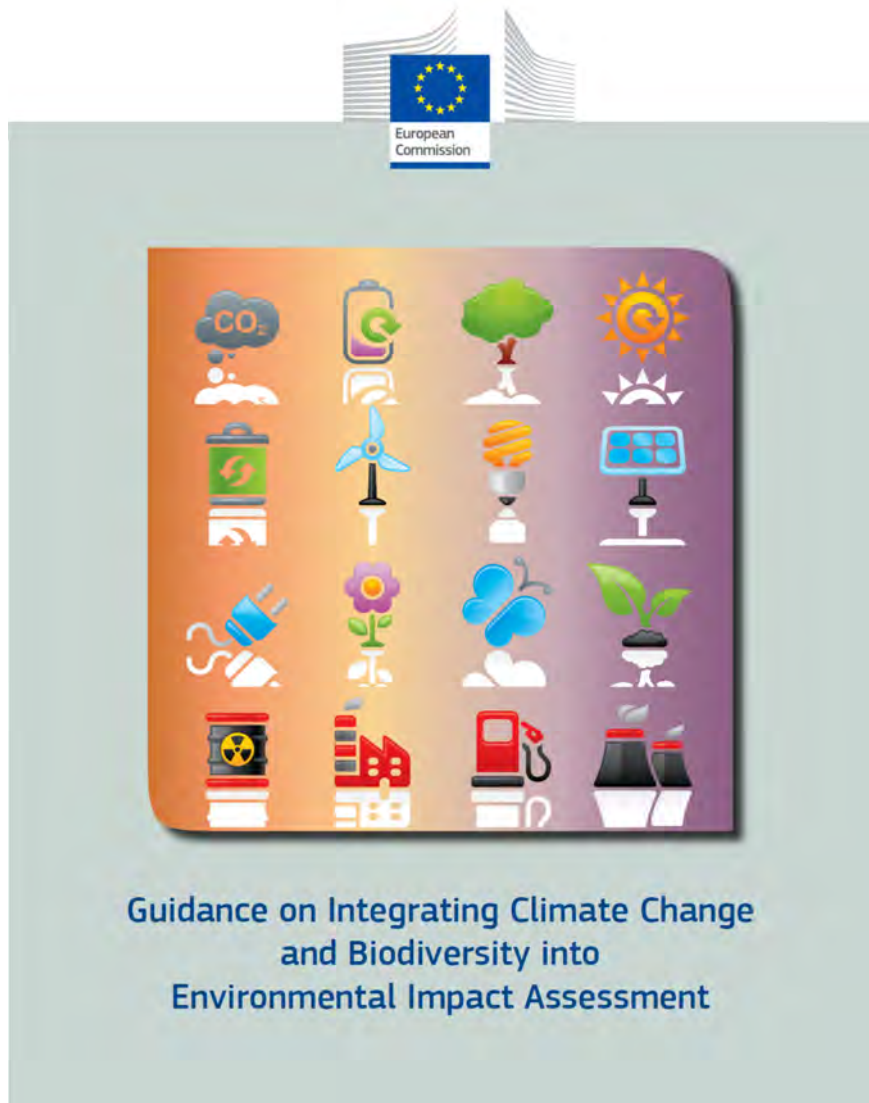
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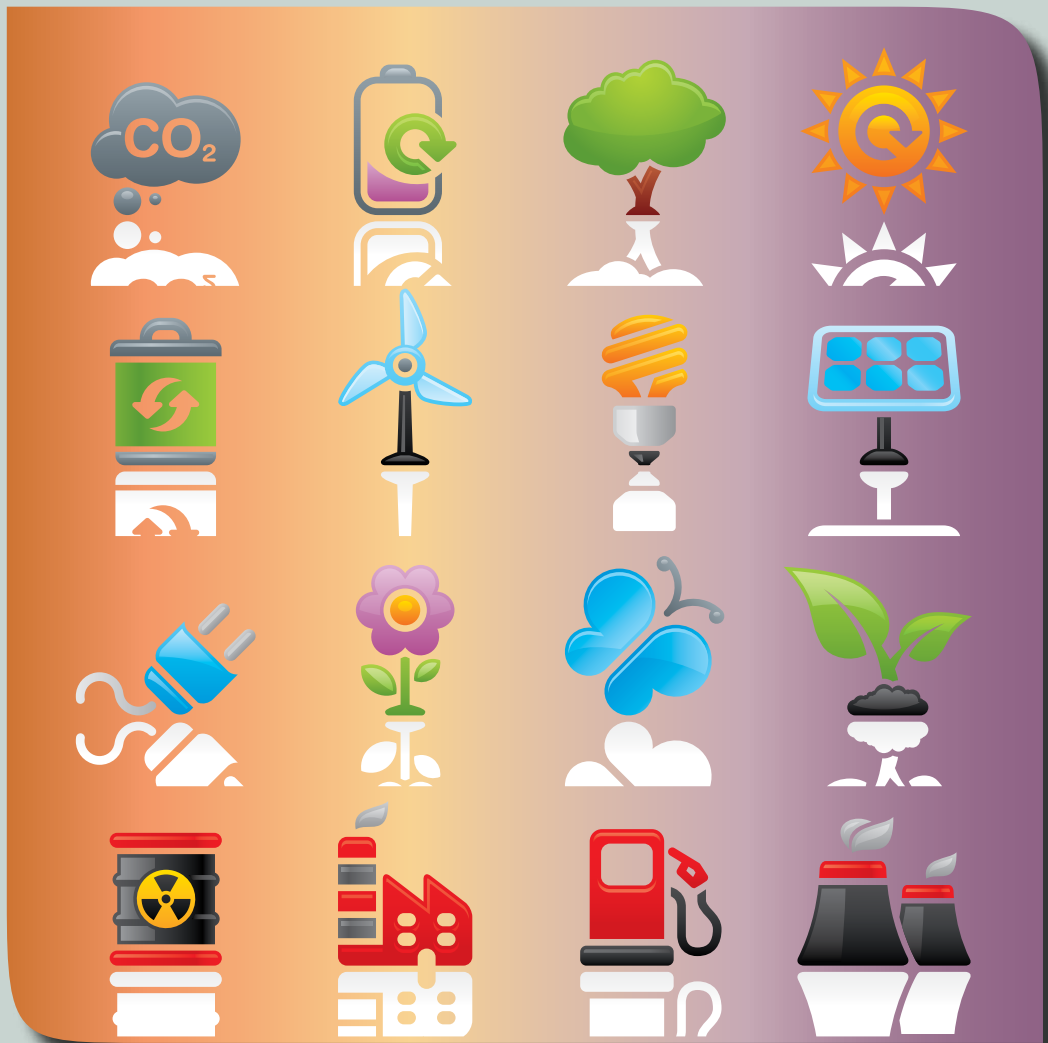
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20 APPENDIX I: GUIDANCE ON INTEGRATING CLIMATE CHANGE AND BIODIVERSITY INTO ENVIRONMENTAL IMPACT ASSESSMENT





Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

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ISBN 978-92-79-28969-9

doi: 10.2779/11735

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This document benefited from Study Contract No 07.0307/2010/580136/ETU/A3, implemented for the European Commission by Milieu Ltd, Collingwood Environmental Planning Ltd and Integra Consulting Ltd. The main authors were: Jennifer McGuinn and Guillermo Hernandez from Milieu Ltd; Ric Eales, William Sheate and Jonathan Baker from Collingwood Environmental Planning; and Jiri Dusik from Integra Consulting. Maria Partidario of the Technical University of Lisbon and Helen Byron of the Royal Society for the Protection of Birds/Birdlife UK provided advice. Additional contributions about climate change were collected during the JASPERS workshops (March-April 2012). The text was also revised by Jiri Dusik. Members of the Commission Group of EIA/SEA National Experts (in particular, Paolo Boccardi, Susanna Eberhartinger-Tafill, Paul Fortuin, Aurora Hernando Garcinuno, Anna Kieniewicz, Gabrielle McKeown, Koen Maertens, Tadhg O'Mahony, Martine Moris, Kees Van Muiswinkel, Rainer Persidski, Claire Piens, Matthias Sauer, Roel Teeuwen, Adrian Vecino Varela) and staff of the European Commission's Directorate-General for Climate Action (Vaidotas Kuodys, Sami Zeidan), Directorate-General for Humanitarian Aid and Civil Protection (Yordanka Mincheva, Thomas de Lannoy) and Directorate-General for Environment (Stephanos Ampatzis, Szilvia Bosze, Marco Fritz, Milena Novakova and Przemyslaw Oginski) also contributed.

Foreword

The need for action on climate change and biodiversity loss is recognised across Europe and around the world. To make progress towards combating and adapting to climate change, and halting the loss of biodiversity and the degradation of ecosystems, it is vital to fully integrate these issues in the plans, programmes and projects implemented across the EU.

It is widely recognised that climate change has enormous economic consequences. The evidence gathered in the *Stern Review on the Economics of Climate Change* (2006) shows that ‘ignoring climate change will eventually damage economic growth.’ The Review also points out that ‘the benefits of strong and early action far outweigh the economic costs of not acting’. The Commission’s *White Paper – Adapting to climate change: Towards a European framework for action* (2009) tackles this evidence and includes a commitment that ‘... the Commission will work with Member States and stakeholders setting guidelines and exchanging good practice, to ensure that account is taken of climate change impacts when implementing the Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) Directives and spatial planning policies.’ It also encourages Member States to adopt ecosystem-based approaches, including green infrastructure. The Commission’s *EU Strategy on Adaptation to Climate Change*, to be adopted in 2013, will build on the White Paper.

The loss of biodiversity has become one of our main environmental challenges. Its impact on the delivery of ecosystem services, society and the economy as a whole is increasingly recognised, including in the international study by TEEB (2010) of *The Economics of Ecosystems and Biodiversity – Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations*. To address this challenge, Member States have committed themselves to halting the loss of biodiversity and ecosystems by 2020 and to restoring them in so far as feasible.

This *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* is a response to the above commitments. Since climate change and biodiversity loss — like so many other environmental issues we face — are closely related, they are covered in the same guide.

It is clear that ‘business as usual’ will neither achieve our climate change nor our biodiversity objectives. The time has come to make sure that we employ all available tools to tackle these global threats. Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs) are legally-required and systematic tools, and as such are well suited to tackling these problems. The Commission’s proposal for a revised EIA Directive adopted on 26 October 2012 also introduced amendments to adapt to these challenges (i.e. biodiversity and climate change, as well as disaster risks and availability of natural resources).

As José Manuel Barroso, President of the European Commission, said at the Athens Biodiversity Conference in 2009 – ‘The success of our climate change policy will also be measured by the success of our efforts in stopping the loss of biodiversity.’ Our aim is that this guide will help the impact assessment community to better integrate these issues into their work, stepping up global and EU action to combat biodiversity loss and climate change.

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Acronyms and abbreviations

BAP	Biodiversity Action Plan
BISE	Biodiversity Information System for Europe
CBD	Convention on Biological Diversity
CH₄	Methane
CO₂	Carbon dioxide
EC	European Commission
ECCP	European Climate Change Programme
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ETC/ACM	European Topic Centre for Air Pollution and Climate Change Mitigation
ETC-BD	European Topic Centre for Biological Diversity
EU ETS	EU Emissions Trading System
EU	European Union
GHG,GHGs	Greenhouse gas, Greenhouse gases
GIS	Geographical Information System
IAIA	International Association for Impact Assessment
IEMA	Institute of Environmental Management and Assessment
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
NBSAP	National Biodiversity Strategy and Action Plan
NGOs	Non-governmental organisations
NO_x	Nitrogen oxides
N₂O	Nitrous oxide
OECD	Organisation for Economic Cooperation and Development
PP, PPs	Plan or Programme, Plans and/or Programmes
SACs	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SOER	State of the Environment Report
SPAs	Special Protection Areas
TEEB	The Economics of Ecosystems and Biodiversity
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOCs	Volatile organic compounds

Glossary

Term	Definition
Adaptation (climate change)	The term used to describe responses to the effects of climate change. The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as ‘adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.’ Adaptation can also be thought of as learning how to live with the consequences of climate change.
Adaptive capacity	The ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities and to cope with the consequences. (CLIMATE-ADAPT Glossary)
Adaptive management	A systematic process for continually improving management policies and practices by learning from the outcomes of previously implemented policies and practices.
Article 6(3) on appropriate assessment	Article 6(3) of the Habitats Directive requires an appropriate assessment (also referred to as ‘Habitats Directive assessment’ or ‘Natura 2000 assessment’) to be carried out where any plans or projects that are not directly linked to the management of that site may have a significant effect on the conservation objectives and would ultimately affect the integrity of the site. Integrity can be defined as the ability of the site to fulfil its function to continue to support protected habitats or species. Annex I to the Habitats Directive includes a full list of protected habitats and Annex II of protected species.
Baseline	A description of the present and future state if the project is not implemented, taking into account changes resulting from natural events and other human activities.
Biodiversity	‘The variability among living organisms from all sources including, <i>inter alia</i> , terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems’ (Article 2 of the Convention on Biological Diversity).
Biodiversity offsets	Measurable project outcomes designed to compensate for significant residual adverse impacts of development plans or projects on biodiversity, after appropriate prevention and mitigation measures are taken.
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds [codified version], OJ L 20, 26.1.2010, p.7.
Carbon sequestration	The removal of carbon from the atmosphere and its storage in carbon sinks (such as oceans, forests or soil). Carbon sequestration is achieved through physical or biological processes, such as photosynthesis.
Carbon sink	An absorber of carbon (usually in the form of CO ₂). Natural carbon sinks include forests and other ecosystems that absorb carbon, thereby removing it from the atmosphere and offsetting CO ₂ emissions. (Modified from EEA Glossary)
Climate	Usually defined as the ‘average weather’, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities of variables such as temperature, precipitation, and wind, over a period of time. The conventional period of time over which weather is averaged to calculate climate is 30 years, as defined by the World Meteorological Organisation (WMO). (Modified from IPCC Glossary)
Climate change	IPCC defines climate change as ‘... any change in climate over time, whether due to natural variability or as a result of human activity.’ The United Nations Framework Convention on Climate Change (UNFCCC) defines it specifically in relation to human influence, as ‘a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods’.
CO₂ equivalent	A metric measure used to compare emissions of various greenhouse gases (GHGs) based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as ‘million metric tonnes of carbon dioxide equivalents (MMTCDE)’.
Cumulative effects	The incremental effects of an action when added to the effects of past, present, and reasonably foreseeable future actions. Cumulative effects result from individually minor but collectively significant actions taking place over a period of time.
Direct effects	Environmental effects directly caused by the preparation, construction or operation of a project in a particular location.
Disaster risk management plan	A document that sets out goals and specific objectives for reducing disaster risks and includes a list of actions needed to accomplish them. It can be prepared by an authority, sector, organisation or enterprise.

Ecosystem services	<p>Ecosystems serve a number of basic functions that are essential for using the Earth's resources sustainably. The Economics of Ecosystem Services and Biodiversity (TEEB) study defines ecosystem services as: 'the benefits people receive from ecosystems'. TEEB also sets out the basis of human dependence on the natural environment. The European-led study builds on the United Nations Millennium Ecosystem Assessment, which defined four categories of ecosystem services that contribute to human well-being:</p> <ul style="list-style-type: none"> • provisioning services e.g. wild foods, crops, fresh water and plant-derived medicines; • regulating services e.g. filtration of pollutants by wetlands, climate regulation through carbon storage and water cycling, pollination and protection from disasters; • cultural services e.g. recreation, spiritual and aesthetic values, education; • supporting services e.g. soil formation, photosynthesis and nutrient cycling. (TEEB, 2010)
Effort Sharing Decision	A decision that sets annual binding greenhouse gas (GHG) emission targets for Member States for the 2013–2020 period. These targets concern emissions from sectors not included in the EU Emissions Trading System (ETS), such as transport, construction, agriculture and waste.
EIA Directive	Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [codification], OJ L 26, 28.1.2012. The EIA Directive requires Member States to ensure that projects likely to have significant effects on the environment because of their nature, size or location are subject to an assessment of their environmental effects, before development consent is given.
Emissions trading scheme and EU Emissions Trading System (EU ETS)	A market mechanism that allows those bodies (such as countries, companies or manufacturing plants) that emit/release GHGs into the atmosphere to buy and sell these emissions (as allowances) amongst themselves. Emissions mean the release of GHGs and/or their precursors into the atmosphere over a set area and period of time. The European Union Emissions trading system (EU ETS) is based on the idea that creating a price for carbon offers the most cost-effective way to achieve the significant cuts in global GHG emissions that are needed to prevent climate change from reaching dangerous levels.
Environmental limits	<p>Following the publication of the Millennium Ecosystem Assessment, it is widely accepted that ecosystems provide a range of benefits. External pressures (e.g. pollution) may impact ecosystems and diminish ecosystem services. In the long run, the system may reach a tipping/critical point beyond which the reduction in benefit is no longer acceptable or tolerable. Such a critical level can best be described as an environmental limit.</p> <p>There are several frequently used terms that fall within the category of environmental limits, including:</p> <ul style="list-style-type: none"> • Threshold (also referred to as a biophysical threshold or a tipping point): a tolerance point at which the conditions necessary to maintain a prevailing ecosystem state are exceeded (e.g. pollutant levels may have a small effect until a critical point is reached and the impact becomes significant); and • Carrying capacity: the concept that a particular system could indefinitely sustain a particular intensity of use providing it is at its capacity or use limit, but, beyond this, additional pressure would produce undesirable resource degradation. (SNIFFER, 2010)
European Climate Change Programme	A programme launched by the European Commission in June 2000. Its goal is to identify and develop all the necessary elements of the EU strategy for implementing the Kyoto Protocol.
Fauna	The animals of a particular region or habitat.
Flora	The plants of a particular region or habitat.
Green infrastructure	Green infrastructure serves the interests of both people and nature. It can be defined as a strategically planned and delivered network of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering a wide range of benefits and services. Green infrastructure includes natural and semi-natural areas, features and green spaces in rural and urban, terrestrial, freshwater, coastal and marine areas. Areas protected as Natura 2000 sites are at the core of green infrastructure.
Greenhouse gas (GHG)	Any atmospheric gas (either natural or anthropogenic in origin) which absorbs thermal radiation emitted by the Earth's surface. This traps heat in the atmosphere and keeps the surface at a warmer temperature than would otherwise be possible.
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended, OJ L 206, 22.7.1992, p.7.
Indirect effects/impacts	Effects/impacts that occur away from the immediate location or timing of the proposed action, e.g. quarrying of aggregates elsewhere in the country as a result of a new road proposal, or as a consequence of the operation of the project (see also secondary effects).
Kyoto Protocol	The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UNFCCC in Kyoto (Japan) in 1997. It contains legally binding commitments. Countries included in Annex B of the Protocol (most OECD countries and Economies in Transition countries) agreed to reduce their anthropogenic emissions of GHGs (CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆) by at least 5% below 1990 levels between 2008 and 2012.
Maladaptation	An action or process that increases vulnerability to climate-change-related hazards. Maladaptive actions and processes often include planned development policies and measures that deliver short-term gains or economic benefits, but increase vulnerability in the medium- to long-term.

Maximum sustainable yield (MSY)	Maximum sustainable yield (MSY) is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.
Mitigation (climate change)	A term used to describe the process of reducing GHG emissions that are contributing to climate change. It includes strategies to reduce GHG emissions and enhance GHG sinks.
Mitigation (EIA)	Measures to 'prevent, reduce and where possible offset any significant adverse effects on the environment'. (EIA Directive)
Natura 2000	An EU-wide network of nature protection areas established under the Habitats Directive. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive.
No-regret measures	'No-regret' measures are activities that yield benefits even in the absence of climate change. In many locations, implementing these actions constitutes a very efficient first step in a long-term adaptation strategy. For example, controlling leakages in water pipes or maintaining drainage channels is almost always considered a very good investment from a cost-benefit analysis point-of-view, even in the absence of climate change. Improving building insulation norms and climate-proofing new buildings is another typical example of a no-regret strategy, since it increases climate robustness and any additional cost can be paid back within a few years. Once no-regret measures have been identified, it is important to know why they are not yet implemented. Reasons can include: (i) financial and technological constraints; (ii) lack of information and transaction costs at the micro-level; and (iii) institutional and legal constraints. These obstacles can be addressed through adaptation planning, as a first step in a long-term adaptation strategy. (CLIMATE-ADAPT relevant webpage)
Proxy indicator	Indirect measure that approximates or represents a phenomenon in the absence of a direct measure.
Public	One or more natural or legal persons, and, in accordance with national legislation or practice, their associations, organisations or groups. (EIA Directive)
Public concerned	The public affected or likely to be affected by, or having an interest in, the environmental decision-making; for the purposes of this definition, non-governmental organisations promoting environmental protection and meeting any requirements under national law are included.
Residual effects	Effects that remain after mitigation action.
Resilience	The ability of a social or ecological system to absorb disturbances, while retaining the same basic structure and ways of functioning, as well as its capacity to self-organise and adapt to stress and change. There are different ways in which resilience can be framed; the Dutch Climate Changes Spatial Planning research programme provides a list . (Adapted from CLIMATE-ADAPT Glossary)
Risk	The probability that something will cause injury or harm.
Scoping	The process of determining the scope and level of detail of an EIA, including the environmental effects and alternatives which need to be considered, the assessment methods to be used, and the structure and contents of the environmental report.
Screening	The process of deciding whether a project requires an EIA.
SEA Directive	Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, OJ L 197, 21.7.2001, p.30. The SEA Directive requires that the environmental effects of a broad range of plans and programmes (PPs) are assessed and taken into account while PPs are still being developed. The public must be consulted on the draft PP and environmental assessment, and their views must be taken into account.
Secondary effects	Effects that occur as a consequence of a primary effect or as a result of a complex pathway (see also indirect effects).
Sensitivity	The degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct (e.g. a change in crop yield in response to a change in the temperature) or indirect (e.g. damages caused by more frequent coastal flooding due to rising sea levels).
Short-term effects	Effects that may occur during construction stage of a development, e.g. the increased traffic going to and from the site during the construction period.
Significant effects	Effects that are significant in the context of the project, i.e. a function not just of magnitude or size of effect, but of the nature, sensitivity and scale of the receptor.
Synergistic effects	Effects that interact to produce a total effect greater (or less than) than the sum of the individual effects.
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Summary

The *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* aims to help Member States improve the way in which climate change and biodiversity are integrated in Environmental Impact Assessments (EIAs) carried out across the EU. This summary gives a brief overview of the guidelines and recommendations presented in the document.

Section 1 contains an introduction explaining the purpose, identifying the target audience and presenting an overview of the contents, to help readers decide when and how to use the guidance. Sections 2 and 3 explain why climate change and biodiversity are so important in EIA and present the relevant EU-level policy background. Section 4 provides advice on how to integrate climate change and biodiversity into selected stages of the EIA process. The annexes provide sources of further reading and links to other relevant information, data, and tools.

The boxes below summarise the main ways of incorporating climate change and biodiversity into EIA. The information has been organised according to four headings, which do not match the structure of the document, but reflect the key messages that appear throughout the guidance.

HOW TO INCORPORATE CLIMATE CHANGE AND BIODIVERSITY INTO EIA:

- **Build them into the assessment process at an early stage (screening and scoping):**
 - You will be more likely to include them in the rest of the EIA process;
 - They will be built into the mindset of all key parties involved, including authorities and policymakers, planners, EIA practitioners, etc.
- **Tailor how you incorporate biodiversity and climate change to the specific context of the project:**
 - It is not a matter of simply ticking off items on a checklist. Every EIA is different.

