Arguing about climate change : judging the handling of climate risk to future generations by comparison to the general standards of conduct in the case of risk to contemporaries

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Chapter 3: Regulation of climate change and the reasonable man standard

1. Introduction

Climate change due to the emission of greenhouse gases involves substantial risk of damage to human health and property (IPCC, 2007a, 2007b). Because of the inertia of the climatic system, however, most of the impacts of our present acts will not be clearly felt for another 50 years or more, when the planet is occupied by future rather than present generations (Hansen, 2005; Wigley, 2005; Meehl et al., 2005).[1] At various summits and in many national policy reports the international community has therefore stated that it considers climate policy a matter of intergenerational justice (see e.g. UNCHE, 1972; WCED, 1987; UNFCCC, 1992; UNCED, 1992; UNESCO, 1997; UK Government, 1999). The Parties to the United Nations Framework Convention on Climate Change (1992), for example, have stated that they are "determined to protect the climate system for present and future generations". In 1997, the general conference of UNESCO adopted the 'Declaration on the Responsibilities of the Present Generations Towards Future Generations', of which Article 5.2 states that "The present generations should ensure that future generations are not exposed to pollution which may endanger their health or their existence itself". What exactly would intergenerational justice with respect to the handling of climate risk entail, however? Justice is difficult to define, but the formal requirement of justice that equal cases be treated equally and different cases differently is an important starting point for any policy on justice. Amongst other things, this requirement means that every person should receive the same treatment under the law and the same treatment from the authorities. To treat people differently, one must have relevant moral grounds (see e.g. Rawls, 1972; Shrader-Frechette and Persson, 2001). Therefore, the question is from what part of the legal system of regulations governing the conduct of the people of a community, society or nation, relevant rules can be obtained for the handling of climate risk.

Since the emission of greenhouse gases involves risk of harm to others' health and property, and this harm is not an intentional wrong-doing (*dolus*), but an unintentional side-effect of our acts (*culpa*), there are two

[1] Throughout this chapter, the term 'future generations' refers to all those who will exist in the future, but are not yet conceived and born. Thus, the first members of future generations will be born in nine months' time, while in a hundred years' time almost everyone will belong to future generations from today's perspective.

obvious ways to handle the risk of climate change: regulation, which requires a potential injurer to take measures to prevent the harm from occurring, and tort law, which seeks to deter the harm by making a potential injurer liable for the costs of the harm should it occur. So far, the focus has been on regulation as a means to reduce the impacts of climate change. In 1997, in Kyoto, a protocol was formulated which asks the industrialised countries to reduce their greenhouse gas emissions by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force and became legally binding on February 16th, 2005. Governments are presently translating this target into regulation, such as the introduction of systems of tradable emission rights (see e.g. European Commission, 2003), emission charges and other policy instruments. There are, however, also some preliminary attempts at climate change litigation (see e.g. Gupta, 2007).

The main purpose of this chapter is not to champion either regulation or tort law as a means of handling climate change, although I shall indeed argue that regulation is a more straightforward instrument. The main purpose is to argue that the argumentation behind such regulation ought to be consistent with the *reasonable man* standard from tort law. Although regulation and tort law may differ methodologically, the formal requirement of justice assumes that types of reasoning that are considered unreasonable under negligence tort law must be unreasonable as well when regulating the emission of greenhouse gases.

Since I believe the general working of regulation needs little further explanation, I shall first describe tort law and the reasonable man standard (section 1). Next, I shall argue why the application of actual tort lawsuits are problematic in the case of climate change (section 2) and why regulation is better equipped to handle the risk of climate change (section 3). Finally, I shall argue that although actual liability suits are problematic in the case of climate change, the argumentation on which regulation is based should be consistent with the reasonable man standard from tort law (section 4).

