

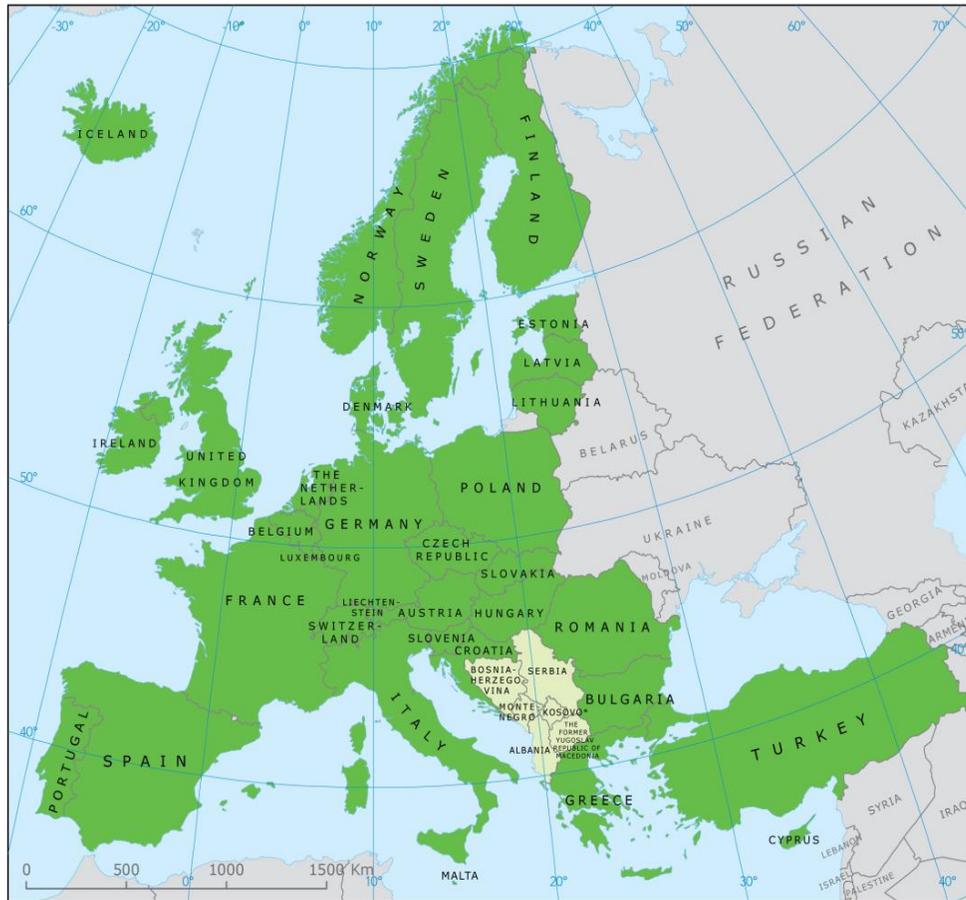
André Jol, EEA Head of Group  
Climate change impacts, vulnerability impacts, vulnerability and adaptation

Conference: Adaptation to climate change: what is the situation in Belgium?  
Brussels, 23 November 2017

# European information on climate change impacts, vulnerability and adaptation



# EEA networking with member countries (Eionet)



## EEA coverage

 Member countries

 Cooperating countries

\*Kosovo under UNSCR 1244/99

- **33 member** and six collaborating **countries** (ministries and **environment agencies**)
- Main target audience: **policymakers** at European and national levels
- Supporting and informing policy development and implementation by **data, indicators and assessments**
- **Networking:** annual Eionet workshop with all countries, expert meetings
- Supported by **European Topic Centres**, e.g. on adaptation see: <http://cca.eionet.europa.eu/>

# Global and European policy context



## Global level

UNFCCC Paris Agreement  
Sendai Framework for Disaster Risk  
Reduction  
Sustainable Development Goals



## European level

EU Climate Adaptation Strategy  
EU Civil Protection Mechanism  
EU Action Plan on Sendai Framework for  
Disaster Risk Reduction  
EU Floods Directive  
EU Green Infrastructure Strategy

# EU climate change adaptation strategy evaluation by the European Commission

- Increase in number of MS with a **national adaptation strategy** and/or action plan (see below)
- **Mainstreaming** in many relevant EU policies being assessed
- Reflecting on **changes needed due to the Paris climate agreement**
- [First stakeholder workshop 5 April 2017](#), [Second stakeholder workshop 23 Jan. 2018](#), **Public consultation** from end Nov 2017 to mid Feb. 2018
- **Commission communication** planned for autumn 2018

## EU Strategy on Adaptation to Climate Change (2013)



### 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

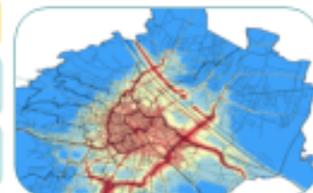
Action 3. Promoting adaptation action by cities along the Covenant of Mayors initiative



### 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



Minimum of 20 % of EU funds for climate action



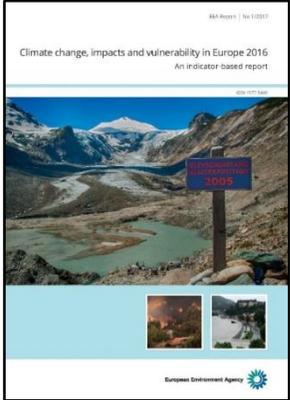
# EU MS 'adaptation preparedness' scoreboard

- **European Commission** within the EU adaptation strategy evaluation
- **Process-based indicators** linked to adaptation policy making process (see e.g. guidelines for national adaptation strategies)
- About 30 **questions** for various areas of performance and domains of relevance
  - Step 1: Preparing the ground for adaptation
  - Step 2: Assessing risks and vulnerabilities to climate change
  - Step 3: Identifying adaptation options
  - Step 4: Implementing adaptation action
  - Step 5: Monitoring and evaluation
- Based on **updated information MS submitted voluntarily in 2017** under the EU climate change monitoring mechanism (presented in country pages on Climate-ADAPT, see below)
- **Draft MS 'Adaptation preparedness scoreboards'** prepared by **end 2017**, to be made available as part of public consultation