HOW TO IDENTIFY CLIMATE CHANGE AND BIODIVERSITY ISSUES IN EIA:

- **Bring together all the relevant stakeholders who need to be part of biodiversity/ecosystems-related and climate change-related decision-making:**
 - Let the stakeholders help identify the key climate change and biodiversity issues early in the process;
 - Design the engagement process and select the best tools for your particular situation. Consider the needs of the EIA and of climate change and biodiversity in particular.
- **Understand how both climate change and biodiversity interact with other issues to be assessed in the EIA, as well as with each other.**

CRITICAL CHALLENGES FOR ADDRESSING CLIMATE CHANGE AND BIODIVERSITY IN EIA:

- **Consider the impact that predicted changes in climate and biodiversity will have on the proposed project, potentially over a long timescale, and the project's resilience and capacity to cope.**
- **Consider long-term trends, with and without the proposed project, and avoid 'snapshot' analyses.**
- **Manage complexity.**
 - For example, introducing an element such as climate change mitigation would usually be positive, but it might have a negative impact on climate change adaptation and/or biodiversity.
- **Consider the complex nature of climate change and biodiversity and the potential of projects to cause cumulative effects.**
- **Be comfortable with uncertainty, because you can never be sure of the future.**
 - Use tools such as scenarios (for example, worst-case and best- case scenarios) to help handle the uncertainty inherent in complex systems and imperfect data. Think about risks when it is too difficult to predict impact.
- **Base your recommendations on the precautionary principle and acknowledge assumptions and the limitations of current knowledge.**
- **Be practical and use your common sense! When consulting stakeholders, avoid drawing out the EIA procedure and leave enough time to properly assess complex information.**

HOW TO ASSESS EFFECTS RELATED TO CLIMATE CHANGE AND BIODIVERSITY IN EIA:

- **Consider climate change scenarios at the outset:**
 - Include extreme climate situations and 'big surprises', which may either adversely affect the implementation and operation of a project or worsen its impact on biodiversity and other environmental aspects.
- **Analyse the evolving environmental baseline trends:**
 - Include trends in key issues over time, drivers for change, thresholds and limits, areas that may be particularly adversely affected and key distributional effects.
 - Use vulnerability assessment to help assess the evolution of the baseline environment and identify the most resilient alternative(s).
- **Take an integrated approach to planning and assessment, investigating relevant thresholds and limits.**
- **Seek to avoid biodiversity and climate change effects from the start, before considering mitigation or compensation. For biodiversity, EIA should focus on ensuring 'no-net-loss'.**
- **Assess alternatives that make a difference in terms of climate change and biodiversity.**
- **Use ecosystem-based approaches and green infrastructure as part of project design and/or mitigation measures.**
- **Assess climate change and biodiversity synergies and cumulative effects, which can be significant.**
 - Causal chains/network analysis may be helpful in understanding these interactions.

1. Introduction

1.1 Nature and purpose of this guidance

Climate change and biodiversity loss are among the most important environmental challenges we face today. Both are complex and cross-cutting issues, which affect nearly all human activity. The *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* ('the guidance') aims to help Member States improve the way in which climate change and biodiversity issues are integrated in EIAs carried out across the EU, under Directive 2011/92/EU¹ (the 'EIA Directive').

EIAs are legally required. They are an opportunity to systematically integrate climate change and biodiversity into a wide range of public and private projects. However, despite climate change and biodiversity being set as priorities within environmental policy agendas (see [Sections 3.1](#) and [3.2](#)), experience² shows that they are not being systematically integrated into EIA. The main reason for this is that climate change and biodiversity are not yet explicitly included in the formal requirements of EIA procedures. In addition, they are multi-faceted issues that do not lend themselves to simple or quick analyses.

This guidance is designed primarily for EIA practitioners and authorities, as well as other stakeholders across the EU. It is addressed to all Member States and their legislative and governance structures and applies to all project types that require either screening³ (Annex II projects) or full EIA (Annex I and screened-in Annex II projects) under the EIA Directive. The guidelines and recommendations contained here are general and do not give tailored advice for the specific project types under Annex I and Annex II of the EIA Directive.

The guidance addresses the specific issues and challenges that climate change and biodiversity bring to EIA.⁴ It is designed to encourage users to think about how important climate change and biodiversity issues are likely to be for their specific project and EIA. It also includes issues related to disaster risk management, mainly in the context of climate change adaptation. It is assumed that readers will be familiar with EIA, so it does not explain the basic process.

Since it is the first such type of guidance issued by the European Commission, and since the EIA Directive is currently under review (see [Section 2.1](#) for more details) and the climate change and biodiversity scientific base, policies and EIA practices constantly evolve, it should be considered as a

The EIA Directive

The EIA Directive requires Member States to ensure that projects likely to have significant effects on the environment because of their nature, size or location are subject to an assessment of their environmental effects. This assessment should take place before development consent is given, i.e. before the authority/ies decide(s) that the developer can go ahead with the project.

The Directive harmonises EIA principles by introducing minimum requirements, in particular for the types of projects that should be assessed, the main obligations of developers, the assessment's content and provisions on the participation of competent authorities and the public.

¹ Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [codification], OJ L 26, 28.1.2012, p.1. Directive 2011/92/EU codifies Directive 85/337/EEC and its three subsequent amendments (Directives 97/11/EC, 2003/35/EC and 2009/31/EC).

² Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the application and effectiveness of the EIA Directive (Directive 85/337/EEC, as amended by Directives 97/11/EC and 2003/35/EC), COM(2009) 378 final.

³ The process of deciding if a project requires EIA.

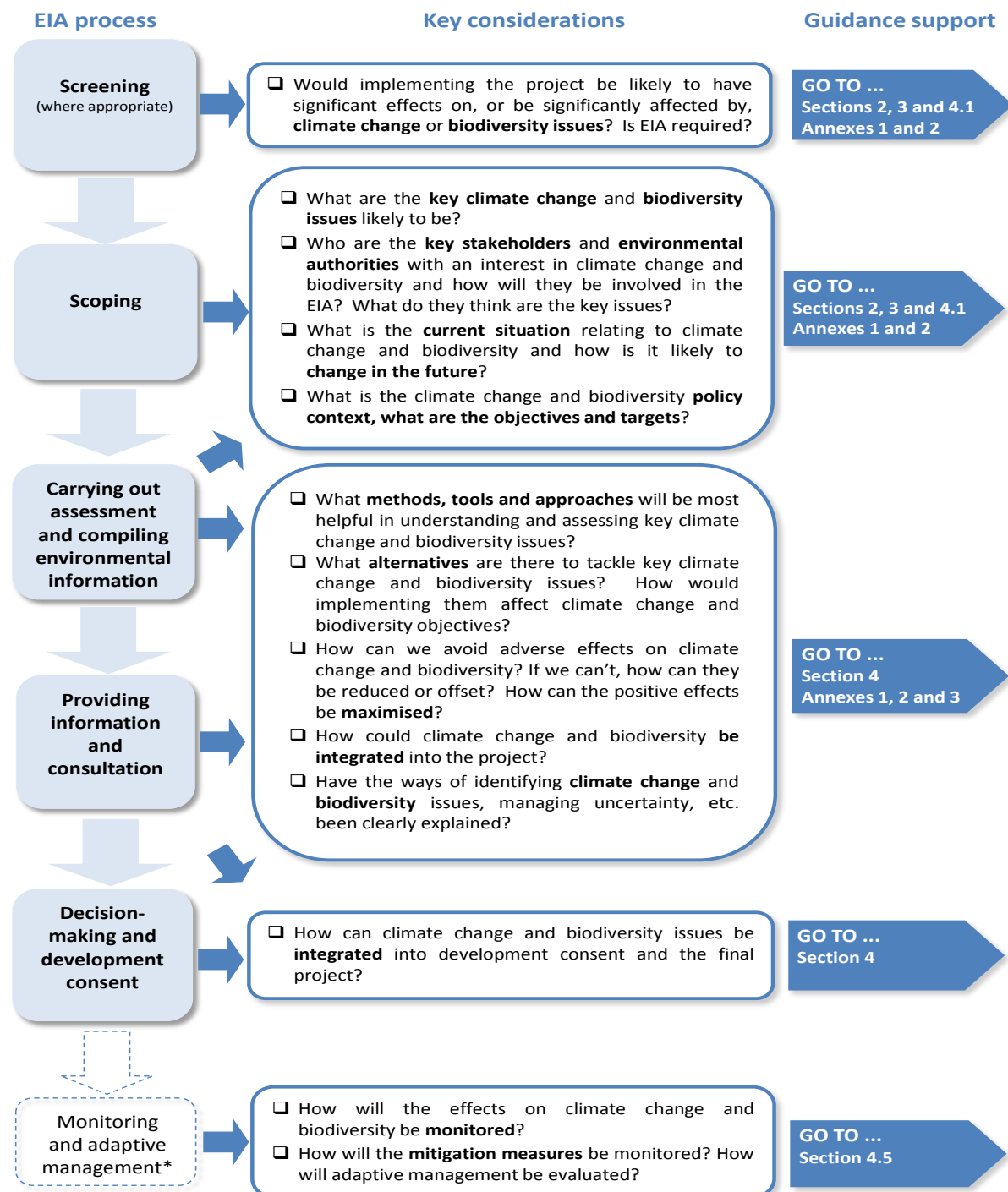
⁴ A complementary *Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment* was prepared.

pilot guidance. Subsequent amended versions are expected as experience with the process is gained. These may include more specific guidance on integrating disaster risk management.

1.2 Overview of how to integrate climate change and biodiversity issues into the EIA process

Figure 1, below, gives an overview of how to integrate climate change and biodiversity issues into the EIA process, as well as where information on specific EIA stages can be found in this guidance.

Figure 1: Overview of how to integrate climate change and biodiversity issues into key EIA stages



*Monitoring is not obligatory under the EIA Directive, but is nevertheless used in some Member States.

2. Climate change and biodiversity in EIA

This section looks at how climate change and biodiversity are currently covered in EIA. It reviews the requirements of the EIA Directive and shows that not only are climate change and biodiversity clearly referenced in the legislation, but that they should be given more weight in light of the Directive's preventive intent or 'spirit'. It also discusses the benefits and challenges of integrating climate change and biodiversity into EIA.

2.1 The legal basis and the 'spirit' of the Directive

The EIA Directive contains a number of principles that provide the basis for considering climate change and biodiversity in EIA, even though it does not refer to either term explicitly (see Table 1). In line with Article 191 of the *Treaty on the Functioning of the European Union*,⁵ the Directive clearly sets out to prevent damage to the environment rather than merely counteract it. Furthermore, The European Court of Justice has consistently confirmed that the EIA Directive has 'a wide scope and a broad purpose'⁶ and therefore needs to be interpreted as such.

The 2012 Commission proposal for the revised EIA Directive⁷ strengthened the provisions related to climate change and biodiversity.

As regards climate change, it introduced clear references to 'climate change' and 'greenhouse gases'. It provided a detailed description of climate change issues to be addressed as part of the screening criteria for Annex II projects — 'impacts of the project on climate change (in terms of greenhouse gas emissions, including from land use, land-use change and forestry), contribution of the project to an improved resilience, and the impacts of climate change on the project (e.g. if the project is coherent with a changing climate)'. Furthermore, it described climate change issues to be addressed in the EIA report in more detail — 'greenhouse gas emissions, including from land use, land-use change and forestry, mitigation potential, impacts relevant to adaptation, if the project takes into account risks associated with climate change'.

As regards biodiversity, the proposal introduced clear references to 'biodiversity' and 'species and habitats' protected under Council Directive 92/43/EEC⁸ (the 'Habitats Directive') and Directive 2009/147/EC⁹ (the 'Birds Directive'). It introduced additional elements of biodiversity to be considered within the screening criteria for Annex II projects — 'population quality and quantity and ecosystem degradation and fragmentation'. It also proposed that the EIA report should cover 'biodiversity and the ecosystem services it provides'.

Lastly, the proposal introduced clear references to disaster risk management, mainly in Article 3 and Annexes III and IV.

⁵ The Treaty on the Functioning of the European Union [consolidated version], OJ C 83, 30.3.2010, p.47.

⁶ See [Case C-72/95](#), Kraaijeveld and others, paragraph 31; [Case C-227/01](#), Commission v Spain, paragraph 46.

⁷ Proposal for a Directive of the European Parliament and of the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, COM(2012) 628 final http://ec.europa.eu/environment/eia/pdf/com_628/1_EN_ACT_part1_v7.pdf.

⁸ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended, OJ L 206, 22.7.1992, p.7

⁹ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009, on the conservation of wild birds [codified version], OJ L 20, 26.1.2010, p.7.

Table 1: Direct and indirect references to climate change and biodiversity in the EIA Directive

Issue	Directive reference (direct)	Directive reference (indirect)
Climate change	<ul style="list-style-type: none"> Climate/climatic factors' and interactions with other factors to be assessed within EIA (Article 3 and Annex IV(3)). 	<ul style="list-style-type: none"> The Directive refers to the precautionary principle and the need for preventive action and EIA in a transboundary context. Projects related to the transport, capture and storage of carbon dioxide (CO2) are included in Annex I and Annex II.
Biodiversity	<ul style="list-style-type: none"> 'Fauna and flora' and interactions with other factors to be assessed (Article 3 and Annex IV(3)). Reference to the Habitats Directive and the Birds Directive (Annex III(2)(V)). 	<ul style="list-style-type: none"> Paragraph (14) of the recital acknowledges the value of ecosystems and highlights the need to take them into account when the effects of a project on the environment are assessed. Annex III (screening criteria) refers to the regenerative capacity of natural resources and the absorption capacity of the natural environment.

2.2 Benefits of integrating climate change and biodiversity in EIA

For many types of project, EIA is the only legally-required tool for including environment issues at an early stage, when alternatives are still open and opportunities exist. Including climate change and biodiversity in EIA helps to, for example:

- achieve climate and biodiversity objectives;
- comply with EU and national legislation and policies;
- improve project reputation;
- increase a project's resilience to climate change;
- manage conflicts and potential synergies between climate change, biodiversity and other environmental issues;
- support the ecosystem services used by the project.

2.2.1 Achieving climate and biodiversity objectives

EIA provides a way of assessing key issues effectively and transparently and highlights opportunities to achieve wider environmental objectives, in particular those related to climate change (including disaster risk management) and biodiversity. For climate change this might include, for example, exploring the possible synergies and conflicts between climate change mitigation and adaptation and therefore avoiding [maladaptation](#). For biodiversity, it might include, for example, assessing how the objectives and measures of the *EU 2020 Biodiversity Strategy*¹⁰ can be integrated into the EIA process.

¹⁰ Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of Regions, Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (EC, COM(2011) 244 final).

2.2.2 Compliance with EU and national legislation and policies

Addressing climate change and biodiversity in EIA makes it easier to comply with the EIA Directive and relevant national laws. This is useful, since climate change and biodiversity are the subjects of many recent pieces of EU legislation, policies and strategies, including national binding targets.

Member States (see box right) are also likely to have a suite of legislative instruments relevant to climate change and biodiversity (e.g. building codes that promote energy efficiency, planning policies that avoid developing flood-prone areas, species and site protection).

Climate and energy requirements in Austrian EIA procedures

In Austria, a 2009 amendment to the EIA act requires project developers to provide information on how the proposed project has considered energy demand and flow, energy efficiency, GHG emissions and measures to reduce emissions and improve efficiency. This provision is accompanied by a guiding document to help project developers and EIA practitioners better understand and comply with the requirement.

2.2.3 Project reputation

Aside from meeting public policy requirements, projects also have to address pressure from developers, local authorities and the general public and show that the project has a positive effect on the environment, or only a minimal negative effect. Environmental impact affects a project's and project developer's reputation. This is particularly true for greenhouse gas (GHG) emissions, in part due to climate change concerns, but also because reducing GHGs can improve energy efficiency and reduce costs.

2.2.4 Resilience of projects to a changing climate

A number of recent studies on the [vulnerability](#) of the EU and specific sectors and territories to the changing climate (see [Annex 1](#) for further reading on this subject) have shown that Europe's infrastructure needs to be adapted to better cope with natural phenomena caused by climate change. This means considering that the design parameters identified at a project's inception may no longer be valid at the end of its potentially long lifespan. It represents a shift in thinking, from the traditional assessment of environmental impact to taking possible long-term risks into account. Insurance firms, for instance, are already recognising the value of this way of thinking and including it in their risk assessments of natural hazards. EIA can help projects to adapt to this shift through the concept of [resilience](#). A project needs to be assessed against an evolving environmental baseline. EIA should show an understanding of how the changing baseline can affect a project and how the project may respond over time. The EIA process is particularly important since it can help set the context for projects; taking potential climate change impact (including disaster risks) into consideration in EIA can make projects more resilient. More information on how resilience can be built into EIA is presented in [Section 4](#).

2.2.5 Managing conflicts and potential synergies between climate change, biodiversity and other environmental issues

Considering climate change mitigation and adaptation, biodiversity and other environmental issues together has many benefits and is cost-effective. For example, it creates win-win situations when

ecosystem-based approaches are applied to climate mitigation and adaptation and helps avoid mitigation actions that either don't have any adaptive capacity or reduce the resilience of other factors. Managing these conflicts and potential synergies is one of the roles of EIA.

2.2.6 Supporting ecosystem services

The [ecosystem services](#) provided by biodiversity also need to be considered as part of a project's development, as they can support its objectives and help in its implementation. For instance, a project could aim to reduce flood risk in a specific area and ensure the safety of and demand for local property; such a project may depend on a local wetland area to reduce flood risk or store water. Another example is a local green space that adds value to a residential development by providing a recreation area and temperatures cooler than in the local urban environment.

Acknowledging a project's reliance on ecosystem services, and hence on biodiversity, can make it more effective, as well as supporting biodiversity and biodiversity policy objectives. However, the degree to which a project can use these services depends on the local and wider environmental limits affected by it and by other projects, as well as by wider drivers for change. EIA can play an important role in helping to understand these relationships and the broader context.

2.3 Challenges of addressing climate change and biodiversity in EIA

It is the main characteristics of climate change and biodiversity that are most likely to pose significant challenges to addressing climate change and biodiversity in EIA. They are:

- the long-term and cumulative nature of effects;
- complexity of the issues and cause-effect relationships;
- uncertainty.

This section explains these aspects in more detail and tackles the question of how to deal with them more effectively throughout the EIA process. Table 2 (below) summarises ways of approaching them.

Table 2: Tips on how to approach the challenges of integrating climate change and biodiversity into EIA

Key challenges	Tips on how to approach them
Long-term and cumulative nature of effects	<ul style="list-style-type: none"> • Avoid 'snapshot' analyses (i.e. at a single point in time) and consider trends, <i>with</i> and <i>without</i> the proposed project; • Work with the notion of absorption capacity/environmental limits.
Complexity of the issues and cause-effect relationships	<ul style="list-style-type: none"> • Analyse the impact of proposed projects on key climate change and biodiversity trends and their drivers; • Work with worst-case and best-case scenarios.
Uncertainty	<ul style="list-style-type: none"> • Acknowledge assumptions and the limitations of current knowledge; • Base recommendations on the precautionary principle; • Prepare for adaptive management.

2.3.1 Long-term and cumulative nature of effects

The long-term nature of climate change – both mitigation and adaptation – makes it more difficult to consider within EIA, but doing so is crucial to the long-term viability of projects. Major long-term infrastructure projects are most likely to be vulnerable to progressively more significant climate

change (including the increasing number of weather-related disasters). This influences the baseline environment against which projects should be assessed as part of EIA.

Effects on biodiversity are cumulative and once species or habitats are completely lost they cannot be replaced or recovered. This means that we need to avoid negative impact wherever possible and do more to enhance and better manage existing biodiversity and to help maximise ecosystem services.

EIA should therefore **avoid ‘snapshot’ analyses** (i.e. at a single point in time) and instead consider trends and scenarios with and without the proposed project (and its reasonable alternatives). It should also **work with the notion of [environment limits](#)**, which define an ecosystem’s capacity to cope with change without losing its core attributes or functions.

2.3.2 Complexity of the issues and cause-effect relationships

Both climate change and biodiversity involve complex systems and interact with other environmental aspects and with people. Since we cannot fully understand all aspects of complex systems at the point in which we make decisions, we need to be able to use what we have. For example, we can **analyse trends** — the general direction in which things seem to move — based on available studies, reports and other sources of information.

2.3.3 Uncertainty

Uncertainty exists within any decision-making system, but it increases with complexity and timescale and is particularly likely to affect long-term projects. Uncertainty related to the long-term effects of a project on biodiversity and climate change, and to the effects of climate change on the project, is therefore very likely. Working with uncertainty requires **a qualitative approach**, as quantitative data are often either unavailable or unreliable in predicting impact.

3. Understanding climate change and biodiversity

This section provides background information on climate change and biodiversity in the EU. It starts by explaining the terms ‘climate change’ and ‘biodiversity’ and then provides an overview of the current status, trends, drivers and policy responses for climate change mitigation, adaptation and biodiversity.

The purpose of this section is to highlight the importance and complexity of climate change and biodiversity to those involved in EIA: authorities, project developers, EIA practitioners, regulators and other stakeholders. For those undertaking EIA, it also provides a starting point for identifying some of the key information sources and issues, policy objectives and targets that need to be considered to successfully integrate climate change and biodiversity into the process.

Depending on the scale of the project, an EIA may also need to consider the national, regional and local levels. However, for practical reasons, this document focuses on the international/EU context and should be considered a starting point. The information presented here will need to be supplemented with what is available in the Member States and from environmental authorities and other institutions.

3.1 Introduction to climate change

Responses to climate change can be divided into two aspects:



Mitigation — the term used to describe the process of reducing GHG emissions that contribute to climate change. It includes strategies to reduce GHG emissions and enhance GHG sinks.



Adaptation — is a process, or set of initiatives and measures, to reduce the [vulnerability](#) of natural and human systems against actual or expected climate change effects. Adaptation can also be thought of as learning how to live with the consequences of climate change. The first consequences of climate change can already be seen in Europe and worldwide, and these impacts are predicted to intensify in the coming decades. Temperatures are rising, rainfall patterns are shifting, glaciers are melting, sea levels are getting higher and extreme weather resulting in hazards such as floods and droughts is becoming more common.

Climate change adaptation and mitigation are closely interrelated. While they are often considered as separate topics or policy fields, it is critical to consider the links between them. Certain adaptation responses have clear mitigation benefits, but some actions can result in ‘[maladaptation](#)’ — i.e. instead of reducing vulnerability to climate change, they actually increase it or reduce the [adaptive capacity](#). Some actions can also distribute the benefits of adaptation unequally across society (for example, the prevention of climate-change-induced diseases only for affluent people).

One of the roles of EIA is to seek to manage these conflicts and potential synergies. This can be done by comprehensively assessing the synergies between climate change mitigation, adaptation and other environmental issues and policy concerns, in order to avoid negative synergies and missed opportunities for promoting positive synergies.



3.1.1 Climate change mitigation — overview of current status, trends and policy responses

Current status, trends and key drivers

Many studies have been carried out into how to assess the current status, trends and key drivers for GHG emissions, and they provide a useful background. See *Mitigating climate change — SOER 2010 thematic assessment* (EEA, 2010)¹¹ and other documents listed in [Annex 1](#) of this guidance for an overview.

Policy response

In March 2007,¹² the EU Heads of State and Government endorsed an integrated approach to climate and energy policy that aims to combat climate change and increase the EU's energy security while strengthening its competitiveness. They set a series of demanding climate and energy targets to be met by 2020, known as the '20-20-20' targets (see box right).

With its Roadmap for moving to a competitive low-carbon economy in 2050, the European Commission has looked beyond these short-term objectives and set out a cost-effective pathway for reducing domestic emissions by 80 to 95 % by mid-century. The Roadmap identifies milestones and provides guidance on how to move to a climate-friendly, low carbon economy in the most efficient way.

'20-20-20' climate and energy targets

- A reduction in **EU GHG emissions** of at least **20%** below 1990 levels;
- **20%** of **EU energy consumption** to come from renewable resources;
- **20%** reduction in **primary energy use** compared with projected levels, to be achieved by improving energy efficiency.

The key aspects of international and EU climate change mitigation policy are summarised in Table 3 below.

Table 3: Key aspects of climate change mitigation policy

Policy response	Objectives and targets
<u>United Nation Framework Convention on Climate Change (UNFCCC)</u>	<ul style="list-style-type: none"> • UNFCCC seeks to reduce international GHG emissions by setting national level targets based on the concept of 'common but differentiated responsibility'. This means that nations which have emitted the majority of GHGs up to now should seek to reduce GHGs at a greater rate.
<u>UNFCCC's Kyoto Protocol</u>	<ul style="list-style-type: none"> • Under the UNFCCC's Kyoto Protocol, 15 Member States of the EU ('EU-15') decided on a collective target of reducing GHG emissions by 8% relative to 1990 levels between 2008 and 2012 (Member State emission targets are differentiated under an EU burden-sharing decision). The other Member States have similar targets, with the exception of Cyprus and Malta. • The EU-15 are well on track to meeting their target. Preliminary EEA estimates indicate that they reduced their emissions by 14.1% below base-year levels by 2011.¹³

¹¹ <http://www.eea.europa.eu/soer/europe/mitigating-climate-change>.

¹² European Council, 8/9 March 2007.

¹³ Approximated EU GHG inventory, <http://www.eea.europa.eu/publications/approximated-eu-ghg-inventory-2011>.

