

Jointly Developing Climate Information Systems:

Requirements for the

# CLIMATE SERVICE CENTER (CSC)

from the perspective of the financial sector



As part of the coordination project

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## Jointly Developing Climate Information Systems - Comments by the "Climate Change Finance Forum" on the Establishment of the Climate Service Center (CSC)

The "Climate Change Finance Forum" welcomes the decision to establish the Climate Service Center (CSC) at the GKSS Research Centre Geesthacht, based in Hamburg, as part of the High-Tech Strategy on Climate Protection of the German Federal Government.

Improving the availability of decision-oriented climate information, which will be provided by the CSC, is of great importance for the financial sector. This is evident from the results so far from the survey on the information needs of financial service providers. The "Climate Change Finance Forum" is prepared to cooperate with the CSC and the network of existing research and service institutes in the implementation of this mission.

Insurers, banks and other participants in the financial sector require the expansion of those public information systems that translate scientific findings of climate research and results of computer climate models into application-oriented knowledge, in addition to their own databases and their own expertise. Given the complexity of



climate impacts, this service is needed so that financial service providers in their various roles can fulfil their respective tasks in the assumption of risks. In this regard, the financial sector depends on a neutral body that objectifies and interprets the results of climate research - including its own findings. The focus of the systems to

be developed should be on regional climate modelling and the development of forecasts in the short and medium term. In this regard, it is vital to ensure a balance between science on the one hand, and an application and decision-oriented approach on the other hand, and to establish adequate competences in terms of the specific information needs of the various participants and decision-makers. In doing so, the CSC is expected to master the "balancing act" between the mission to create public transparency and also to establish exclusive customer relationships.

The financial sector hopes that the establishment of the CSC, and the formation of networks between public institutes and service institutions, will result in a productive development of the existing cooperation between private and public sectors. The existing - private and public - competences must be used, concentrated and developed further.

The "Climate Change Finance Forum" is therefore interested in an intense collaboration with the CSC and other research and service institutions, the responsible partners from other sectors of the business community, and the officials at federal, state and municipal levels.

The report presented here on the need for climate information as determined so far, is a contribution of the "Climate Change Finance Forum" to the dialogue on research policy with the Federal Ministry of Education and Research (BMBF). Simultaneously, it contributes to the development of the "German Strategy for Adaption to Climate Change" of the German Federal Government. The development of the knowledge base, the relevant information systems and the advice offered is a crucial prerequisite to ensure that the financial sector can support its customer industries in the adaption to climate change.



Not only the investors and financial service providers and their private and commercial customers will benefit from this improved information offer. In view of the potential losses and also new economic opportunities and necessities, the knowledge about climate and weather changes

and the consequences of these is of high importance for the economy.

Once the current survey has been completed, a more detailed breakdown of the information needs will be presented at the end of 2009.

June 2009

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The "Climate Change Finance Forum" is a central research and dialogue platform for the effective implementation of the climate policy of the German Federal Government. The Forum serves for the development and the implementation of research initiatives and the systematic cooperation with the Federal Ministry of Education and Research (BMBF). The members of the "Climate Change Finance Forum" are: Allianz SE, ABL Unternehmensgruppe, Bankhaus Sal. Oppenheim, Bayerische Hypo- und Vereinsbank AG, BayernLB, Bundesverband der Deutschen Volksbanken und Raiffeisenbanken (BVR), Commerzbank AG, Deutsche Bank AG, Deutsche Postbank AG, Deutscher Sparkassen- und Giroverband, Munich Re Group.



## Determination of the information needs

### Preliminary note

Upon the creation of the Climate Service Center (CSC), and as part of the BMBF sponsored project "CFI - Climate Change, Financial Markets and Innovation," the Sustainable Business Institute (SBI) e.V. together with the "Climate Change Finance Forum" and the German Insurance Association (GDV) and other companies in the financial sector, examined the need for improved climate information systems by distributing an exploratory survey.

As part of this exploratory survey, 44 experts were interviewed in writing during the period between

February and April 2009. In total, 28 of them responded to the questionnaire, and three submitted written comments without answering the questionnaire.

In addition, a workshop was organised with members of the Working Committee of the "Climate Change Finance Forum" in March 2009. Also in March, the founding board of the Climate Service Center (CSC) was briefed on the first results.

In cooperation with insurers and reinsurers, as well as the German Insurance Association (GDV), two expert workshops on research and development tasks, as well as several in-depth individual interviews, were organised in April and May 2009.

