Climate Change Related Requirements for Major Projects in the 2014 – 2020 Programming Period

Ljubljana, 18 November 2016

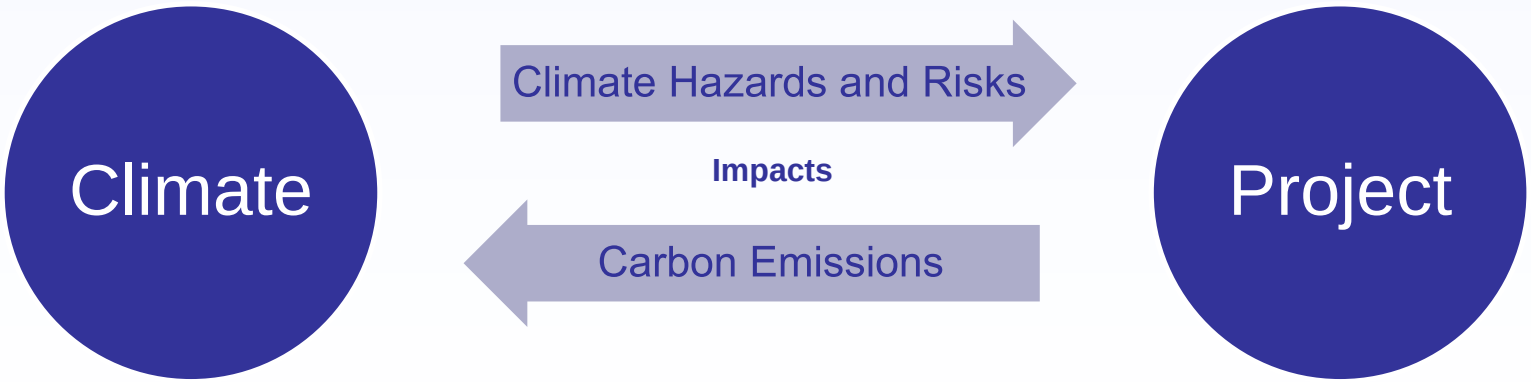
Jaspers
Joint Assistance to Support Projects in European Regions

Climate Change Requirements for Major Projects

European Investment Bank The EU bank
European Bank Reconstruction and Development

Adaptation vs Mitigation

- There are two main ways to deal with climate change: mitigation and adaptation. **Mitigation** is about dealing with the causes of climate change, by reducing greenhouse gas emissions (GHGs). **Adaptation** is about dealing with the inevitable consequences of climate change and attempting to lower the risks.



