
# Adaptation
## preparing for a changing climate

***A joint presentation by***
***DG Climate Action &***
***DG Research & Innovation***

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# Contents

- Some facts and impacts of climate change
- The EU Adaptation Strategy and its implementation
- Mainstreaming of climate change adaptation in EU funding and in the maritime sector

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# IPCC AR5 – Intergovernmental Panel on Climate Change – Fifth Assessment Report

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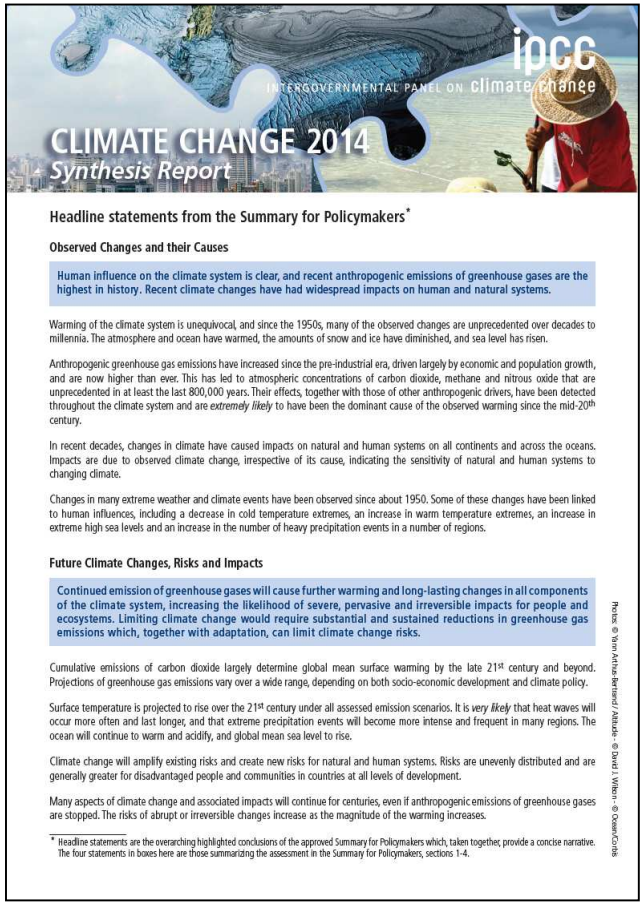


## Observed changes and their causes:

- Warming of the climate system is unequivocal
- Widespread impacts on human and natural systems
- Changes in many extreme weather and climate events

## Future climate changes, risks and impacts:

- Continued GHG emissions will cause further warming
- Rising surface temperature for all emission scenarios
- More frequent and longer lasting heat waves
- More frequent and intense precipitation events typically
- Ocean warming, acidification, global mean sea level rise

## Pathways for adaptation, mitigation, sustainable dev.:

- Quick emission reductions will reduce risks, costs and challenges, help climate-resilient sustainable development

