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**Comparison of Approaches to Risk Governance**  
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**RISK GOVERNANCE**  
**DISCUSSION DOCUMENT**

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## ***1. Introduction***

Societal decisions in many areas, such as energy production, genetic testing, stem cell research, food safety or carbon dioxide disposal, include factual and value-laden elements of both risks and benefits. In all decisions, positive and negative factors have to be taken into account and be weighted against each other. These issues are of technical and scientific character and reflect social concerns and potential major democratic challenges. It is critical that they are met not by technocratic decision-making. It is equally important that discussions about increased transparency and participation does not make the same clear separation between facts and values as is assumed within a technocratic view.

Indeed, increased openness, public participation and transparency are all put forward as crucial for decision-making today. However, the increasing complexity of today's society, and decision-making processes and a heightened concern for how both public and private organizations perform, make the issues of transparency and participation complicated. Pressure on public administration as well as corporations to be open and transparent may lead to a greater focus on 'how to make things right' rather than on 'how to make the right thing'. The decision-making context is not only set up by internal negotiations of how to translate expert knowledge into policy, but also by stakeholder pressure groups and extensive media coverage. The seemingly unlimited availability of information on the Internet and the continuous information flow in TV channels does not make it easier for the layman to get insight and clarity.

In the domain of ***risk governance***, these problems are very relevant, first of all since the concept of risk itself is differently understood among various groups in society. Moreover, in many cases the risks of new technologies are discovered and fully understood not until the technologies have been implemented and established in the market economy. The increasing understanding of this mechanism of delay in risk identification is one reason for the introduction of the precautionary principle as a means to reduce risks.

But risk management may also create new risks. The critique against a technocratic view was first discussed as a problem *within* risk analysis. Public perceptions of risk were seen as a challenge to how risk was defined and approached by technical and calculative means. From the mid-1990s, however, there has been a shift from this internal focus to the broader question of the legitimacy of government. Michael Power (2007) denotes this shift as a shift from risk analysis to risk governance. The "governing gaze" has shifted from how risk is defined, analysed and calculated to the governance of the organisations that analyse risk. Among other things this shift implies that organisations may see public perceptions *as sources of risk*, in that they could pose a threat to the legitimacy and stability of existing ways of governing risk.

The point of departure for the CARGO project is that there is a need for more knowledge about the governance of risk. We compare three approaches to risk governance by using a number of example areas, we explore how risk governance can be made transparent to decision makers and the general public, and we arrive at recommendations for a comprehensive risk governance strategy.

The management of risk is an issue of concern at the highest political level. For example, in the UK, Her Majesty's Treasury (2005), has published an appraisal guidance for managing risks to the public. The document provides guidance for developing and assessing proposals that affect the risk of fatalities, injury and other harms to the public. It confirms that communication, public involvement, and risk management should be integrated into the decision-making process at an early stage. There is also a commitment that government will explain how views obtained through consultation have been reflected in its decisions. A great deal of the document is devoted to the management of public involvement - especially there is an appendix that sets out a framework for understanding peoples concerns.

Also at the level of the European Union and on the global scale risk management principles are being discussed and used in guidance, EU Directives and international conventions. There can thus hardly be any more relevant topic for policy makers than the comparison and integration of risk management approaches.

Three work packages of the CARGO project represent three approaches to risk governance. Risk informed decision making is more based on quantitative assessments than the other two. The precaution and risk reduction approaches involve both qualitative (value – laden and ethical) principles and more traditional risk assessment. The deliberative approach refers to processes aiming to include lay people in discussions over science and technology and risk.

## 2. *Risk informed decision making*

Risk informed decision-making relies on quantitative risk assessment (QRA) which is a systematic methodology for the application of a mathematical construct of risk. It tries to identify all possible events that can lead to an undesired end state, thus evaluating an overall estimate of risk for the system being analyzed (e.g. a nuclear reactor). The QRA is a powerful instrument for finding risk dominant sequences in technical systems which then can be taken care of to prevent the sequences to occur. QRA is best suited for large technical systems where the failure probabilities of the components in the system can be estimated with relatively large certainty.