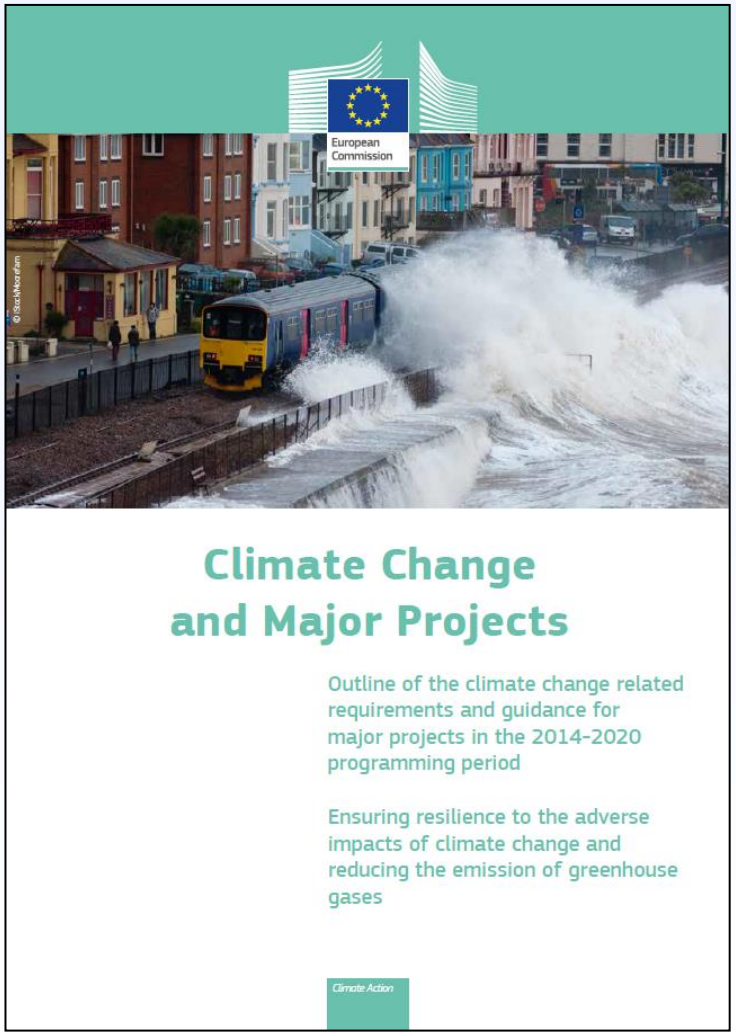
ESIF and Major Projects

- 2014-2020 is the first programming period when climate considerations are included in the preparation and implementation of programmes and projects:
  - "Climate action objectives will represent at least 20% of EU spending";
  - Mitigation and adaptation are an integral part of sustainable development.

Major Project Requirements

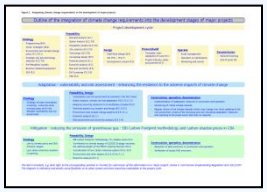
- **Consistency with Climate Policy**
  - EU 2020 Strategy Targets
  - National and/or Regional Adaptation Strategy
  - Climate Financing
- **Evaluation of GHG Emissions / Carbon Footprint**
  - How was it undertaken / Methodology
  - What were the results / Footprint and cost
- **Adaptation Vulnerability and Risk Assessment**
  - How was it undertaken / Methodology
  - What were the results / Adaptation Measures

DG Climate Action Publication



http://ec.europa.eu/clima/publications/docs/major_projects_en.pdf

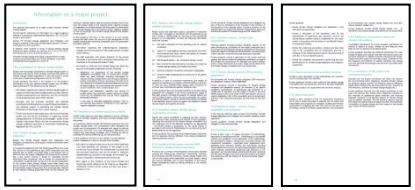
Introduction
(major projects,
climate change, …)



