CLIMATE CHANGE AND INSURANCE LAW

General Report

submitted
to the

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N.B. The footnotes of this General Report frequently refer to the reports submitted by the different National AIDA Chapters, as well as to specific contributions at the Paris Congress. All of these are available on the AIDA website (http://www.aida.org.uk), in the sections devoted to the Climate Change Working Party and Past World Congresses respectively. When a paper has been posted both in its original French or Spanish version and in English, the reference is made to the pages of the English version.

INTRODUCTION

The subject

1. AIDA World Congresses have traditionally been centred around two main general themes, either on classical issues of insurance law (e.g. third parties' rights against the insurer) or on subjects inspired by current events (e.g. insurance and terrorism).

The theme of climate change belongs to the latter category. In recent years, climate change has become a major concern for all mankind[1].

2. The insurance sector is directly implicated. It is more and more affected by the increase of many risks linked to climate change[2]. It has already adopted various protective measures to protect itself.

On the other hand, insurers have also discovered that climate change gives them opportunities to create new products, sometimes to guarantee new or increased risks, sometimes to contribute to ongoing efforts to reduce greenhouse gas emissions.

Reinsurance is necessarily involved, in the protective as well in the innovative developments. The response to Climate change has also facilitated new forms of alternative risk transfer (ART).

Protective measures, new products, reinsurance (and ART) will - successively be examined in the three parts of this general report[3].

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[1] In 2007, the *Fourth Assessment Report* of the *Intergovernmental Panel on Climate Change* (IPCC) left no room for doubt about climate warming.

[2] Admittedly, climate changes will also have positive effects in certain regions, where warmer temperatures can be favourable to sectors such as agriculture and tourism, as well as reduce illnesses due to cold weather. See i.a., Reports from Denmark and Germany. In 1910, Swedish scientist S. Arrhenius had already written: *« the increase of carbon gas in the atmosphere allows us to hope for periods of warmer climatic conditions, especially in the cold regions of the planet. These periods will allow the land to produce considerable better harvests than today, which will be a godsend for the populations that are increasing faster than ever »* (quoted by W. R. STAHEL, In Favour of a Proactive Insurance Approach to Climate Change, *The Geneva Papers*, 2009, p. 320). However, this report shall only deal with the negative effects of climate change and their impacts on the insurance sector.

[3] Our division between « defensive » measures and « new products » (reinsurance and ART being discussed as separate items) seems to correspond to a basic difference between two possible attitudes towards the emergence of new risks. A widely spread practice is to distinguish between « mitigation » and « adaptation » measures (see i.a., the Report from Belgium ; C . VAN SCHOUBROECK, p. 4 ; The Geneva Association, The insurance industry and climate change – Contribution to the global debate, *The Geneva Reports – Risk and*

3. Having in mind that AIDA is an association devoted to the study of insurance law, the legal aspects will necessarily be emphasised. Literature on climate change in general is more than abundant, and much has also already been written on the various impacts of climate change on the insurance sector. However, much less has been published on the legal aspects. This is where all the reports submitted at the session on climate change of the Paris AIDA Congress will hopefully bring a significant contribution. By examining the legal aspects, we mean going beyond a mere description of initiatives taken by the insurance sector, to concentrate on their legal expression in clauses, general conditions or new types of policies, and on the new legal issues that have come up, or probably will in the near future.

Method

4. After a few initial contacts with various firms and institutions concerned with climate change (insurers, reinsurers, insurers' associations, the *Comité européen des assurances*, the *Intergovernmental Panel on Climate Change, the Centre for Research on the Epidemiology of Disasters*), as well as an initial investigation in

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Insurance Research, No. 2, July 2009, pp. 47-60 (hereinafter quoted *« Geneva Reports »*); C.E.A, Tackling climate change – The vital contribution of insurers, 2009, pp. 5 and 8 ; also see the IPCC's *4th Assessment Report*, pp. 55 et seq.). We are not entirely satisfied with these two concepts, which are often ambiguous. It is not sure that they are always used in the same meanings. «Adaptation» of what? Of behaviours? Then,whose behaviours, the insurer's or the insured's? Or adaptation of contract terms? « Mitigation »of what? Of gas emissions? Of the losses resulting from climate change? Or of the costs for insurers? The distinction between « defensive measures » and « new products », adopted for the different reports at the Paris AIDA Congress, seems to be more precise, at least for the specific subject of the impacts of climate change on insurance terms and policies. The different measures that will be described can of course be classified as « adaptative » or « mitigating » initiatives, depending on the meaning given to these two latter terms (comp. S. B. HECHT, Climate Change and the Transformation of Risk; Insurance Matters, 55 *U.C.L.A. L. Rev*., (2007), p. 1593, who mentions the distinction between adaptation and mitigation measures, only to proceed with yet another classification into three groups of insurance products).

the existing literature, the general reporter prepared a questionnaire and had it sent to all national chapters. This questionnaire is reproduced in Annex 1 to the present general report.

5. We received answers from 21 national chapters, representing a broad scope of countries from all over the world : Argentina, Australia, Belgium, Brazil, Chile, Costa-Rica, Denmark, El Salvador, Finland, France, Germany, Greece, Italy, Japan, Mexico, the Netherlands, Poland, South Africa, Spain, Turkey and the United Kingdom.

This list is impressive, but some important gaps are obvious. Countries such as the United States, Russia, China or India, for instance, are not included, though they are major producers of carbon emissions as well as major participants in the debates concerning climate change. This is regrettable, but due to the fact that in spite of constant efforts, AIDA still does not have national chapters (or active ones) in many countries. To some extent, this general report tried to fill these gaps through information gathered from other sources. In particular, much documentation is available in various reports prepared by the insurance industry[4], as well as in legal literature[5] [6].

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[4] Among the most informative sources consulted, we can especially mention : ALLIANZ, *Climate Change and Insurance : An Agenda for Action in the United States*, 2006, 46 pp. (hereinafter quoted « *ALLIANZ Agenda* ») ; MARSH, *Climate Change : Business Risks and Solutions*, 2006, 34 pp. (hereinafter quoted « *MARSH* ») ; C.E.A., *Reducing the Social and Economic Impact of Climate Change and Natural Catastrophes*, 2007, 47 pp. ; ALLIANZ, *Hedging Climate Change*, 2007, 34 pp. ; DLA PHILLIPS FOX, *Climate Change – Liability and Insurance Implications*, 2008, 15 pp. (hereinafter quoted « *DLA PHILLIPS FOX* »); CERES, *From Risk to Opportunity : Insurer Responses to Climate Change*, signed by E. MILLS, 2009, 88 pp. (hereinafter quoted « *CERES* ») ; SWISS RE, The role of indices in transferring insurance risks to the capital markets, *Sigma*, 2009, n° 4, 46 pp. ; MUNICH RE, *MUNICH RE newables – Our Contribution to a low carbon energy supply*, 2009, 52 pp. (hereinafter quoted *« MUNICH RE newables »*) ; C.E.A., *Tackling climate change – The vital contribution of insurers*, 2009, 63 pp. (hereinafter quoted « *C.E.A. Report* ») ; MUNICH RE, *Liability for Climate Change. Experts' views on a potentaial emerging risk*, 2010, 28 pp.

[5] E. MILLS, Insurance in a Climate of Change, *Scienc*e, 2005, pp. 1040-1044 ; S. B. HECHT, Climate Change and the Transformation of Risk ; Insurance Matters, 55 *U.C.L.A. Law Rev*.,

On the other hand, three individual members of AIDA took the initiative to send us interesting contributions, which came as valuable complements to the national reports received from their respective countries : Ms. Föllmer from Germany, Ms. Bril and Ms. Kavanagh, both from Argentina.

6. It was not materially possible to give the floor to all twenty-one national reporters during the Paris session on climate change, but lively discussions were organised on some selected items, each presented by a member of a national chapter. The following sub-themes were introduced by the different speakers indicated:

- *Variable impacts according to regions, economic sectors, lines of insurance*: Chris Rodd (Australia), Frédéric Gudin du Pavillon (France)

(2007), pp. 1559-1620 ; C. ROSS, E. MILLS and S.B. HECHT, Limiting Liability in the Greenhouse : Insurance Risk Management Strategies in the Context of Global Climate Change, *Stanford Environm. Law Journ.* and *Stanford Journ. of Int. Law*, Symposium on Climate Change Risk, vol. 26A/43A, 2007, pp. 251-334 (hereinafter quoted *« Stanford Symposium »*) ; S. MUTENGA and S.K. STAIKOURAS, The Theory of Catastrophe Risk Financing : A Look at the Instruments that Might Transform the Insurance Industry, *The Geneva Papers*, 2007, pp. 222-245 ; A. DLUGOLECKI, Climate Change and the Insurance Sector, *The Geneva Papers*, 2008, pp. 71-90 ; W. R. STAHEL, Global Climate Change in the Wider Context of Sustainability, *The Geneva Papers*, 2008, pp. 507-529 ; W. R. STAHEL, In Favour of a Proactive Insurance Approach to Climate Change, *The Geneva Papers*, 2009, pp. 319-322 ; E. MILLS, A Global Review of Insurance Industry Responses to Climate Change, *The Geneva Papers*, 2009, pp. 323-359 ((hereinafter quoted « *MILLS Global Review »)* ; C. HERWEIJER, N. RANGER and R.E.T. WARD, Adaptation to Climate Change : Threats and Opportunities for the Insurance Industry, *The Geneva Papers*, 2009, pp. 360-380 ; J. LINNEROOTH-BAYER, K. WARNER, C. BALS, P. HÖPPE, I. BURTON, T. LOSTER and A. HAAS, Insurance, Developing Countries and Climate Change, *The Geneva Papers*, 2009, pp. 381-400 ; B. COLLIER, J. SKEES and B. BARNETT, Weather Index Insurance and Climate Change : Opportunities and Challenges in Lower Income Countries, *The Geneva Papers*, 2009, pp. 401-424 ; M. SATO and M. SEKI, Sustainable Business, Sustainable Planet – A Japanese Insurance Perspective, *The Geneva Papers*, 2010, pp. 325-335 ; M. WILKINS, The Need for a Multi-Level Approach to Climate Change – An Australian Insurance Perspective, *The Geneva Papers*, 2010, pp. 336-348.