<p><u>EU Climate and Energy Package</u></p>	<ul style="list-style-type: none"> • To meet the EU’s obligation under international law and in line with European ambition. Member States are required to: • Collectively reduce their combined GHG emissions in 2020 by at least 20% compared to 1990 levels. Note: the EU has offered to take on a 30% target for 2020 if other major emitters contribute adequately to global mitigation efforts. • Produce 20% of their combined energy from renewable sources. • Improve energy efficiency to reduce primary energy use by 20% compared with projected levels. • The collective EU target of reducing emissions by 20% by 2020 is to be achieved by: <ul style="list-style-type: none"> ○ The EU Emissions Trading System, the backbone of the EU mitigation effort, which sets a cap on emissions from the most polluting sectors, including over 11000 factories, power plants and other installations, including airlines. By 2020, the cap should result in a 21% reduction relative to 2005 levels. The EU ETS covers about 40% of all EU emissions. ○ The ‘effort sharing decision’, which operates outside the EU ETS and establishes annual binding GHG emission targets for individual Member States for the 2013-2020 period. These concern emissions from sectors such as waste, agriculture, buildings, etc. • The ‘20-20-20’ targets are supported by the long-term target of 85-90% reduction in GHG emissions against 1990 levels by 2050.
<p><u>Roadmap for moving to a low-carbon economy in 2050</u></p>	<ul style="list-style-type: none"> • The Roadmap looks beyond the 2020 targets and sets out a plan to meet the long-term target of reducing EU emissions by 80-95% by 2050. The strategy takes a sectoral perspective, looking at how the heavy-emissions sectors such as power generation, transport, buildings and construction, industry and agriculture can make the transition to a low-carbon economy over the coming decades.
<p><u>Energy Roadmap 2050</u></p>	<ul style="list-style-type: none"> • In the <i>Energy Roadmap 2050</i>, the EU explores the challenges posed by delivering the EU’s decarbonisation objective, while at the same time ensuring security of energy supply and competitiveness.
<p><u>Flagship initiative for a resource-efficient Europe</u></p>	<ul style="list-style-type: none"> • It supports the shift to a resource-efficient, low-carbon economy to achieve sustainable growth. It provides a long-term framework for action to factor in resource efficiency in a balanced manner in many policy areas, including climate change, energy, transport, industry, agriculture, biodiversity and regional development.

3.1.2 Climate change adaptation — overview of current status, trends and policy responses

Current status, trends and key drivers

Regardless of the success of mitigation action, some degree of climate change is already ‘locked in’ and we are feeling the effects of our changing climate already. One of the most important consequences of climate change will be the increased frequency and magnitude of extreme events such as floods, droughts, windstorms and heat waves. Climate change may also trigger other hazards in which climate or weather conditions play a fundamental role, such as snow avalanches, landslides and forest fires.

Several studies have assessed the current status, trends and key drivers for climate change and provide a useful background. See *Adapting to climate change — SOER 2010 thematic assessment* (EEA, 2010)¹⁴ and the *European Climate Adaptation Platform: CLIMATE-ADAPT*,¹⁵ as well as other documents listed in [Annex 1](#) to this Guidance.

Policy response

Adaptation involves adjusting our behaviour to limit harm and exploiting the beneficial opportunities arising from climate change. However, our level of preparedness, resilience and vulnerability are not

¹⁴ <http://www.eea.europa.eu/soer/europe/adapting-to-climate-change>.

¹⁵ <http://climate-adapt.eea.europa.eu/>

easily quantifiable, making it difficult to set hard and fast targets. But climate change mitigation targets are more tangible. In the EU, the focus is on integrating ('mainstreaming') adaptation into all relevant policies and instruments and facilitating effective, consistent adaptation actions at national, regional and local levels.

Many European countries, as well as some regions and cities, have adopted adaptation strategies. The European Environment Agency (EEA) keeps an overview of adaptation strategies in its 32 member countries.¹⁶ It also hosts the European Climate Adaptation Platform: CLIMATE-ADAPT.

The key aspects of international and EU climate change adaptation policy are summarised in Table 4 below.

Table 4: Key aspects of climate change adaptation policy

Policy response	Objectives and targets
EU Strategy on Adaptation to Climate Change	<ul style="list-style-type: none"> • The European Commission adopted a <i>White Paper on Adapting to Climate Change</i> in 2009, leading to an EU Adaptation Strategy in 2013. • The <i>Adaptation Strategy</i> will: <ul style="list-style-type: none"> ○ recognise how important impact assessment is for climate proofing (this guidance supports the Strategy's key objectives and actions) ○ identify the key priorities for action and how EU policies can encourage effective adaptation action ○ highlight the issue of adapting infrastructure to climate change and include a separate document on this topic ○ encourage creating green infrastructure and applying ecosystem-based approaches. • Guidance on how to mainstream adaptation into the Common Agricultural Policy and Cohesion Policy will be developed after the Adaptation Strategy is adopted.
<u>European Climate Adaptation Platform: CLIMATE-ADAPT</u>	<ul style="list-style-type: none"> • A publicly accessible, web-based platform designed to support policy-makers at EU, national, regional and local levels in the development of climate change adaptation measures and policies. • It has been developed to help users to access, disseminate and integrate information on: <ul style="list-style-type: none"> ○ expected climate change in Europe ○ the vulnerability of regions, countries and sectors now and in the future ○ information on national, regional and transnational adaptation activities and strategies ○ case studies of adaptation and potential future adaptation options ○ online tools that support adaptation planning ○ adaptation-related research projects, guideline documents, reports information sources, links, news and events.

3.2 Introduction to biodiversity



Biodiversity — or biological diversity — is one of the key terms in conservation, encompassing the richness of life and the diverse patterns it forms. The Convention on Biological Diversity (CBD) defines biological diversity as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems' (Article 2).

The Natura 2000 network of protected areas, created on the basis of the Habitats and the Birds Directives, is the backbone of the EU's biodiversity policy. At present, the network covers almost 18% of the EU's land surface and more than 145000 km² of its seas. However, it is important to

¹⁶ Available from: <http://www.eea.europa.eu/themes/climate/national-adaptation-strategies>.

remember that the concept of biodiversity is not limited to the Natura 2000 network, it is much broader:

- The Birds and Habitats Directives also cover species and habitats outside Natura 2000 sites.
- Under Article 6(3) of the Habitats Directive, an ‘appropriate assessment’ – is required for any plan or project likely to have a significant effect on Natura 2000 site, even if it is implemented outside these sites.
- Article 10 of the Habitats Directive recognises the importance of ensuring the ecological coherence of the Natura 2000 sites.
- Finally, the *EU 2020 Biodiversity Strategy* as endorsed by the Council and European Parliament covers the whole territory and emphasises the benefits that ecosystems give us. It provides a package of actions needed to halt the loss of biodiversity and the degradation of ecosystem services by 2020 and to restore them in so far as feasible.

It is recommended that an EIA takes into account all of these aspects of biodiversity.

3.2.1 Current status, trends and policy responses

Current status, trends and key drivers

Several studies have assessed the current status, trends and key drivers for biodiversity, and provide a useful background. See *Biodiversity — SOER 2012 thematic assessment* (EEA, 2010),¹⁷ the *EU 2010 Biodiversity Baseline* (EEA, 2010),¹⁸ and the other documents listed in [Annex 1](#) to this guidance for an overview.

These studies have found that the rate of biodiversity loss is accelerating all over Europe. Although there are some positive signs, they recognise five main pressures and drivers of biodiversity loss: (i) habitat loss and fragmentation; (ii) overexploitation and unsustainable use of natural resources; (iii) pollution; (iv) invasive alien species, and (v) climate change.

The aim of the Natura 2000 network and the sites designated under it is to slow down the rate of biodiversity loss, by establishing a system to protect key species and habitats. However, many Natura 2000 sites remain in an unfavourable state and require improved management.

Policy response

Biodiversity has been a core part of EU policy for over 20 years. Nevertheless, the overall trends are still negative and recent policy has been considered ineffective. This is shown by the EU’s failure to achieve the target of halting biodiversity loss by 2010.

In 2011, the European Commission adopted a new Biodiversity Strategy¹⁹ with its 2020 headline target — ‘Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.’

¹⁷ <http://www.eea.europa.eu/soer/europe/biodiversity>.

¹⁸ <http://www.eea.europa.eu/publications/eu-2010-biodiversity-baseline/>.

¹⁹ Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of Regions, Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (EC, COM(2011) 244 final).

Target 2 of this Strategy is that ‘by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystem’. This target is broken down into accompanying actions, two of which seek to influence planning practices:

- set priorities to restore and promote the use of green infrastructure (Action 6); and
- ensure ‘no-net-loss’ of biodiversity and ecosystem services (Action 7).

These provide a good policy basis for preserving ecosystem services and using [ecosystem-based approaches](#) and [green infrastructure](#) within EIA. In the climate change context, ecosystem-based approaches can maintain existing carbon stocks, regulate water flow and storage, maintain and increase resilience, reduce vulnerability of ecosystems and people, help to adapt to climate change impacts, improve biodiversity conservation and livelihood opportunities and provide health and recreational benefits.²⁰

The key aspects of international and EU biodiversity policy are summarised in Table 5 below.

Table 5: Key aspects of biodiversity policy

Policy response	Objectives and targets
The Habitats Directive and Birds Directive	<ul style="list-style-type: none"> • The Habitats Directive and the Birds Directive seek to protect sites of particular importance for biodiversity— these sites form a network referred to as Natura 2000. • Member States are required to designate and manage Natura 2000 network sites within their borders. This includes habitat and species conservation, and reducing the impact of building new infrastructure and of other human activities. This is achieved in part by applying Article 6(3) on ‘appropriate assessments’. • The two directives create provisions for the protection of certain species of flora and fauna when they occur in the wider natural environment. • Article 10 of the Habitats Directive recognises the importance of ensuring the ecological coherence of Natura 2000 sites.
The Convention on Biological Diversity (CBD)	<ul style="list-style-type: none"> • The CBD is the main international agreement governing biodiversity policy. The EU and its Member States are all parties to the convention. Article 14 of the CBD, on Impact Assessment and Minimising Adverse Impacts, requires that a project’s potential adverse impact on biodiversity be taken into account.
Nagoya Protocol	<ul style="list-style-type: none"> • The <i>Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity</i> (adopted in Nagoya, October 2010) is a legally binding agreement that addresses two issues: <ul style="list-style-type: none"> ○ How states provide access to genetic resources and/or associated traditional knowledge under their jurisdiction; and ○ What measures they take to ensure that benefits of using such resources and/or knowledge are shared with provider countries, including indigenous and local communities?
Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets	<ul style="list-style-type: none"> • The <i>Strategic Plan for Biodiversity 2011-2020</i> (adopted in Nagoya, October 2010) aims to inspire action in support of biodiversity by all countries and stakeholders over the next decade. • The <i>Strategic Plan</i> includes 20 headline targets, collectively known as the <i>Aichi Targets</i>. They are organised under five strategic goals that address the underlying causes of biodiversity loss, reduce the pressures on biodiversity, safeguard biodiversity at all levels, enhance its benefits, and provide for capacity-building.
EU Biodiversity Strategy 2020	<ul style="list-style-type: none"> • <i>Our life insurance, our natural capital: an EU biodiversity strategy to 2020</i> is in line with the two commitments made by EU Heads of State and Government in March 2010 — halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU

²⁰ Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe (EC study, Ecologic Institute and Environmental Change Institute, 2011).

	<p>contribution to averting global biodiversity loss.</p> <ul style="list-style-type: none"> • The long-term goal states that ‘by 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity’s intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.’ • The Strategy is also in line with the global commitments world leaders made in Nagoya in October 2010, when, in the context of the CBD, they adopted a package of measures addressing global biodiversity loss over the next decade (described above). • The emphasis is on the essential contribution of biodiversity and ecosystem services to human wellbeing and economic prosperity, and avoiding catastrophic changes caused by the loss of biodiversity. This represents a significant change in approach for the impact assessment process, from reducing impact to actively improving (restoring) biodiversity as a whole and ensuring ‘no-net-loss’. • The main targets of the Strategy cover: <ul style="list-style-type: none"> ○ full implementation of EU legislation on protecting biodiversity; ○ better protection for ecosystems and more use of green infrastructure; ○ more sustainable agriculture and forestry; ○ better fish stock management; ○ tighter controls on invasive alien species, including adopting new legislation to fill existing policy gaps; ○ a more significant EU contribution to averting global biodiversity loss.
<p>Biodiversity Action Plans (BAPs)</p>	<ul style="list-style-type: none"> • BAPs provide details on how the Biodiversity Strategy is to be achieved. They are present at European level (for example, the 2006 BAP now superseded by the 2020 Biodiversity Strategy), but also exist across the EU and worldwide under the CBD (as National Biodiversity Strategy and Action Plans, NBSAPs). In Member States, they are sometimes aligned with the EU 2006 BAP. • BAPs form the wider implementation framework for biodiversity, beyond Natura 2000. At Member State level, they list identified species and habitats, assess their status within the ecosystem, create conservation and restoration targets and establish the budgets and timelines needed to achieve said targets. • BAPs can also require the protection of certain species where they occur outside of protected areas.

3.3 Interactions between climate change and biodiversity

There are clear links between many environmental issues, just like there are connections in the natural environment. This section describes the link between climate change and biodiversity. It does not attempt to fully describe the relationship, but focuses on the key interactions directly relevant to EIA.

Examples of interactions between biodiversity and climate change are listed below:

- Supporting biodiversity delivers clear carbon benefits by enhancing the natural environment’s ability to absorb and store carbon via soil and plant matter. Evidence suggests that healthy natural habitats such as soil, wetlands, and forests can sequester significant amounts of carbon. Damaging the biodiversity or physical environment of these areas can release the stored carbon, even indirectly, contributing to climate change, as well as reducing biodiversity.
- Biodiversity and the natural environment provide services that increase our resilience to the impacts of climate change and disasters. For example, well-functioning green spaces can regulate storm water flow, reducing the risk of flooding. Ecosystems and their services can be successfully used in many PPs as cost-effective alternatives to building infrastructure, or, for example, to manage flood risk (see box overleaf). Green spaces and vegetation also have a cooling effect and reduce the impact of heat waves in cities, lessening the urban heat island effect. Plants stabilise soil, reducing the risk of landslides and erosion (in fact, it is deforestation that can contribute to mudslides).

The relationship between biodiversity and climate change goes both ways — the effects of a changing climate are already having an impact on biodiversity and ecosystem service provision. It is predicted that, in the future, climate change will be the single biggest driver of biodiversity loss next to land-use change.²¹ Climate change affects biodiversity because species tend to evolve to a specific range of environmental factors such as temperature, moisture, etc. As these factors alter due to climate change, species need to migrate to stay in their optimum environment. Some species are more adaptive, but, for others, a changing environment is a threat to their ability to survive and therefore increases extinction rates and reduces biodiversity.

The ability of species to respond to this climate-enforced migration is also limited by human activity, which has changed land-use and fragmented habitats. When roads, urban areas and agricultural land stand in their way, many species will find it almost impossible to migrate across the landscape. There is therefore a need to facilitate this natural adaptation process by, for example, creating migration corridors of natural habitats and reducing fragmentation.

Using green infrastructure for flood risk management

The EU Floods Directive establishes a framework for the management of flood risks. It gives the EU Member States the choice of measures to put in place to reduce the adverse consequences related to floods.

Article 7 requires Member States to set their own flood management objectives. These objectives should also, if appropriate, focus on 'non-structural' measures (ranging from early-warning to natural water retention measures) and/or on reducing the likelihood of flooding.

These are cost-effective alternatives to constructing or reinforcing dykes and dams. They also often have many additional benefits.

Examples include:

- restoring natural flows by realigning coastal areas or re-connecting rivers with their floodplain;
- restoring wetlands, which can store flood water and help slow down their flow;
- urban green infrastructure such as green spaces or green roofs.

Source: [DG Environment relevant webpage](#)

²¹Millennium Ecosystem Assessment (2005) Synthesis Report.

4. Integrating climate change and biodiversity into EIA

This section provides guidance on integrating climate change and biodiversity throughout the EIA process. It focuses on the EIA areas where climate change and biodiversity have the most impact.

It is divided into the following sub-sections:

- identifying climate change and biodiversity concerns in EIA (useful for screening and scoping);
- analysing evolving baseline trends;
- identifying alternatives and mitigation measures;
- assessing effects (cumulative effects and uncertainty);
- monitoring and adaptive management.

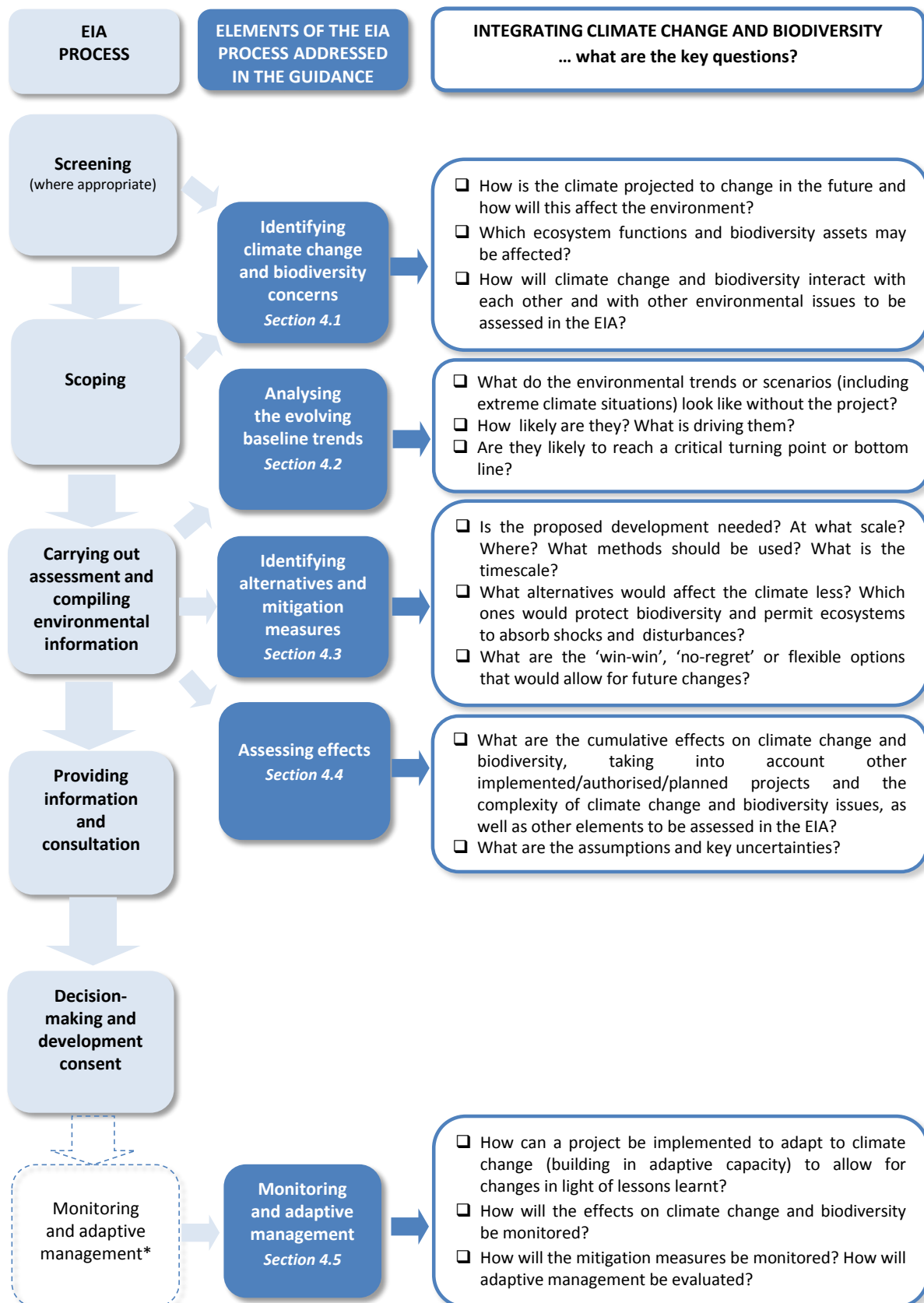
Each sub-section looks at the EIA elements for which climate change (including disaster risks in the context of climate change adaptation) and biodiversity considerations are most relevant, and gives some examples. You can use these as a starting point for more in-depth work.

This section pays particular attention to climate change adaptation, which is a relatively new issue in the context of EIA. The advice and examples provided could serve as a basis for developing tailored approaches to a wide range of infrastructure projects (e.g. power plants, motorways/roads, pipelines, industrial plants, overhead electrical power lines, installations for storage of petroleum, ports, waste disposal facilities, urban development projects, etc.) covered by the EIA Directive. Such tailored approaches fall outside the scope of this guidance, however.

Addressing climate change and biodiversity in the EIA process (see [Section 2.3](#)) brings new challenges for the EIA practitioner. There will be situations in which the EIA practitioner will have to make a judgement, preferably in consultation with stakeholders, to avoid unnecessarily extending the EIA procedure or to leave enough time to properly assess complex information. Taking a practical, common sense approach to EIA will sometimes be best.

Figure 2 (overleaf) shows the scope of this guidance and includes a set of questions related to specific topics addressed in it.

Figure 2: Integrating climate change and biodiversity into EIA



*Monitoring is not obligatory under the EIA Directive, but is nevertheless used in some Member States.

4.1 Identifying climate change and biodiversity concerns in EIA

This section looks at how climate change and biodiversity issues could be better factored into EIA. It can be useful in the screening and scoping stages of EIA. Of course, the issues and impacts relevant to a particular EIA will depend on the specific circumstances and context of each project (e.g. the sector concerned, location and scale, characteristics of the receiving environment, etc.).

The section is structured around four key recommendations:

- identifying **key issues early on**, with input from **relevant authorities and stakeholders**;
- determining whether the project may significantly change GHG emissions and defining the scope of any necessary GHG assessments (**climate mitigation concerns**);
- being clear about climate change scenarios used in the EIA and identifying the key **climate change adaptation concerns** and how they interact with the other issues to be assessed in EIA;
- identifying the key **biodiversity concerns** and how they interact with the other issues to be assessed in EIA.

4.1.1 Identifying key issues early on, with input from relevant authorities and stakeholders

Identifying key climate change and biodiversity issues early on ensures that they are recognised by all involved and followed-up throughout the EIA process. Involving relevant authorities and stakeholders at an early stage (at the latest at the scoping stage for Annex I projects or prior to the

The relationship between EIA and Article 6(3) of the Habitats Directive

Article 6(3) of the Habitats Directive requires an ‘appropriate assessment’ when any project, either individually or in combination with other plans and projects, is likely to have a significant effect on a Natura 2000 site (a Special Protection Area — SPA — under the Birds Directive, or Special Area of Conservation — SAC — under the Habitats Directive). There is therefore a clear link to EIA, but EIA has a wider environmental remit, as it should consider all biodiversity and not just impact related to Natura 2000 sites.

In some cases, the EIA and Article 6(3) assessments can be combined, or data and information from the Article 6(3) assessment of the Natura 2000 site can be used in the EIA and *vice-versa*. The extent of iteration between EIA and any Article 6(3) assessment will depend on the nature and scale of the project and site(s) concerned.

issuing of a screening decision for Annex II projects) will improve compliance with the EIA Directive. It will also make it possible to capture the most important issues and establish a consistent approach to assessing impact and looking for solutions. Making use of the knowledge and opinions of environmental authorities and stakeholders can help to:

- highlight potential areas of contention and areas of improvement in a timely and effective way;
- provide information on relevant forthcoming projects, policies and legislative or regulatory reforms, other types of assessments (including Article 6(3) of the Habitats Directive on ‘appropriate assessment’ — see box left) that should be considered when analysing evolving baseline trends (see [Section 4.2](#));
- collect suggestions for building climate change mitigation and adaptation measures and/or biodiversity enhancement schemes into the proposed project from the very beginning.

The main climate change and biodiversity concerns are listed in Table 6, below. They can help you define a set of questions on climate change mitigation, adaptation and biodiversity. These could then be asked in the screening and/or scoping stages of EIA.

Table 6: Examples of main climate change and biodiversity concerns to consider as part of EIA

Climate change mitigation	Climate change adaptation	Biodiversity
<ul style="list-style-type: none"> • direct GHG emissions caused by the construction, operation, and possible decommissioning of the proposed project, including from land use, land-use change and forestry; • indirect GHG emissions due to increased demand for energy; indirect GHG emissions caused by any supporting activities or infrastructure which is directly linked to the implementation of the proposed project (e.g. transport, waste management). 	<ul style="list-style-type: none"> • heat waves (including impact on human health, damage to crops, forest fires, etc.); • droughts (including decreased water availability and quality and increased water demand); • extreme rainfall, riverine flooding and flash floods; • storms and high winds (including damage to infrastructure, buildings, crops and forests); • landslides; • rising sea levels, storm surges, coastal erosion and saline intrusion; • cold spells; • freeze-thaw damage²². 	<ul style="list-style-type: none"> • degradation of ecosystem services; • loss of habitats, fragmentation (including the extent or quality of the habitat, protected areas, including Natura 2000 sites, habitat fragmentation or isolation, as impact on processes important for the creation and/or maintenance of ecosystems) • loss of species diversity (including species protected under the Habitats Directive and the Birds Directive) • loss of genetic diversity.

For climate change in particular, both the impact of the project on climate and climate change (i.e. mitigation aspects) and the impact of climate change on the project and its implementation (i.e. adaptation aspects) should be considered early on in the EIA process.

