



Technical guidance on the climate proofing of infrastructure in the period 2021-2027

Joint Statement on Guiding Principles on the Development of Inland Navigation and Environmental Protection in the Danube River Basin

Special topic: Climate change adaptation and Ecologically sound River Engineering

Presented by Andras Toth, European Commission, DG Climate Action

15 September 2022



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A new EU strategy on climate adaptation

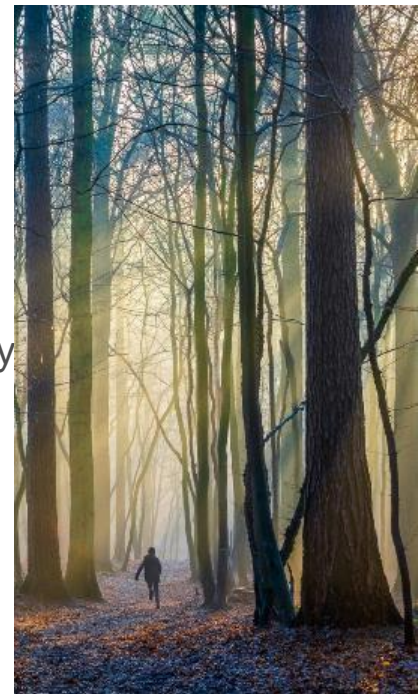
“Forging a climate-resilient Europe - The new EU strategy on adaptation to climate change”

Adopted by European Commission on 24 February 2021

- Impact Assessment
- Blueprint, open public consultation, and expert reviews (2020)
- Evaluation of the first strategy (2018)
- First EU Strategy on Adaptation to Climate Change (2013)
- Climate Law (2021): *MSs will also be required to develop and implement adaptation strategies to strengthen resilience and reduce vulnerability to the effects of climate change*

Vision & Objectives

- Vision: by 2050 the EU will be a climate-resilient society, fully adapted to the unavoidable impacts of climate change
- Objectives:
 - **Smarter adaptation** – improving knowledge and managing uncertainty
 - **More systemic adaptation** – support policy development at all levels and sectors
 - **Faster adaptation** – speeding up adaptation across the board
 - **Stepping up international action** for climate resilience



© picture: Peter Löffler

Smarter adaptation

improving knowledge and managing uncertainty, by

- Pushing the frontiers of **knowledge** on adaptation
- More and better climate-related **risk and losses data**
- Making **Climate-ADAPT** the authoritative European platform for adaptation knowledge



© picture: NOAA

More systemic adaptation

support policy development at all levels and sectors, by:

- Improving **adaptation strategies and plans**
- Fostering **local, individual, and just resilience**
- Integrating climate resilience in **macro-fiscal policy**
- Promoting **nature-based solutions** for adaptation



© picture: Peter Löffler

Faster adaptation

speeding up adaptation across the board, by:

- Accelerating **the rollout** of adaptation solutions
- Reducing **climate-related risk**
- Closing the **climate protection gap**
- Ensuring the **availability** and **sustainability** of **freshwater**



© picture: Peter Löffler

Stepping up international action

For climate resilience, by:

- Increasing support for **international climate resilience** and **preparedness**
- Scaling up **international finance** to build climate resilience
- Strengthen **global engagement** and **exchanges** on adaptation



© picture: Peter Löffler

Water in the Strategy

Faster adaptation across the board – ensuring the availability and sustainability of fresh water

- ⇒ help to reduce water use by raising the water-saving requirements for products, encouraging water efficiency and savings, and by promoting the wider use of drought management plans as well as sustainable soil management and land-use;
- ⇒ help to guarantee a stable and secure supply of drinking water, by encouraging the incorporation of the risks of climate change in risk analyses of water management;
- ⇒ ensure climate-resilient, sustainable use and management of water across sectors and borders by improving coordination of thematic plans and other mechanisms, such as water resource allocation and water-permits;

Broader policy framework for climate proofing

In addition to the “reducing climate risk” objective of the Strategy:

- The European Green Deal introduces pathway to climate neutrality by 2050, on adaptation, reinforcing efforts. Confirmed by European Parliament resolution of 15 January 2020.
- The European Climate Law recital (33): EU-funded projects should include climate vulnerability and risk assessment and relevant adaptation measures, and cost-benefit analysis should cover GHG emissions and mitigation measures.
- Council Conclusions of 17-21 July 2020: EU long-term budget 2021-2027, should be consistent with Paris Agreement
- Requirements on climate proofing of infrastructure in legislation for various EU-funds in the period 2021-2027.

