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# The role of the insurance industry in environmental policy in the Nordic countries





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Sanna Ahvenharju

Ylva Gilbert

Julia Illman

Johan Lunabba

Iivo Vehviläinen

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## **The role of the insurance industry in environmental policy in the Nordic countries**

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Phone: (+47) 22 61 44 00. Fax: (+47) 22 55 65 56

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## Advisory Group

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### **Finland**

Kaarina Huhtinen, Finnish Environment Institute (Helsinki)

Veli-Pekka Kemppinen, If (Helsinki)

### **Norway**

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Tom Anders Stenbro, Tryg (Bergen)

Marcus Zackrisson, Nordic Innovation (Oslo)

### **Sweden**

Mats Nordenskjöld, If (Stockholm)



## Executive summary

In previous studies the possibilities for the policy sector and the insurance industry to interact have been looked at. However, the types of interaction, the benefits and challenges of occurred interaction and the potential benefits from increasing interaction between environmental policy actors and the insurance industry, have not been widely analysed. This study aims to highlight the role of the insurance industry as well as the role of insurance as a tool in environmental policy.

### **The objectives of this study are to:**

- Analyse the links and interaction between environmental policy actors and the insurance industry,
- Identify the needs and forms for improving the benefits of interaction, and
- Assess the potential of using insurance as an environmental policy instrument.

### **The study has achieved these aims by:**

- Defining three types of interaction that typically occur between environmental policy actors and the insurance industry in the Nordic countries
- Examining the challenges and benefits of the identified interaction types
- Identifying ways in which the benefits from interaction can be enhanced
- Discussing what the role of insurance can be in environmental policy implementation
- Identifying potential policy areas where insurance could be used as an effective tool
- Providing recommendations on how interaction could be improved
- Suggesting areas for further research

## Methodology

The study was carried out by reviewing secondary data from publicly available sources in addition to conducting a series of interviews with representatives from environmental administration, the insurance industry (private companies as well as industry associations), researchers and other experts on insurance and environmental policy. A total of 22 interviews were conducted within the scope of this study in addition to consultations with the advisory group.

Three case studies were used to delve in more detail into the interaction and relationships between an environmental policy area and the insurance industry. The cases were selected so as to include different types of environmental risks and different types of actors:

1. Flood risks – includes damage caused *by* the environment and concerns mainly national level actors, but is a current topic in most Nordic countries.
2. Major accident hazard industry – includes high risks and possible damage *to* the environment as well as international level actors.
3. Insurance policies promoting innovation – includes different types of actors from the insurance industry, action to prevent environmental risks by promoting alternative solutions and provides insight into new types of environmental insurance products.

The findings from primary and secondary data collection were validated with the advisory group and other experts.

## **Results and conclusions**

While insurance could be a relevant policy instrument in many areas of environmental policy, there are some areas with more potential than others. Identified areas where insurance could be a viable solution for risk management include:

- Where no policy requirement to reduce risks through specific obligations exists yet
- Where risks involve high costs and lead to the actor being unable to meet these costs
- Where current instruments are deemed ineffective
- Where the role of state compensation is seen as diminishing

These are typically areas where there is little or no existing policy instrument to ensure risk management, where risks may be perceived as high, but there is uncertainty around the likelihood and consequences of risks. In these areas, insurance companies could provide valuable data and analysis to estimate the cost of risks to help policy decision making.

The results indicate that interaction has some clear benefits to offer for the two parties. This study provides insight to the environmental policy sector on how the insurance industry can be utilised within the policy development process and in relation to what issues. For the insurance industry, the research provides a summary of the opportunities and challenges of interaction with the environmental policy sector.

## **Recommendations**

It is recommended that a detailed review of different environmental policy areas is carried out to assess whether insurance could be a viable policy tool. To be of real use to policy makers and the insurance industry, such an assessment should also comparatively address other policy instruments used for risk minimisation and/or mitigation.

It is recommended that a review of the needs and possibilities of data exchange is mapped. Such a map would provide a valuable tool to both parties in ensuring that the maximum benefits from interaction at all levels can be achieved.

It is recommended the practices that Nordic insurance companies have initiated with municipalities and counties on climate change risks are tried in other environmental risk areas as well.

It is recommended that a Nordic Conference on environmental risks and environmental policy is organised or that this theme is added to an existing conference. To meet objectives of enhancing understanding of risk management challenges, the conference should have a broad focus on risk management as part of environmental policy, aiming to exchange information and experiences of the effectiveness of different policy instruments.



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# 1 Introduction

The aim of environmental policy can be summarised as to preserve and improve the quality of the environment and promote sustainable development. In practice, environmental policy is inevitably a compromise between the overarching aims of environmental policy and other societal interests. Environmental policy tends to be cross-cutting, and will both effect and be affected by other policy areas, such as industrial and trade policy, health and safety policy, innovation policy, transport policy or energy policy. The balancing act between the aims of environmental policy and other societal interests - such as promoting industrial developments or developing land resources - is evident at all stages of developing and implementing environmental policy.

From the insurance industry's perspective, environmental policy is part of the overall regulatory framework that sets the principles on the basis of which judicial or monetary liabilities and responsibilities for risks are determined. Environmental policy creates the framework for how, when and what type of environmental risks are covered by public funds (e.g. flood damage, which is covered by public funds in some cases and not in others) and what risks the actors (organisations or private persons) have to either carry themselves or insure against. The insurance industry assesses the responsibilities set by the regulatory framework (who has to pay) and the associated risks (how likely is it to happen and what will it cost). Based on the results, insurance companies determine what type of environmental risks they will insure, to what price and with what terms and conditions. The actors can then choose whether to carry the risk themselves or to take out an insurance policy<sup>1</sup>. The insurance industry's decisions on pricing etc. may influence the decisions made by different actors, thereby leading to either:

- Reduced effects of realised risks, if the actor chooses to cover the risk through insurance, the purpose is to ensure sufficient funds are available to cover potential cost of realised risks to and from the environment.
- Reduced risk of environmental incidents occurring, if the actor chooses to actively work to reduce risks in order to gain a reduction in insurance fees.
- Reduced environmental risk, if the actor chooses to not engage in a particular high risk activity due to insurance conditions or non-availability of insurance.
- Increased environmental risk, if actors choose to avoid the cost of insurance policies but still go ahead with the activity, thereby potentially leaving them without the necessary capital for remediation work if their risks are realised.

In addition, insurance companies often provide advice on how to reduce risks in practice.

There are therefore clear, potential benefits for policy makers from taking into account the consequences of policy decisions on the terms and conditions as well as price and availability of insur-

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<sup>1</sup> To avoid potential confusion in relation to the word 'policy', in this report all references to an insurance policy is always given as "insurance policy". Any other use of the word 'policy' refers to the legal and strategic framework governing a particular area.

ance for environmental damage and liability. Whilst the overarching polluter pays principle is a fundamental part of environmental policy, few regulatory areas actually specify how to make sure sufficient funds are available in case of damage. In particular, the requirements stemming from Directive 2004/35/CE of the European Parliament and of the Council on unlimited liability for environmental damage leaves it up to individual Member States to decide whether to introduce a system of mandatory financial security at a national level. To date, eight Member States have introduced mandatory financial security, entering into force at different dates up to 2014; none of the Nordic countries have done so. These systems are subject to risk assessment of relevant sectors and operators, and are dependent on various national implementing provisions providing for issues such as ceilings, exemptions, etc. The remaining Member States, including the Nordic countries, rely on voluntary financial security.<sup>2</sup> There are, however, examples of environmental regulations within the Nordic countries of mandatory environmental liability insurance in order to be granted a permit to operate.

While some previous studies have looked at the possibilities for interaction<sup>3</sup>, no comprehensive research exists on the benefits and challenges of occurred interaction, channels of interaction or the potential benefits from increasing interaction between environmental authorities and the insurance industry. Neither has the generic role of the insurance industry as a stakeholder and actor in the environmental policy framework been a prominent area of research. The aim of this study was to highlight the role of insurance and the insurance industry in environmental policy. The objectives set for this study were to:

- Analyse the links and interaction between environmental policy actors and the insurance industry,
- Identify the needs and forms for improving the benefits of interaction, and
- Assess the potential of using insurance as an environmental policy instrument.

Areas where interaction between the environmental policy sector and insurance industry could potentially bring benefits to both parties were identified and the current practices and potential for enhancing the benefits from interaction were analysed. The environmental policy areas covered include policy areas aimed at reducing risks to the environment through industrial or other operations (e.g. pollution control, land use planning) as well as policy areas setting the framework for responsibilities for damage to property caused by the environment (e.g. storms, floods etc.). The insurance types covered are limited to property and liability insurance.

At the request of the Nordic Council of Ministers, Nordic Innovation initiated this study that was carried out by Gaia Consulting Ltd in the summer and autumn of 2011. The study was guided by a advisory group consisting of insurance industry representatives from the Nordic countries led by Mr. Marcus Zackrisson (Nordic Innovation) and Ms. Kaarina Huhtinen (Finnish Environment Institute).

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<sup>2</sup> European Commission (2010)

<sup>3</sup> See, for example, Geneva Association (2009), Dlugolecki (2000), Kaatra et al. (2006), Comité Européen Des Assurances (2007)

## 2 Background, analytical framework and study approach

### 2.1 Environmental policy and risk

The aim of environmental policy is to manage human activities with a view to prevent, reduce, or mitigate harmful effects on nature and natural resources, and to ensure that man-made changes to the environment would not have harmful effects on humans<sup>4</sup>. In principle, environmental impacts can result from almost any kind of human activity and consequently one of the central features of environmental policy is that it relates to all sectors.

Environmental resources are often common resources such as water, land, air or for example fish, and thus they typify the dilemma of governing common resources<sup>5</sup>. Already in 1968, Hardin put forward that common resources such as the seas are exploited and overused, since use or exploitation is not related to ownership. As there is no specific owner who would carry – and care about – the costs and implications of pollution of for example air, these costs are in the end carried by society. The deficiencies of market-based mechanisms to protect such natural resources have long been addressed through environmental policy, including the usage of instruments such as regulations, taxes, fees, permits, quotas etc. In the EU, the polluter pays principle has been firmly established in the regulatory framework, including the Directive 2004/35 EC on environmental liability with regard to the prevention and remedying of environmental damage.

When looking at the potential for and benefits of interaction between environmental policy makers and the insurance industry, the common denominator is minimisation of environmental risks and the consequences of unwanted incidents. Two types of environmental risks can be identified:

1. **Risks of damage caused by the environment:** Damage caused *by* the environment can result from natural phenomena such as storms, floods, tsunamis, earthquakes or volcanic emissions. The events are, in some cases, frequent enough to be predicted on a statistical basis (e.g. spring floods, autumn storms).
2. **Risks of damage to the environment:** Long-term or gradually caused damage *to* the environment typically originates from the combined effects of many actors' emissions or discharges, wear and tear from use (e.g. traffic) as well as noise or light pollution in cities and overuse of eco-systems (e.g. overfishing). Such damage can often be hard to quantify and relate to single actors (e.g. it is often difficult to appoint liability). Single point long term pollution by for example industrial actors is largely regulated through a system of environmental permits setting discharge and emission limits. Accidental discharges, emissions or leakages of pollutants as well as other incidents (fire, explosion) lead to acute damages.

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<sup>4</sup> McCormick (2001)

<sup>5</sup> See for example Ostrom (1990); Hardin (1968)

When compared to combined effects by many actors, such single point releases – both continuous and accidental - are both easier to identify and quantify (in terms of unwanted effects on air, water, soil as well as on individual species or ecosystems) and to apportion responsibility and liability for damages.

Environmental policy addresses both types of risks and lays out the rules and conditions for different actions or operations. For example, land use planning policy determines where you can build (e.g. how far from a river), building regulations determine how you can build (e.g. sewage and drainage solutions; roof carrying capacity), and flood policy determines who pays for the damage to the house if it is flooded (state or house owner). At the same time, policy may stipulate specific requirements for municipalities or energy suppliers to ensure the distribution of electricity after a storm. Equally, environmental policy sets the conditions under which a plant where hazardous materials are stored or used can operate (e.g. an environmental permit sets conditions for how to manage the operations and what kind of technology has to be used and where). From the insurance industry's point of view, the relevant insurance policies are environmental liability insurance (damage caused to the environment) and property insurance (damages caused by the environment).

If environmental policy is viewed from an insurance perspective, one could say that environmental policy aims to shape the framework within which the activities of individual insurance policy holders, insurers, re-insurers and other actors take place, by making it attractive in financial and judiciary terms to

- minimize both the potential frequency and consequences of risk to the environment, and
- encourage preventive actions to minimise damages caused by natural phenomena.

Environmental policy does this by defining responsibilities, setting standards for environmental performance, and requiring preventive actions as well as determining the societal responsibility for damage remediation in the case of natural phenomena.