## Adaptation and mitigation:

- No single option, but integrated responses, enabling factors

http://www.ipcc.ch/

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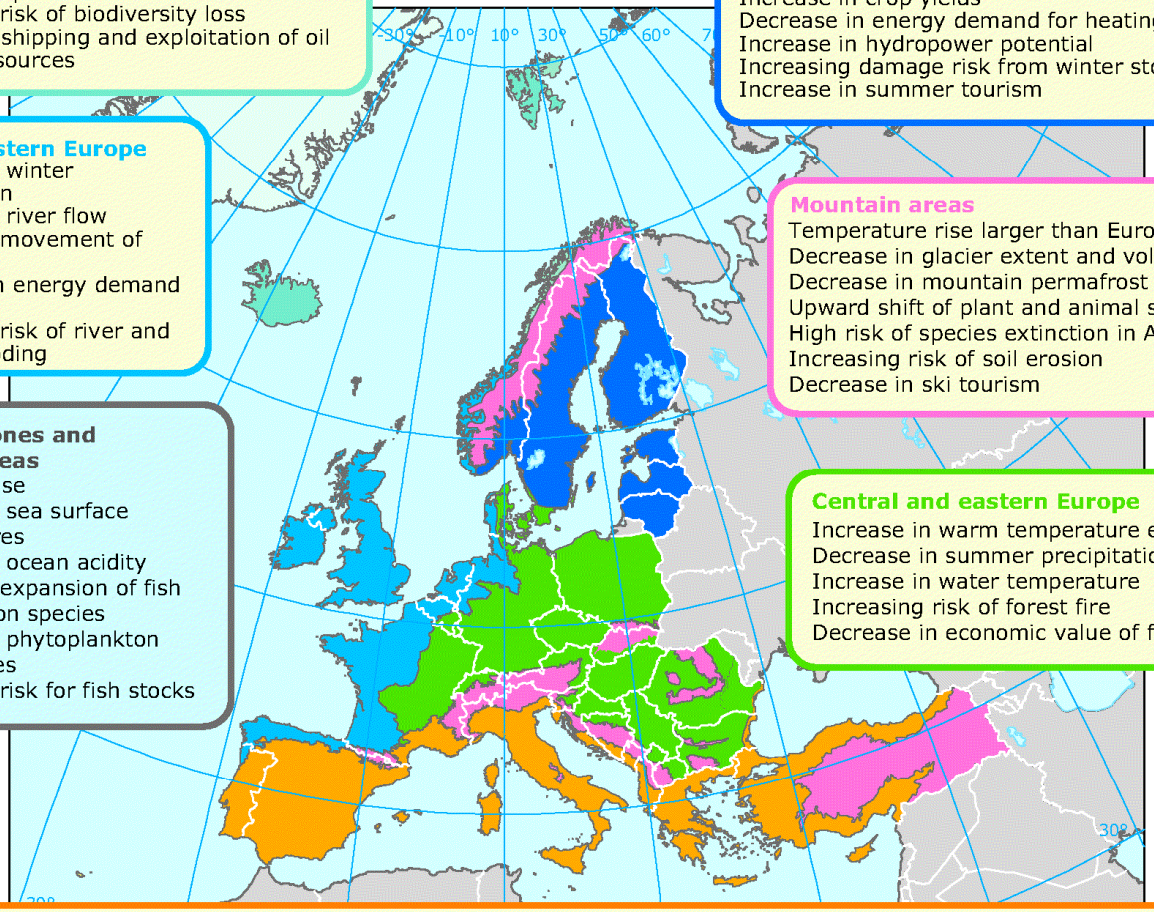
# Territorial climate impacts



**Arctic**
Temperature rise much larger than global average
Decrease in Arctic sea ice coverage
Decrease in Greenland ice sheet
Decrease in permafrost areas
Increasing risk of biodiversity loss
Intensified shipping and exploitation of oil and gas resources

**Northern Europe**
Temperature rise much larger than global average
Decrease in snow, lake and river ice cover
Increase in river flows
Northward movement of species
Increase in crop yields
Decrease in energy demand for heating
Increase in hydropower potential
Increasing damage risk from winter storms
Increase in summer tourism

**North-western Europe**
Increase in winter precipitation
Increase in river flow
Northward movement of species
Decrease in energy demand for heating
Increasing risk of river and coastal flooding

**Mountain areas**
Temperature rise larger than European average
Decrease in glacier extent and volume
Decrease in mountain permafrost areas
Upward shift of plant and animal species
High risk of species extinction in Alpine regions
Increasing risk of soil erosion
Decrease in ski tourism

**Coastal zones and regional seas**
Sea-level rise
Increase in sea surface temperatures
Increase in ocean acidity
Northward expansion of fish and plankton species
Changes in phytoplankton communities
Increasing risk for fish stocks

**Central and eastern Europe**
Increase in warm temperature extremes
Decrease in summer precipitation
Increase in water temperature
Increasing risk of forest fire
Decrease in economic value of forests

**Mediterranean region**
Temperature rise larger than European average
Decrease in annual precipitation
Decrease in annual river flow
Increasing risk of biodiversity loss
Increasing risk of desertification
Increasing water demand for agriculture
Decrease in crop yields
Increasing risk of forest fire
Increase in mortality from heat waves
Expansion of habitats for southern disease vectors
Decrease in hydropower potential
Decrease in summer tourism and potential increase in other seasons

**Source: EEA**

# The EU Adaptation Strategy: Why action at the EU level?

- Adopted in April 2013
- Contributing to a climate resilient EU
- Better balancing adaptation with mitigation agendas
- Integrating adaptation in key EU policies and funds
- Benefiting from economies of scale for addressing knowledge gaps and dissemination objectives
- Addressing cross-border issues
- EU financing for adaptation
- Promoting action by the private sector