2. Negligence tort law and reasonable man

A tort is a legal wrong. Tort law is a branch of the civil law; the other main branches are contract and property law. Generally, two aims are distinguished in tort law: to provide relief for damages incurred (corrective justice) and to deter others from committing the same harms. It should be noted, though, that different theories of torts exist, claiming either corrective justice to be the primary aim of tort law (see e.g. Coleman, 1992; Weinrib, 1995; Ripstein, 1998) or deterrence instead (see e.g. Sheinman, 2003). According to the economic approach to tort law the primary aim is *efficient* deterrence, i.e. minimizing the sum of the costs of accidents and the costs of

avoiding them (see e.g. Coase, 1960; Calabresi, 1961, 1970; Posner, 1972, 1973). It is difficult, however, to label one of the aims of tort law as primary, since tort law effectively *results* in both deterrence and compensation. Since the primary aim of this chapter is to investigate the relevance of tort law for judging the argumentation behind the regulation of greenhouse gas emissions, I focus on deterrence and disregard the issue of compensation. The central conclusion of this chapter will not depend, however, on which of the aims of tort law is to be considered primary.

Of particular interest is the *reasonable man* standard from *negligence* tort law. In our society, everyone has a legal duty not to cause injury to others, whether with or without intent. Negligence is a kind of conduct that falls below the standards of behaviour established by law for the protection of others against unreasonable risk of harm. Other branches of tort law include intentional torts (*e.g.* intentionally hitting a person) and strict liability torts (*e.g.* liability for making and selling defective products). A person has acted negligently if he or she has departed from the conduct expected of a reasonably prudent person acting under similar circumstances. As Lord Atkin argued in *Donoghue v. Stevenson* ([1932] All ER Rep 1; [1932] AC 562; House of Lords):

> "The rule that you are to love your neighbour becomes in law, you must not injure your neighbour; and the lawyer's question, Who is my neighbour? receives a restricted reply. You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law is my neighbour? The answer seems to be - persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question."[2]

To establish negligence, a plaintiff must prove that the defendant had a duty to the plaintiff, that the defendant breached that duty by failing to conform to the required standard of conduct, that the defendant's negligent conduct was the cause of the harm to the plaintiff, and that the plaintiff was, in fact, harmed or damaged.

[2] It is important to note that Lord Atkin does not hold a restricted opinion about who is to be considered a neighbour, as he further explains: "So A. L. Smith L.J.: "The decision of Heaven v. Pender (11 Q. B. D. 503, 509.) was founded upon the principle, that a duty to take due care did arise when the person or property of one was in such proximity to the person or property of another that, if due care was not taken, damage might be done by the one to the other." I think that this sufficiently states the truth if proximity be not confined to mere physical proximity, but be used, as I think it was intended, to extend to such close and direct relations that the act complained of directly affects a person whom the person alleged to be bound to take care would know would be directly affected by his careless act."

Sometimes the distinction between negligence and recklessness is made, depending, respectively, on whether the defendant acted unknowingly with respect to the risk or with foresight (see e.g. Feinberg, 1975: 71). When acting recklessly, a person consciously or knowingly disregards a substantial and unjustifiable risk. When acting negligently, a person exposes others to substantial and unjustifiable risk unknowingly, although he could and should have been aware of the risk.

Negligence tort law recognises the fact that risk of harm to others can never be avoided entirely. Such an absolute demand would either be physically impossible to fulfil or would bankrupt society, and some risk, however small, will usually remain. Therefore, common law requires us to take the care that a *reasonable man* would exercise under the circumstances. According to the Second Restatement of Torts (§ 291) of U.S. common law, for example (see also the First and draft Third Restatement of Torts of U.S. common law (Wright, 2002)):

> "Where an act is one which a reasonable man would recognize as involving risk of harm to another, the risk is unreasonable and the act is negligent if the risk is of such magnitude as to outweigh what the law regards as the utility of the act or of the particular manner in which it is done."

The reasonable man or reasonable person standard is a legal fiction: a person appropriately informed, capable, aware of the law, and fair-minded. The reasonable man is allowed to exercise self-interest and is not required to give his money to the poor. He exercises due care, however, to ensure that his acts do not injure others. He may weigh up the risk itself and the cost of alleviating it. In some instances legal formulations require a quantitative cost-benefit analysis. According to a famous ruling by judge Learned Hand in the *Carroll Towing* case (Hand, 1947; see also Posner, 1972, 2002; Landes and Posner, 1987), the defendant is found negligent if the cost of precautions is less than the damage multiplied by its probability:[3]