One instrument available to policy makers is mandatory environmental liability or property insurance. The cost of insurance will then act as an incentive to reduce the risks. Another option is to provide state support, in particular in relation to damages caused by natural phenomena such as floods or storms, either through subsidized insurance rates or by covering the damage through state funds. This type of policy can lead to reduced incentive for actors to reduce risk, or even to ignore the risk. An example often mentioned is where flood damages to actors are compensated by the state. A third policy option is where the state partners with insurance companies to insure certain risks, which are either unpredictable or very costly. In such cases the part insured by the market is generally clearly defined and limited. Examples include earthquake insurance, terrorism insurance and nuclear liability risk insurance.<sup>6</sup>

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<sup>6</sup> Swiss Re (2011)

## **2.2 The environmental administration**

The environmental administration can be divided into four different groups based on whether their responsibilities mainly relate to policy making, enforcement or accident and incident investigation and mitigation (see Figure 2.1).

The first group are the policy makers and includes the environmental legislators and regulators, i.e. the parliament and ministries. In this work, the focus is on the civil servant side, e.g. the environmental administration that prepares the details of regulations rather than the politically elected parliament that approves the regulations. This group both defines environmental policies and determines how and by whom environmental policy is going to be enforced.

The second group are the enforcing authorities, i.e. those authorities that evaluate and issue environmental permits and/or monitor compliance with regulations. These include national, regional and local level environmental authorities, depending on the type and level of environmental risk.

The third type of authorities is those that deal with incidents if and when they happen. These authorities have environmental specialists that typically work closely with other specialists, such as rescue services. The fourth group consists of independent bodies that evaluate the incidents, research the causes, assess impacts and make recommendations for improvements.

In some organisations, the boundaries between the second, third and fourth groups can be blurred and some authorities may carry out more than one of these tasks. All of the groups can influence the actors either directly or through other actors. Authorities at many of the policy levels also have departments or institutes that perform research.

Within the overall environmental policy scene, interaction with the insurance industry could occur with all of these groups in various ways. Within this study, the focus is on environmental administration and policy making, i.e. the first two groups (shown in darker green in Figure 2.1). This way the focus is firmly on the policy making and policy enforcing aspects related to environmental risks and their prevention.

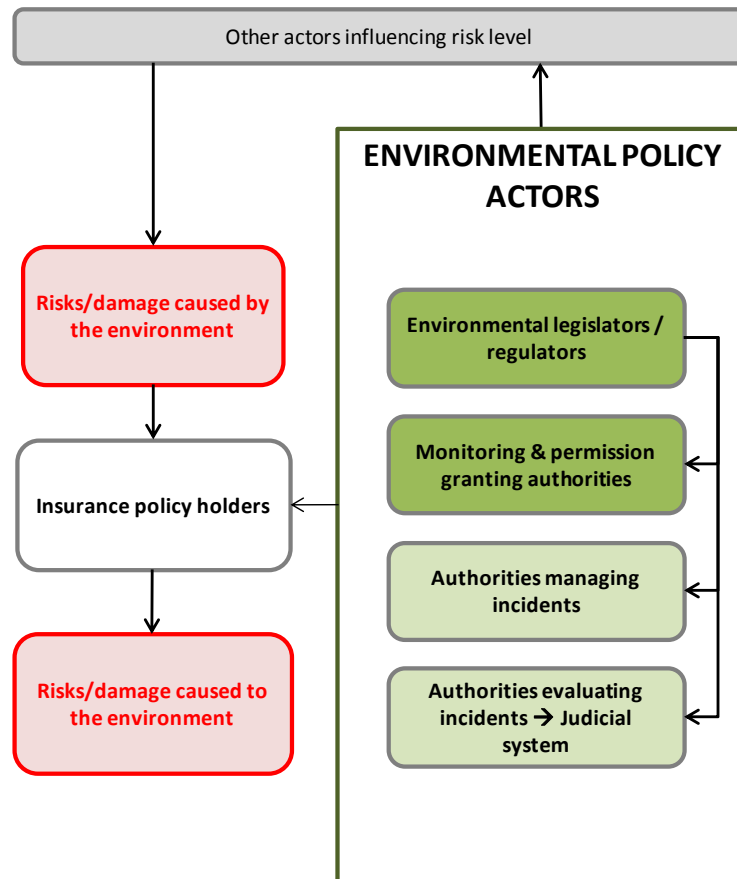


Figure 2.1 The relationship between risks, insurance policy holders and environmental policy actors

### 2.3 The insurance industry and environmental risks

Insurance is a product sold by insurance companies to actors in the market, who then become insurance policy holders. Insurance is a means of protecting the insured against the financial costs of unwanted events, such as storms, floods or spills. In essence, insurance reimburses incurred losses in exchange for prepaid premiums. Notably, states are also involved in property insurance, where the rationale for involvement can be either a very large loss potential (e.g. natural catastrophes, such as earthquakes) or a policy to ensure that property insurance is affordable for all homeowners.<sup>7</sup>

Households, private companies and other organizations can use insurance to safeguard against both damage to property caused *by* the environment, and liability for damage caused *to* the environment. Insurance can also be taken to offer protection against long-term environmental damage and liabilities that may not be immediately visible. This latter area is particularly often related to industrial sector activities. In this study the focus is solely on property and liability insurances. Other insurance areas, such as life insurance, are not included in the study.

<sup>7</sup> Swiss Re (2011)



The insurance company provides coverage for unexpected and unforeseen losses against a fee, i.e. the insurance premium. The insurance premium is set by market-based mechanisms, where the price is determined by how much the insurance company expects have to pay out for losses. The premiums paid to the insurance company are invested so as to provide the necessary capital in case of losses. By giving the risk a price, the insurance industry encourages risk reduction.

Insurance premiums are calculated based on actuarial<sup>8</sup> techniques, i.e. based on historical data and through estimating the likelihoods and sizes of potential claims. Premiums are affected by a multitude of factors, including the monetary value of a potential loss, the probability of such a loss, and the terms and conditions of the insurance policy in place<sup>9</sup>.

In general, high insurance premiums for a particular activity or property type indicate that the risks for that activity or property type are high. High premiums can lead to policy holders investing in active risk reduction in order to decrease insurance premiums. Alternatively, the policy holder may choose to withdraw completely from the high-risk activity, or decide to carry the risks themselves.

Through insurance policy terms and conditions, the insurance companies can also define mandatory risk reduction measures i.e. measures that the policy holder must carry out to prevent or contain risks. For example, in order for certain property damages from floods to be covered by insurance, an insurance company can state in its policy conditions that certain technical standards must be adhered to in installation or construction activities for flood water drainage.

Actors may also in some cases be protected against risk through other means. For example, the Norwegian National Fund for Natural Damage Assistance provides compensation for natural damages in cases where insurance against such damage is not available through private insurance<sup>10</sup>. On the other hand, in Finland the public debate on the role of the state in paying for damage has been heated. Whilst insurance companies in some countries may price flood insurance premiums based on location and may well refuse to insure properties in certain areas, this is not the case in for example Finland or Sweden today. Whether this is due to public opinion or influence from the environmental policy sector to ensure that households can still get affordable insurance, is open.

If viewed from a theoretical point of view, a particular activity is worth doing if the benefits of the activity are greater than the costs. The cost estimates should include estimates of the cost of risk. One way of making sure that the financial consequences of a realised risk are not too high to the actor, is to transfer the risk to the insurance company in return for premiums paid. If no insurance is available, the activity can still be attractive if sufficient risk prevention can be achieved, thereby reducing the cost of risk. Alternatively, the decision may be to not carry out the activity at all, or if the potential gain is seen as high enough, to carry the risk on one's own. The availability of insurance is in essence a way of "outsourcing" some of the economic risk to the insurance company.

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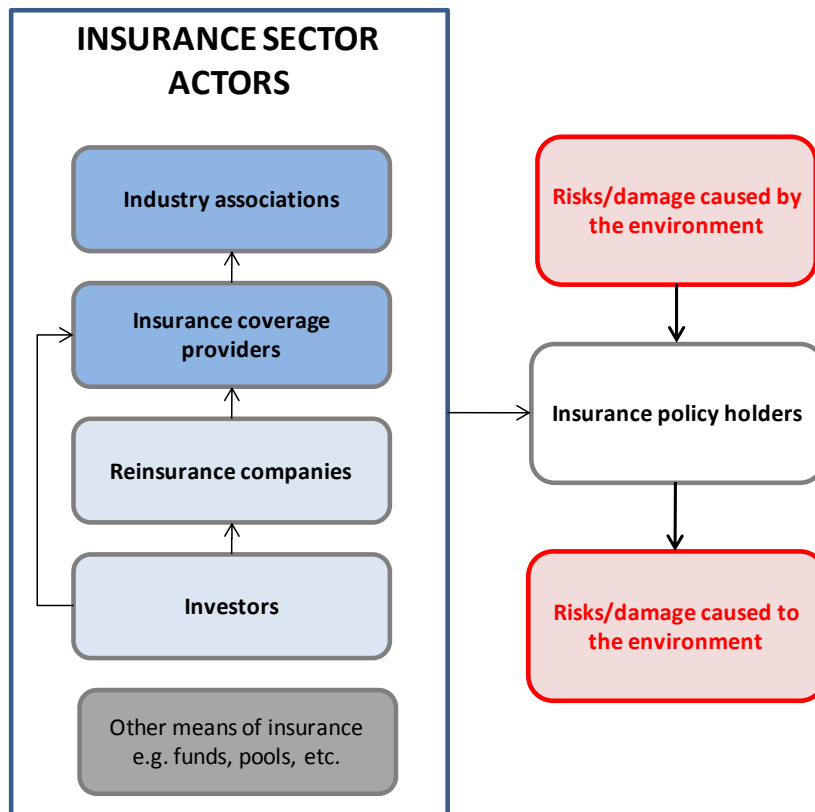
<sup>8</sup> Actuarial science is the discipline that applies mathematical and statistical methods to assess risk in the insurance and finance industries.

<sup>9</sup> In addition, insurance premium costs are affected by the cost of capital, operational efficiency and profit margins of the insurance companies, among other things.

<sup>10</sup> Comité Européen Des Assurances (2005)

Catastrophic events such as major storms, earthquakes, or oil spills can create simultaneous insurance claims too expensive to bear for a single insurance company. In order to protect themselves from such large losses, insurance companies in turn insure themselves (re-insurance). Reinsurance companies either have adequate funds to cover large losses or alternatively the insurance is covered by selling the reinsurance liability directly to investors via various funding schemes. The value chain described is illustrated in Figure 2.2.

Although availability of reinsurance capital is crucial for the operation of the insurance market, the focus in this study is on industry associations and insurance companies, shown in darker blue in Figure 2.2. The choice was based on the assumption that companies interacting directly with the policy holder could also interact either directly or through industry associations with the environmental administration at the national, regional, and local level. The focus supports the aim to identify and analyse interaction between the different actors.



**Figure 2.2 Insurance industry value chain and its role in reducing environmental risks**

## **2.4 The analytical framework**

The analysis focuses on existing and potential interaction and dialogue between environmental policy actors and the insurance industry. The two parts of the analytical framework were presented in the previous sections (see Figures 2.1 and 2.2), and the full framework used in this study for analysing interaction and the associated challenges and benefits is illustrated in Figure 2.3.

The framework allows a systematic look at how the different actors influence the risk to and from the environment, manifested through the choices made and actions taken by the actors, who may or

may not become policy holders. Whilst the framework allows looking at the very interesting topic of how different environmental policy or insurance products can jointly or separately shape the overall environmental risk level, in this study the focus was placed on the interaction between the two actors under scrutiny. The potentials for impacts are briefly mentioned in places, but no in depth impact analysis has been made in this study.