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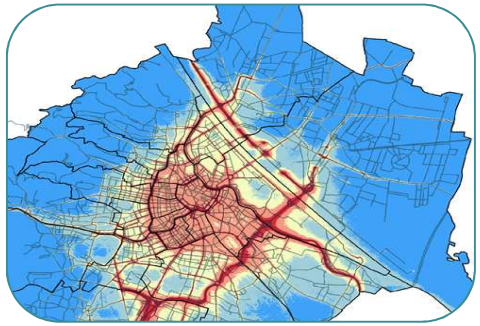
# The EU Strategy in a Nutshell

## Priority 1: Promoting action by Member States

- Action 1. Encourage MS to adopt Adaptation Strategies and action plans
- Action 2. LIFE funding, including adaptation priority areas
- Action 3. Promoting adaptation action by cities along the Covenant of Mayors initiative

## Priority 2: Better informed decision-making

- Action 4. Knowledge-gap strategy
- Action 5. Climate-ADAPT



## Priority 3: Key vulnerable sectors

- Action 6. Climate proofing the Common Agricultural Policy, Cohesion Policy, and the Common Fisheries Policy
- Action 7. Making infrastructure more resilient
- Action 8. Promote products & services by insurance and finance markets

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# Priority 1: Promoting action by Member States

**Action 1. Encourage MS to adopt Adaptation Strategies and action plans**

**Action 2. LIFE funding, including adaptation priority areas**

- cross-border floods management, coastal management, urban environment, mountain and island areas, drought-prone areas (water, desertification, fire risks)

**Action 3. Promoting adaptation action by cities along the Covenant of Mayors initiative: Mayors Adapt**

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# Priority 2: Better informed decision-making

## Action 4. Knowledge-gap strategy

- Identify and prioritise knowledge gaps
- Feed this into programming Horizon 2020

## Action 5. Climate-ADAPT

- Develop interfaces with other databases and climate services

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## Marine and fisheries

EU policies and instruments include the Integrated Maritime Policy (and action plan) allowing for the sustainable development of sea-related activities. Its environmental pillar, the Marine Strategy Framework Directive aims to deliver a 'good environmental status' of the marine environment by 2020. The Common Fisheries Policy is being reformed to achieve sustainable fisheries. The EU strategy on adaptation to climate change includes a Staff Working Document on marine issues and a staff working document on climate change adaptation in the Maritime and Fisheries Fund operational programmes was also published.

Read more

### Indicators

- Ocean heat content
- Phenology of marine species
- Arctic and Baltic sea ice
- Distribution of marine species
- Ocean acidification
- Sea surface temperature

### Resources

- Climate Change and Water, Coasts and Marine issues
- IPCC Fifth Assessment Report, WGI Chapter 13: Sea Level change
- IPCC Fifth Assessment Report, WGI Chapter 3: Observations: Ocean
- IPCC Fifth Assessment Report, WGII Chapter 5: Coastal systems and low-lying area
- IPCC Fifth Assessment Report, WGII Chapter 6: Ocean Systems
- GMES Ocean Monitoring and forecasting (MyOcean)
- UK Ocean Acidification Research

### Multimedia

- NATURA 2000: Safeguarding Europe's biodiversity

### Search results

- ► Publications and reports (136)
- ► Information portals (46)
- ► Guidance (41)
- ► Tools (7)
- ► Indicators (6)
- ► Research and knowledge projects (94)
- ► Adaptation options (6)
- ► Case studies (2)
- ► Organisations (36)

Share your information

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# Priority 3: Key vulnerable sectors

## Action 6. Climate proofing the CAP, Cohesion Policy, and the Common Fisheries Policy

- Guidance
- Capacity building

## Action 7. Making infrastructure more resilient

- Mapping standards through CEN/CENELEC/ETSI
- Guidelines for project developers

## Action 8. Promote products & services by insurance and finance markets

- Green paper insurance of disasters
- Stakeholder dialogue

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# ICM/MSP

Marine waters

Coastal waters

Freshwaters (Surface & groundwaters)

