

# Climate Change in Germany

## 1. Awareness of climate change and its consequences:

- We are already feeling the effects of climate change.
- However, there are still many people who do not really recognize that it is already happening and that it is not only a future topic (but 76,600,000 hits in Google worldwide and 2,810,000 in Germany)
- Business sector: is highly aware, e.g. renewable energies are used instead of nuclear power and car manufacturers established emission guidelines (to decrease carbon emissions)
- Insurance industry: climate change is biggest environmental challenge and with its large loss potential on first position of Emerging Risk (many companies have established new department Risk Management). Already higher risks due to cloudbursts, hail and squalls
- Public Authorities: the government promotes energy efficiency in buildings, etc.

## 2. Consequences:

There are three reasons why Germany is more affected by climate change than other regions on earth:

1. The temperature in the tropics will only moderately rise, but will even more rise in the Antarctic. Germany is exactly located in between.
2. The landscape heats more than the ocean
3. In winter there is more warm air circulating from the Antarctic, as the airflow system has also changed due to climate change

- Floods
  - the regional average for mean annual precipitation in Germany has increased by about 9%
  - spring rainfall shows a marked increase (especially in March)
  - reduced rainfall in summer (July and August), but heavier rainfall in June
  - more rainfall in winter than snow, especially in the low mountain ranges (e.g. Eifel) - winter rainfall already shows a general increase of about 20%
  - more days of heavy rain will put pressure on municipal sewage and water management systems -> northern rivers (e.g. Elbe (as in 2002), Oder) will flood more frequently
- Rise of sea level
  - could rise by 18-59 cm until the end of this century, some experts even expect a rise by 1.5 metres
  - decreasing water table in the summer, especially in Southwest Germany
  - storm tides
- Melting of snow in the Alpine countries -> more rockfalls/avalanches and mudflows

- Storms (e.g. “Lothar” and “Martin” in 1999, “Kyrill” in 2007, “Emma” in 2008)
  - increasing and more severe winter storms
  - heavier thunderstorms with more flashes
- Heat waves
  - the mean air temperature in Germany rose by nearly 0.9°C (1901-2006), probably another 0.8°C until 2040 -> less frost, warmer days, especially in winter, and tropical nights
  - but less increase of temperature in the northern region (North Sea and Baltic Sea) due to closeness to the sea
  - precipitation in summer could fall by up to 50% this century in the Northern Lowlands causing droughts affecting farming
  - heat waves as in 2003 could become the norm in coming decades and kill people (7,000 victims in 2003) -> number and term of heat waves will increase
  - drier climates increase the danger of forest fires (especially in the southwestern and northeastern part)
- Spread of diseases
  - warming temperatures may enable the northern migration of insect-borne diseases (e.g. malaria, meningitis)
  - an increase in asthma- and heart-related diseases
  - change of rainfall patterns could also prolong the allergy season
  - ozone layer is getting thinner -> higher UV-A and UV-B wavelengths, can cause genetic damage -> higher risk of skin cancer
- Favorable consequences:
  - more (twice a year) and better crops (particularly in the North)
  - efficient/high-yield vintage in South Germany
  - more tourism at the coast
  - less diseases due to cold

### 3. Affected economic sectors:

- Agriculture
  - increasing and more severe winter storms could affect agriculture (crops), especially in drier regions
  - increase of soil erosion (summer: wind erosion, winter: erosion due to water)
  - as the climate will be more variable, there will be less certainty about the crop (when and how much)
  - the change of precipitation will affect the water resources and hence the drink water supply and irrigation (*Bewässerung*)
- Infrastructure
  - inland navigation will be affected due to low tide and flooding
- Forestry
  - forest fires
  - higher temperature will amplify the distribution of pests (e.g. bark beetles) that destroy trees and crops and at the same time weaken the tree's resistance to pests

- possible extinction of species and/or relocation of their natural habitats
- Energy
  - electricity: Numerous onshore wind parks as alternative energy resource
  - offshore wind farms in the North Sea planned (as the storms are stronger out there)
- Tourism
  - climate change also threatens to take a lot of the fun out of winter vacations to the Alps, melting the snow that draws millions of tourists each year to the mountains and ski resorts. According to the OECD, the German ski industry is most vulnerable of all Alpine countries: one-degree of warming would reduce the number of naturally snow-reliable ski areas by up to 60%.
  - more tourism at the coast


