

ADVISORY LETTER

The Minister for Infrastructure and the Environment
Ms M.H. Schultz van Haegen

The State Secretary for Infrastructure and the Environment
Ms W.J. Mansveld

P.O. Box 20901
NL-2500 EX The Hague

Date:	26 June 2014	Contact person:	F.W. de Haan
Our ref.	RLI-2014/599	Tel.:	06-46152496
Cc:	-	Email:	f.w.dehaan@rli.nl
Subject:	Risks assessed Towards a transparent and adaptive risk policy		

Dear Minister, State Secretary,

On 25 November 2013, you requested the Scientific Council for Government Policy (WRR) and the Council for the Environment and Infrastructure (Rli) to advise on an integrated risk assessment framework¹. The purpose of such a framework is to increase the transparency of decision-making processes, whereupon risk policy would enjoy greater support, become easier to implement, and gain in efficiency. The Rli wishes to propose a review of current risk policy which underlies various policy dossiers within your department. We refer you to our letter of 4 April 2014, in which we present various agenda points further to a brief advisory process.

Context

The Council notes that a strategic discussion is currently being conducted with regard to the manner in which norms are calculated and applied, prompted in part by the Senate's debate of legislation on the transport of hazardous materials (*Wet Basisnet*) in July 2013. There have been calls for greater cohesion to be introduced to risk assessment within the safety policy applied by the Ministry of Infrastructure and the Environment.

Preparations are now being made for the implementation of the *Omgevingswet*, legislation intended to integrate environmental management and spatial planning regulations. The conflation demands further harmonisation of the concepts applied and the underlying norms. This too prompts discussion about the principles upon which those norms are based.

The Council further notes that the societal discussion has been fuelled by media coverage surrounding actual incidents (Chemie-Pack and Odfjell, among others), as well as the contents of advisory reports such as *Evenwichtskunst*² ('A balancing act'), which considers the division of responsibility for physical safety.

¹ IENM/BSK-2013/263802

² Scientific Council for Government Policy (WRR, 2011). *Evenwichtskunst. over de verdeling van verantwoordelijkheid voor fysieke veiligheid*. The Hague



Agenda points for a new risk policy: why now?

The discussion surrounding a new risk policy is not new. This advisory letter follows on from a series of comprehensive and forward-looking reports on risk policy. It is produced in the context of changing practice. There are implicit developments which should now be made explicit.

The Council proposes a risk assessment framework in which decision-making is less reliant on numerical norms. Rather, greater weight must be attached to moral considerations such as the fair division of benefits and costs. Stakeholders' concerns about the uncertainty of risks should also be taken into account in a fully transparent manner.

Risks are seldom certain; a scientific approach can, to some extent, reveal the degree of uncertainty they involve. Nevertheless, people have expectations or beliefs with regard to the outcomes of uncertainty. This is why there is a divergence of opinion about risks, and the extent to which they may be considered 'acceptable', within the societal debate. If it is to take due account of the various expectations and standpoints, risk policy must be both adaptive and transparent.

Summary: agenda points for a new risk policy

In this advisory letter, the Council wishes to place the following key principles on the agenda.

1. Enhance the consistency of risk policy by differentiating according to type of risk and by applying a broad characterisation.

To characterise a risk as 'chance multiplied by effect' is too narrow an approach. Probability and effect should be described separately. For each risk, apply a classification which reflects the potential impact on people, the environment, the economy, and society at large. A risk policy based on this classification and on the characteristics of risks will be more consistent. Complete consistency is, however, unattainable.

2. Introduce a new consultation process which involves stakeholders in all phases of decision-making about risk management.

Engaged citizens are a valuable source of information about the values at stake. Contact with the public will also provide information about the level of support for policy proposals, and hence their likelihood of success.

3. Explore possibilities for a more equitable division of the benefits and costs of high-risk activities and for a more explicit consideration of the expected benefits against the possible risks.

The expected benefits of a high-risk activity, and the division of benefits and the costs they entail, are important factors in stakeholders' assessment and acceptance of risk. In many cases, these factors will weigh more heavily than a generic, numerical norm such as 'a maximum risk of 10^{-6} per year'.

4. Make a clear distinction between risk avoidance and conditional risk acceptance by using clear language. The choice between the two approaches is, after all, a political one.

In current policy and the ongoing debate, the concept of 'caution' is given various definitions and applications. On the one hand, it is taken to mean refraining from activities which pose an (as yet) unknown or uncertain level of risk: the 'better safe than sorry' approach. At the same time, certain activities are permitted under specific conditions intended to reduce the uncertainty of risks: the 'trial and error' approach. The difference must be made explicit; only then will it become possible to assess the prudence of political decisions.

5. Encourage innovation.

Risk policy must include incentives to further reduce risk in situations which are already permitted. There may be new technological developments which allow risk reduction, or new insights or

spatial developments which demand risk reduction. Possible measures include 'dynamic' permits, phased objectives, and financial incentives.

Elements of a transition programme

The Council has also considered the question of why new knowledge and insights have not yet permeated policy. We present a number of elements which may form the basis of a transition programme towards a new risk assessment framework. As the first step in implementing this advisory report, the Council recommends devoting attention to policy dossiers such as the Delta Programme and the 'Basisnet' (designated routes for the transport of hazardous materials). These dossiers already look beyond the traditional risk norms, albeit implicitly. Our proposed agenda points will then build upon an ongoing development and provide a good starting point for the new approach.

The Delta Programme allows for a differentiation of acceptable risk based on the possible consequences of a major incident. Such consequences are not only considered in terms of individual risk, but also in terms of the societal disruption, economic impact, loss of vital infrastructure, and the vulnerability of public functions.

The *Basisnet* policy dossier takes the specific circumstances into consideration in a more implicit way when establishing the various 'risk ceilings' along the transport routes. One factor is the national importance of a specific section of the *Basisnet* system. In the current arrangements, explicit differentiation is confined to disaster response and public self-sufficiency (the ability to cope without organised assistance).