> "[T]he owner's duty, as in other similar situations, to provide against resulting injuries is a function of three variables: (1) The probability that she will break away; (2) the gravity of the resulting injury, if she does; (3)

[3] Positive law sometimes even requires consumption losses to the risk bearer to be afforded a higher weight than consumption losses to the risk creator. In the United Kingdom the Law Lords were asked in 1949 to give a definitive ruling on the meaning of 'reasonably practicable'. Lord Justice Asquith (1949) ruled that "'Reasonably practicable' is a narrower term than 'physically possible' and seems to me to imply that a computation must be made by the owner in which the quantum of risk is placed on one scale and the sacrifice involved in measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that if it be shown that there is a *gross disproportion* between them - the risk being insignificant in relation to the sacrifice - the defendants discharged the onus on them." (emphasis added).

> the burden of adequate precautions. Possibly it serves to bring this notion into relief to state it in algebraic terms: if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i.e., whether B less than PL."

It should be noted that the hand interpretation of reasonableness is not undisputed (see e.g. Gilles, 2001; Wright, 2002; Zipursky, 2007). Some have remarked that in most cases there is more to the determination of negligence or reasonableness than the weighing of benefits and risk of harm, or that not all the relevant factors can be put in a single (economic) metric. However, since there is nothing more involved in the issue of discounting than the weighing of costs and benefits, we do not have to be concerned with this criticism here. A second criticism is that the Hand formula would not be stringent enough. Wright (1995, 2002) offers an example of possible criticism: "It is not properly respectful of the equal dignity and autonomy of others, and hence not just, for you to impose substantial unaccepted risks of injury or loss upon them merely for your own personal benefit, even if your gain will exceed their loss." This might explain why English law sometimes attaches a higher weight to the injury. When in the United Kingdom the Law Lords were asked in 1949 to give a definitive ruling on the meaning of 'reasonably practicable', Lord Justice Asquith (1949) ruled that

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Generally, however, judges undertake their task in a broad, impressionistic manner (Ogus, 1997).

People do not only have a legal duty to exercise the care of a reasonable man when their acts involve the risk of harm to fellow-countrymen; international treaties also oblige us to take reasonable care when our acts involve the risk of harm to people living abroad, as in the case of transboundary air pollution (see in the context of climate change e.g. Tol and Verheyen, 2004). A landmark case in this context is the decision by the Trail Smelter Arbitral Tribunal (1941) between the United States and Canada concerning American farmers who had suffered damage from sulphur dioxide emissions by a Canadian smelter of zinc and lead ores located in Trail, British Columbia. The arbitral Tribunal declared that "no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is

established by clear and convincing evidence". Furthermore, the arbitral Tribunal agreed with a decision by the Federal Court of Switzerland between the Swiss cantons of Solothurn and Aargau (see Schindler, 1921, p. 174) that "no more precautions may be demanded … near the boundaries of two cantons than are required … in the interior of a canton." In other words, the precautions taken by a state in such a context should be no more and no less than those it would take to protect its own citizens. This responsibility for transboundary pollution has found its way into many contemporary treaties, primarily from its inclusion in the influential Principle 21 of the 1972 UN Conference on the Human Environment (Stockholm Convention), which declares that "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction." This principle was reaffirmed at the UN Conference on the Environment and Development (UNCED) convened in Rio de Janeiro in 1992.

3. Tort-based climate change litigation

Is tort-based climate change litigation feasible in principle? There are various questions that need to be answered (see e.g. Peñalver, 1998; Culley, 2002; Hodas, 2002; Kerr, 2002; Davidson, 2003; Grossman, 2003; Spier, 2006; Posner, 2007). As stated earlier, to establish negligence a plaintiff must prove that the defendant had a duty to the plaintiff, that the defendant breached that duty by failing to conform to the required standard of conduct, that the defendant's negligent conduct was the cause of the harm to the plaintiff, and that the plaintiff was in fact harmed or damaged. I focus here on the following issues, although these certainly do not exhaust the entire palette of legal issues: 1. Causation: did the defendant's acts or omissions cause the damage? 2. Does the defendant have a duty of care to the plaintiff? 3. Do future generations or their representatives have legal standing?