#### **4. Measures taken or envisaged:**

- Legislation
  - 2005: Flood Prevention Law (identification of flood areas, i.e. no buildings or infrastructure with a high risk potential)
  - EU-Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC (which established a scheme for greenhouse gas emission allowance trading within the community in order to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner) as to improve and extend the greenhouse gas emission allowance trading scheme of the Community
- Regulation
  - EU Climate Change Strategy:
    - advocating practical action to prevent temperatures from increasing to more than 2°C above pre-industrial levels
  - 2007: the European Commission adopted a Green Paper on adapting to climate change in Europe
  - December 2008: the EU Commission adopted an integrated energy and climate change policy, including ambitious targets for 2020. It hopes to set Europe on the right track – towards a sustainable future with a low-carbon, energy-efficient economy – by:
    - cutting greenhouse gases by 20%
    - reducing energy consumption by 20% through increased energy efficiency
    - meeting 20% of our energy needs from renewable sources
  - reduction in fluorinated greenhouse gases, e.g. air-conditioning (labeling of products and equipment as well as prohibitions on the commercialization and the training and certification of personnel regarding these gases)
- Conferences and workshops nationwide on the climate change topic

## 5. Involvement of Germany in international efforts and initiatives related to climate change:

- Kyoto Protocol (1998)
  - chief instrument for tackling climate change
  - contains the undertaking entered into by most of the industrialized countries to reduce their emissions of certain greenhouse gases (which are responsible for global warming) by an average of 5%
  - Germany is Europe's largest (and the world's 6<sup>th</sup> greatest) single emitter of CO<sub>2</sub>
  - March 2002: the Bundestag unanimously ratified Kyoto
  - May 2002: the EU submitted the articles of ratification for all 15 of its then member states
  - German greenhouse gas emissions reduced by 17.2% from 1990 to 2004
  - Germany has committed to reducing its emissions to 21% below 1990 levels between 2008 and 2012
  - Nov. 2008: a study found that Germany had already reduced its greenhouse gas emissions by 22.4%, i.e. it already reached its Kyoto Emissions Commitments!
  - some of Germany's achievements since signing the protocol:
    - So far reduction of greenhouse gas emissions by 22.4%
    - Topping of world production in wind energy with more than 16,000 wind turbines (which generate 39% of the world's total wind power)
    - Key role in installing 64% of the solar energy generation capacity in 2003
  - next steps
    - Plan of generating 20% of Germany's energy from renewable energy sources by 2010
- Hyogo Framework for Action 2005-2015 (2005):
  - key instrument for implementing disaster risk reduction, adopted by the Member States of the United Nations
  - assists the efforts of nations and communities to become more resilient to, and cope better with natural hazards
  - Germany sees this Global Platform as an important forum for sharing experiences and lessons learnt, raising awareness of disaster risks and achieving further progress on the disaster risk agenda and the implementation of the Hyogo Framework for Action
  - the German Government is willing to continue contributing fully to this endeavour.
  - every year Germany spends 10% of its humanitarian aid budget and also allocates funds from its development-oriented and transitional aid budget to promote disaster risk reduction activities in disaster-prone countries. Further funds are made available under the Government's International Climate Protection Initiative. Projects are being supported and implemented in Asia, Central Asia, Sub-Saharan Africa, Latin America and the Caribbean.