[6] Apart from the large number of articles devoted to the climate change impacts on the insurance sector published in the periodical *The Geneva Papers* (see preceding note), another important source, frequently referred to in this general report, are the already quoted *Geneva Reports*, also published by the Geneva Association.

- *Definition of climate risk – problems of causality*: Marco Frigessi (Italy)

- *« Defensive » measures taken by insurers***:** Florencia Mangialardi (Argentina), Caroline Van Schoubroeck (Belgium), Teresa Rodriguez de las Heras (Spain)

- *« New Products »***:** Søren Theilgaard (Denmark), Yoshiro Yamano (Japan)

- *Insurance Products Linked with* CO^2: Tim Hardy (UK)

- *Alternative Modes (« ART »)***:** Stijn Franken (The Netherlands)

Participants in the Paris session were also privileged to hear a presentation by Ms. S. Noël, of the *Comité européen des assurances*, entitled *Tackling Climate Change: Vital Contribution of Insurers*.

All these reports and presentations were additional sources for the preparation of this general report (a short oral summary was already presented at the Paris Congress); they are referrred to in the footnotes by the name of their respective authors.

Wide scope of types of insurance affected by climate change

7. The impacts of climate change on the insurance sector are extremely varied[7]. Distinctions have to be made according to regions of the world[8], economic

[7] Awareness of the issues has been rapidly developing. In 1998, an author still wrote that *« the impact of climate change on the profitability of the commercial insurance sector is not likely to be severe »* (R.D.J. TOL, Climate change and insurance: a critical appraisal, *Energy Policy*, 1998, p. 257). This author also argued against the feasability of climate change insurance.

[8] Even within the same country which can experience various effects of climate change on its own territory (cf. for instance, the Reports from Spain (pp. 3-4) and Mexico (pp. 4-6). On the other hand, as the Belgian report rightly points out (p. 10), a purely national approach is not adequate *« in matters that relate to an insurance industry which is highly internationalized,*

sectors and lines of insurance. There is more on this in the special contributions of Chris Rodd (Australia) [9] and Frédéric Gudin du Pavillon (France)[10] [11], as well as in the different national reports, but we already want to stress the fact that many types of insurance are concerned. It is not only a matter of covering direct property losses due to more frequent and more damaging natural catastrophes such as floods, landslides, hurricanes or forest fires. Climate change can also affect other lines of property insurance, as well as liability insurance and even personal insurance. This is not always sufficiently perceived[12].

- Property insurance

8. As already said, the first impacts of global warming on the insurance sector that come to the mind are those linked to the coverage of natural catastrophes. But one also has to consider the growing importance of damages caused by gradual phenomena, such as the progressive increase of sea levels, or the desertification of certain areas[13].

Several types of property insurance are affected (at various degrees depending on local conditions) : agricultural insurance (damages to crops, forestry,

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especially when it comes to determining its long term and strategic orientations ». The German report (p. 2) notes that the German insurance industry can be more affected by a hurricane in Florida that by a storm in Munich. For a summary of the main expected consequences of Climate Change in the different parts of the world, see *Geneva Report*, pp. 33-34.

[9] See below, C. J. RODD, *Variable impacts according to regions, economic sectors, lines of insurance.*

[10] See below, F. GUDIN DU PAVILLON, *Quelles perspectives sur les régimes futurs ? Changements climatiques et assurance des aléas naturels.*

[11] On the subject also see *C.E.A Report*, pp. 16-25.

[12] For instance, some national answers did not appear to perceive the possible impacts of climate change on liability insurance. One report even minimized the impact on agriculture. Local conditions (natural environment, development of regulation) obviously influence some perceptions.

[13] See South African report.

livestock) [14], insurance of buildings, contents, mobile homes, machinery, equipment [15], transport and marine insurance (losses of equipment or of transported or stored goods, losses due to interruption of traffic, …) [16], insurance in the tourism industry [17], export credit insurance [18], business interruption insurance in all sectors [19], as well as new types of insurance coverage needed for alternative sources of energy, such as wind-mills (themselves having to be covered by some risks linked to climate change, such as especially severe storms, or, on the contrary, insufficient wind).

- Liability insurance

9. Climate change causes new types of liability to appear. Firms can be held liable for excessive gas emissions[20], violation of regulatory requirements[21], failure to disclose information, lack of preventive measures or inadequate handling of accidents[22]. Directors and officers can personally be liable for the firm's shortcomings[23]. Members of several professions and trades whose activity can have an influence on climate change can also become liable in certain

[14] See i.a., Reports from Brazil, Costa-Rica, Germany, Spain, South Africa and the UK; C. RODD, slide 23; M. S. KAVANAGH, pp. 11-12 ; S.B. HECHT, *op. cit.*, pp. 1574-1575; *DLA PHILLIPS FOX*, pp. 7, 9 *; C.E.A Report*, pp. 22-23.
[15] See i.a., Reports from Brazil, Germany, Italy, Spain, South Africa and the U.K. In motor insurance, casco insurance still faces increased losses due to storms, hail (larger hailstones), floods, landslides and avalanches (*C.E.A Report*, p. 23).
[16] See i.a., Reports from Brazil, Germany, Spain and the U.K.
[17] See i.a., Reports from the U.K.; C. RODD, slide 21; M. FRIGESSI, p. 4.
[18] See the Report from the U.K.
[19] See i.a., Reports from Denmark, Germany, Italy, South Africa, Spain and the U.K; *C.E.A Report*, pp. 24-25.
[20] See S.B. HECHT, *op. cit.*, pp. 1577-1578. According to the U.K. Report (pp. 21-22), 80 % of CO^2 emissions are caused by only 122 corporations.
[21] See i.a., Reports from Italy, Germany and Spain; C. FÖLLMER, p. 6.
[22] See *DLA Phillips Fox*, pp. 3, 10-13.
[23] See the Brazilian Report; S.B. HECHT, *op. cit.*, p. 1578; *DLA Phillips Fox*, pp. 10-13, *MARSH*, pp. 22-24.

circumstances, such as architects, contractors[24], experts or manufacturers[25]. Even bankers, as well as insurers, can be reproached for having accepted to finance or to insure certain projects[26]. Public authorities can be responsible for failing to take adequate preventive measures (sewer systems, dikes…)[27], to give the necessary warnings (incoming hurricane) or even to adopt or enforce proper regulation[28].

10. Actual litigation connected to climate change has already started in several countries, especially in the United States[29]. The State of California has (unsuccessfully) sued six automobile manufacturers for damages to the environment due to marketing products causing excessive greenhouse gas emissions. Different firms have also been sued (unsuccessfully) for damages, by some Inuit communities which were forced to move because of the melting of the ice cap. With more success so far, several States and the City of New York have asked for an injunction to a producer of electricity to reduce its gas emissions; after a first dismissal, the action was recently declared admissible. Several suits of several victims of the Katrina hurricane against chemical and utility companies are also still pending; it is argued that these companies'

[24] See i.a., Reports from Spain and the U.K. ; *DLA Phillips Fox*, pp. 3-5 ; *C.E.A Report*, p. 24 (e.g. *"failure to comply with building codes or disregarding state-of-the-art techniques for climate-friendly and climate-resilient buildings"*).
[25] For instance, for delivering goods or services that are defective, e. g. with a poor quality of flood defence (see A. DLUGOLECKI, *op. cit.*, p. 79).
[26] See the U.K. Report. About the insurers' own exposure to climate change claims, also see *MILLS Global Review*, p. 19**.**
[27] See i.a., Reports from Denmark, Germany, Japan and the U.K.; *DLA Phillips Fox*, p. 5; *Stanford Symposium*, pp. 277-279; *C.E.A Report*, p. 24.
[28] On the different categories of liability insurance liable to be affected by climate change, also see *Stanford Symposium*, pp. 253-255, 276-277, 281-295.
[29] Cases have also been reported in countries as varied as Australia (see *DLA PHILLIPS FOX*, p. 2), Japan (see the Spanish Report; *C.E.A Report*, p. 24; *Geneva Repor*t, p. 65), Nigeria and New Zealand (according to the U.K. Report).

activities have contributed to global warming and thus intensified the damaging effects of the hurricane[30].

Such developments are to be watched with much attention. Some suits have failed, but others are going on. A trend could develop where vast new fields would open for litigation concerning liability connected to climate change, with the inevitable consequences for the insurance sector[31] [32].