Note that this list is not comprehensive and should be adapted. The issues and impacts relevant to a particular EIA should be defined by the specific context of each project and by the concerns of the authorities and stakeholders involved. Flexibility is therefore needed. This table (and other tables in this section) should be used only as a starting point for discussion.

[Annex 2](#) provides additional sources of information that can help you identify key issues and effects.

4.1.2 Understanding key climate mitigation concerns

When it comes to mitigation, the main concerns focus on GHG emissions. Implementing a project may lead to, for example:

- a direct increase in GHG emissions;
- an increase in energy demand leading to an indirect increase in GHG emissions;
- embedded GHG emissions, e.g. due to energy use in material production, transport, etc.;
- loss of habitats that provide carbon sequestration, (e.g. through land-use change).

This guidance does not include any specific methodologies for calculating GHG emissions as part of the EIA procedure. However, [Annex 3](#) provides links to carbon calculators and other methodologies, including to the [methodology for calculating absolute and relative GHG emissions](#) piloted by the European Investment Bank (EIB).

²² Freeze-thaw weathering is a form of physical weathering, common in mountains and glacial environments, caused by the expansion of water as it freezes. This process also applies to infrastructure materials, e.g. concrete. Climate change is projected to bring more unpredictable winter weather in some parts of the world, increasing the frequency of freeze-thaw cycles. As this happens, roads, railways, water networks, etc. will suffer problems and increased maintenance costs. (adapted from: [Talk Talk](#), and [Weathering of building Infrastructure and the changing climate: adaptation options](#) (Auld H., Klaassen J., Comer N., 2007))

Table 7 (below) provides examples of basic questions that could be asked by EIA practitioners when identifying major climate change mitigation concerns.

Table 7: Examples of key questions that could be asked when identifying key climate change mitigation concerns

Main concerns related to:	Key questions that could be asked at the screening and/or scoping stage of the EIA
Direct GHG emissions	<ul style="list-style-type: none"> • Will the proposed project emit carbon dioxide (CO₂), nitrous oxide (N₂O) or methane (CH₄) or any other greenhouse gases part of the UNFCCC? • Does the proposed project entail any land use, land-use change or forestry activities (e.g. deforestation) that may lead to increased emissions? Does it entail other activities (e.g. afforestation) that may act as emission sinks?
Indirect GHG emissions due to an increased demand for energy	<ul style="list-style-type: none"> • Will the proposed project significantly influence demand for energy? • Is it possible to use renewable energy sources?
Indirect GHG caused by any supporting activities or infrastructure that is directly linked to the implementation of the proposed project (e.g. transport)	<ul style="list-style-type: none"> • Will the proposed project significantly increase or decrease personal travel? Will the proposed project significantly increase or decrease freight transport?



4.1.3 Understanding key climate change adaptation concerns

Both a project's impact on climate change (i.e. mitigation aspects) and the impact of climate change on the project and its implementation (i.e. adaptation aspects) should be considered early on in the EIA process. **How might implementing the project be affected by climate change? How might the project need to adapt to a changing climate and possible extreme events?**

When addressing climate change adaptation concerns as part of EIA, you should not only consider the historical data on climate, but also clearly identify and present the climate change scenario that should be considered in the assessment process. A clear description of the climate change scenario facilitates discussion on whether the expected climatic factors should be considered in the project design and how they may affect the project's environmental context. EIA practitioners, in particular, should outline extreme climate situations to be considered as part of the environmental baseline analysis.

You should also review any existing adaptation strategies, risk management plans and other national or sub-regional studies on the effects of climate variability and climate change, as well as proposed responses and available information on expected climate-related effects relevant to the project.

Table 8 provides examples of basic questions that you could ask when identifying major climate change adaptation concerns.

Table 8: Examples of key questions that could be asked when identifying climate change adaptation concerns

Main concerns related to:	Key questions that could be asked at the screening and/or scoping stage of the EIA
Heat waves (take into account that heat waves are usually associated with water scarcity — see also the suggestions for droughts)	<ul style="list-style-type: none"> • Will the proposed project restrain air circulation or reduce open spaces? • Will it absorb or generate heat? • Will it emit volatile organic compounds (VOCs) and nitrogen oxides (NO_x) and contribute to tropospheric ozone formation during sunny and warm days? • Can it be affected by heat waves? • Will it increase energy and water demand for cooling? • Can the materials used during construction withstand higher temperatures (or will they experience, for example, material fatigue or surface degradation)?
Droughts due to long-term changes in precipitation patterns (also consider possible synergistic effects with flood management actions that enhance water retention capacity in the watershed)	<ul style="list-style-type: none"> • Will the proposed project increase water demand? • Will it adversely affect the aquifers? • Is the proposed project vulnerable to low river flows or higher water temperatures? • Will it worsen water pollution — especially during periods of drought with reduced dilution rates, increased temperatures and turbidity? • Will it change the vulnerability of landscapes or woodlands to wild fires? Is the proposed project located in an area vulnerable to wildfires? • Can the materials used during construction withstand higher temperatures?
Extreme rainfall, riverine flooding and flash floods	<ul style="list-style-type: none"> • Will the proposed project be at risk because it is located in a riverine flooding zone? • Will it change the capacity of existing flood plains for natural flood management? • Will it alter the water retention capacity in the watershed? • Are embankments stable enough to withstand flooding?
Storms and winds	<ul style="list-style-type: none"> • Will the proposed project be at risk because of storms and strong winds? • Can the project and its operation be affected by falling objects (e.g. trees) close to its location? • Is the project's connectivity to energy, water, transport and ICT networks ensured during high storms?
Landslides	<ul style="list-style-type: none"> • Is the project located in an area that could be affected by extreme precipitation or landslides?
Rising sea levels	<ul style="list-style-type: none"> • Is the proposed project located in areas that may be affected by rising sea levels? • Can seawater surges caused by storms affect the project? • Is the proposed project located in an area at risk of coastal erosion? Will it reduce or enhance the risk of coastal erosion? • Is it located in areas that may be affected by saline intrusion? • Can seawater intrusion lead to leakage of polluting substances (e.g. waste)?
Cold spells and snow	<ul style="list-style-type: none"> • Can the proposed project be affected by short periods of unusually cold weather, blizzards or frost? • Can the materials used during construction withstand lower temperatures? • Can ice affect the functioning/operation of the project? Is the project's connectivity to energy, water, transport and ICT networks ensured during cold spells? • Can high snow loads have an impact on the construction's stability?
Freeze-thaw damage	<ul style="list-style-type: none"> • Is the proposed project at risk of freeze-thaw damage (e.g. key infrastructure projects)? • Can the project be affected by thawing permafrost?

4.1.4 Understanding key biodiversity concerns

For biodiversity, key concerns should focus on ensuring 'no-net-loss' and should outline how EIA can support this goal. The project may result in, for example:

- changes in the provision of ecosystem services as a result of loss of species and habitats;
- habitat loss and degradation, e.g. the destruction of wetlands, grasslands and forests for housing, etc.;



- habitat fragmentation — ecosystems and their species need a certain amount of interconnectivity for processes to continue; breaking a natural area into smaller pieces, means that eventually species disappear and certain functions are lost;
- loss of species, e.g. the plants and animals endemic to a particular habitat will not be able to survive if that habitat is destroyed or altered by development;
- changes in natural environmental processes, such as continued river flow, water purification, coastal sediment transport, and erosion control, which can have long-term impact on habitats and species;
- direct impacts, for example birds colliding with power lines or wind turbines;
- the spread of invasive alien species that can transform natural habitats and disrupt native species;
- effects of pollution on ecosystems and species.

Table 9 (below) provides examples of basic questions you could ask when identifying major biodiversity concerns.

Table 9: Examples of key questions that could be asked when identifying biodiversity concerns

Main concerns related to:	Key questions that could be asked at the screening and/or scoping stage of the EIA
<p>Degradation of ecosystem services (including impact on processes important for creating and / or maintaining ecosystems)</p>	<ul style="list-style-type: none"> • Will the proposed project directly or indirectly lead to serious damage or total loss of ecosystem or land-use type, thus leading to a loss of ecosystem services? Will it affect the exploitation of ecosystems or land-use type so that the exploitation becomes destructive or unsustainable? • Will the proposed project damage ecosystem processes and services, particularly those on which local communities rely? • Is the project in any way dependent on ecosystem services? • Can increased supply of ecosystem services contribute to the project's objective(s)? • Will the proposed project result in emissions, effluents, and/or other means of chemical, radiation, thermal or noise emissions in areas providing key ecosystem services? <p>As regards processes important for creating and/or maintaining ecosystems:</p> <ul style="list-style-type: none"> • Will the proposed project change the food chain and interactions that shape the flow of energy and the distribution of biomass within the ecosystem? • Will the proposed project result in significant changes to water level, quantity or quality? • Will the proposed project result in significant changes to air quantity or pollution?
<p>Loss and degradation of habitats (including the Natura 2000 network, habitat fragmentation and isolation)</p>	<ul style="list-style-type: none"> • If habitats are lost or altered, are there alternatives available to support the species populations concerned? • Will the proposed project adversely affect any of the following: protected areas; threatened ecosystems outside protected areas; migration corridors identified as being important for ecological or evolutionary processes; areas known to provide important ecosystem services; or areas known to be habitats for threatened species? • Will the proposed project involve creating linear infrastructure and lead to habitat fragmentation in areas providing key and other relevant ecosystem services? • How seriously will this affect habitats and corridors, considering that they can also be adversely affected by climate change? • Are there opportunities to establish or further develop green infrastructure as a part of the project to support the project's non-environmental and environmental goals (e.g. adaptation to climate change or increasing connectivity of protected sites)?

<p>Loss of species diversity²³ (including species protected under the Habitats Directive and the Birds Directive)</p>	<ul style="list-style-type: none"> • Will the proposed project have direct or indirect negative impact on the species of Community interest listed in Annex II and/or Annex IV or V, in particular, priority species from Annex II²⁴ of the Habitats Directive or on the species covered by the Birds Directive? • Will the proposed project cause a direct or indirect loss of a population of a species identified as priority in National Biodiversity Strategies and Action Plans²⁵ (NBSAPs) and/or other sub-national biodiversity plans? • Will the proposed project alter the species-richness or species-composition of habitats in the study area? • Will the proposed project affect sustainable use of a population of a species? • Will the proposed project surpass the maximum sustainable yield, the carrying capacity of a habitat/ecosystem or the maximum allowable disturbance level of populations, or ecosystem? • Will the proposed project increase the risk of invasion by alien species?
<p>Loss of genetic diversity²⁶</p>	<ul style="list-style-type: none"> • Will the proposed project result in the extinction of a population of a particularly rare species, declining species or a species identified as one of Community interest, in particular of priority species from Annex II of the Habitats Directive? • Will the proposed project result in the extinction of a population of a particularly rare species, declining species or those identified as priorities in NBSAPs and/or sub-national biodiversity plans? • Will the proposed project result in the fragmentation of an existing population leading to (genetic) isolation?

4.2 Analysing the evolving baseline trends

The evolution of the baseline — how the current state of the environment is expected to change in the future — is critical to understanding how the proposed project might impact that changing environment.

The baseline environment is a moving baseline. This is especially true for large-scale projects, which might only become fully operational after many years. During this time, the biodiversity in the project's area may change and the area may be subject to different climatic conditions, such as storms, increased flooding, etc. For long-term projects or those with long-lasting effects (timescales exceeding 20 years), you should ideally use climate scenarios based on climate model results. Such projects may need to be designed to withstand very different environmental conditions from current ones. For short-term projects, scenarios need to represent only 'near future' or 'present-day' climates.²⁷

Environmental outlooks and scenario studies that analyse trends and their likely future directions can provide useful information. If data are unavailable, it may be useful to use proxy indicators. For example, if air quality monitoring data are not readily available for an urban area, perhaps there are data outlining trends in traffic flow/volumes over time, or trends in emissions from stationary sources.

²³ Definition: The number and variety of species found in a given area in a region <http://www.cbd.int/cepa/toolkit/2008/doc/CBD-Toolkit-Glossaries.pdf>

²⁴ Priority species are indicated by an asterisk (*) in Annex II of the Habitats Directive.

²⁵ National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at national level (Article 6). The Convention requires countries to prepare a national biodiversity strategy (or equivalent instrument) and to ensure that this strategy is mainstreamed into the planning and activities of all sectors whose activities can have an impact (positive or negative) on biodiversity.

²⁶ The potential loss of natural genetic diversity (genetic erosion) is extremely difficult to determine, and does not provide any practical clues for formal screening/scoping. The issue would probably only come up in dealing with highly-threatened, legally-protected species that are limited in numbers and/or have highly separated populations, or when complete ecosystems become separated and the risk of genetic erosion applies to many species (the reason for constructing so-called eco-ducts across major line infrastructure), COP 6 Decision VI/7, Annex: Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental impact assessment, <http://www.cbd.int/decision/cop/?id=7181>.

²⁷ Adapted from <http://climate-adapt.eea.europa.eu>.

Spatially explicit data and assessments, potentially using Geographical Information Systems (GIS), are likely to be important for analysing the evolving baseline trends and also to understand distributional effects. There are several such European sources of data, including data repositories and online digital datasets, for example the [Biodiversity Information System for Europe \(BISE\)](#) or the [Climate change Data Centre](#). [Annex 2](#) provides a comprehensive overview and links to sources of information on biodiversity and climate change.

When looking at the evolving baseline, you should consider:

- **Trends in key indicators over time**, for example GHG emissions, indices of vulnerability, frequency of extreme weather events, disaster risk, key species such as farmland birds and the status of habitats or protected areas. Are these trends continuing, changing, or levelling out? Are there environmental outlooks or scenario studies available that have looked at their likely future direction? If data are unavailable for certain indicators, can you use [proxy indicators](#)?

Biodiversity considerations

Designated sites

- Are there any sites designated for nature conservation or the distribution of protected species that fall within the zone of influence?
- Does the project affect any sites likely to be designated in the foreseeable future?
- Is there any policy presumption in favour of habitat protection/creation/restoration in the area?

General ecological considerations

- What ecological features at or above the defined threshold level of value may occur within the zone of influence?
- What are their distribution and status elsewhere for comparison?
- What were their historical distributions, status and management compared with the present?
- What are their scales of variation, vulnerability and likely exposure to the project?
- What are the key ecological processes or species activity periods; are there seasonal variations in distribution, abundance and activity?
- Are there any species, the disappearance of which would have significant consequences for others?
- Are there any other projects planned within the same area or time-frame that may contribute to cumulative effects?

Source: [Guidelines for Ecological Impact Assessment in the UK \(IEEM, 2006\)](#)

- **Drivers of change** (both direct and indirect), which may cause a particular trend. Identifying drivers facilitates future projections, especially if some existing drivers are expected to change or new drivers are about to come into play and will significantly affect a given trend (e.g. already approved developments that have not been implemented yet; changes in economic incentives and market forces; changes in the regulatory or policy frameworks; etc.). Identifying drivers should not become a complex academic exercise — it is only important to recognise drivers that will significantly change the trend and take them into account when outlining the expected future state of the environment.
- **Thresholds/limits**, e.g. have thresholds already been breached or are limits expected to be reached? The EIA may determine whether the given trend is already approaching an established threshold or if it is coming close to certain tipping points that can trigger significant changes in the state or stability of the local ecosystem.²⁸
- **Key areas that may be particularly adversely affected by the worsening environmental trends** including, in particular, protected areas, such as areas designated pursuant to the Birds Directive and the Habitats Directive. The Institute of Ecology and Environment Management (IEEM) in the UK recommends several considerations when establishing the baseline from the point of view of biodiversity (see box left).

²⁸ See examples of environmental limits relevant to climate change and biodiversity at http://www.resalliance.org/index.php/thresholds_database.

- **Critical interdependencies**, for example water supply and sewage treatment systems, flood defences, energy/electricity supply, communication networks, etc.
- **Benefits and losses brought by these trends and their distribution** may determine who benefits and who doesn't. Beneficial and adverse impacts are often not proportionally distributed within society — changes in ecosystems affect some population groups and economic sectors more seriously than others.
- **Climate change vulnerability** assessment needs to be built into any effective assessment of the evolution of the baseline environment, as well as of alternatives. Major infrastructure projects, in particular, are likely to be vulnerable (see box right).

When developing the baseline against which the project is to be evaluated it is also important to acknowledge uncertainty — depending on the timescale and spatial scale some uncertainty is inevitable and will increase for large-scale projects. Uncertainty can be communicated using terms such as 'strongly suspected', 'suspected', etc., used for instance by IPCC in their *Fourth Assessment report* (2007). More detailed guidance on expressing uncertainty is provided in [Section 4.4.3](#).

4.3 Identifying alternatives and mitigation measures

In the early stages of the process, alternatives are essentially different ways in which the developer can feasibly meet the project's objectives, for example by carrying out a different type of action, choosing a different location or adopting a different technology or design for the project. The zero option should also be considered, either as a specific alternative or to define the baseline. At the more detailed level of the process, alternatives may also merge into mitigating measures, where specific changes are made to the project design or to methods of construction or operation to 'prevent, reduce and where possible offset any significant adverse effects on the environment'.²⁹

Note that many alternatives and mitigation measures important from the point of view of biodiversity and climate change should be addressed at strategic level, in a Strategic Environmental Assessment (SEA). For example, to avoid problems associated with flood risk, planners should prevent projects from being developed on flood plains or areas of flood risk, or promote land management to increase water retention capacity. To avoid or minimise effects on Natura 2000 sites located near motorway or railway projects, it is necessary to assess the siting of the whole corridor before leaving it to the level of individual sections, as this would limit the choice of alternative locations, etc.

Climate change vulnerability of major infrastructure projects

Major infrastructure projects may be particularly vulnerable to:

- increased flood risk to fossil fuel and nuclear power sites and electricity substations;
- reduced availability of cooling water for inland power stations;
- reduced quality of wireless service from increased temperatures and intense rainfall;
- increased flood risk to all transport sectors;
- increased scour of bridges from intense rainfall/flooding;
- reduced security of water supply from changing rainfall patterns;
- increased flood risk to wastewater infrastructure.

When assessing vulnerability, it is important to consider critical interdependencies, as they can lead to 'cascade failure', where the failure of one aspect, such as flood defences, can lead to other failures, e.g. flooded power stations leading to power cuts which in turn affect telecommunications networks.

Source: [Climate Resilient Infrastructure: Preparing for a Changing Climate — Summary Document \(HM Government, UK, 2011\)](#)

²⁹ Annex IV of the EIA Directive.

4.3.1 Climate change mitigation

For **climate change mitigation**, it is important to investigate and use options to eliminate GHG emissions as a precautionary approach in the first place, rather than having to deal with mitigating their effects after they have been released. Mitigation measures identified and introduced as a result of an EIA, e.g. construction and operational activities that use energy and resources more efficiently, may contribute to climate change mitigation as well. However, this does not always mean that the project will have overall positive impacts as regards GHG emissions. Impact may be less negative in terms of quantity of emissions, but still have overall negative impact, unless the carbon used in development and transport is unequivocally equal to zero.

Bear in mind that some EIA mitigation measures that address climate change can themselves have significant environmental impact and may need to be taken into account (e.g. renewable energy generation or tree planting may have adverse impacts on biodiversity).

Table 10: Examples of alternatives and mitigation measures related to climate change mitigation concerns



Main concerns related to:	Examples of alternatives and mitigation measures
Direct GHG emissions	<ul style="list-style-type: none"> Consider different technologies, materials, supply modes, etc. to avoid or reduce emissions; Protect natural carbon sinks that could be endangered by the project, such as peat soils, woodlands, wetland areas, forests; Plan possible carbon off-set measures, available through existing off-set schemes or incorporated into the project (e.g. planting trees).
GHG emissions related to energy	<ul style="list-style-type: none"> Use recycled/reclaimed and low-carbon construction materials; Build energy efficiency into the design of a project (e.g. include warmcel insulation, south facing windows for solar energy, passive ventilation and low-energy light bulbs); Use energy-efficient machinery; Make use of renewable energy sources.
GHG emissions related to transport	<ul style="list-style-type: none"> Choose a site that is linked to a public transport system or put in place transport arrangements; Provide low-emission infrastructure for transport (e.g. electric charging bays, cycling facilities).

4.3.2 Climate change adaptation

In terms of **climate change adaptation**, different types of EIA alternatives and mitigation measures (see box overleaf) are available for decision-makers to use in planning the adaptation of projects to climate change. The most appropriate mix of alternatives and/or mitigation measures will depend on the nature of the decision being made and the sensitivity of that decision to specific climate impacts and the level of tolerated risk. Key considerations include:³⁰

- 'no-regret' or 'low-regret' options that yield benefits under different scenarios;
- 'win-win-win' options that have the desired impacts on climate change, biodiversity and ecosystem services, but also have other social, environmental or economic benefits;

³⁰ Adapted from <http://climate-adapt.eea.europa.eu>

- favouring reversible and flexible options that can be modified if significant impacts start to occur;
- adding ‘safety margins’ to new investments to ensure responses are resilient to a range of future climate impacts;
- promoting soft adaptation strategies, which could include building adaptive capacity to ensure a project is better able to cope with a range of possible impacts (e.g. through more effective forward planning);
- shortening project times;
- delaying projects that are risky or likely to cause significant effects.

If, based on an assessment of specific risks and constraints, alternatives and mitigation measures are considered impossible or too expensive, the project may have to be abandoned.

Types of EIA mitigation measures for climate change adaptation and risk management

- Measures that strengthen the project’s capacity to adapt to increasing climate variability and climate change (e.g. building in early warning or emergency/disaster preparedness);
- Risk reduction mechanisms (e.g. insurance);
- Measures that control or manage certain identified risks (e.g. choice of project location to reduce exposure to natural disasters);
- Measures that improve the project’s ability to operate under identified constraints (e.g. choice of most water-efficient or energy-efficient options);
- Measures that better exploit certain opportunities offered by the natural environment.

Source: [Guidelines on the Integration of Environment and Climate Change in Development Cooperation, Guidelines No 4 \(EuropeAid, 2009\)](#)



Table 11: Examples of alternatives and mitigation measures related to climate change adaptation concerns

Main concerns related to:	Examples of alternatives and mitigation measures
Heat waves	<ul style="list-style-type: none"> • Ensure that the proposed project is protected from heat exhaustion; • Encourage design optimal for environmental performance and reduce the need for cooling; • Reduce thermal storage in a proposed project (e.g. by using different materials and colouring).
Droughts	<ul style="list-style-type: none"> • Ensure that the proposed project is protected from the effects of droughts (e.g. use water-efficient processes and materials that can withstand high temperatures); • Install livestock watering ponds within animal-rearing systems; • Introduce technologies and methods for capturing storm water; • Put in place state-of-the-art wastewater treatment systems that make reusing water possible.
Wildlife fires	<ul style="list-style-type: none"> • Use fire-resistant construction materials; • Create a fire-adapted space around the project (e.g. use fire-resistant plants).
Extreme rainfall, riverine flooding and flash floods	<ul style="list-style-type: none"> • Consider changes in construction design that allow for rising water levels and ground water levels (e.g. build on pillars, surround any flood-vulnerable or flood-critical infrastructure with flood barriers that use the lifting power of approaching floodwater to automatically rise, set up backwater valves in drainage-related systems to protect interiors from flooding caused by backflow of wastewater, etc.); • Improve the project’s drainage.
Storms and winds	<ul style="list-style-type: none"> • Ensure a design that can withstand increased high winds and storms.
Landslides	<ul style="list-style-type: none"> • Protect surfaces and control surface erosion (e.g. by quickly establishing vegetation – hydroseeding, turfing, trees); • Put in place designs that control erosion (e.g. appropriate drainage channels and culverts).
Rising sea levels	<ul style="list-style-type: none"> • Consider changes in construction design to allow for rising sea levels (e.g. building on pillars, etc.).
Cold spells and snow	<ul style="list-style-type: none"> • Ensure that the project is protected from cold spells and snow (e.g. use construction materials that can withstand low temperatures and make sure the design can resist

	snow build-up).
Freeze-thaw damage	<ul style="list-style-type: none"> Ensure that the project (e.g. key infrastructure) is able to resist winds and prevent moisture from entering the structure (e.g. by using different materials or engineering practices).



4.3.3 Biodiversity

For **biodiversity**, EIA should focus on ensuring ‘no-net-loss’ (see box below) and avoiding effects from the start, before considering mitigation, with compensation being used as a last resort.

Key messages for promoting ‘no-net-loss’ of biodiversity

1. Avoid irreversible biodiversity loss, for example by improving the spatial arrangement of a project;
2. Seek alternative solutions that minimise biodiversity loss, in particular consider and prioritise maintaining habitats that are experiencing long-term decline;
3. Use mitigation to restore biodiversity resources where their loss is unavoidable;
4. Compensate for unavoidable loss by providing substitutes of at least similar biodiversity value;
5. Look for ways of optimising environmental benefits, for example by facilitating connection of fragmented environments or creating beneficial high biodiversity habitats.