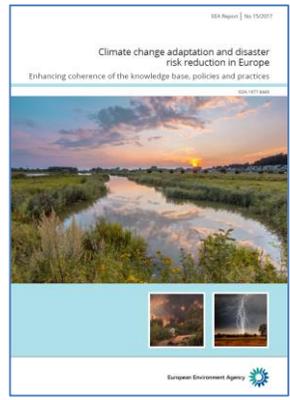


# EEA products and services on climate change impacts, vulnerability and adaptation

## Impacts and vulnerability



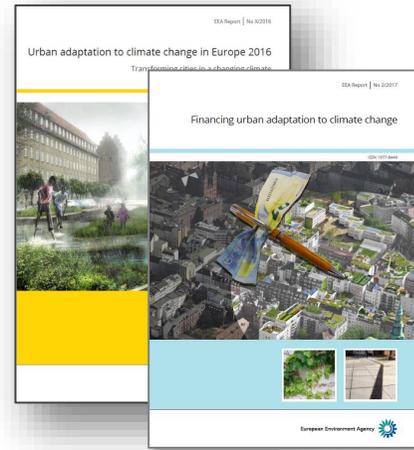
## CCA & DRR



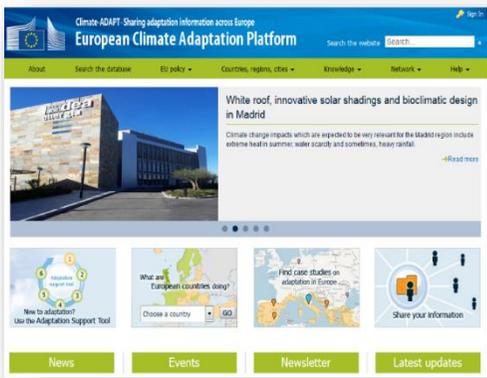
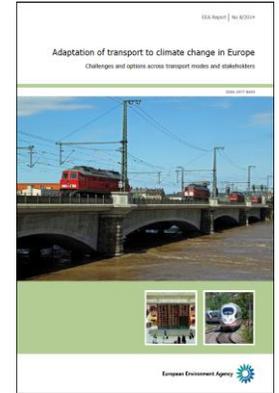
## National adaptation



## Urban adaptation



## Sectoral adaptation



**Climate-ADAPT**

- Products for 2018:
- Evaluation of Climate-ADAPT
  - Transnational regions
  - Analysis of national CCIV
  - Assessment CCA in sectoral policies

# Climate change is affecting all European regions – but adaptation needs differ across regions

## Arctic region

- 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
- Some new opportunities for the exploitation of natural resources and for sea transportation
- Risks to the livelihoods of indigenous peoples

## Atlantic region

- Increase in heavy precipitation events
- Increase in river flow
- Increasing risk of river and coastal flooding
- Increasing damage risk from winter storms
- Decrease in energy demand for heating
- Increase in multiple climatic hazards

## Mountain regions

- Temperature rise larger than European average
- Decrease in glacier extent and volume
- Upward shift of plant and animal species
- High risk of species extinctions
- Increasing risk of forest pests
- Increasing risk from rock falls and landslides
- Changes in hydropower potential
- Decrease in ski tourism

## Coastal zones and regional seas

- Sea level rise
- Increase in sea surface temperatures
- Increase in ocean acidity
- Northward migration of marine species
- Risks and some opportunities for fisheries
- Changes in phytoplankton communities
- Increasing number of marine dead zones
- Increasing risk of water-borne diseases

## Boreal region

- Increase in heavy precipitation events
- Decrease in snow, lake and river ice cover
- Increase in precipitation and river flows
- Increasing potential for forest growth and increasing risk of forest pests
- Increasing damage risk from winter storms
- Increase in crop yields
- Decrease in energy demand for heating
- Increase in hydropower potential
- Increase in summer tourism

## Continental region

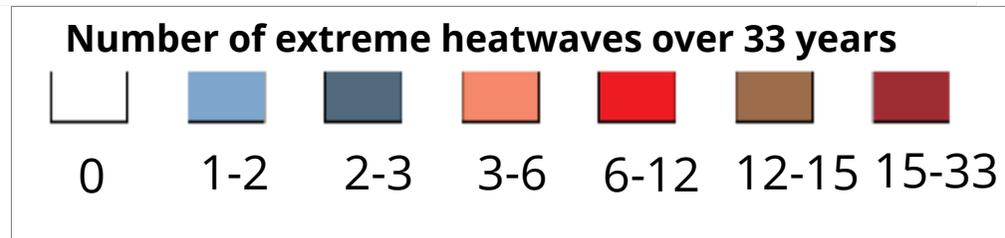
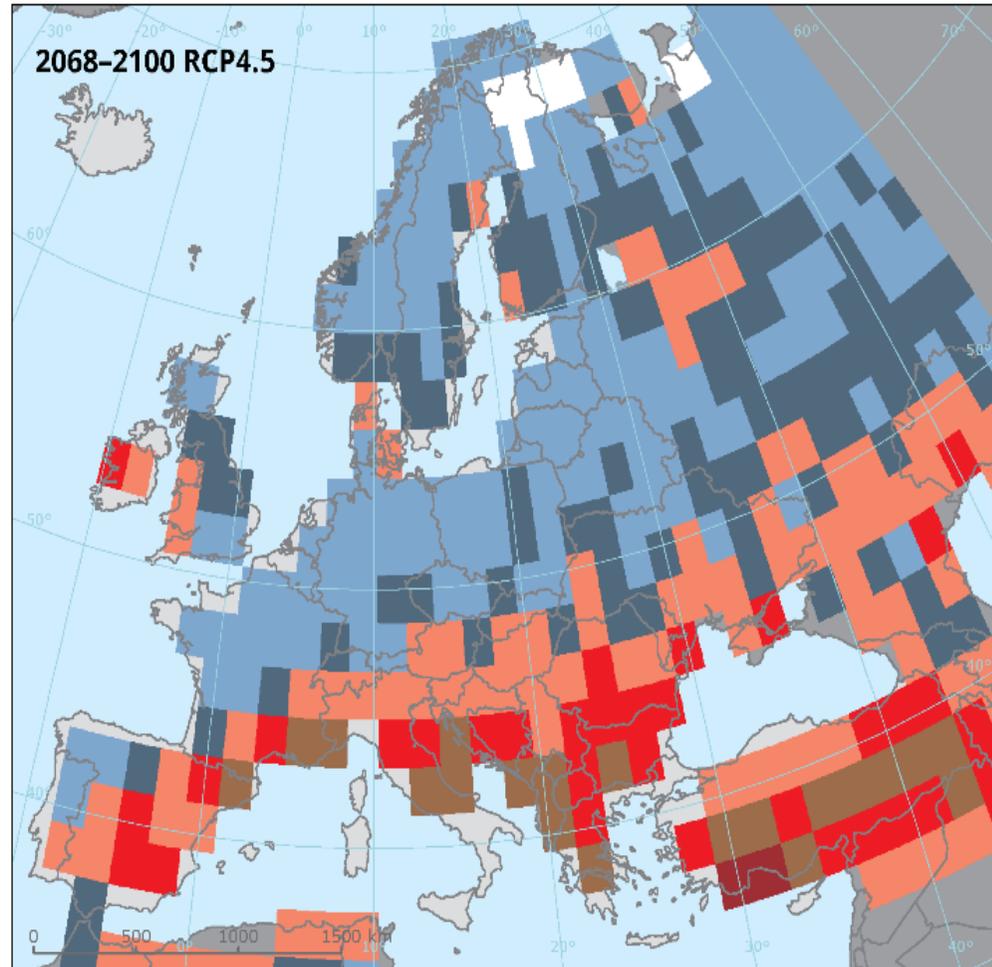
- Increase in heat extremes
- Decrease in summer precipitation
- Increasing risk of river floods
- Increasing risk of forest fires
- Decrease in economic value of forests
- Increase in energy demand for cooling