Project cycle, integrating climate change

Adaptation: vulnerability and risk assessment

Mitigation: EIB Carbon footprint methodology + carbon shadow price in CBA



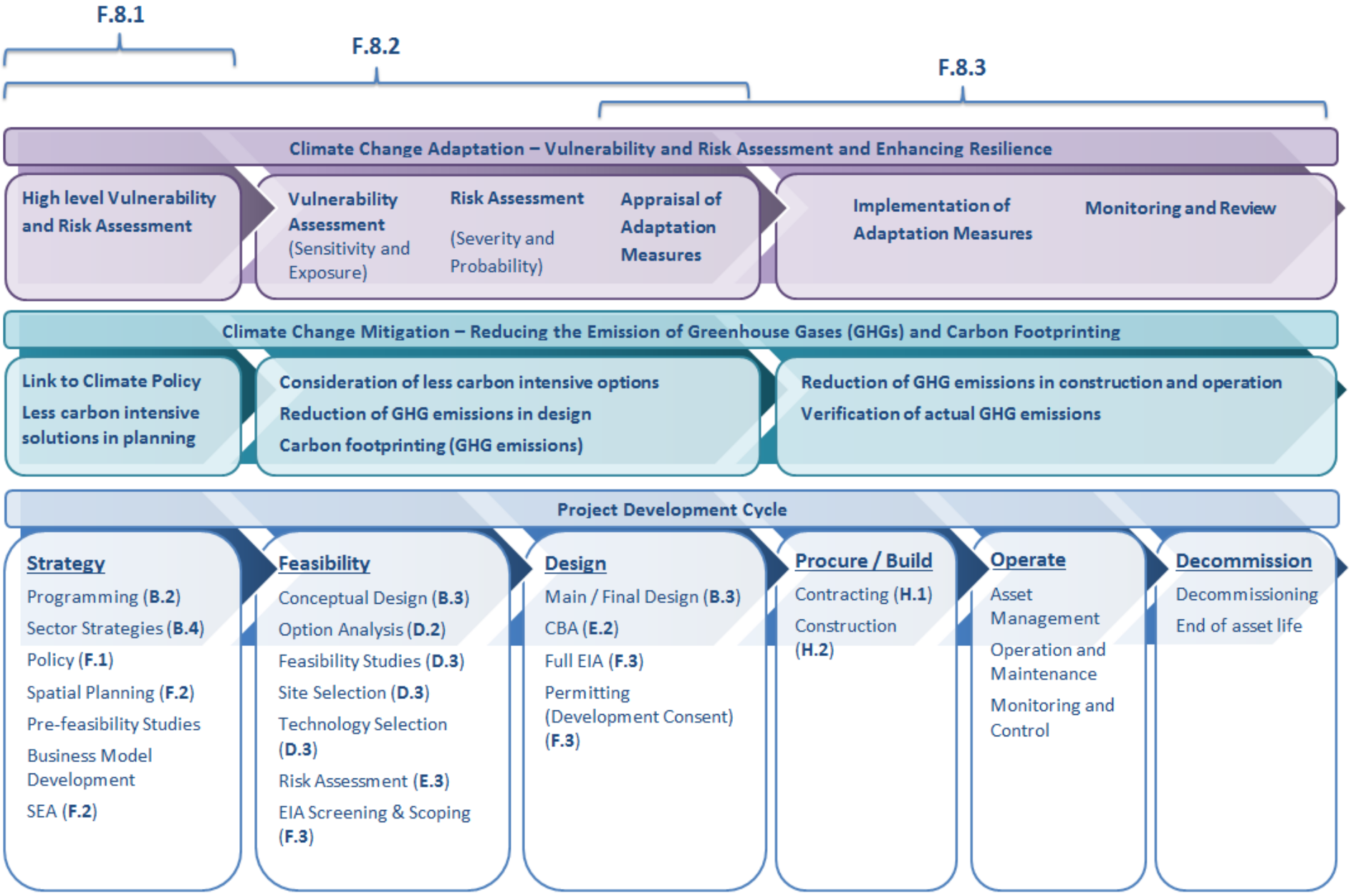
Information on a major project (climate aspects)

Legal and other references and explanatory footnotes

Integration into Project Development

- Climate change considerations (adaptation and mitigation) need to be an integral part of the overall project development cycle; it is not just an add-on at the final stage.
- It needs to be properly documented throughout the application form and supporting documents.

Integration into Project Development



Integration into Project Development

Project Development Cycle – Feasibility Studies – Option Analysis

Climate Change Adaptation

- Relative vulnerability of options - assess whether one option is more or less vulnerable than another option.
- Relative sensitivity of technical options.
- Relative exposure of location options.
- Based on expert judgement and understanding of current and future climate

Climate Change Mitigation

- Carbon footprint of each project alternative / option calculated and these figures used in the assessment of options

Integration into Project Development

Project Development Cycle – Design

Climate Change Adaptation

- Full Risk Assessment for all vulnerabilities – assessing probability and severity
- Part of an overall Risk Assessment
- Based on expert judgement and sound data regarding current and future climate
- Integration of adaptation measures into design and operation
- Reduce risk to acceptable level

Climate Change Mitigation

- Attempt to reduce GHG emissions through design
- Carbon footprint of final technical solution
- Using shadow price of carbon, monetise emissions and include in the CBA