In spite of limitations in completeness, ability to assign probabilities and consequence analysis, QRA has enjoyed great success in nuclear safety. The confidence in the QRA method grew to the extent that the NRC established a policy for implementing *risk-informed regulation* in the 1995 policy statement on the use of quantitative risk assessment (QRA) methods in nuclear regulatory activities (Nuclear Regulatory Commission, 1995)

It is important to realize what differs *the risk-informed* approach to decision making from a *risk-based* approach in which a safety decision is solely based on the numerical results of risk assessment. This would place heavier reliance on risk assessment results than is practicable. However, in spite of its success story as part of reactor safety work, also risk-informed decision making using QRA as an important element has limitations when it comes to decisions on the political level, e.g. concerning the use of nuclear power as compared to other energy sources or the siting of reactor power plants. For these decisions, the mathematical construct of risk is not sufficient. Other dimensions in a more comprehensive risk assessment which takes into account social and perceptive factors then enter the scene. For example the risk from nuclear power as calculated with QRA techniques may be lower than for many other energy sources. In addition, nuclear power is environmentally clean during normal operation. However, the consequences of a severe accident, whatever low probability it may have, are still severe. The potential harm may thus outweigh the QRA risk in policy making.

The concept of risk informed decision making implies that different risks can be compared. To what extent is that possible? As human beings, we take risky decisions all the time, from the hour we get up in the morning until we fall asleep. Those of us who smoke cigarettes take risks on a well informed basis. Driving our car or to taking a ride on our motorcycle are also quite well informed risky decisions (in these cases risk is also directly measurable by the size of our insurance premium). On a societal level, annual individual occupational risks are other well known statistical facts, although as individuals we may not have the same freedom to avoid them as we have for avoiding risks associated with smoking, driving motorcycles or mounting climbing. Certain risks, notably the probability of dying as a result of certain activities, are thus statistically well known. And, as we have seen, QRA methods can often help in quantifying risks and providing information on how they can be reduced.

### 3. *Precaution and risk reduction*

The precautionary principle comes into force when there are possible serious risks with large scientific uncertainty. The precautionary principle is listed as Principle 15 of the Rio Declaration of 1992 among the principles of general rights and obligations of national authorities<sup>1</sup>:

*"In order to protect the environment, the precautionary approach should be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".*

Since 1992, the principle has been implemented in various environmental instruments for areas such as global climate change, ozone depleting substances and biodiversity conservation. It is action oriented meaning that persistent dissent among scientists can not be taken as an excuse not to take action.

The precautionary principle as cited above deals with protection of the environment, however, in different forms it is used in many other areas, especially in human health protection. The principle is the subject for much deliberation and controversy on the philosophical level but also when it comes to practical applications in specific areas. Often the battle goes on between industry wanting to introduce a new technology and opposing groups using the precautionary principle as an argument for a moratorium until more is known about uncertain risks. Typically, regulatory authorities find themselves being on the frontline between these two major stakeholder groups. They have to make decisions based on scientific evidence but they also need to take public values into account.

It can be argued that the precautionary principle is no longer action oriented, but instead it can be used to prevent the introduction of any new technology without any real factual reason. And can it be justified, for example, to use the mere existence of public concern as a reason for precautionary measures when there is no real risk at hand? Another problem is that the application of the principle can be taken over by scientists and regulators. Then it may become just another tool in technocratic risk assessment. People with a pure scientific approach want to see that there is a substantial risk before they take action. The probability is high that they use the mathematical construct of risk, furthermore narrowly defined to a specific type of risk. The dimensions of social values and ethics are then lost.

Regardless of different interpretations of the precautionary principle, a common ground is that the absence of proof of a risk is not reason enough *not* to take precautions. But to trigger the precautionary principle there should be an *indication* for a possible risk. An important issue for discussion is often how strong the indications should need to be for the precautionary principle to be triggered. There is no obvious way to judge whether the authorities apply the precautionary principle in a correct manner. Therefore, there is reason to require that the authorities make transparent on what grounds they apply the principle, scientifically as well as value-based.