## Mediterranean region

- Large increase in heat extremes
- Decrease in precipitation and river flow
- Increasing risk of droughts
- Increasing risk of biodiversity loss
- Increasing risk of forest fires
- Increased competition between different water users
- Increasing water demand for agriculture
- Decrease in crop yields
- Increasing risks for livestock production
- Increase in mortality from heat waves
- Expansion of habitats for southern disease vectors
- Decreasing potential for energy production
- Increase in energy demand for cooling
- Decrease in summer tourism and potential increase in other seasons
- Increase in multiple climatic hazards
- Most economic sectors negatively affected
- High vulnerability to spillover effects of climate change from outside Europe



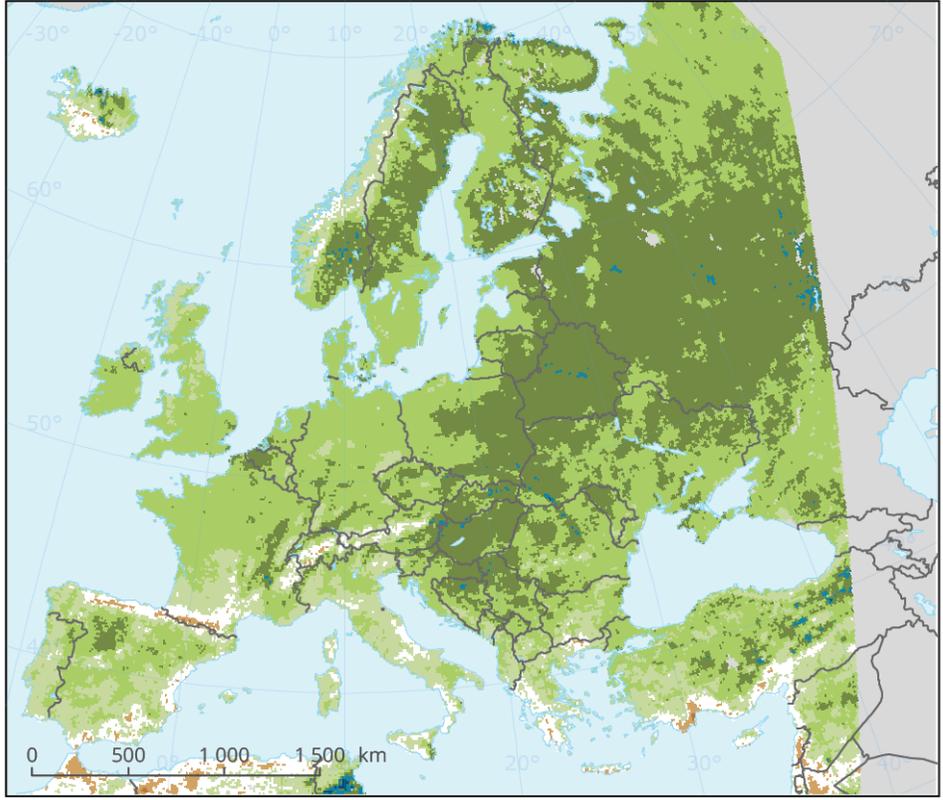
# The number of extreme heatwaves will increase