Legal problems involved are numerous. Fault has to be established, unless the applicable regulation provides for strict liability. The causation issue will generally be a major problem[33]. Claimants may be exposed to the argument that they have themselves contributed to the damage and/or failed to mitigate it. If a firm is held to be liable, subsequent claims could be envisaged against its directors and officers[34]. It can be safely predicted that climate change litigation

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[30] On these climate change-related claims, see the U.K. Report ; *MARSH*, pp. 11-12 ; *Stanford Symposium*, pp. 260-263 ; S.B. HECHT, *op. cit.*, pp. 1577-1578, 1579 and note 171; *Geneva Reports*, p. 65 ; A. DLUGOLECKI, *op. cit.*, pp. 79-80 ; R.E.T. WARD, C. HERWEIJER, N. PATMORE and R. MUIR-WOOD, The Role of Insurers in Promoting Adaptation to the Impacts of Climate Change, *The Geneva Papers*, 2008, pp. 133-139 ; T. MAYNARD, Climate Change : Impacts on Insurers and How They Can Help with Adaptation and Mitigation, *The Geneva Papers*, 2008, pp. 140-146 ; SWISS RE, *Extraordinary CEA General Liability Seminar*, 2009, especially the contribution from I. EBERT ; A. THOMPSON, T*he Impact of Climate Change on Liability Insurance*, Barlow Lyde and Gilbert, 2009 ; MUNICH RE, *Liability for Climate Change. Experts' views on a potential emerging risk*, 2010, with contributions from K. HAROFF (pp. 6-8), R. STEWART (pp. 9-10), W. STEWART and D. WILLARD (pp. 11-13), I. EBERT (pp. 14-15), S.M. SEAMAN and J.E. DELASCIO (pp. 16-18), P. FAJARDO (pp. 19-21) and G. FUNKE (pp. 22-25).

[31] See *MILLS Global Review*, pp. 17-19.

[32] Another type of litigation linked with climate change came before an English court. An executive of a company had been dismissed for his strongly held views on climate change, conflicting with the other managers' *« contempt for the need to cut carbon emissions »*. An English judge accepted the argument that the dismissal amounted to discrimination against the employee's *« philosophical belief in climate change »* (as reported in *The Guardian*, Sept. 7, 2009 – information kindly provided by T. Hardy).

[33] See below, No. 29-31. Market share liability could sometimes come into consideration.

[34] See S.B. HECHT, *op. cit.*, pp. 1585-1593, 1598 ; I. EBERT, contribution in SWISS RE, *Extraordinary CEA General Liability Seminar*, 2009, p. 5. However, also see P. FAJADO, *op. cit.*, pp. 19-21, who points out the significant differences in procedural issues and litigation cultures between the U.S. and Europe.

will develop to a significant extent[35], though some insurers and experts believe that many claims will have few chances of success[36].

- Personal insurance

11. Even personal insurance is bound to be more and more affected by climate change[37].

Life insurance is concerned by the increase of the death rate due to excessive heat[38]. In some countries of Europe, the Summer of 2003 was especially deadly[39]. Hurricanes, floods and forest fires also have their death toll[40]. In 2010, floods cost over 1,700 lives in Pakistan. Some diseases develop as a consequence of climate change, thus affecting health insurance: depending on the circumstances, climate change can increase the risk of afflictions such as malaria, meningitis, skin cancer, allergies, stress due to excessive heat, malnutrition due to drought, diseases due to water contamination[41]. In countries where private health insurance is the primary means of coverage, the effects of climate change on insurance will be especially serious[42].

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[35] See *CERES*, pp. 59-60; *Geneva Reports*, p. 65.
[36] See *C.E.A. Report*, p. 24; I. EBERT, contribution in MUNICH RE, *Liability for Climate Change. Experts' views on a potential emerging risk*, *op. cit.*, p. 15.
[37] See i.a. G. BENOIST, Climate Change Impacts on Personal Insurance, *The Geneva Papers*, 2007, pp. 16-21.
[38] See i.a., Reports from Germany, Italy and Japan ; C. FÖLLMER, p. 6; S.B. HECHT, *op. cit.*, pp. 1576-1577.
[39] 5,000 casualties according to F. GUDIN DU PAVILLON (silde 5), 6,500 according to the Spanish Report (p. 14), 22,000 to 35,000 in five countries according to *C.E.A Report*, p. 22 !
[40] Almost 2000 persons lost their life with Katrina. In Australia, 173 people were killed by the forest fires of February 2009 (C.J. RODD, slide 16).
[41] See i.a., Reports from Australia, Brazil, Germany, Italy, Japan, South Africa and Spain ; C. FÖLLMER, p. 6 ; C.J. RODD, slide 4 ; S.B. HECHT, *op. cit.*, pp. 1575-1576 (West Nile virus, Lyme disease) ; *Stanford Symposium* , pp. 279-281 ; *C.E.A Report*, p. 22.
[42] See *C.E.A Report*, p. 22.

12. One can see that the study of the impact of climate change on insurance does not simply amount to adding a few developments in the chapter on insurance of natural catastrophes. The phenomenon has far-reaching consequences on all types of insurance.

Preliminary observations

Before entering into the substance of this general report, two preliminary observations have to be made.

13. In the first place, it has to be understood that the syntheses below are based on all the developments found in the national reports and other sources. Obviously all these measures and initiatives are not taken to the same extent everywhere in the world. There are wide differences between countries as to the impacts of climate change, the degree of awareness of the phenomenon and the development of the insurance sector. National reports give valuable information about the respective situations[43]. Also, certain measures may not be enforced yet in certain countries, but are envisaged for the future.

14. On the other hand, an important difficulty encountered by the general reporter and several national reporters is the policy of secrecy maintained by many insurers about their contractual terms, especially when it comes to « new products ». Equally as firms like to make a point, on websites and publications, to advertise their creative approaches to climate change and their involvement in innovative products, as much they usually keep the door closed when more

[43] More than often, some national reports are not referred to on the different points that will be considered. This usually means that no information was provided on the issue.

precise details or sample clauses or policies are asked for the purposes of scientific research. Most requests remain unanswered.

An explanation given to us (off the record) by an insurer is that there may be some distance between advertising a new product and its actual implementation. Another concern would be not to risk losing what is perceived as a competitive edge by submitting the product to an investigation leading to public discussions in a colloquium.

This is understandable to some extent, but not totally convincing. On the one hand, most of the time similar clauses or new products are simultaneously developed by competitors; on the other hand, secrecy is rarely full-proof when it comes to contract terms. It can be added that submitting contractual documents and clauses to an objective comparative analysis often leads to suggestions for significant improvement of the products, of direct interest to those who have submitted them[44].

15. In spite of the many difficulties encountered, we have eventually been able to gather considerable documentation. But we wanted to express our frustration towards such excessive caution on the part of many insurers. It is of special concern for an association such as AIDA, devoted to the study of the developments of insurance contract law. Perhaps AIDA could some time give

[44] In the field of typical clauses in international contracts (such as force majeure, hardship, exemption or best effort clauses), we have remarkably been able, with a group of active corporate lawyers, to overcome the alleged obstacle of secrecy and to gather invaluable concrete documentation taken from actual files (obviously, making it sure to eliminate any possibility to identify names). See M. FONTAINE and F. DE LY, *Drafting International Contracts. An Analysis of Contact Clauses*, New York, 2006, 653 pp.). This book is exceptionally rich with practical advice for contract drafting, thanks to the open-mindedness of a large number of firms providing materials.

some thoughts to the issue, together with insurance associations and those insurers who have a more open approach[45].

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As already announced, this general report will successively deal with « defensive » measures (I), « new products » (II), reinsurance and ART (III).

I. « DEFENSIVE » MEASURES

16. Faced with the perspective that climate change will gradually increase their loss burden[46], the insurers' first natural reaction is to attempt to counter this unwelcome development by taking all types of so-called « defensive » measures, aimed at achieving a better knowledge of the facts, at fostering preventive initiatives and at adjusting their policies in order to mitigate the impact of climate change on their results.

[45] On this subject, also see T. HARDY, p. 5.

[46] See S.B. HECHT, *op. cit.*, pp. 1580-1581, points out that the high potential for losses of climate change-related risks threatens the solvency of insurers, climate change's impacts are high and affect many lines of insurance (see above), and climate change-related risks being often correlated, the risk of extremely large losses is exacerbated.

The variety of these « defensive measures » is wide. Our first interest lies with the measures of a legal nature, mainly those affecting contractual terms, but we cannot fail to describe some important types of extra-legal initiatives also taken by insurers.

17. It will be recalled that wide differences exist among the different parts of the world as to the development of the various measures which are going to be described. The respective national reports are enlightening on this point[47].

A. Extra-legal measures

18. The first concern of the insurance sector is to *improve their own knowledge* of the phenomenon of climate change and its evolution.

Statistics are regularly reevaluated in areas sensitive to climate change[48]. Cartography of certain risks is promoted, for instance of flood-prone areas, in order to identify zones of higher risk[49]. Some specific studies are undertaken[50],

[47] Comp., for instance, the lack of defensive measures reported by countries such as Brazil, El Salvador and Poland, as well as by C. VAN SCHOUBROECK, p. 1, about Belgium, and the more positive answers received from countries such as Argentina, Germany, South Africa or the U.K.

[48] See i.a., Reports from Brazil, Costa-Rica, Denmark, Germany, Italy, the Netherlands, South Africa and the U.K. The Italian report draws the attention to the possible antitrust aspects of joint gathering of statistics (p. 6). Also see S. NOEL, slide 13. However, in her presentation at the Paris Congress, C. VAN SCHOUBROECK considers that *"the insurance industry worldwide is still searching for accurate statistical data"* (p. 2).

[49] See i.a., Reports from Argentina, Australia, Brazil, Costa-Rica, Denmark, Finland, France, Germany, Japan, Mexico, Spain and the U.K.; C. J. RODD, slide 22 ; *Geneva Reports*, p. 101.

[50] See the Report from South Africa; *ALLIANZ Agenda*, p. 28. Also see the different publications from the insurance sector listed in the bibliography above, under footnote 4.

often in cooperation with universities and other research centers[51]. The insurance sector can also finance such studies[52].

19. Initiatives are also undertaken by insurers to *improve awareness* of the climate change issues by the general public and by public authorities. Campaigns of information are organised in many countries or parts of the world[53]. Climate risk management services are offered[54]. Solemn declarations are made public, such as the *« Kyoto Statement of the Geneva Association »*, signed in 2009 by 50 top insurance executives[55]. One of the main purposes of these efforts is to promote prevention[56]. A remarkable example is *« ClimateWise »*, an international initiative launched by a number of insurance companies devoted to climate risk analysis, public policy, climate awareness among customers, investment strategies and study of the impact of climate change on their business[57].