Policy in these areas can be enhanced by allowing a broader and more explicit consideration of all factors. Such consideration will take various effects into account, as well as the concerns of stakeholders and the moral aspects of equity, justice, and the fair division of benefits and costs.

In accordance with the Advisory Bodies Framework Act (*Kaderwet Adviescolleges*), copies of this advisory letter will today be submitted to the President of the Senate and the Speaker of the House of Representatives.

Yours sincerely,
The Council for the Environment and Infrastructure (Rli),



Henry M. Meijdam
Chair



Dr Ron Hillebrand
General Secretary

Issues within current risk policy

The government has for several decades sought a risk policy which is transparent, proportional, and practicable. That policy must be firmly embedded in legislation, address the interests and perceptions of stakeholders, and apply to all domains within the physical environment. Over the course of years, various advisory bodies have produced authoritative reports on this topic. They include:

1989: *Omgaan met risico's: de risicobenadering in het milieubeleid* ('Addressing risks: the risk management approach within environmental policy'), appendix to the National Environmental Policy Plan (NMP)

1994: *Duurzame risico's; een blijvend gegeven* ('Sustainable risks: a permanent consideration'), Scientific Council for Government Policy (WRR)

1995: *Niet alle risico's zijn gelijk* ('Not all risks are equal'), Health Council of the Netherlands (GR)

1996: *Risico, meer dan een getal* ('Risk: more than a number'), Health Council of the Netherlands (GR)

2002: *Perspectieven op milieurisico's* ('Perspectives on environmental risks'), Scientific Council for Government Policy (WRR)

2003: *Nuchter omgaan met risico's* ('A sober approach to risks'), National Institute for Public Health and the Environment (RIVM)

2003: *Verantwoorde risico's, veilige ruimte* ('Responsible risks, safe space'), Council for Transport, Public Works and Water Management / VROM Council

2008: *Voorzorg met rede* ('Caution with good reason'), Health Council of the Netherlands (GR)

2008: *Onzekere veiligheid* ('Uncertain safety'), Scientific Council for Government Policy (WRR)

2011: *Evenwichtskunst* ('A balancing act'), Scientific Council for Government Policy (WRR)

2012: *Belichaming van de kundige overheid* ('The embodiment of skilful government'), Council for Public Administration (ROB)

The Council for the Environment and Infrastructure notes several recurring issues within the current discussion, which may be summarised as follows.

Cost-effectiveness and proportionality

Due in part to decades of government policy, we live in a relatively safe society. Nevertheless, the benefits of safety involve costs to government, the private sector, and society at large.

Implementing safety technology demands investments, while refraining from high-risk activities represents the loss of potential benefits, including economic gains. The costs of applying additional government policy are increasingly disproportionate to the potential reduction in risk. When is 'safe' safe enough?

An ongoing, and as yet unresolved, debate about the proportionality of investments has been fuelled by various incidents and situations. For example, the government has undertaken to purchase 1300 homes which stand beneath high-voltage electricity cables because there is a potential link between exposure to electromagnetic radiation and childhood leukaemia.

Procedural and distributive justice

A high-risk activity which is warranted from the perspective of society as a whole is not automatically acceptable to individual stakeholders. Opposition may be due to the belief that stakeholders were not adequately consulted during the decision-making process (procedural justice) or because those who face the risks of an activity do not enjoy a fair share of the benefits (distributive justice). There has, for example, been widespread public opposition to CO₂ capture and storage in Barendrecht. Current policy fails to take moral questions into consideration, largely ignoring the interests of procedural and distributive justice. This inevitably undermines support for policy.

Uncertain and unquantifiable risks

Various developments, including climate change, the increasing complexity of society, and advances in technology confront the government and society with risks which cannot (yet) be quantified. Their potential effects are unknown, as is the probability of those effects actually emerging. Traditional risk policy does not allow for such uncertainty. How must it be adapted? Where is the appropriate dividing line between risk avoidance (refraining from an activity altogether until more is known) and the conditional acceptance of risk ('trial and error', or 'crossing that bridge when we come to it')? Does the precautionary principle provide adequate direction?

Consistency and cohesion

There are several domains in which risk policy is based on disparate principles. Safety in the workplace adopts the 'zero tolerance' approach. External safety policy, by contrast, applies thresholds below which risks are deemed acceptable. There is also a difference in approach with regard to *security* on the one hand and *safety* on the other. Divergent norms may be applied based on differing degrees of public concern. For example, far more is spent on reducing the risks of transporting chlorine than on reducing those of transporting liquefied petroleum gas. The objective risks do not justify this disparity. To what extent can risk policy be made more consistent?

Given the cohesion between the various aspects of environmental quality, there is a need for a more integrated approach and more balanced decision-making. A risk policy based on specific numerical norms for each domain stands in the way of achieving this aim. Balanced decision-making calls for an adaptive approach in which each type of risk is considered individually. However, the integrated (area-specific) approach can lead to differences in the accepted level of risk, whereby another form of inconsistency is created.

Changing view of the role of government

The development of current risk policy coincided with that of the welfare state, in which the government takes significant responsibility for the well-being of the people. In recent years, however, the government has reviewed its role, opting to pass more responsibility to the individual and to the private sector. This changing role does not chime with the restrictive application of the concept of outright risk avoidance or 'due caution'. At the European level, the debate on risk management and the development of international standards (such as ISO 31010 and 26000³) has seen a marked shift from compliance to the acceptance of responsibility. Is current risk policy in keeping with the political desire to divide responsibility more evenly?

Risks of societal disruption

Is the government fully aware of the effects a disaster would have in terms of the disruption of society, and does it have a policy to address those effects? What would be the consequences if a storm of the same magnitude as Hurricane Katrina were to strike the Netherlands? The increasing interdependency between sectors has altered the degree to which society is vulnerable. The knock-on effects of a disaster in the physical domain could be extremely far-reaching. If, for example, the electricity supply fails, electronic payments are no longer possible whereupon there will also be serious economic consequences.

