Climate Change and Major Projects

Presented by Claus Kondrup, European Commission, DG Climate Action, at the JASPERS Networking Event "Climate Change Adaptation: Vulnerability and Risk Assessment and the Resilience of Major Infrastructure Projects", at the EIB Brussels Office, 7-8 June 2016
Climate Change and Major Projects

Outline of the climate change related requirements and guidance for major projects in the 2014-2020 programming period

Ensuring resilience to the adverse impacts of climate change and reducing the emission of greenhouse gases

• Climate change requirements part of the legal basis for major projects 2014-2020
• EU Adaptation Strategy 2013:
  • Resilient infrastructure
  • Climate proofing policies
  • Adapting infrastructure to climate change (SWD)
• Guidelines for Project Managers: Making vulnerable investments climate resilient
• Policy objective 2014-2020: climate mainstreaming across the board, at least 20% climate related expenditure
• **Major projects**

• **Adaptation + Mitigation**
  (resilience + GHG Emissions)

• **Climate change impacts:**
  - Increase in overall climate hazards, key hotspots (coastlines, floodplains)
  - Extremes, return period

• **Context, e.g.:**
  - Paris Climate Agreement
  - EU Adaptation Strategy

---

**Introduction**

Major projects are funded by the European Regional Development Fund (ERDF) and the Cohesion Fund and listed in the connected operational programmes.

Climate change adaptation and mitigation considerations are integrated in the preparation and appraisal of major projects.

Adaptation costs to achieve adequate resilience of major projects to the climate impacts of climate change, for example flooding, are based on a vulnerability and risk assessment.

Mitigation seeks to reduce the emission of greenhouse gases, for example in the aviation or bio-energy sectors. This is addressed through the quantification of greenhouse gas emissions and integration in the cost-benefit analysis.

---

**Figure 1. Addressing climate change in the development of major projects**

Consideration of climate change requirements, both adaptation and mitigation should be included as early as possible in the development cycle. By doing so, the corresponding climate resilience measures and mitigation options can be optimally integrated in the project cycle. This is illustrated in Figure 2, which provides an overview of the main project development stages and an indication of how climate change adaptation and mitigation considerations should be included.

The fact sheet is intended for those involved in the various development stages of major projects. It is the initial version and intended to be updated and further developed based on evolving experience and emerging best practice.

**Climate change**

Europe will see a progressive and possibly very strong increase in the overall climate hazard. Key hazards emerge particularly along coastlines and in floodplains. Climate change impacts to critical infrastructure and EU regional investments may strongly affect the economic resilience, for example, in 2030s, multiplied crop failure by 50% and increase more than 10 times present damages by the end of the century.

Economic losses will be highest for the industry, transport and energy sectors. The strongest increase (more than fifteen-fold by the end of the century) in damage is projected for the energy and transport sectors: losses from worst-case droughts and floods in southern Europe and central floods (including the effects of sea-level rise) will show the largest increase, etc. Climate resilience to critical infrastructure and EU regional investments may strongly affect the economic resilience, such as the 2030s, multiplied crop failure by 50% and increase more than 10 times present damages by the end of the century.

Economic losses will be highest for the industry, transport and energy sectors. The strongest increase (more than fifteen-fold by the end of the century) in damage is projected for the energy and transport sectors: losses from worst-case droughts and floods in southern Europe and central floods (including the effects of sea-level rise) will show the largest increase, etc. Climate resilience to critical infrastructure and EU regional investments may strongly affect the economic resilience, such as the 2030s, multiplied crop failure by 50% and increase more than 10 times present damages by the end of the century.

---

**Figure 2. Flood damages, © copyright farouil - creative commons**

**EU Strategy on adaptation to climate change**

The EU Strategy on adaptation to climate change, which was adopted by the European Commission on 16 April 2013, includes specific actions on enhancing the resilience of infrastructure and the efficient management of climate change impacts to the regional and national policy. Climate resilience of major projects will contribute to the objectives of the EU adaptation strategy.
Consideration of climate change requirements should be initiated as early as possible in the project development cycle.
Adaptation to Climate Change

Vulnerability and Risk Assessment

Introduction

The European Commission Climate Action and Adaptation Strategy is the policy of the European Union (EU) to adapt to climate change. It involves identifying which climate-related project is vulnerable to, assessing the level of risk, and determining adaptation measures to reduce that risk to an acceptable level.

The consideration of climate-change related risks is integrated into the legal texts for major projects, but often only on a voluntary basis. It is highly recommended to integrate the vulnerability and risk assessment from the beginning of the project development. However, this is not always possible, due to the long time required for the implementation of measures and the need for a detailed analysis of the impacts. The guidelines for project managers on how to make vulnerable buildings and infrastructure climate change proof, which are included in the project strategy, are detailed in the following sections. This can be considered as a first step.

Figure 3. Overview of the process. © Copyright Tom Hignett - Creative Commons

Figure 4. Main steps in the vulnerability and risk assessment.

- **Vulnerability:** Sensitivity × Exposure
- **Risk:** Likelihood × Impact
- **Adaptation:** Sensitivity, Exposure, Planning

Vulnerability = Sensitivity × Exposure

Risk = Likelihood × Impact

Adaptation = Options, Appraisal, Planning

Prior steps: prepare, plan, define, ...