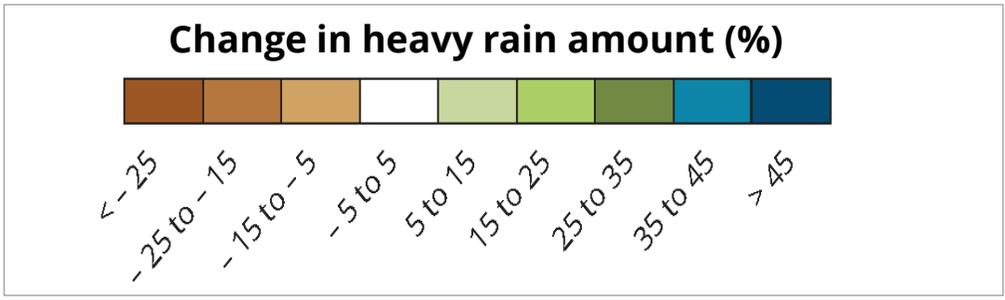
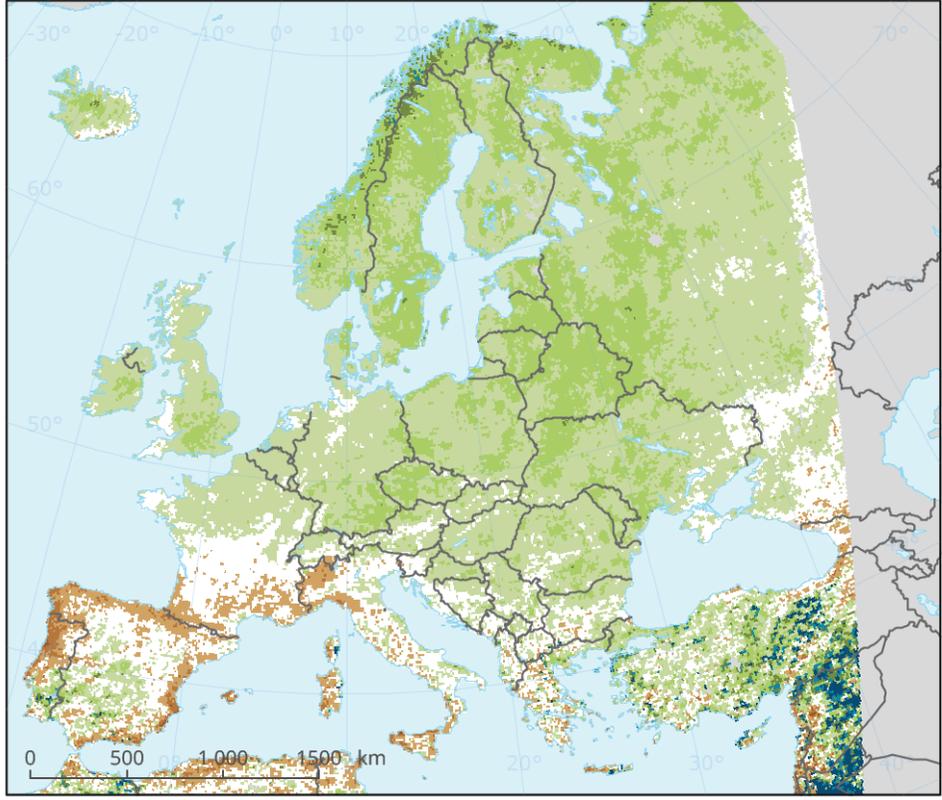
Source: JRC, Russo et al, 2014

# Heavy rain projections 2071-2100

Winter 2071-2100



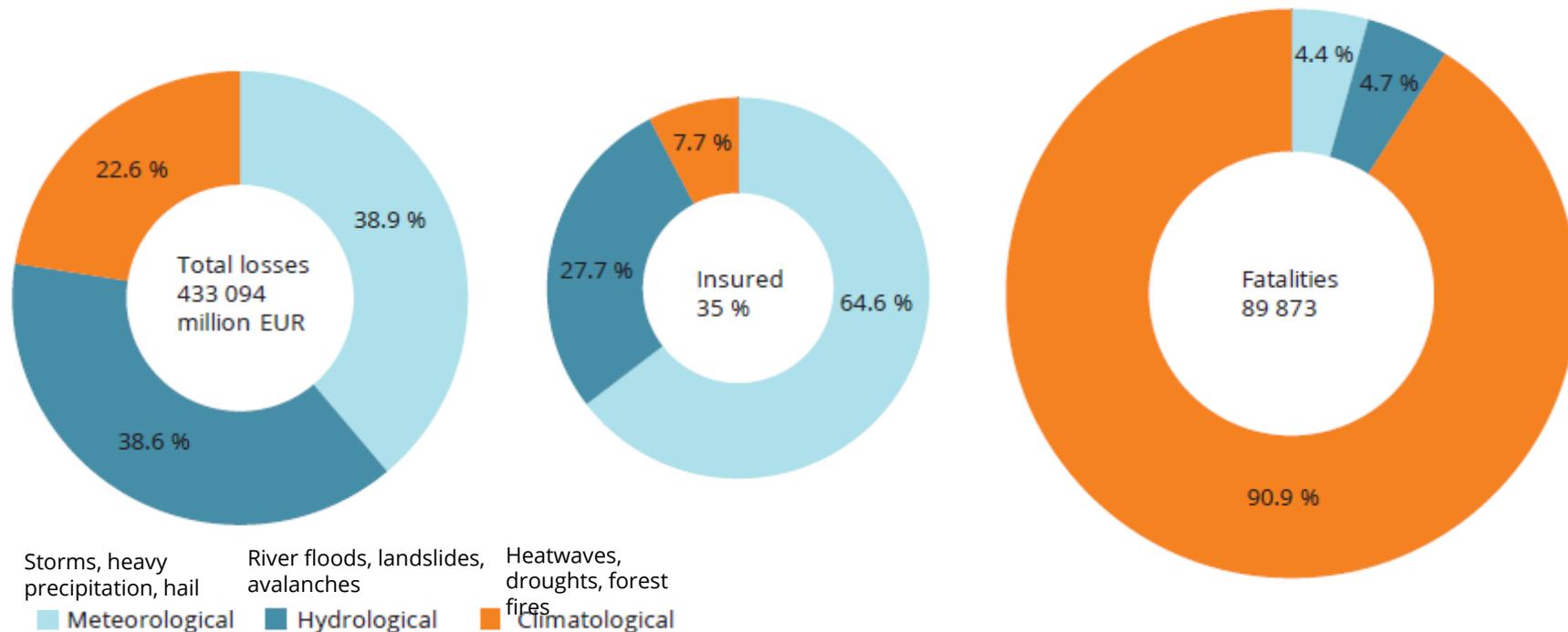
Summer 2071-2100



Source: EURO-CORDEX, 2015

# Extreme climate events are costly and life-threatening

Figure 4.3 Total economic losses (left), insured losses (middle) and fatalities (right)

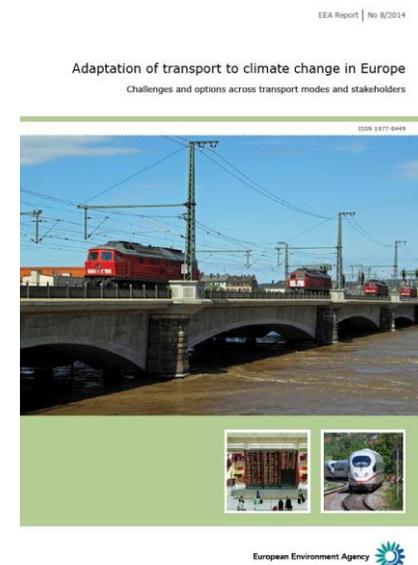


**Note:** Diagrams show total economic losses (expressed in 2015 values), insured losses and fatalities in EEA member countries over the period 1980–2015. Hazard categories: meteorological events, hydrological events and climatological events.