In addition to the members of the "Climate Change Finance Forum", we wish to thank the following participating financial service providers:

- Other insurance companies: AXA Versicherung AG, HUK-COBURG-Allgemeine Versicherung AG, R+V Versicherung AG, SIGNAL IDUNA, Vereinigte Tierversicherung Gesellschaft a.G., VGH Versicherungen Landschaftliche Brandkasse Hannover
- Other banks: DekaBank, Eurohypo, Landesbank Baden-Württemberg, WestLB AG
- Auditors and project financiers: First Climate AG, PricewaterhouseCoopers AG Wirtschaftsprüfungsgesellschaft, South Pole Carbon Asset Management AG
- Research and rating agencies: Centre Info SA, imug Beratungsgesellschaft für sozialökologische Innovationen mbH, INrate AG, oekom research AG, SAM Sustainable Asset Management AG, Sustainalytics GmbH, Zürcher Kantonalbank - IRN Nachhaltigkeitsresearch

The first key points of the results of the survey and the discussions are summarised below. The quantitative analysis is not the main focus of the report. For this reason, reference to a quantitative evaluation is made only in some places. We wish to thank all parties involved. Special thanks go to Prof Dr Dr Peter Höpfe and Ernst Rauch (both Munich Re Group), and Klaus Krummrich (Deutscher Sparkassen- und Giroverband) for

their excellent cooperation. We wish to thank Marco Ludolph (SBI e.V.) for his support in the definition of further research and development tasks with the GDV, and Jan D Joel (SBI e.V.) for his support in the evaluation of the questionnaires. At the end of 2009, when the current exploratory survey has been completed, a more detailed breakdown of the information needs will be presented.

■ Dr Paschen von Flotow

■ Dr Lutz Cleemann

## Climate change: Affecting financial service providers differently

Climate change will lead to changes in temperatures and frequencies, and intensities of extreme events such as storms, heavy rainfall, hail, lightning and high water/low water. Last but not least, these extreme events will increase the risk of economic losses. The questioned market participants anticipate that these weather-related loss risks will increase, albeit to a different extent in the various regions - in Germany and worldwide. However, there is uncertainty about the concrete manifestations of these risks and the possible physical and economic impacts of climate change.

Consequently, there is a need to reduce this uncertainty, which means that the changes we are facing should be predicted as reliably as possible, while developing private and public measures to adapt to such changes. In addition, the costs of such adaptation measures must be weighed against the costs of waiting, at a private-sector and macroeconomic level. Some loss risks can thus be reduced.

The individual insurance, capital and credit markets and/or the corresponding business fields of the financial service providers differ significantly in terms of the types of risks (insurance, credit, investment risks) and the time horizons (ranging from hours and days to years and decades).

- have recorded an increase in weather-related losses (6), and they expect these to increase in the future (4),
- expect change risks (4), and anticipate that these will become more relevant in future (6), and
- have recorded an accumulation of such risks (5), and expect an increase in accumulation risks (5).

What are the consequences of these changes for the business of the insurers?

- Already today, insurers have recorded a demand for additional capacities (4) and they expect that this demand will continue to grow (5).

Apart from these fundamental differences, the individual financial service providers and their customers operate in different regions of Germany, Europe or the world. With regard to the perception and actual significance of climate change, this means that financial service providers are affected by the physical and economic consequences of climate change in very different ways.

### Insurers and reinsurers

The insurers identify, calculate and insure the weather-related loss risks of their customers. By assuming risks, they help secure loss risks privately. In doing so, they fulfil a crucial role for the national economy.

Already today, they have recorded corresponding weather-related changes in the risks, and they anticipate that these changes will increase in the future. For monitoring these losses, they use their own databases, as well as those of the German Insurance Association (GDV). Some also rely on the information provided by the reinsurers, as well as public databases and research results. The eight insurers who have participated in this survey:

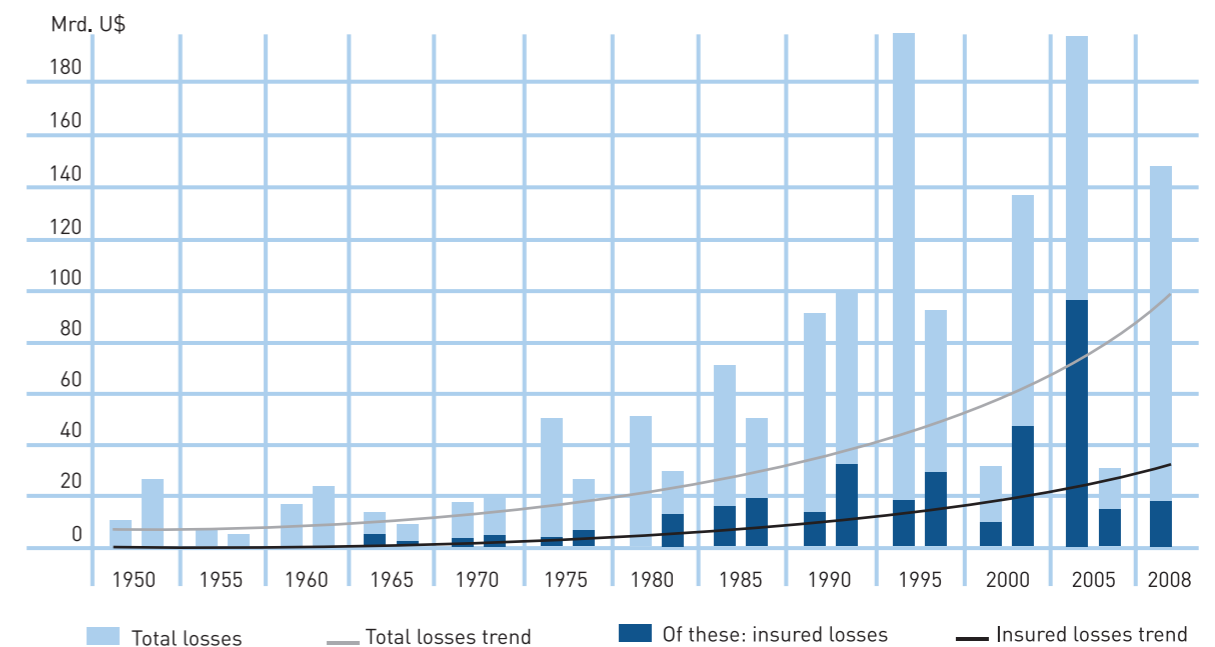
In addition, the insurers have adapted their calculation of premiums as well as terms and conditions to the changed risks.

- By now they are adjusting existing insurance products (6) or expect this to become relevant in the future (3), and
- they also are developing new insurance products (5) or expect this to become relevant in the future (4).

Consequently, they expect that their business development will increasingly be influenced by these changes in the future as well.

In this regard, the increase of the risk and the changes resulting from climate change offers new business opportunities for insurers and reinsurers. At the same time, however, there is the economic possibility that these risks might be incorrectly assessed.

Total losses and insured losses as a result of the major natural catastrophes 1950 - 2008



Source: TOPICS/GEO Natural catastrophes 2008 / Munich Re Group

## Lenders

Banks grant loans that help companies with the financing of private and commercial buildings or projects. For this, they must analyse and calculate the associated credit risks. The identification of weather-related loss risks does not form part of the classical tasks and core competences of the credit business.

The majority of the nine banks that participated in this survey do not feel that their money lending business is affected by weather-related losses, so far. Compared to other risks of the credit portfolio, risks resulting from climate change play no - or only a very insignificant - role. However, the banks do anticipate that changing and increasing weather-related risks will become more relevant for the credit business in the future. A majority of them see the need for a development of the credit check (in the future). Already today, three banks are in the process of



- increased weather-related losses (0),
- change risks (2),
- accumulation risks (1), and
- reputational risks (2).

adjusting the credit check, and six of them believe that this will become relevant in the future. Last but not least, some banks foresee reputational risks should they fail to consider climate risks in credit checks in the future.

At present, banks check the corresponding risk directly as part of the credit check only under certain circumstances and only in individual cases, for instance, sometimes as part of the assessment of buildings, in the (international) project financing business, and in dependence of size.

For this purpose, they also make direct use of experts in this field, or arrange for the checking of these aspects as part of a due diligence review. However, banks make sure on a systematic basis that their customers are insured (insurance diligence), relying on the expertise of insurance consultants in this regard. In addition, banks have access to their own competence centres on specific issues in some areas (for instance, in the field of renewable energies).