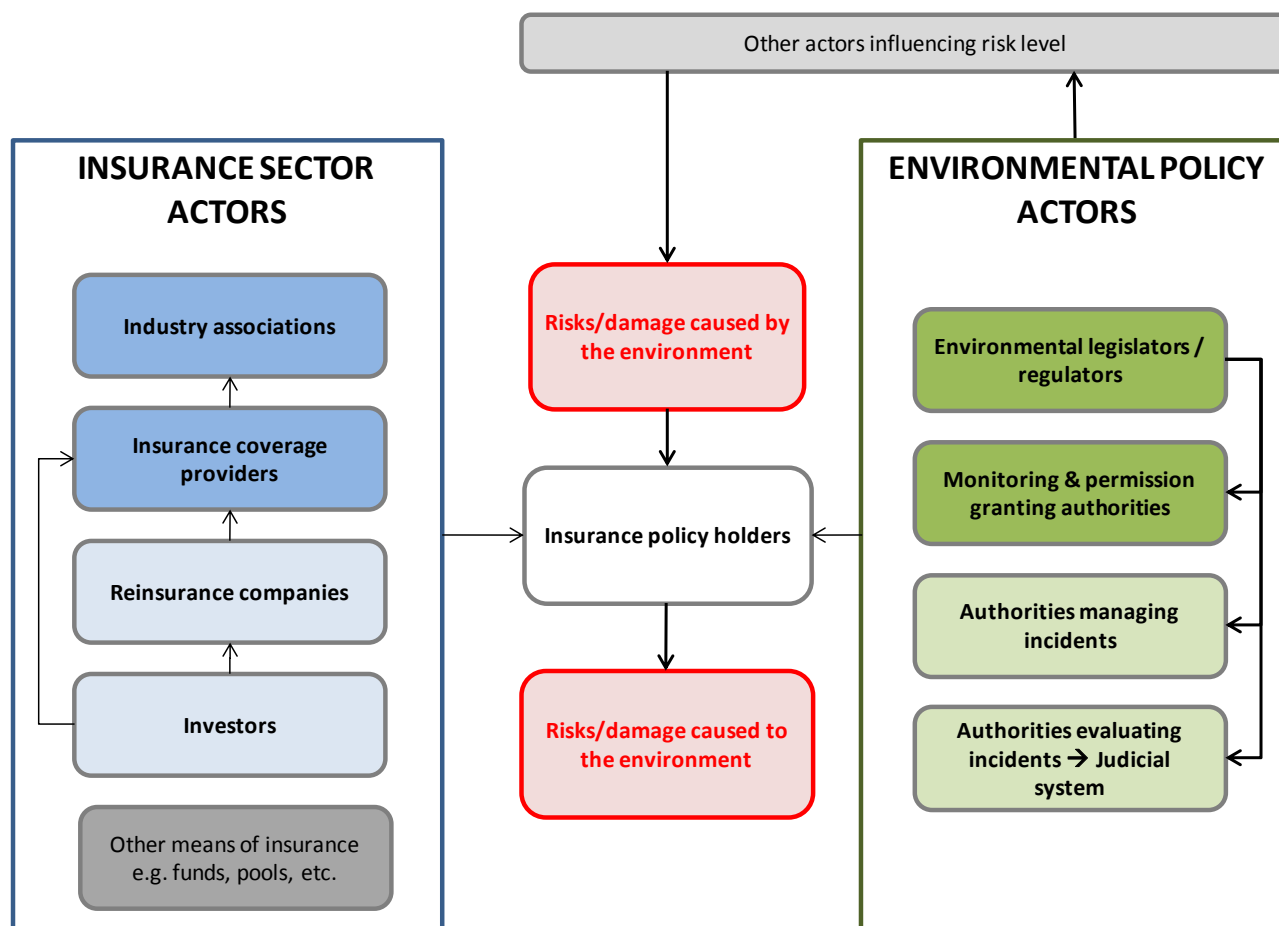


Figure 2.3 Framework for analysing the relationship between

## 2.5 The study objectives

The interaction and potential for interaction has been analysed through three main objectives with associated research questions.

### ***Objective 1: Analyse links and interaction between environmental policy and insurance industry***

In addition to identifying who is involved in interaction, it is also important to consider *how* the interaction between the stakeholders takes place. Much of the environmental policy design and

stakeholder involvement has become institutionalized during the past decades<sup>11</sup>. The involvement of market participants in policy design is, however, a more modern development. The insurance industry has, by definition, a clear business interest in how property damage and liability is defined by the regulatory framework. Yet insurance companies have varying capacity and interest to be directly involved with the environmental policy sector. Typically many policy making questions are addressed by industry associations. Both parties generate a large amount of data, which could potentially be useful for the other. Interaction clearly depend on why interaction is done, e.g. is it to shape policy or is it to find practical means of implementing policy at, for example, a local or regional level. Within this study particular attention was paid to categorising different types of interaction and analysing how and with whom the parties involved interact within these categories.

***Objective 2: Identify needs and forms for improvement of benefits of interaction***

Successful interaction between any two parties depends on the types of actors involved and types of processes that are being followed. As the overarching aim of both parties under scrutiny is to reduce risks<sup>12</sup>, active interaction between the parties could bring new insight into how this goal could be achieved. Within this study, the current benefits and challenges of different forms of interaction were analysed in addition to the characteristics of both parties that may hinder or enhance interaction. The specific aim was to identify interaction that should be strengthened and encouraged in order to achieve overall environmental risk reduction.

***Objective 3: Assess the potential of using insurance as an environmental policy instrument***

Insurance can be and is used as a tool in the environmental policy instrument palette, but how effective insurance as a policy instrument is appears to be somewhat less clear. It also depends on whether the policy area is dealing with risks caused by the environment (e.g. floods, storms) or risks caused to the environment (e.g. liability, polluter pays principle). In some cases strict insurance policy terms and conditions may be more efficient than stringent regulation, whereas in other cases it may be seen as a societal responsibility to deal with certain incidents. Within this study, the possibilities for making more use of insurance as an effective environmental policy tool are discussed. This discussion brings a new twist to the old debate on what are the most effective mechanisms to reduce risks – regulation or market-based instruments.

## **2.6 Information sources and methodology**

The study was carried out by reviewing secondary data from publicly available sources. Primary data was collated through a series of interviews with representatives from the environmental administration, the insurance industry (private companies as well as industry associations), researchers and other experts on insurance and environmental policy. A total of 22 interviews were conducted and a full list of interviewees can be found in Appendix 2. In addition, consultations with the advisory group were organised in the beginning of the study to finalise the objectives and methodology

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<sup>11</sup> Arts, Leroy, and van Tatenhove (2006)

<sup>12</sup> Mills (2009)

and at the end of the study to validate the results. The data was analysed qualitatively using the presented analytical framework. No quantitative analyses were included.

Three case studies were used to delve in more detail into the interaction and the relationships between a specific environmental policy area and the insurance industry. The cases were selected to include different types of environmental risks and different types of actors:

1. Flood risks – addressing damage caused *by* the environment to property. It involves both national and regional level actors in the policy sector and is a current topic for most Nordic countries. Differences in approaches include the level of state involvement in paying for damage.
2. Major accident hazard industry – addressing damage *to* the environment. The case was selected to allow a discussion on the protection of the commons against environmental damage and the use of obligatory insurance with respect to environmental liability.
3. Insurance products promoting sustainability – addressing how the insurance industry can react to environmental policy by formulating different products. The case includes different types of actors from the insurance industry and discusses reduction of emissions to air through using different pricing mechanisms by the insurance industry.

In addition, examples of actual environmental policy or insurance products are included throughout the text to illustrate practical applications of various types of interaction.

The findings and conclusions of this study are based on the reviewed literature and the conducted interviews. The results should therefore be taken as indicative of overall status rather than an exhaustive analysis of current practices.



## 3 Interaction in practice

### 3.1 Drivers and barriers for interaction

Insurance companies are businesses, and aim to sell their products at a profit. Insurance products for damage caused by the environment to properties and environmental liability are no different from other products. Insurance premiums and terms and conditions, when differentiated by risk level, act as an incentive for policy holders to reduce risks. At the same time, the insurance industry wants to minimise the expenses incurred from claims. The insurance industry therefore shares the goal of environmental risk reduction with the environmental policy sector. The potential benefits for each party can vary considerably by policy area, and the potential benefits of interaction are not always very clear to all parties. In the following, the drivers and barriers to interaction are discussed.

#### 3.1.1 Drivers

**Driver for insurance industry: to know what is coming.** A clear driver for the insurance industry to interact with the policy sector was identified by interviewees as the potential to gain information from policy actors on future environmental policy. This way the insurance company can plan and adjust their activities in anticipation of future environmental policy<sup>13</sup>.

**Driver for insurance industry: to influence what is coming.** The insurance industry has a wealth of knowledge on risks, and can provide data on for example what type of risks are not insurable. Interacting with the environmental policy sector when, for example, future policy on property insurance (e.g. flood, storm) is determined, gives the insurance industry the possibility to ensure the discussion includes consideration of market forces on risk and risk acceptance by society.

**Driver for policy sector: the potential of using better quantified data on risk.** Previous research has focused on highlighting possibilities for interaction and providing recommendations for specific policy areas where interaction might add value<sup>14</sup>. These recommendations include, for example, raising risk awareness among the public, taking risk into account in land use planning, risk mapping, and developing climate change mitigation measures through building and technical standards<sup>15</sup>. Most of these recommendations relate to quantifying risks, a particular forte of the insurance industry. Arguably the need for interaction is in such cases being driven by the benefit policy actors can achieve from using better and/or complementary data on risk expectations and consequence predictions when making policy decisions<sup>16</sup>.

**Driver for policy sector: enhanced effectiveness of environmental policy.** According to the Geneva Association, active interaction aimed at sharing data between the insurance industry and envi-

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<sup>13</sup> Interview data

<sup>14</sup> See, for example, Geneva Association (2009), Dlugolecki (2000), Kaatra et al. (2006), Comité Européen Des Assurances (2007)

<sup>15</sup> See for example Comité Européen Des Assurances (2007)

<sup>16</sup> Interview data

ronmental policy actors could lead to a more coordinated approach to prevent and reduce risks as well as help to improve the effectiveness of environmental policy<sup>17</sup>. Active discussions and consideration of data from both parties could be particularly useful for policy makers when choosing policy instruments. The driver for policy makers would then be that interaction could help to identify what type of environmental risk can be dealt with through insurance solutions (mandatory or voluntary) and which issues require other measures. This could help policy makers achieve an optimum balance between market-based solutions and regulatory mechanisms for risk control. For example, in a study on underground storage tanks in the United States, it was concluded that insurance was a more effective mechanism for risk control when compared with damage-based fines or risk management mandates with pre-damage fines<sup>18</sup>.

Environmental liability can also lead to smaller or less solvent companies defaulting payment of damage-based fines as well as for the cost of clean up through bankruptcy. Regulators also lack the resources to monitor risk management mandates within every company, which severely limits the effectiveness of pre-damage fines. The burden on the regulator is much lower if all that has to be done is to confirm that a company has mandatory environmental liability insurance. In general, it would seem more effective from a societal point of view to ensure the funds are available in the case of damage caused to the environment than to impose fines after an incident. This is particularly relevant in the case of the Directive 2004/35 EC on environmental liability, where the means of ensuring that the necessary funds are available in case of an incident are still far from being determined in all EU Member States<sup>19</sup>.

### **3.1.2 Barriers**

**Barrier to policy sector: ensuring no ties with industry.** A fundamental barrier to close interaction is the general tendency to regard close ties between the public and private sector at the level of individual politicians or civil servants as something negative<sup>20</sup>.

**Barriers to both: available time and timeframes.** Another potential barrier is the difference between decision making timeframes. Elections and other political cycles can influence the timeframes of commitments made by decision makers. For example, in Denmark climate change was clearly on the agenda around the time of the 15<sup>th</sup> Conference of the Parties held in Copenhagen in 2009, but now that elections are being held in 2011, climate change is barely being discussed<sup>21</sup>. Policy decision making is often a much longer process than insurance companies can endure in their own decision making and as a result policy can be seen as lagging behind. This does not provide a lot of incentive for insurance companies to interact.

**Barriers to both: lack of knowledge.** A lack of grasping what the other party could bring to the table can influence the engagement and activeness of interaction. Comments given by some inter-

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<sup>17</sup> Geneva Association (2009)

<sup>18</sup> Yin, Pfaff and Kunreuther (2011)

<sup>19</sup> COM (2010)

<sup>20</sup> Advisory Group (10.5.2011)

<sup>21</sup> Interview data



viewees suggest that the more active the private sector is in managing environmental impacts, the more inclined they are to engage with policy makers on environmental issues and vice versa.<sup>22</sup> At the same time, the potential gains that could be had from interaction with the insurance industry are far from clear.

**Barrier to both: differences in preferred types of interaction.** For the environmental policy sector, there is a clearly established need to interact formally with different industries as part of the formal policy making process. For example, regulations are reviewed with industry through formal procedures, and the time available for civil servants to engage in this interaction is specified. On the other hand, the insurance industry tends to prefer less formal interaction, where they can get direct feedback on specific issues. The allocation of time to such interaction is therefore easy for the insurance industry, whereas time for such interaction is more limited for the civil servants.

### **3.1.3 Factors influencing drivers and barriers**

There is a clear difference in interaction between the insurance industry and the level of environmental administration. Many interviewees suggested that interaction is somewhat easier and less formal on a regional or local level. For example, in Sweden and Denmark, interaction between municipalities and insurance companies is seen as being more successful in the area of climate change when compared with interaction between insurance companies and national level policy makers on the same issue. Municipalities are implementing national policies and regulations and are often able to take rapid action when compared with national level decision making. Consequently the barrier for interaction appears to be lower. Some differences can also be recognised between international and national levels: it is considered easy to bring together different parties on an international level to discuss principles, but when national level actions are required, interests to actually act on particular environmental risks inevitably have to be balanced with other policy priorities.<sup>23</sup>

The type of environmental risk also appears to influence the strength of the drivers and barriers. Interaction in areas relating to such risks where there is a history of heated debate and friction between stakeholders is seen as more difficult and therefore the barrier to interact is higher. Emerging risks or risks with an established consensus (e.g. environmental liability) tend to raise fewer barriers to interaction. Interestingly, issues related to climate change as a whole<sup>24</sup> appear to raise fewer barriers than issues related to particular consequences of climate change (e.g. increased floods, storms).

## **3.2 Case 1: Insurance and policy related to flood risks**

### **3.2.1 Background**

Flooding is a prevalent natural phenomenon around the globe. In recent years, flooding has caused severe infrastructural and economical damage in the Nordic area. These floods have mainly been

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<sup>22</sup> Interview data

<sup>23</sup> Interview data

<sup>24</sup> Interview data

caused by torrential rainfall or rapid melting of snow and ice in spring, leading to rivers bursting their boundaries.