**Source:** EEA, based on NatCatSERVICE data received under institutional agreements.

# Main messages EEA 2014 report on 'Adaptation of transport to climate change in Europe'

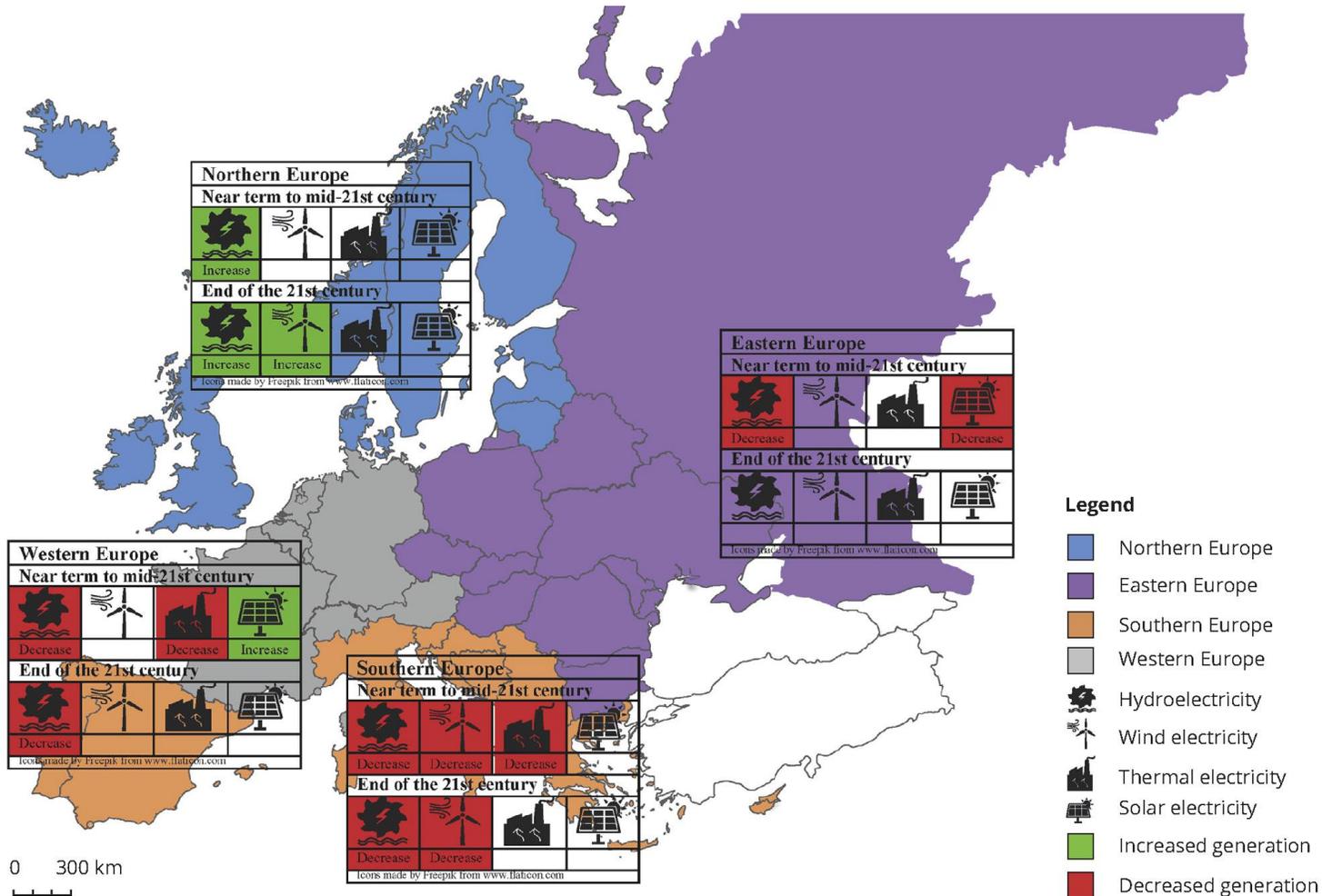
- Climate change **threatens to compromise transport services**
- The **effects** of malfunction, disturbance and broken links **may stretch far beyond the originally affected area**
- Within the transport sector, however **attention to adaptation is as yet relatively low**
- Adapting the transport system **could require substantial infrastructure investments**; mainstreaming of adaptation in infrastructure planning is needed now
- **Cooperation** between the many diverse stakeholders **within and outside** the transport sector is needed
- The **EU and national governments** can create the **enabling framework and invest in the knowledge base**
- Adaptation to climate change is a new policy area; the **effectiveness** of current steps **should be evaluated** in the future



# Climate change impacts on the energy sector and system

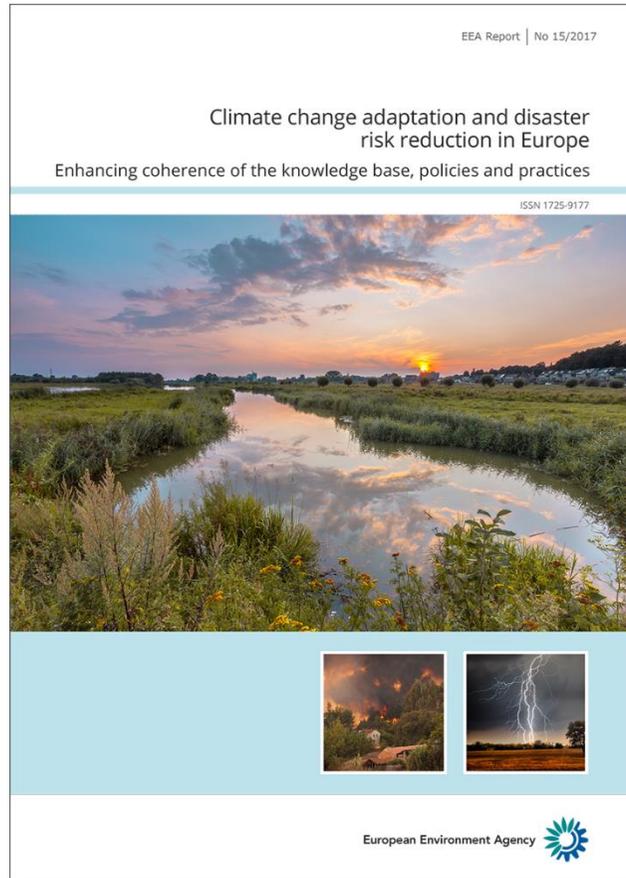
- **Energy demand for heating has decreased** (northern and north-western Europe), while the **energy demand for cooling has increased** (southern and central Europe)
- Further increases in temperature and the occurrence of droughts may **limit the availability of cooling water** for thermal power generation in summer
- For both renewable and conventional electricity generators **most of the projected impacts of climate change will be negative**, but **some positive** impacts may occur, in particular for **hydropower production** in northern Europe.
- **Energy transport infrastructures across Europe are exposed** to substantial risks from increasing frequency and magnitude of weather and climate related extreme events.
- **Infrastructures in mountain regions** will be threatened by geological instability owing to increased precipitation.