In view of the potential reputational risks, some of the respondents indicated that any possible risks are restricted through the systematic compliance with the Organisation for Economic Cooperation and Development (OECD) environmental guidelines or the requirements of the Equator Principles. The respondents believe that their credit transactions are affected by changes in climate and/or weather already today with regard to:

In addition, the banks are preparing themselves for changes. In the future, they expect the credit business to be affected by the following climate and weather changes, by:

- increased weather-related losses (5),
- change risks (2),
- accumulation risks (4), and
- reputational risks (3).

Apart from the impact on credit transactions, some of the banks expect to be facing operational risks (i.e., effects on buildings, infrastructure, staff, etc.) today and increasingly in the future. Some of the banks have operational risk databases in which such risks are documented, or they take these risks into account as part of the contingency planning of the Business Continuity Management.

## Investors

Banks and insurers do not only operate as money lenders and insurers. At the same time, they are investors or consult investors. Investors that buy company shares at the stock exchange cannot analyse the physical risks at individual locations.

Therefore, analysts and investors in these markets rely on highly aggregated information. From this abstract perspective, the opportunities and risks of the regulation in the context of international climate change policy becomes more important than the physical consequences of climate change.

For about fifteen years, newly established specialised rating agencies analysed publicly traded companies of the global stock markets in terms of economic, ecological and social sustainability aspects, and assessed their sustainability performance. These agencies are service providers for investors and their analysts, investment consultants and fund managers. All of the questioned research departments of

investment companies and rating agencies, without exception, indicated that the analysis of companies affected by "consequences of climate change" always and systematically formed part of the analysed aspects. Those agencies that also develop country ratings indicated that they systematically considered potential "consequences of climate change" for these as well.

In this regard, the research and rating agencies rely on aggregated public information (secondary analyses) on the impact of climate change. Besides this, they make use of information and assessments of the company itself. The main focus of these analyses are the indirect effects of climate change, i.e., the regulatory and market-related aspects of climate change, and also the companies' own contribution to climate change (climate impact), with the direct physical impacts of climate change being of secondary importance. In this respect, their perspective and their questions differ from those of the insurers and banks.

## Information needs of financial service providers

Particularly for the insurers, and - albeit in a different role - for other financial service providers and their customers, it is of crucial importance to be able to calculate the weather-related physical and economic risks and opportunities as accurately as possible. To be able to do this, they need the information relevant for these decisions. This means they need forecasts that correspond to the amortisation or contract terms, and that focus on the region that the insured buildings, production areas, etc., where their customers are situated. For insurers, this already has been a challenge for some time, while it is more of a future requirement for banks and others. The insurance industry therefore established a number of its own (private) databases and de-

veloped its own models for climate forecasts in the past. This information base no longer meets today's requirements. In addition, and also for ensuring a common reference framework for the financial sector and its customer industries, as well as the public sector, the public forecast models must be improved. The financial service providers and their customers will then be in a better position to calculate and/or fund investments, calculate premiums, sign insurances, etc. Not only individual firms and private households will benefit from this improved information. Prevention of losses through improved climate information systems is also significant for the national economy.

**"Back to the present"** Climate research primarily develops models for assessing long-term trends and consequences for different regions of the world. However, transactions of financial service providers today occur at certain places with specific terms. Every day, insurance and financing decisions are made, contracts are signed, goods are transported, etc. Therefore, it is vital for financial service providers and their customers to improve the forecasts that are relevant for decision-making. Frequently, scientific findings are available; however, there is a feeling that there is a "gap" with regard to how to translate scientific findings into decision-relevant data for decision-makers and contractual parties.

Consequently, application-oriented climate research and modelling must fulfil rather different tasks:

- Interpretation of models of long-term climate research and assessment, in terms of the informational value and the quality of these by a neutral department, and
- a provision for robust data for insurance and investment decisions in specific regions, or for contractual obligations (insurance, financing in certain periods).

At the same time, the relevant information is also of vital importance for the democratic decision-making process, for example when it comes to the distribution of the costs of climate change between the private and the public sector - or also with regard to actions of the executive in the planning process, such as spatial design, infrastructure development and far more. The respective decisions made by the Federal Government, the German states and municipalities are



closely interrelated with the private sector costs, returns and risks as a result of climate change.