20. Many insurers also choose to give themselves *the « good example »*, by adopting certain types of « green » conduct within their own firms – and publicising it. Some of them adopt energy-saving modes of construction. Strict

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[51] See for instance *« Climate Change Features : Health, Ecological and Economic Dimensions »*, a study conducted by the Harvard Medical School with the support of Swiss Re and the U.N. Development Program (2008).
[52] See *ALLIANZ Agenda*, pp. 27-30 ; *C.E.A. Report*, pp. 29-31 ; *Stanford Symposium*, pp. 305-308 ; *Geneva Reports*, pp. 98-99.
[53] See i.a., Reports from Australia, Denmark, Finland, France, Germany, Italy, Spain and Turkey; S. NOEL, slide 14; *MILLS Global Review*, pp. 11, 15-16 ; *CERES*, pp. 24-27; *C.E.A. Report*, pp. 33-37 ; *Geneva Reports*, p. 101.
[54] See Reports from Germany and South Africa.
[55] See *Geneva Report*, pp. 7-8.
[56] See i.a., Reports from Italy and South Africa; *MILLS Global Review*, pp. 11-12; *CERES*, pp.18-24 ; *Geneva Reports*, pp. 102-103; *C.E.A. Report*, pp. 37-39.
[57] See the Report fom the U.K.; C. HERWEIJER et al., *op. cit.*, p. 365; *C.E.A. Report*, pp. 28-29, 60-62.

measures are sometimes enforced in the firm's day-to-day business in order to save energy (e.g. in heating or lighting), or to restrict consumption of paper[58].

On another level, some insurers make it known that their reserves are significantly invested in projects of sustainable development, such as low-carbon technology or reforestration[59].

B. Legal Measures

21. Of special interest in the context of AIDA are the « defensive » measures of a legal nature taken by insurers to protect themselves against deterioration of results due to climate change, i.e. measures that directly concern the terms of insurance policies[60].

Preventive measures

22. A first group of such measures consists in *imposing additional types of preventive measures on the insured* (distinguished as *Obliegenheiten* in German law, but also well present in most jurisdictions), such as, in flood-exposed locations, storage at a minimum level above ground, replacement of ground

[58] See the Report from the U.K.; *CERES*, p. 46; *C.E.A. Report*, pp. 48-50 ; *Geneva Reports*, p. 69.
[59] See i.a., Reports from Brazil, the Netherlands and the U.K.; *MILLS Global Review*, pp. 14-16; *CERES*, pp. 43-44, 46 ; *C.E.A. Report*, pp. 50-51 ; *Geneva Reports*, pp. 70, 101-102. Comp. the carbon offsetting schemes described below, at No. 43.
[60] Insurers do not always have complete freedom to impose such measures in their policies. Mantarory provisions of the applicable law may interfere, especially in the case of compulsory insurance. See i.a. Reports from Argentina and Spain; R. BRIL, pp. 8-9.

floor carpeting, installation of backflow flaps, regular maintenance of drain pipes, etc… [61].

Sanctions for failure to take these preventive measures can go as far as forfeiture, but much depends of the applicable law, which often restricts the insurer's freedom to stipulate such radical consequences. In several legal systems, forfeiture clauses can only apply under certain conditions, such as intentional fault or gross negligence, and/or the requirement of a causal link between the breach and the loss. Reduction of the indemnity by the amount of the loss which could have been avoided is also sometimes susbtituted to total forfeiture[62].

Examples are also found of cases where insurers do not impose certain preventive measures, but reward their adoption by granting the insured some advantage, such as a reduction of the premium. This will be developed below when dealing with the « new products ».

Extent of coverage

23. Another important set of « defensive » measures aims at controlling the extent of coverage[63].

[61] See, i.a., Reports from Germany and the U.K. Also see the question put by C. VAN SCHOUBROECK, p. 5.
[62] See for instance Article 4:103 of the *Principles of European Insurance Contract Law* (PEICL) and the accompanying notes on comparative law.
[63] Once more, it will be pointed out that if the measures described below seem to already know concrete applications in the countries referred to in the footnotes, other national reports have indicated that they are not yet in practice on their respective markets.

- *Maximum amounts* of coverage can be stipulated[64], as well as deductibles[65]. Such devices are of course no innovations in certain types of insurance contracts, where they have existed for a long time. But climate change concerns can bring insurers to multiply the instances where they are stipulated and to pay special attention to the amounts or percentages involved[66].

- The *definition of the risk* covered can be adjusted[67], or *exclusions* can be stipulated, in order to restrict or eliminate the impact of climate change[68]. For instance, coverage can be restricted to losses of an accidental nature, thus excluding damages due to gradual climate change[69]. Flood coverage can be excluded in certain areas, or the minimum speed of wind adapted in the contractual definition of « tempest »[70].

Premium adaptation

24. *Premiums can be increased* as a consequence to the deterioration of losses due to climate change[71]. This can for instance be the case for fire insurance, in regions where forest fires become more frequent, or for agricultural insurance,

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[64] See i.a., Reports from Denmark, Germany, Italy, Japan, South Africa, Spain and the U.K.
[65] See i.a., Reports from Denmark, Germany, Italy, Japan and the U.K.; *MARSH*, p. 19.
[66] As the German Report rightly points out (p. 8), it may however be difficult, in certain cases, to assess whether or to what extent a modification concerning ceiling amounts ou deductibles is attributable to the effects of climate change. Also see *MARSH*, p. 9.
[67] See i.a., the Report from Germany.
[68] See i.a., Reports from Argentina, Australia, Costa-Rica, Denmark, Germany, the Netherlands, South Africa and the U.K. ; C.J. RODD, slide 22. Here again, mandatory rules may restrict the possibility to provide for exclusions, especially in mandatory insurance.
[69] This solution is well-known in the practice of certain lines of liability insurance. It was already discussed at the Madrid AIDA Congress of 1978, in some of the reports covering the topic of « Pollution and Insurance »; see for instance our report for Belgium, in the Proceedings of the Congress, vol. II, pp. 91-92.
[70] See i.a., the Report from Germany, p. 8.
[71] See i.a., Reports from Australia, Costa-Rica, Denmark, France, Germany, Greece, Italy, South Africa and Spain; C.J. RODD, slides 22 and 23; *Stanford Symposium*, pp. 310-311.

where storms tend to be more and more severe[72]. Premium increases are naturally unpopular measures, often difficult to implement in a competitive market; public authorities can also intervene to restrict such initiatives[73].

Cancellation, withdrawal

25. A more radical step is to *cancel an insurance contract* where the risks are felt to have become too high[74]. The policy may allow the insurer to cancel the policy unilaterally in such circumstances. However, cancellation is subject to the provisions of the applicable law, which are often mandatory: formal requirements can be required, cancellation can often occur only at certain times, e.g. at the next anniversary of the contract, or after a loss, under certain conditions[75].

26. When the effects of climate change appear to be wide-spread on the insurer's portfolio, a more general measure can be envisaged: *withdrawal from the market* (which will lead to cancellation of all contracts, or possibly assignment of the portfolio to another insurer)[76].

However insurers are aware that when the private sector tends to leave a market, public authorities may be pressed to intervene to impose compulsory insurance or another scheme which will replace insurance by the private sector[77].

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[72] See i.a., the U.K. Report; *ALLIANZ Agenda*, pp. 31-32.
[73] See *ALLIANZ Agenda*, p. 31. Insurers themselves may be reluctant to raise premiums to adequate levels: cf. *Geneva Reports*, p. 64.
[74] See i.a., Reports from Australia, Germany and Greece.
[75] See for instance PEICL, Art. 2 :604, 4 :102 and 5 :103.
[76] See i.a., Reports from Germany and South Africa; *ALLIANZ Agenda*, p. 32. Comp. the U.K. Report, pp. 28-29, about the statement made by the U.K. insurance industry in 2008 about the "flood-for-all" cover.
[77] See the Italian Report.

Public schemes

27. *Public schemes* have indeed developed in several countries. Interesting examples are described in several national reports[78].

- In Argentina, for instance, every entity whose activities involve risks for the environment must conclude an insurance contract to guarantee « financing of restoration (*« financiamiento de recomposicion »*) of possible losses (*« Seguro ambiental de incidencia colectiva »*)[79]. Such policies are *« polizas de caución »*, where the entity involved in hazardous activities is the policyholder, but the State (or another public entity such as the Province or the City) appears to be the insured[80]. The insurer guarantees the availability of the necessary funds to promptly remedy environmental damages.

- Another example is that of Spain, where all risks linked to natural catastrophes are covered by a specific *« seguro de riesgos extraordinarios »* (also involving political risks). All policies of different lines of insurance (such as fire, first party motor insurance, personal accident) must add extraordinary risks to their coverage and collect the corresponding additional premiums. However these additional premiums are then transferred to a public entity, the *« Consorcio de compensación de seguros »*, which offers the actual coverage[81].

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[78] For a brief overview of the situations in 18 European countries, see *C.E.A. Report*, pp. 17-18.

[79] See the Report from Argentina; R. BRIL, pp. 11-13. (Both reports describe the legal controversies concerning this legislation and the implementing regulation.)

[80] See the definition of the « Insured » (*« asecurado »*) in the General conditions of the *Poliza*.

[81] See the Report from Spain. Also see the Report from Chile on the *« Seguro Agricola »* created in 2000 by the Ministry of Agriculture. Comp. the Dutch Report (p. 19) on an

In other countries, such as Belgium and France, insurance of certain catastrophic risks is also mandatorily included in certain otherwise non-compulsory types of insurance, such as homeowners' insurance, but coverage is directly provided by the insurance company itself (subject to the possible additional intervention of public funds) [82].