Integration into Project Development

Project Development Cycle – Implementation

Climate Change Adaptation

- Implementation of adaptation measures during construction and operation
- Monitor changes in climate
- Review effectiveness of measures
- Manage risks

Climate Change Mitigation

- Attempt to reduce GHG emissions during construction and operation
- Verification of ex-ante carbon footprint with actual emissions figures

Not Just Major Projects

Major / Minor

EU Funded / Other Funding Source

Greenfield Project / Development of Existing

Mature Project / Initial Concept Idea

Climate Change Adaptation Vulnerability and Risk Assessment is the process of managing climate adaptation issues for a project. Evaluation of Greenhouse Gas emissions is about considering resource efficiency. These are not just Commission requirements, their purpose is to develop sound sustainable infrastructure, in everybody's interests.

Evaluation of GHG emissions
–
Carbon Footprint

Evaluation of GHG Emission

Major Project Requirement:

Guidance Questions: How were the volume of GHG externality and the external cost of carbon assessed? What is the shadow cost of GHG and how has it been integrated in the economic analysis?...

Aim:

- *Calculation of the expected direct and indirect Greenhouse Gas Emissions from the project (absolute and relative)*
- *Quantification of the associated costs / benefits and incorporation into the CBA.*

Guide to CBA of Investment projects - Evaluation of GHG emissions

"Guide to Cost-Benefit Analysis of Investment Projects: Economic Appraisal Tool for Cohesion Policy 2014-2020", EC, December 2014

- Incremental Approach – Calculate the difference between the investment and non-investment option (the baseline or counter-factual scenario).

- Calculation methodology is based on EIB Methodology

"European Investment Bank Induced GHG Footprint – Methodologies for the Assessment of Project GHG Emissions and Emission Variations, Version 10.1 ", EIB, April 2014

Guide to CBA of Investment projects - Evaluation of GHG emissions

Quantification of emissions saved/emitted to atmosphere

Calculation of CO_2e

} **Emission factors**

Evaluation of externality using unit cost of CO_2e

Cost of GHG emissions =

V_{GHG} **x** **C_{GHG}**

Incremental volume of GHG emissions produced by the project (tCO_2e)

Unit shadow price of CO_2e

Table 2.10 Unit cost of GHG emissions

	Value 2010 (Euro/t-CO2e)	Annual adders 2011 to 2030[89]
High	40	2
Central	25	1
Low	10	0.5

Source: EIB (2013).

EIB Methodology – Introduction

EIB Project Carbon Footprint Methodologies present in detail EIB's approach to calculating the carbon footprints of the projects it finances.
The Bank completed a 3-year pilot phase (2009-2011) during which time the methodologies have been refined and the calculations routinely incorporated into project appraisals.
This process is now mainstreamed into regular project appraisal work.

Publically available:

http://www.eib.org/attachments/strategies/eib_project_carbon_footprint_methodologies_en.pdf

EIB Methodology

Ex ante calculation of **carbon footprint** for all projects emitting more than 100kt CO_2eq/yr or leading to an emission variation of more than 20kt CO_2eq/yr compared to the baseline.
Absolute and Relative emissions
All 7 GHGs under the Kyoto Protocol
An average year of operation

Standard: **Scope 1 & 2** included
Direct emissions generated from within the physical project boundary (Scope 1)
Indirect emissions from the generation of power consumed by the project (Scope 2)
Standard: **Scope 3** excluded (other indirect emissions)
Exception: for certain network projects, indirect emissions as a result of the use of the physical infrastructure links are included, e.g. road, rail, urban transport networks

Requirements

Minimum Requirement: Calculation of GHG Emissions (Carbon Footprint) and associated costs/benefits at submission stage – Mature Projects

Best Practice: Early consideration and use of GHG Emissions and associated costs/benefits in option analysis stage to inform the development of the projects in a more sustainable manner.

Post Implementation: Verification of actual GHG Emissions, useful to inform future assessments and improvements to existing systems.