Incentives for innovation

Current policy does not do enough to encourage innovation. Whether a company is to be permitted to use the *Basisnet* system depends solely on the tonnage of a particular material it intends to transport, not the safety of the transport itself. Provided the company meets the minimum safety norms, it has absolutely no incentive to develop even safer transport. In fact, it is possible that safety provisions are aimed to meet the norm exactly rather than meeting it amply. Policies aimed at means rather than goals also fail to promote innovation. There is no structured approach to learning from past incidents or near-misses.

³ ISO 31010 is one of a series of relevant international standards: ISO 31000 (Risk Management Principles and Guidelines, 2009), NPR/ISO Guide 73 (Risk Management Terminology, 2009), and ISO/IEC 31010 (Risk Management – Risk Assessment Techniques). NEN/ISO 26000 is the Guide to Corporate Social Responsibility (2010), published by NEN (the Dutch standardisation institute) to assist organisations in fulfilling their reporting obligations.

Complex risk calculations and inadequate risk definition

Spatial planning decisions on the siting of high-risk activities or transport routes call for complex risk calculations. The models applied are based on an incomplete problem definition and fail to take moral considerations into account. A risk assessment based on such calculations does not have the required degree of transparency and creates only the illusion of certainty. Stakeholders regard such risk assessments as incomplete.

A broad characterisation of risks: the French model

France's external safety policy relies on a risk assessment methodology which uses so-called PPRTs: *Plans de Prévention des Risques Technologiques* (Technological Risk Prevention Plans). The system applies a broader set of risk characteristics and, compared to the Dutch approach, provides greater opportunity to take location-specific aspects into consideration.

1. The assessment of external safety relies on location-specific risk analyses, which form the basis for the safety assessment of premises on which high-risk activities are undertaken (or planned).
2. The 'incident scenarios' examine whether there is ample opportunity for emergency aid to be provided, and/or whether victims will be able to fend for themselves.
3. The risk analysis involves a classification of probability (the likelihood of an incident occurring) and effect. Both probability and effect can be expressed in quantitative, semi-quantitative or qualitative terms. In addition, the likelihood and effects of the scenarios are presented separately to the stakeholders.
4. When completing the PPRT, assessors examine the vulnerability of the area in question with the aid of local authorities and other local partners. Considerations include the risks for employees, the local population, and the environment. The area's status as cultural heritage is also taken into account.
5. There is a firm emphasis on consultation and dialogue. National government, the private sector and local authorities are all actively involved in the design of a PPRT, and all make a financial contribution to its production.
6. In principle, only the 'top tier' Seveso activities are included in the analyses.
7. A PPRT does not cover each individual high-risk business location but the area as a whole. It is therefore possible to plan disaster management resources (such as a water supply with which to extinguish fires and emergency service capacity) more effectively, and their availability is included in the assessment itself.

Source: Advisory Council on Hazardous Substances (2010) *Risicoberekening volgens voorschrift: een ritueel voor vergunningverlening*. The Hague

Principles and underlying values of risk policy

Various principles underpin risk policy⁴. First, there are the *constitutional principles* and *principles of good governance*. These include the 'duty of care' and the 'equality principle' whereby identical cases must be treated equally and divergent cases differently, according to the degree of divergence. These principles are not open to discussion; they form the very basis of our constitutional democracy.

Risk policy is also based on certain *policy principles*. On the one hand, these principles are based on society's perception of risk, while on the other, they rely on moral standpoints with regard to how our society should be structured. In other words, an optimistic society will design risk policy somewhat differently than a pessimistic society, while a society which attaches greater importance to liberty than to prosperity will be less inclined to support a paternalistic risk policy. Hence, policy principles are generally matters of political choice: there are neither facts nor arguments to

⁴ Roels, J.M., Maas, R.J.M., Beijl, R., Knol, A.B. & Ree, J. van der (2013). *Omgaan met normen in de Omgevingswet*. Bilthoven: RIVM. With the cooperation of H.C. Borgers (AT Osborne Legal). Report of a study conducted for the Ministry of Infrastructure and the Environment.

ascertain whether the fundamental risk perceptions and moral standpoints are fair and reasonable⁵.

Varying perceptions of risk

Risks are seldom certain. Their uncertainty may be due to the impossibility of identifying the potential effects or that of assessing the probability of the risk event occurring. Figure 1 shows Van Asselt's typology of the sources of uncertainty⁶.

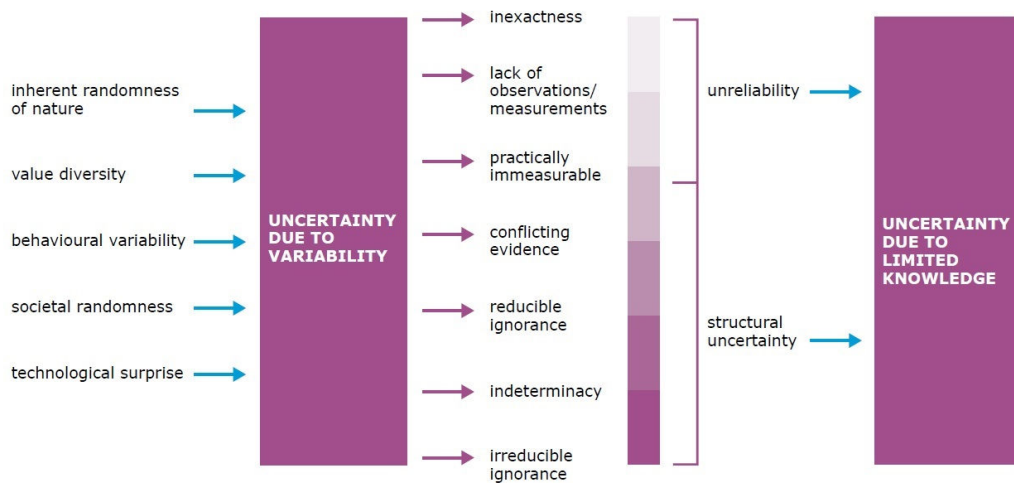


Figure 1: Sources of uncertainty with regard to risks: Van Asselt, 2000

This 'epistemological fog' is impenetrable even to the keen eye of science. People nevertheless hold certain expectations or beliefs as to what lurks within. Within the societal debate, four main schools of thought can be observed⁷.