There are important advantages to that formula of covering extraordinary risks by imposing their inclusion in otherwise non-compulsory, but widespread, types of insurance. It only necessitates the inclusion of additional clauses in existing policies, without having to devise new types of contracts**.** Mainly, it ensures the affordability of the new system, since the risk is spread over a very wide group of insureds. Compulsory flood insurance would be excessively expensive if it were to be freely subscribed only by people living in exposed valleys. But if in a certain country, all people insured against fire, even those living on a high plateau, also subscribe to flood insurance within the scope of their general homeowners' policy, this act of compulsory solidarity does not cost them much and those at risk can find affordable insurance [83].

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initiative where in case of damage to crops, the Ministry of Agriculture had undertaken to double the amount of premiums collected by private insurers.

[82] See Reports from Belgium and France. On the compensation scheme introduced in the Netherlands by the 1998 Act, see the Dutch Report, pp. 22-23.

[83] On the question whether this is compatible with contractual freedom, see the German Report, pp. 9-10.

Coinsurance and reinsurance

28. Another « defensive » measure against risks which may be beyond its individual capacity is for an insurer to join with others in *co-insurance* schemes [84].

Reinsurance can also be considered as a « defensive » measure, as well as resort to different alternative methods of risk transfer, but these issues will be examined separately below (Part III).

C. Causation issues

29. The application of some of the « defensive measures » can raise problems of causation of two different kinds.

30. It is often the case that climate change does not create new risks, but aggravates existing ones. Storms, environment liabilities or malaria are certainly not new phenomena, and some existing policies may cover them to certain extents. What the insurer wants to do is to protect itself against significant increase of such existing risks as a result of climate change, without necessarily withdrawing from « normal » coverage. Consequently, restrictions or exclusions of coverage should be limited to the additional part of the risks caused by climate change[85].

This concern can often be met by careful drafting of relevant provisions of the policy. What is meant by « climate change » and its effects on the insurance

[84] See for instance the pools for uninsurable risks mentioned in the German Report**,** p. 9.
[85] See i.a., the Spanish Report.

coverage has to be precisely defined[86]. Some individual events also call for precise definitions, such as "windstorm" or "hurricane"[87] ; this is not a new problem for insurers, but the difficulty is to find language that will identify the part specifically attributable to climate change.

Quantitative criteria can also be used in certain circumstances. Various natural phenomena could still be covered, but with caps amounting to exclusions of events of a certain magnitude: for instance, storms where the wind blew over a certain speed, floods where the level of water rose above a certain level.

31. Others problem of causation result from the fact that losses are often the result of a combination of causes, climate change being only one of them[88].

For instance, in a region where climate change brings more frequent floods, the population keeps increasing, thus multiplying the losses[89]. In the same circumstances, the economic value of the assets under risk can also increase: small peasant houses are replaced by expensive villas, or by industrial plants[90].

Another frequent situation where climate change is only one of the causes of the loss appears when human behaviour has been negligent with regard to the required precautionary or preventive measures. For instance, public authorities have failed to adjust the sewage system, or to maintain it properly[91]. Firms have not taken the necessary steps to reduce their emission of greenhouse gases [92]**.**

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[86] See M. FRIGESSI, pp. 1-3. Also see *MARSH*, pp. 20-21.
[87] See i.a., Report from Brazil.
[88] See i.a., Reports from Australia, Costa-Rica, Denmark, Italy, Japan, Spain, Turkey, the Netherlands and the U.K.; M. FRIGESSI, pp. 4-5
[89] For several examples, see for instance the Report from Spain, pp. 16-19.
[90] See i.a., Reports from Denmark, Germany, Italy and the U.K.; S.B. HECHT, *op. cit.*, pp. 1573-1574.
[91] See i.a., Reports from Denmark and Finland.
[92] See i.a., Reports from Australia, Brazil, Denmark, France and South Africa.

If the policy covers the consequences of climate change, is coverage due when a loss is due to a combination of different factors, climate change being only one of them? Difficult legal problems can rise here, first to bring evidence of the respective impacts of the alleged multiple causes, then to decide, under the applicable law, whether a loss occuring under such circumstances would still be covered[93] [94]. The insured's reproachable conduct may also sometimes trigger the application of the insurance law rules on risk aggravation, failure to take preventive measures or forfeiture of coverage for losses due to gross negligence or intentional behaviour[95].

II. « NEW PRODUCTS »

32. Climate change causes certain existing risks to deteriorate and some new risks to appear. We have seen how insurers try to protect themselves against such developments with different types of « defensive » measures. But the impacts of climate change are also considered as opportunities to take initiatives

[93] The Report from South Africa notes in this respect that *« The flexible principles of common law relating to liability law will have to develop to accommodate the new risks posed by climate change »* (p. 12).

[94] A possibility for insurers could be to stipulate that coverage is granted only for losses *exclusively* attributable to climate change. Similar clauses are sometimes found in other types of policies (e.g. in some policies covering financial loss due to business interruption or other specific causes); it would of course not eliminate all practical difficulties.

[95] See for instance PEICL, art. 4:101 - 4:103, 4 :201- 4 :203 and 9 :101.

and to offer new types of coverage designed to meet the new challenges, either by adapting existing policies or by creating new ones[96].

Such developments are certainly of special interest for research devoted to the consequences of climate change on the law of insurance, as they concern issues where insurance contract law is developing and conquering new grounds.

Two different categories of « new products » can be distinguished. On the one hand, classical policies are transformed into instruments to reduce greenhouse gas emissions (the so-called « green policies »). On the other hand, original types of policies have appeared to cover new risks linked with climate change[97] [98].

A. « Green » policies »

33. This first class of « new products » is not meant to cover new types of losses linked to climate change, but to act « upstream », by marketing insurance products which could contribute to the reduction of greenhouse gas emissions. This can be applied to several classical types of policies.

[96] That is the so-called « from reaction to pro-action » attitude : see the Belgian Report, p.12 ; W. R. STAHEL, R. NAKAI and R. MUIR-WOOD, Insurance and climate change – from reaction to proaction, *Geneva Reports*, pp. 61-71; W. R. STAHEL, In Favour of a Proactive Attitude Insurance Approach to Climate Change, *The Geneva Papers*, 2009, pp. 319-322.
[97] Comp. the distinction made by S.B. HECHT, *op. cit.*, p. 1602, between products that help to create conditions for active adaptation to building physically resilient communities, and products that provide capacity to cope with losses.
[98] It will again be recalled that obviously, all these new products are not currently available in all parts of the world. See the respective national Reports.

34. *Buildings* will save energy if they are properly constructed and isolated. A first category of « green » or « energy saving » policies are available in several countries, granting lower premiums or other advantages when the insured building satisfies a certain number of energy-saving requirements[99] [100]. Sometimes, indemnification of a loss is made more generous if reconstruction is made according to energy-saving standards[101].

Similarly, some insurers grant premium discounts if a building is made less vulnerable to flood damage[102].

35. *Motor insurance* is another important sector where various types of « green policies » have appeared[103].

« Pay-as-you-drive » policies give an incentive to drive less, since the amount of the premium to be paid depends on how much the car has been driven[104].

There are also policies which reward the use of GPS, on the assumption that this will reduce distances covered[105]. Some insurers also grant reduced premiums on

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[99] See i.a., Reports from Australia, Denmark, Finland, Italy, Japan, the Netherlands, South Africa and the U.K.; Y. YAMANO, p. 4 (quoting the case of an insurance company granting a premium reduction if the building satisfies the norms of ISO 14000 for environmental management); also see C.J. RODD, slide 22 (lower premiums for fire-resistant dwellings in regions subject to bush fires) ; S. NOËL, p. 15; S.B. HECHT, *op. cit.*, pp. 1594-1596, 1602-1603; *MILLS Global Review*, p. 13; *CERES*, pp. 32-35 ; *ALLIANZ Agenda*, p. 34; *Stanford Symposium*, p. 312; *C.E.A. Report*, p. 40; *Geneva Reports*, pp. 69-70, 99-100.

[100] Another new type of insurance product protects the installer or owner an energy efficiency project from failure to achieve the predicted energy savings (See *CERES*, pp. 29-30)

[101] See the U.K. Report.

[102] See i.a., Reports from Belgium and South Africa; *Geneva Reports*, p. 68..

[103] See Y. YAMANO, p. 2.

[104] See i.a., Reports from Belgium, Denmark, France, Germany, Italy, Japan, the Netherlands and the U.K.; C. FÖLLMER, p. 8 ; Y. YAMANO, p. 2 ; S. NOEL, slide 15; S.B. HECHT, *op. cit.*, pp. 1596-1597, 1599-1601; *MILLS Global Review*, pp. 12, 19; *CERES*, pp. 24-25 ; *Geneva Reports*, p. 99.

[105] See the U.K. Report.

the evidence that the insured has purchased a season-ticket with a railroad company[106] !

Another formula with similar purposes is offered by policies rewarding speed moderation, controlled by a « black box » installed in the car - a system having to cope with reluctance from some drivers[107].

On the other hand, «low emission » cars, such as « hybrid cars », are often insured on more favourable terms [108] [109] [110] [111].

36. Marketing « green » policies may flatter the image of insurers, but doubts are sometimes expressed about their merits. Such policies may contribute to reducing gas emissions, but they do so in the form of a subsidy granted by the insurance industry, while the risks at stake (e.g. the motorist's risk profile) are not affected. This means that insurers, while bearing part of the cost of reducing emissions, can be penalised on actuarial grounds[112].