Climate Change Adaptation

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Vulnerability and Risk Assessment

Climate Change Adaptation Vulnerability and Risk Assessment

- The process of managing climate adaptation issues for a project,
- Involves identifying which climate hazards the project is vulnerable to, assessing the level of risk and integrate adaptation measures to reduce that risk to an acceptable level.
- The process starts from the feasibility and option analysis stage and should be integrated into all subsequent stages of project development.
- The results are used to inform decision making as the project develops.

Climate Change Adaptation Vulnerability and Risk Assessment




Prior steps
prepare, plan, define, …

↓

Vulnerability
= Sensitivity × Exposure

↓

Risk
= Likelihood × Impact

↓

Adaptation
Options, Appraisal, Planning




Climate Influenced Projects *vs* Climate Change Adaptation Projects

It can be useful to consider projects as falling into two categories:

- **Climate-influenced projects** – those assets and infrastructure projects whose success may be affected if climate change is ignored,
- **Climate adaptation projects** – whose main aim is to reduce vulnerability to climate hazards, such as a flood management scheme.

Assessment can and should be undertaken for both types of projects. All major infrastructure projects, regardless of the sector, may be vulnerable to climate change (climate influenced projects) and may need to adapt to a changing climate, therefore the process of Vulnerability and Risk Assessment is applicable to all projects, cross-sector.

Prior Steps – Project Context

Project Context

– What is the Project?
– What is it's purpose?
– How does it operate?
– What does it rely on?

Understand the importance of the project within the overall context (system / network) – how critical

Lifespan of the project (and/or components)

Prior steps
prepare, plan, define, ...

Prior Steps – Methodology

Methodology – How will you do the assessment?

At what stage of project development (early involvement or mature project)

Qualitative or Quantitative approach

Detailed description of methodology in relation to specific project.

Identify Data sources:

- National and/or Regional Adaptation Strategies
- National and/or Regional meteorological, hydrogeological and environmental institutes
- European Level information / mapping
- E.g. http://climate-adapt.eea.europa.eu/tools/map-viewer

Prior steps
prepare, plan, define, ...

Prior Steps – Roles and Responsibilities

Role and Responsibilities and Involvement of Stakeholders –
Who should do the assessment and who should be involved?

Assessment should be undertaken by people involved in the project with knowledge of the projects components and the local area (likely that project engineer should lead)

Not undertaken in isolation – needs a team with different specialisms and varying view-points

Involvement of stakeholders is key – need to consider construction and operation of assets, need historical and local knowledge.

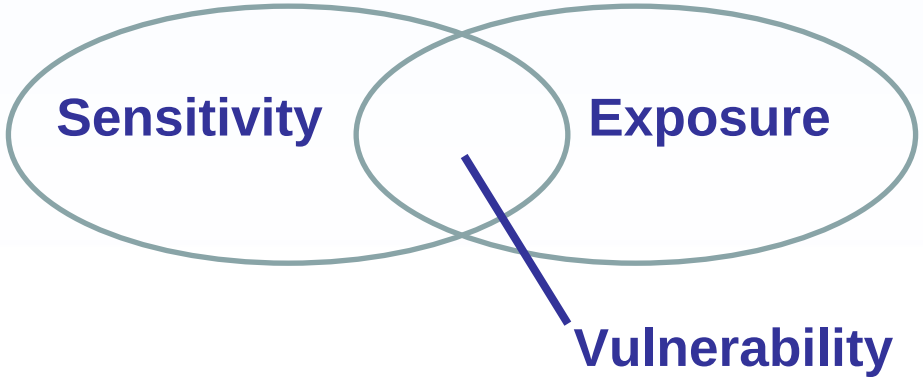
Vulnerability Assessment – Screening

Understand which climate factors (hazards) the project may be vulnerable to.

Vulnerability of a project is a combination of two aspects: 1) how sensitive the project's components are to climate hazards (sensitivity) and, 2) the probability of these hazards occurring at the project location now and in the future (exposure).