Overall societal protection and reduction of exposure to flooding is very much a public sector issue. For example, preventive measures are often expensive (e.g. sea defences, renewal of urban storm water drains) and often flooding is made worse by the spread of urban areas and the covering of old floodplains with impenetrable materials. The strongest instrument for risk prevention is indubitably land use planning policy. Land use planning can be used to restrict building on floodplains and in other vulnerable areas, thereby preventing risk to society and protecting individuals from damages caused by flooding. Land use planning can also be used effectively to design storm water run offs. However, land use planning is mainly relevant to new developments.

The EU 2007/60 Flood Directive requires all Member States to a) assess if water courses and coast lines are at risk from flooding, b) to map the flood extent and assets and humans at risk in these areas and c) to take adequate and coordinated measures to reduce this flood risk<sup>25</sup>. It thereby directly impacts land use planning policy and is expected to lead to an increase in public awareness of flood risks as well as strengthen and coordinate public sector investments into preventive measures.

Depending on the general policy on government compensation schemes for flooding and the market penetration of commercial insurers, two distinct systems can be recognised.

- In a market driven system, insurance is taken out by policy holders before an event. Then the premiums collected in advance are used to cover damages (ex-ante measures). In such market areas the availability, price and conditions for flood insurance in general reflects the cost of risk. Increased premiums, harsher conditions or even non-availability of insurance can influence decisions on what type and where new developments go ahead as well as what type and extent of preventive measures are taken.
- The other type of system is based on the damages being covered after the event (ex-post measures), including donations, credits or more prevalently in the EU, by state provided compensation schemes, i.e. the actor that has suffered damage is compensated by the state after the event. Such ex-post (after the event) assistance provides "insurance", the price of which is not connected to each insurance policy holder's risk. There is then less incentive to invest in risk reduction measures and take precautions.

Within the European Union (EU) and the Nordic countries, the role and penetration of market based ex-ante insurance is dependent on at least legislation, previous history of how floods have been compensated and public awareness of flood risk expectancy.<sup>26</sup> After the heavy floods in Europe in August 2002, the advantages and disadvantages of these two systems of compensating flood damage were vigorously debated. Strong criticism was voiced against government run ex-post compensation systems. Germany, Austria and Czech Republic suffered the largest financial losses in this event (totally approx. 15 billion Euros) and due to low risk awareness and low market penetration,

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<sup>25</sup> Directive 2007/60/EC on the assessment and management of flood risks that entered into force on 26 November 2007; EC Environment web pages ([http://ec.europa.eu/environment/water/flood\\_risk/index.htm](http://ec.europa.eu/environment/water/flood_risk/index.htm))

<sup>26</sup> Interview data

commercial insurance only carried between 10 % and 20 % of the economic losses. Notably, if the expectancy is that the state covers damages without any financial implications to the property owner, there is little incentive for property owners to reduce risks.<sup>27,28</sup>

### **3.2.2 Insurance and compensation models in the Nordic countries**

In the Nordic countries, as indeed in most of the EU countries, the state does take an active role in ensuring coverage for flood losses. This can be done in several ways. Firstly, the policy can be to regulate compulsory flood insurance. Secondly, the state may collect premiums in advance (ex-ante) through, for example, taxes or specific insurance premiums. Thirdly, the state can compensate damages after the event, and extract the payments from future tax or through budget reservations. Within the Nordic countries, each country has a somewhat different model for compensation of flood damages, specifically in relation to the degree of damages compensated through ex-post measures. The current trend in the Nordic countries is, however, that responsibility for compensation is shifting from the state to property owners, who can then insure the risk ex-ante at the commercial market if they so wish.<sup>29</sup>

- **Mandatory flood insurance combined with national funds for ex-post compensation** is used in Norway and Iceland. In Norway, flood insurance is part of mandatory fire insurance for properties and there is also a national fund for natural disasters for risks that are not insurable. Iceland implements a similar system as Norway and flood insurance costs are partly covered by Iceland Catastrophe Insurance (the government's own insurance company).<sup>30</sup>
- **Voluntary flood insurance** is the system used in Sweden. Any state given compensation is allocated on an *ad hoc* basis.<sup>31, 32</sup>
- **Ex-ante measures in terms of annual tax payments** are applied in Denmark to sea floods. Sea flood compensation funds are collected through taxes charged on private fire insurance. Other types of floods are covered by private insurance policies.
- **Ex-post state compensation** has been the norm in Finland. As a result, the market penetration of private insurance is relatively low.

The ex-ante dominated system in Sweden is characterised by flood insurance being part of the general property insurance. As a consequence, the market penetration of private insurance in Sweden is high. Premiums are not directly risk related.<sup>33</sup> In Finland, the ex-post provision of state compensation for flood damage has led to a lower market penetration, and where there is insurance, the premiums are not directly linked to the risk of that specific party. There is currently an ongoing legisla-

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<sup>27</sup> Menzinger and Brauner (2002)

<sup>28</sup> Interview data

<sup>29</sup> Bouwer, Huitema and Aerts (2007)

<sup>30</sup> Kelman (2011)

<sup>31</sup> Bouwer, Huitema and Aerts (2007)

<sup>32</sup> Skogh (2009)

<sup>33</sup> Skogh (2009)

tive process which aims to privatize flood insurance for buildings and movables. The new law will come into force in January 2014.<sup>34</sup> There has been considerable debate in relation to recent floods on the consequences of shifting compensation responsibility towards the private sector. At least one Nordic insurance company has already introduced a solution that is in accordance with the new law.

In Denmark, flood risk scenarios are somewhat different from the other Nordic countries due to lower elevation and higher sea flood risk. The Danish ex-ante government run scheme of collecting taxes on private fire insurance only extends to flooding caused by the sea. Other types of floods are covered by private insurance policies.<sup>35</sup> The Danish Storm council<sup>36</sup> has suggested introduction of a mandatory insurance system to cover property in high-risk areas, with the premium depending on whether or not the policy holder has taken precautionary measures to prevent damage.<sup>37</sup>

### **3.2.3 Interaction**

Interaction between the insurance industry and policy makers (in the Nordic countries) is not equally active on all administrative levels (See Figure 2.1). At the policy making level, interaction with insurance companies tend to relate to legislative processes. Information sharing and interaction is generally channelled through the insurance associations, which represent the whole insurance industry in the dialogue with the public sector. Collaboration between the environmental policy actors and the insurance industry has been active in relation to the preparation of the EU Flood Directive (2007/60). According to interview data, this collaboration has brought practical benefits to both actors in terms of better understanding of the alternatives and instruments available to the environmental policy sector, and how insurance is one such instrument. The dialogue has included discussions on consequences in terms of risk reduction when using obligatory insurance (as in Norway), voluntary insurance linked to property insurance where risk is not taken into account in premiums (Sweden, Finland) or through risk related premiums as in some other countries.

Individual insurance companies appear to view interaction at the municipal and county level as “easier” and more pragmatic than interaction at the national level with policy makers<sup>38</sup>. A specific forum aimed to ease collaboration around the theme of disaster risk reduction is the example from Sweden, the National Platform for Disaster Risk Reduction, established in 2007. The aim of this platform is to contribute to the prevention and mitigation of consequences of natural disasters by improving coordination at local, regional and national levels. However, insurance companies are not members of the platform, but certain activities such as a series of flood risk mitigation seminars have been acting as meeting points for the insurance industry and the environmental policy sec-

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<sup>34</sup> Finnish Environment Institute (2011)

<sup>35</sup> Bouwer, Huitema and Aerts (2007)

<sup>36</sup> The Danish Storm Council, established by the Minister for Economic and Business Affairs, decides compensation claims pursuant to the Danish Act on storm surges and storm damage.

<sup>37</sup> The Danish Portal for Adaptation to Climate Change (2011)

<sup>38</sup> Interview data

tor.<sup>39,40</sup> One could ask whether there would be additional benefits to be had if the insurance industry was a member of this platform. A more concrete example of practical collaboration between insurance companies and authorities is found in a project on increasing knowledge on flood risks and to discuss cooperation carried out in southern Sweden in 2009-2010. In this project, four regional insurance companies (Länsförsäkringsbolag) together with two county councils and a university jointly commissioned a study on establishing the flood risks of the inland lake Vänern.<sup>41</sup>

Provision of information and data is an essential part of interaction between policy makers and the insurance industry. Often valuable information is shared through public reports and governmental stakeholder web pages. Vice versa insurance companies submit information to the public sector through the insurance associations, such as statistics on insurance claims. This allows aggregation of data and protects the individual insurance companies own data.<sup>42</sup> Insurance companies in turn use data provided by the environmental policy sector, including meteorological data and different studies on effects, trends and predictions on climate change.

### **3.2.4 Lessons learnt and future developments**

At the moment, the requirements of the EU Flood Directive 2007/60 are in the process of being implemented. Accordingly, the environmental policy sector has been heavily engaged in various assessments and models for how to manage flood risks whilst taking into consideration long-term developments, including climate change, as well as sustainable land use practices. An example is the ongoing mapping of flood risk areas. Once all the flood risk areas have been mapped, there will be a clear knowledge base of risk expectancy to which, for example, insurance conditions as well as building standard requirements could be tied.<sup>43</sup>

Whilst the risk assessments required by the directive are ongoing and the actual effects of the directive are yet to be seen, the interaction between the two parties appear to have increased somewhat. According to representatives from the insurance industry, there is still room for more frequent, open and proactive debate on flood risks and liabilities.<sup>44</sup>

When looking at, for example, the specific topic of flooding in urban environment, one of the risk increasing factors is the desire by people to live close to the water without being fully aware of the potential costs of flood risks. The individuals or other actors owning current property in areas of higher than average flood risks are also generally incapable of financing the installation of preventive measures, which often are aimed at protecting an entire area (e.g. large flood defences, setting aside floodplains etc.). Whilst the way land is used is part of the environmental policy remit, the

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<sup>39</sup> Work is carried out in activities and initiatives, to which the participating authorities have contributed resources, or in activities initiated by the authorities responsible, or through the participation of other stakeholders. Activities can take the form of, for example, seminars, studies or projects. See the Swedish Civil Contingencies Agency (2010)

<sup>40</sup> Annual Report 2010 Sweden's National Platform for Disaster Risk Reduction

<sup>41</sup> Bergström et al (2010)

<sup>42</sup> Interview data

<sup>43</sup> Interview data

<sup>44</sup> Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

insurance industry could provide more input into the discussion on the actual costs of flooding. If land use planning policy does not prevent developments in flood prone areas, a possibility that could be explored is the potential for differential insurance premiums, terms and conditions reflecting the actual level of risk in that location. This could include tiered insurance premiums and levels of excess (amount payable by the insured in the event of a loss) and the insurers could potentially demand that different risk control measures have to be implemented before insurance cover is provided. Some high risk areas might even be impossible to insure. At the same time, this kind of differentiation would probably also be extended to existing property.

However, if the state wishes to ensure that affordable insurance is available to all, the potential for public private partnerships in relation to compensation could be further explored. Currently the model of sharing the costs of claims between all policy holder premiums does not specifically deter from reducing risks in flood prone areas. Perhaps the pleasure of living close to the water would need to be compensated through higher insurance premiums.<sup>45</sup>

In particular, interaction between land use planners and insurance companies at the local and regional level appear beneficial. Such interaction has the potential for widening the knowledge base and broadening the aspects taken into account in land use planning decisions, both in relation to new developments and in allocating public investment into preventive measures.

### **3.3 Case 2: Major accident hazard industry**

#### **3.3.1 Background**

This case study looks at the interaction between environmental policy and the insurance industry in relation to liabilities arising from accidental pollution of the environment. In particular, interaction initiated by or addressing the potential to cause widespread or long lasting environmental damage to common resources are analysed. In view of the much reported major accident in the Gulf of Mexico in 2010, the offshore oil and gas industry is used as an example of how interaction can change and develop due to a major environmental incident. The potential for learning from the incident and instigating more and better interaction between the environmental policy sector, the insurance industry and the insured industry itself is explored.

In the EU, Major Accident Hazard Industries are identified through the Seveso II Directive<sup>46</sup>, based on the type and amount of chemicals any industrial plant uses, stores or handles. A major accident in such an industry is then defined as involving uncontrolled development of an incident, chemicals listed in the Directive and leading to serious damage to human health, the environment or property<sup>47</sup>. There are many industrial plants ranging from refineries to pulp and paper mills, from paint manufacturing to chemical industries that have the potential to initiate such a major accident in the Nordic countries. Whilst few such major accidents with truly major consequences have occurred in

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<sup>45</sup> Interview data

<sup>46</sup> 96/82/EC, as amended by 2003/1005/CE

<sup>47</sup> MAHB: New Guidance on the Preparation of a Safety Report to meet the Requirements of Directive 96/82/EC as amended by Directive 2003/105/EC (Seveso II)

the Nordic countries, examples within the EU since the turn of the century include the AZF Fertiliser Factory Explosion in September 2001 in Toulouse, France (30 killed, total insured costs some 1.4 billion EUR, complete destruction of the plant and surrounding area including hundreds of houses)<sup>48</sup>, the Buncefield oil depot fire in Hertfordshire, UK in December 2005 (43 injured and companies fined some 5.3 million GBP, significant damage to properties in the vicinity, the fire burned for several days, emitting large clouds of black smoke into the atmosphere<sup>49,50</sup>) and Enschede Fireworks Disaster in May 2000 (Netherlands 22 people killed; a 40 hectare area destroyed including 400 houses, material loss of some 500 million EUR)<sup>51</sup>.