- Optimism: The world is on our side and everything will turn out for the best. If anything does go wrong, we will cross that bridge when we come to it. Human ingenuity is great: solutions will present themselves, perhaps as innovations or technological advances. We shall find our way through the fog by trial and error.
- Pessimism: The world is a dangerous place. The system is vulnerable, and there is a very real chance of a disaster. We must not expect too much of technology: it merely creates new risks. Based on the 'precautionary principle', we must not enter the fog until we can see the way out.
- There is no 'epistemological fog': experts and scientists can always assess and quantify risks in a rational manner. They will find the best route by comparing the costs and returns. Innovation can be controlled.
- Fatalism: Whatever will be will be. It is out of our hands.



⁵ This should not be taken to mean that 'anything goes'. There are after all certain bounds which delimit 'reasonable' moral views. It may for instance be necessary to ascertain whether a person's moral views are internally consistent, or whether that person's theoretical opinions are in line with his or her moral intuitions in specific instances. It may also be necessary to examine whether his or her views on the desired structure of society are based on personal interests – a motive which may be masked by eloquent rhetoric. However, even stripped of rhetoric and vested interests, there may be fundamental differences in opinions, based on similarly fundamental differences in moral intuitions. Liberal egalitarianism, libertarianism and utilitarianism are all on the same 'egalitarian plane', to use the term coined by Kymlicka (2002), in the sense that people should be treated as moral equals when structuring society. See: Kymlicka, W. (2002) Contemporary Political Philosophy. An Introduction (2nd edition). Oxford: Oxford University Press.

⁶ Asselt, M.B.A. van (2000). Perceptives on uncertainty and risk: the PRIMA approach to decision support. Dordrecht: Kluwer Academic Publishers

⁷ Douglas, M. & Wildavsky, A.B. (1982). Risk and culture: an essay on the selection of technical and environmental dangers. Berkeley: University of California Press. The figures are taken from <http://riskviews.wordpress.com/category/cultural-theory-of-risk>.

Varying opinions regarding the most desirable societal structure

Alongside these fundamentally different perceptions of risk, there are also varying moral standpoints which will determine the most appropriate risk policy:

1. The best type of society is one in which people have greatest possible freedom to lead their own lives, provided doing so does not impinge upon the freedom of others (libertarianism / deontology).
2. The best type of society is one in which overall welfare and prosperity is maximised (utilitarianism).
3. The best type of society is one in which the least wealthy enjoy the best possible position (liberal egalitarianism / solidarity).

With regard to the first standpoint, we may state that anyone who embraces individual freedom rejects paternalism⁸. If people voluntarily expose themselves to risks, the government must not intervene. Where the risks are not of a voluntary nature, there are two possible and opposing routes:

- Involuntary risk is *never* permissible. Only when people consent to risks do they become voluntary, and hence justifiable. Those responsible for causing the risk must observe the precautionary principle and accept their duty of care. Should harm or damage occur without consent, compensation must be paid.
- The government should be cautious in regulating risks and uncertainties. Unless actual damage is shown to be inevitable, freedom of action supersedes the right to protection. Risks are, after all, not actual harm or damage. However, where damage does occur, compensation must be paid.

The second standpoint is held by those who seek maximum welfare and prosperity. They will have no objection to paternalism. If the government is better able to assess risks than the individual, it is entitled to take measures to protect the individual. The key consideration will be a costs-returns analysis: a project or activity is 'good' if the returns are greater than the costs to all stakeholders collectively. The only consideration is the overall benefit for society as a whole. In principle, individual rights and the division of wealth are irrelevant. Indeed, if individual rights stand in the way of maximising the welfare and prosperity of society, those individual rights can and should be overridden. According to this moral standpoint, the role of government is determined by efficiency. From the societal perspective, it will often be preferable for stakeholders to negotiate directly with private sector organisations with regard to risks and their acceptability. They usually have the best information. Where they have less information than the government, or where they are unable to bear the risks, the government must become involved.

Those who subscribe to the third standpoint focus on how the benefits and costs of the high-risk activities are to be divided. Is it the more vulnerable members of society who face the greatest risks? Is it those who live in the poorer areas alongside factories or railway lines used to transport hazardous materials? Are the risks being foisted upon people who are not in a position to object or defend themselves, such as the elderly, people in developing countries, or generations yet to come? Are nature and the environment at risk? A risk is often seen as acceptable if the activity concerned actually improves the lives of the less fortunate, either directly or through the redistribution of wealth.

Emotional reactions within the debate

As we have seen, risk perceptions and moral standpoints differ. As a result, the government's risk policy can evoke strong emotions. An emotional reaction to risk itself is not necessarily irrational but it can undermine the ability to take a fully rational approach based on moral considerations. This

⁸ Cf. John Stuart Mill's 'Harm Principle' which states: "[...] the sole end for which mankind are warranted, individually or collectively, in interfering with the liberty of action of any of their number is self-protection – the only purpose for which power can be rightfully exercised over any member of a civilised community, against his will, is to prevent harm to others, either by his action or inaction. The only part of the conduct of anyone for which he is amenable to society is that which concerns others. In the part which merely concerns himself, his independence is, of right, absolute. Over himself, over his own body and mind, the individual is sovereign." (On Liberty, 1865).

must therefore be taken into account within the political decision-making process and when identifying the moral aspects of high-risk technologies⁹. An apparent lack of risk acceptance may indicate an underlying conflict of values. A dialogue in which both the emotional reactions and the underlying values are brought into the open will lead to better decisions from the moral perspective. As a secondary effect, this type of dialogue will help experts and laypeople to better understand each other. Both will be more willing to seek acceptable compromises, to 'give and take', if they feel that they are being taken seriously.

Standpoints vary over time, between countries, and possibly between ministries and policy domains (Figure 2)

None of the risk perceptions or moral standpoints described above is any better or more 'correct' than the others in itself. However, governments and politicians attach varying weight to the standpoints over time. Figure 2 shows how thinking with regard to risk policy has developed.