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<sup>1</sup> Agenda 21 (1992): *Agenda 21 and the UNCED Proceedings*, vol 1. Ed. by Nicholas Robinson. New York

The politicians need to understand that it is not enough to have established the precautionary principle for environmental protection and public health. They have to take continued responsibility for the application of the principle in all policy areas, for the very simple reason that it is their responsibility to determine what the relevant risks are. The European Commission has made it perfectly clear where the expert role ends and where political responsibility takes over (European Commission, 2000, p 2):

*The precautionary principle should be considered within a structured approach to the analysis of risk which comprises three elements: risk assessment, risk management, risk communication. The precautionary principle is particularly relevant to the management of risk*

And further on (ibid, p3):

*The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty.*

*Decision-makers need to be aware of the degree of uncertainty attached to the results of the evaluation of the available scientific information. Judging what is an "acceptable" level of risk for society is an eminently **political** responsibility. Decision-makers faced with an unacceptable risk, scientific uncertainty and public concerns have a duty to find answers. Therefore, all these factors have to be taken into consideration.*

The Commission also states that “The decision-making procedure should be transparent and should involve as early as possible and to the extent reasonably possible all interested parties” (ibid, p3).

The precautionary principle is not thought to replace risk informed decision-making, but to be used when it cannot be applied because of too much scientific uncertainty (provided there is a threat of serious or irreversible damage). The need for insight and transparency as a prerequisite for high quality decisions goes for application of the precautionary principle as well. On the factual side, we need to evaluate the scientific status of the area to see if the requirement of scientific uncertainty is fulfilled. On the value-laden side we need to evaluate the nature of the threat and compare it with some sort of standard in order to decide if action shall be taken or not. Such standards have a normative character and can not be set by science alone. For example, for the GMO case one can identify at least three possible standards: reduction of biodiversity, comparison with conventional agricultural practices and compatibility with sustainable agricultural practice. Divergence with any of these standards could set the precautionary principle into action. Which one of them (if any, or which combination of them) to use is, however, a matter of societal values and politics.

#### 4. *Risk deliberation*

There are three rationales for the desirability of public involvement in risk governance. The first rationale is *ethical* and means that citizens have the right to be involved in decisions that concerns them. In other words, we should respect our citizens' right for self-determination and autonomy. The second rationale is *instrumental*. This means that public involvement is assumed to mitigate conflicts and aid strategies for the presentation and implementation of a decision. The third rationale concerns *knowledge*. The public should be involved because citizens have knowledge, which is different from the knowledge of experts and politicians. This lay-knowledge is often of essential importance for the issue considered, at least it means that the knowledge base becomes wider. This could concern local residents' knowledge of the local environment, as well as the provision of diverse social knowledges, values and meaning which could inform critical discussions about how issues are framed etc.

Public deliberation has been suggested as a remedy to a range of structural problems that are associated with aggregative and inflexible forms of decision-making. It is assumed that by making democratic institutions more deliberative, a 'democracy deficit', expressed in voter numbers in decline and increased mistrust in public institutions, can be overcome. What is perceived as 'good risk governance' in the EU is explicitly announced to involve deliberative participatory elements. For example, the European Commission's white paper on European Governance (CEC 2001a:3) proposes that good governance implies that "more people and organisations are involved in shaping and delivering EU policy". This includes efforts to democratising expertise, to improve access and participation and to involve relevant stakeholders at every stage of the process, from the "identification of risks to the evaluation of policies intended to manage them" (CEC 2001b: 25). Thus, making risk regulation decision-making processes more deliberative is mainly about making them more inclusive, "questions normally seen as the province of experts and functionaries, lobbyists and politicians, must somehow be brought before the public at large for comment, debate, and in some cases, resolution" (Whiteside 2006:118).