1. Causation: did the defendant's acts or omissions cause the damage?
One of the most problematic aspects of tort-based climate change litigation is the issue of causation. Generally, courts require a plaintiff to prove that the defendant's negligent conduct was the cause of the harm to the plaintiff, i.e. to prove the precise causal link between the specific harm of the plaintiff and the act or omission of the specific defendant in the sense of a *condicio sine qua non*-relationship (or *but for* causation). In the case of climate change this is highly problematic. First, even if there were absolute certainty about mankind's influence on the earth's climate, then it would still be impossible

to distinguish man-made climate change from natural variability of the climate system (the 'background level' or 'confounding factors') in specific cases. Although the frequency of cyclones in a particular area might triple, it would be impossible to prove that a particular cyclone was caused by the enhanced greenhouse effect. Second, even if the damage could be ascribed to climate change, it would be impossible to ascribe such impacts to particular present acts. Although general causation can be argued for, individual causation is problematic (Peñalver, 1998).[4]

What *might* be established with sufficient confidence are the probability that a present individual act contributed to man-made climate change and the probability that certain damage was due to man-made climate change. On a person-to-person basis, this will generally result in negligible risks. If I travel the world by air transport, this will create a negligible risk for a specific future individual. However, the *aggregated* risk to the whole future world community would by no means have to be negligible. This aggregated risk is precisely what economists estimate when calculating marginal damage costs of carbon dioxide emissions (see e.g. Tol, 2005). The marginal climate damage of one intercontinental holiday might for example be around 1000 Euro, an amount worth contemplating. Divided over billions of future people, the individual impact is negligible, however. Tort law is not well equipped to handle such dispersed impacts. Nevertheless, a proportional liability rule (in relation to the probability of causation) is in fact gaining ground in tort law (Green, 2004; see for analogues in English law: Howarth, 2002). In the case of *Sindell v. Abbott Laboratories* 607 P.2d 924 (1980), which involved the mass disaster of the DES drug, the court determined each manufacturer to be liable for a fraction of every victim's harm, with liability determined in proportion to the manufacturer's market share (Ben-Sharar, 2000). Such a proportional liability rule is indeed required from the point of view of optimal and efficient deterrence (Calabresi, 1970) and courts may in the future be willing to consider such a rule in the case of climate risk (Verheyen, 2005). Lipanovich (2005) believes that in this respect the tobacco tort litigation can be a model for suits against large greenhouse gas emitters, such as the auto and oil industry. Furthermore, it should be noted that since we are here concerned about the meaning of tort law for regulation

[4] The difficulties in establishing causal links over a long time period are illustrated by the recent cases to win reparations for the U.S. descendants of African slaves. In one case, for example, the company Aetna has been sued for making profits from slavery by selling insurance policies to protect slaveholders from loss in the event of their slaves running away (Deadria Farmer-Paellmann v. FleetBoston Financial Corporation et al., 02cv1862 (United States District Court for the Eastern District of New York, March 26, 2002)). One of the main problems, however, is that plaintiffs have to show that their particular situation is a harm caused by acts one and a half century ago and that this harm is related to particular ancestors of the plaintiffs being slaves working for the particular precursor of the defendant (see e.g. Brophy, 2004). So far, this has been unsuccessful.

by governments, we do not have to establish the precise risk created at the individual level, but at the level of nations.

2. Does the defendant have a duty of care to the plaintiff?
This question has two components. The defendant has a duty of care to the plaintiff if the damage is a wrongful harm, and if the damage was reasonably foreseeable. With respect to the first component, I refer to the previous chapter, in which I argued that governments are indeed justified in considering climate damage a wrongful harm, i.e. a violation of future generations' rights to bodily integrity and property. Moreover, as stated in the introduction of this chapter, governments have expressed their willingness to accept a duty of care to future generations, in particular in the case of climate change.