## Focus regions

According to calculations of climate researchers, climate change affects the regions of the Earth to a different degree. More accurate statistics and a more reliable interpretation of the observable changes with direct reference to specific regions are indispensable to produce concrete forecasts. According to the realised survey, the following are of especially high, high or medium importance (indicated figures are only for a total of 19 banks, insurers and auditors):

- Accurately broken down representation according to regions for the observed changes in: temperatures, frequencies and intensities of extreme events such as storms, heavy rainfalls, hail, lightning and high water/low water (16 out of 19)
- Accurately broken down changes according to regions with regard to recurring periods of excess values of the parameters listed above (16 out of 19)
- Interpretation and evaluation of the informational value and reliability of the available data and the observable changes (17 out of 19)

The objective is to develop valid climate models or forecasts for regions based on reliable statistics:

- Concrete data on expected changes for a specific location and a specific time horizon for the next 5-10 years (14 out of 19)
- Concrete data on expected changes for a specific location and a specific time horizon for the next 10-30 years (15 out of 19)
- Interpretation and assessment of the quality of the data and/or forecasts in terms of probabilities and/or uncertainties (17 out of 19)

With regard to all types of information referred to in the survey, the majority of the banks and insurers feel that the level of information today is "not sufficient." At the same time, on average, all types of information are regarded as being of "high importance."

Unlike the insurers and banks, the agencies that work for the analysts and investors of the global capital markets indicate that they do have sufficient information on the above information and data. Accordingly, above types of information are regarded to be of "little importance" on average. This is mainly due to the fact that, from a stock market perspective, information about the indirect consequences of climate change (e.g., ener-

gy and climate policy) and not the direct effects of climate change are relevant for the assessment of opportunities and risks of companies. As far as the potential impacts of climate change in Germany are concerned, only one-third of the surveyed banks and insurers said that they were "well informed."

And only one in five gave this answer with regard to certain relevant or problematic regions (e.g., river landscapes, coastal regions). Accordingly, the answer that one would "like to be better informed" was given more often. Some of the German banks and insurers, and also their customers, operate worldwide. They indicated that they would also like to be better informed with regard to other regions of the world.

Respondents also would "like to be better informed" with regard to the other regions listed in the survey:

- Africa (4 out of 9 financial service providers operating in Africa)
- Asia (6 out of 12 financial service providers operating in Asia)
- North America (6 out of 12 financial service providers operating in North America)
- South America (5 out of 11 financial service providers operating in South America)



## Sectors affected in the regions

Climate change has a physical and especially a local and regional impact. From the perspective of the financial sector, it is therefore crucial that climate information systems are structured according to regions.

As a consequence, questions regarding what economic participants are directly affected by regional impacts, activities, and options of adaptation and insurance, and the future value creation potential become relevant for the actions of insurers and banks. Participants from certain industries and also indirect participants of public planning processes will then become significant.

On the one hand, these are industries for which the value creation highly depends on the respective regional circumstances, or that are especially affected by climate change. Accordingly, adaptation decisions must be made and/or insurance options must be reviewed or developed (real estate industry, agriculture and forestry, tourism, etc.). On the other hand, those decision-makers

whose adaptation measures - or failure to adapt measures - may have a special influence on the value creation opportunities of others, become more important (e.g., spatial design, transport planning, etc.).

The following participants and participant networks are regarded as "high or very high importance" by the majority of the questioned financial service providers - apart from the financial service providers themselves (indicated figures refer only to 19 banks, insurers and auditors in total; it must be taken into account that not all of them operate in all sectors):



- Investors and project developers in the area of renewable energies (15 out of 16)
- Private and commercial property owners and investors in the construction and real estate industry, and the relevant authorities and planners (13 out of 16)
- Companies and investors in agriculture and forestry (11 out of 14)
- Companies operating in the field of infrastructure and transport, and the corresponding authorities and planners (9 out of 15)
- Companies operating in the water sector and the corresponding authorities and planners (8 out of 13)
- Companies in the area of tourism and the corresponding authorities and planners (6 out of 12)





The majority of financial service providers indicate that they are "poorly informed" and/or "would like to be better informed" regarding the following industries affected (indicated figures refer only to 19 banks, insurers and auditors in total; it must be taken into account that not all of them operate in all sectors):

- Construction and real estate industry (16 out of 17)
- Infrastructure and transport (14 out of 16)
- Tourism (12 out of 15)
- Water sector (11 out of 15)
- Financial sector (11 out of 15)

With regard to the sectors "renewable energies" and "agriculture and forestry," the respondents indicated most frequently that they were "well informed":

- Renewable energies (9 out of 16)
- Agriculture and forestry (6 out of 16)

At the same time, however, a relevant percentage indicated that they were "poorly informed" and/or "would like to be better informed":

- Agriculture and forestry (10 out of 16)
- Renewable energies (7 out of 16)