Sensitivity x Exposure = Vulnerability

Based on sound data (trends and forecasts / projections)



Vulnerability
= Sensitivity × Exposure

Potential Climate Hazards

- Incremental air temperature increase
- Extreme temperature increase and Heatwaves
- Incremental rainfall change
- Extreme rainfall change
- Water availability
- Water temperature
- Flooding (coastal and fluvial)
- Seawater temperature
- Relative sea level rise
- Storm surges
- Saline intrusion
- Ocean salinity
- Ocean pH
- Coastal erosion
- Soil erosion
- Ground instability/ landslides/ avalanche
- Soil salinity
- Average wind speed
- Maximum wind speed
- Storms(tracks & intensity)
- Humidity
- Droughts
- Dust Storms
- Wild fire
- Air quality
- Urban heat island effect
- Growing season length
- Solar radiation
- Cold spells
- Freeze-thaw damage














Vulnerability Assessment – Screening

Sensitivity x Exposure = Vulnerability

Sensitivity

- How sensitive the project's components are to climate hazards
- Based on knowledge of the project context
- Which hazards are most relevant for this type of project and why
- Irrelevant of location

Exposure

- Based on the location of the project it is possible to identify the degree to which the project is likely to be exposed to specific climate hazards.

- Current Climate Variability
- Future Climate Change

"Screening" for risks – focuses the risk assessment to use resources effectively.

Note - If the vulnerability assessment concludes that the project is not vulnerable to any climate hazards, and that conclusion can be duly justified, there may be no need to undertake further risk assessment.

Vulnerability
= Sensitivity ✕ Exposure

Risk Assessment

Risk Assessment considers the likelihood (probability) and severity (impact) of each hazard affecting the project.

Probability x Severity = Risk

Level of risk (Significant or not) needs to be defined

Based on sound data (trends and forecasts / projections)

Note - If the risk assessment concludes that there are no significant risks to the project from climate change, and that conclusion can be duly justified, there may be no need to undertake further assessment or to identify adaptation measures.

Risk
= Likelihood ✕ Impact

Risk Assessment

Severity

	1	2	3	4	5
	Insignificant	Minor	Moderate	Major	Catastrophic
Meaning:	Minimal impact that can be mitigated through normal activity.	An event which effects the normal project operation, resulting in localised impacts of a temporary nature.	A serious event requiring additional actions to manage, resulting in moderate impacts.	A critical event requiring extraordinary action, resulting in significant, widespread or long term impacts.	Disaster with the potential to lead to shut down or collapse of the asset / network, causing significant harm and widespread long term impacts.

Risk
= Likelihood × Impact

Risk Assessment

Probability / Likelihood

	1	2	3	4	5
	Rare	Unlikely	Possible	Likely	Almost Certain
Meaning:	Highly unlikely to occur	Given current practices and procedures, this incident is unlikely to occur	Incident has occurred in a similar country / setting	Incident is likely to occur	Incident is very likely to occur, possibly several times
OR					
Meaning:	5% chance of occurring	20% chance of occurring	50% chance of occurring	80% chance of occurring	95% chance of occurring

Risk
= Likelihood × Impact

Risk Assessment

Severity x Probability / Likelihood = **Risk**

	Probability	Rare	Unlikely	Probable	Likely	Almost Certain
Severity		1	2	3	4	5
Insignificant	1	1	2	3	4	5
Minor	2	2	4	6	8	10
Moderate	3	3	6	9	12	15
Major	4	4	8	12	16	20
Catastrophic	5	5	10	15	20	25

- Negligible Risk
- Low Risk
- Medium Risk
- High Risk
- Extreme Risk

What is significant?