The second question is whether climate damage is reasonably foreseeable. It should be noted that the answer to this question is unrelated to the question of whether the damage is reasonably *acceptable*. The question is only whether the risk is not too far-fetched to contemplate before acting, not so remote that a reasonable man would not think it over. In section 2, I discussed the science of climate change and concluded that the emission of greenhouse gases involves substantial risk of damage to future generations' health and property. There are scientifically based harm scenarios available supporting the assumption that such a risk can pose a threat to future people (Ekeli, 2004). Since the public debate about the science of climate change has been going on for many years across the media landscape, climate damage to future generations is a *reasonably foreseeable* risk (see also Kerr, 2002: 13); it is not so remote that taking climate change into consideration is an unreasonable requirement. With respect to climate change, future generations are – in Lord Atkin's words – our neighbours. Any reasonable person driving a fossil-fuel powered car could and should foresee the risk involved of climate change, even if they are unable to assess whether their particular contribution to the risk is reasonably acceptable. This holds particularly at the level of governments.

If what is reasonably foreseeable were to imply foreseeing the precise chains of cause and effect, then this would be problematic, as argued before. However, this is not required. If I drop a brick from an open window, it is reasonably foreseeable that a passer-by might get hurt, although I do not know for certain that this will occur or know who this passer-by will be. So the requirements for reasonable foreseeability *ex ante* are less stringent than the requirements to prove a *condicio sine qua non*-relationship *ex post*. According to Ekeli (2004), it would be unreasonable to interpret the foreseeability condition in such a way that it demands absolute certainty regarding the harmful consequences of an action: "Such an interpretation is unreasonable because it will exclude the possibility that a person can be held responsible for his or her actions at all. Absolute certainty about the

consequences of an action is impossible in principle." In this context, Ekeli cites Lackey (1986: 636-7):

> "What is of moral interest in what we ordinarily call 'the infliction of harm' is itself nothing other than the infliction of a risk. Any infliction of harm can be decomposed into some basic action, not by itself the infliction of harm, and certain causal and perhaps conceptual consequences that constitute the harm. Since the basic action cannot suffice to produce the causal consequences, all it does is to increase the probability that the harm will ensue. ... All our moral attention must center on the basic act, evaluated in terms of the risk it generates. To take risk seriously, then, is to treat the infliction of risk as morally akin to the infliction of harm. Where there is a moral rule against inflicting harms, there is a moral rule against imposing risks, regardless of whether the risk is realized."

In conclusion, I do not see any problem in the recognition of a duty of care to future generations with respect to climate change.

3. Do future generations or their representatives have legal standing?

In contrast to regulation, tort law seeks to deter the harm by making a potential injurer liable for the costs of the harm should it occur. The fear of future liability should deter potential injurers. Therefore, tort-based actions are generally initiated *after* loss or damage has occurred and tort law does not generally require a potential injurer to take measures to prevent the harm from occurring. In other words, to have a case one has to prove *injury in fact*. Taken literally, however, this requirement makes climate change litigation virtually impossible (Rosenkranz, 1986), since the defendants will already be in their graves before harmed plaintiffs can file suits. The reason is the time lag between the emission of greenhouse gases and rising temperatures, due to the thermal inertia of the oceans. The oceans require time to warm (or cool) in response to the forcing. This response time depends on the rapidity with which the ocean circulation transmits changes in surface temperature into the deep ocean. Hansen (2005) estimates the climate response time at about 50-100 years (see also Wigley, 2005; Meehl et al., 2005). In other words, if we experience climate change today, it will not be due to our contemporaries' emissions, but due to the acts of our ancestors. Whether we decide today to emit more or less greenhouse gases will hardly result in a climatic change noticed by ourselves during our own lifetimes, but by people who are as yet unborn. Therefore, future liability can hardly frighten and deter present potential injurers in the case of climate change.

A way out of this problem would be an injunction, such as a *Quia timet* (because he fears) injunction: a court order requiring individuals to take reasonable care when emitting greenhouse gases in view of the associated risk (Kerr, 2002; Howarth, 2002; Spier, 2006). Generally, an