Finally, it will be recalled that in the part devoted to « defensive » measures above, we have mentioned that some insurers try to set a « good example » by acting responsibly towards the environment. This attitude can also take the form

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[106] See C. FÖLLMER, p. 8.
[107] See i.a., Reports from Belgium and Germany; *Geneva Reports*, p. 99.
[108] See i.a., Reports from Belgium, Germany and Japan ; *Geneva Reports*, pp. 68, 99, 100 ; S.B. HECHT, *op. cit.*, p. 1596; *ALLIANZ Agenda*, p. 34.
[109] The Report from Brazil (p. 12) also mentions projects that encourage car repairs garages that adapt themselves to sustainability standards.
[110] Another interesting development mentioned in the Report from Brazil (p. 12) is the appearance of reforestration insurance, another way to encourage action against carbon dioxide.
[111] Comp. below, No. 43, the possibility offered by some motor insurers to offset carbon emissions.
[112] See i.a., Reports from Denmark and the U.K. ; S.B. HECHT, *op. cit.*, p. 1590; *MILLS Global Review*, p. 12; C. HERWEIJER et al., *op. cit.*, p. 368. Also see the *Geneva Reports*, p. 64, for a discussion of the difficulties in insurance of properties.

of special policies, where the insurer untertakes that the premiums will be invested in projects of reducing gas emissions or sustainable development [113]. It is also reflected when electronic policies, replacing paper, are offered at a reduced price[114] .

B. New or adapted types of policies

Risks connected to climate change are directly covered by different types of policies, either adaptation of existing types, or completely new policies.

Adaptation of existing policies

38. Some *third party liability policies* are being adapted in order to cope with the development of liabilities linked to climate change. Instead of protecting themselves by providing for restrictions or exclusions of coverage (see above, concerning « defensive » measures), some insurers devise policies that are meant to give adequate cover to the new risks, with an appropriate level of premiums.

Environmental liability policies are adjusted in order to cover liabilities linked to climate change[115]. The same occurs with D&O liability policies[116], as well as

[113] See i.a., Reports from Brazil, Germany, the Netherlands (example of a motor insurer who compensates the CO^2 emissions of a car by planting seven new trees every year in Costa-Rica) and the U.K.; Y. YAMANO, p. 4. Comp. the carbon offsetting schemes described below, at No. 43.
[114] See the Report from Brazil; Y. YAMANO, pp. 2-3.
[115] See i.a., the Report from Germany. In some countries, policies that offer gradual pollution cover have emerged; see the Report from South Africa.
[116] See i.a., the Report from Germany; S.B. HECHT, *op. cit.*, p. 1598; *MILLS Global Overview*, pp. 12, 12; *MARSH*, pp. 22-24; *CERES*, pp. 26-27, 29; *DLA PHILLIPS FOX*, pp. 10-13; *C.E.A. Report*, p. 39.

with policies covering liabilities of certain professions, especially in the construction sector (architects, contractors, experts, etc…)[117].

As with all new types of liability, insurers have to be very careful to evaluate the risks before offering coverage. Especially important is a scrutiny of the means implemented by the insured to identify its own exposure, as well as to prevent and mitigate possible losses[118].

39. Existing *property insurance policies* can also be affected. In certain countries insurers are attempting to extend to new sectors (such as tourism) the distribution of policies already present in some other sectors (such as energy) and related to some effects of climate change, such as policies covering floods or avalanches, or weather insurance [119].

Alternative sources of energy

40. A new range of policies are developing for alternative sources of energy. Insurance is playing its traditional role of promoting technical advances by agreeing to cover the risks involved[120].

Wind-mill policies are now well developed. Some of them provide for comprehensive coverage: construction risks, delay in start-up, mechanical and

[117] See i.a., Reports from Germany and the U.K.; *CERES*, p. 29; *C.E.A. Report*, pp. 39-40.
[118] See *CERES*, pp. 26-27.
[119] See the German Report, p. 10.
[120] See i.a., Reports from Australia, Denmark, France, Germany, the Netherlands and the U.K.; S. THEILGAARD, pp. 1-4 and slide presentation; S. NOEL, slide 16 ; *MILLS Global Overview*, p. 14; *C.E.A. Report*, p. 41 ; *MUNICH RE-Newables*, pp. 10-21, 29-31. See also E. LEBLANC, Challenges of the Renewable Energy Industry Generate New Demands for Risk Advisory: How to Value an Insurance Package from a Financial Perspective ?, *The Geneva Papers*, 2008, pp. 147-152.

electrical breakdown, operational risks, business interruption, third party liability, etc…[121]**.**

Similar policies are available to cover solar energy (e.g. solar panels), or other alternative sources, such as hydro, geo-thermal, wave or bio fuels[122] [123].

Carbon dioxide

Some new types of coverage are directly connected to carbon dioxide[124].

41. Specific policies are available to cover some risks linked to the carbon market and the "cap and trade system"[125] [126]. There are different varieties of such policies. When a firm takes measures to reduce its emissions in order to be able to gain carbon credits and sell them on the market, the risk exists that an event (e.g. a technical incident such as the break-down of a filter, or a political risk such as the cancellation of a licence or the outburst of a violent conflict interrupting the delivery of carbon credits) could prevent the firm from reaching its objective and thus fail to gain the credit. "*Carbon credit delivery insurance*" is available on some markets to cover such risks[127] [128]. Another risk is covered

[121] See i.a., Reports from Australia, Denmark, France, Italy and the Netherlands; S. THEILGAARD, p. 2 and slide 3 ; *Geneva Reports*, p. 100 ; *MARSH*, pp. 25-28; *CERES*, pp. 30-31; *MUNICH RE-Newables*, pp. 16-21.

[122] See i.a., Reports from Brazil, Denmark, France and Germany; S. THEILGAARD, p. 1 and slide 2; *MUNICH RE-Newables***,** pp. 10-15, 29-31.

[123] Weather derivatives (see below No. 49) are also available for wind and solar-electric systems (see *Geneva Reports*, p. 100; *CERES*, p. 31).

[124] Apart from the « green policies » already described above, attempting to promote reduction of greenhouse effect gases.

[125] On the regulatory framework, see T. HARDY, pp. 1, 12-13.

[126] Here again, it will be kept in mind that developments widely vary depending on the regions of the world. Even some highly developed countries report that the types of carbon-linked policies that are now described are not available yet (See i.a., Reports from Denmark, France and Japan).

[127] See i.a., Reports from Brazil, Germany, South Africa and the U.K; T. HARDY**,** pp. 3-5; S.B. HECHT, *op. cit.*, p. 1605; *CERES*, pp. 40-41; *C.E.A. Report*, p. 43. Some varieties also

by "carbon counterparty credit insurance", which insures against the default of payment by the purchaser of the carbon credit[129].

42. Another type of carbon-related risk is linked to the process of capturing carbon dioxide and storing it underground (« CCS »: *carbon capture and sequestration*)[130]. This is a new technology, the effects of which are still not completely mastered[131]. Certain types of coverage for the different risks linked to carbon sequestration (pollution liability, business interruption, damages to the well, etc…) are being devised, some are already available [132] [133] [134].

43. Several insurers are also offering to offset carbon emissions caused by some insured activities, such as driving a car or travelling by air. Either the insurer undertakes to purchase carbon credits to offset the emissions (or to make a corresponding investment in a project neutralising carbon emissions such as forest restoration), or it offers the insured options to buy such carbon offsets[135].

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exist, such as "forest carbon sequestration insurance", covering losses of anticipated carbon credits due to physical damage to a forest.

[128] On the moral hazards involved in such types of coverage, see *C.E.A. Report*, p. 43.

[129] See T. HARDY, p. 4.

[130] For a description of the technique, see T. HARDY, pp. 5-7 and slide 6. In the European Union, see the Directive 2009/31/EC on the geological storage of carbon dioxide (*OJEU*, L140/114 of June 5, 2009).

[131] See T. HARDY, pp. 6-7 and slide 6; *MILLS Global Overview*, p. 13 ; *C.E.A. Report*, p. 42 ; *MUNICH RE Newables*, pp. 24-28**.**

[132] See descriptions of several policies in T. HARDY, pp. 7-10 and slides 6-10.

[133] See i.a., Reports from Denmark and Italy; *CERES*, pp. 61-62; *C.E.A. Report*, pp. 42-43. Also see the presentation by N. HELLEBERG, Climate change: Carbon capture and storage and other emerging risks, in SWISS RE, *CEA General Liability Seminar*, 2009.

[134] Even though it is not directly a legal development, mention should also be made of the initiatives taken by some insurers and brokers to offer carbon-risk management (including claims management) and carbon-risk reduction services to enterprises (see *MILLS Global Overview*, p. 14 ; *CERES*, pp. 38-41 ; *CEA*, pp. 44-47).

[135] See the Reports from Costa-Rica, p. 8 and the UK, p. 34; *CERES*, p. 41; *Geneva Reports*, pp. 99, 100.

Additional obligations for the insurer are thus created in the concerned insurance contracts, but these obligations, by themselves, do not have the nature of insurance, since they do not actually cover any risks[136]. They can rather be analysed as marketing techniques to attract environment-conscious customers, either by the insurer's personal pledge to offset their emissions, or by offering the facility to purchase the corresponding offsets[137].

Micro-insurance

44. A different type of « new product » linked to climate change has been identified by some national reporters and in certain publications: varieties of micro-insurance especially adapted to climate risks. Micro-insurance aims at providing affordable access to insurance for low-income beneficiaries. It is especially developed in some Third World countries. Certain recent applications are related to climate change.

In some markets, farmers can micro-insurance coverage against extreme drought in the form of a climate derivative (on derivatives, see below, No.49). Reference is made to a climatic index (related for instance to the duration of sun exposure, or to the amount of rain over a certain period). If this index goes over or under a

[136] In contrast to carbon credit insurance described above No. 41, covering the risk of losing expected carbon credits.