Deliberative risk governance may sound as an adequate response to calls for a remedy to democracy deficits as well as too narrow technocratic approaches to risk. It is important however not to confuse public deliberation as a *social phenomenon*, which may take many forms, with public deliberation as a *policy tool*, which is always framed around particular issues and objectives (cf. Plows 2007). Policy tools will always be imperfect and have undesired and unanticipated side effects, and perhaps more importantly, they will always be connected to a particular political economy.

For example, when nuclear power was discussed in the 1970s and when GM crops were debated in the 1990s, both issues were connected to powerful science communities before public discussions were generated. However, the issues arose in very different circumstances. The state had a more central role in the 1970s nuclear power debate. Three decades later, the state's role has changed, policies emerge and are formed within transnational networks and science and technology are seen as important means for competition on a globalised market.

Such changes pose new challenges to public deliberation and the policy tools aiming to stimulate public engagement and debate need to be understood in relation to such changes.

In many European countries, seeking lay views to inform complex technical and scientific decisions has become political orthodoxy, and it is to increase ‘public participation’ in science and technology policies that the most innovative instruments of consultations are being devised today. This new centrality of “the public” has been accompanied by the growth of a veritable industry, one that employs different techniques of elicitation – the opinion poll, the focus group, the citizens’ jury, etc – to generate and process the views and opinions of different publics and feed them into the policy-making process.

One aspect of participation is the emergence of a new type of expertise employed to organise, conduct and make claims on behalf of various groups of the public. The public consultations in the GM nation project in the UK is a case that can inform us about this new type of expertise and the role of citizens in decisions over complex technologies. Another aspect is *the conduct of the conduct* of public consultations. By this we mean the organization of the communication of models used for deliberation and transparency and how legitimate constituencies of the public are constructed through the use of such models.

For instance, in the GM Nation Public Debate, the distinction between ‘stakeholders’ and the ‘general public’ became an important topic and the main challenge for the organizers, since the aim was to reach ‘ordinary people’ without preconceived views. This interest in the opinions of reticent publics and ‘hard to hear’ constituencies seem to be valuable commodities in the policy-making process; listening attentively to *silent* majorities is now a main occupation and preoccupation of governments. This ambition is today most intense, perhaps paradoxically, in policy areas that have traditionally been the domain of experts and unaccountable professionals.

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<sup>2</sup> This was pointed out in a presentation by Robin Grove-White, emeritus professor, Lancaster University, at *People Power? A workshop on science, participation and politics*, Demos, London 20 November 2007.

## 5. *Combining different approaches to risk governance*

There are many potential gains with approaches that combine risk-informed decision making, precaution and public deliberation. In a combined approach, public deliberations could contribute with a reflection over the framing conditions of technical approaches to risk. Exposing technological elites to discussion with publics can enlarge their thinking and make them reflect on the limitations of their methods, what aspects of an issue that they cover and what aspects they leave out. Participatory deliberations on risk related issues could be used to open up issues for debate, in order to decide in what direction (and when) they should be closed down.

With these three strategies as a starting point Andreas Klinke and Ortwin Renn (2002) have offered a classification of risk types and argue that some strategies for risk management are better for some types of risks. In what they call an “analytical-deliberative approach”<sup>3</sup>, they argue that the extents to which deliberation and analysis are needed are dependent on which type of risk we are dealing with. Further, while they make a distinction between three risk management strategies – risk-based, precautionary and deliberative approaches – they argue that deliberation is an important feature of all three approaches, and that deliberation take the form of different types of discourse that are connected to the three approaches. Equally well, however, one can argue that there is an element of risk informed decision making in deliberation as well as in precaution.

### **Opening up versus closing down**

Instead of relying on the dichotomy between analytical expert-based approaches and more open and flexible participatory approaches Stirling suggests that we look at distinctions that are crosscutting and that may be equally relevant to both. One such crosscutting distinction is that between *opening up* or *closing down* the process of technological choice.