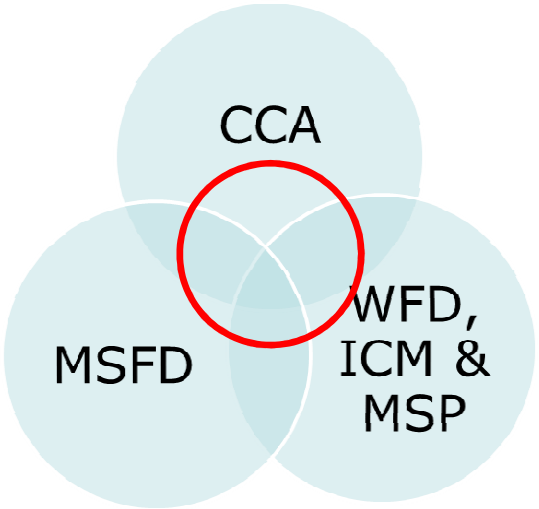
**Water Framework & Floods Directives - 2000/2007**

***ICM/2002***

areas of joint interest

**MSFD/2008**

**MSP Directive/2014**




Exclusive Economic Zone

Territorial waters

Land/terrestrial areas

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# Maritime Security Strategy & Action Plan

- Assess maritime transport infrastructure's resilience to climate change in order to
  - Minimize security risk caused by man-made and natural disasters
  - Enhance readiness and preparedness of MS and EU capacities to respond to security threats

- Best practices to be shared on Climate-ADAPT

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# Resilience of infrastructure: major projects

- **Main objective –** to climate proof major projects under the European Structural and Investment Funds

- **Scope: major infrastructure projects (transport, energy, constructions, water, ICT)**

- In project proposals to the ESIF, the following information is to be provided
  - Contribution to EU CC objectives
  - Climate Change mitigation needs
  - Risk and vulnerability of the project to effects of CC
  - Risks related to CC and Disaster Risk Reduction
  - Appropriate measures taken to ensure resilience

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# Resilience of infrastructure: standards

- **Main objective -** climate resilient infrastructure in 3 priority sectors

  1. transport infrastructure– including maritime transport infrastructure;
  2. energy infrastructure;
  3. buildings/construction;
     - **plus** ICT infrastructures that are closely interconnected with, and support the functioning of the ones above.

- **Scope:** existing European standards and European standardisation deliverables

- all types of standards managed by the ESOs (e.g. for products, systems, services, testing and measurements, processes) - excluding the EUROCODES.

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# Mainstreaming climate action in the Multiannual Financial Framework - MFF (1)


- **Climate policies**
  - Mitigation -> low-carbon societies and economies in the EU
  - Adaptation -> climate resilience
- **Europe 2020 strategy - contributes to the 20/20/20 climate change and energy sustainability targets**
  - Greenhouse Gas Emissions 20% lower than 1990
  - 20% of energy from renewable energy sources
  - 20% increase in energy efficiency
- **Political objective: Minimum 20% of the MFF (EU budget) will support climate action objectives**

  "Climate action objectives will represent at least 20% of EU spending in the period 2014-2020 and therefore be reflected in the appropriate instruments to ensure that they contribute to strengthen energy security, building a low-carbon, resource efficient and climate resilient economy that will enhance Europe's competitiveness and create more and greener jobs."

  *(Conclusions of the European Council on MFF 2014-2020, 8 February 2013)*

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# Mainstreaming climate action in the Multiannual Financial Framework - MFF (1)

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- **The MFF 2014-2020**
  - Lays down the maximum annual amounts ('ceilings') which the EU may spend in different policy fields
  - € 960 bn (2011 prices), over € 1 082 bn (current prices)

- **Horizon 2020, the EU Framework programme for Research and Innovation – Total budget of € 70.2 bn (2011) - € 80 bn (current prices)**
  - 35% of budget to be spent for climate-related R&I

- **European Structural and Investment Funds (ESIF)**
  - Over 43% of the MFF; 5 funds:
    - European Regional Development Fund (ERDF)
    - Cohesion Fund (CF)
    - European Social Fund (ESF)
    - European Agricultural Fund for Rural Development (EAFRD)
    - European Maritime and Fisheries Fund (EMFF)

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# Climate mainstreaming (mitigation, adaptation) Fact Sheets