Source: [Biodiversity Impact Assessment \(IAIA, 2005\)](#)

EIA mitigation measures for biodiversity can also help to mitigate and adapt to climate change. For example, creating new habitats, green spaces, green corridors, green and brown roofs (enhancement) can help maintain and enhance biodiversity, aid species in adapting to long-term climate change, and provide essential ecosystem services such as flood storage capacity, rainfall interception, shade and heat regulation and air quality regulation as part of adaptation to climate change.

As a last resort, [biodiversity offsets](#) can be used to compensate for significant negative impacts arising from a project, after appropriate prevention and mitigation measures have been taken. For example, Article 6(4) of the Habitats Directive provides a compensation system specifically for Natura 2000 sites. However, compensation will not always be possible: there are cases where a development proposal can be rejected on grounds of irreversible damage to, or irreplaceable loss of, biodiversity.

You should apply the precautionary principle when considering risks and adjust your proposal, rather than try to defend it against significant biodiversity effects.

Table 12: Examples of alternatives and mitigation measures related to biodiversity concerns

Main concerns	Examples of alternatives and mitigation measures
Degradation of ecosystem services	<ul style="list-style-type: none"> Restore degraded ecosystems on the site to enhance ecosystem services.
Habitats , (including Natura 2000 network, habitat fragmentation and isolation)	<p>Use an ecosystem services approach, ecosystem-based approaches and green infrastructure:</p> <ul style="list-style-type: none"> Green bridges and eco-ducts (elements of green infrastructure) re-connect natural areas divided by linear developments (e.g. roads or railway lines). They reduce accidents involving wild animals and cars, allow animals to move easily and safely from one area to another, and help plant species to spread. This gives animals more space to find food and shelter, and allows populations of the same species to interact, improving the overall resilience of the species.
Species diversity	<ul style="list-style-type: none"> Introduce design alternatives to avoid adverse effects on bird species (e.g. size, height, spacing, lighting and visibility of wind turbines); Consider timing of construction, maintenance and decommissioning; Deliver ‘smart conservation’, e.g. by promoting well-designed parks, walking paths, green roofs and walls that can contribute to species diversity and to tackling climate change related to urban infrastructure projects.

4.4 Assessing significant effects

Many assessment approaches used in the EIA process have the capacity to address biodiversity and climate change. [Annex 3](#) lists several tools and approaches that are being used or piloted to support EIA assessment. There are, however, three fundamental issues that you should consider when addressing climate change and biodiversity: the **long-term and cumulative nature of effects**, **complexity of the issues and cause-effect relationships** and **uncertainty of projections**.

4.4.1 Long-term and cumulative nature of effects

As shown in [Section 2](#), climate change and biodiversity are generally complex issues with long-term impacts and consequences. EIAs that aim to properly address biodiversity and climate should take this into account and assess the combined impact of any number of different effects. This requires an understanding of evolving baseline trends and an assessment of the cumulative effects of the project on the changing baseline.

There are a number of tips and approaches to be considered when assessing the cumulative effects of climate change and biodiversity in EIA:

- **Recognise cumulative effects early on in the EIA process**, in the scoping stage if possible. Talking to the right stakeholders as early as possible can give the wide overview needed to better understand how seemingly insignificant individual effects can have greater consequences when considered together.
- **Pay attention to the evolving baseline** when assessing the cumulative effects of climate change and biodiversity impacts. The current state of the environment will not necessarily be the future state of the environment, even if the proposed project does not go ahead. Moreover, both the climate and the species that make up the natural world are in a constant state of flux. A changing climate may mean that the design and operational management of a project meant for a certain climate scenario will no longer be relevant in 20 years' time. For instance, warmer summers may increase the susceptibility of materials to heat deformation or increase the risk of wildfires to a project. Considering potential impacts such as these is a unique challenge of climate change within EIA.
- **Distinguish between magnitude and significance and use significance criteria** — a large magnitude impact may not be significant if the species affected is common, widely distributed and readily able to recover, but a small magnitude impact may be very significant to a highly sensitive or rare species or habitat. Significance criteria can be developed from existing policy and guidance documents, such as: biodiversity strategies; biodiversity action plans for habitats and species; international, national and local designations: legislation; and/or using an ecosystem-based approach by identifying the valued ecosystem services and how these will be affected by drivers of change over time.
- **Where possible, use causal chains or network analysis** to understand the interactions and associated cumulative effects between specific elements of the project and aspects of the environment. The point is not to be comprehensive, but to understand which cumulative effects might be most significant. These can often be identified with stakeholders who can help work through potential pathways in causal chains.

4.4.2 Complexity of the issues and cause-effect relationships

Many of the recommendations regarding assessing a project's long-term and cumulative effects addressed in [Section 4.4.1](#) will also help address the complexity of climate change and biodiversity and understand the cause-effect relationship they have with each other, as well as with other issues assessed within an EIA.

The complexity of climate change and biodiversity should not deter you from analysing direct and indirect impacts the proposed project could have on trends in key issues. At times, this will require simplified models that give best estimates of emissions and impacts, e.g. using best-case and worst-case scenarios to illustrate different future states under various assumptions.

Judging an impact's magnitude and significance must be context-specific. For an individual project — e.g. a road project — the contribution to GHGs may be insignificant on the global scale, but may well be significant on the local/regional scale, in terms of its contribution to set GHG-reduction targets.

Communicating uncertainty

Quantifying uncertainty can be very valuable in decision-making. It cannot eliminate uncertainty, but it can help to understand the levels of uncertainty we are dealing with. To do this well, uncertainty has to be well explained and communicated.

There are two types of probability, subjective and objective. Subjective or inductive probability gives an estimate based on the available information and strength of evidence. Objective or statistical probability presents information where all uncertainties are accounted for.

Irrespective of the type of probability, it is important to be consistent in how terms are used and how they relate to the probability they represent. The IPCC provides a guide, reproduced below:

Likelihood scale	Likelihood of the outcome
Term	
Virtually certain	99 – 100% probability
Very likely	90 – 100% probability
Likely	66 – 100% probability
About as likely as not	33 – 66% probability
Unlikely	0 – 33% probability
Very unlikely	0 – 10% probability
Exceptionally unlikely	0 – 1% probability

Source: [CLIMATE-ADAPT](#)

Biodiversity impacts will also depend on geographical and temporal scales of impact and the sensitivity of the habitat or species concerned. For instance, a project's implementation could have possible negative effects on a species that is relatively common at global level, but is the only viable population of that species at local level.

As described in [Section 4.4.1](#), using casual chains or network analysis should help to understand the complexity of the issues and cause-effect relationships.

4.4.3 Uncertainty

One of the tasks of describing expected impacts is to help audiences understand what is known with a high degree of confidence and what is relatively poorly understood.

Decision-makers and stakeholders are used to dealing with uncertainty all the time (e.g. economic growth, technological change) and they will be able to use such information. It will be important to reassure them that considering a range of possible uncertain futures and understanding the uncertainties is part of good EIA practice and permits better and more flexible decisions.

The key principle in communicating uncertainty is avoiding complex or obscure language. Those undertaking EIA should describe the sources of uncertainty, characterise its nature and explain the meaning of phrases used. Using everyday language to describe uncertainty can make the concept more accessible, but there is a risk of misunderstanding, as people may have personal and

differing interpretations of terms like ‘high confidence’. Using the IPCC terms (see box above) may help here.

The [European Climate Adaptation Platform: CLIMATE-ADAPT](#) offers [Uncertainty Guidance](#) which aims to help decision-makers to understand the sources of uncertainty in climate information that are most relevant for adaptation planning. It also provides further suggestions for dealing with uncertainty in adaptation planning and for communicating uncertainty.

4.5 Monitoring and adaptive management

Although monitoring is not required by the EIA Directive, it can be identified and implemented as a mitigation measure. For example, such monitoring measures could be linked to the environmental conditions set in development consent as a result of the EIA procedure (e.g. adherence to agreed flights schedules in order to avoid increasing noise or GHG emissions levels for airports). Moreover, generating recommendations for monitoring the impact of implementing a project, in order to identify any unforeseen adverse effects and take appropriate remedial action, is good EIA practice.

This guidance emphasises the importance of analysing long-term trends related to climate change and biodiversity, assessing direct and indirect impacts of proposed projects on these trends, acknowledging assumptions and uncertainty in the assessment process and ideally choosing a project design and implementation that allows for changes in light of lessons learnt. If project implementation does allow for changes to be made, EIA practitioners may find it useful to consider the principles of [adaptive management](#).

A key feature of adaptive management is that decision-makers seek development strategies that can be modified once new insights are gained from experience and research. Learning, experimenting and evaluation are key elements of this approach. Adaptive management requires the flexibility to change decisions as new information becomes available. While this may not always be possible, project development designs and permits should increasingly allow for changes in project structure and operation, if changes in the environmental context make them necessary (e.g. increasing severity of flooding, droughts, heat waves, changes in habitats and migration corridors, need for changes in buffers of areas important for protection of biodiversity, etc.).

EIA may facilitate adaptive management by clearly acknowledging assumptions and uncertainty and proposing practical monitoring arrangements to verify the correctness of the predictions made and bring any new information to the attention of decision-makers. When designing such systems, EIA practitioners will need to expand project owners’ and stakeholders’ knowledge and awareness, ensure their commitment and propose approaches to project implementation that provide for flexibility.

Annexes

Annex 1: Further reading

The international, European, and Member State level policy documents, reports and guidelines described below include documents referred to within this guide and other sources of information potentially useful for integrating climate change and biodiversity into EIA. This section includes only reference documents publicly available on the internet. The table below provides the title, hyperlink (status as of November 2012) and short description of each source. The icons below are used to distinguish the different topics covered in the table.

Key:



Climate change



Mitigation



Adaptation






Biodiversity



Environmental
Impact
Assessment




Strategic
Environmental
Assessment

Reference/further reading (links active as of March 2013)	Comments on relevance
 Climate change — general	
Climate change, impacts and vulnerability in Europe 2012 (EEA, 2012)	<ul style="list-style-type: none"> This report presents information on past and projected climate change and related impacts in Europe, based on a range of indicators. It also assesses the vulnerability of society, human health and ecosystems in Europe and identifies those regions most at risk from climate change.
Stern Review on the Economics of Climate Change (Cabinet Office - HM Treasury, 2006)	<ul style="list-style-type: none"> This review contributes to assessing the evidence and building an understanding of the economics of climate change. It first examines the evidence on the economic impacts of climate change and explores the economics of stabilising GHGs in the atmosphere. The second half of the document considers the complex policy challenges involved in managing the transition to a low-carbon economy and in ensuring that societies can adapt to the unavoidable consequences of climate change.
Understanding climate change — SOER 2010 thematic assessment (EEA, 2010)	<ul style="list-style-type: none"> This report provides an introduction to climate change, including scientific background, policy context, possible risks and impacts, policy actions and current targets and goals.
UN Framework Convention on Climate Change (UN FCCC)	<ul style="list-style-type: none"> This website provides information on latest developments made through the United Nations Conference of Parties (COP) process. It includes links detailing international requirements (such as Kyoto, Bali Action Plan, Copenhagen Accord and Cancun Agreement), including likely developments. It is also a good source of supra-national GHG data.
 Climate change — mitigation	
Mitigating climate change, SOER thematic assessment (EEA, 2010)	<ul style="list-style-type: none"> This report summarises the EU's progress towards GHG reduction targets. It considers global and European GHG trends and associated challenges.
 Climate change — adaptation	
Adapting to climate change — SOER 2010 thematic assessment (EEA, 2010)	<ul style="list-style-type: none"> This report is a good source of European climate change impact analysis, with descriptions and analyses of current and possible future policy actions.
Climate Change: Working Group II: Impacts, Adaption and	<ul style="list-style-type: none"> The IPCC Chapter on the impact of climate change across

Vulnerability (IPCC, 2007)	Europe considers key vulnerabilities and possible policy responses.
Communication: the EU approach on the prevention of natural and manmade disasters (COM(2009) 82 final)	<ul style="list-style-type: none"> The Communication sets out the EU's approach to preventing natural and man-made disasters and includes ways of mainstreaming prevention in existing legislative and financial instruments.
Forest, health and climate change: Urban green spaces, forests for cooler cities and healthier people (EEA, 2011)	<ul style="list-style-type: none"> A leaflet describing the benefits of forests (parks and green spaces) in urban environments as an adaptation approach to climate change.
Fourth Assessment Report: Climate Change (IPCC, 2007)	<ul style="list-style-type: none"> Information regarding global climate change science, split into a range of working groups and sectoral reports.
Guiding principles for adaptation to climate change in Europe ETC/ACC Technical Paper 2010/6 (ETC, 2010)	<ul style="list-style-type: none"> This document considers the higher-level principles of adapting to climate change, with an introduction to the concept and supporting principles.
Managing the risks of extreme events and disasters to advance climate change adaptation (IPCC, 2012)	<ul style="list-style-type: none"> Extreme weather and climate events, interacting with exposed and vulnerable human and natural systems, can lead to disasters. This report explores the challenge of understanding and managing the risks of climate extremes, to advance climate change adaptation.
Mapping the impacts of natural hazards and technological accidents in Europe (EEA, 2010)	<ul style="list-style-type: none"> The report assesses the occurrence and impacts of disasters and the underlying hazards such as storms, extreme temperatures, forest fires, water scarcity and droughts, floods, snow avalanches, landslides, earthquakes, volcano eruptions and technological accidents in Europe in the 1998-2009 period. It is useful for assessing potential vulnerability.
Risk assessment and mapping guidelines for disaster management (SEC(2010) 1626 final)	<ul style="list-style-type: none"> These EU guidelines focus on the processes and methods used in the prevention, preparedness and planning stages of national risk assessments and mapping, as carried out within the broader framework of disaster risk management.
White paper — Adapting to climate change: towards a European framework for action (EC, 2009)	<ul style="list-style-type: none"> The White Paper setting out the EU's approach to adapting to climate change, based on the concept of mainstreaming. It refers to the resilience of biodiversity and natural systems.
 Biodiversity	
General	
Assessing biodiversity in Europe — the 2010 report (EEA, 2010)	<ul style="list-style-type: none"> The report provides information on the status of European biodiversity with a focus on designated areas and progress towards the EU's biodiversity targets.
Biodiversity Baseline Flyer (EEA, 2010)	<ul style="list-style-type: none"> The report summarises the EEA's biodiversity assessments as part of the State of the Environment Report 2010.
Biodiversity — SOER 2010 thematic assessment (EEA, 2010)	<ul style="list-style-type: none"> The report provides a comprehensive assessment of the state of and trends in Europe's biodiversity.
Biodiversity — 10 messages for 2010 (EEA, 2010)	<ul style="list-style-type: none"> Provides a series of specific assessments based on Europe's bio-geographic regions and the relationship between climate change and biodiversity.
EU 2010 Biodiversity Baseline (EEA, 2010)	<ul style="list-style-type: none"> The report provides an assessment of the status of and trends in Europe's biodiversity.
EU Biodiversity Strategy to 2020 (EC, COM(2011) 244 final)	<ul style="list-style-type: none"> The new Biodiversity Strategy aims to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help Europe reach its goal.
Landscape fragmentation in Europe (EEA, 2011)	<ul style="list-style-type: none"> This report provides a foundation for environmental monitoring and protective measures for those landscapes that are not yet fragmented. It also makes it clear that fragmentation analysis must be integrated into transport and regional planning so that cumulative effects are considered more effectively in the future.
Millennium Ecosystem Assessment (2005)	<ul style="list-style-type: none"> A report that considers the status of and trends in global biodiversity and the services it provides.

PIANC — Working with Nature (PIANC, revised 2011)	<ul style="list-style-type: none"> A document that sets out the World Association for Waterborne Transport (PIANC) management plans to integrate ecosystem services into its activities. It is based on the general principle of integrated planning.
Resource Paper: No Net Loss and Loss-Gain Calculations in Biodiversity Offsets (BBOP, 2012)	<ul style="list-style-type: none"> This paper was prepared by the BBOP to help auditors, developers, conservation groups, communities, governments and financial institutions that wish to consider and develop best-practice related to biodiversity offsets.
The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB (TEEB, 2010)	<ul style="list-style-type: none"> A report on the current provision of ecosystem services and the tools that can support their integration into policy and decision-making.
The use of environmental limits in regulating environmental systems - How could the concept be applied in environmental agencies? (SNIFFER, 2010)	<ul style="list-style-type: none"> A report that considers the concept of environmental limits and how they may be usefully applied within environmental agencies.
Green infrastructure	
Green infrastructure implementation and efficiency (EC study, 2012)	<ul style="list-style-type: none"> A study that assesses the effectiveness and efficiency of policy initiatives supporting green infrastructure across Europe. It identified the main existing policy measures that can help to support green infrastructure initiatives and their implementation, including seven in-depth case studies on thematic issues.
Green infrastructure and territorial cohesion (EEA, 2011)	<ul style="list-style-type: none"> A report that explores the concept of green infrastructure, with illustrative examples of green infrastructure initiatives and analyses of integrating green infrastructure into policy sectors.
Green infrastructure — Sustainable investments for the benefit of both people and nature (SURF-nature project, 2011)	<ul style="list-style-type: none"> A booklet that presents the basics of green infrastructure and explains a number of approaches.
Article 6 of the Habitats Directive guidance documents	
Commission Staff Working Document: Integrating biodiversity and nature protection into port development (EC, 2011)	<ul style="list-style-type: none"> A document that describes the policy context for reconciling environmental requirements with port development.
EC Guidance: Non-mineral extraction and Natura 2000 (EU, 2011)	<ul style="list-style-type: none"> This guidance document shows how the needs of extractive industries can be met while avoiding adverse effects on wildlife and nature. It examines how the potential impacts of extraction activities on nature and biodiversity can be minimised or avoided altogether.
EC Guidance: The implementation of the Birds and Habitats Directives in estuaries and coastal zones with particular attention to port developments and dredging (EU, 2011)	<ul style="list-style-type: none"> This guidance document aims to explain the protection regime (defined under Article 6 of the Habitats Directive) that applies to Natura 2000 sites in the specific context of estuaries, fairway channels and coastal zones, with particular attention paid to port-related activities, including dredging and industry (e.g. shipyards).
EC Guidance: Wind energy development and Natura 2000 (EC, 2010)	<ul style="list-style-type: none"> The purpose of this document is to provide guidance on how to best ensure that wind energy developments are compatible with the provisions of the Habitats Directive and the Birds Directive.
Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007/updated in 2012)	<ul style="list-style-type: none"> This document clarifies the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, Opinion of the Commission.
Guidance document on the assessment of plans and projects significantly affecting Natura 2000 sites (EC, 2001)	<ul style="list-style-type: none"> A methodological guidance document on the provisions of Articles 6(3) and (4) of the Habitats Directive.
Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC (EC, 2000)	<ul style="list-style-type: none"> This document provides Member States with guidelines on how to interpret certain key concepts used in Article 6 of the Habitats Directive.

 Biodiversity and climate change	
Adapting through natural interventions (Climate North West, 2011)	<ul style="list-style-type: none"> A detailed description and analysis of environment-based interventions that increase adaptive capacity with regard to climate change.
Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe (EC study, Ecologic Institute and Environmental Change Institute 2011)	<ul style="list-style-type: none"> A study that addresses current knowledge gaps concerning the implementation of ecosystem-based approaches and aims to gain a better understanding of their role and potential in climate change adaptation and mitigation in Europe.
Biodiversity and Climate Change: Achieving the 2020 targets (CBD, 2010)	<ul style="list-style-type: none"> A technical note on how the 2020 targets as set out in the CBD will be achieved, considering the problems caused by climate change and biodiversity loss.
Climate change and biodiversity — 10 messages for 2010 (EEA, 2010)	<ul style="list-style-type: none"> A summary report exploring and describing the main issues surrounding climate change and biodiversity in Europe.
Climate change and biodiversity — The role of the European regions (ECNC, 2007)	<ul style="list-style-type: none"> A report that discusses the role of European regions in responding to climate-change-related issues, including adaptation and mitigation.
Impacts of climate change and selected renewable energy infrastructures on EU biodiversity and the Natura 2000 network: Summary report (EC study, 2011)	<ul style="list-style-type: none"> A summary report that provides an overview of the likely impact of climate change on biodiversity in the EU and includes indications as to how the design and implementation of current policy might need to be adapted in order to ensure that the EU respects its commitment to reducing biodiversity loss.
Nature's role in climate change (EC, 2009)	<ul style="list-style-type: none"> A report on the potential role of nature and ecosystem services in mitigating and responding to climate change.
 EIA	
Environmental impact assessment of projects, Rulings of the Court of Justice (EU, 2010)	<ul style="list-style-type: none"> A collection of the most important rulings of the European Court of Justice related to key articles of the EIA Directive.
Report on the application and effectiveness of the EIA Directive (COM (2009) 378 final)	<ul style="list-style-type: none"> A report that reviews the application and effectiveness of the EIA Directive in the EU. It gives an overview of the link between EIA and other legislation and includes a section on the link between EIA, biodiversity and climate change.
 EIA and biodiversity	
Biodiversity, Ecology, and Ecosystem Services - Impact assessment considerations/approaches (IAIA, updated 2010)	<ul style="list-style-type: none"> An IAIA Wiki webpage that provides a range of overarching principles, case studies, possible tools, links, etc. on biodiversity, ecology and ecosystem services in the context of impact assessment considerations/approaches.
Biodiversity in impact assessment (IAIA, 2005)	<ul style="list-style-type: none"> A publication that reviews key strategic and operational issues linked to integrating biodiversity-related considerations into impact assessment practices.
Biodiversity in impact assessment: Voluntary guidelines on biodiversity-inclusive impact assessment (Secretariat of CBD, the Netherlands Commission on Environmental Assessment, 2006)	<ul style="list-style-type: none"> Assessment guidelines that seek to incorporate the requirements of the CBD into PPs (via SEA) and projects (via EIA). They deal with high-level principles and provide relevant case studies.
Guidelines for ecological impact assessment in the United Kingdom (IEEM, 2006)	<ul style="list-style-type: none"> Guidelines that include examples of how biodiversity could be included in assessment methodologies (although not directly applicable to EIA).
Position paper on environmental assessment in the European Union (Birdlife, 2010)	<ul style="list-style-type: none"> No-net-loss of biodiversity (and net-gain wherever possible) is a principle that must be applied in the environmental assessment system that is used in the wider countryside. This paper considers how this can be achieved through EIA, SEA and impact assessment of the European Commission's own policies and other initiatives. It proposes reforms to

	<p>each of these forms of environmental assessment as a means of achieving the EU's biodiversity goals.</p> <ul style="list-style-type: none"> • A report that promotes standards and data publishing tools that can be used to collect and publish primary biodiversity data on the internet.
<p>Promoting biodiversity-inclusive EIA: best practice guide for publishing primary biodiversity data (IAIA, GBIF, 2011)</p>	<ul style="list-style-type: none"> • A technical guidance document based on the CBD guidelines described above. It contains RAMSAR-specific additions that seek to include wetlands.
<p>Resolution X.17 - Environmental impact assessment and strategic environmental assessment: updated scientific and technical guidance (RAMSAR Convention, 2010)</p>	<ul style="list-style-type: none"> • This report considers how EIA and SEA could include ecosystem services.
<p>TEEB for local and regional policy makers (TEEB, 2010)</p>	<ul style="list-style-type: none"> • This paper calls for an important shift in our approach, towards navigation development projects that help deliver mutually beneficial 'win-win' solutions. • It focuses on achieving the project objectives in an ecosystem context rather than assessing the consequences of a predefined project design. It also identifies win-win solutions rather than simply minimising ecological harm.
<p>Working with nature, PIANC position paper (PIANC, revised 2011)</p>	
  <p>EIA and climate change</p>	
<p>Climate change adaptation & EIA (IEMA, 2010)</p>	<ul style="list-style-type: none"> • A guidance document that sets out overarching principles related to assessment, reporting and follow-up.
<p>Guidelines on the Integration of Environment and Climate Change in Development Cooperation, Guidelines No. 4 (EuropeAid, 2009)</p>	<ul style="list-style-type: none"> • Guidelines covering EIA and SEA, with specific reference to climate change, adaptation and risk management in international development funding and projects.
<p>Incorporating climate change considerations in environmental assessment: General guidance for practitioners (The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, 2003)</p>	<ul style="list-style-type: none"> • A document that sets out principles, and provides checklists and examples to help include climate change adaptation in EIA.
<p>Incorporating climate change impacts and adaptation in environmental impact assessments: opportunities and challenges (OECD, 2010)</p>	<ul style="list-style-type: none"> • A guidance document that assesses the current state of including adaptation in EIA, with examples of current approaches.
<p>Symposium on impact assessment and climate change, Washington, 17-18.11.2010 (IAIA, 2010)</p>	<ul style="list-style-type: none"> • A document with links to presentations on various aspects of climate change.
<p>Symposium on climate change and impact assessment, Aalborg, 25-27 October 2010 (IAIA, 2010)</p>	<ul style="list-style-type: none"> • A document with links to presentations on various aspects of climate change.