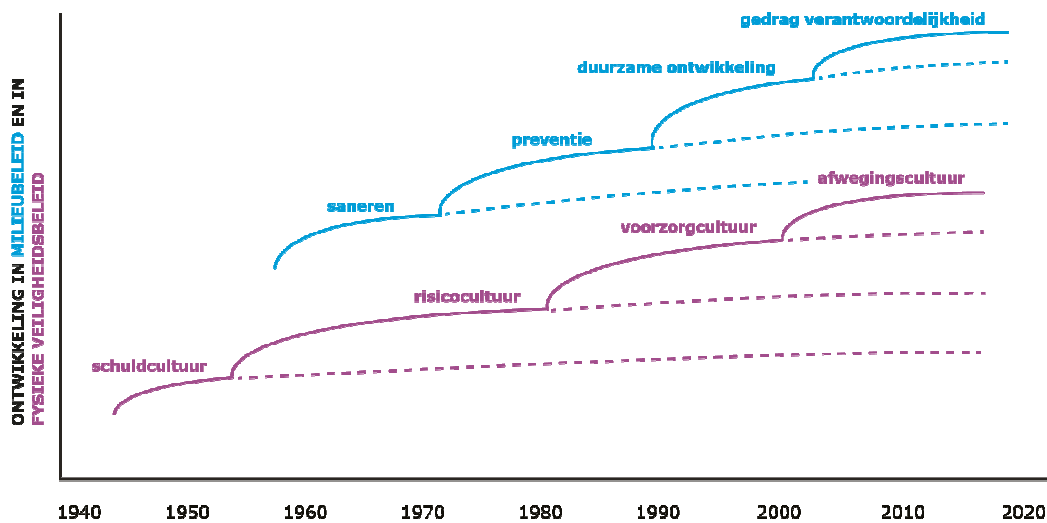


Figure 2: Development of environmental policy and physical safety policy¹⁰

The challenge is to develop a new risk policy which is based on current insights, and which does justice to the risk perceptions and moral standpoints described above. The 'caution culture' has gradually led to a situation in which the government was expected to ensure that citizens face absolutely no risk whatsoever. Today, given the changing role of government and the new division of responsibility between government and society, this is no longer the most dominant framework. People are gradually coming to realise that absolute safety – the absence of all risk – is impossible to achieve. Risks must be considered, both implicitly and explicitly, in any decision-making with regard to high-risk activities and the equitable distribution of their benefits and costs.

The technical and scientific basis for risk policy

Within the professional discipline of safety management, insights with regard to risk have also evolved over the years (Figure 3). The systems approach is now dominant, whereby a distinction is made between the technical and the organizational components of systems. For the purposes of risk assessment, it seems essential to examine all system components in combination. This insight is reflected by recent amendments to the international standards and norms (such as ISO 31010).

⁹ Roeser, S. (2013). *Risico, ethiek en emoties*. Delft: TU Delft. Inaugural address on taking up the Antoni van Leeuwenhoek Chair of Philosophy.

¹⁰ Pieterman, R. (2008). *De voorzorgcultuur: streven naar veiligheid in een wereld vol risico's en onzekerheden*. The Hague: Boom Juridische Uitgevers

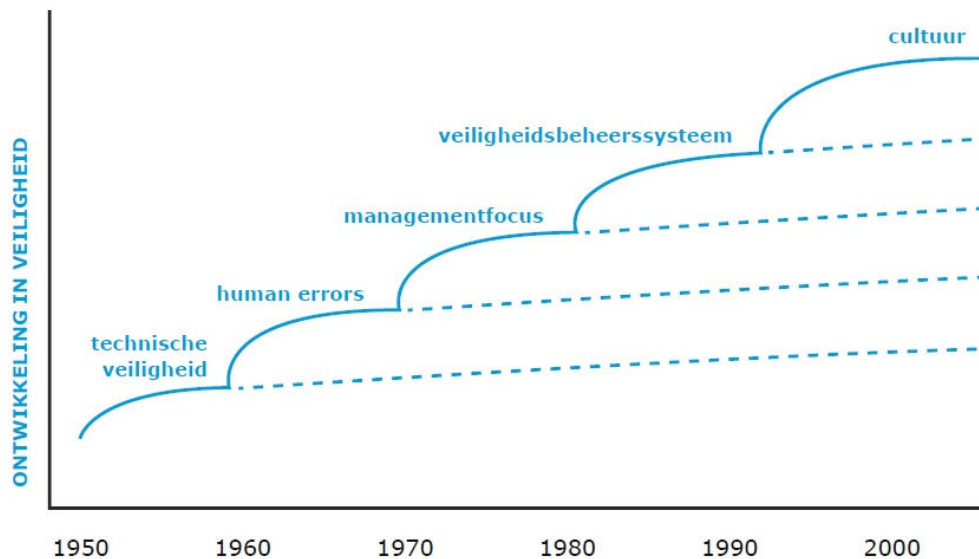


Figure 3: Development in safety¹¹

The interdependency of systems and the potential impact of an incident on critical infrastructure inevitably raise concerns¹². In view of this interdependency, current responsibility for risk management should now be subject to critical review.

Agenda points for a new risk policy

1. Enhance the consistency of risk policy by differentiating according to type of risk and by applying a broad characterisation.

Identical risks must be given equal treatment, and those which are not identical must be treated accordingly. Only when risks with similar characteristics are compared one against the other can we seek common threads and introduce consistency into the approach. Where differences can be explained, there need be no inconsistency.

In the Council's view, it will be appropriate to distinguish three main categories of risk:

1. Risks to the individual, covering acute as well as chronic health and safety risks
2. Risks to the environment (which could be further classified under the headings 'soil', 'groundwater', 'surface water', and 'nature')
3. Risks to society and the economy, with an emphasis on system-disruptive risks which may have an impact on the critical infrastructure

The differences between these categories are fundamental, whereupon there also will be differences in the risk assessment processes and the dialogue about the acceptability of risk. The ambition of achieving greater consistency in policy is therefore primarily concerned with consistency within each category. Where a risk falls into two or more categories (e.g. a risk to both human health and the environment), the different approaches must be combined in a single consideration.