Climate proofing 2014-2020



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Addressing climate change in the development of major projects

Adaptation to climate change
Vulnerability/Risk Assessment
and adaptation response

Mitigation of climate change
EIB carbon footprint
EIB cost of carbon

- Legal basis (e.g. project information / application form)
- Integration in CBA and project cycle management
- Memorandum of Understanding DG REGIO – DG CLIMA
- JASPERS advisory service, verification, training etc.

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 Action

Adaptation to climate change
Vulnerability and Risk Assessment
and adaptation response

Vulnerability
= Sensitivity x Exposure

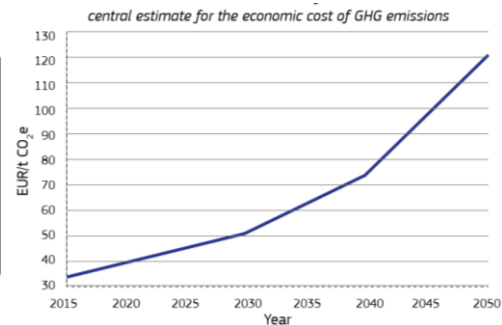
Risk
= Likelihood x Impact

Adaptation
Options, Appraisal Planning

Mitigation of climate change
EIB carbon footprint
EIB cost of carbon

- Quantify GHG emissions
- Monetise GHG emissions
- Integrate in CBA, options analysis

Estimate	Value 2010 emission	Annual adders 2011 to 2030	Annual adders 2031-2040	Annual adders 2041-2050
High	40	2	4	8
Central	25	1	2	4
Low	10	0.5	1	2



Climate proofing 2014-2020



Knowledge and experience sharing,
outreach, awareness raising, training



Knowledge and Learning Center

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SECOND WORKSHOP ON CLIMATE CHANGE ADAPTATION IN THE TRANSPORT SECTOR – EXPERIENCE FROM PROJECT PREPARATION AND NETWORK MANAGEMENT



<http://jaspersnetwork.org/display/EVE/Second+Workshop+on+Clim+ate+Change+Adaption+in+Transport+Sector>

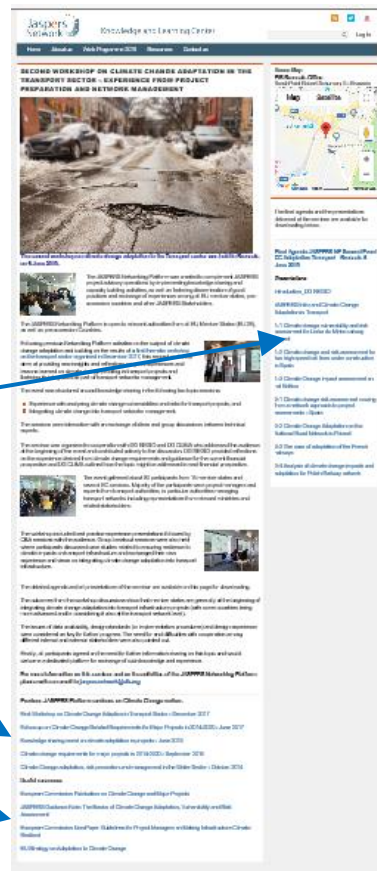
Event

Description

Presentations,
project examples
webstreaming

Other knowledge sharing
and training events

Resources, guidelines





- More EU funds: InvestEU, Connecting Europe Facility (CEF), European Regional Development Funds (ERDF), Cohesion Fund (CF), and Just Transition Fund (JTF), ...
- Updated carbon footprint methodology and shadow cost of carbon
- Climate vulnerability and risk assessment as basis for adaptation
- Consistency with the Paris Agreement and climate objectives
- Documentation and verification
- Environmental Impact Assessment (EIA)
- Strategic Environmental Assessment (SEA)
- Recommendations to support climate proofing in Member States