Annex 2: Sources of information on climate change and biodiversity

This annex outlines the different types and sources of information that are available and can be used to support the integration of climate change and biodiversity into EIA. Additional sources of information are listed in Annex I. This information will be particularly useful in the EIA screening, scoping and assessment stages, as well as for monitoring/follow-up.

Types of information

Examples of the types of quantitative datasets relevant to climate change and biodiversity include:

- species distribution;
- trend data, e.g. loss of species/habitats;
- protected area status: e.g. Natura 2000 sites, national designations;
- GHG emission inventories, etc.;
- climate projections: IPCC, etc.;
- future climate and socio-economic scenarios.

These datasets may already exist, depending on the location and scale required.

Sources of information

The strategic documents that provide the context in which a project must be considered will serve as the starting point for sources of information on climate change and biodiversity. These may include, for example, municipal/local authority spatial plans and policies/strategies on biodiversity protection (e.g. biodiversity action plans for species and habitats) and climate change mitigation and adaptation plans, strategies, risk assessment or risk management plans, or vulnerability assessment studies.

Other assessments may also be relevant, such as SEAs carried out for higher-level plans and programmes under the SEA Directive, or assessments carried out under the Habitats Directive.

For biodiversity, specialist sources include:

- environmental authorities with responsibility for nature conservation;
- environmental NGOs;
- stakeholders dependent on or influencing biodiversity-derived ecosystem services, e.g. foresters, fisheries, water companies/authorities.

For climate change, specialist sources include:

- species distribution;
- trend data, e.g. loss of species/habitats;
- protected area status: Natura 2000 sites, national designations, etc.;
- GHG emission inventories etc.;
- climate projections: IPCC, etc.;
- future climate and socio-economic scenarios.

Key European sources of data

The table below summarises some of the key sources of data available at European level, including data repositories and datasets, online tools and key reports and documents. The table is organised by different topics and types of data, using the icons below.

Key:



Table: Key European sources of data, including data repositories and online digital datasets

	Source	Description	Links (March 2013)
	Climate change		
	Climate Change Data Centre (EEA)	Repository of a wide range of climate change relevant data and information. It includes all the latest climate change relevant developments within the EEA. It is a good meta-source of developments across European climate policy and reporting.	http://www.eea.europa.eu/themes/climate/dc
	Climate Change Knowledge Portal, CCKP (the World Bank Group)	The portal provides online access to comprehensive global, regional, and country data related to climate change and development. The portal provides development practitioners with a resource that helps them explore, evaluate, synthesise, and learn about climate-related vulnerabilities and risks, in various levels of detail.	http://sdwebx.worldbank.org/climateportal/index.cfm
	Intergovernmental Panel on Climate Change (IPCC)	The IPCC is the leading international body for the assessment of climate change. Its website includes the fourth assessment report on climate change (2007) and other global climate change science findings, split by working groups and sectors.	http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml
	Climate change — mitigation		
	European Topic Centre for Air Pollution and Climate Change Mitigation, ETC/ACM (EEA)	The ETC/ACM assists the EEA in supporting EU policy in the fields of air pollution and climate change mitigation. The ETC/ACM provides reports and databases relevant to climate change mitigation.	http://acm.eionet.europa.eu/
	Greenhouse Gas Emission Viewer (EEA)	The EEA GHG viewer provides easy access and analysis of the data contained in the Annual EU GHG inventories. The EEA GHG data viewer shows emission trends for the main sectors and allows for comparisons of emissions between different countries and activities.	http://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer
	Climate change — adaptation		
	CLIMATE-ADAPT: European Climate Adaptation Platform (EEA)	CLIMATE-ADAPT is an interactive, publicly accessible web-based tool on adaptation to climate change. It is designed to support policy-makers at EU, national, regional and local levels in the development of climate change adaptation measures and policies.	http://climate-adapt.eea.europa.eu/
	CLIMSAVE	CLIMSAVE is a research project that is developing a user-friendly, interactive web-based tool that will allow stakeholders to assess climate change impacts and vulnerabilities for a range of sectors, including agriculture, forestry, biodiversity, coasts, water resources and urban development. Linking models relating to different sectors will enable stakeholders to see how interactions could affect the European landscape.	http://www.climsave.eu/climsave/index.html

	EmDAT	International disaster database that provides information helpful for natural disaster preparation and decision-making. It can be useful for scoping vulnerability to climate change.	http://www.emdat.be/
	ERA-NET ROAD — Coordination and Implementation of Road Research in Europe	ERA-NET ROAD was a Coordination Action funded by the EU Sixth Framework Programme for European Research and Technological Development. Eleven National Road Administrations participated. A call entitled Road owners getting to grips with climate change was launched as part of this Coordinated Action. Four projects relevant to climate change adaptation were funded within the call: IRWIN — Improved local winter index to assess maintenance needs and adaptation costs in climate change scenarios; P2R2C2 — Pavement Performance and Remediation Requirements following Climate Change; RIMAROCC — Risk Management for Roads in a Changing Climate; SWAMP — Storm Water prevention — Methods to predict damage from water stream in and near road pavements in lowland areas. The project is being continued as ERA-NET Road II within an enlarged consortium and with funding from the EU Seventh Framework Programme for Research and Technological Development.	http://www.eranetroad.org/
	European Severe Weather Database	Database of severe weather events across Europe. It can be useful for indicating general vulnerability of projects.	http://www.essl.org/ESWD/
	NatCatSERVICE	Insurance-based database analysing approximately 1000 events per year. The information collated can be used to document and perform risk and trend analyses on the extent and intensity of individual natural hazard events in various parts of the world.	http://www.munichre.com/en/reinsurance/business/non-life/georisks/natcatservice/default.aspx
	National Adaptation Strategies (EEA)	Up-to-date database of EU Member State progress on the EU's Adaptation White Paper. It is a good source of country-specific actions.	http://www.eea.europa.eu/themes/climate/national-adaptation-strategies
	National Climate Research The Netherlands	The joint website of the Dutch Climate Changes Spatial Planning Programme and the Knowledge for Climate Research Programme. The Climate Changes Spatial Planning Programme enhances joint-learning between communities and people in practice within spatial planning, on several themes: climate scenarios, mitigation, adaptation, integration and communication. The Knowledge for Climate Research Programme develops knowledge and services and focuses on eight hotspots, enabling the climate proofing of the Netherlands.	http://www.climateresearchnetherlands.nl/
	Urban adaptation to climate change in Europe and Interactive maps from the Report on Eye on Earth (EEA)	This Report provides information on challenges and opportunities specific to cities and related national and European policies. It is accompanied by a range of interactive maps from the Eye on Earth report, including on the heat wave risk to European cities; coastal flooding; and the share of green and blue areas.	http://www.eea.europa.eu/publications/urban-adaptation-to-climate-change http://eea.maps.arcgis.com/apps/PublicGallery/index.html?appid=1573f2f083824a34a5640bd04e098248&group=b9052eb339264f64b1eb75f6244eccdf
	Biodiversity		
	ALARM	ALARM (Assessing LARge Scale Risks for Biodiversity with Tested Methods) is a research project that developed and tested methods and protocols for the assessment of large-scale environmental risks, in order to minimise negative direct and indirect human impacts.	http://www.alarmproject.net/alarm/
	Biodiversity Data Centre (EEA)	Repository of a wide range of biodiversity-relevant data and information. It includes all the latest biodiversity-relevant developments within the EEA and is a good meta-source of	http://www.eea.europa.eu/themes/biodiversity/dc

		developments across European biodiversity policy and reporting.	
	Birdlife Datazone	Updated site that provides species- and habitat-specific information for sites across the EU (and beyond).	http://www.birdlife.org/datazone/
	Biodiversity Information System for Europe, BISE (EEA)	Database of all relevant European biodiversity data sources. It is a good source of indicators and maps collated from across European institutions.	http://biodiversity.euroopa.eu/data
	European Topic Centre on Biological Diversity, ETC/BC (EEA)	The ETC/BD is an international consortium working with the EEA under a framework partnership agreement. It presents expert knowledge and reporting in a series of reports and databases.	http://bd.eionet.europa.eu/
	Global Biodiversity Information Service	Publicly accessible biodiversity data, including species occurrence and taxonomic information. It is a very detailed species-specific data source and a good indicator of potential species presence across Europe for use in scoping. It is likely to require site investigation to confirm occurrences.	http://data.gbif.org/welcome.htm
	Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)	The IPBES goal is to be an interface between the scientific community and policy makers and to build capacity for and strengthen the use of science in policy making. IPBES set up a mechanism to address the gaps in the science policy interface on biodiversity and ecosystem services.	http://www.ipbes.net/
	MACIS	MACIS (M inimisation of and A daptation to C limate C hange I mpacts on B iodiversity) is a research project that summarises what is already known about the impacts of climate change on biodiversity and developed methods to assess potential impacts in the future.	http://macis-project.net/index.html
	Natura2000 Viewer (EEA)	Information on the Natura2000 network across EU Member States.	http://natura2000.eea.europa.eu/#
	RESPONSES	The objective of the RESPONSES research project is to identify and assess integrated EU climate-change policy responses that achieve ambitious mitigation and environmental targets and, at the same time, reduce the EU's vulnerability to inevitable climate change impacts.	http://www.responsesproject.eu/
General			
	Data and Maps (European Environment Agency)	Access to the EEA's maps, indicators, databases and graphs.	http://www.eea.europa.eu/data-and-maps
	EUROSTAT	Database with a huge range of environmental, economic and social data.	http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home
	EUROSTAT Country profiles	Country-specific data on a range of issues including climate change emissions and sectoral activity.	http://epp.eurostat.ec.europa.eu/guip/introAction.do
	EUROSTAT Sustainable development indicators	The Sustainable Development Indicators are used to monitor the EU Sustainable Development Strategy in a report published by Eurostat every two years. They are organised into ten themes, including climate change and natural resources, and include Member State-level information.	http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators
	Group on Earth Observatories (GEO)	Database of global data components on a range of environmental aspects, including climate change and biodiversity.	http://geossregistries.info/holdings.htm
	Indicators (EEA)	Indicators and factsheets about Europe's environment.	http://www.eea.europa.eu/data-and-maps/indicators#c7=all&c5=&c0=10&b_start=0

Annex 3: Tools for integrating climate change and biodiversity in EIA

This annex provides an overview of some of the tools and approaches that are available to support the assessment of climate change and biodiversity within EIA. This is not an exhaustive list and many other tools may also be relevant.³¹ Some of the tools and approaches listed are used to support the assessment of specific aspects of climate change and biodiversity (e.g. GHG emission calculators and ecological surveys), whilst others can be more generally applicable. Some apply to specific stages of EIA and others to the whole EIA process.

The tools and approaches that will be relevant and useful for your EIA will depend on the specific circumstances of the project (e.g. the type of project, its location, the characteristics of the receiving environment, etc.) and therefore its potential effects. These circumstances will define the type, level of detail and nature of analysis that is appropriate to a particular EIA and therefore which tools may be relevant. The decision about whether to use any of these tools for the EIA should be taken early in the process, most likely at the scoping stage.

Name	Description	Application Comments	Source of further information
Biodiversity offsetting	Biodiversity offsetting is an approach that seeks to compensate for unavoidable loss of habitats and species due to development. Though not formalised in every Member State, there are specific provisions for offsetting within the Environmental Liability Directive and Habitats Directive — Article 6.4.	The practice is developing across Europe. Recent examples include the 2011 Biodiversity Strategy, which makes reference to the Commission acting in line with previous studies. It is likely that, within the context of European policy, Member States will develop this area as they see fit.	Business-led offsetting programme: http://bbop.forest-trends.org/index.php BirdLife International position on offsetting: http://www.birdlife.org/eu/pdfs/2010_BHDTF_position_Biodiversity_offsets.pdf European Commission feasibility study: http://ec.europa.eu/environment/enveco/pdf/eftec_habitat_technical_report.pdf A source of news, data, and analytics on markets and payments for ecosystem services: http://www.ecosystemmarketplace.com/
Biodiversity screening map	Screening maps are a form of spatial analysis that requires the identification of the habitats sited around a particular project. Based on these, habitats are assessed on their relative worth, considering wider trends and likely impacts of the project. Information on potentially significant effects needing consideration should be part of the screening decision.	Screening maps are useful during the screening and scoping stages, for identifying potential areas of higher-value biodiversity that may be used as alternatives.	Some of the information sources presented in Annex 2 could be useful, but expert judgment and the experience of other stakeholders are more relevant here.

³¹ The IAIA wiki is a useful resource for more general tools and concepts for the practice of EIA: <http://www.iaia.org/iaia/wiki/>.

(Pilot) Carbon footprint exercise (EIB)	<p>The European Investment Bank (EIB) developed a sector-specific methodology to assess the carbon footprint of projects it finances. Most EIB projects emit GHGs into the atmosphere, either directly (e.g. fuel combustion or production-process emissions) or indirectly through purchased electricity and/or heat. In addition, many projects result in emission reductions or increases when compared to what would have happened if the project didn't exist, referred to as the baseline.</p> <p>The objective of the draft methodology is twofold:</p> <ul style="list-style-type: none"> • to assess the absolute GHG emissions of the projects financed by the EIB; and • to assess any emission variations compared to a baseline, referred to as the relative emission. 	A comprehensive practical guide for EIB staff working on the pilot footprint calculations.	EIB
Confidence levels	Confidence levels are an effective approach to communicating uncertainty and may be useful when considering potential climate change impacts.	Increasingly, climate change impacts are being shown in probabilistic scenarios that can be presented in terms of confidence levels.	Confidence levels vary between different climate scenarios — e.g. the IPCC provides information as to specific confidence levels within different assessments.
Disaster risk management	The systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.	This term is an extension of the more general term 'risk management' and addresses the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures that focus on prevention, mitigation and preparedness	
Ecological surveys	Undertaken by expert ecologists, site surveys can identify and describe the ecosystems, habitats and species present on site. This enables the identification of protected species or habitats and informs project designers of the need to reduce avoidable damage to higher-value areas of biodiversity and to look for areas of potential enhancement.	The scale and type of expertise required will vary hugely between projects and should be defined based on local circumstances. An early ecological survey can save time and effort at later stages of the project by allowing the early identification of certain species and habitats that require particular protection or mitigation measures. There is also the need to consider Member States' legal requirements based on the Birds Directive and Habitats Directive.	There is a wide range of consultants available to undertake ecological surveys.

<p>Ecosystem-based approaches</p>	<p>Managing, restoring and protecting biodiversity and ecosystem services provide multiple benefits to human society. These ecosystem-based approaches contribute to protecting and restoring natural ecosystems by conserving or enhancing carbon stocks, reducing emissions caused by ecosystem degradation and loss, and providing cost-effective protection against some of the threats that result from climate change.</p>	<p>Ecosystem-based approaches can be used as cost-effective alternatives to infrastructure projects or their elements.</p>	<p>Relevant information from the DG Environment website, including the following reports:</p> <ul style="list-style-type: none"> • Towards a Strategy on Climate Change, Ecosystem Services and Biodiversity http://ec.europa.eu/environment/nature/pdf/discussion_paper_climate_change.pdf • Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe http://ec.europa.eu/environment/nature/climatechange/pdf/EbA_EBM_CC_Final_Report.pdf <p>Relevant information from the CBD website: http://www.cbd.int/climate/</p>
<p>Ecosystem services approach</p>	<p>Ecosystem services potentially offer a new tool to use in EIA, using the concepts developed by the Millennium Ecosystem Assessment.</p>	<p>Ecosystem services could be used in particular when considering alternatives and mitigation measures in EIA.</p>	<p>Millennium Ecosystem Assessment (MEA) (2005) Ecosystems and Human Well-Being: Synthesis. Island Press, Washington. http://www.maweb.org/en/index.aspx</p> <p>World Resources Institute (2008) Ecosystem Services: A Guide for Decision Makers http://www.wri.org/publication/ecosystem-services-a-guide-for-decision-makers</p> <p>Sheate W, Eales R, Daly E, Murdoch A, and Hill C (2008), Case study on developing tools and methodologies to deliver an ecosystem-based approach: Thames Gateway Green Grids, Project report NR0109, London, Defra, 2008, available at http://randd.defra.gov.uk/Document.aspx?Document=NR0109_7429_FRP.pdf</p>

Ecosystem services valuation	<p>The economic valuation of ecosystem services has significantly developed as a potential tool within impact assessment. Recent analysis within the TEEB and various Member States indicates that this approach has the potential to make the economic value of biodiversity clear. In theory, this would allow a more informed understanding of the societal impact of a project.</p> <p>Valuation is a useful tool but the most efficient use of the concept of ecosystem services within impact assessment may be demonstrating that the environment is important to us rather than quantifying the cost equivalence of this importance.</p>	<p>The time and resource requirements for ecosystem valuation are significant and may undermine its potential to support impact assessment practice where resources are limited. It is possible to relate existing valuation studies to a different project but this is difficult and the results are generally for illustrative purposes only, due to the contextual nature of the environment of different projects. However certain ecosystem services (i.e. provisioning services) can be relatively simply valued and may add value to certain assessments.</p>	<p>Chapter 6 of TEEB for Local and Regional Policy makers considers economic valuation as part of EIA (and SEA) practice:</p> <p>http://www.teebweb.org/local-and-regional-policy-makers-report/</p> <p>Guide to valuing ecosystem services (UK):</p> <p>http://www.defra.gov.uk/environment/natural/ecosystems-services/valuing-ecosystem-services/</p>
GHG conversion factors	<p>Managed by the UK Department for Food, Environment and Rural Affairs (Defra), this resource provides a useful excel-based tool for considering the total GHG emissions of a range of materials and activities.</p> <p>Activities include fuel, electricity, processes, transport and refrigeration.</p>	<p>The tool was developed for the UK but is useful elsewhere because of its wide range of parameters that can be populated with whatever data are available.</p> <p>It is useful for scoping and when considering alternatives.</p>	<p>Sheet available from here:</p> <p>http://archive.defra.gov.uk/environment/business/reporting/pdf/110807-guidelines-ghg-conversion-factors.xls</p>
GHG emission calculators	<p>Emission calculators quantify the total GHG (or often carbon alone) emissions from an activity or project as a whole. Emissions can be calculated for operation or the construction of a project. Various calculators exist and are generally based on GHG equivalents for certain indicators, such as energy consumption.</p>	<p>Depending on the scale of your project, it may be appropriate to hire consultants; online tools can be used for smaller projects. Note that some of these focus on transport emissions and may not always be relevant for all projects.</p>	<p>A number of consultancies operate or provide GHG emissions calculators that can be used for individual projects. Examples include:</p> <p>http://www.carbonindependent.org/</p> <p>http://www.oneplanetliving.net/?s=carbon+calculator</p> <p>The World Resource Institute and World Business Council for Sustainable Development have developed and maintain the http://www.ghgprotocol.org/ website, which includes a wide range of sectoral GHG calculators and related tools/case studies.</p>
GIS and spatial analysis	<p>Geographic Information Systems (GIS) and their use as a form of spatial analysis have proven to be valuable in communicating and identifying environmental impacts of projects. There is a huge spectrum of possible GIS methods and uses and these can be tailored depending on individual project scales and resources.</p>	<p>The nature of the GIS required will vary depending on the scale of the project and its intended purpose. GIS is a broad technique and can be used to undertake analysis of various morphological or technical factors or only to support consultation exercises.</p>	<p>GIS is largely dependent on available data; potentially useful sources of pan-European information and data are presented in Annex 2.</p>

GRaBS Adaptation Action Planning Tool	<p>GRaBS (Green and blue space adaptation for urban areas and eco towns) is an online toolkit (developed within the INTERREG IV C programme) that presents spatially various aspects of climate change risk and vulnerability. It has relatively low data resolution but may be useful to understand broader regional vulnerabilities.</p>	<p>It is a useful tool for the scoping stage and for identifying regional trends for certain climate hazards. However, its current scope covers only a limited number of locations (GRaBS partners).</p>	<p>http://www.ppgis.manchester.ac.uk/grabs/start.html</p>
Green infrastructure	<p>‘Green infrastructure’ refers to ecosystem-based approaches in a spatial context. It can be defined as a strategically planned and delivered network of high- quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering a wide range of benefits and services. Green Infrastructure includes natural and semi-natural areas, features and green spaces in rural and urban, terrestrial, freshwater, coastal and marine areas. Areas protected as Natura 2000 sites are at the core of green Infrastructure.</p> <p>The underlying principle of Green Infrastructure is that the same area of land can frequently offer multiple benefits. By enhancing Green Infrastructure, valuable landscape features can be maintained or created, which is valuable not only for biodiversity, climate change mitigation and adaptation, but also contributes to ecosystem services such as clean water, productive soil and attractive recreational areas. In addition, Green Infrastructure can sometimes be a cost-effective alternative or be complementary to grey infrastructure and intensive land use change.</p>	<p>It is useful when considering alternatives and mitigation measures.</p>	<p>http://ec.europa.eu/environment/nature/ecosystems/index_en.htm</p>
Integrated Biodiversity Assessment Tool (IBAT) for Business	<p>The tool offers up-to-date biodiversity information to support impact assessment.</p>	<p>For business use, subscription required.</p>	<p>https://www.ibatforbusiness.org/login</p>

Integrated Biodiversity Assessment Tool (IBAT) for Research and Conservation Planning	IBAT for Research and Conservation Planning is an innovative tool designed to facilitate access to a range of global and national data layers, such as protected area boundaries, biological information about habitat and species diversity indices, and key areas for biodiversity, which can be useful for research and conservation planning purposes.	To be used by the academic and conservation research communities.	https://www.ibat-alliance.org/ibat-conservation/
Life Cycle Assessment (LCA)	<p>LCA is a technique that seeks to consider all the environmental impacts of particular actions over their lifetimes. This is particularly relevant to climate change as GHG emissions are often released during the construction stage.</p> <p>LCA can include a full assessment of all impacts in detail or be a less quantitative and detailed consideration of the materials in use and their probable environmental impacts. For example, responsibly-sourced wood has a lower carbon footprint than steel and a generally lower impact on biodiversity than un-certified wood. LCAs can be undertaken by consultants or in-house.</p>	<p>Undertaking full LCA can be a very costly and timely process, but certain elements of a project may already be subject to LCA so the information can be used by EIA where available.</p> <p>It may also be possible to undertake a qualitative assessment of possible LCA impacts based on readily available information such as material types.</p> <p>LCA is particularly useful during the impact assessment stage of the EIA and can inform the consideration of alternatives but identify the most significant elements of a project in terms of biodiversity and climate change.</p>	<p>Online repository of LCA tools: http://www.dantes.info/Tools&Methods/Software/enviro_soft_SW.html</p> <p>Introduction on LCA and the LCA Resource Centre are available through the European Commission's Joint Research Centre: http://lca.jrc.ec.europa.eu/lcainfohub/introduction.vm</p>
Network analysis	Network analysis is an effective way to consider complex systems by linking causes and impacts via a chain of causation. The concept is based on the idea that there are links and impact pathways between elements of a project and environmental outcomes, and that these can be identified. This enables the identification of actions that may achieve desired objectives, such as reduced impact or enhancement.	This approach can be used to ascertain the probable impacts and benefits on climate change and biodiversity of various elements of a project by identifying their outcomes via the development of a chain of causation. It is best undertaken during the scoping stage, but may be extended into the later stages of assessment.	Network analysis is generally dependent on the use of expert knowledge and judgment and the accurate identification and linking of drivers and impacts.