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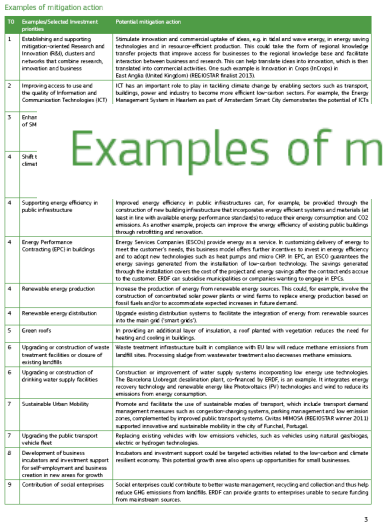
Examples of mitigation action


Examples of mitigation action

| TO | Examples/Selected investment priorities | Potential mitigation action |
|---|---|---|
| 1 | Establishing and supporting mitigation-oriented Research and Innovation (R&I), clusters and networks that combine research, innovation and business | Stimulate innovation and commercial uptake of ideas, e.g. in tidal and wave energy, in energy saving technologies and in resource-efficient production. This could take the form of regional knowledge transfer projects that improve access for businesses to the regional knowledge base and facilitate interaction between business and research. This can help translate ideas into innovation, which is then translated into commercial activities. One such example is Innovation in Crops (inCrops) in East Anglia (United Kingdom) (REGIOSTAR finalist 2013). |
| 2 | Improving access to, use and the quality of Information and Communication Technologies (ICT) | ICT has an important role to play in tackling climate change by enabling sectors such as transport, buildings, power and industry to become more efficient low-carbon sectors. For example, the Energy Management System in Haarlem as part of Amsterdam Smart City demonstrates the potential of ICTs |
| 3 | Enhan of SM | |
| 4 | Shift t climat | |
| 4 | Supporting energy efficiency in public infrastructure | Improved energy efficiency in public infrastructures can, for example, be provided through the construction of new building infrastructure that incorporates energy efficient systems and materials (at least in line with available energy performance standards) to reduce their energy consumption and CO2 emissions. As another example, projects can improve the energy efficiency of existing public buildings through retrofitting and renovation. |
| 4 | Energy Performance Contracting (EPC) in buildings | Energy Services Companies (ESCOs) provide energy as a service. In customizing delivery of energy to meet the customer's needs, this business model offers further incentives to invest in energy efficiency and to adopt new technologies such as heat pumps and micro CHP. In EPC, an ESCO guarantees the energy savings generated from the installation of low-carbon technology. The savings generated through the installation covers the cost of the project and energy savings after the contract ends accrue to the customer. ERDF can subsidise municipalities or companies wanting to engage in EPCs. |
| 4 | Renewable energy production | Increase the production of energy from renewable energy sources. This could, for example, involve the construction of decentralised solar power plants or wind farms to replace energy production based on fossil fuels and/or to accommodate expected increases in future demand. |
| 4 | Renewable energy distribution | Upgrade existing distribution systems to facilitate the integration of energy from renewable sources into the main grid ('smart grids'). |
| 5 | Green roofs | In providing an additional layer of insulation, a roof planted with vegetation reduces the need for heating and cooling in buildings. |
| 6 | Upgrading or construction of waste treatment facilities or closure of existing landfills | Waste treatment infrastructure built in compliance with EU law will reduce methane emissions from landfill sites. Processing sludge from wastewater treatment also decreases methane emissions. |
| 6 | Upgrading or construction of drinking water supply facilities | Construction or improvement of water supply systems incorporating low energy use technologies. The Barcelona Llobregat desalination plant, co-financed by ERDF, is an example. It integrates energy recovery technology and renewable energy like Photovoltaics (PV) technologies and wind to reduce its emissions from energy consumption. |
| 7 | Sustainable Urban Mobility | Promote and facilitate the use of sustainable modes of transport, which include transport demand management measures such as congestion-charging systems, parking management and low emission zones, complemented by improved public transport systems. Civitas MIMOSA (REGIOSTAR winner 2011) supported innovative and sustainable mobility in the city of Funchal, Portugal. |
| 7 | Upgrading the public transport vehicle fleet | Replacing existing vehicles with low emissions vehicles, such as vehicles using natural gas/biogas, electric or hydrogen technologies. |
| 8 | Development of business incubators and investment support for self-employment and business creation in new areas for growth | Incubators and investment support could be targeted activities related to the low-carbon and climate resilient economy. This potential growth area also opens up opportunities for small businesses. |
| 9 | Contribution of social enterprises | Social enterprises could contribute to better waste management, recycling and collection and thus help reduce GHG emissions from landfills. ERDF can provide grants to enterprises unable to secure funding from mainstream sources. |