# Projected impacts of climate change on electricity production from different sources in four European regions



Source: Adapted from Bonjean Stanton et al., 2016.

# Climate change adaptation and disaster risk reduction in Europe 'Enhancing coherence of the knowledge base, policies and practices' (17 Oct. 2017)



The report presents:

- Main global and European policies on CCA and DRR
- Knowledge base on weather- and climate-related hazards and their impacts
- Good practice examples of linking CCA and DRR
- Opportunities and benefits from linking CCA and DRR in Europe

# Dealing with disasters: good practice

Six case studies:

- Combining risk transfer using **insurance**
- **National** agenda and **local** implementation
- **Developing** national risk assessments
- **City networks** promoting urban resilience
- Financing **nature-based solutions**
- Long-term **programmatic approach**



# Key features of Climate-ADAPT

Database search

Countries, Cities

Tools

EU policy and funding

Adaptation support tool

Country profiles

The screenshot shows the homepage of the European Climate Adaptation Platform. At the top, the header includes the logo, the title "Climate-ADAPT - Sharing adaptation information across Europe", and the main title "European Climate Adaptation Platform". A search bar is located on the right. Below the header is a navigation menu with items: "About", "Search the database", "EU policy", "Countries, regions, cities", "Knowledge", "Network", and "Help".

The main content area features a large image of a modern building with a curved, metallic facade. To the right of the image is a text box titled "About Climate Change Adaptation in Europe" which describes the platform's mission and lists key features:

- Expected climate change in Europe
- Current and future vulnerability of regions and sectors
- National and transnational adaptation strategies
- Adaptation case studies and potential adaptation options
- Tools that support adaptation planning

A "Read more" link is provided at the end of the text. Below this is a row of four interactive tiles:

- "Adaptation support tool" with a circular diagram showing steps 1-6 and the text "New to adaptation? Use the Adaptation Support Tool".
- "What are European countries doing?" with a map of Europe and a "Choose a country" dropdown menu.
- "Find case studies on adaptation in Europe" with a map of Europe showing various locations.
- "Share your information" with an icon of a person and a document.

At the bottom of the page, there are four green buttons: "News", "Events", "Newsletter", and "Latest updates".

# European countries adaptation policies

- Presenting information based on official **country reporting** (updated until early 2017)
- **Summary** of national policies, assessments, sectors and actions, stakeholder involvement
- Web-based template with **links** to key **national documents** and official web-pages
- Example: Belgium



The screenshot shows the 'European Climate Adaptation Platform' website. The header includes the logo, the text 'Climate-ADAPT - Sharing adaptation information across Europe', and the title 'European Climate Adaptation Platform'. A search bar is located in the top right. The navigation menu includes 'About', 'Database', 'EU policy', 'Countries, regions, cities', 'Knowledge', 'Network', and 'Help'. The breadcrumb trail reads 'You are here: Home / Countries, regions and cities / Country Information / Belgium'. A map of Europe highlights Belgium, with a dropdown menu labeled 'Choose a country'. The page is dated 'Last update: 11 Jan 2017'. A navigation bar contains tabs for 'Summary', 'Policy & legal framework', 'Sectors & actions', 'Assessments', 'Engaging stakeholders', and 'Contact'. The main content is a table with three columns: 'Item', 'Status', and 'Links'.

Item	Status	Links
National adaptation strategy	• Adopted	<a href="#">National Climate Commission working group Adaptation</a>
Action plans	• Adopted/Completed and submitted for adoption/Being developed	<ul style="list-style-type: none"><li>• National Climate Plan 2009-2012 (<a href="#">Fr</a>, <a href="#">Nl</a>)</li><li>• National Adaptation plan (project adopted in December 2016)</li><li>• <a href="#">Flanders Adaptation plan Progress Report on Adaptation</a></li><li>• <a href="#">Flanders 2015</a></li><li>• <a href="#">Walloon Adaptation plan</a></li><li>• <a href="#">Brussels Adaptation plan</a></li><li>• <a href="#">Federal Contribution to the National Adaptation Plan</a></li></ul>
Impacts, vulnerability and adaptation assessments	• Completed • Currently being undertaken	<ul style="list-style-type: none"><li>• <a href="#">Flanders</a></li><li>• <a href="#">Wallonia</a></li><li>• <a href="#">Brussels</a></li><li>• <a href="#">Federal</a></li></ul>

# National adaptation policy processes in Europe (updated 2017)

- **Voluntary reporting** by countries to the Commission and EEA **end 2016/early 2017**
- Information included on **Climate-ADAPT country pages**
- 25 EU MS and 3 EEA member countries have a **national adaptation strategy** and 16 and 2 respectively also have **action plans** (national and/or multi-sectoral)
- Some countries are in the **implementation stage**
- Some countries have systems for **monitoring and reporting** in place, but **few** have performed **evaluations**
- **Providing information and mainstreaming** in sectors are the most reported policies
- **Main policy drivers:** extreme weather events and damage costs, EU policies, research