Commission Notice — Technical guidance on the climate proofing of infrastructure in the period 2021-2027
C/2021/5430
OJ C 373, 16.9.2021, p. 1–92 (BG, ES, CS, DA, DE, ET, EL, EN, FR, HR, IT, LV, LT, HU, MT, NL, PL, PT, RO, SK, SL, FI, SV)

▼ Languages, formats and link to OJ

	BG	ES	CS	DA	DE	ET	EL	EN	FR	GA	HR	IT	LV	LT	HU	MT	NL	PL	PT	RO	SK	SL	FI	SV
HTML																								
PDF																								
Official Journal																								

[https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0916\(03\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0916(03))

Climate Neutrality

*Screening
Phase 1 (mitigation)*

*Detailed analysis
Phase 2 (mitigation)*

The climate proofing process is divided into two pillars (mitigation, adaptation) and two phases (screening, detailed analysis)

Climate Resilience

*Screening
Phase 1 (adaptation)*

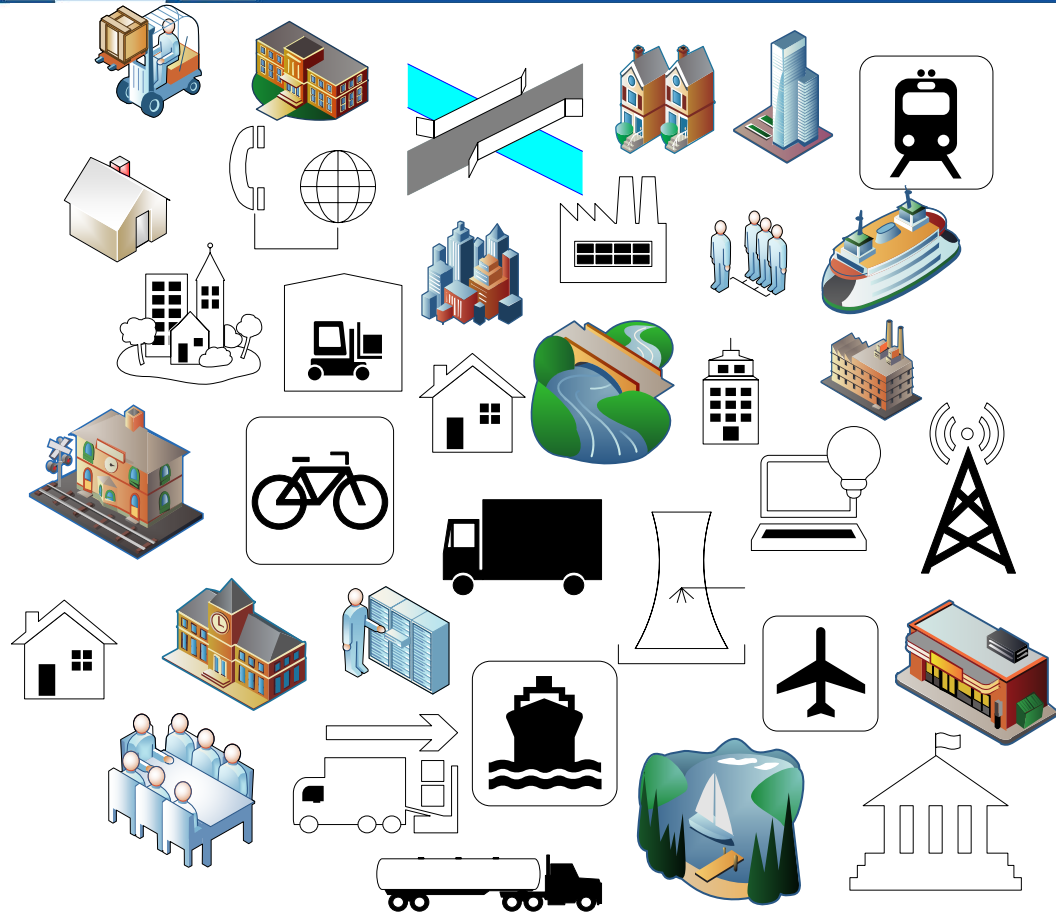
*Detailed analysis
Phase 2 (adaptation)*

Climate proofing 2021-2027



Infrastructure is a broad concept encompassing buildings, network infrastructure, and a range of built systems and assets.