<p>Risk management</p>	<p>When considering climate change, it is particularly useful to frame potential impacts in terms of their probability and magnitude. These two components make up risk.</p> <p>Such framing can be achieved for example by considering the probability of impact (how likely is it that rising sea levels will affect a project) in relation to the magnitude of the impact (what would be the likely impact of rising sea levels on a project). Understanding these two elements is essential to reducing vulnerability and increasing resilience.</p>	<p>Thinking in terms of probability and magnitude within an EIA can inform stakeholders about a project's vulnerability and the need for adaptation measures — what alternatives are available and what monitoring is required.</p>	<p>Vulnerability and climate change (Vancouver sewerage area infrastructure): http://www.metrovancouver.org/planning/ClimateChange/ClimateChangeDocs/Vulnerability_climate_change.pdf IAIA's risk management advice: http://www.iaia.org/iaia/wiki/ra_ashx</p>
<p>Robust Decision Making (RDM)</p>	<p>RDM is a decision-making concept that seeks to consider the vulnerability and adaptability of a project rather than solely predicting the impact of that project. An example of RDM could be looking at a road system and considering what climate circumstances would cause the road to cease to operate (for instance floods, temperature changes, etc.). Having identified the vulnerability, the project supported by EIA can then consider potential alternatives that may reduce this vulnerability. This will include an assessment of other elements such as cost and the potential impacts on other EIA issues, including biodiversity.</p>	<p>RDM is particularly useful when considering the impacts of climate change on a project and should be integrated into the alternative stage of project design and EIA.</p> <p>RDM approaches are commonly used within project design but EIA offers the potential to make this link to climate change more explicit and effective.</p>	<p>RDM and climate change: http://www.rdcep.org/ Related publications: http://www.rand.org/international_programs/pardee/pubs/futures_method/exploratory.html</p>
<p>Scenarios</p>	<p>Scenarios relate to climate change (e.g. IPCC scenarios) and socio-economic/alternative futures scenarios and assess the resilience of projects and the environment in the long term. The use of scenarios is a response to uncertainty.</p>	<p>Scenarios are effective for considering the evolution of the baseline — both in terms of the potential impacts of the climate on a project and the changes to wider socio-economic context that the project operates in. Scenarios can also support assessing alternatives.</p>	<p>Potential European resources include the information on the EEA's website: http://www.eea.europa.eu/the_mes/scenarios/scenarios-and-forward-studies-eea-activities http://www.eea.europa.eu/the_mes/scenarios/intro http://scenarios.ew.eea.europa.eu/</p>

Spheres of influence and ecosystem chains	<p>Spheres of influence are based on using spatial tools to assess the potential effects of a project beyond the specific project boundaries. These concepts use tools such as network analysis but apply them spatially. This entails looking at the indirect impact on downstream or related ecosystems, for instance at how changing water abstraction will impact downstream systems; how increased dust will affect the turbidity of downstream environments; how removing one habitat type will affect neighbouring habitats.</p>	<p>This concept is particularly useful for the screening and scoping stages and for identifying indirect and secondary effects. It requires an understanding of possible impacts and causal chains. Network analysis is a related tool.</p> <p>It may also be useful when considering alternatives and their impacts.</p>	<p>Some information sources presented in Annex 2 may be helpful, but expert judgment and the experience of other stakeholders are more relevant.</p>
Technical data	<p>Technical data and parameters provided by equipment manufacturers may include information on emissions per production unit; energy use/demand, etc.</p>	<p>Data from process and equipment suppliers could be used to assess the magnitude and significance of a project's overall GHG emissions and how GHG emissions can be mitigated.</p>	<p>Many potential sources of such data and comparative data exist for different types of common equipment, see for example: http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/technology-advice/pages/office-equipment.aspx</p>
Vulnerability assessment	<p>A vulnerability assessment is the process of identifying, quantifying, and prioritising (or ranking) the vulnerabilities in a system. Vulnerability assessment has many things in common with risk assessment. Assessments are typically performed according to the following steps:</p> <ul style="list-style-type: none"> • cataloguing assets and capabilities (resources) in a system • assigning quantifiable value (or at least rank order) and importance to those resources • identifying the vulnerabilities or potential threats to each resource • mitigating or eliminating the most serious vulnerabilities for the most valuable resources. 	<p>Vulnerability assessment is helpful when taking a resilience approach to climate change. It needs to be built into any effective assessment of the evolution of the baseline environment and of alternatives to investigate how the environment will change if the plan or programme is not implemented, and in relation to different alternatives. It can therefore be used to evaluate alternatives and to help identify and select the most resilient one(s).</p>	<p>Climate change Clearing House. Technical Briefings on Climate Vulnerability Assessment: http://www.theclimatechange clearinghouse.org/Resources/TechBrief/default.aspx</p> <p>Scanning the Conservation Horizon: A Guide to Climate Change Vulnerability Assessment (National Wildlife Federation, Washington, D.C., 2011): www.nwf.org/vulnerabilityguide</p>



21 APPENDIX J: CHATHAM HOUSE, CLIMATE CHANGE RISK ASSESSMENT 2021

Summary of research findings

Environment and Society Programme

Daniel Quiggin, Kris De Meyer, Lucy Hubble-Rose and Antony Froggatt

September 2021

Climate change risk assessment 2021

The world is dangerously off track to meet the Paris Agreement goals.

The risks are compounding.

Without immediate action the impacts will be devastating in the coming decades.

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OUT-PATIENT



Introduction and context

This short report summarizes climate risks and their consequences for people, food and water security, as well as national and international security, migration, economies and trade, focusing on impacts that are likely to be locked in for the period 2040–50 unless emissions drastically decline before 2030.

The summary report is intended for heads of government and ministers. It is supported by a full-length Chatham House research paper to inform briefing officials, which gives fuller detail on all the content. Note that all references are provided in the research paper.

Current emissions and temperature pathways

Central estimate
2.7°C,
plausibly
higher

Global efforts to reduce CO₂ emissions are dangerously off track. Current nationally determined contributions (NDCs) indicate a 1 per cent reduction in emissions by 2030, compared with 2010. If policy ambition, low-carbon technology deployment and investment follow current trends, 2.7°C of warming by the end of the century is the central estimate, relative to pre-industrial levels, but there is a 10 per cent chance of warming of 3.5°C. These projections assume that countries will meet their NDCs; if they fail to do so, the probability of extreme temperature increases is non-negligible. A global temperature increase greater than 5°C should not be ruled out.

Consequences for reaching the Paris Agreement goals

If emissions follow the trajectory set by current NDCs, there is a less than 5 per cent chance of keeping temperatures **well below 2°C**, relative to pre-industrial levels, and a less than 1 per cent chance of **reaching the 1.5°C Paris Agreement target**.

Less than
1%
chance

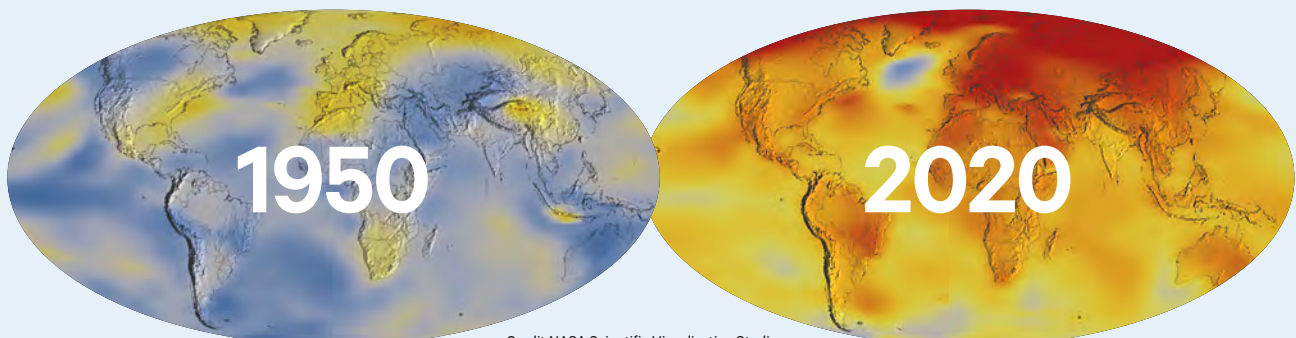
Net zero pledges

Many countries are currently focusing on net zero pledges, with an implicit assumption that these targets will avert climate change. However, net zero pledges lack policy detail and delivery mechanisms, and the gap between targets and the global carbon budget is widening every year. Unless NDCs are dramatically increased, and policy and delivery mechanisms are commensurately revised, many of the impacts described in this summary report will be locked in by 2040, and become so severe they go beyond the limits of what nations can adapt to.

An opportunity and necessity for greater mitigation action

The governments of highly emitting countries have an opportunity to accelerate emissions reductions through ambitious revisions of their NDCs, significantly enhancing policy delivery mechanisms and incentivizing rapid large-scale investment in low-carbon technologies. This will lead to cheaper energy and avert the worst climate impacts. For more information on accelerating the energy transition, see www.energychallenge.info.

Variation of average global surface temperatures



Credit NASA Scientific Visualization Studio

How to read this summary report

Approach to climate risk

This report summarizes the climate risks and impacts associated with the current global emissions trajectory and existing NDCs. Our descriptions of these risks focus on the next 20–30 years, to highlight the urgent need for emissions reduction actions to avert them. Longer-term impacts regarding flooding and sea level rise are also provided.



Protests erupt after the wildfires in Greece, 2021.
Copyright © George Panagakis/Pacific Press/LightRocket/Getty Images

Climate impact themes



Heat, productivity and health



Food security



Water security



Flooding



Tipping points and cascading risks

The report sets out five areas of climate change impacts and adverse consequences that will become severe over the next 20–30 years.

Analysing these impact themes, and based on the central impact indicator estimate, we highlight:

- The climate impacts of concern.
- What is already happening.
- How much worse impacts are likely to get by 2040–50, if emission trends continue.
- Impacts and consequences at a regional level and global scale.

For fuller details on how to interpret the climate risks and impacts described in this summary report, see the supporting Chatham House research paper for briefing officials, which includes greater geographic granularity as well as methodological descriptions.

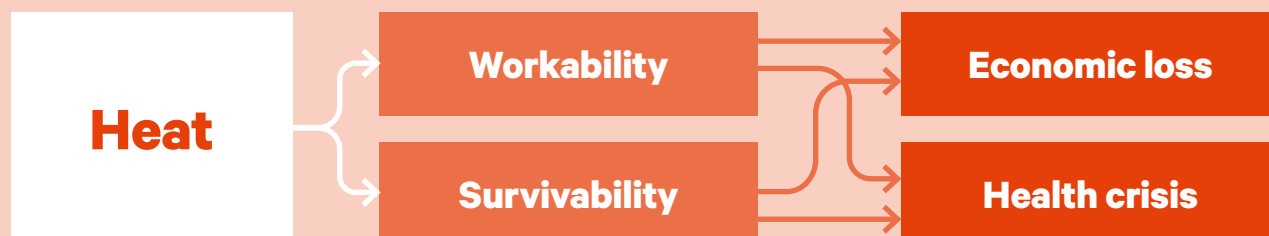
Read the full research paper at www.chathamhouse.org/2021/09/climate-change-risk-assessment-2021



Heat, productivity and health

Impact of concern

Too hot to work or even survive outdoors, leading to productivity losses and health crises.



What is happening already?

>50%
COVID-19 lost
working hours

In 2019, a potential **300 billion working hours were lost** due to temperature increases globally, 52 per cent more than in 2000. COVID-19 resulted in around 580 billion lost working hours in 2020; hence temperature increases are already resulting in the equivalent of over 50 per cent of COVID-19-induced lost working hours.

Globally, heat-related mortality has increased by nearly 54 per cent in the over-65s in the past two decades, reaching 296,000 deaths in 2018.

Europe: 104,000 deaths China: 62,000 deaths India: 31,000 deaths

Deaths
54% up



Australian bushfire, 2021. Copyright © Paul Kane/Getty Images

The Australian bushfires in 2019–20 exhibited a heatwave intensity that is now **10 times more likely** than at the beginning of the last century. Property and economic damage resulting from the disaster is estimated to have totalled some US \$70 billion.

The 2020 heatwave in Siberia caused wide-scale wildfires, loss of permafrost, and an invasion of pests. Climate change has already made this heatwave at least **600 times more likely**.

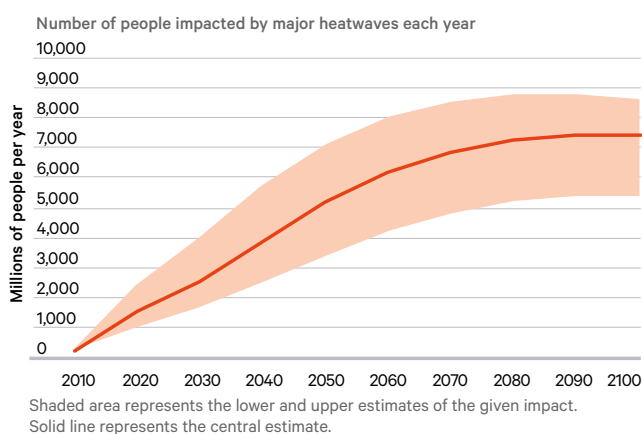


Heat, productivity and health

How much worse will it get?

3.9 billion exposed to major heatwaves by 2040

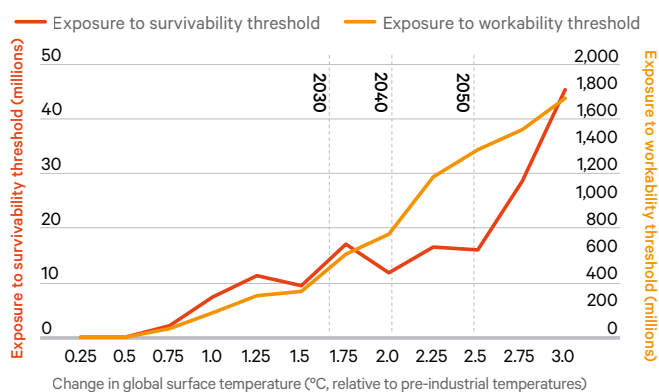
If emissions do not come down drastically before 2030, then by 2040 3.9 billion people are likely to experience major heatwaves each year. Major heatwaves represent the most extreme historic temperatures, lasting four or more days. Hence they are comparable to the most severe historic heatwaves.



400 million unable to work and 10 million deaths per year

Globally, each year in the 2030s:

- More than 400 million people a year are likely to be exposed to temperatures exceeding the workability threshold (unable to work outdoors).
- More than 10 million people a year are likely to be exposed to heat stress exceeding the survivability threshold (likely to die outside).

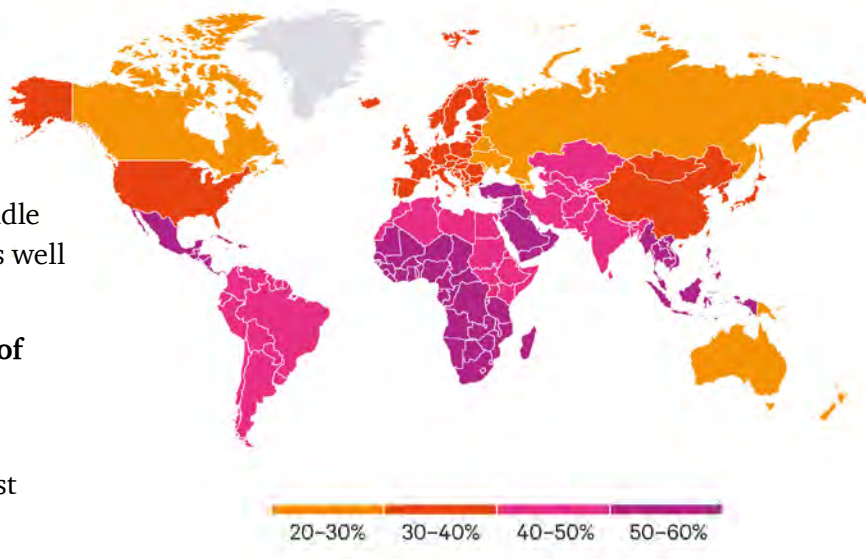


Regional impacts, 2040: proportion of population experiencing major heatwaves each year (Major heatwaves are comparable to the most extreme historic heatwaves)

No region will be spared. By 2040, major heatwaves will be experienced each year by **50 per cent or more** of the populations in West, Central, East and Southern Africa, the Middle East, South and Southeast Asia, as well as Central America and Brazil.

By 2050, **more than 70 per cent of people in every region** will experience heatwaves each year.

Urban areas will suffer the greatest challenges of workability and survivability.





Impact of concern

Agricultural drought and heat extremes reduce crop yields.



What is happening already?

In recent years, regional drought and heatwaves have caused 20–50 per cent crop harvest losses.

Australia: Severe drought caused a 50 per cent collapse of wheat harvests two years in a row (2006–07).

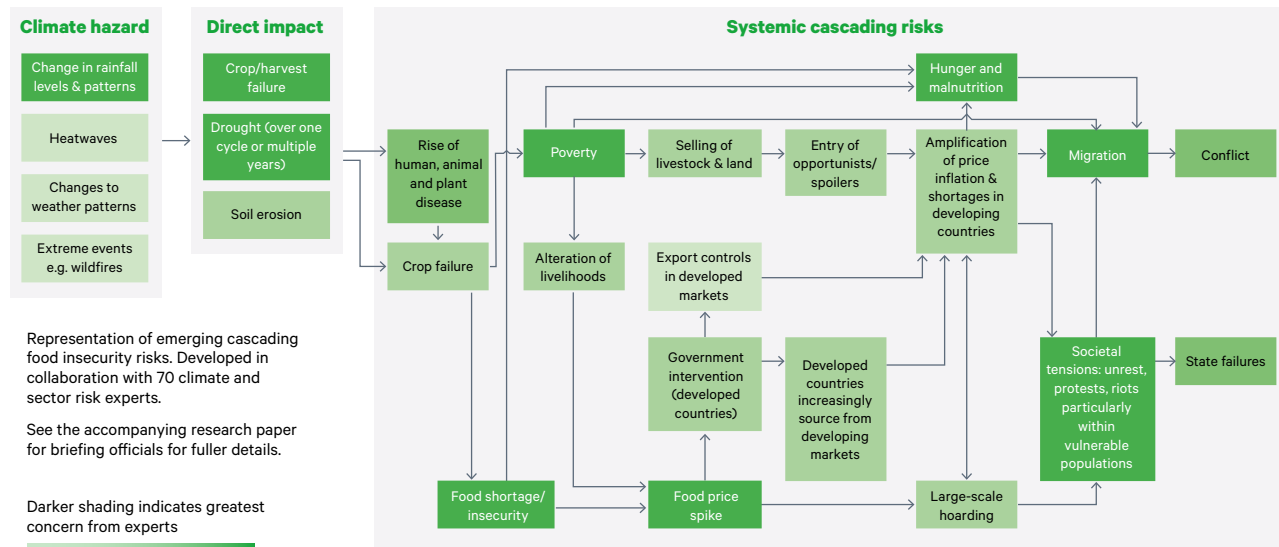
Europe: The 2018 heatwave led to multiple crop failures and yield losses of up to 50 per cent in Central and Northern Europe.

China: In Liaoning Province, drought years led to 20–25 per cent reductions in maize harvests.

The **global food crisis** of 2007–08, caused by depleted grain stores, Australian drought and regional crop failures, led to a doubling of global food prices, export bans, food insecurity for importers, social unrest, and mass protests in countries including Cameroon, Egypt, Indonesia, Mexico, Morocco, Nepal, Peru, Senegal and Yemen.

**Up to 50%
crop harvest
loss**

Emerging cascading food insecurity risks



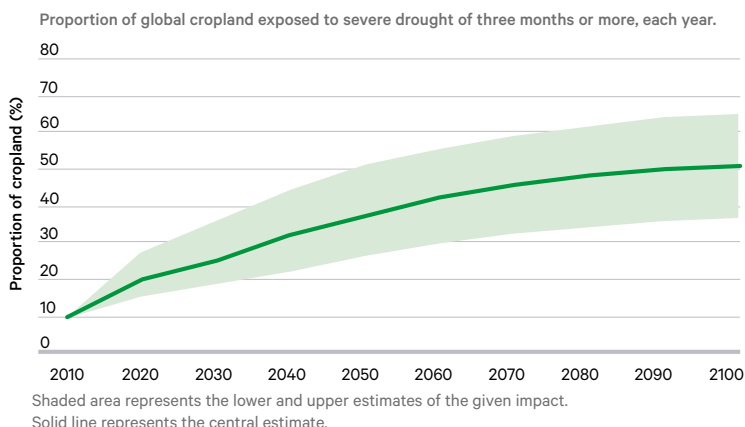


How much worse will it get?

50% more food needed

To meet global demand, agriculture will need to produce

almost 50 per cent more food by 2050. But yields could decline by 30 per cent in the absence of dramatic emissions reductions.

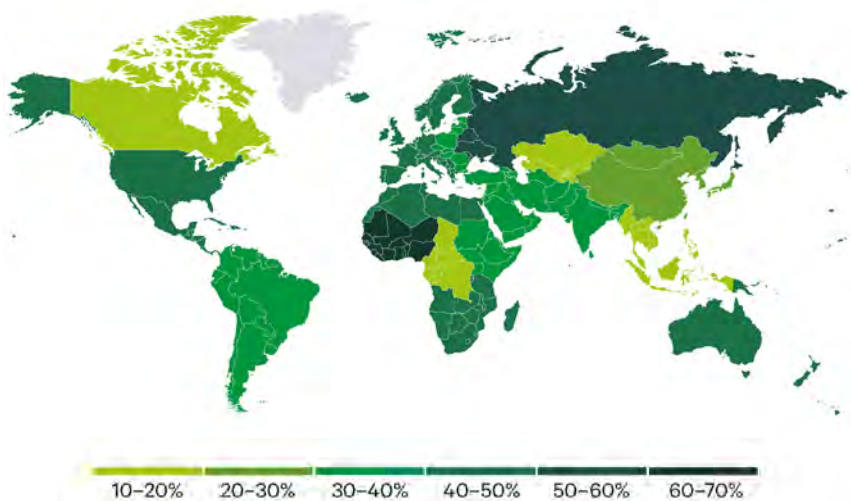


Droughts 3 x worse by 2040

By 2040, the proportion of global cropland affected by severe drought – equivalent to that experienced in Central Europe in 2018 (50 per cent yield reductions) – will likely rise to 32 per cent each year, more than three times the historic average.

Wheat and rice together make up 37 per cent of global average calorific intake. By 2050, more than 35 per cent of the global cropland used to grow both these crops will likely be exposed to damaging hot spells each year, causing reductions to yields. South Asia is likely to be the most impacted, with more than 60 per cent of winter wheat, spring wheat and rice exposed to damaging hot spells.

Regional impacts, 2050: proportion of cropland exposed to severe drought each year (Severe drought is equivalent to that experienced in Central Europe in 2018)



Farmers in the worst-affected areas (including the critical breadbasket regions of **southern Russia** and the **US**) are likely to experience severe agricultural drought impacting 40 per cent or more of their cropland area every year during the 2050s.

During the 2040s there is a 50% chance of synchronous crop failure

A synchronous >10 per cent yield loss in the top four maize producing countries would have devastating impacts on availability and prices. Currently, there is a near zero chance of this happening. Over the decade of the 2040s, the risk of this increases to just under 50 per cent.



Water security

Impact of concern

Changes in rainfall patterns and water scarcity causing premature mortality, reductions in sanitation and hygiene, and greater malnutrition.



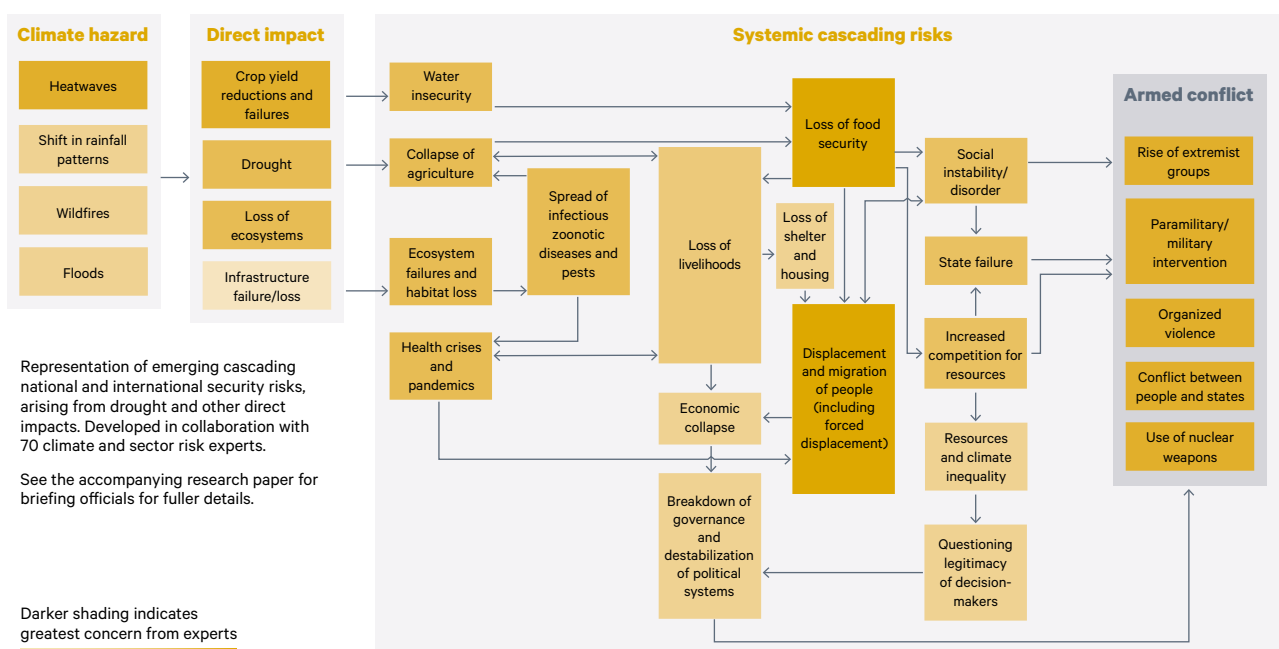
What is happening already?