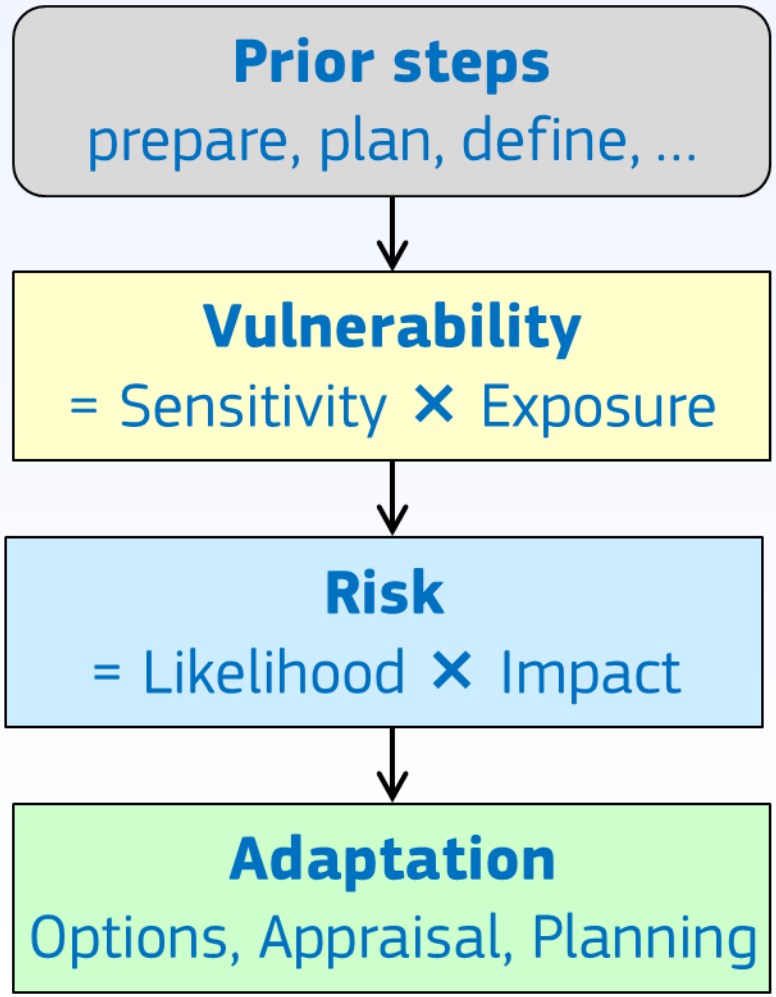
Risk
= Likelihood × Impact

Adaptation Measures

- Adaptation options are needed to address each significant risk
- Different options for adaptation should be assessed
- Such measures can be structural or non-structural (operational and maintenance measures)
- Aim for:
  - No Regret
  - Low Regret
  - Win-win
  - Flexible or Adaptive Management
- The measures must be integrated into the project and proven to reduce risk to an acceptable level.
- Therefore the residual level of risk should be (re)assessed
- If integrated throughout project development “measures” may not be easy to abstract from good project design. If undertaken later (in a more audit approach) measures will be more “add-on” style.

Adaptation
Options, Appraisal, Planning

Climate Change Adaptation Vulnerability and Risk Assessment



- Basic Principle = identify which climate hazards the project is vulnerable to, assess the level of risk and integrate adaptation measures to reduce that risk to an acceptable level.

- Based on sound data and forecasts
- Covering current climate variability and future climate change
- Demonstrate clear and logical thinking

Climate Change Adaptation Vulnerability and Risk Assessment – Further Guidance


EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION

Non-paper
Guidelines for Project Managers:
Making vulnerable investments climate resilient

EN EN

European Commission DG Climate Action Non-Paper –

Guidelines for Project Managers – Making vulnerable investments climate resilient

Methodology for Vulnerability and Risk Assessment

http://ec.europa.eu/clima/policies/adaptation/what/docs/non_paper_guidelines_project_managers_en.pdf

Climate Change Adaptation Vulnerability and Risk Assessment – Further Guidance

EUFIWACC

European Financing Institutions Working Group on Adaptation to Climate Change (AfD, CEB, EBRD, EC, EIB, KFW, NIB)

Emerging Experience from Practitioners

https://ec.europa.eu/clima/publications/docs/integrating_climate_change_en.pdf

Climate Change and Project Development

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Links to EIA

Climate Change Links to EIA

New EIA Directive:

New EIA Directive is not substantially different from old Directive in terms of how climate change should be treated.