¹¹ Source: Advisory Council on Hazardous Substances (2009). *Strategie in de kennisinfrastructuur voor veilige chemie en energie*. The Hague

¹² World Economic Forum (2014). *Global risks 2014: Ninth Edition. Insight report*. Geneva: World Economic Forum

Even within these categories, current risk assessment practice can produce results which are, or appear to be, inconsistent. The characterisation of risks now in use, based on the product of probability and effect, is too limited to explain the differences between risks. There have already been many calls for the adoption of a broader characterisation.

A separate description of probability and effects will be a valuable addition. It should be concerned with the nature of effects, such as nuisance, health impact, casualties, or the incapacitation of essential facilities, as well as their dynamic in terms of the speed with which the effects of an incident emerge and the necessary response time. There is a difference between an unpredictable incident (e.g. the explosion of an LPG tank) and one for which some prior warning might be expected (e.g. flooding). A careful analysis of the impact of an incident within one safety domain on other domains – the knock-on or domino effect – will help to establish the resilience of essential facilities and of society itself.

Other important considerations include whether the risk is voluntary, avoidable or can be influenced, and the division of benefits and costs. It is desirable for the government to define the various possible characteristics of a risk so that they can be assessed by means of a systematic and transparent process. It is also desirable for the government to develop a differentiated assessment framework which incorporates all the various characteristics.

Differentiation of policy according to risk category and risk characteristics will enhance consistency. However, complete consistency can never be achieved because there are differing views of what consistency entails (based in part on the varying risk perceptions and moral considerations with regard to the desired structure of society mentioned before). We may distinguish:

- Consistency in cost-effectiveness and proportionality
Although the social costs and returns cannot be established with certainty, greater attention should now be devoted to the proportionality of risk policy. For example, how do the government's efforts and investments to reduce flood risks compare to those concerned with the safety of hazardous materials in transit?¹³
- Consistency in justice and equity: equal treatment in equal cases
- Consistency in the sense that companies and individuals do not have to contend with conflicting rules and regulations, or with legislation which applies fundamentally different approaches

There may be circumstances in which the various types of consistency cannot be reconciled. The interests of cost-effectiveness may clash with those of achieving an equal level of risk for all individuals, for example. As more characteristics of the risk are taken into consideration, the options for an appropriate response also increase in number. It may become necessary to accept greater variation in the risks, or to devote extra effort and investment to the restriction of those risks. Such differences are legitimate insofar as they can be explained, and provided certain minimum requirements are met. Consistency should then be sought within a uniform procedure which is fully transparent to all stakeholders¹⁴.

Where inconsistency leads to actual conflicts, the government must be transparent in its choices, seeking means to distribute the benefits and costs more equally (see Point 3). Facilities should be created at the implementation level whereby practical solutions to conflicts or inconsistency within policy can be found: a 'complaints desk' or 'risk arbitrator', for example, to whom stakeholders can turn if they face conflicting government requirements.

¹³ One method which can be used to compare government expenditure in different policy domains is that proposed by Bjørn Lomborg in the Copenhagen Consensus project. See: <http://www.copenhagenconsensus.com>.

¹⁴ The report *Nuchter omgaan met risico's* ('A sober approach to risks', RIVM, 2003) notes that the choice of permissible risk levels and the degree of differentiation between them is very much a matter of policy choice. The risk assessment methodology should clearly reveal the rationale on which the differentiation is based.

2. *Introduce a new consultation process which involves stakeholders in all phases of decision-making about risk management.*

Public consultation in all phases of the decision-making process will result in a more balanced and more informed decision. It will also ensure a more representative picture of the various interests and standpoints of all citizens, rather than one which is confined to the views of the activists who attract most media attention.

- a. Consultation with citizens is essential in order to identify all characteristics of the risks, the appropriate indicators, and the system limits. Because people attach differing weight to risks and their effects, the perception of risks is always, to a certain degree, dependent on individual perspective. The perception becomes more subjective as the risks themselves become more uncertain. It is partly because risk perceptions and moral standpoints differ that government risk policy can evoke such strong reactions. Emotional responses are important indicators which must be taken into consideration in any policy decision-making with regard to high-risk technologies.
- b. Take advantage of the problem-solving ability of the 'crowd'. Engaged citizens can be a source of insights which have eluded the experts, perhaps because they have had more time to consider an issue in depth, or because they are most familiar with their own situation. Moreover, they are in a better position to think 'outside the box' because they lack the specialist knowledge required to think inside the box.

3. *Explore possibilities for a more equitable division of the benefits and costs of high-risk activities and for a more explicit consideration of the expected benefits against the possible risks.*

In current risk policy, the assessment of a risk's acceptability takes little account of the relationship between the benefits of the high-risk activity (to the party undertaking it) and the division of benefits and costs among those who are exposed to the risk. As a result, the government applies rigid numerical norms such as a 'maximum localised risk of 10^{-6} per year'.

The government could take a more flexible approach. First, it can join stakeholders in seeking solutions which are acceptable to all, and ensure that citizens who face disproportionately high risks are able to share the benefits of the activities which create those risks. This calls for the government to offer maximum transparency about the risks, including the degree of uncertainty they involve. We should not assume that those who bear the risks will automatically think of the common interests of society, and neither is it reasonable to expect them to do so. The transport of hazardous substances does serve certain national interests, as does the capture and storage of CO₂, but those interests should be weighed against those of the people at greatest risk: those who live in the risk zones. It is also appropriate to examine the desirability of raising the maximum risk level in specific zones to, say, 10^{-4} per year if the people affected are willing to accept a higher level of risk on a voluntary basis. It goes without saying that any such amendment must not shift the risks onto the more vulnerable members of society who are unable to express their opposition.

The current rigid norms are based in part on a historic and generic assessment of cumulative risks. A broader characterisation which devotes due attention to risk perceptions and to vulnerabilities within the specific situation may well justify the lowering of these norms.