When the social appraisal process is about closing down the aim is instrumentally to assist policy-making: “Whether analytical or participatory, the role of social appraisal process lies in cutting through the messy, intractable and conflict-prone diversity of interests and perspectives to develop a clear authoritative, prescriptive recommendation to inform decisions” (Stirling 2005:228). The outcome of a process aiming to close down, is a *unitary and prescriptive* policy advice, and it involves only a small number of choices or courses of action to be explored, which appear as favourable in the light of how the process has been framed.

When the social appraisal process is about opening up the process of technological choice, the aim is to explore a wide range of possibilities, and the outcome is rather a *plural and conditional* advice. It involves a systematic exploration of how framing conditions relate to

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<sup>3</sup> The term ‘analytic-deliberative’ was coined to describe processes able to reconcile technocratic and citizen-centric approaches to risk. ‘Analytic’ refers to scientific and technological data/methods of risk assessment and ‘deliberation’ refers to inclusive participatory communication processes (Stern and Fineberg 1996, in Burgess et al 2007:300).

“the real world of divergent contexts, public constituencies, disciplinary perspectives and stakeholder interests” (ibid:229).

The distinction between opening up, expand and enrich the scope of the debate, or closing down issues and policy options is not directly related to certain methods. For instance, the consensus conference in the Danish context aims to open up discussions over technology and enrich the political debate, and sometimes this works, when issues dealt with in a consensus conference are taken up in discussions in the parliament, for example. The same opening up approach can be used in the US-style consensus conferences, which is less participatory and inclusive. Focus groups can also be used in either opening-up or closing-down approaches, depending on how the results are presented and fed into a debate.

### **Deliberation in a pluralist society?**

The barriers to deliberative approaches to risk governance should not be neglected. Kerry Whiteside (2006) points out that democracies today are more pluralist than deliberative, Even though this may be more prevalent in the United States than in Europe, pluralist aspects of democracy can counteract deliberative qualities, also within European countries. While a deliberative approach would be based on an ethos of seeking the common good and the better argument, a pluralist society is based on trade-offs among interest groups: it is “short-term electoral advantage that comes to the fore in pluralist decision-making, not the long-term environmental consequences. Political mobilization usually occurs around visible problems affecting clearly identifiable victims, seldom around invisible, slowly accumulating dangers” (Whiteside 2006:132f). Whiteside argues that pluralist democracies can combine some aspects of deliberation and precaution, for example by encouraging wider rather than narrower participation, and to create legal structures that supports preventive policies. Similar to Dryzek et al (2007) he points to the importance of institutions for participatory technology assessment, like the Danish Technology Board, and elsewhere in Europe.

Existing institutions for participatory technology assessment, depending on organisational factors, resources etc., differ in their capacity to combine different approaches to risk. What Dryzek et al. (2007) emphasise as crucial for successful (‘successful’ in terms of its ability to produce more legitimate and informed decision) public deliberations on risk is the prevailing discourse on how to balance between economic growth and environmental protection. In societies in which environmental protection and economic growth are seen as mutually reinforcing as opposed to the tendency that economic concerns override ecological concerns, the conditions for combined approaches are better than when this is not the case.

In the case of the precautionary principle, the European Commission (2000, p2) takes sides against technocratic risk management and emphasizes the role of politicians not only in the management of risk but also in making it transparent and participatory. In practice, however, the question is whether the political system has really understood what this requires and if it has the muscles to live up to its responsibility. In order to manage risk using the results of risk assessment politicians need to see if the assessment rests on technocratic assumptions about what is worth assessing, which questions need answers and if scientific controversy has been appropriately included in the assessment. It may well be the case that the risk assessment has excluded research deviating from the main stream and thus outframed the real meaning of the precautionary principle from the beginning.