For instance, the InvestEU Regulation includes a comprehensive list of eligible investments under the sustainable infrastructure policy window.



Climate proofing infrastructure (mitigation, climate neutrality)



2021-2027

Climate Neutrality

Mitigation of climate change

Preparation, planning, resources, ...

Screening – Phase 1 (mitigation)

With reference to the screening list, is the project of a category requiring a carbon footprint assessment etc.?

YES

NO

Climate neutrality screening documentation

Detailed analysis – Phase 2 (mitigation)

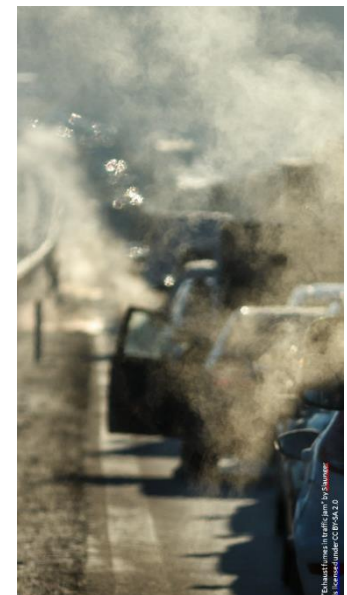
Quantify and compare GHG emissions in a typical year of operation with the thresholds for absolute and relative emissions.

If above emissions threshold:

Monetise GHG emissions using the shadow cost of carbon, firmly integrate “energy efficiency first” in project design, cost benefit and options analysis.

Verify the project's compatibility with a credible pathway to the overall 2030 and 2050 GHG emission reduction targets.

Climate neutrality proofing documentation





3.2.2.1. Carbon footprint methodology for infrastructure projects

This guidance recommends the Carbon Footprint Methodologies⁶⁶ of the European Investment Bank (EIB) for calculating the carbon footprints of infrastructure projects. The methodology includes the default emissions calculation approach for e.g.:

- Waste water and sludge treatment
- Waste treatment management facilities
- Municipal solid waste landfill
- Road transport
- Rail transport
- Urban transport
- Building refurbishment
- Ports
- Airports

Table 5: Shadow cost of carbon for GHG emissions and reductions in €/tCO₂e, 2016 prices

Year	2020	2025	2030	2035	2040	2045	2050
€/tCO ₂ e	80	165	250	390	525	660	800

Source: EIB Group Climate Bank Roadmap 2021-2025

To monetise greenhouse gas emissions, the EIB carbon footprint methodology can be used and complemented by the separate publication *The Economic Appraisal of Investment Projects at the EIB (2013)*⁶⁷ and the *Shadow Cost of Carbon* (see Section 3.2.2.4).

Climate proofing infrastructure (adaptation, climate resilience)



2021-2027

Climate Resilience

Adaptation to climate change

Preparation, planning, resources, ...

Screening – Phase 1 (adaptation)

Based on the sensitivity, exposure and vulnerability analysis, are there any potentially significant climate risks warranting detailed analysis?

NO

YES

Climate resilience screening documentation

Climate resilience proofing documentation

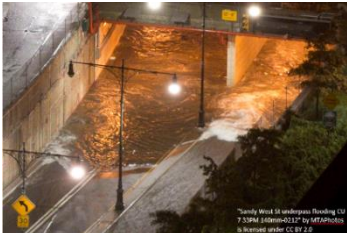
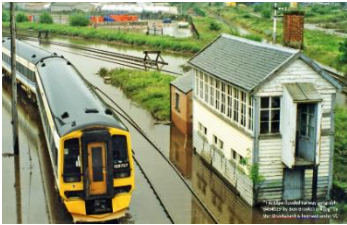
Detailed analysis – Phase 2 (adaptation)

Climate risk assessment including the likelihood and impact analysis in accordance with this guidance.