13.4m
in the Sahel
needing
relief aid

In the Sahel in 2020, some 13.4 million people in Mali, Niger and Burkina Faso were reported as being in need of humanitarian assistance because of drought. Over twice the global land area was affected by drought in 2019, compared with the historic baseline.

Water scarcity during the **US drought of 2012** was forecast to reduce GDP growth by **0.5–1 percentage point**, with natural disasters declared in 71 per cent of counties. In 2020, drought in the **China's Yunnan Province** affected **1.5 million people**. Around 100 rivers were cut off, 180 reservoirs dried up, and 140 irrigation wells had insufficient water supply.

Emerging cascading water insecurity risks

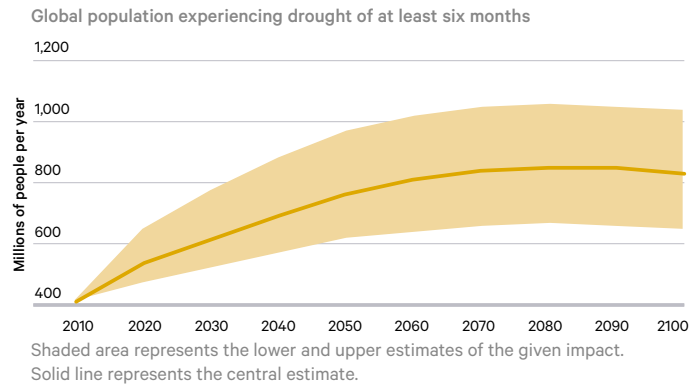




How much worse will it get?

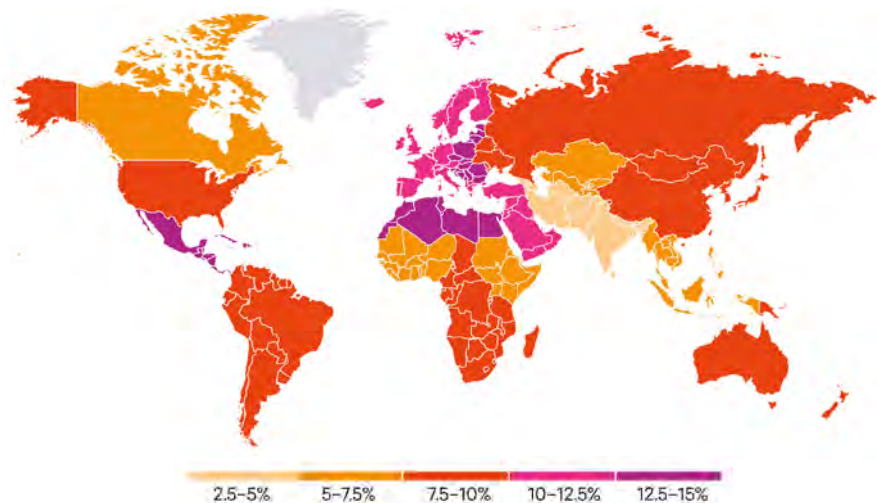
**By 2040
700 million
exposed
to drought**

By 2040, almost 700 million people each year will likely be exposed to prolonged severe droughts of at least six months' duration. The severity and length of these future droughts are at least as bad as the first wave (1934) of the US Midwest 'dust bowl' drought of the 1930s.

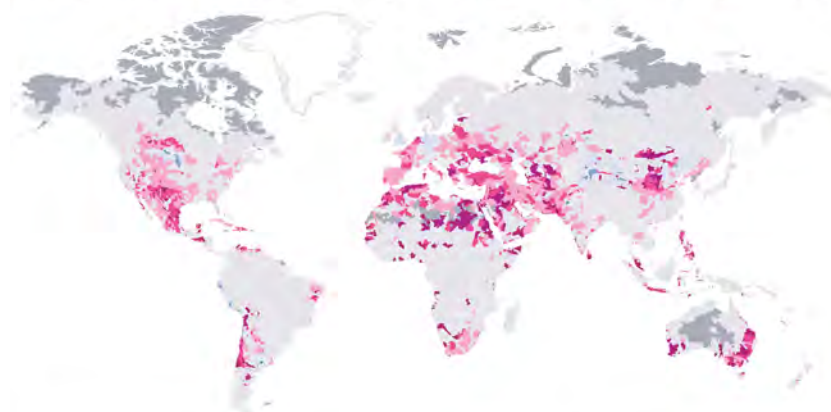
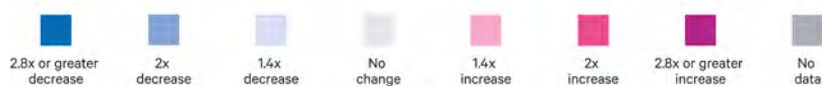


Regional impacts, 2040: proportion of population experiencing prolonged severe drought each year

By 2040, North Africa, the Middle East, Western and Central Europe, and Central America will all see more than 10 per cent of their populations impacted by prolonged severe drought.



Regions of increasing water stress (demand relative to supply) in 2040, relative to 2019



Miller Cylindrical projection (10° E) Water stress data: Aqueduct Water Risk Atlas Country and boundary data: Natural Earth

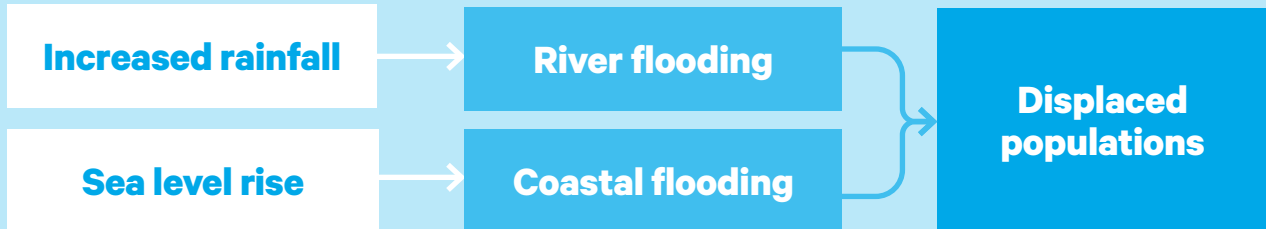
North Africa and the Middle East are likely to have the greatest proportion of their populations experiencing extreme water stress (<500m³ per head per year): 17 per cent and 14 per cent in 2050, respectively.



Flooding

Impact of concern

Coastal and river flooding, leading to population displacement



What is happening already?

23%
more floods
in 2020

One billion people now occupy land less than 10 metres above current high tide lines, including 230 million below 1 metre.

In 2020 there were 23 per cent more floods than the annual average of 163 events in 2000–19, and 18 per cent more flood deaths than the annual average of 5,233 deaths.





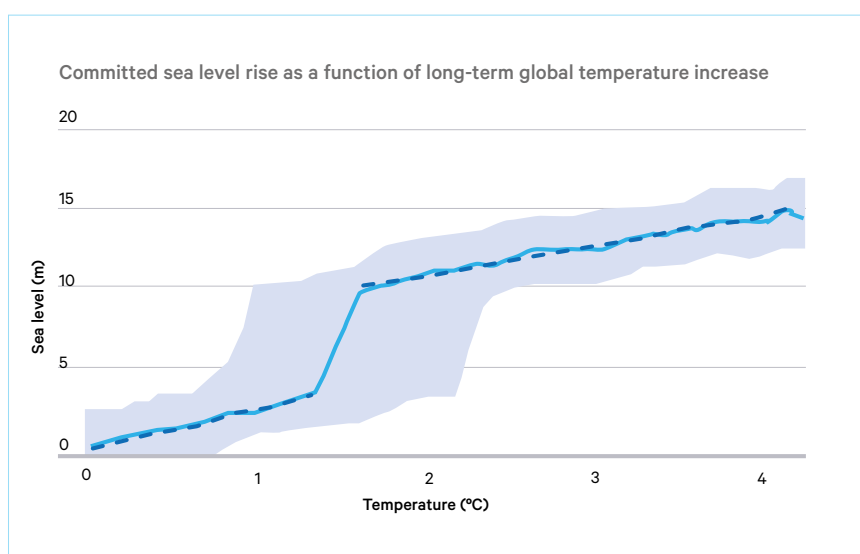
How much worse will it get?

200 million people at risk of frequent, devastating '100-year' floods

Coastal flooding is likely to occur over a longer time frame. The long-term central estimate of **committed sea level rise is around 12 metres**, if temperatures are held at 2°C. This could occur over 500 years or 10,000 years: the time frames are extremely uncertain.

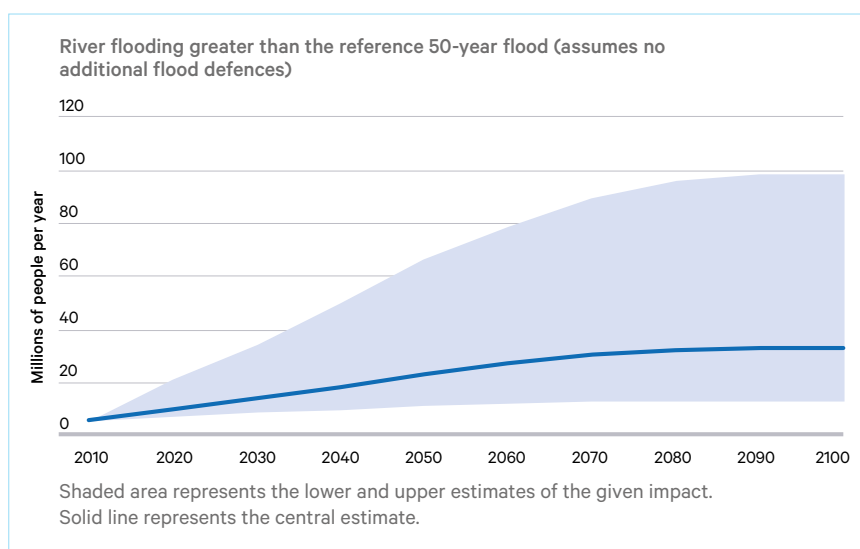
By 2100, nearly 200 million people worldwide will be living below the 100-year flood level. However, if the rate of Antarctic ice melt continues at the rate of recent years, this is likely to be an underestimate.

A 1 metre rise in relative sea level increases the probability of current 100-year flood events by around 40 times for Shanghai, around 200 times for New York, and around 1,000 times for Kolkata.



60 million people per year will be impacted by river flooding

River flooding will likely impact nearly 60 million people a year globally by 2100. The impacts are concentrated in South Asia, where 33 million a year are likely to be affected.





Instability and tipping points

Abrupt changes – or tipping points – are difficult to characterize and predict. There are growing concerns that climate models may under-represent the influence of tipping points.

One such example is the melting of the permafrost in the Arctic leading to the release of methane. The latest IPCC climate models show a cluster of such abrupt shifts between 1.5°C and 2°C. If tipping points are reached at lower temperatures, the impacts presented in the previous sections are likely to be an underestimate, occurring with a higher probability, sooner in time. Moreover, the severity and frequency of the impacts will be far more extreme, which in turn will hugely reduce the capacity of societies the world over to adapt, compounding the impacts.

Global temperatures can rise significantly beyond those characterized in the previous sections. Current atmospheric CO₂ concentration is around 420 parts per million. Around 50 million years ago, atmospheric CO₂ exceeded 1,000 parts per million, while global mean surface temperatures were 9° to 14°C.



Glacial ice sheet, Greenland, 2013.
Copyright © Joe Raedle/Getty Images

Examples of tipping points include:

- **Greenland and West Antarctic ice sheet disintegration:** Melting of ice reduces reflection of sunlight back out into space, resulting in accelerated warming and increased sea level rise.
- **Permafrost loss:** Abrupt increase in emissions of CO₂ and methane through the thawing of frozen carbon-rich soils. Methane is a more potent greenhouse gas than CO₂, resulting in accelerated warming.
- **AMOC breakdown:** Caused by an increased influx of freshwater into the North Atlantic, reducing the ability of oceans to disperse heat around the globe.
- **Boreal forest shift:** Dieback of boreal forests, potentially turning some regions to carbon sources as pests and wildfires create large-scale disturbances.
- **Amazon rainforest dieback:** A shift towards savannah, resulting in large release of CO₂.

Ice sheets are crucial for the stability of the climate system as a whole, and are already at risk of transgressing their temperature thresholds within the Paris Agreement range of 1.5°–2°C. A domino-like effect has recently been identified between various tipping points, with the potential to lead to abrupt non-linear responses. Tipping point cascades (two or more tipping points being initiated for a given temperature level) have been identified in more than 60 per cent of simulations, with the initial trigger likely to be polar ice sheet melting, and the Atlantic Meridional Overturning Circulation (AMOC) acting as a mediator transmitting cascades.



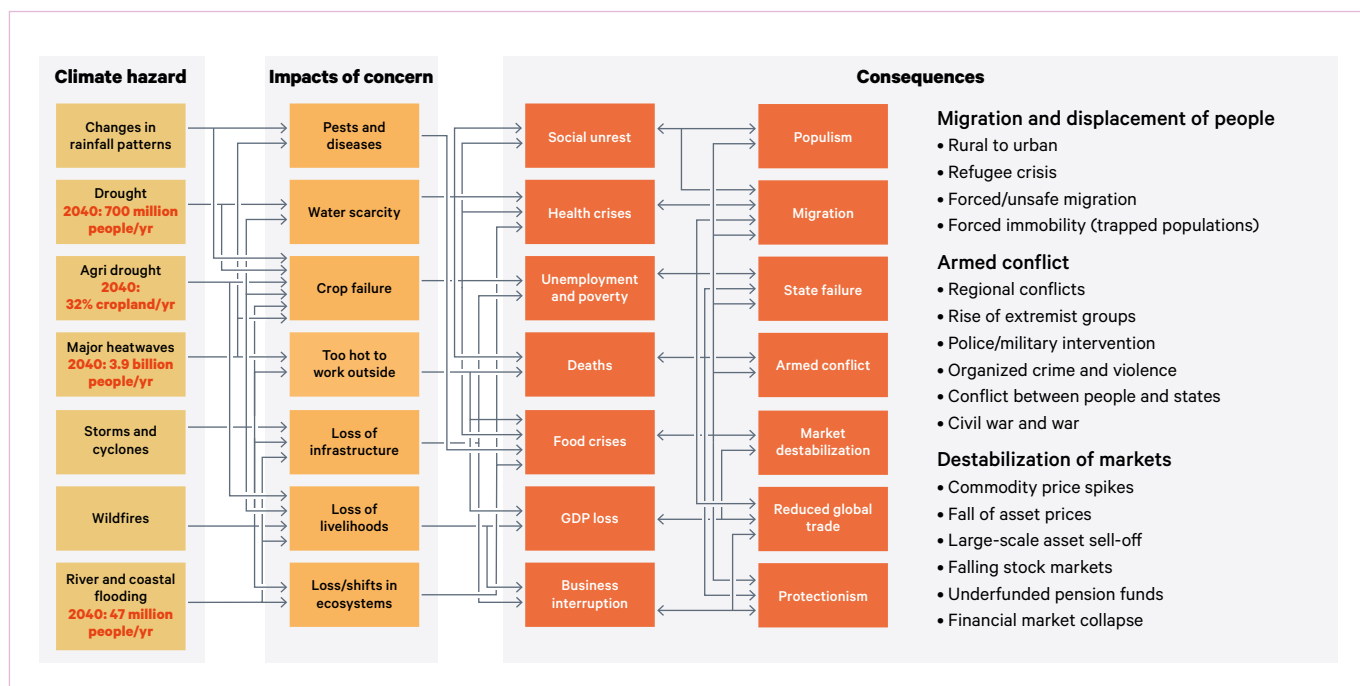
Cascading risks: economic, national and international security

Systemic risks arise from the consequence of direct impacts – materializing as a chain, or cascade, of impacts – compounding to produce even more severe impacts for people and societies. Due to their complex nature, it is not possible to quantify the probability and severity of systemic risks. Instead, 70 experts from a broad range of disciplines contributed to an exercise to identify the major systemic risk dynamics and impacts that climate scientists and sector risk experts are concerned will occur as direct impacts increase in prevalence. Their insights are captured in the six diagrams and associated descriptions included in the research paper for briefing officials. The figure on this page summarizes the detailed risk cascades.

Cascading climate impacts can be expected to cause higher mortality rates, drive political instability and greater national insecurity, and fuel regional and international conflict.

The cascading risks that most concern the contributing experts are the interconnections between shifting weather patterns, resulting in changes to ecosystems, and the rise of pests and diseases, which combined with heatwaves and drought will likely drive unprecedented levels of crop failure, food insecurity and migration. In turn, all will likely result in increased infectious diseases, and a negative feedback loop that compounds each of these impacts.

Extreme weather events often initiate compounding cascading impacts across borders and disrupt global supply chains. The American Meteorological Society has found a substantial link between climate change and extreme weather in 70 per cent of instances studied (146 research findings) between 2011 and 2018.

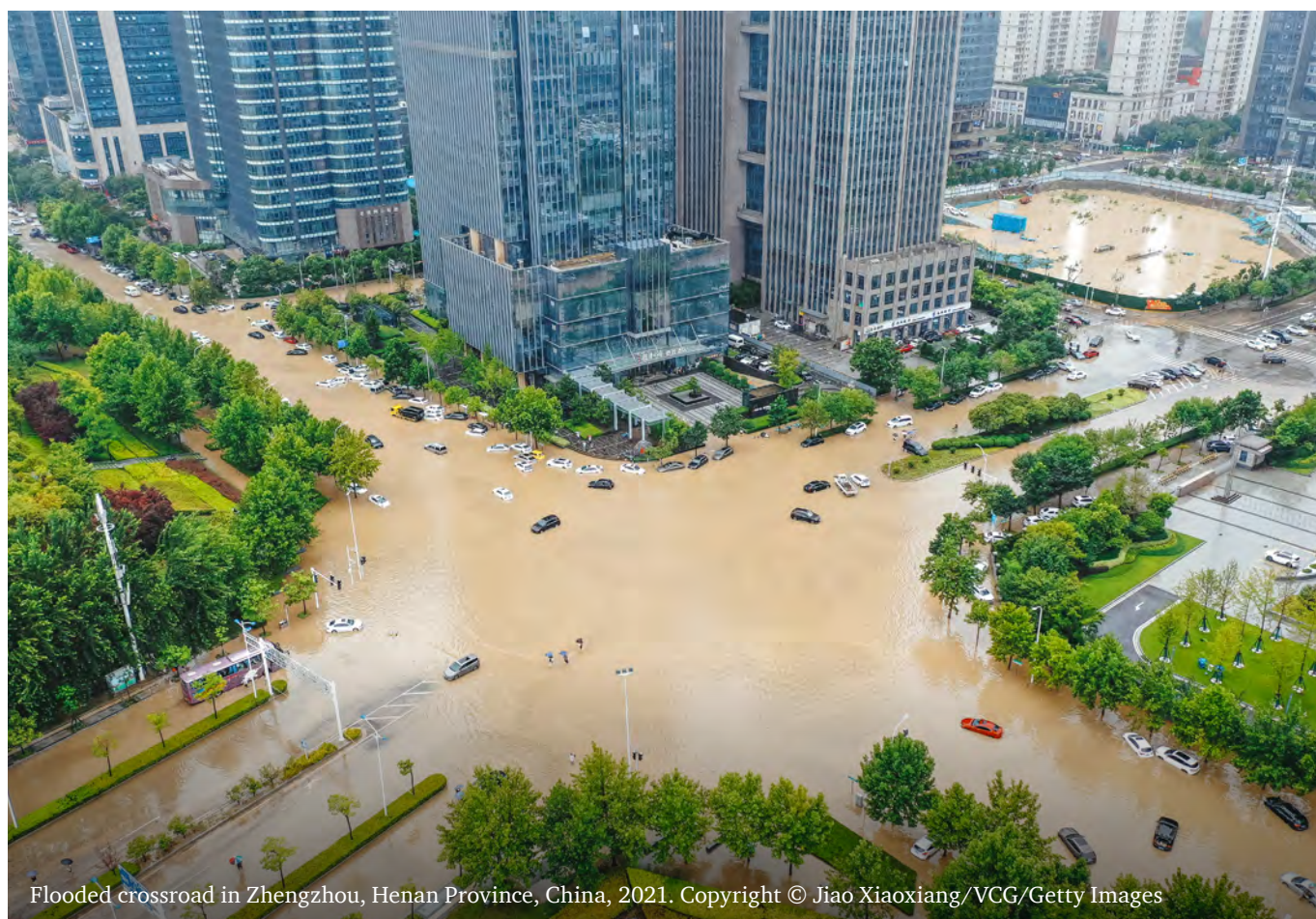




Tipping points and cascading risks

Recent examples of cascading impacts, due to extreme weather

- Globally, every year since 2008, an average of 21.8 million people have been internally displaced by weather-related disasters (extreme heat, drought, floods, storms or wildfires). In 2015, as the number of refugees and migrants entering Europe, having fled conflict in the Middle East and Africa, reached its highest point, at more than 1 million, an equivalent number of people – some 1.1 million – were displaced by extreme weather events in sub-Saharan Africa alone. In 2020, some 30 million people in 143 countries worldwide were displaced by weather-related disasters, 4.3 million of whom in sub-Saharan Africa.
- An abnormally cold spell in Texas in February 2021 brought rolling power outages, resulting in a lack of safe drinking water, and forcing a shutdown of semiconductor chip factories that contributed to a global shortage. Evidence points to the warming of the Arctic, and the resultant weakening of the polar vortex, pushing cold air far further south than normal, and bringing about the coldest period Texas has experienced in more than 30 years.
- The Yangtze river flooding of 2020, caused by the highest rainfall in 60 years, forced authorities to destroy a dam at risk of collapse, and disrupted cargo ships down the river and within Shanghai port itself. The floods caused hundreds of deaths and other casualties in affected areas, as well as heavy financial losses for China, and disrupted global supply chains, including exports of personal protective equipment intended for health workers battling COVID-19.



Flooded crossroad in Zhengzhou, Henan Province, China, 2021. Copyright © Jiao Xiaoxiang/VCG/Getty Images

About the authors

Dr Daniel Quiggin is a senior research fellow with the Environment and Society Programme at Chatham House. He has expertise in the modelling, analysis and forecasting of national and global energy systems, having modelled various UK and global energy scenarios.

As a senior policy adviser at the UK Department for Business, Energy & Industrial Strategy in 2018–20, Daniel led work on the post-Brexit policy implications for the energy sector's trade of goods and services, and helped shape effective strategies for the energy and climate package of the UK–EU FTA negotiations. He also previously worked as an analyst at Investec Asset Management within a commodities and resources investment team.

Daniel holds master's degrees in particle physics and climate science, and a PhD in energy system modelling.

Dr Kris De Meyer is a research fellow in neuroscience at King's College London, and a senior honorary research fellow in earth sciences at University College London. He leads the UCL Climate Action Unit, where he is responsible for grounding climate risk and climate communication projects in insights from neuroscience and psychology.

Kris has a PhD in cybernetics from the University of Reading, and a master's in systems engineering from KU Leuven.

Dr Lucy Hubble-Rose is an honorary research fellow in earth sciences at University College London. In her role as strategy expert for the UCL Climate Action Unit, she is responsible for developing the structure and strategy of the unit's programmes. Lucy is an expert facilitator who specializes in helping people and organizations to deliver action on climate change.

Lucy has a PhD in climate change engagement from the University of Exeter, and a master's in climate change from the University of East Anglia.

Antony Froggatt joined Chatham House in 2007, and is deputy director and a senior research fellow in the Environment and Society Programme.

He has worked as an independent consultant for 20 years with environmental groups, academics and public bodies in Europe and Asia. His most recent research projects are concerned with understanding the energy and climate policy implications of Brexit, and the technological and policy transformation of the power sector.

Since 1992 Antony has been the co-author of the World Nuclear Industry Status Report, a now annual independent review of the nuclear sector.

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T +44 (0)20 7957 5700

F +44 (0)20 7957 5710

E contact@chathamhouse.org

The Royal Institute of International Affairs,
Chatham House, 10 St James's Square,
London SW1Y 4LE

Charity Registration Number: 208223

Acknowledgments

Particular thanks are due to Professor Nigel Arnell and team at the University of Reading, whose 2019 paper and associated data are heavily drawn on throughout the research paper on which this summary report for heads of government is based. Furthermore, the research paper builds on phases one and two of the UK-China Cooperation on Climate Change Risk Assessment projects; all those who contributed to these phases have done much to inform the work captured in the paper and accompanying summary report. Thanks also to the various project partners; to Patrick Morrison at Brand Temple, and Autumn Forecast and Sarah Bunney at Soapbox, for design and typesetting work; to Chris Aylett of the Environment and Society Programme at Chatham House for skilful coordination of the many elements of this project; and to Jo Maher and the Chatham House publications team for editorial support.

We are very grateful to the Foreign, Commonwealth and Development Office for funding the research that has informed the research paper and summary report, through its prosperity programming.



Foreign, Commonwealth
& Development Office