injunction is an extraordinary remedy that courts utilize in special cases where preservation of the status quo or taking some specific action is required in order to prevent possible injustice; for example, to ensure to a plaintiff that the defendant will not make him- or herself judgment-proof, nor insolvent in some way. In the case of climate change, the rationale behind an injunction might precisely be the fact that the defendant makes himself judgment-proof by sheer time, i.e. by not being alive at the time of damage. There are, however, several problems with an injunction in the case of climate change. First, injunctions are generally not available unless the threatened injury to the plaintiff is *irreparable* or *irreversible*, a requirement which is much more stringent than injury that is simply *unreasonable*, according to the Learned Hand formula, for example. Although an intercontinental flight just to see the opera in Sydney might be unreasonable in view of its contribution to climate change, it is difficult to argue that the particular flight itself leads to irreparable or irreversible damage. The second question is who could demand such an injunction. Future generations are not around and contemporaries acting on behalf of future generations face the problem of legal standing or *locus standi* (Davidson, 2003; see also Hodas, 2000; Mank, 2005). Legal interest criteria of standing often demand that an individual or a group has some kind of personal stake in the controversy in question (Ekeli, 2006). In U.S. law, there is a Prohibition of Third Party Standing: a party may only assert his or her own rights and cannot raise the claims of a third party who is not before the court. However, as Davidson notes, future generations occupy a position that resembles, both legally and practically, the position of other equitably protected 'incompetent' classes, which cannot request attorney representation or directly express any of their own interests or preferences, such as the mentally disabled or infants. Still, however, representatives must show why they in particular should be the representatives. Third, if the injunction route is followed, the distinction between tort law and regulation fades, its main difference being that an injunction is employed at the urgings of private parties (Shavell, 1984). If the issue becomes *ex ante* norm-making instead of *ex post* norm-enforcing, however, regulatory authorities are in a much better position than courts to handle the risk of climate change, as I shall argue in the following section.

In conclusion, climate change litigation is problematic to say the least. Although a duty of care can be established, there will be few cases in which plaintiffs are able to prove that the defendant's negligent conduct was the cause of the harm to the plaintiff. Furthermore, either the defendants will already be defunct by the time the causal relationship can be established, or the difficult route of an injunction must be followed.

4. Why climate change is better regulated

Some authors are optimistic that climate change litigation may indeed prove feasible. However, even if climate change litigation were to be successful in some cases, it will certainly not lead to *optimal deterrence*: making society take all measures to reduce the emission of greenhouse gases of which the costs would be less than the harm prevented. Shavell (1984) cites four considerations when choosing between liability for harm versus regulation of safety (see also Landes and Posner, 1984; Kolstad *et al*., 1990). In the case of the emission of greenhouse gases, all these considerations point towards a preference for regulation.

1. Difference in knowledge about risky activities between a regulatory authority and private parties.
The difference in knowledge might be over the value of parties' activities, the costs of reducing risks, or the probability or magnitude of risks. If the private parties possess information about these elements that is superior to the regulatory authority's, then, other things being equal, it would be desirable for them to be the parties performing the calculations to decide how to control the risks (Shavell, 1984). In the case of climate change this knowledge is divided over both governments and private parties. Governments are clearly at an advantage with respect to knowledge about the probability or magnitude of climate risks, since even the IPCC established and paid for by governments via the United Nations Environment Programme has a hard job assessing the impacts of climate change and determining the marginal costs of greenhouse gas emissions. Such a thorough assessment of the scientific literature by private parties would be an almost impossible task. Furthermore, it is difficult for private parties to establish the emissions due to specific activities, such as individual car journeys. Therefore, it also seems unfeasible for private parties to determine the specific emissions of each act and weigh up the costs and benefits of that act. Even if private parties could obtain all the relevant information, the social costs of assessments and cost-benefit analyses at the level of individual consumption and production acts would be enormous.

With respect to knowledge about the value of parties' activities and the costs of reducing risks, however, private parties are clearly at an advantage, since the number of activities involved in greenhouse gas emissions and the variety of measures to reduce such emissions are enormous. Therefore, direct regulation such as the prescription of specific measures and techniques seems unfeasible or highly inefficient. Although knowledge is thus divided, there is a kind of regulation which could bring together both kinds of information: economic instruments, such as tradable emission rights and emission charges. In the case of emission charges or tradable emission rights, governments attach a price to emissions equal to

the estimated marginal costs of damage. These instruments leave it to private parties, however, to assess on the basis of their own information whether it is better to reduce emissions or pay the calculated price. An increase in petrol prices reflecting the marginal costs of greenhouse gas emissions would integrate cost-benefit analysis of emission reduction in every individual consumption or production decision.