- Germany is keen to strengthen disaster risk capacities in coastal areas and remains strongly engaged in the field of early warning, e.g. by providing substantial assistance to the Tsunami Early Warning System in Indonesia.
- in addition, the German Committee for Disaster Reduction (DKKV) is playing a pioneering role as a centre of excellence and expertise in the field of disaster prevention
- furthermore, there exists an European Network of national platforms, which since 2007 has been enlarged and currently consists of the Czech Republic, France, Germany, Poland and Switzerland.
- Emission trading systems
  - administrative approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants
  - the *European Union Emission Trading Scheme* (EU ETS) is the largest multi-national, greenhouse gas emissions trading scheme in the world and was created in conjunction with the Kyoto Protocol (since January 2005)
    - the program (consisting of two phases) caps the amount of carbon dioxide that can be emitted from large installations, such as power plants and carbon intensive factories and covers almost half of the EU's Carbon Dioxide emissions
    - Table:

Member State	1st period cap	2005 verified emissions	Proposed cap 2008-2012	Cap allowed 2008-2012
 <a href="#">Germany</a>	499	474	482	453.1

## 6. References to literature:

- Internet
  - Spiegel Online
  - European Commission
    - [http://ec.europa.eu/climateaction/index\\_en.htm](http://ec.europa.eu/climateaction/index_en.htm)
    - [http://ec.europa.eu/environment/climat/home\\_en.htm](http://ec.europa.eu/environment/climat/home_en.htm)
  - EU legislation
    - [http://europa.eu/legislation\\_summaries/environment/tackling\\_climate\\_change/index\\_en.htm](http://europa.eu/legislation_summaries/environment/tackling_climate_change/index_en.htm)
  - Umweltbundesamt
    - <http://www.umweltbundesamt.de/klimaschutz-e/index.htm>

## B. Climate change and insurance (please stress legal aspects)

1. Which are the lines of insurance that could be affected ?

- Property

Agriculture (crops, forestry, livestock) –

Affected (crop failure, forest fires, floods)

Buildings –

Less affected (possibly floods in coastal regions, or in river bed areas, possible increase of fires in the summer)

Business interruption –

Only with underlying property damage – if anything, less affected

Others (specify) - none

- Liability –

Not affected (exceptions: failed protection measures where there is an obligation to act – eg. enhanced coastal protection)

- Transport, marine – Less affected

- Life, health:

- improved conditions for vector-borne diseases like malaria, dengue, Lyme disease, encephalitis, and hantavirus or water-borne illnesses like cholera, cryptosporidiosis and toxoplasmosis (VBDs increase as temperatures warm up to about 40 C);
- enhanced mortality risks due to natural disasters, including flash floods;
- contamination of waters and soils with pathogens by flooding and intensified precipitation;
- heat-related stress: increased probability of episodes of heat-related mortality and respiratory disease;
- constraints on food production and public water supplies;
- increase of cardiovascular diseases, sunstroke, skin cancer, smog

2. How are the risks linked to climate change to be defined ?

- Problems of interference of human and natural causes

(e.g. building in an area prone to being flooded)

Obligations of the Community, no planning permission should be issued for regions at risk (river areas etc).

- Problems of causal links

(e.g. increase of losses often due to a combination of factors  
– natural, but also demographic and economic)

Overall the German meteorological association is stating that the Federal Republic of Germany is warming faster than other regions on the planet. The average temperature increase of 1.7°C will lead to a decline in the Perma-frost soil (melting of glaciers), which can result in an increase in avalanches and also risk for home-owners in endangered valleys. In January 2010 it gave rise to an avalanche in a Bavarian village, which did not only cause high property damage, but also bodily injuries – two people died, and others were injured.

Heat waves in summer give rise to increased health liabilities (heart/circulation problems) in both humans and animals, as well as an increased risk of fire with simultaneous water shortage. Furthermore, the risk of skin cancer diseases increases.

In extreme summers (for example 2003) there is a risk of land crustification so that rain-water cannot drain away, but it may induce torrential rain to cause flooding.

The increase in sea-levels leads to risks in the North and Baltic Sea (risk of property damages in coastal regions). Storm floods can reach up to 20cm higher.

Dry periods may affect the crop yields in the farming industry (claims from indemnity insurance).

Risks during severe summer storms (heavy rainfall, hail, lightning) may cause property damage leading to accumulated losses (motor hull damage).

### 3. Insurers' measures of protection against excessive exposures

- Improvement of statistics

  - Cartography of risks

- Raising risk awareness (communication campaigns, lobbying, ...)