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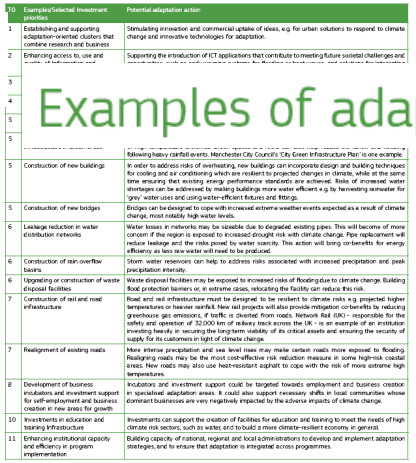
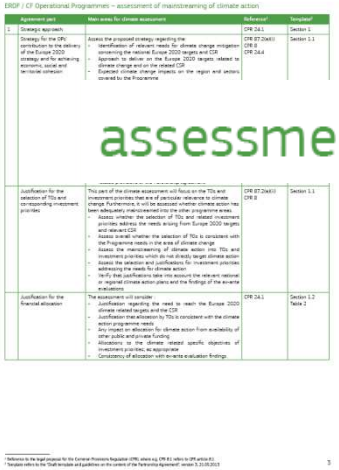
Examples of adaptation action


Examples of adaptation action

| TO | Examples/Selected investment priorities | Potential adaptation action |
|---|---|---|
| 1 | Establishing and supporting adaptation-oriented clusters that combine research and business | Stimulating innovation and commercial uptake of ideas, e.g. for urban solutions to respond to climate change and innovative technologies for adaptation. |
| 2 | Enhancing access to, use and | Supporting the introduction of ICT applications that contribute to meeting future societal challenges and |
| 3 | | |
| 4 | | |
| 5 | | |
| 5 | | following heavy rainfall events. Manchester City Council's 'City Green Infrastructure Plan' is one example. |
| 5 | Construction of new buildings | In order to address risks of overheating, new buildings can incorporate design and building techniques for cooling and air conditioning which are resilient to projected changes in climate, while at the same time ensuring that existing energy performance standards are achieved. Risks of increased water shortages can be addressed by making buildings more water efficient e.g. by harvesting rainwater for 'grey' water uses and using water-efficient fixtures and fittings. |
| 5 | Construction of new bridges | Bridges can be designed to cope with increased extreme weather events expected as a result of climate change, most notably high water levels. |
| 6 | Leakage reduction in water distribution networks | Water losses in networks may be sizeable due to degraded existing pipes. This will become of more concern if the region is exposed to increased drought risk with climate change. Pipe replacement will reduce leakage and the risks posed by water scarcity. This action will bring co-benefits for energy efficiency as less raw water will need to be produced. |
| 6 | Construction of rain overflow basins | Storm water reservoirs can help to address risks associated with increased precipitation and peak precipitation intensity. |
| 6 | Upgrading or construction of waste disposal facilities | Waste disposal facilities may be exposed to increased risks of flooding due to climate change. Building flood protection barriers or, in extreme cases, relocating the facility can reduce this risk. |
| 7 | Construction of rail and road infrastructure | Road and rail infrastructure must be designed to be resilient to climate risks e.g. projected higher temperatures or heavier rainfall. New rail projects will also provide mitigation co-benefits by reducing greenhouse gas emissions, if traffic is diverted from roads. Network Rail (UK) - responsible for the safety and operation of 32,000 km of railway track across the UK - is an example of an institution investing heavily in securing the long-term viability of its critical assets and ensuring the security of supply for its customers in light of climate change. |
| 7 | Realignment of existing roads | More intense precipitation and sea level rises may make certain roads more exposed to flooding. Realigning roads may be the most cost-effective risk reduction measure in some high-risk coastal areas. New roads may also use heat-resistant asphalt to cope with the risk of more extreme high temperatures. |
| 8 | Development of business incubators and investment support for self-employment and business creation in new areas for growth | Incubators and investment support could be targeted towards employment and business creation in specialised adaptation areas. It could also support necessary shifts in local communities whose dominant businesses are very negatively impacted by the adverse impacts of climate change. |
| 10 | Investments in education and training infrastructure | Investments can support the creation of facilities for education and training to meet the needs of high climate risk sectors, such as water, and to build a more climate-resilient economy in general. |
| 11 | Enhancing institutional capacity and efficiency in program implementation | Building capacity of national, regional and local administrations to develop and implement adaptation strategies, and to ensure that adaptation is integrated across programmes. |