[137] Compare the « green policies » described above at No. 35, where no carbon offsets are considered, but more favourable insurance terms offered for energy-saving products. Also compare other initiatives taken by insurers to demonstrate their involvement in the climate change issues, described above at Nos. 20 and 37.

certain pre-agreed level, the farmer receives a pay-out (often a pre-fixed amount) to compensate for the losses suffered involving its crops[138] [139].

These characteristics, that the insurer's intervention is triggered by the mere evolution of an index and that compensation takes the form of payment of a pre-set fixed amount, contribute to the low and affordable cost of micro-insurance[140].

III. REINSURANCE AND ART

45. The essential part played by reinsurance in the insurance sector need not be restated, especially in the coverage of major risks. This is similarly applicable to climate change. But this is also a field where several alternative modes of risks transfer (ART) are developing.

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[138] See i.a., Reports from Costa-Rica, Germany and the U.K. ; Y. YAMANO, pp. 3-4 ; S. NOEL, slide 16 ; S.B. HECHT, *op. cit.*, p. 1604; C. HERMEIJER et al., *op. cit.*, p. 377; *MILLS Global Overview*, pp. 13-14; B. COLLIER et al., *op. cit*., pp. 401-424; *CERES*, pp. 36-37; *C.E.A. Report*, p. 44; *Geneva Reports*, pp. 88, 104; ALLIANZ, *Learning to insure the poor. Microinsurance report*, 2010, 38 pp.

[139] Some governments also benefit from such weather derivatives: see the Caribbean Catastrophe Risk Insurance Facility (CCRIF), which provides immediate capital to Caribbean governments that are hit with a natural disaster (see S.B. HECHT, *op. cit.*, p. 1604 ; T. MAYNARD, *op. cit.*, p. 144). Comp. the index-based drought insurance set up in 2006 in favour of the Ethiopian government (see C. HERWEIJER, N. RANGER and R.E.T. WARD, *op. cit.*, p. 377).

[140] According to the German Report (p. 11), it is yet unclear if insurers will make any substantial profits with micro-insurance, but *« the publicity effect involved in providing the poorest of the poor with rudimentary protection may be invaluable »*. An author also points out the moral hazard that may be involved with the risk that the purchaser of such products *« may take fewer steps to mitigate future losses as a result of the security associated with* (the derivative) *»* (S.B. HECHT, *op. cit.*, p. 1604).

A. Traditional reinsurance

Large reinsurance companies play a very active and visible part in the debates concerning climate change[141]. This is not surprising, due to the catastrophic, cumulative character of many of the risks involved.

Extra-legal initiatives

46. Like insurers, as explained above, reinsurers face the challenges of climate change first by taking different extra-legal initiatives.

Reinsurers conduct and finance climate-change related research. They gather data, and make them available to insurers[142]. They publish important studies[143]. As the Dutch national report very appropriately puts it, reinsurers often act as « knowledge institutes » for insurers[144]. Some reinsurance brokers are also active in this area[145].

Reinsurers, together with insurers and insurers' associations, do much lobbying with public authorities, national, supranational and international, to raise the degree of awareness of climate change issues and to inspire or influence regulation[146].

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[141] See i.a., the Report from Germany; S.B. HECHT, *op. cit.*, pp. 1579, 1583-1585.
[142] The possible antitrust aspects have already been mentioned above, No. 18.
[143] See the presence of major reinsurers among the authors of the publications listed in the bibliography above, footnote 4.
[144] See the Report from the Netherlands; also see i.a. Reports from Germany, Spain and the U.K.
[145] See the Report from the U.K.
[146] See the Report from Germany.

Some reinsurers even take personal initiatives to contribute to the development of alternative sources of energy. Munich Re, for instance, is promoting a project to install solar panels in African deserts[147].

Legal measures

47. Reinsurers have been directly involved in all the measures described above taken by insurers, often by having devised, inspired or recommended them.

Defensive measures such as modification of contract terms, restrictions or exclusions of coverage, termination of contracts, withdrawal from certain markets are often the result of discussions between ceding companies and their reinsurers[148].

Many of the « new products » described above have been devised by reinsurers, or at least with their contribution. Swiss Re, for instance, was among the first to offer insurance services related to carbon trading and alternative technologies. Munich Re's *Climate Insurance Initiative*, launched in 2005, was a pioneering step in trying to develop insurance solutions for developing countries[149].

The U.K. Report expects that among the problem areas for ceding companies to recover from their reinsurers in the context of climate change will be those of allocation and aggregation of losses, particularly if extended over a long period

[147] See C. FÖLLMER, p. 9 ; *MUNICH Re-Newables*, pp. 46-52.
[148] See the Report from Germany (p. 13), with the example of the withdrawal of reinsurers from the Caribbean market, due to the increased frequency and intensity of hurricanes, thus causing insurers to withdraw themselves.
[149] See the Report from the U.K.

(this has been the source of much dispute with earlier asbestos, tobacco and other environmental claims)[150].

B. Alternative risk transfer

48. Derivatives are known to be used in the insurance industry for purposes such as protection against risks of exchange rate, stock market fluctuations or interest rate modifications[151].

To an extent that greatly varies depending on the regions of the world[152], derivatives are also present among the means to cope with climate change. They can help insurers to reduce capital requirements and to increase their capacity to underwrite new business; they serve as an alternative where reinsurance capacity is limited or its cost too high[153]. Varieties of climate derivatives have been devised, based on indices linked to temperature, rainfall, snowfall, or the like[154].

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[150] See the U.K. Report, p. 35.

[151] See the Report from Germany.

[152] In many countries, ART forms related to climate change are still described as not available (See i.a. Reports from Argentina, Denmark, El Salvador, Finland, Greece, Poland, Spain and Turkey), or still "in infancy" (See i.a. Reports from Australia, Brazil and the Netherlands). The U.K. Report explains that in the U.K. and in many other parts of Europe, reliance upon ART technique has been so far much more modest that in the U.S.. *"...growth in this area has been hindered by uncertainties about the reliability of data, modelling and the significance of past records, as well as the costs to be charged. Concerns have also arisen about some of the legal and regulatory characterisations of some of the techniques"* (p.37).

[153] See S.B. HECHT, *op. cit.*, pp. 1584-1585; S. FRANKEN, who points out that the capital market has a much wider capacity than the capacity available to the insurance industry: *« A one percent fall of the stock markets – not very uncommon these days – results in a world wide loss of about $ 600 million. Even the worst natural disaster so far did not get close to these figures. »* (p. 2).

[154] See SWISS RE, The role of indices in transferring insurance risks to the capital markets, Sigma, 2009, n° 4, 46 pp. ; B. COLLIER, J. SKEES and B. BARNETT, Weather Index

So-called « catastrophe bonds » have been issued. Some of the main types will be briefly presented.

We shall successively deal with weather derivatives and catastrophe bonds, the two most important types of ART techniques related to climate change[155].

Weather derivatives

49. A first group of ART products related to climate change comprises weather derivatives. Three main types are « put-options », « caps » and « swaps ».

- « Put-options » (or « floors ») offer protection against situations where a variable would go under a certain level. For instance, the average temperature would be under 10° C, or it would not rain for a total of so many days in a certain period, or snow would not reach a certain level.

The purchaser of such an option is entitled to receive compensation should the relevant index turn out to be inferior to the agreed threshold. This could for instance be the case for a firm having had to face high heating costs because the winter was unusually cold, for a farmer whose crops were damaged by scarcity of rain, for the manager of a ski resort who experienced losses due to insufficient snow coverage, for the operator of a wind-mill when there has not been enough wind over a certain period or for the owner of a solar power system if the hours of sunlight fall below a certain level[156].

Insurance and Climate Change : Opportunities and Challenges in Lower Income Countries, *The Geneva Papers*, 2009, pp. 401-424.

[155] Categorisation of the different modes of ART is a diffficult task. Each presentation consulted seems to rely on its own distinctions and even terminology.

[156] See *Geneva Reports*, p. 100.

- « Caps » are the opposite of « floors ». They offer protection against situations where the variable would go above the agreed level, e.g. excessive heat, rain or snow. The purchaser would be compensated if the relevant index exceeded the agreed « cap »: the seller of heaters if the winter had been too mild, the manager of a summer resort if the summer had been too rainy, an airline company having had to cancel more flights than usual because of excessive fog[157].

- « Swaps » are a sort of combination of « floors » and « caps »[158]. They offer protection where the variable goes either above or under the agreed threshold, and they involve firms having opposite interests, who promise to exchange their respective risks. For instance, a seller of fresh drinks and a farmer are both concerned with the possibility of a heat wave in the summer, but in totally different ways. By entering a swap arrangement, the seller of drinks promises to pay an indemnity to the farmer should the summer be exceptionally hot (average temperature above a certain level), and vice-versa in the opposite circumstances (average temperature below a certain level). Each participant thus exchanges the chance to make exceptional profits against a guarantee to be compensated in case of major losses.

50. Weather derivatives are sold by various types of sellers, such as banks and insurers[159], or even energy companies[160]. Swaps can be arranged between

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[157] Also see the examples given in the Report from The Netherlands (p. 20).
[158] See i.a., Reports from Germany, Italy and the U.K.; S. MUTENGA and S.K. STAIKOURAS, The Theory of Catastrophe Risk Financing : A Look at the Instruments that Might Transform the Insurance Industry, *The Geneva Papers*, 2007, pp. 235-236.
[159] See the Report from the Netherlands, p. 20. However, the Report from the U.K. (p. 37) points out that to the extent that weather derivatives cannot be considered as insurance contracts (see below, Nos. 53-54), they may not be sold by insurers or reinsurers (who can on the other hand invest their funds into such products).
[160] See the U.K. Report, p. 36.

insurers, mainly on the international level. Risks of serious storms in Europe, for instance, can be swapped against risks of earthquakes in Japan[161] [162].