Address significant climate risk through the identification, appraisal, planning and implementation of relevant adaptation measures.

Assess the need for regular monitoring and follow-up for example of critical assumptions in relation to future climate change.

Verify consistency with Union and, as applicable, national, regional and local strategies and plans on the adaptation to climate change



Climate proofing infrastructure (adaptation, climate resilience)



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2021-2027

Phase 2

SENSITIVITY ANALYSIS

Indicative sensitivity table: (example)		Climate variables and hazards			
		Flood	Heat	...	Drought
Themes	On-site assets, ...	High	Low	...	Low
	Inputs (water, ...)	Medium	Medium	...	Low
	Outputs (products, ...)	High	Low	...	Low
	Transport links	Medium	Low	...	Low
Highest score 4 themes		High	Medium	...	Low

Phase 1

EXPOSURE ANALYSIS

Indicative exposure table: (example)		Climate variables and hazards			
		Flood	Heat	...	Drought
Current climate		Medium	Low	...	Low
Future climate		High	Medium	...	Low
Highest score, current+future		High	Medium	...	Low

The output of the exposure analysis may be summarised in a table with the exposure ranking of the relevant climate variables and hazards for the selected location, irrespective of the project type, and divided in current and future climate. For both the sensitivity and exposure analysis, the scoring system should be carefully defined and explained, and the given scores should be justified.

VULNERABILITY ANALYSIS

Indicative vulnerability table: (example)		Exposure (current + future climate)		
		High	Medium	Low
Sensitivity (highest across the four themes)	High	Flood		
	Medium		Heat	
	Low			Drought

Legend: Vulnerability level
High
Medium
Low

The vulnerability analysis may be summarised in a table for the given specific project type at the selected location. It combines the sensitivity and the exposure analysis. The most relevant climate variables and hazards are those with a high or medium vulnerability level, which are then taken forward to the steps below. The vulnerability levels should be carefully defined and explained, and the given scores justified.

LIKELIHOOD ANALYSIS

Indicative scale for assessing the likelihood of a climate hazard (example):		
Term	Qualitative	Quantitative (*)
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

The output of the likelihood analysis may be summarised in a qualitative or quantitative estimation of the likelihood for each of the essential climate variables and hazards. (*) Defining the scales requires careful analysis for various reasons including e.g. that the likelihood and impacts of the essential climate hazards may change significantly during the lifespan of the infrastructure project among other due to climate change. Various scales are referred to in the literature.

IMPACT ANALYSIS

Indicative scale for assessing the potential impact of a climate hazard (example)		Impacts:				
		Insignificant	Minor	Moderate	Major	Catastrophic
Risk areas:						
Asset damage, engineering, operational						
Safety and health						
Environment						
Social						
Financial						
Reputation						
Any other relevant risk area(s)						
Overall for the above-listed risk areas						

The impact analysis provides an expert assessment of the potential impact for each of the essential climate variables and hazards.

RISK ASSESSMENT

Indicative risk table: (example)		Overall impact of the essential climate variables and hazards (example)				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Rare					
	Unlikely		Drought			
	Moderate		Heat	Flood		
	Likely					
	Almost certain					

Legend: Risk level
Low
Medium
High
Extreme

The output of the risk analysis may be summarised in a table combining likelihood and impact of the essential climate variables and hazards. Detailed explanations are required to qualify and substantiate the assessment conclusions. The risk levels should be explained and justified.

IDENTIFYING ADAPTATION OPTIONS

Option identification process:

- Identify options responding to the risks (use e.g. expert workshops, meetings, evaluations, ...)
- Adaptation may involve a mix of responses, e.g.:
 - training, capacity building, monitoring, ...
 - use of best practices, standards, ...
 - nature-based solutions, ...
 - engineering solutions, technical design, ...
 - risk management, insurance, ...