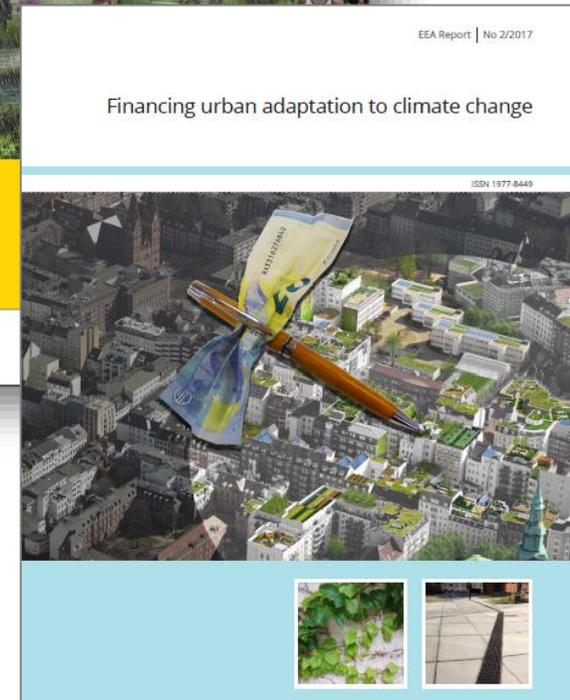
EEA countries:	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 (1)
Austria													
Belgium													
Bulgaria													
Croatia													
Cyprus													
Czech Republic													
Denmark													
Estonia													
Finland										*			
France													
Germany													
Greece													
Hungary													
Ireland													
Italy													
Latvia													
Lithuania													
Luxembourg													
Malta													
Netherlands												*	
Poland													
Portugal											*		
Romania												*	
Slovakia													
Slovenia													
Spain													
Sweden													
United Kingdom													
Iceland													
Liechtenstein													
Norway													
Switzerland													
Turkey													

white	No policy
light green	National adaptation strategy (NAS) in place
dark green	National adaptation strategy (NAS) and national and/or sectoral adaptation plans (NAP/SAP) in place

\* National Adaptation Strategy (NAS) updated

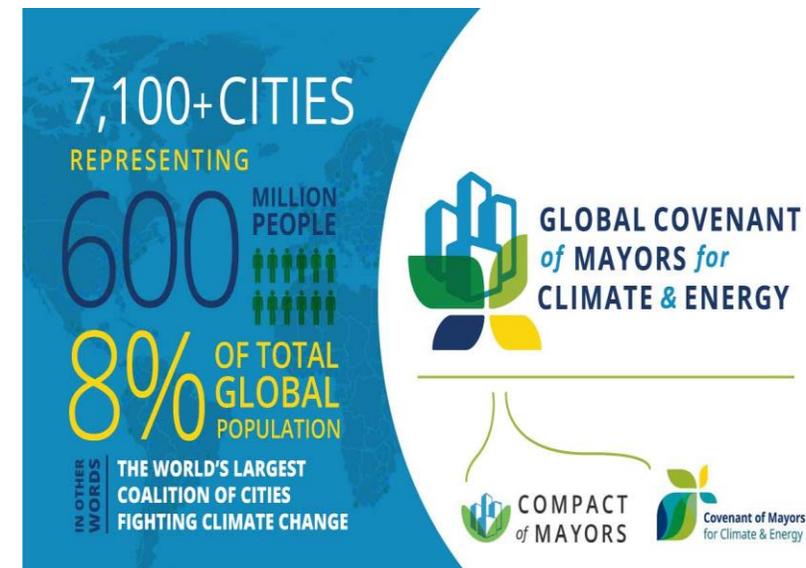
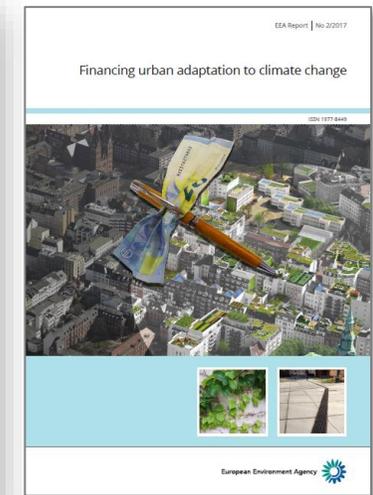
# Cities have started to act (1)

- **Knowledge** on CC impacts, vulnerability and adaptation options **has rapidly increased but many cities**, especially smaller, **lack the capacity** to access knowledge and select appropriate available tools
- **Adaptation has started** in many cities; mainly at planning stage, implementation in few cases by front-runner cities
- **Low cost and 'soft' solutions** are predominant – cities are coping with climate variability or making incremental changes
- **Public funds** for adaptation measures are **difficult to find**
- **Integrating climate adaptation** requirements when replacing old or building new infrastructure for basic services **will save money** in the long term



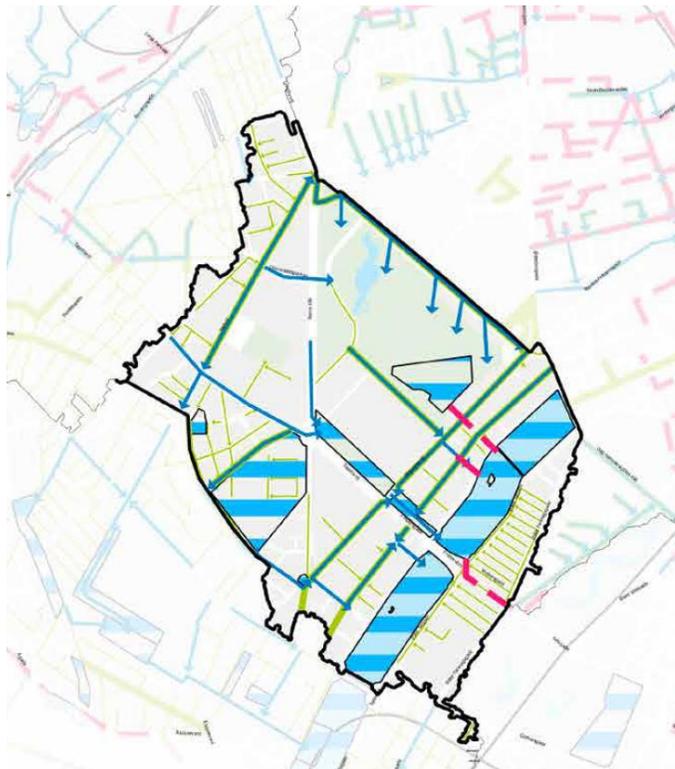
# Cities have started to act (2)