## What makes a risk unacceptable?

Legislation usually stipulates that measures must be taken to mitigate those risks that are regarded as “unacceptable”. Similarly, the presence of trivial risks is accepted as a matter of course. The issue is then what approaches are used in mitigating the non-trivial risks, which fall into the “grey area” where a balance needs to be reached between risks, costs and benefits, and other wider decision criteria. For substances identified as potentially damaging, a range of regulatory controls exists at both national and international levels. The approaches adopted in setting such controls vary across countries and regulatory agencies. In some countries, regulation is based on a precautionary stance, which requires that risks be minimized if the causes and mechanisms are unknown when human health or the environment is under threat. In the extreme, such an approach implies that many hazardous chemicals and activities are considered unacceptable because of the uncertain nature of associated risks. This type of approach to the management of chemical risks may neglect the benefits that the chemicals could confer on society. A less strict interpretation of the precautionary principle stresses the cost of taking precautionary measures. Other approaches to risk reduction are technology-led. For example, they can be based on the concepts of making emissions “as low as reasonably practicable” or the use of “best available techniques not entailing excessive costs”. Both these concepts recognize, at least implicitly, that a balance should be found between the costs involved in reducing risks and the benefits gained from risk reductions. To find the balance point is a matter of values and thus a political task.

Although there is wide consensus about the limits of acceptable and unacceptable risks, the practical applications of risk management differ significantly between different countries. In particular, the extent to which QRA has gained acceptance in addressing major accident hazards varies between industries. Within Europe some regulators are quite enthusiastic requiring QRA studies by law, e.g. the UK and the Netherlands. Other countries, e.g. France and Germany, prefer a consequence based approach. The Netherlands has a clearly defined policy on the maximum levels of risk that are acceptable in land-use decisions (a risk informed approach). In Germany, deterministic approaches are extensively used in the chemical process industry to demonstrate the quality of measures taken to avoid risk inside and outside the installation.

## The politics

In the end, many matters are subject for political decisions which in a sense certainly means closing them down. The quality of these decisions should be higher if there has been a phase of deliberate opening-up, and a phase of challenging all arguments with the objective to enhance awareness both by the politicians and the general public.

Concerns about the lack of trust in societal institutions has made EU institutions as well as member countries convinced that citizens should be more involved in the decision processes. The Plan D<sup>4</sup> of the European Commission as well as the White Paper on Communication<sup>5</sup> are visible expressions of commitment in this direction, as well as the European Transparency

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<sup>4</sup> The Commission’s contribution to the period of reflection and beyond: Plan-D for Democracy, Dialogue and Debate COM(2005) 494

<sup>5</sup> White Paper on A European Communication Policy. COM(2006) 35

Initiative<sup>6</sup>. However, we believe that these initiatives by the Commission as well as participatory processes developed in member states need to be complemented with new arenas that provide transparency, awareness and accountability in the policy making process.

Areas such as nanotechnology, biotechnology, synthetic biology, food safety, sustainable energy production and security have a high technological and scientific content, however, they also contain social concerns, ethical aspects and major democratic challenges. It is thus critical that politicians and citizens get insight so that societal decisions are made with awareness. Ideally, efforts to provide such insight need to take place early in the decision-making process, before actual decisions are taken inside the political parties. This is crucial since other actors (industry, academia and NGO:s) take position already at an early stage. They will then do what they can to influence politicians by all means available.

Politicians are exposed to a market of arguments, often without appropriate means for challenging the arguments made by various stakeholders. Early narrow framing leads to a decision-making basis that may be insufficient, or even irrelevant, for the political decisions, resulting in frustration and inability to solve important societal problems. A more active early political involvement should help avoiding such situations.

These considerations lead us to a number of critical questions with regard to expert advice (risk informed decision making), precaution and citizen involvement:

- What is the role of expertise? Could there be values hidden in expert investigations? In that case – how shall we deal with it?
- What do principles of sustainable development and precaution mean in practical application - what are the roles of expertise and politics? What is the role of deliberation?
- What is the role of deliberation in a representative democracy?
- How can stakeholders and the general public get the same level of democratic insight?
- How can transparency be achieved? What is the role of participation and deliberation?
- How should the interface between science and politics be formed?

These and other issues will be debated at the CARGO meeting on February 11, 2008, before the final CARGO report is written.

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<sup>6</sup> European Transparency Initiative. Green Paper. COM(2006) 194

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