Unlike onshore plants, the offshore industry in the EU is not directly regulated by the Seveso II Directive, but for example the Norwegian Petroleum Act has many similarities to the Directive. Even though the offshore industry has few operators and mainly concerns Norway and Denmark, the offshore environmental regulations are *de facto* a means of governing a common environment and applying the polluter pays principle to a specific industry.

Oil companies tend to operate on a global scale, and environmental lessons learnt are often transferred to operations in other areas. Accidents in one part of the globe can also directly affect environmental policy in other areas. The most recent major environmental disaster in the offshore industry is the largest accidental marine oil spill caused by a major accident hazard industry. A blowout at the Deepwater Horizon rig at the Macondo Prospect in the Gulf of Mexico killed 11 people in the spring of 2010 and a total of nearly 5 million barrels (780 000 m<sup>3</sup>) of oil was lost into the sea. The operator, BP, has set up a 20 billion USD fund to cover the costs. Only time will tell whether this will be enough. The much reported incident led to a heated political debate both the in the US, UK (home of the operator BP) and other countries. The incident also led to changes in the US Offshore regulatory requirements and reshaped the insurance market.

The offshore industry in the North Sea and the Barents Sea on Nordic country continental shelf areas are subject to strict regulatory requirements for both safety and environment. The regulatory framework stipulates both the use of best available technology, influences directly the use of chemicals through permits to use and discharge, and requires comprehensive safety management systems. In depth risk assessments for each and every operation have to be done and approved.

In Norway, the regulations unambiguously state that the operator of a licence (to drill, produce or explore) is fully liable for any damages occurred to the environment and that they must have insurance. In accordance with the Petroleum Act, licensees on the Norwegian Continental Shelf “*shall be insured and the licensees have a joint and unlimited responsibility for pollution damage, without regard to fault*”.<sup>52</sup> This means that each licensee must accept overall liability. This is in line with the Directive 2004/35/CE on Environmental Liability<sup>53</sup>, although each individual Member State is

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<sup>48</sup> Dali (2008)

<sup>49</sup> Macalister and Wearden (2010)

<sup>50</sup> Buncefield Investigation (2010)

<sup>51</sup> Health Protection Agency (2010)

<sup>52</sup> Data provided by e-mail from the Ministry of Petroleum and Energy, Norway to the question on liability (30.8.2011)

<sup>53</sup> with regard to the prevention and remedying of environmental damage. Article 8 of the Directive states that the operator shall bear the cost of both preventive and remedial actions taken

able to determine how this liability shall be guaranteed and obligatory insurance is only used in eight Member States today. The Directive has been implemented slightly differently in different countries, for example Denmark and Finland opted to choose proportionate liability for multiple parties, most other Member States opted for a system of joint and several liability<sup>54</sup>. Liability also extends to the owners of hazardous materials, as a very recent ruling from the Finnish Supreme Court shows. Here the Finnish oil company Neste was deemed liable for environmental pollution which occurred at a petrol station, owned and operated by another company, because the petrol station was selling fuel supplied and owned by Neste.<sup>55</sup> The essence of this case study is therefore applicable to many other industries in the Nordic countries.

### **3.3.2 Insurance as a tool for preventing major accidents**

Based on the fact that the operator shall bear the cost of preventive and remedial actions, the regulatory framework in Norway requires oil and gas companies to have insurance before they can become licensees. Often oil and gas offshore development insurance is either dealt with by re-insurers or syndicates. Some of the larger oil and gas companies have their own insurance company or cover potential losses out of their own funds.

Offshore projects are continuously pushing technological and engineering boundaries, using new techniques to reach reservoirs located not only deep under the water but also deep under the seabed. Technologies, processes and chemicals used to facilitate drilling operations can be very different in the details from one project to another. When insuring such projects, the insurers have to take into account not only the technical complexity of operations, but also the potential enormity of the costs of realised risk.

Insurance costs are naturally still based on past risk data, but the time span for which historical data on incidents is taken into account is very short. The risk expectancy used by insurance companies to set premiums, terms and conditions for the industry utilises data from the last few years, and single incidents have a large effect on premiums. This is in stark contrast to, for example, flood insurance or fire insurance where data from many years are used and damage suffered by a single policy holder generally has little effect on overall insurance rates. A single large incident – such as the Macondo incident – can effectively double or triple insurance premiums as well as cause changes in terms and conditions.

The Macondo incident has led to changes in the insurance market for prospects in the Nordic countries and has fundamentally changed the mindset of both buyers and sellers of insurance. Insurers are more hesitant to provide insurance for offshore developments. Time is now devoted to discussions with technical experts on the actual processes and technologies and evaluating project risk management plans and safety management systems. The insurance buyers on the other hand are certainly highly aware of the necessity and importance of having good insurance cover.

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<sup>54</sup> COM (2010)

<sup>55</sup> Finnish Supreme Court decisions KKO:2011:62



As a direct consequence of the Macondo incident, oil and gas companies are increasing their insurance cover heavily, some sources cited increases of up to 20 times higher coverage being arranged for, through both increased insurance cover and pledged internal funds. As a direct consequence, technical risk management has become an even more prominent feature of large projects. It has also in some cases led to the oil and gas company reviewing and updating their internal procedures for risk assessment and management. The availability, conditions and expense of insurance in conjunction with the heavily publicised enormous losses are therefore directly affecting the risk management measures taken by operating companies.

### **3.3.3 Interaction**

There is little formal interaction between insurance companies and the environmental policy sector in relation to this industry. The main reason for this is that the insurance market is dominated by global players whilst the regulatory framework tends to be national. Some oil and gas companies also have their own insurance companies, whose purpose is to provide insurance to the company by placing the risks with re-insurers. Some of the large companies also have so-called emergency funds that are pooled between all of the company's different divisions. Insurance cover may be taken out for all of a company's assets and operations rather than for specific developments. Therefore the environmental fragility or difficulties with potential clean up operations in for example Arctic environments are not necessarily computed directly into location specific insurance premiums.

The offshore insurance market is very specialized and companies are understandably reluctant to share details of their experiences. However, there are some specific areas which are of particular interest. For the environmental policy sector, the calculations of potential risk and what level of cover that shall be deemed sufficient are directly linked to the level of potential costs. In Norway, the requirement to have insurance cover has been in place for decades, but since the Macondo incident, the authorities have increased their vigilance on checking insurance details. According to an operator, many more questions are asked by the regulator in relation to ability to cover any potential damages. At the same time, concrete experiences from an insurance company specialised in the market is that regulators dealing with the licences do not directly approach the insurance companies. Neither has this company felt it appropriate to approach the regulator, stating that a more detailed analysis of the potential benefits and drawbacks of such discussions would be needed before the insurance company itself would approach regulators. Any interaction tends to occur with the policy holder.

### **3.3.4 Lessons learnt and future developments**

The liability for damage to common property (the sea) has been squarely allotted to the licensee. The environmental policy sector is requiring the offshore industry to provide a certain guarantee of being able to commit funds in case of damage. The licensee in turn insures the risk. The insurance company is likely to put a cap on the maximum amount payable in case of an accident. This means that the policy holder is carrying a certain part of the very large incident risk costs themselves. This may be beyond the financial capabilities of a company.

Despite the environmental liability being firmly appointed to the polluter through the EU Directive 2007/60, the Nordic countries have not implemented an obligatory insurance<sup>56</sup>. Stating liability in regulations is of little practical value if it means the company will go bankrupt without means to pay for the damage. Voluntary insurance cover is not always directly related to the potential risk and many smaller companies have limited or no insurance cover for environmental damage. However, smaller companies can still cause environmental damage on a relatively large scale if they are engaged in major accident hazard industries. From an environmental policy point of view, the scale of damage that can occur should therefore be reflected in the stringency of the regulation.

Large scale environmental incidents such as the Macondo incident are widely publicized and inevitably investigated by the environmental administration. Indeed, the cost of risk in major accident industries is seldom debated unless a specific incident has led to the issue being raised. Trends in major accident risk expectancy or incident data used by the insurance industry tends to be short term. Therefore it is perhaps not as useful information to policy makers as, for example, trends on relatively frequently realized risks (e.g. trends on flood damage, fires).

Understanding major accident risk costs requires a different approach away from reliance on trends and is often augmented by the use of scenarios. Closer interaction between the two parties to share scenarios that include potential costs of risk could enhance this understanding. This is not only applicable to offshore industry but any industry engaged in major accident hazard activities or indeed in activities with potential for environmental damage. It could be of value to both insurers and the environmental policy sector to jointly work through information relating to worst case scenarios and overall costs of risk for different industry categories as part of a policy review cycle. This would give the regulator data that helps to judge what level of insurance is required and what types of damages may become payable by the society. The regulator could then better take into account insurance cover requirements, for example as part of environmental permits. Reaching a deeper technical understanding of the risks involved in different scenarios and how these can be prevented could be valuable to insurers when designing new products. Both parties could also require further risk management measures before insurance cover is given or a licence or permit to operate is awarded. On an individual company level, an obligation to be covered by insurance, where the premiums reflect the risk management ability of the company as well as the relative risk of the operation, could also lead to financial deterrents to undertake activities where there either is a potential for large scale environment damage or the complexity of the operation is beyond the company's experience. Running through different scenarios with the insurance company and the regulator could also help the operator to crystallise the overall financial consequences to the company in case of an incident.

Whilst the Norwegian regulations require each operator to submit data on the insurance they have, this data has not apparently been utilized to any great extent. Data on insurance cover could be used by the environmental administration to evaluate the financial ability of a company to pay for potential clean up and restoration. Larger companies often have extensive procedures for risk assessment

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<sup>56</sup> European Commission (2010)

and management and certainly deeper coffers to pay damages from. In effect, this could mean that smaller companies would be excluded from certain high risk activities.

One suggestion put forward by an insurance company is that data on how much insurance cover the insurance industry is willing to provide could be shared with policy makers. If this interaction also included discussions on the expectancy of the insurance company to be able to market a voluntary policy - especially to smaller companies - that would cover the required liability sums, the regulator would have a fair idea of the actual liability that would be covered by insurance. This type of data could then be taken into account in the policy preparatory phase as well as being valuable in the licensing or permitting process.

In view of the global nature of the insurance companies underwriting offshore oil and gas risks, any forum for interaction within this industry would have to be global. However, the same approach could potentially be applied to any major accident hazard industry. Any forum would benefit from including both the regulator and the enforcing and investigating authorities as well as insurance companies. Focusing the discussions on estimating cost of major accidents could provide better data for future regulatory requirements on insurance cover. It would also be a less commercially sensitive discussion, being based on forecasting consequences rather than directly relating risk to insurance premiums.

### **3.4 Case 3: Insurance policies promoting innovation**

#### **3.4.1 Background**

Besides having a role as risk assessor, manager and carrier, insurance companies can promote environmentally-friendly behaviour<sup>57</sup> through different products. Policy holders can be incentivised to change or adopt new behaviours through, for example, reduced premiums. Insurance products therefore have the potential to lower barriers for policy holders to, for example, invest in new technologies. However, sustainability is not a criteria used to price insurance. Innovative insurance products can nevertheless be developed in response to environmental policy, if the market appears to be responsive. As one interviewee mentioned, cooperation with environmental policy actors on a national level can enable insurance companies to provide insurance products that drive the policy holders to sustainable choices, in line with other policy mechanisms to promote sustainability<sup>58</sup>.

Several examples of insurance products in the Nordic countries have been identified as having potential to drive policy holders towards sustainable choices. One insurance company offers car insurance in Norway for electric vehicles for 25% less than premiums for traditional fuel driven cars. The same company also offers 50 000 NOK extra compensation towards using renewable energy solutions when rebuilding properties after substantial damages have occurred. Another type of sustainability promotion is exhibited by an insurance company that promotes not only accident prevention, but also fuel efficient driving to transport companies. Such a company can reduce their insur-

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<sup>57</sup> Bacani (2008)

<sup>58</sup> Interview data

ance premiums by their drivers taking a specific driving course, where the driving is monitored and more fuel efficient driving techniques learned. According to statistics from Sweden, this allows the transport companies to save up to 30% on damages and fuel, thereby reducing the CO<sub>2</sub> emissions. Naturally, so-called eco-driving is also inherently safer, as regulating the speed makes driving more even, allowing the driver to assess the traffic situation around them more accurately.<sup>59</sup> In Finland, one insurer offers a 10% discount on premiums based on passing a recognised eco-driving test<sup>60</sup>. Reinsurance companies are active in insuring renewable energy projects and the development of related technologies.

Through these examples this case study examines the role of the insurance companies and policy actors in the emergence of these products, what interaction has occurred between them and what the benefits of this interaction are today and could be in the future.

### **3.4.2 The role of insurance companies and policy makers in driving sustainability**

Historically the financial sector has not been as proactive in environmental issues as, for example, the manufacturing sector<sup>61</sup>. Today sustainability is more and more an inseparable part of the strategies and commitments of financial sector organisations. Developing innovative products that drive sustainability among their customers strengthens these strategies and commitments and builds credibility on the markets they operate in. The examples of products mentioned above (renewable energy, electric vehicles, reduction in insurance premiums based on eco-driving style) are relatively new, not only on the part of the technology, but also as a consumer market. Being active in these markets early on is seen as offering attractive business opportunities and building competitive advantage. For example, the insurance company giving the 25% discount on premiums for electric vehicles is actively engaged with the Norwegian Electric Vehicle Association to have access to new members and market their electric car insurance through the association<sup>62</sup>.