4


assessment of mainstreaming of climate action


ERDF / CF Operational Programmes – assessment of mainstreaming of climate action

| Agreement part | Main areas for climate assessment | Reference[1] | Template[2] |
|---|---|---|---|
| 1 Strategic approach | | CPR 24.1 | Section 1 |
| Strategy for the OPs' contribution to the delivery of the Europe 2020 strategy and for achieving economic, social and territorial cohesion | Assess the proposed strategy regarding the:<br>- Identification of relevant needs for climate change mitigation concerning the national Europe 2020 targets and CSR<br>- Approach to deliver on the Europe 2020 targets related to climate change and on the related CSR<br>- Expected climate change impacts on the region and sectors covered by the Programme | CPR 87.2(a)(i)<br>CPR 8<br>CPR 24.4 | Section 1.1 |
| Justification for the selection of TOs and corresponding investment priorities | This part of the climate assessment will focus on the TOs and investment priorities that are of particular relevance to climate change. Furthermore, it will be assessed whether climate action has been adequately mainstreamed into the other programme areas:<br>- Assess whether the selection of TOs and related investment priorities address the needs arising from Europe 2020 targets and the CSR;<br>- Assess overall whether the selection of TOs is consistent with the Programme needs in the area of climate change<br>- Assess the mainstreaming of climate action into TOs and investment priorities which do not directly target climate action<br>- Assess the selection and justifications for investment priorities addressing the needs for climate action<br>- Verify that justifications take into account the relevant national or regional climate action plans and the findings of the ex-ante evaluations | CPR 87.2(a)(ii)<br>CPR 8 | Section 1.1 |
| Justification for the financial allocation | The assessment will consider:<br>- Justification regarding the need to reach the Europe 2020 climate related targets and the CSR;<br>- Justification that allocation by TOs is consistent with the climate action programme needs<br>- Any impact on allocation for climate action from availability of other public and private funding<br>- Allocations to the climate related specific objectives of investment priorities, as appropriate<br>- Consistency of allocation with ex-ante evaluation findings | CPR 24.1 | Section 1.2<br>Table 3 |

[1] Reference to the legal proposal for the European Structural Investment Funds (ESIF), where e.g. CPR 87 refers to CPR article 87.
[2] Template refers to the "Draft template and guidelines on the content of the Partnership Agreement" version 5.2 (10.2013)

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http://ec.europa.eu/clima/publications/index_en.htm#Mainstreaming

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# EU Research & Innovation for Climate Change Adaptation through Nature-Based Solutions

Research and Innovation

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# Nature-based solutions

- **Solutions inspired or supported by nature that simultaneously provide environmental, social and economic benefits and help to build resilience**
- **Bringing of more nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions**
- **Funding for R&I through Societal Challenge 5 of Horizon 2020, 'Climate Action, Environment, Resource Efficiency and Raw Materials'**
  - Large-scale demonstration for climate resilience and hydro-meteorological risk reduction through nature-based solutions

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# EC Plenary Session on Nature-Based Solutions for Climate Change Adaptation

- **Tomorrow, 14:00-16:00**
- **Auditorium 10**

- **EU R&I for Nature-Based Solutions**
  - Birgit de Boissezon, DG Research and Innovation
- **Scientific perspectives**
  - Pam Berry, Oxford University
- **End-users' experiences & perspectives**
  - Water Safety in the Netherlands, Arjan Ruijs, PBL
  - Coastal threats & solutions in Emilia-Romagna, Italy, Luisa Perini, Region of Emilia-Romagna
  - Resilience in Cities, Holger Robrecht, ICLEI

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# Thank you for your attention

- **More on:**
  - EU Adaptation Policies: http://ec.europa.eu/clima/policies/adaptation
  - Climate-ADAPT Homepage: http://climate-adapt.eea.europa.eu/
  - Mayor´s Adapt: http://mayors-adapt.eu/
  - HORIZON 2020 http://ec.europa.eu/programmes/horizon2020/
  - EU R&I on Nature-Based Solutions

    http://ec.europa.eu/research/environment/index_en.cfm?pg=nature-based-solutions

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