4. *Make a clear distinction between risk avoidance and conditional risk acceptance by using clear language. The choice between the two approaches is, after all, a political one.*

People differ in their willingness to accept uncertain and unquantifiable risks. Some take the 'better safe than sorry' view, calling for the introduction of a high-risk activity to be deferred until more information is available, or demanding immediate protection against harmful effects before it is even ascertained that those effects will ever emerge.

This approach is dominant within European policy on genetically modified organisms, for example. It attempts to reduce risks to the greatest possible extent, but also prevents the potential societal benefits being realised.

Others favour the 'trial and error' approach. Activities should not be prohibited outright unless it is absolutely certain that they will have harmful effects. This approach should not be confused with recklessness. It too can involve due caution, whereby new knowledge is sought at every stage, the effects are carefully monitored, transparency is observed, and responsibility for process management is assigned to the appropriate parties who may also be required to provide financial indemnities. In assessing the acceptability of the risks of the proposed activities, a comparison with the risks posed by current alternatives can be made. The introduction of nanotechnology in the Netherlands would appear to rely on just such an approach, whereby it is decided to proceed with caution. As a result, the potential societal benefits of nanotechnology can be gleaned while it is accepted that adverse effects, as yet unknown, are possible.

Although the proponents of both approaches often regard their choice as entirely rational, this is not entirely the case. The choice depends on the subjective perceptions of risk and the moral standpoints with regard to the desired structure of society. In short, the choice is a *political* one. In their advisory reports, both the Health Council of the Netherlands and the Scientific Council for Government Policy have attempted to link the cautious 'trial and error' approach to the established precautionary principle¹⁵. The Council for Environment and Infrastructure regards this as inappropriate. When making political choices, it is important to use clear language. Taking cautious steps is not the same as avoiding taking any steps. The Council therefore recommends that the terms 'precaution' and 'precautionary' are never used in connection with the 'trial and error' approach.

5. *Encourage innovation*

Despite demographic and economic growth, various risks to health and safety have been reduced over time. Road safety has been improved, as has air quality (due to the control of emissions of particulate matter). Nevertheless, we must not rest on our laurels. The 'acceptable' level of risk is dynamic because:

- New knowledge and insights affect our view of what is and is not acceptable
- Technical innovation creates new possibilities but also raises new issues
- Spatial patterns and space usage are changing

The acceptability of a high-risk activity will always depend on the perceived benefits of that activity, set against the societal costs and the level of risk. Whether any further reduction of risk is proportional and desirable will depend on the costs of achieving that reduction in relation to the actual benefits. In this consideration, technological developments and increasing prosperity enable a higher level of safety to be achieved. However, current policy and its supporting instruments do little to encourage either private or public sector parties to engage in any ongoing pursuit of further risk reduction, as previously noted by the Council for Transport, Public Works and Water Management and the VROM Council in their joint report *Verantwoorde risico's, veilige ruimte* ('Responsible risks, safe space', Par. 3.6 and 4.2.1)¹⁶.

The councils further noted that, in the implementation of external safety policy, the quantitative norms indicating the maximum acceptable risk, such as a personal risk of 10^{-6} per year, were often applied in a very narrow manner in that activities would be permitted provided the norm was not exceeded. This effectively absolves the company concerned of its responsibility to observe the ALARA principle, whereby the risk level should be 'As Low As Reasonably Achievable'. The Council therefore advises that the responsibilities of parties undertaking high-risk activities are made more explicit within legislation. Alongside the more conscientious application of the ALARA principle, the potential value of the following instruments should be examined.

¹⁵ Health Council of the Netherlands (2008). *Voorzorg met rede*. The Hague; Scientific Council for Government Policy (2008). *Onzekere veiligheid: verantwoordelijkheden rond fysieke veiligheid*. The Hague

¹⁶ Council for Transport, Public Works and Water Management & VROM Council (2003). *Verantwoorde risico's, veilige ruimte*. The Hague

1. *Dynamic permits*
If permits allow greater opportunity for later amendment or review (e.g. every five or ten years), the issuing authorities will be able to impose stricter new requirements as necessary. The government must provide timely and transparent information about the conditions which apply to the renewal of the permit in order to ensure long-term continuity within the private sector.
2. *Phased objectives*
When establishing objectives and targets, future scenarios should be taken into consideration.
3. *Financial incentives such as a 'risk levy'*
To encourage a company or sector to reduce risks, it may be appropriate to introduce a tax or levy. A company responsible for restricting space usage due to its high-risk activities might be required to pay the relevant authorities a 'per unit' price or an amount which reflects the level of risk concerned. There is a parallel in the form of the charges which airlines pay to airport authorities, which are differentiated by aircraft type and acoustic emissions with a view to reducing noise contours.
4. *Mandatory financial indemnity*
Companies which engage in high-risk activities are legally liable for any harm or damage they may cause, compensation for which can be sought through the civil courts. A financial indemnity requirement as a permit condition will provide an additional incentive for the company concerned to accept and act upon its responsibilities with regard to risk management and risk reduction.

Transition towards a new risk policy

The agenda points set out in this advisory letter relate to a complete revision of risk policy. They are further to the discussions about the policy conducted over the past twenty years, and are in keeping with various changes now seen in practice.

Previous proposals have led to only minor amendments to policy. Why? First, the policy itself has long been based on a firm vision with regard to the identification and manageability of risks. That vision is embedded within the established institutes and the risk management methodologies. Another impediment to change is that any renewal of risk policy will result in two different approaches: one which applies to existing situations and one which applies to new situations. Without some encouragement, and in the absence of any feeling of urgency, it will be difficult to spur established institutions into action.

The Council therefore sees good reason to pursue a transition, the main objective of which is to introduce greater consistency to policy while also promoting 'cross-pollination' between the various policy and knowledge domains. It is necessary to create appropriate conditions for collaboration between experts in the various disciplines, whereby they are encouraged to apply the best knowledge from each discipline when developing the new risk policy.