- Highlighting **ecosystem-based measures** ('green infrastructure'), with multiple benefits (e.g. nature protection, recreation, adaptation). These can **increase the chance of securing funding**
- **Few cities** recognise the **need for transformative adaptation** – a long-term, systemic approach – to anticipate future climate impacts and other changes
- Key new **EU initiative Global Covenant of Mayors for Climate and Energy** provides support (as well as city networks)



# Few systemic solutions, example of Copenhagen

Copenhagen **Cloudburst Plan as backbone for physical development** in the City



**Copenhagen** (Denmark) implements the next decades a cloudburst plan with 300 projects, **combining green, blue and grey solutions** costing 1.5 billion Euro

Adding more urban nature, increasing biodiversity and creating a liveable city



Storm water storage space at Tåsingeplads in Copenhagen, Denmark

# Case studies (examples)

Climate-ADAPT-Sharing adaptation information across Europe  
European Climate Adaptation Platform

Log in

Search:

About Database EU policy Countries, regions, cities Knowledge Network Help

You are here: Home / Database / Case studies / Integrating adaptation in the design of the metro of Copenhagen

## Case studies



### Integrating adaptation in the design of the metro of Copenhagen (2015)

Climate change impact assessment has been an integrated part of the design and planning of the Copenhagen metro since the first metro line was designed in the mid-1990s. Apart from the first metro line, opened in 2002, and the extensions in the following years, which are partly subterranean, Metroselskabet, the Copenhagen metro company, is now constructing the City ring, an underground metro ring in the city centre of Copenhagen, which is scheduled to open in 2018. The biggest planning challenge is changing projections of increasingly higher mean sea water level as a consequence of climate change, meaning that entrances, ventilation (plus other infrastructure elements) to stations and shafts near the harbour and the coastline should provide sufficient protection against storm surges.

#### → Case Study Description

- [Challenges](#)
- [Objectives](#)
- [Adaptation Options Implemented In This Case](#)
- [Solutions](#)
- [Importance and Relevance of Adaptation](#)

#### → Additional Details

#### Case Study Illustrations (3)



#### Case studies Documents (1)

Metroselskabet 2013 Annual Report

#### Keywords

Copenhagen, design standard, metro, storm surge, urban transport

#### Sectors

Disaster Risk Reduction, Transport, Urban

#### Climate impacts

Flooding, Sea Level Rise, Storms

#### Governance level

Local (e.g. city or municipal level)

#### Geographic characterization

Europe

Climate-ADAPT-Sharing adaptation information across Europe  
European Climate Adaptation Platform

Log in

Search:

About Database EU policy Countries, regions, cities Knowledge Network Help

You are here: Home / Database / Case studies / Implementation of the integrated Master Plan for Coastal Safety in Flanders

## Case studies



### Implementation of the integrated Master Plan for Coastal Safety in Flanders (2014)

The Flemish coast is intensively used by many actors. A safety test of the coastal defences showed that about one third of the coastline together with parts of the harbours are not sufficiently protected against severe storm events, being minimally for a 1000-year event under current conditions and when taking into account a sea level rise of 30 cm in 2050. In 2007, the Flemish Government started the elaboration of an Integrated Master Plan for Coastal Safety that was eventually approved by the Flemish Government in June 2011.

#### → Case Study Description

- [Challenges](#)
- [Objectives](#)
- [Adaptation Options Implemented In This Case](#)
- [Solutions](#)
- [Importance and Relevance of Adaptation](#)

#### → Additional Details

- [Stakeholder Participation](#)
- [Success and Limiting Factors](#)
- [Costs and Benefits](#)
- [Legal Aspects](#)
- [Implementation Time](#)
- [Life Time](#)

#### → Reference Information

#### Case Study Illustrations (4)



#### Keywords

Beach nourishment, Flanders, Master Plan, Ostend, coastal safety, harbour improvement, storm events, storm surge

#### Sectors

Coastal areas, Disaster Risk Reduction, Urban

#### Climate impacts

Flooding, Sea Level Rise, Storms

#### Governance level

Sub National Regions

#### Geographic characterization

Europe

#### Macro-Transnational region:

North West Europe, North Sea

#### Biographical regions:

Atlantic



# Dissemination via the adaptation newsletter

European Climate-Adaptation Platform (Climate-ADAPT)  
European Climate Adaptation Newsletter

Your update on Adaptation to Climate change in Europe

European Environment Agency

Issue March 22, 2016

[EU policy and EEA activities](#) | [Climate-ADAPT](#) | [EU research](#)  
[Transnational, national and local activities](#) | [Events](#) | [Subscribe](#)

## News

### » EU policy and EEA activities

#### » 1. Next steps for Europe after the Paris agreement

The European Commission has presented an assessment of the implications that the new global climate agreement, adopted in Paris in December 2015, will have for the European Union.

» [Read more](#)



© COP21 Official logo

#### » 2. Foreign Affairs Council calls for continuing European climate diplomacy following landmark Paris deal

The European Union's Foreign Affairs Council has welcomed the global climate agreement, reached in Paris in December 2015, as a landmark achievement for combatting climate change and for multilateralism.

» [Read more](#)



## Climate-ADAPT

### » 5. Sharing knowledge on adaptation in Europe - a new case study

As a result of the collaboration between the EEA and its member countries, in the frame of the European Environment Information and Observation Network (Eionet), a new case study has been published on Climate-ADAPT. The development of green roofs in Basel as a combined mitigation and adaptation measure has been proposed by Switzerland as an inspiring case study. Using a participatory approach, incentives were developed to enhance green roof coverage in Basel, with a view to providing a climate change adaptation function through limiting surface water runoff and reducing temperature in urban areas.

» [Read more](#)



© Stephan Brenneisen

### » EU research

#### » 6. Resilience of infrastructure

This work by the European Commission's Joint Research Centre provided insight into current and future impacts of climate extremes on the present stock of critical infrastructures in Europe. It also considered regional investments under the EU Cohesion Policy for the 2007-2013 programming period.

» [Read more](#)



© Knowledge for Climate programme

#### » 7. ERA-NET Cofund for Climate Services officially launched at kick-off meeting in Paris



European Research Area

Dissemination of Climate-ADAPT news