2. The possibility that private parties would not be able to pay fully for harm done.
To the extent that this is so, potential liability would not furnish an adequate incentive to reduce risk. Specifically, such would be the case because liability exceeding a party's assets would be seen by him only as liability equal to his assets; thus the party's motive to reduce risk would be less than society's (Shavell, 1984). This argument can only be in favour of regulation, but not against it. It is less relevant in the case of climate change,

3. The chance that private parties would not face suit for harm done.
Shavell (1984) gives three reasons. First, the chance of dispersal of harm over many victims, making it less than worthwhile for any particular victim to initiate legal action. Second, the passage of a long period of time before harm eventuates, raising the possibility that by the time suit could be brought, the evidence necessary for a successful action would be stale or that the responsible parties would be defunct. Third, the difficulty in attributing harm to responsible parties, for example due to background risk or the contribution to the risk by different parties. Particularly in cases where many different actors contribute to a problem and cause-effect relations are based on statistical data and models, regulation seems better equipped than tort law to handle risk of harm. As explained earlier, all these reasons hold to an extreme extent in the case of climate change.

4. Administrative costs incurred by private parties and the public in connection with use of the legal system and with regulation.
An advantage of litigation is that under liability law administrative costs are borne only if harm occurs, while in the case of regulation there are always administrative costs. However, because of the wide dispersion of climate damage an enormous number of claims might result, with equally enormous administrative costs. In the case of asbestos litigation in the United States, for example, over 60 percent of the $70 billion paid in settlements was spent on administrative costs, primarily attorneys' fees (Kakalik *et al*., 1984; Elliott, 1985). In the case of regulation via taxation, the administrative costs are low, especially if an early link in the chain from energy production to consumption is chosen; in the case of schemes of tradable emission rights, the administrative costs are more substantial (enforcement, trading, control et cetera), but still small compared to the expected costs of litigation.

Finally, it should be mentioned that there is also a political side to the choice between regulation and litigation. The choice also depends upon citizens' attitudes towards their government and their willingness to be regulated by it. Some authors have suggested climate change litigation as an answer to government's inability (or reluctance) to formulate climate policy (see e.g. Peñalver, 1998). However, it should be noted that the United States, in particular, has been unwilling to participate in the Kyoto Protocol and also has a strong tradition of settling disputes by means of litigation. In the European Union, on the other hand, which has been one of the champions of the Kyoto Protocol, citizens are generally much less suspicious of their governments imposing regulating and taxation.

5. Why regulation should be consistent with tort law

So far, I have cited several reasons why regulation is more appropriate than tort law for handling the risk of climate change. Nevertheless, the *reasonable man* standard from *negligence* tort law does offer important leverage points for the discussion about climate damage regulation. First, although regulation and tort law may differ methodologically, the formal requirement of justice assumes that types of reasoning that are considered unreasonable under negligence tort law must likewise be unreasonable for regulating the emission of greenhouse gases. Standards for good governance include the principle of due care and the principle of equality ('equal cases must be treated equally and different cases with due observance of their difference').

Second, the reasons why regulation is more appropriate than tort law for handling the risk of climate change are all practical reasons rather than morally relevant reasons justifying a different level of 'due care'. In other words, the precautions required from *reasonable man* under tort law are also required under regulation. The reason is that although it is difficult or impossible for a plaintiff to establish negligence in the case of climate change, the duty of care can indeed be established: climate damage is a wrongful and reasonably foreseeable harm. This duty of care is not diminished by the fact that the risk creator cannot be held liable once he is dead, nor by the fact that the dispersion of risk over many potential victims makes it impossible to establish *but for* causation.