Catastrophe bonds

51. Another alternative mode of risk transfer which plays a noticeable part in the context of catastrophes, including those due to climate change, is « securitisation », which transfers the risk to the capital market[163].

Securitisation consists of issuing bonds to investors for the amount to be covered, at an agreed interest rate[164]. Like traditional bonds, these will be reimbursed on due date, under normal conditions. However, reimbursement will not take place (or will only be partial) should the risk have occurred, the funds being immediately available for coverage purposes.

The technique is interesting. In the first place, it provides advance financing. Then, when a loss occurs, risk coverage does not take the form of payment of an

[161] See the Report from Germany (p. 14) and the concrete example given.
[162] Even though this is not specifically linked with climate change, comp. the so-called « Debt for Nature » swaps referred to in the Reports from Brazil and Costa-Rica, consisting in converting the external debt of the beneficiary countries into financing for environmental projects.
[163] See i.a., Reports from Germany (where a few specific examples are given), the Netherlands and the U.K.; S. FRANKEN, pp. 2-3 ; S.B. HECHT, *op. cit.*, pp. 1584, 1585, 1603; S. MUTENGA and S.K. STAIKOURAS, *op. cit.*, pp. 233-235 ; *ALLIANZ*, *Hedging climate change*, 2007 pp. 24-31 ; D. WEMMER, The Securitization of Insurance Liabilities : The View from Zurich, *The Geneva Papers*, 2008, pp. 1-6 ; W. ZELLER, Securitization and Insurance – Characteristics of Hannover Re's Approach, *The Geneva Papers*, 2008, pp. 7-11 ; A. CHARPENTIER, Insurability of Climate Risks, *The Geneva Papers*, 2008, pp. 98-101 ; E. MICHEL-KERJAN and F. MORLAYE, Extreme Events, Global Warming and Insurance-Linked Securities : How to Trigger the « Tipping Point », *The Geneva Papers*, 2008, pp. 153-176.
[164] This rate is relatively high (see S. FRANKEN, p. 2).

indemnity by the risk bearer, but of the waiver of the right to be reimbursed. It is not really an innovation: the antique *« bottomry loan »* (*« prêt à la grosse aventure »*) was based on the same lines.

52. Such « catastrophe » bonds are initiated by insurers or reinsurers[165], but they are issued through a distinct entity (a « special purpose vehicle » - « SPV », sometimes also called « side-car company »), which manages the collected funds[166] [167].

Legal nature

53. A fundamental question for AIDA is to determine the legal nature of the above ART products. Do they satisfy the definition of an insurance contract, or are they different types of « financial products »? The question has scientific relevance, but also great practical importance, since the nature of the contract determines the law applicable. Are such products governed by the law of insurance contracts, are their promoters subject to the requirements of insurance supervision?

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[165] Not exclusively. The Mexican Report (p. 16) refers to the issuance by the Mexican Government of catastrophe bonds related to hurricane risks.

[166] Another form of ART available for climate change risks are *« Industrial Loss Warranties »* (« ILW's »), briefly mentioned in the Report from the U.K., as well as by S. FRANKEN, p. 2. These are contracts which offer protection against catastrophic risks, subject to a double trigger : on the one hand, the loss of the protection buyer, but also, on the other hand, the loss of the insured industry. Both triggers have to be hit for a buyer to receive a claims payoff. Sich ILW's are typically bought and sold by insurers and reinsurers, but they are also sold by non- insurance entities such as hedge funds. On ILW's, see SWISS RE, The role of indices in transferring insurance risks to the capital markets, *Sigma*, 2009, n° 4, pp. 16-17. On other possible forms of ART, see the enumeration in the Italian Report, p. 8.

[167] See i.a., Reports from Germany, Japan, Mexico, the Netherlands and the U.K.; S. FRANKEN, p. 2. In the European Union, SPV's are regulated by Directive 2005/68/EC of November 16, 2005; where a Member State allows the establishment within its territory of such SPV's, prior official authorisation is required, under a list of conditions (art. 46).

There is probabably no single general answer; case by case analysis is necessary. A few observations may nevertheless be submitted.

54. As with insurance, the above products transfer risks to third parties, for a certain price, and they offer protection should the risks occur.

On the other hand, there are elements which do not correspond to some basic features of insurance contracts. Usually, there is no requirement of an insurable interest. The amount of the promised compensation is often determined in advance, whereas in insurance (at least property and liability insurance), the principle of indemnity would limit indemnification to the amount of the actual loss, duly documented.

The event triggering compensation is often linked to the evolution of a general index, not to an occurrence personally affecting the « insured ».

In catastrophe bonds, as already explained, risk coverage does not take the form of payment of an indemnity by the risk bearer, but of the waiver of the right to be reimbursed a payment made in advance.

Such are some of the main elements to consider when attempting to determine the legal nature – insurance or not – of these various ART products. Within the limits of this general report, we shall not endeavour to go further in the analysis[168]. Obviously, these legal nature issues will be on the agenda of the AIDA Climate Change Working Patry which has just been created.

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[168] See the positions taken in some national Reports, such as Brazil, El Salvador, Japan, France, Italy, Mexico, the Netherlands, South Africa and the U.K. Also see C. FÖLLMER, p. 9 ; SWISS RE, The Role of Indices …, *op. cit.*, p. 16, concerning ILW's, at least in their basic form, as reinsurance contracts.

CONCLUSIONS

At the AIDA World Congress held in Madrid in 1978, I had the privilege of submitting the Belgian report on the theme « Insurance and Pollution », one of the two general topics retained for the occasion.

Is AIDA today revisiting a 32-year old theme? There is an apparent similitude, since climate change is largely due to pollution by greenhouse gases.

However, a major difference is evident. The instances of pollution discussed in Madrid were local accidents, however catastrophic some of them may have been. At the time, everyone had in mind the Torrey Canyon oil spill of 1967 and the Seveso dramatic industrial pollution of 1976 (Bhopal was still to come in 1984). On the contrary, climate change due to greenhouse gases is a world-wide phenomenon. Obviously, there are still local catastrophes, such as the one which recently occurred in the Gulf of Mexico, and they still deserve to cause high concern. However, with climate change, it is the whole planet that is endangered. The theme of the AIDA Congress of 2010 raises issues of a much larger scale than the theme of 1978.

Let me tell you a little story narrated by Hubert Reeves. A green planet meets a white planet and the following dialog occurs:

- Green planet: *« You look bad. What's wrong with you? »*

- White planet: *« I don't feel very well. I have caught some disease called mankind »*.

- Green planet: *« Mankind ? Oh, don't worry. I had it too but it goes away by itself … »*.

The exceptional importance of our theme is obvious, the more so as in the context of climate change, the role of insurance is far from negligible, and this is also specifically true for insurance law. Of course, insurance by itself will not solve all problems, but it can bring significant contributions to efforts to reduce some of the causes of climate change, and to offer compensation for some of its effects.

On the scientific level, with special concern for the legal aspects, there is no doubt that the newly created AIDA Climate Change Working Party will have a rich agenda for the years to come.

Prof. Marcel FONTAINE
Honorary President of AIDA
December 2010.

ANNEX I

QUESTIONNAIRE

ON CLIMATE CHANGE

SUBMITTED TO THE NATIONAL AIDA CHAPTERS

Foreword

1. Climate change has been chosen as one of the topics for the AIDA World Congress to be held in Paris in 2010. Thank you for accepting to prepare a national report.

2. This subject is obviously one of great importance, and very much has already been written on it. For an AIDA World Congress, the focus should naturally be on the impact on the insurance sector, and more precisely on the impact on insurance law – a domain in which AIDA can make a significant contribution. When preparing your report, please stress the legal aspects (legislation, regulation, policies, clauses, legal nature of new products, etc…) – even though describing the context will always be necessary.

3. National reports will be particularly useful for such a subject where perceptions of the phenomenon may vary, and mainly, where the feared consequences of climate change can be widely different in the different regions of the world. Please see that your report gives the necessary information about the local context in which it is written (see part A of the questionnaire below).

4. The questionnaire is indicative. Try to cover all points you find relevant for your country, but do not hesitate to include additional information and comments in part C below.

A. Your local context

In your country:

1. What is the degree of awareness of climate change and its consequences :

- in the general public
- in the business sector
- in the insurance industry
- in public authorities ?

2. Which are locally the main expected consequences of climate change (please specify: “not applicable”/”medium risk”/”high risk”):

- floods (including flash floods)
- rise of sea level
- melting of ice, of snow, avalanches
- earthquakes
- storms, tornadoes
- heat waves, draught, fires
- spread of diseases
- other adverse effects
- any favourable consequences ?

3. Which economic sectors, critical for your country, could be particularly affected:

- agriculture
- fisheries
- forestry
- energy
- industry (which ?)
- tourism

- others?

4. Have some concrete measures already been taken or envisaged (other than in insurance sector – see B below):

- legislation, regulation
- initiatives of economic agents
- others?

5. How much is your country involved in international efforts and initiatives related to climate change:

- Kyoto Protocol
- International Strategy for Disaster reduction, Hyogo Framework
- National Platforms
- Emission trading systems
- others?

6. Please provide references to literature on climate change concerning your country.

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)
    - Buildings
    - Business interruption
    - Others (specify)
- Liability
- Transport, marine

- Life, health

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

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
    - "Energy saving", "Green-building" insurance
- 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?

5. ART (Alternative Risk Transfer)

Have any of the following techniques developed in your country in connection with climate change:

- Derivatives
- Swaps
- Cat bonds
- Others?

What is the legal nature of these different products? Can they qualify as "insurance"?

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?

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

C. Any additional information or comments