APPRAISING ADAPTATION OPTIONS

The appraisal of adaptation options should give due regard to the specific circumstances and availability of data. In some cases a quick expert judgement may suffice whereas other cases may warrant a detailed cost-benefit analysis. It may be relevant to consider the robustness of various adaptation options vis-à-vis climate change uncertainties.

ADAPTATION PLANNING

Integrate relevant climate resilience measures into the technical project design and management options. Develop implementation plan, finance plan, plan for monitoring and response, plan for regular review of the assumptions and the climate vulnerability and risk assessment, and so on. The vulnerability and risk assessment and adaptation planning is aiming to reduce the remaining climate risks to an acceptable level.

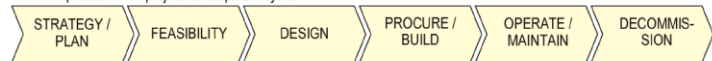
Climate proofing & environmental assessments



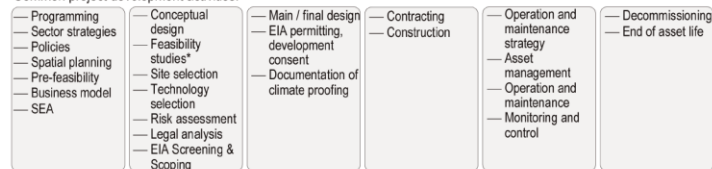
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Common phases in the project development cycle:

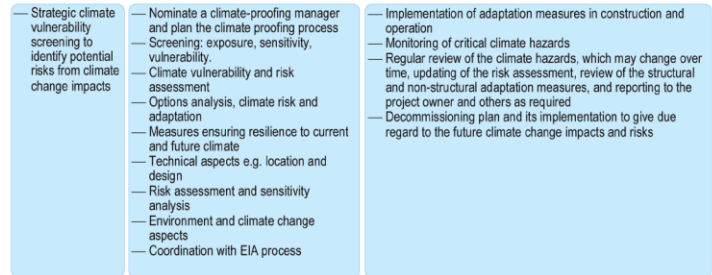


Common project development activities:

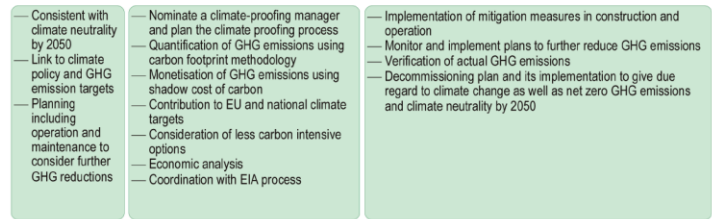


Where feasibility studies* may include various types of analysis e.g. demand, financial, economic, options and cost benefit analysis.

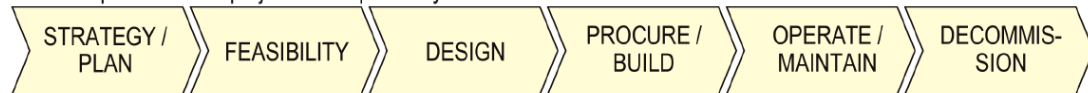
Climate resilience – adaptation to climate change – enhancing the resilience to adverse climate change impacts



Climate neutrality – mitigation of climate change – reducing the emission of greenhouse gas