Investing in renewable technologies is an expensive and highly uncertain business. Although no or very little historical loss data is available, it is unlikely that associated, particularly investment, risks could be carried by any public entity. Studies by UNEP's Renewable Energy and Finance Unit indicate that insurance and other financial risk management instruments can reduce the default rate, improve credit rating and cash flow, and help achieve a higher internal rate of return for renewable energy projects<sup>63</sup>. Private insurance therefore plays a key role in enabling companies to explore new energy sources and attract sufficient investment.

A good example of this enabling role is the insurance product for service performance guarantees that reinsurance companies offer directly to the market (vs. its traditional role of insuring insurance companies). Feed-in tariff<sup>64</sup> contracts are offered as a policy incentive to renewable energy produc-

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<sup>59</sup> Interview data

<sup>60</sup> See for example [www.ecodriving.com](http://www.ecodriving.com)

<sup>61</sup> UNEP FI (2007)

<sup>62</sup> Interview data

<sup>63</sup> UNEP FI (2007)

<sup>64</sup> Feed-in tariffs exist in most of the EU Member States. Feed-in tariffs are designed to encourage the production and use of renewable energy. Producers of renewable energy receive a specific price for the electricity they produce and feed into the electricity grid.

ers typically for a period of 15-25 years. Through the contract a producer needs to provide a performance guarantee for this period. This way performance guarantee has developed into a standard requirement on the renewable technology market<sup>65</sup>. With renewable energy, 15-25 years is a long time horizon. It requires companies to set up large provisions on balance sheets against potential losses up to the lifetime of the contracts – provisions that most, relatively young, renewable energy producing companies cannot afford. Through insurance, the reinsurance companies carry the risks of financing the guarantee of operations on behalf of the companies<sup>66</sup>. This helps secure investor funding (as for many investors, having this insurance is a prerequisite to their investment) and lower the risks of innovation for companies.

It should be noted, that in most instances, driving environmentally-friendly behaviour does not require entirely new products to be developed, but traditional insurance products are “flavoured” to include environmental incentive<sup>67</sup>. For example, with adjusted premiums for car insurance (whether low-emission, electric cars or eco-driving), the product in itself is simply a type of car insurance.

According to Swiss Re, in a functioning insurance market, the role of government is likely to be limited to enforcing regulatory policy, setting building codes, regulating land use and performing other enforcement functions.<sup>68</sup> Environmental policy often provides the necessary mechanisms to support development and ensure demand for new insurance products. For example, the insurance product for performance guarantees for renewable energy is reliant on the governments’ policy decision on feed-in tariffs – if they were to remove this policy, there would be no market for the product. In the case of electric vehicles (EVs), the policies put in place by the Norwegian government have made it extremely attractive to buy electric vehicles: there is no VAT for EVs, parking is free, there is no congestion charge for EVs in the city centres like Oslo, and EVs can drive using bus lanes, to name a few. These policies and incentives have resulted in rapid growth of the EV market in Norway – sales for 2011 are expected to reach 2000-2500 new EVs<sup>69</sup> - and a growing market for EV insurance.

### **3.4.3 Interaction**

In the case of EV insurance, the roll-out of electric vehicles specific insurance has mostly been driven by the market<sup>70</sup>. There has not been any clear interaction and cooperation between policy actors and the insurance companies, but both parties have played a role at different stages in the history of the EV industry in Norway. If any link is to be made between the two, it could be identified as the Secretary General of the Norwegian Electric Vehicle Association, who has been a contact point for the insurance company and at the same time is the leader of the Norwegian Council for Electrification of Transport and an advisor to the Ministry of Transport. In theory, through discussion with the association, the insurance industry can provide its ideas and suggestions through to

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<sup>65</sup> Interview data

<sup>66</sup> Interview data

<sup>67</sup> Interview data

<sup>68</sup> Reichenmiller et al. (2010)

<sup>69</sup> Interview data

<sup>70</sup> Interview data

the ministry level.<sup>71</sup> Currently, there is an on-going process to make sure that there is a common position on safety of charging for all EV manufacturers delivering EVs to the Norwegian market<sup>72</sup>. In a meeting among representatives of the automobile industry during the first half of 2011, two methods were decided on to make sure that people are charging EVs at home according to a standard: 1) cooperation with insurance companies where policy holders would receive a discount on their insurance if they buy necessary charging equipment that is qualified to an agreed standard, and 2) to facilitate discussion whether there should be a programme to support home charging points with grants from the government<sup>73</sup>. In this context, the role of insurance is therefore increasing, particularly regarding risk control of EV charging, and interaction with policy actors during this process is anticipated to increase<sup>74</sup>.

To date, in developing insurance products for renewable energy there has been very little interaction between policy makers and the reinsurance companies. This in itself is surprising considering that globally many policies have been put in place on national levels to increase the share of renewable energies. Development of a product to insure renewable energy has primarily been driven by investors and companies active in deploying new technologies. Data to set premiums has been gathered by insurance companies themselves. One would assume that governments could benefit from information, not only whether insurance products exist, but also on risk data for renewable energy, when setting targets for renewable energy to ensure these targets are realistically achievable. According to Munich Re, awareness that insurance solutions are available is increasing among policy makers and dialogue around this is expected to increase<sup>75</sup>.

#### **3.4.4 Lessons learnt and future developments**

The motive for interaction is two-fold: insurance companies want to make sure that policy, on the one hand, does not raise barriers for them to present new products to the market, and on the other hand, where possible, provides support to emerging market areas (such as renewable energy or electric vehicles). For policy actors, increased interaction could help decide what areas of environmental risks require more formal policy and what areas can be controlled through insurance products.

Despite these motivations, interaction between the insurance industry and environmental policy actors in the past has not been a significant contributor to the development of new products. However, this is not to say that there are no benefits to having interaction, as for example, the developments on ensuring safety of EV charging demonstrate. Product development is a market-led process and insurance companies are challenged to continue to innovate. Risk profiles change and insurance products need to be able to accurately reflect this. The market for innovative insurance products could be jeopardised should policy makers suddenly make changes to incentives, such as abruptly remove feed-in tariffs. In the face of shared challenges, discussing these issues together and sharing

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<sup>71</sup> Interview data

<sup>72</sup> Interview data

<sup>73</sup> Interview data

<sup>74</sup> Interview data

<sup>75</sup> Interview data

data on changes in risk and policy would be a natural course of action for the insurance industry and policy actors. Furthermore, interaction would help increase predictability of changes<sup>76</sup>: the key for insurance companies is to anticipate how long supporting policies exist that enable products to have a market. For the public sector, the knowledge that private insurance solutions can carry certain environmental risks and offer ways to promote environmental policy targets helps to improve the efficiency of policy making.

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<sup>76</sup> Interview data





## 4 Analysis

### 4.1 Types of interaction

The interaction that occurs between environmental policy actors and the insurance industry in Nordic countries can be categorised into three different types:

1. Formal interaction occurs through clearly defined processes such as during the preparation of regulation where the insurance industry is typically represented through an industry association.
2. Informal interaction occurs through various modes such as open discussions, stakeholder forums and other regular contact between policy actors and the insurance industry.
3. Information provision is more sporadic and passive in nature and can also occur without direct contact between the parties.

These three types of interaction are illustrated in Figure 4.1.

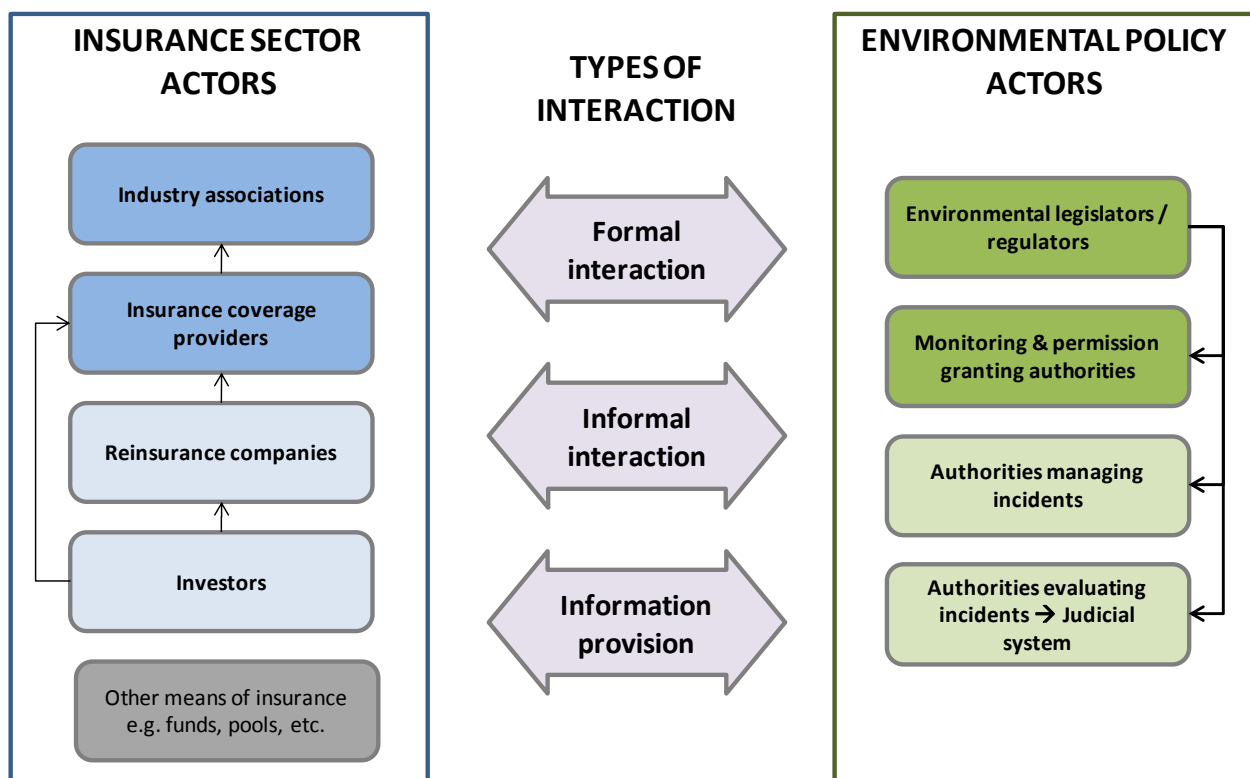


Figure 4.1 Types of interaction

#### *Formal interaction*

Formal interaction in this context is defined as interaction occurring through a systematic, pre-defined policy process, which may originate in regulatory requirements. This type of interaction typically occurs between national level environmental legislators/regulators and national insurance

industry associations. In this process, the insurance industry is invited to comment on regulations being prepared and comments are channelled through the industry associations to policy makers. In these discussions, the industry has an opportunity to share the data it has and comment on proposed policy options<sup>77</sup>. The channels for interaction are clearly established, though these can vary by country. The aim of formal interaction is to provide input and shape policy (insurance industry) and gather views (environmental policy sector) when policy is made.

Formal interaction occurring through industry associations is generally limited to issues relevant to the whole insurance industry. The insurance industry typically reaches a consensus that is communicated as one voice through the industry association. The ability of individual insurance companies to raise specific issues is therefore limited. There are few direct channels for communication between individual companies and policy makers<sup>78</sup>. In theory, there could be two other situations where formal interaction could be called on.

1. The insurance industry takes an initiative to urge legislators and/or regulators to develop policy concerning a particular environmental risk because it cannot be covered by insurance.
2. After an incident, there may be pressure on the government to act and make sure damages are covered in the future (either through policy or market-based solutions). The initiative would then assumedly be taken by legislators/regulators to find out whether market-based solutions exist to cover damages, before any decisions on policy are taken.

Based on experiences from Sweden, the insurance industry sees that formal interaction is more frequent in areas of risk where environmental policy and/or regulations already exist. In areas not yet covered by legislation the insurance industry has been somewhat reluctant to provide input into policy making<sup>79</sup> (e.g. situation 1 above). This could indicate that the insurance industry is less inclined to interact in “new” areas where the potential to innovate and develop new market-based solutions is high.

### ***Informal interaction***

In this study, informal interaction is defined as regular, on-going interaction that does not follow any prescribed processes. Typically informal interaction occurs through direct contact between policy actors and insurance policy providers. This type of interaction does not attempt to shape policy directly (as with formal interaction), but often aims to build deeper understanding of issues or to discuss the practicalities of a specific policy. In contrast to formal interaction that is part of the job description of legislators, such as civil servants working in ministries, legislators are not in the same way required to allocate time for informal interaction. Therefore the range of actors involved tends to be broader, including e.g. municipalities and other regional bodies or national agencies.