- Prevention

- Limits of indemnity

- Deductibles

- Exclusions

- Premium increases

- Cancellations

- Withdrawals from markets

- Adaptation of reinsurance agreements (or develop under point 4 below)
- Cover or climate risks on the financial market  
(or develop under point 5 below)
- Others

### 3. Insurers' initiatives to develop « new products »

*N.B. Climate change is seen as opening new opportunities by a growing number of insurers. Some examples are listed below, but they are far from exhaustive and new products keep appearing. Please investigate the situation in your country and provide as much information as possible (obtaining models of clauses and policies would be extremely valuable).*

- New policies to cover the consequences of climate change
  - Coverage for producers of new energies (e.g. wind-mills)
  - Liability of architects
  - D & O environmental liability
  - Micro-insurance products for developing countries
- Climate risk management services, expertise
- New policies as incentives to reduce greenhouse gas emissions
  - “Pay as you drive” motor insurance

A large German motor insurer has made advances with a test run.

“Energy saving”, “Green-building” insurance

One idea of a leading German motor insurer is to reduce premiums upon production by the insured of a train card. The more the train is used, the less motor risks there are, and this also means less consumption of fuel and CO2-emissions.

- Initiatives in the carbon market
  - Carbon credit insurance (covering failure to deliver emission rights)
  - Options to buy carbon credits to offset emissions (vehicles)
- Others

### 4. Reinsurance



In your country, what is the role of reinsurance companies with respect to the above problems ?

Initiatives, in particular of Munich Re, to reduce the production of greenhouse gases by placing solar panels in the North African Deserts to harvest energy to be used in Europe (joint venture with the energy industry).

Adoption of an environmental agreement and declarations of the insurance industry for the environment (in force since 1996), with optional accession for primary and reinsurers. Through acceptance the insurance companies bind themselves to the environmental agreement – to work together to improve the economic developments, the welfare of humans and a sound environment. To this end, it also contains provisions to limit global warming. The declaration accepts the basic underlining principle of sustainability, as it was applied in the UN Conferences in 1987 (Our Common Future) and 1992 (Agenda 21) for the environment and developments, and acknowledges the basic principle of prevention.

## 5. ART (Alternative Risk Transfer)

Have any of the following techniques developed in your country in connection with climate change, what is the legal nature of these different products ? Can they qualify as “insurance” ?

### - Derivatives

There is a legal definition of “derivative” in §1 KWG (German Banking Act) – as a security - or financial transaction depending on the original risks. Therefore this falls under real insurance, otherwise not. Since 2002, independent of Climate Change, there exists a business for weather derivatives. Effect: Fluctuation of property claims or pure financial losses due to extreme weather conditions with abstract risk components.

### - Swaps “

“Service Exchange” without risk components – not insurance in the legal sense.

### - Cat bonds –

Catastrophe bonds – there is a real risk, therefore this is an insurance product.

### - Others ?

## 6. Cooperation or competition with public sector

What is the state of cooperation (or competition) between public authorities and the insurance sector in your country in issues related to climate change ?

Since 2009 the GDV (German Association of Insurers) has established a climatic impact project with 5 core topics:

- Claims and claims impact through the insurance industry (focus on storm/floods)
- Supporting the adaption strategy of the federal government of Germany (Integrated climate and energy programme of the German Government (IEKP) with the aim to induce and attend socio-economic change): clear co-operation, no competition.
- Product incentive elements, services (e.g. on the basis of the VGB 2008 (insurance by-laws) a paper was compiled which integrates climate related components for expansion of the coverage options in the VGB, called the VGB 'Green')
- CO2 neutrality of the insurance branches (the branch is itself an initiator of greenhouse gas emissions, e.g. through higher participation in IT. Compilation of a guide was prepared for conversion to climate protection measures in the insurance companies, with the aim of CO2 neutrality, further measures include videoconferencing instead of flights)
- Claims prevention (States should legislate reasonable frameworks, building precautions, improve awareness of climate change within the population, optimisation of the States catastrophe management).

Are there specific public schemes concerning some of the risks involved ?

Tax legislator: environmentally friendly vehicles have tax advantages, vehicles with higher pollutant emission are taxed at a higher rate. Grants provided by States to individuals who make their vehicles environmentally friendly or buy a low emission car.