Apart from these two reasons why regulation should be consistent, many choices and questions are encountered in the design of climate change regulation which *can* be considered from the point of view of legal reasonable man. In other words, the requirement of consistency also has practical meaning. Here I briefly discuss three issues, the first of which will be further investigated in the following two chapters:

1. Climate policy is increasingly based upon cost-benefit analysis. One of the pivotal issues in such cost-benefit analysis is how to weigh the benefits of climate policy, i.e. the climate-change-related damage prevented decades hence, against the consumption we would forfeit today by incurring expenses on climate damage prevention. The standard approach in conventional economic analysis is to assume a *social rate of time preference*, whereby society is held to prefer present consumption over future climate damage because future generations are empathically remote from us and are moreover expected to be much wealthier. According to the reasonable man standard, however, neither geographic (empathic) distance nor differences in wealth between the risk creator and risk bearer are taken into account in setting the standard of reasonable care (Arlen, 1992; 2000).

2. In cost-benefit analysis, economists are often optimistic about the capacity of technological development and innovation to solve future environmental problems. This view results in low estimates of the future costs of damage and mitigation, obtained by extrapolating past technological developments to the future. It is then argued that scarcely any environmental policy is required to mitigate long-term risks, or that mitigation should be deferred to the future (see for an example from the climate debate: Wigley, Richels and Edmonds, 1996). However, although one could not argue for a single, objectively 'right' approach to technological progress, it is a matter of fact that in today's society there are strong *de facto* limits to the degree of anticipation of future technological or scientific developments that is considered appropriate in the case of risk to others. One could hardly imagine someone responsible for infecting another person with HIV or Creutzfeld-Jacob defending themselves by saying: "The risks were known to me, but the disease only manifests itself several decades after infection. History shows that medical science has found a cure for almost every disease in such a time span." It is unthinkable that such a defence would convince a judge, even if it were accompanied by a sound cost-benefit analysis. When creating risk to others, reasonable man would base his decisions at least on currently available technology or seriously account for the risk that the anticipated technological developments will not materialise.

3. In climate policy making, there is an imbalance between the certainty required about the impacts of climate change and the certainty required about the economic impacts of climate policy. While there is an insatiable demand for stronger evidence and indication of the risks of climate change, indications vis-à-vis the (short-term) economic costs of risk prevention are generally readily accepted. What if the economic models used by governments to predict, say, economic growth and future employment were to be scrutinised with the thoroughness with which climate models are examined by the International Panel for Climate Change and further questioned in public debate? This imbalance can also be illustrated by reference to the lawsuits in the United States against the tobacco industry.

Even today's state-of-the-art knowledge about the health risks of smoking offers no absolute proof that smoking indeed causes cancer. There are still scientists who question their colleagues' results. However, although the relationship between smoking and cancer is still the subject of research, US courts recently ruled that the *indications* of health risks reported in scientific journals in the 70s should already have been sufficient for the tobacco industry to change its ways (Engle v. Reynolds Tobacco Co, 2000). It seems reasonable to assume that an 'intergenerational court' would consider the first or second assessment report by the Intergovernmental Panel on Climate Change (IPCC, 1990; 1996) as providing at least as much of an indication of risk to future generations as the 70s reports of the health risks of smoking. Although I shall not investigate this issue further, it seems that reasonable man would consider climate change 'reasonably foreseeable' at an earlier point than some governments, which still today require greater proof of climate change before changing their ways.[5]

6. Conclusion

In this chapter, I have argued that the application of actual tort lawsuits is problematic in the case of climate change. Although a duty of care can be established, there will be few cases in which plaintiffs are able to prove that the defendant's negligent conduct was the cause of the harm to the plaintiff. If such a causal relationship can be established, the defendants will probably already be defunct. However, although regulation seems better equipped to handle the risk of climate change, the argumentation on which regulation is based should be consistent with the reasonable man standards from tort law. Although regulation and tort law may differ methodologically, the formal requirement of justice assumes that types of reasoning that are considered unreasonable under negligence tort law must likewise be unreasonable for regulating the emission of greenhouse gases. Therefore, the point of view of reasonable man has implications for how future benefits and present costs are weighed up in cost-benefit analysis, how expectations about technological progress are dealt with, and how scientific uncertainty and controversy are handled.

[5] Interesting to note in this respect is the plea of Lord Woolf, the Lord Chief Justice of England and Wales, for an environmental court, which he believes should have "general responsibility for overseeing and enforcing the safeguards provided for the protection of the environment which is so important to us all" (Woolf, 1992, 2001).

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