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<sup>77</sup> Interview data

<sup>78</sup> Interview data

<sup>79</sup> Interview data

### **SUCCESSFUL INTERACTION**

An insurance company has been involved in setting up a secretariat for climate change adaptation within the Directorate for Civil Protection in Norway. The aim was to promote adaptation practices in municipalities. Through the secretariat, the insurance company began to cooperate with municipalities and communities to bring climate change on their agenda. This evolved into a network of 6 communities in Norway. The network has had meetings and workshops facilitated by the insurance company to share tools being developed by the Directorate. At the same time information on how insurance companies are working to promote adaptive solutions to decrease vulnerability to climate change risks are shared. While the insurance company had an intention to organise a one-time event, they now have regular contact with for example Kristianstad around the Cities of the Future-project run by the Directorate.<sup>80</sup>

The channels for informal interaction often include various types of stakeholder forums and open discussions, or may be related to specific practical projects, such as land use plans in a particular municipality or county. The success and frequency of informal interaction is dependent on personal activity and engagement into specific issues.

### **SUCCESSFUL INTERACTION**

One insurance company has been working together with the city of Copenhagen in developing a climate adaptation plan: members from the city council were invited by the insurance company to discuss future trend analyses and compare data including historical data about damages.<sup>81</sup>

Most often it is the insurance companies that take the lead and initiate informal interaction, whereas with formal interaction, the opposite tends to be the case, i.e. the push towards interaction comes from the policy sector. Informal interaction can therefore also be heavily reliant on the agenda of individual insurance companies.

### **SUCCESSFUL INTERACTION**

In Finland, a stakeholder forum that has facilitated interaction in relation to flood risk and insurance between insurance companies and the environmental policy sector is the Finnish Association for Rescue Services (SPEK) whose members include various national and regional associations.<sup>82</sup>

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<sup>80</sup> Interview data

<sup>81</sup> Interview data

<sup>82</sup> Interview data

### ***Information provision***

Information provision is here defined as a type of interaction that does not necessarily involve direct contact between the insurance industry and environmental policy actors. Typically it would involve one party *acquiring* and using information *provided* by the other to support analyses or decision making. Often this is passive interaction that includes, for example, finding and using information available in the public domain. The interaction is sporadic with no specific aims other than information gathering and is reliant on the activity of the information needing party rather than the information provider.

#### **SUCCESSFUL INFORMATION PROVISION**

Good examples of proactive information provision combined with informal interaction are conferences organised by an insurance company, inviting researchers from health and other welfare-related services on a regional level in Norway and Denmark. These conferences have facilitated discussions on the role of insurance in future scenarios and what kind of services the insurance company can provide. In this instance, the interaction also resulted in gathered information being used to guide the strategy and planning processes of the insurance company.<sup>83</sup>

#### **SUCCESSFUL INFORMATION PROVISION**

An example of good practice in data sharing can be found from a municipality in Copenhagen. Through the insurance association, insurance companies began a process with the municipality to collect historical data on water damages and map likely future developments in the North Jylland area to define flood risks. Water damage data was collected from different insurance companies through an independent agency. This showed that even sensitive data can be shared and brought to the attention of policy makers, if there is an independent party managing the data. With the data, there is now a better platform for dialogue with the municipality and the insurance industry to help the municipality figure out what they need to do to adapt to climate change.<sup>84</sup>

Reinsurance companies play a significant role in producing and disseminating data on trends and scenario analyses for the industry and they also play a significant role in setting premiums for the industry. They are able to provide a more global perspective compared with Nordic insurance companies and are by some insurance companies considered forerunners in, for example, climate change risk analysis. Information provided by reinsurance companies is mostly exchanged without direct contact with policy actors; however, it forms a solid background for risk information that could be beneficial to policy actors.<sup>85</sup>

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<sup>83</sup> Interview data

<sup>84</sup> Interview data

<sup>85</sup> Interview data

### EXAMPLE OF USEFUL DATA

An example of useful data developed by the insurance industry is the work done by Munich Re to identify what types of risks related to different types of power plants are insurable (see Figure 4.2). This type of analysis in other areas of environmental risks would be useful to policy actors in determining what risks can be covered by insurance and help prioritise areas for policy development (those that are not covered by insurance).

Insurability of damage to power plants

Power plant type	Operating errors, negligence	Malice, sabotage	Faulty design and material	Short-circuit, overvoltage	Storm, swell	Frost	Ice drift (damage due to freezing of the sea)	Earthquake, seaquake	Flood	Fire, lightning, explosion	Intent/gross negligence	War	Civil commotion	Terrorism	Radioactive contamination	Wear and tear, erosion, and cavitation	Guarantee losses	Liability	Loss of income
Onshore wind farm	Green	Green	Green	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Offshore wind farm	Green	Green	Orange	Orange	Green	Green	Green	Orange	White	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Convent. hydroelec. power plant	Green	Green	Green	Green	Green	Green	Green	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Wave power plant	Green	Green	Orange	Green	Orange	Green	Green	Orange	White	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Tidal power plant	Green	Green	Orange	Green	Orange	Green	Green	Orange	White	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Photovoltaic	Green	Green	Green	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Large-scale solar power plant	Green	Green	Orange	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Solar chimney power plant with no storage device	Green	Green	Orange	Green	Orange	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Biomass	Green	Green	Green	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Biogas	Green	Green	Green	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Geothermal power plant	Green	Green	Orange	Green	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Fuel cells	Green	Green	Orange	Orange	Green	Green	White	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange
Conventional thermal power plant	Green	Green	Green	Green	Green	Green	Green	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Green
Nuclear power plant	Green	Green	Green	Green	Green	Green	Green	Orange	Orange	Green	Red	Red	Orange	Orange	Red	Red	Orange	Green	Orange

Legend

- Green: Cover is available
- Orange: Cover is not currently available
- White: Risk not relevant
- Light Orange: Cover is available after special check
- Red: Cover is not available

Figure 4.2 Insurability of damage to power plants<sup>86</sup>

<sup>86</sup> Munich Re Group (2004)

### ***Product development – where is the boundary for interaction benefits?***

Whilst this study discusses the interaction between the environmental policy sector and the insurance industry, there are of course also many cases where the insurance market finds a market opportunity from new policy initiatives or regulations without any interaction. How the insurance industry may act in response to legal obligations without necessarily any formal interaction are exemplified by the following two examples.

- In the case of insuring renewable energy projects presented earlier, there is a policy incentive in the form of feed-in tariffs, but at the same time, a large need for guarantees. As there is no specific policy instrument to help companies meet the required performance guarantee, a clear market for insurance products. As a response, the reinsurance companies developed new products to respond to market needs, without any prior discussions with the policy sector. To be attractive to insurance companies, formal interaction in such cases would need to provide the insurance industry with the opportunity to discuss such products as a form of market led policy instruments.
- In response to policy development in relation to legally stated environmental liability, one Nordic insurer has produced environmental liability insurance products on the market in Sweden, but the up-take has been slow. In Norway, one insurer has a new product to cover environmental liability for the Environmental Diversity Permits (naturmangfaldlov) that apply to the entire Norwegian environment<sup>87</sup>. The new product has been relatively well received in this market.

In both cases the product development has, however, apparently occurred in response to existing regulative requirements, independently of any interaction with the policy sector. However, this does not rule out that participation in the formal processes did not provide the insurance companies with an insight into what type of products that could be needed.

## **4.2 Challenges and benefits of interaction**

### ***Formal interaction***

Formal interaction involves the industry in policy decision making and this type of interaction is therefore a good channel for the industry to collectively voice their opinions on policy and policy development. This is seen by as more effective than if each company made separate statements. It is also a way for the industry to keep up-to-date with policy developments. The downside is that the motivation for the insurance industry to participate may be low due to lack of confidence that their opinions would have an actual impact on decisions, although here there are different views. Information exchanged through interaction can also be restricted due to the commercial sensitivity of certain data which is not shared with others in the industry association. Policy-makers often need “the big picture” to make decisions, and one company cannot provide this alone. Therefore acting through an industry association has clear benefits to both parties in terms of formal interaction.

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<sup>87</sup> Norwegian Nature Diversity Act: Act of 19 June 2009 No. 100 Relating to the Management of Biological, Geological and Landscape Diversity (Nature Diversity Act)

The regulatory feature of formal interaction tends to favour interaction initiated by the policy sector. However, the role of the insurance industry is not always clear to policy makers. It is also evident that whilst the policy sector clearly allocates time to this type of interaction, it can be more difficult for the private sector to find the required time to participate in these processes.

### ***Informal interaction***

By comparison, informal interaction often leads to actions more quickly. This was the case in interaction between the insurance industry and municipalities on climate change in Norway and Denmark. Informal interaction also allows actors to develop closer, more personal relationships as interaction is not limited to individual policy issues as is the case when industry is invited as an association to comment on a specific piece of regulation. Informal interaction can also involve a broader range of stakeholders. The involved parties can also influence the channels of interaction (how), suitable to the topics (what) and outcomes (how). Contrary to formal interaction, it can be more difficult for the policy sector to find the required time to participate in informal interaction.

Initiating informal interaction can be very effective immediately in the aftermath of a risk having been realised, i.e. after an incident. With respect to preventive actions and risk minimisation, this type of informal interaction with monitoring and permission granting authorities and, for example, municipalities is seen as particularly fruitful.

When compared with formal interaction, a clear challenge is to systematically gather and analyse information from informal interaction. However, there is no easy solution to distil information and the outcomes of interaction that occurs in a wide and relatively loose network.

### ***Information provision***

Information provision as a form of interaction does not rely on any defined process or channels in order to occur and expert data can be made available to a wide audience. Challenges here include sensitivity of data. This can limit what information is made available to other parties. Another challenge is that pure data gathering relies on the parties to actively look for data and information in order to benefit from it. It should also be noted that companies rarely put out information in the public domain just for the sake of it but tend to have a motive for providing the information. In contrast, the public sector tends to publish all of the information it analyses.

The benefits and challenges of the three types of interaction have been summarised in Table 4.1.

**Table 4.1 Benefits and challenges of different types of interaction**

Type of interaction	Benefits	Challenges
Formal interaction	<ul style="list-style-type: none"> <li>– A means for industry to provide input into policy (formulation)</li> <li>– A collective voice of industry provides direct input into regulatory discussions</li> <li>– Provides industry with relevant and up-to-date information (of coming changes)</li> </ul>	<ul style="list-style-type: none"> <li>– Insurance companies are competitors and data sharing may be limited</li> <li>– The role of the insurance industry is not always clear to policy makers</li> <li>– Interaction limited to consensus areas</li> <li>– Limited resources for insurance companies to be active at this level</li> </ul>
Informal interaction	<ul style="list-style-type: none"> <li>– Enables building of closer, more personal relationships</li> <li>– Not limited to a specific policy</li> <li>– Can involve a broader range of stakeholders</li> <li>– Timeframes are short</li> <li>– Good for “practical” discussions</li> <li>– Effective in the aftermath of incidents</li> </ul>	<ul style="list-style-type: none"> <li>– Relies on the activeness of each party</li> <li>– Input into regulatory framework difficult</li> <li>– Systematic gathering and analysis of interaction results and information</li> <li>– Challenge for the policy sector to allocate resources</li> <li>– Reluctance of policy sector to rely on information from one company</li> </ul>
Information provision	<ul style="list-style-type: none"> <li>– Interaction does not require any facilitation</li> <li>– Data produced can be made available to a wide audience</li> </ul>	<ul style="list-style-type: none"> <li>– Data sensitivity may limit information provided</li> <li>– Relies on the activeness of each party to find relevant information</li> </ul>



## 5 Conclusions and recommendations

### 5.1 Insurance as an environmental policy instrument

The overarching aim of environmental policy is to reduce risk to the environment. This can be done through encouraging or requiring risk reduction, ensuring sufficient resources are available for 'clean-up' and eliminating or minimising activities seen as having too high an environmental risk. At the same time, there is a clear incentive to reduce public sector costs. In theory environmental policy is therefore shaped by determining what the most efficient ways to tackle both environmental liability and risk to property from environmental phenomena. As has been shown in multiple examples in this study, there is a clear role for the insurance industry's data and products in certain environmental policy areas that could help meet these targets. Areas identified where insurance would be a viable solution for risk management include:

- Where no policy requirement to reduce risks through specific obligations exists yet
- Where risks can be high cost and lead to the actor being unable to meet the costs
- Where current instruments are deemed ineffective
- Where the role of state compensation is seen as diminishing

For example, to relate to the three cases presented, the use of insurance supports risk management as follows:

- **Flood risks - protecting society:** Insurance reduces the overall consequences of floods to society through encouraging property owners to prevent risks. This is done through controlling availability and pricing of insurance in relation to the location and its susceptibility to floods. Property owners are therefore encouraged to consider where property is built from the perspective of flood risks and to take the necessary precautions to minimise consequences, for example, by means of appropriate drainage systems. Insurance transfers the risks from the public to the private sector reducing the costs carried by society.
- **Major accident hazard industry – protecting the commons:** Moving from a general allocation of liability, the financial extent of which may be neither understood nor met by the funds of the actor, towards requiring proof of funds or insurance helps to ensure that sufficient resources for clean-up are available. Through requirement of insurance, activities with too high risks are eliminated if the insurance industry either refuses to provide insurance or sets very high premiums. This creates financial incentives for companies to manage risks in order to be able to reduce costs of premiums.
- **Innovations – enhancing sustainable choices:** Insurance can be used to meet specified standards for activities in order to create a functioning market (e.g. the case of feed in tariffs). Insurance premiums and conditions can support the achievement of environmental goals through voluntary actions (e.g. car insurance discounts) or through setting requirements on how to rebuild and repair properties after damages have occurred.