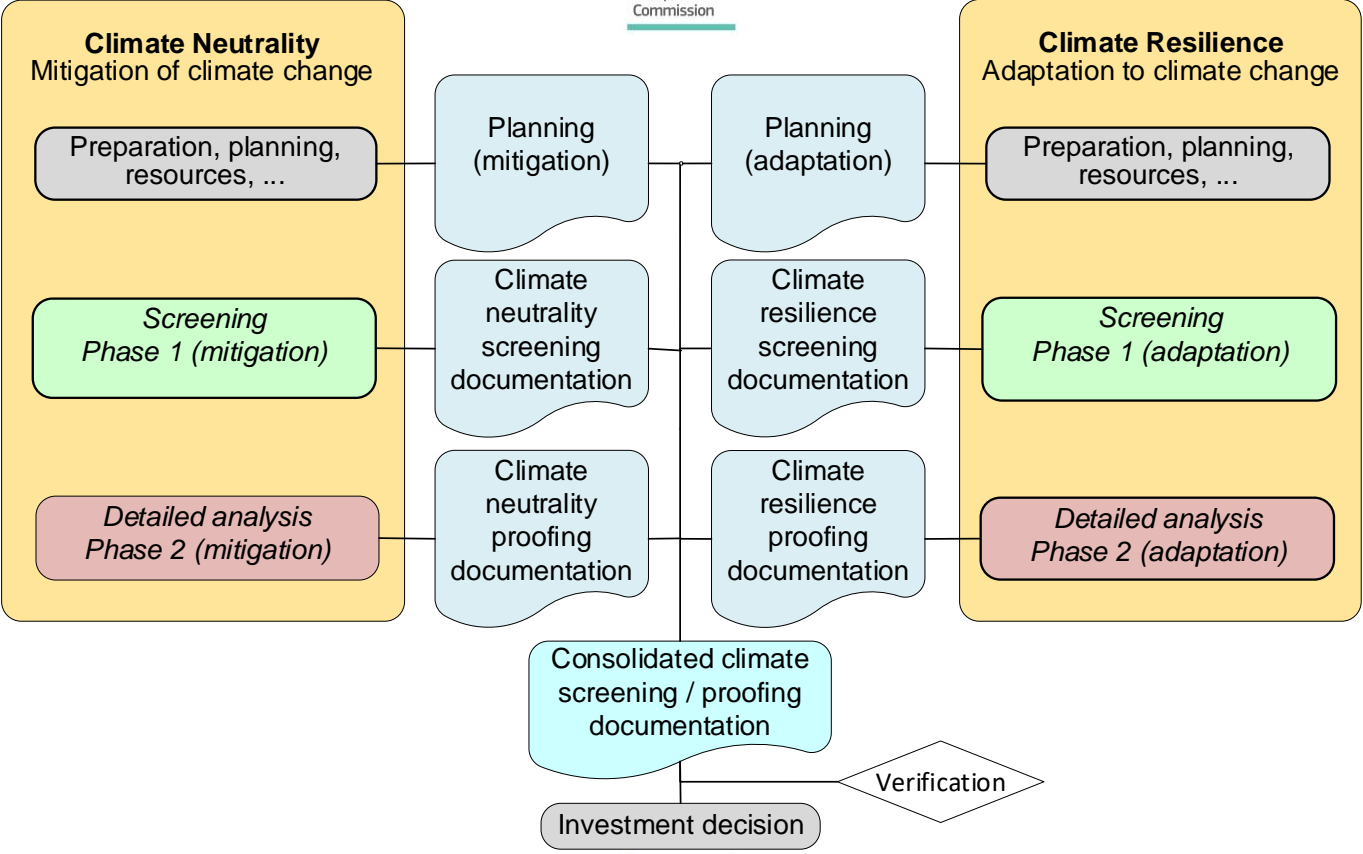
Common phases in the project development cycle:



Environmental assessments and climate proofing (not limited to SEA and EIA, e.g. Natura 2000)

- Integrate and address climate change mitigation and adaptation effectively in SEA and other environmental assessments, ref. e.g. Directive 2001/42/EC (SEA Directive)
- Distinguish between projects following Directive 2014/52/EU (2014 EIA Directive) and Directive 2011/92/EU (2011 EIA Directive), and plan accordingly
- Ensure close coordination with the climate proofing process for mitigation and adaptation
- Take into account how the environment will change in the future among other due to climate change (evolving baseline)
- EIA screening, scoping (as appropriate)
- EIA and other relevant environmental assessments e.g. Natura 2000
- Final Development Consent decision
- Assess the projects climate vulnerability
- No-regret, low-regret, win-win options
- During the construction and operation phases of the project, monitor the significant adverse effects on the environment identified as well as measures taken to mitigate them

Climate proofing and EIA (Annex D), and SEA (Annex E)





Thank you for your attention



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