Figure 5. Diagram: Climate Change Information and Adaptation Options. © European Commission

*The European Commission is committed to ensuring equal access and participation for all users. If you require any assistance or you cannot access a document, please get in touch with the Eurostat Information Systems Unit to request accessibility services, which are free and can be provided in various languages.*
Mitigation of climate change

Introduction
Mitigation of climate change is about reducing the emissions of greenhouse gases (GHG) and limiting global warming. Major projects can contribute in this regard, for example through the design and selection of emission options.

A cost-benefit analysis is required for all major projects including the quantification of the project's GHG emissions. This applies to all major project phases, irrespective of the project category and the level of absolute and relative emissions.

Carbon footprint methodology for major projects

The Carbon Footprint Methodology for major projects (EFCA) includes the evaluation of GHG emissions. The proposed approach to calculate climate change emissions is based on the EU Emission Trading System (EU ETS). This methodology includes the default emissions calculation approach for projects:
- Waste water and sludge treatment
- Waste treatment management facilities
- Municipal solid waste facilities
- Road transport
- Rail transport
- Urban transport
- Building refurbishment

Scope in the carbon footprint assessment

The carbon footprint methodology includes the following main steps:
1. Define project boundary
2. Define the assessment period
3. Emission scope to include:
4. Quantify absolute project emissions (A)
5. Identify and quantify baseline emissions (B)
6. Calculate relative emissions (A - B)

The absolute (A) GHG emissions are the annual emissions estimated for an average year of operation for the project.

The baseline (B) GHG emissions are those emissions which would arise from the expected alternative scenario that independently represents the anthropogenic emissions by sources of GHG that would have occurred in the absence of the project.

The relative (A - B) GHG emissions represent the difference between the absolute project emissions and the baseline emissions.

The absolute and relative emissions should be quantified for a typical year of operation. For certain projects, for example transport projects, where the traffic is fluctuating over time, it is recommended to select a year with the highest level of emissions.

Scope 1 emissions direct emissions that occur from sources within the project boundary, including:

- Fuels burning onsite at the facility
- Industrial processes

Scope 2 emissions indirect emissions that occur from sources outside the project boundary but under the control of the project:

- Indirect emissions from vehicles using transport infrastructure projects that are operated by the owner of the infrastructure
- Electric heating, cooling, and electricity
- Scope 3 emissions those emissions not under the control of the project:

- Indirect GHG emissions from vehicles using transport infrastructure, including fuel shifts and mode effects
- Indirect GHG emissions from the use of energy products purchased by the project

The carbon assessment should include the evaluation of the quantification of GHG emissions. This applies to all major projects, irrespective of the project category and the level of absolute and relative emissions.

Table 2 illustrates the three scopes that are part of the carbon footprint methodology and the particular consideration of emission sources for road, rail, and public transport infrastructure.

The carbon assessment should be included throughout the project development stage, including the evaluation of the carbon footprint methodology and the selection of options - with a view to promote low-carbon considerations and options.

The project boundary defines what is to be included in the calculation of the absolute, baseline, and relative emissions.

The carbon footprint methodology uses the concept of "Scope" as defined by the greenhouse gas protocol.

Table 2. Examples of scope 1, 2 and 3 emissions for selected projects

<table>
<thead>
<tr>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct emissions from purchased electricity</td>
<td>Indirect emissions from vehicles using transport infrastructure, including fuel shifts and mode effects</td>
<td>Indirect GHG emissions from the use of energy products purchased by the project</td>
</tr>
</tbody>
</table>

The central estimate for the economic cost of greenhouse gas emissions (carbon shadow price) in the period 2015-2030 in EUR per tonne of CO2 equivalent in 2015 prices, is shown in the table below

<table>
<thead>
<tr>
<th>Year</th>
<th>CO2e</th>
<th>CO2e</th>
<th>CO2e</th>
<th>CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2020</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>2025</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>2030</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

Table 6. Carbon shadow price, EUR/CO2e, in 2015 prices


Climate Action
- F.8.1 Contribution to CC targets
- F.8.2 Risks, adaptation, mitigation
- F.8.3 Climate resilience
- D.2.1 Options, climate risks
- D.2.2 Selection criteria
- D.3 Feasibility (GHG, Impacts):
  - D.3.2 Technical aspects
  - D.3.3 Climate change aspects
  - D.3.4 Reference table
- E.2.1 Economic analysis
- E.3.1 Risk assessment, sensitivity
- E.3.4 Additional assessments ...
- F.1.1 Consistency with env. policy
Thank you for your attention

Directorate-General for Climate Action ("DG CLIMA")
http://ec.europa.eu/clima

Fact sheets on climate mainstreaming in ESIF:
http://ec.europa.eu/clima/publications/index_en.htm#Mainstreaming

EU Strategy on Adaptation to Climate Change:
http://ec.europa.eu/clima/policies/adaptation/index_en.htm

European Climate Adaptation Platform:
http://climate-adapt.eea.europa.eu/
For info or further questions on this seminar and the activities of the JASPERS Networking Platform, please contact:

JASPERS Networking and Competence Centre

jaspersnetwork@eib.org

www.jaspersnetwork.org