New Directive – “Climate Change”

Old Directive – “Climatic Factors”

meaning is the same.

Climate Change Links to EIA

Environmental Impact Assessment

Climate Change Adaptation	Climate Change Mitigation
• Impact of the project on the environment's capacity to adapt (the adaptive capacity) • Impacts related to resilience of the project (the impact of climate change on the project)	• Impact of the Project on Climate Change – e.g. greenhouse gas emissions

Note:

Avoid Duplication – if climate change adaptation vulnerability and risk assessments and/or carbon footprints of projects have already been undertaken in the development of the project, the results of such assessments need to be reflected in the EIA, no need to duplicate assessments.

Climate Change Links to EIA

In Summary:

EIA focuses on assessing the impact of the project on the environment.

In doing that, the assessment should consider the holistic and interlinking issues of climate change, in terms of the greenhouse gas emissions of projects and also the fact that the climate is changing and this can influence the baseline environment and alter the ways in which the project may impact on the environment as a result of its vulnerability to climate change hazards.

Climate Change and Strategic Planning

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Links to SEA

Climate Change and Strategic Planning

Strategic Planning is Key

Strategy

Programming

Sector Strategies

Policy

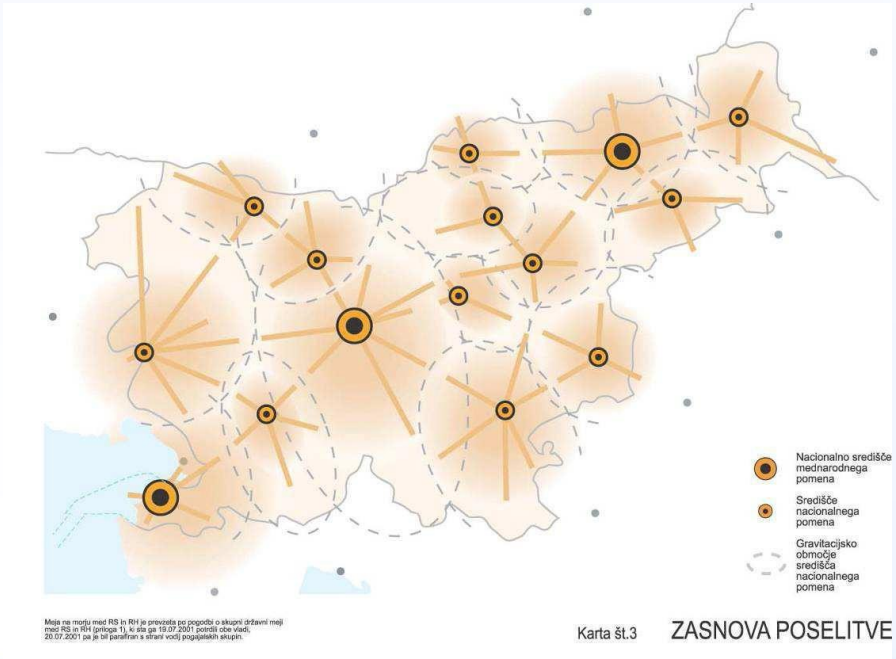
Spatial Planning

Pre-feasibility Studies

Business Model Development

SEA

Sector and spatial planning documents are where the big decisions are taken and can influence sustainable development for many years to follow (particularly for mitigation of greenhouse gases)



Examples – National Transport Strategies, SUMPS, Spatial Plans, National Risk Assessments

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JASPERS Website:

http://www.jaspers-europa-info.org/

JASPERS Networking Platform

http://www.jaspersnetwork.org/

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