The Council proposes a number of elements for a transition programme:

1. *Create urgency with regard to policy consistency with a regular re-evaluation of risk policy dossiers.*

The regular re-evaluation of policy is largely based on input from stakeholders within the specific knowledge or policy domains. In the Council's view, it will be preferable to establish joint commissions, with a mixed membership comprising experts and stakeholders from various risk domains.

There must be opportunity to allow new insights to be incorporated in the existing policy dossiers. This entails resisting the common tendency to demand immediate action and to view more regulation as the only solution. At the same time, it demands the ability to look beyond the deep-rooted ideas of the experts responsible for the current policy. The Council believes that the pursuit of greater consistency will involve addressing both the policy itself and its underlying rationale.

Consistency must then be assessed from each of the three perspectives: cost-effectiveness and proportionality, justice and equity, and uniformity within legislation.

2. *Draw on practical experience and identify inconsistencies through an arbitration process.*
Whenever some inconsistency in policy becomes apparent during the implementation process, it falls to the government to take appropriate measures. One possibility would be a form of arbitration, whereby in some cases it may be possible to avoid lengthy legal proceedings. The rulings of arbitration tribunals, and the experience gained through their use, should form a framework for further policy amendments which achieve the desired additional consistency.

3. *Draw a firm distinction between existing and new situations.*
It will be necessary to distinguish between existing situations and new situations. However, applying a radically different approach to each may hinder the smooth implementation of the new risk policy. Existing situations call for a phased introduction of the elements of that policy, and in some cases a remediation programme to create a 'clean slate' situation. It will also be necessary to apply the results of a Social Costs and Returns Analysis ('MKBA') differently in new and in existing situations. It will be possible to explain and justify the differences between the two types of situation in the context of phased development and permanent improvement, whereupon those differences can be reconciled with consistency in policy.

4. *Create greater opportunity for administrative assessment and discretion.*
The agenda points proposed by the Council call for greater opportunity for administrative discretion. That opportunity can be created by the manner in which norms are established within the legislation. The Council recommends that further study is conducted to determine the parameters of the discretion to be permitted and to ensure transparency.

Other means by which the required flexibility can be created include:

- Procedural agreements, whereby the challenge is to ensure that public consultation takes place within the decision-making process in a transparent manner, alongside or as part of instruments such as Social Costs and Returns Analyses and Quantitative Risk Analyses
- Experiments, whereby solutions are sought within actual situations, including solutions relating to the fair division of benefits and costs

5. *Facilitate the transition by means of a knowledge programme.*
In the Council's view, it will be appropriate to facilitate the required transition by means of a knowledge or research programme which will provide direction for the proposed policy renewal and its implementation. The process calls for ingrained knowledge and methods to be reappraised, and for the existing programmes and disciplines to be combined. The themes to be addressed by such a knowledge programme might include:

- The role of emotion in the assessment of risk
- The manner in which benefits and costs can be evenly divided, including the possibility and desirability of compensation payments
- Incentives for innovation

RESPONSIBILITY AND ACKNOWLEDGEMENT

About the Council for the Environment and Infrastructure

The Council for the Environment and Infrastructure (*Raad voor de Leefomgeving en Infrastructuur*, Rli) advises the Dutch government and Parliament on strategic issues concerning the sustainable development of the living and working environment. The Council is independent, and offers solicited and unsolicited advice on long-term issues of strategic importance to the Netherlands. Through its integrated approach and strategic advice, the Council strives to provide greater depth and breadth to the political and social debate, and to improve the quality of decision-making processes.

Composition of the Council

Henry Meijdam, Chair
Agnes van Ardenne – van der Hoeven
Marjolein Demmers, MBA
Eelco Dykstra, MD
Léon Frissen
Jan Jaap de Graeff
Prof. Dr Pieter Hooimeijer
Prof. Niels Koeman
MARIKE van Lier Lels
Prof. Dr Gerrit Meester
Annemieke Nijhof, MBA
Prof. Dr Wouter Vanstiphout

Composition of the advisory committee

Eelco Dykstra, MD
MARIKE van Lier Lels
Annemieke Nijhof, MBA, Chair

Composition of the project team

Dr M.D. Davidson
F.W. de Haan, Project Leader
Y.M. Oostendorp
B.B.W. Thorborg
C.I.A. de Vries, BC

Experts and reviewers consulted

Expert meeting of 19 and 20 March 2014

Dr M.T.M. Bosman, Ministry of Infrastructure and the Environment
A.D.M. Duindam, Province of Zuid-Holland
Prof. N.D. van Egmond, Utrecht University
Prof. P.H.A.J.M. van Gelder, Delft University of Technology
Dr P.J.M. de Goede, Scientific Council for Government Policy (WRR)
M. Groenewold, Msc., Ministry of Infrastructure and the Environment
Prof. Emer. H. van Gunsteren, Leiden University
M.M. de Hoog, DCMR
R.M. Kiès, Association of Provinces of the Netherlands (IPO)
Prof. J.A. Knottnerus, Scientific Council for Government Policy (WRR)
Dr A.G. Muntendam-Bos, State Supervision of Mines (SODM)
Prof. H.J. Pasman, Texas A&M University
Dr R. Pieterman, Erasmus University Rotterdam
C.M. Pietersen, Safety Solutions Consultants BV
Dr M.T.M. van Raaij, National Institute for Public Health and the Environment (RIVM)
A. van der Rest, Shell Netherlands B.V.

Dr J.M. Roels, National Institute for Public Health and the Environment (RIVM)
Prof. S. Roeser, Delft University of Technology
Prof. E.M. Steg, University of Groningen

Departmental consultations:

A.J. Arbouw, Ministry of Infrastructure and the Environment
Dr D.W.G. Jung, Ministry of Infrastructure and the Environment
C.B.F. Kuijpers, Ministry of Infrastructure and the Environment

External reviewer

Prof. I. Helsloot, Radboud University Nijmegen

Other

Editorial recommendations: Catherine Gudde, Paradigma Producties
Translation: DBF Communicatie, Alphen aan den Rijn

RLI publication 2014/06

June 2014