Also for those industries that the majority does not consider to be of "very high or high importance," a majority indicated that it was "poorly informed" and/or "would like to be better informed":

- Health (15 out of 15)
- Chemical industry (14 out of 15)
- Automotive industry (10 out of 15)

According to a preliminary prioritisation, the CSC would consequently have to focus on the customers' demand for the building up of competences regarding the direct consequences of climate change. In the following areas, there is a particular need, as these are of high importance and/or have a special need for existing information:

- Construction and real estate industries, including residential and commercial building owners
- Renewable energies
- Infrastructure and transportation
- Agriculture and forestry
- Tourism
- Water sector

## Jointly developing climate research and information (further)

Some of the banks, particularly insurers today rely on their own databases and climate models. Nevertheless, there is a broad and strong interest in cooperation with regard to the (further) development of such information systems. Only a few banks see no additional need. This applies to those who believe they receive sufficient information from the insurance consultants.

This interest exists for all information systems included in the survey and which are listed below according to the frequency of mention (figures are only for the 19 banks, insurers and auditors in total):

- (Further) development of loss databases (12 out of 19)
- (Further) development of loss and catastrophe models (12 out of 19)
- (Further) development of project databases (11 out of 19)
- (Further) development of economic industry analyses (11 out of 19)
- (Further) development of regional scenarios (11 out of 19)
- (Further) development of databases on weather/extreme events (8 out of 19)
- Assistance with the procurement of data and/or the processing of data

The development of information systems requires further research. This is especially true for research and development tasks on the following topics:

- Climate impact research to assess the effects of convective extreme weather events (such as hail and heavy rainfall, etc.) on the loss burden (in Germany)
- Climate impact research in the fields of agriculture and forestry (multiple risk insurance), the water sector and spatial and construction planning
- Calculation of extreme events with a probability greater than 1,000 years
- Loss prevention, adaptation (e.g., spatial and construction planning, drainage), investigation of the adaptation needs of the drainage systems and their structural requirements

Respondents also foresee a particular challenge in the integration of long-term climate models and the scenarios of their effects into existing natural hazard models (e.g., NATHAN of Munich Re Group, Risk Browser of RMS, CatNet of SwissRe).



## Need for standardised and individual services

Financial service providers hope to receive improved standardised information in the future. The following relevant needs were indicated for the questioned standardised and serial services (figures are for the 25 banks, research and rating agencies, insurers and accountants that gave an answer to this question):

- Periodic reports on the climate change impacts on individual sectors and companies (21 out of 25)
- Best practice examples for considering relevant risks and opportunities (17 out of 25)
- Periodic reports on the state of climate research (15 out of 25)
- Online services, such as FAQs (13 out of 25)
- Periodic reports on the climate change impacts on individual regions (11 out of 25), and definition of corresponding zones
- Training, such as seminars and conferences (9 out of 25)

In addition, 10 of the 19 banks, insurers and auditors indicated that they had a need for "ad hoc statements/expert opinions," for example, for the provision of weather and climate data and the implementation of special assessments, scenario calculations and forecasts on a contract basis. Furthermore, a demand for management advice regarding a prospective risk management with a focus on the "management of risks of climate change" has been expressed.

## Developing networks (further)

A versatile but complex landscape of institutions and initiatives in climate research and consultancy exists in Germany and internationally for the provision of such information. The expectation of financial service providers is that the CSC - with a focus on "climate advice" - should integrate this landscape into one network, thus reducing the complexity for those who have the demand. In addition, the implementation of complex collaborations respectively requires specific consortia in public-private partnerships. Besides, financial service providers are also interested in information regarding issues that clearly go beyond climate modelling and improved weather forecasts, and that also consider economic issues. These include, among other things:

- Implementation of regional financial studies in addition to the regional scenario models that already have been developed in many industry/research projects (especially in cooperation with local banks)
- Studies on market potentials and market exploitation levels, especially for new business models
- Research on insurance issues regarding new technologies
- Studies on (international) economic and regulatory issues of climate change, climate protection and "climate policy"
- Studies on the potential for the prevention of losses and catastrophes
- Research on the "carbon impact" or "carbon footprint" of technologies and businesses
- Market forecasts on electricity and CO<sub>2</sub> certificate prices
- Research on the awareness of citizens and their climate-friendly behaviour



## Masthead

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Loss statistics: P 9: TOPICS GEO - Natural catastrophes 2008 / Munich Re Group

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