Making more use of insurance as a policy measure can in practice be hampered by lack of understanding of a) alternatives the insurance industry could provide through new products, b) sensitivity of data and c) capabilities and willingness to interact with different levels of actors.

Traditionally, the insurance industry tends to create new products after the policy has been made, if there is a potential market opening up as a result of the policy. However, identifying areas where the two parties can act together to find potentially efficient instruments to reduce risk before the policy is finalised could be beneficial to both parties. For example, as the insurance industry sees the consequences of incidents first hand, this information could be used to find out where to act now to reduce society's bill in future. Where an environmental risk realises and damages are not covered by market-based solutions already, the insurance industry could be encouraged through interaction with the public sector to develop new solutions, as occurred in the aforementioned situation after the 2002 floods in Europe.

It should be noted that insurance is not necessarily useful in all policy areas. The potential for using insurance as a policy instrument in different environmental policy areas therefore needs further research. The results obtained in this study are not detailed enough to be directly applied by the environmental policy sector as a guidance to "when, where and how" insurance could be used as an efficient policy instrument.

***RECOMMENDATION: It is recommended that a review of different environmental policy areas be carried out to assess whether insurance could be a viable policy measure. To be of real use to the policy maker and the insurance industry, such an evaluation should also address other policy instruments used for risk minimisation and/or mitigation.***

## **5.2 Improving benefits from interaction**

### **5.2.1 Improving benefits of formal interaction**

Evaluation of how different policy instruments could be used and how effective these may be during the policy making stage could benefit from using data from the insurance industry in formal policy making or review processes. This data could include

- effects of insurance terms and conditions on companies risk management, and
- calculations of avoided costs of risk management: what would it cost if the biggest risks materialise.

Use of such information could help policy makers evaluate how much needs to be done to avoid risks and what would be the potential financial burden carried by society and by actors. The insurance industry could also be encouraged to develop new products for the market to ensure environmental liabilities are covered by sufficient funds. For example, if certain sectors are required to have insurance against environmental risk, the effects of this are enhanced if the requirements are discussed and reviewed together with the insurance industry (e.g. through both informal and formal interaction).

Insurance companies produce calculations of avoided costs of risk management, i.e. a summary of how much it would cost if the risks materialise in relation to what it costs to manage the risk preventively. Interaction and communication of the results could provide valuable input into an evaluation of “how much needs to be done to avoid risks” and what the financial burden on companies set by the regulation will be. This could particularly be a part of formal interaction in policy consultations with the insurance industry association, based on aggregated national or Nordic data.

There is also a need to define what kind of information can be exchanged through formal channels without comprising commercially sensitive data. One way is to use an independent agency to filter out the company specific data and provide aggregated data from the industry. At the moment, there is a general cautiousness to share information as the companies have to assess in each case what would be commercially sensitive. However, to maximise benefits from formal interaction to both parties, a clarification of “what can be asked for” and “what can be given” would facilitate the discussion. In particular, the depth and breadth of information and the level of detail needed by the policy sector based on “essential data” or “nice to have” data should be defined. Having a clear definition on what type of information can be shared would be helpful for both parties, and in particular for the policy sector to formulate questions and direct discussions into fruitful areas.

Information on up-coming policy is, in general, well transferred to the insurance industry through existing channels. However, improving the feedback on *how* the input from insurance industry is used could enhance confidence in that the input is taken into account.

***RECOMMENDATION: It is recommended that a review of the needs and abilities of data exchange is mapped including what data is available, what it can be used for and how it can be shared. Such a map would provide a valuable tool to both parties in ensuring the maximum benefits from interaction can be achieved at all levels.***

### **5.2.2 Improving benefits of informal interaction**

Informal interaction between researchers, decision makers and insurance companies, when *implementing policy* e.g. at the municipal and/or permitting authority level, has been seen as a fruitful. Here, the potential benefits to be had from increased interaction and more in-depth discussions mostly relate in some form to practical implementation of policy. For example, in land use planning projects, the land use planner can benefit from discussing “practical” problems of the project in relation to flood risk with insurance companies.

Informal interaction could be strengthened by involving multiple stakeholders specifically with concrete solutions in mind. The insurance industry and municipalities have worked together in a fruitful way as illustrated by the Danish and Norwegian experiences with climate change risks. However, while the insurance industry can help build understanding of risk levels and indicate the consequences of risk increase from for example land use planning decisions, it cannot contribute to resources available to municipalities. Involving national level actors in charge of funding to municipalities could result in even more concrete actions.

One further area where informal interaction could be useful to strengthen is policy actors and the insurance industry working together to raise awareness amongst customers and society at large on environmental risks with the aim of improving risk mitigation. This could be focused on targeted messages around particular environmental risks.

***RECOMMENDATION: Generally, the current good examples from Sweden, Norway and Denmark on insurance companies working together with municipalities and counties to address flood risks as well as climate change risks provide models for successful informal interaction. It is recommended these practices are tried in other environmental risk areas as well. Initiatives to such interaction could be actively taken by the environmental policy sector.***

### **5.2.3 Improving benefits of information provision**

While data and knowledge that the insurance industry has could be relevant in many areas of environmental policy, there are some areas there is clearer link than in others. These are typically areas where there is little or no existing data in the public domain on risk management costs or cost of realised risks. In these areas, insurance companies could potentially be able to estimate the cost of risks more easily than policy makers. One such area is renewable energy: as demonstrated in the case study, reinsurance companies have been able to develop new products in this area to support investment in technologies required to support government targets.

As highlighted earlier, the use of independent agencies to work with data can make sharing sensitive insurance industry information with policy actors more feasible. Yet it is important to note that it is not so much a challenge of data not existing, but that the data is not known about or that it is not used appropriately. This may be because data is not clearly understood, in which case information provision needs to happen through some form of contact between the insurance industry and policy actors and not just one party independently trying to make sense of the data at hand.

In order to further understand the challenges that risk management requirements and expectations set, a common forum at a Nordic level of the policy sector, and the insurance industry, associated other policy sectors (for example technical safety regulators; rescue services as well as for example taxation experts), researchers as well as potentially industries could provide a fruitful environment for increased information sharing as well as possibilities for informal interaction. In reality, such forums work best if they provide the potential for face to face contact and wide sharing of experiences. As well as a common forum, a common climate adaptation and environmental risk R&D program coordinated e.g. by a Nordic body, aimed at increasing information sharing could be beneficial.

***RECOMMENDATION: It is recommended that a Nordic Conference on environmental risks and environmental policy is organised either as a separate event or in conjunction with other events. To meet objectives of enhancing understanding of risk management challenges, the conference should have a broad focus on risk management as part of environmental policy, aiming to both exchange information and experience of the effectiveness of different policy instruments as well as debate how information exchange could be made more effective. Participants should include representatives from the all levels of the environmental policy sectors in each country,***

*insurance companies, researchers and industry associations as well as potentially representatives of insurance policy holders. The potential need for having an annual or biannual event focusing on environmental risk management and environmental policy should be explored. The conference could also be used to evaluate the feedback from the field on whether a common environmental risk and policy instruments R&D program is needed.*



## Appendix 1. Abbreviations and terminology

### E

**Eco-innovation:** a term used to describe products and processes that contribute to sustainable development. Eco-innovation is the commercial application of knowledge to elicit direct or indirect ecological improvements. It is often used to describe a range of related ideas, from environmentally friendly technological advances to socially acceptable innovative paths towards sustainability

**Environmental policy:** the legal and strategic framework governing environmental issues, which can include any action deliberately taken to manage human activities with a view to prevent, reduce, or mitigate harmful effects on nature and natural resources, and ensuring that man-made changes to the environment do not have harmful effects on humans.

**EV:** Electric vehicle

**Ex ante:** before the fact

**Ex post:** after the fact

### F

**Flood insurance:** specific insurance coverage against property loss from flooding

**Flood water directive:** Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007. This Directive now requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. With this Directive also reinforces the rights of the public to access this information and to have a say in the planning process.

### G

**Green Business development:** Development of business that is considered to be sustainable and environmentally friendly, often minimizing the ecological footprint.

### I

**Insurance model:** The system how risk of loss is transferred from one entity to another in exchange for monetary payment.

**Insurance premium:** Periodic payment on an insurance policy

**Insurance industry:** Companies that offers insurance policies to the public, either by selling directly to an individual or through another source such as an employee's benefit plan. An insurance company is usually comprised of multiple insurance agents. An insurance company can specialize in one type of insurance, such as life insurance, health insurance, or auto insurance, or offer multiple types of insurance

**Insurance policy:** written contract or certificate of insurance

**L**

**Liability insurance:** Liability insurance is a part of the general insurance system of risk financing to protect the purchaser (the "insured") from the risks of liabilities imposed by lawsuits and similar claims

**M**

**Market penetration:** the extent to which a product is recognized and bought by customers in a particular market

**N**

**Natural hazard:** a threat of a naturally occurring event that will have a negative effect on people or the environment

**NGO:** Non-Governmental Organization

**P**

**Polluter pays principle:** The polluter-pays principle is the principle according to which the polluter should bear the cost of measures to reduce pollution according to the extent of either the damage done to society or the exceeding of an acceptable level (standard) of pollution.

**R**

**Reinsurance:** a contract by which an insurer is insured wholly or in part against the risk he has incurred in insuring somebody else

**Risk:** exposure to the chance of injury or loss

**Risk mitigation:** A systematic reduction in the extent of exposure to a risk and/or the likelihood of its occurrence. Also called risk reduction.

**R&D:** Research and Development



## Appendix 2. List of interviewees

Agustsdottir, Sigrun, Director, Department for Legal and Administrative Affairs, Environment Agency of Iceland

Bacani, Butch, Programme Officer, Asset Management & Insurance, UNEP FI

Edström, Kenth, Environment Director, IF Insurance

Haaland, Rune, Norwegian Electric Car Union

Halldorsdottir, Vigdis, Lawyer, Icelandic Financial Services Association

Hannisdahl, Ole Henrik, Grønn Bil

Holma, Eero, Managing Director, Nordic Nuclear Insurers

Imsland, Trygve, VP Insurance, Statoil

Johannsdottir, Lara, MBA, PhD Candidate, University of Iceland

Kemppinen, Veli-Pekka, Director, IF Insurance

Kivisaari, Esko, Deputy Managing Director, Strategic Planning, Insurance Market, Federation of Finnish Financial Services

Lillienau, Anders, Expert, Swedish Environment Ministry

Moser, Julia, Underwriter, Green Tech Solutions, Munich Re

Odermatt, Simon, Assistant Vice President, Property and Specialty, Swiss Reinsurance Company

Olsson, Torbjörn, Climate Expert, Länsförsäkringar AB

Peltonen, Lasse, Head of Research, YTK, Aalto University

Saarnilehto, Merja, Senior Advisor, Ministry of Environment, Finland

Sandholt, Rune, Communications Consultant, Codan

Spiegel, Andreas, Senior Climate Change Advisor, Swiss Reinsurance Company

Stenbro, Tom Anders, CSR Advisor, Tryg Insurance

Tangerås, Carsten, Marketing Manager, Tryg Insurance

Voysey, Andrew, Secretary, ClimateWise



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Author(s) Sanna Ahvenharju, Ylva Gilbert, Julia Illman, Johan Lunabba, Iivo Vehviläinen		
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Title <b>The role of the insurance industry in environmental policy in the Nordic countries</b>		
Abstract <p>Holistic management of climate change was chosen as the main theme under the Finnish Presidency of the Nordic Council of Ministers in 2011. The aim was to strengthen and unify the Nordic countries' role as a player in climate issues. To achieve this, comprehensive and cross-sectoral commitment and cooperation is required. Reduction of risk to society caused by the environment as well as reduction of risk to the environment is one of the areas where overarching policy objectives and coordinating measures are needed. Neither the insurance industry's risk assessment and risk management expertise nor the use of insurance as a policy instrument has been widely used in environmental policy in the Nordic countries. This study was commissioned by Nordic Innovation at the request of the Nordic Council of Ministers to clarify the current and potential role of the insurance industry in Nordic countries' environmental policy.</p> <p>The study included a review of existing research complemented with primary data gathering through interviews. Policy areas where insurance could prove to be an effective tool for implementing environmental policy were identified. The findings indicate that interaction between the insurance industry and environmental policy actors has an important role to play in decision making on the most effective ways to manage environmental risks, in sharing data that both the environmental policy sector and insurance industry can benefit from, and in facilitating better understanding of environmental risks including raising public awareness. The interaction and information flows between the insurance industry and environmental policy actors were categorised into three types: formal interaction; informal interaction; and information provision. These types differ with regard to the aims and objectives of the actors involved and the benefits and challenges associated with interaction. Analysis of the ways and the extent of which current interaction and information flows occur provides insight into what can be gained in environmental risk management through enhanced interaction.</p> <p>This study was carried out by Gaia Consulting Ltd in the summer and autumn of 2011. The work was guided by an advisory group consisting of insurance industry representatives from the Nordic countries led by Mr. Marcus Zackrisson (Nordic Innovation) and Ms. Kaarina Huhtinen (Finnish Environment Institute).</p>		
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